











NOVITATES ZOOLOGICAE.

VOL. XXII., 1915.





# NOVITATES ZOOLOGICAE.

A Journal of Zoology

*IN CONNECTION WITH THE TRING MUSEUM.*

EDITED BY

LORD ROTHSCHILD, F.R.S., PH.D.,

DR. ERNST HARTERT, AND DR. K. JORDAN.

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*(WITH SEVENTY-SIX PLATES.)*

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No. 4, containing pages 443—475 and i—viii, issued February 29th, 1916.

## ERRATA.

(See also page 442.)

Page 135, No. 216, locality should read “Manusela.”

„ 191, line 3 from top, generic name should read “Ptychopoda.”

„ 206, line 7 from top, specific name should read “*iphigenia*.”

„ 261, No. 119, generic name should read “*Pyromelana*.”

„ 428, line 22 from top, read “*phantastica*” instead of “*phantasticus*.”

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No. 1.

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WALTER ROTHSCHILD, ERNST HARTERT, and KARL JORDAN.

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FEBRUARY 1915.

No. 1.

EXPÉDITION DE MM. WALTER ROTHSCHILD, E. HARTERT  
ET C. HILGERT DANS LE SUD ALGÉRIEN (MARS—MAI 1914).

## NÉMATODES PARASITES.

PAR L. G. SEURAT.

L'HON. WALTER ROTHSCHILD et M. E. HARTERT ont bien voulu nous confier l'étude des Nématodes recueillis lors de leur dernière expédition dans le Sud Algérien.

La collection qui m'a été remise comprend trois formes nouvelles, dont l'une constitue le type d'un genre nouveau de la grande famille des *Spiruridae*. Comme on le verra par la lecture de ce travail, ce nouveau genre permet de relier les *Habronema*, groupe central de la famille, aux formes les plus primitives pour lesquelles nous avons créé récemment le genre *Protospirura*.

Les Filaires d'Oiseaux, représentées par de nombreux spécimens, se rangent dans trois espèces déjà connues. Il nous a paru néanmoins nécessaire de reprendre entièrement la description de ces formes, dont l'étude anatomique est indispensable.

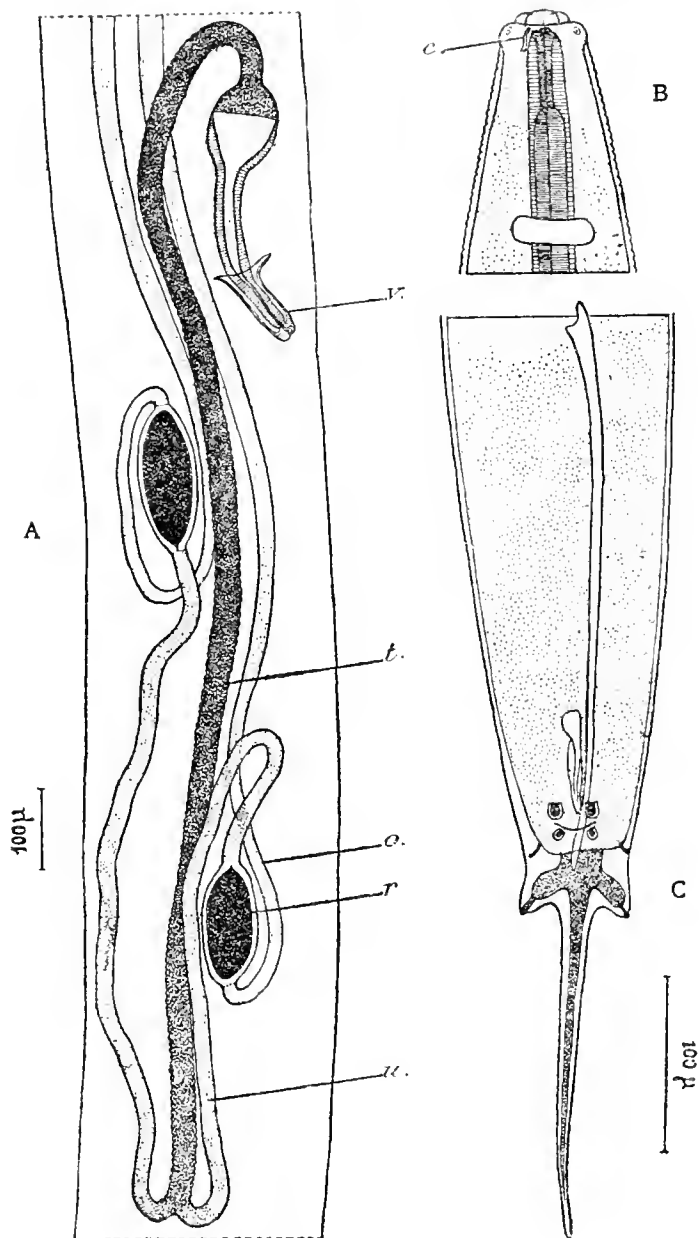
## FAM. OXYURIDÆ.

### 1. *Oxyuris hilgerti* n. sp.

Corps fusiforme, renflé vers le tiers antérieur, atténué aux extrémités, plus particulièrement vers l'arrière. Cuticule striée transversalement, à stries espacées de  $14\mu$ . Pas d'ailes latérales. Cellules musculaires losangiques, de  $800\mu$  de longueur.

Bouche limitée par trois lèvres, une dorsale et deux latéro-ventrales; trois papilles sur le cadre buccal, correspondant à chacune des lèvres. Cavité buccale très courte; œsophage terminé par un bulbe à appareil denticulaire, dont il est séparé par un léger étranglement. Intestin plus large, à son origine, que le bulbe. Deux glandes rectales très apparentes. L'anneau nerveux entoure l'œsophage dans sa région tout-à-fait antérieure, au huitième de sa longueur. Pore excréteur très petit, peu visible, s'ouvrant en arrière du bulbe œsophagien, au milieu d'une aire allongée et étroite qui tranche par son aspect plus clair et plus brillant.

*Femelle*.—La longueur totale du corps oscille entre 5 mm. 1 (femelle jeune, à œufs non développés, mais déjà fécondée) et 12 mm. 7 (femelle adulte à œufs arrivés à maturité); épaisseur maxima, au tiers antérieur de la longueur,  $600\mu$ . Queue longue, effilée, atteignant le quart de la longueur du corps. La longueur de l'œsophage (y compris le bulbe) varie du sixième (femelle immature) au douzième de la longueur totale (femelle adulte).

FIG. A, B, C. *Orgyrus hilgerti* n. sp.

A. Organes génitaux d'une jeune femelle immature de 11<sup>mm</sup> 3 de longueur. *v*, vagin extroversé; *t*, trompe; *u*, utérus gauche; *r*, réceptacle séminal; *o*, oviducte.

B. Tête vue par la face ventrale. *c*, glande céphalique.

C. Extrémité postérieure du corps du mâle, vue par la face ventrale.

Vulve située au tiers antérieur de la longueur. Chez l'une des femelles examinées, elle est en rapport (fig. 2) avec un vagin en tronc de cône, de 120  $\mu$  de longueur, tapissé d'une épaisse cuticule, au fond duquel s'ouvre, au sommet d'un

mamelon arrondi, l'ovéjecteur. Celui-ci comprend tout d'abord une partie rétrécie en une sorte de col, de  $200\ \mu$  de longueur, à assise musculaire mince, doublée d'une épaisse cuticule, à laquelle fait suite une partie cylindrique remarquable par l'extrême développement de l'assise musculaire et dilatée en ampoule à son extrémité distale; au delà, la trompe, musculo-épithéliale, se recourbe brusquement vers l'arrière et après un trajet de plus d'un millimètre rejoint les utérus.

Chez toutes les autres femelles examinées, la région initiale, tubulaire de

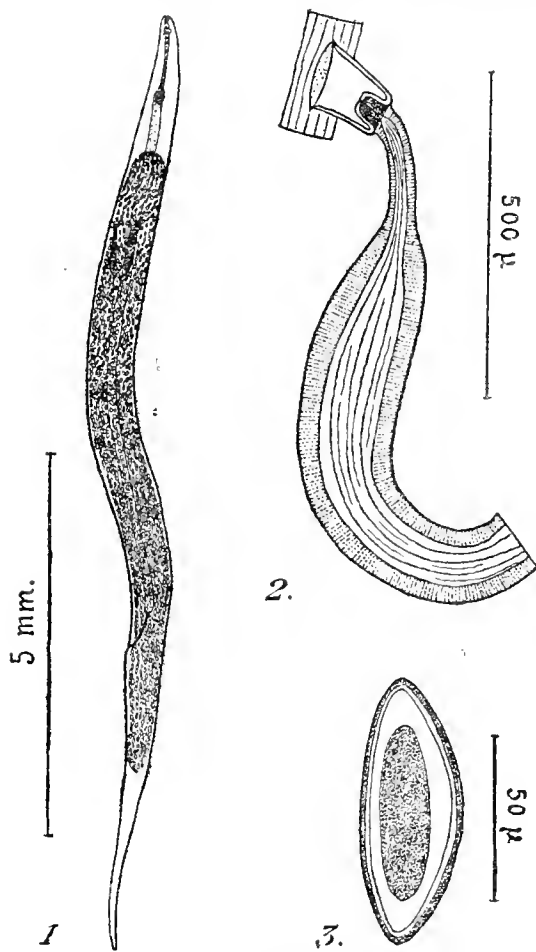


FIG. 1 à 3.—*Oryzias hilgerti* n. sp.

1. Individu femelle vu de profil. 2. Ovéjecteur. 3. Œuf.

l'ovéjecteur est extroversée, saillante au dehors à la façon d'une verge, ce qui rend l'emplacement de la vulve très apparent (fig. A).

Utérus parallèles, remontant vers l'avant, de chaque côté de la trompe; chez les femelles immatures, les utérus ne renferment pas d'œufs; chez les femelles adultes, au contraire, les utérus bourrés d'œufs disposés sur quatre à cinq rangées se sont considérablement allongés et remplissent toute la cavité générale en arrière du bulbe œsophagien jusqu'au delà de l'anus.

Oufs fort nombreux, à coque épaisse, aigus aux deux pôles, légèrement aplatis sur une face, mesurant 75 à 80  $\mu$  de longueur sur 20 à 30  $\mu$  de diamètre transversal ; ils sont rejetés à l'état de morula.

*Larve femelle du 4<sup>e</sup> stade*.—Longueur 2 mm. 2 à 2 mm. 7 ; la longueur de la queue et celle de l'œsophage sont le sixième de celle du corps. Corps orné de deux ailes latérales, prenant naissance à quelque distance en arrière de la tête et s'étendant jusqu'à la région anale.

*Mâle*.—Cette espèce est remarquable par la grande disproportion de taille de la femelle et du mâle adultes. Tandis que la première atteint 12 mm., la longueur du mâle oscille entre 3 mm. 8 et 6 mm. 2 ; ces mâles à corps grêle, peuvent échapper lors d'un examen peu attentif.

La région postérieure du corps du mâle est le plus souvent enroulée en spirale (deux tours). La longueur de l'œsophage est le septième de celle du corps.

La queue est terminée par une longue pointe dorsale (200  $\mu$  de longueur) servant d'axe, dans sa région initiale, à deux ailes caudales ; trois paires de papilles, dont une préanale ; la première paire de papilles postanales (la plus éloignée du cloaque) est longuement pédonculée ; à la hauteur de la seconde paire se trouvent les orifices latéraux des glandes caudales. Spicule très allongé (300  $\mu$ ), légèrement élargi à son extrémité libre. Un gorgéret de 70  $\mu$  de longueur (fig. C).

*Habitat*.—Cœcum du Gundi (*Ctenodactylus gundi* Pallas), Biskra, 15 mars 1914.

Nous avons récemment trouvé cette forme, en très nombreux exemplaires des deux sexes, chez trois Gundis de la région de Bou Saïda (septembre 1914).

*Affinités*.—Cette espèce est voisine de l'*Orguris evoluta* Linst., avec laquelle elle présente cette singulière disposition de l'extroversion de la région initiale de l'ovéjecteur. La description absolument insuffisante de Linstow ne permet d'indiquer, comme caractère différentiel, que la dimension plus grande de la queue de la femelle (le quart de la longueur totale chez l'*Orguris bilgerti*, le  $\frac{1}{17}$  chez l'*Orguris evoluta*).

## 2. *Oxyuris uromasticola* (nom. emend.), Galeb 1889.\*

[*Thelaudros alatus* Wedl. 1861.]

Nématode à corps massif, étant seulement huit à dix fois plus long que large, dépourvu d'ailes latérales ; cuticule striée transversalement, à stries espacées de 14  $\mu$ . Œsophage terminé par un bulbe volumineux et relativement court ; sa longueur varie du quart au cinquième de la longueur totale chez le mâle, du sixième au septième chez la femelle. Il est entouré dans sa région initiale, au huitième de sa longueur, par l'anneau nerveux. L'intestin, à son origine, est beaucoup plus large que le bulbe œsophagien. Rectum avec deux glandes unicellulaires y débouchant.

Pore excréteur situé sur la ligne médiane ventrale, en arrière du bulbe, au quart de la longueur du corps ; c'est un orifice circulaire très petit, de 8  $\mu$  de diamètre, en relation par un court canal cuticulaire (17  $\mu$  de longueur) avec une grosse vésicule excrétrice très apparente sur le vivant, à cause de la plus grande réfringence du liquide qui y est contenu ; à cette vésicule aboutissent quatre canaux disposés en X, deux qui viennent de la région antérieure et deux provenant de la région postérieure du corps.

\* Galeb écrit, avec une double incorrection *Oxyuris uromasticolla*.



Bouche elliptique, allongée dorso-ventralement, entourée de six papilles, deux latéro-dorsales, deux latéro-ventrales et deux latérales. Cavité buccale courte, élargie à la base.

*Femelle*.—Longueur totale 5 à 9 mm.; la largeur maxima, réalisée vers le milieu du corps, est le dixième de la longueur. Queue courte (300  $\mu$ ), conique, arrondie à l'extrémité.

Vulve située en arrière du milieu du corps, aux trois cinquièmes de la longueur; c'est une fente transversale de 136  $\mu$  de largeur sur 18  $\mu$  de hauteur, limitée par des lèvres épaisses et, de ce fait, très apparente. La vulve est en rapport avec un vestibule en forme de tronc de cône, de 240  $\mu$  de longueur, tapissé

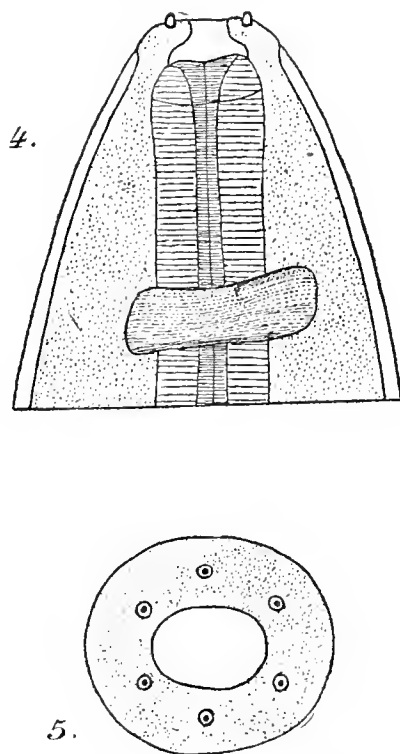


FIG. 4 et 5.—*Oxyuris urumasticola* Galeb.

4. Extrémité antérieure du corps.

5. Tête vue de face.

d'une épaisse cuticule et au fond duquel s'ouvre, au sommet d'un mamelon, le sphincter; les rapports du sphincter et du vestibule sont ainsi les mêmes que chez l'*Oxyuris hilgerti* Senrat. Le vestibule renferme le plus souvent un œuf, qui y séjourne quelque temps avant d'être expulsé; quand le vestibule est vide, la lèvre vulvaire supérieure fait très fortement saillie à l'extérieur. L'ovjecteur, dont nous avons donné précédemment la description\* est dirigé vers l'arrière: il mesure 3 mm. 5 de longueur et comprend un sphincter musculo-cuticulaire de 300  $\mu$  de longueur, auquel fait suite la trompe musculo-épithéliale dilatée dans sa région initiale en un réservoir de 1 mm. 5 de longueur, occupé par 20 à 50 œufs.

\* C. R. Société de Biologie, tome 73, p. 223, fig. 1, 2, 3.

La trompe impaire, tubuliforme, de 1 mm. 5 d'extension, se divise en deux branches qui rejoignent les utérus.

Utérus parallèles, étroits, entortillés le long de l'intestin; ils atteignent quatorze millimètres de longueur (chez un individu femelle de 9 mm. de longueur totale) et renferment un nombre relativement faible d'œufs disposés côte à côte en série linéaire: nous en avons compté 119 dans l'une des branches utérines, 127 dans l'autre. Le réceptacle séminal est une simple dilatation de la région ultime des utérus, non délimitée de ceux-ci.

Oviductes et ovaires représentés par deux tubes de quatre millimètres de longueur, dilatés en masse dans leur région moyenne, rendus opaques par la masse de vitellus dont ils sont chargés; ils sont situés côte à côte dans la région préovulaire, repliés dans l'espace compris entre la vulve et le pore excréteur.

Œufs ovoïdes, un peu aplatis sur une face, à coque épaisse, mesurant  $105\mu$  de longueur sur  $65\mu$  de largeur. Leur nombre est peu élevé: 268 dans une femelle, dont 246 renfermés dans les utérus et 22 dans l'ovojecteur.

Le mode de ponte est assez particulier: les œufs, accumulés au nombre d'une cinquantaine dans le réservoir formé par la trompe sont à l'état de morula et leur coque est claire et transparente: ils passent un à un dans le vestibule où ils séjournent quelque temps: la tunique externe du vestibule présente des glandes unicellulaires dont l'activité sécrétrice a pour effet de reconvrir la coque de l'œuf d'un enduit protecteur qui la rend presque opaque et lui donne une couleur brun clair complètement différente de celle des œufs contenus dans l'ovojecteur. L'œuf ayant ainsi acquis sa structure définitive est pondu et remplacé par un autre qui subira la même transformation.

*Mile.*—Corps plus grêle que celui de la femelle. Longueur totale 2 mm. 5 à 4 mm.; épaisseur maxima  $310\mu$ .

La conformation de la queue est assez compliquée et ne peut se comprendre que par la comparaison avec celle des *Oxyures* à appendice caudal très allongé, l'*Oxyuris spinicauda* Duj. notamment: sur la face dorsale de la queue s'attache un appendice digitiforme, massif, de  $65\mu$  de longueur, portant à la face interne deux grosses papilles, appendice que nous considérons comme l'homologue de la longue pointe caudale de l'*Oxyuris spinicauda*.\* La face ventrale porte, en avant du cloaque, un appendice digitiforme plus petit; enfin les parties latérales donnent insertion à une lame divisée en deux lobes par une échancrure médiane, lame que l'on peut considérer comme l'homologue d'une aile caudale. Spicule unique, long de  $90\mu$ ; pas de gorgéret.

Wedl signale deux ailes caudales latérales qui en réalité n'existent pas, comme nous l'avons vérifié sur le vivant: sur les échantillons conservés en alcool, il se produit fréquemment un décollement de la cuticule, que Wedl a interprété à tort comme une aile.

*Habitat.*—Caecum de l'*Uromastix acanthinurus* Bell., Biskra, 15 mars 1914.

Cette forme se trouve par centaines d'individus, associée à des milliers de spécimens d'un *Oxyure* beaucoup plus petit, l'*Oxyuris vivipara* (Wedl), dans le volumineux caecum, bourré de débris végétaux, du "Lézard des Palmiers."

### 3. *Oxyuris vivipara* (Wedl).

Corps grêle, transparent. Pas d'ailes latérales. Queue courte. La bouche, limitée par trois petites lèvres, s'ouvre dans une courte cavité buccale ( $10\mu$ );

\* C. R. Société de Biologie, tome 73, p. 223, fig. 7, 8, 9, et tome 74, p. 850, fig. 1, 2, 3.

L'œsophage, entouré en son quart antérieur par l'anneau nerveux, se termine par un bulbe arrondi; il est remarquable par sa longueur, qui atteint le tiers de la longueur totale du corps. Intestin plus étroit, à son origine, que le bulbe. Rectum allongé, avec des glandes annexes très apparentes.

Pore excréteur situé sur la ligne médiane ventrale, au delà du bulbe œsophagien.

*Femelle*.—Longueur totale 2 mm. à 2 mm. 3; épaisseur maxima, au niveau de la vulve  $240\mu$ . Queue courte ( $210$  à  $240\mu$ ), conique, arrondie à l'extrémité. Valve située aux deux tiers de la longueur du corps; vestibule et sphincter non délimités, comme chez les formes précédentes, mais confondus en un tube cylindrique musculo-cuticulaire qui se continue par la trompe.

Utérus parallèles (ils sont divergents chez la larve). Les ovaires, très volumineux et surchargés de vitellus, sont deux corps opaques, en forme de massue, situés de chaque côté de l'intestin, immédiatement en arrière du bulbe.

L'*Oxyuris vicipara*, comme nous l'avons montré précédemment,\* est remarquable par la coexistence de deux formes femelles vivant côte à côte dans le caecum de l'*Uromastix*, qui ne diffèrent que par le mode d'évolution des œufs: une forme *ovipare* chez laquelle on trouve une vingtaine d'œufs énormes ( $190\mu$  de longueur sur  $63\mu$  de largeur) en égard aux dimensions de l'animal, à coque épaisse, entassés dans les utérus fortement distendus et une forme *larvipare*, caractérisée par la présence dans les utérus d'un petit nombre (jusqu'à 12) d'œufs de même taille que les précédents, à coque mince, qui évoluent à l'intérieur de l'utérus maternel jusqu'au stade de larve enkystée, ces larves étant ensuite mises en liberté dans le caecum où elles deviennent adultes, sans avoir été mises en liberté dans le milieu extérieur. Cette forme larvipare assure la contamination excessive du Lézard par le parasite; les œufs de la forme ovipare, au contraire, n'évoluent pas immédiatement: ils sont rejetés avec les fèces et ce sont eux qui assurent la dissémination de l'Oxyure et sa transmission d'*Uromastix* à *Uromastix*.

*Mâle*.—Corps très grêle: longueur totale 1 mm. 650; largeur maxima,  $85\mu$ . Pore excréteur situé en arrière du bulbe œsophagien, à  $190\mu$  au delà de celui-ci.

Partie postérieure du corps repliée en arc de cercle sur la face ventrale. Queue courte ( $20\mu$ ), tronquée à l'extrémité et privée d'appendice digitiforme. Deux grosses papilles sessiles en avant de l'orifice du cloaque. Spicule unique, droit, de  $60\mu$  de longueur. Au niveau de l'anus se trouve une pièce cuticulaire en demi-anneau, que nous considérons comme un gorgeret.

*Habitat*.—Caecum de l'*Uromastix acanthinurus*: Biskra, 15 mars 1914.

Cette petite forme fourmille dans le caecum de l'*Uromastix* et se distingue immédiatement par sa petite taille et surtout par sa gracilité. Galeb l'a prise à tort pour la forme larvaire de l'*Oxyuris uromasticola*; elle se distingue cependant immédiatement des larves de même taille de cet Oxyure.

## FAM. SPIRURIIDÆ.

### Genre *Spirura* E. Blanchard 1849.

Corps atténué dans les deux tiers antérieurs, remarquable par l'existence, à une distance de 1 mm. 5 à 2 mm. de l'extrémité céphalique, d'un repli cutané ventral, en forme de bosse, servant à la fixation de l'animal. Deux papilles sensorielles situées latéralement en avant de l'anneau nerveux. Pas d'ailes latérales

\* C. R. Société de Biologie, 1913, tome 74, p. 1079.

(celles-ci existent chez la larve). Pore excréteur ventral, s'ouvrant en arrière de l'anneau nerveux.

Bouche limitée latéralement par deux lèvres munies de dents sur leur bord interne et par une lèvre dorsale et une lèvre ventrale, à bord libre fortement épaissi.

Vulve en arrière du milieu du corps, aux trois cinquièmes de la longueur. Ovéjecteur rectiligne remarquable par la disposition du sphincter muni de replis cuticulaires en forme de valvules.

Utérus divergents. Œufs à coque épaisse, larvès à maturité. Quene du mâle enroulée en spirale. Ailes caudales, symétriques, étalées, striées longitudinalement. Quatre paires de papilles préanales pédonculées; cinq paires de papilles postanales, dont deux très volumineuses. Spicules dissemblables, le gauche épais, très large, strié transversalement et ailé, le droit arqué, plus étroit. Un gorgeret en soc de charrue.

Espèce type : *Spirura talpae* (Gmel.).

### 1. *Spirura rothschildi* n. sp.

Nématode remarquable par ses formes grêles. Papilles cervicales situées très en avant de l'anneau nerveux, au milieu de la distance de celui-ci à l'extrémité céphalique.

*Femelle*.—Longueur totale 12 mm.5 (jeune femelle immature à œufs non larvès) à 15 mm.5; épaisseur maxima, au niveau de la vulve, 500  $\mu$ . Quene conique, régulièrement atténuée, relativement grande: sa longueur est le soixante-sixième de celle du corps. Orifices des glandes caudales subterminaux.

Cavité buccale infundibuliforme 45  $\mu$ . Œsophage musculaire relativement allongé: sa longueur est le septième de celle de l'œsophage glandulaire, la longueur totale de l'œsophage étant le quart de celle du corps.

Vulve située en arrière du milieu du corps, aux deux tiers de la longueur: c'est un orifice ovale, petit, non en saillie sur le tégument. Ovéjecteur conformé comme celui des autres *Spirura*; vestibule infundibuliforme, de 180  $\mu$  de longueur, tapissé d'une épaisse cuticule, sphincter 70  $\mu$ , trompe impaire courte. Les branches paires de la trompe courent parallèlement sur une certaine distance, puis se séparent.

Utérus divergents; leur extrémité distale est différenciée en un réceptacle séminal très allongé, étranglé en son milieu.

Œufs à coque épaisse, larvès à maturité, mesurant 45  $\mu$  de longueur sur 35  $\mu$  de largeur.

*Mâle*.—Longueur totale 6 mm. à 13 mm.8. La longueur de l'œsophage varie du quart au tiers de la longueur du corps.

Ailes caudales symétriques, marquées d'une striation longitudinale. Quatre paires de papilles préanales, pédonculées, régulièrement espacées; six paires de papilles postanales, la sixième immédiatement en arrière du cloaque; la cinquième, très grosse et très apparente, est en avant du milieu de la distance du cloaque à la pointe caudale; en dehors des deux premières papilles se trouvent les orifices de deux glandes caudales.

La distance de l'anus à la pointe caudale est de 350  $\mu$ .

Cloaque limité en avant par une lèvre proéminente sur laquelle se trouve insérée une grosse papille impaire; on n'observe pas, dans cette espèce, le gros fourreau si caractéristique du *Spirura gastrophila* (Müller) (fig. 8 et 9).

Spicules dissemblables: le gauche, large, strié transversalement et ailé; le

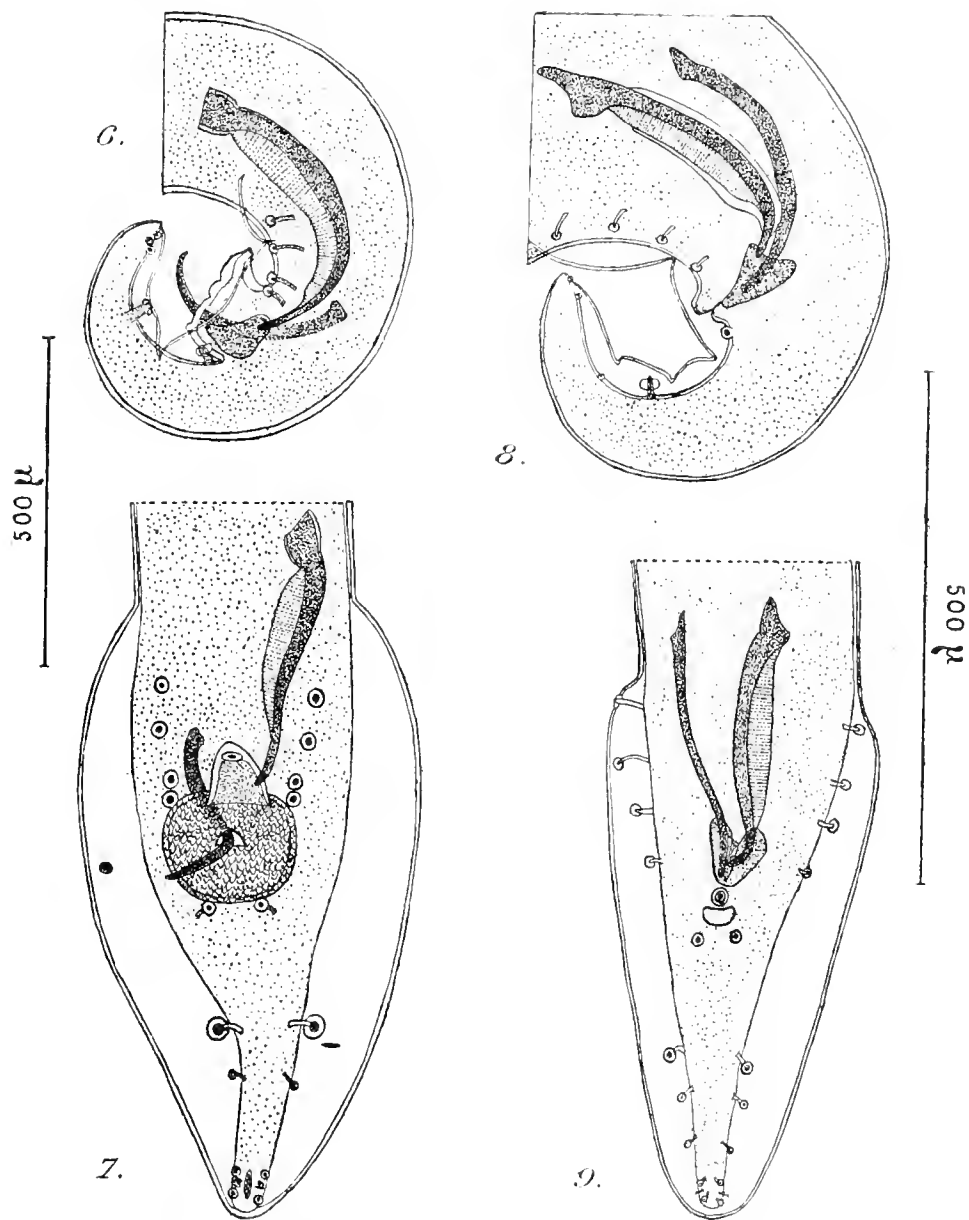


FIG. 6 et 7.—*Spirura gastrophila* (Müller).

6. Extrémité postérieure du corps du mâle, vue de profil.

7. La même, vue par la face ventrale.

(Le grossissement relatif à ces deux figures est indiqué par l'échelle placée à gauche.)

FIG. 8 et 9.—*Spirura rothschildi* n. sp.

8. Extrémité caudale du mâle, vue de profil.

9. La même, vue par la face ventrale.

(Le grossissement est indiqué par l'échelle placée à droite.)

droit, arqué, étroit et dépourvu d'ailes, est d'une longueur *égale* ou à peine supérieure; les longueurs observées sont les suivantes: spicules égaux  $250\mu$ , id.  $330\mu$ , inégaux  $325\mu$  et  $336\mu$ .

Un gorgéret en forme de soc de charrue.

*Habitat*.—Estomac du Macroscélide (*Elephantulus deserti* Thomas), Biskra, mars 1914.

*Affinités*.—Ce parasite du Macroscélide qui nous avait été précédemment envoyé des Matmata (Sud Tunisien) par M. Weiss, présente beaucoup de ressemblances avec les autres *Spirura* et plus particulièrement avec le *Spirura talpæ* (Gmel.), de l'estomac de la Taupe.

Il s'en rapproche par ses formes grêles, la longueur relative de l'œsophage, la queue conique et allongée de la femelle, la vulve petite, non saillante, la disposition des ailes et des papilles caudales; il en diffère par la position plus antérieure des papilles précervicales, par la disposition des papilles préanales régulièrement espacées et par les dimensions relatives des spicules. Chez le *Spirura rothschildi*, les spicules sont égaux ou subégaux, tandis que chez le *Spirura talpæ* (Taupe, Corrèze, France) le spicule gauche est beaucoup moins allongé que le droit (rapport de longueurs 5/8).

Le *Spirura talpæ* et le *Spirura rothschildi* présentent des différences notables avec une forme plus robuste et de plus grande taille, le *Spirura gastrophila* (Müller), signalé comme parasite du Chat en Europe et à Madagascar, et que j'ai retrouvé dans le Nord Africain chez deux nouveaux hôtes, le Hérisson (*Erinaceus algirus* Duv., Bou Saâda, Laghouat) et le Renard d'Algérie (Bou Saâda). Le *Spirura gastrophila* est caractérisé par ses formes plus massives, une longueur relative plus grande de l'œsophage, la brièveté de l'œsophage musculaire, la vulve énorme ( $200\mu$  de largeur), très apparente, limitée par des lèvres très saillantes, la queue de la femelle courte et obtuse, arrondie à l'extrémité, l'inégalité des spicules, le spicule gauche, large et ailé étant plus grand que le spicule droit (rapport de longueurs 8/5), à l'inverse de ce qui est réalisé chez le *Spirura talpæ*, la disposition des papilles postanales, enfin et surtout par un fourreau musculo-cutané très proéminent, de  $200\mu$  de diamètre, au centre duquel s'ouvre le cloaque (fig. 6 et 7).

Le *Spirura rothschildi*, par la disposition des papilles sensorielles précervicales rappelle le *Spirura gastrophila*, tandis que ses autres caractères le rapprochent du *Spirura talpæ*, dont il diffère par les particularités signalées plus haut.

Les caractères différentiels des trois espèces connues de *Spirura* peuvent se résumer dans le tableau suivant :

- |   |  |   |
|---|--|---|
| (a) Vulve énorme, proéminente. Queue de la femelle courte, arrondie. Un fourreau cloacal très saillant. Spicule gauche plus grand que le droit; les deux premières papilles préanales contiguës.    |  | <i>Spirura gastrophila</i> (Müller).  |
| (b) Vulve petite, non saillante. Queue de la femelle allongée, conique, régulièrement atténuée. Cloaque à lèvres peu saillantes, spicule gauche plus petit ou de même taille que le droit . . . . . |  | <div style="display: inline-block; vertical-align: middle;"> <div style="display: inline-block; vertical-align: middle; font-size: 3em; line-height: 1;">{</div> <div style="display: inline-block; vertical-align: middle;"> Papilles précervicales très antérieures; spicules égaux ou subégaux; papilles préanales équidistantes. <i>Spirura rothschildi</i> Seurat.<br/> Papilles précervicales immédiatement en avant du bord antérieur de l'anneau nerveux. Spicule gauche plus petit que le droit. Les deux premières papilles préanales contiguës. . . . <i>Spirura talpæ</i> (Gmelin). </div> </div> |

2. *Hartertia obesa* n. g., n. sp.*Hartertia* n. g.

Nématode ayant l'apparence d'une Ascaride, à corps massif, le plus souvent courbé en arc à concavité dorsale; cuticule épaisse, résistante, finement striée transversalement. Les ailes latérales, quand elles existent, sont limitées à la région antérieure, céphalique et œsophagienne.

Bouche limitée latéralement par deux grandes lèvres cunéiformes à bord interne profondément divisé en trois lobes ou mâchoires. Papilles précervicales très antérieures, situées dans la région céphalique, en avant de l'origine de l'œsophage.

Vulve s'ouvrant dans la région moyenne du corps. Ovjecteur du type de celui des *Habronema* d'Oiseaux, à sphincter très allongé. Utérus divergents.

Ailes caudales symétriques, étalées; papilles longuement pédonculées, dont quatre préanales. Spicules inégaux, le gauche grêle, filiforme. Un gorgeret.

*Habitat*.—Intestin des oiseaux.

Type : *Hartertia obesa* Senrat.

*Hartertia obesa* n. sp.

Corps courbé en arc, à concavité dorsale, remarquable par sa grande épaisseur, plus particulièrement chez la femelle; corps régulièrement atténué aux deux extrémités. Tête très petite, distincte.

Cuticule finement striée transversalement, à stries régulièrement espacées de  $10\mu$ . Aires latérales très larges ( $155\mu$ ), rendues très apparentes par leur opacité, masquant le tube digestif sur l'animal vu de profil. Polymyaire à cellules musculaires très étroites ( $6\mu$ ), allongées et parallèles, dessinant une striation longitudinale.

La longueur de l'œsophage est le sixième chez le mâle, le dixième chez la femelle, de la longueur totale du corps.

Pas d'ailes latérales. Pore excréteur situé sur la face ventrale convexe, un peu en arrière du niveau de l'anneau nerveux. Bouche limitée par deux lèvres latérales cunéiformes s'affrontant par leur face interne; le bord antérieur interne est découpé en trois lobes égaux à bord très épais qui donnent aux lèvres, vues de profil, l'aspect d'une feuille de frêle; les lobes marginaux se rattachent par leur angle externe au cadre buccal. Chaque lèvre porte deux petites papilles.

*Femelle*.—Longueur totale 40 mm. 8; épaisseur maxima, au milieu du corps, 1 mm. 6. Cavité buccale  $180\mu$ ; œsophage musculaire  $660\mu$ , entouré un peu en avant de la moitié par l'anneau nerveux; la longueur totale de l'œsophage est le dixième de celle du corps. L'intestin est remarquable par son calibre qui est égal, voire même supérieur à celui de l'œsophage.

Queue conique, arrondie à l'extrémité, longue de 1 mm. 5. Vulve non saillante, difficilement perceptible, située au tiers antérieur de la longueur, en rapport avec un ovjecteur du type de celui des *Habronema* d'Oiseaux (fig. 15): vestibule piriforme, de  $700\mu$  de longueur, dirigé vers l'avant, doublé d'une épaisse cuticule et renfermant quelques œufs (jusqu'à sept) disposés en file linéaire; le sphincter, très allongé (1 mm. 5) prend naissance vers le milieu de la hauteur du vestibule et se recourbe ensuite. La trompe impaire, de 1 mm. 5 de longueur, ne renferme pas d'œufs: ceux-ci sont, au contraire, accumulés en grand nombre dans les branches

paires. Ces dernières courent parallèlement, puis se séparent, l'une allant rejoindre l'utérus antérieur, l'autre l'utérus postérieur.

Utérus divergents: l'utérus antérieur s'avance jusqu'au milieu de la région œsophagienne, l'utérus postérieur s'arrête à un millimètre en avant de l'anus.

L'extrémité de chaque utérus est élargie en un réceptacle séminal non délimité de la portion utérine voisine.

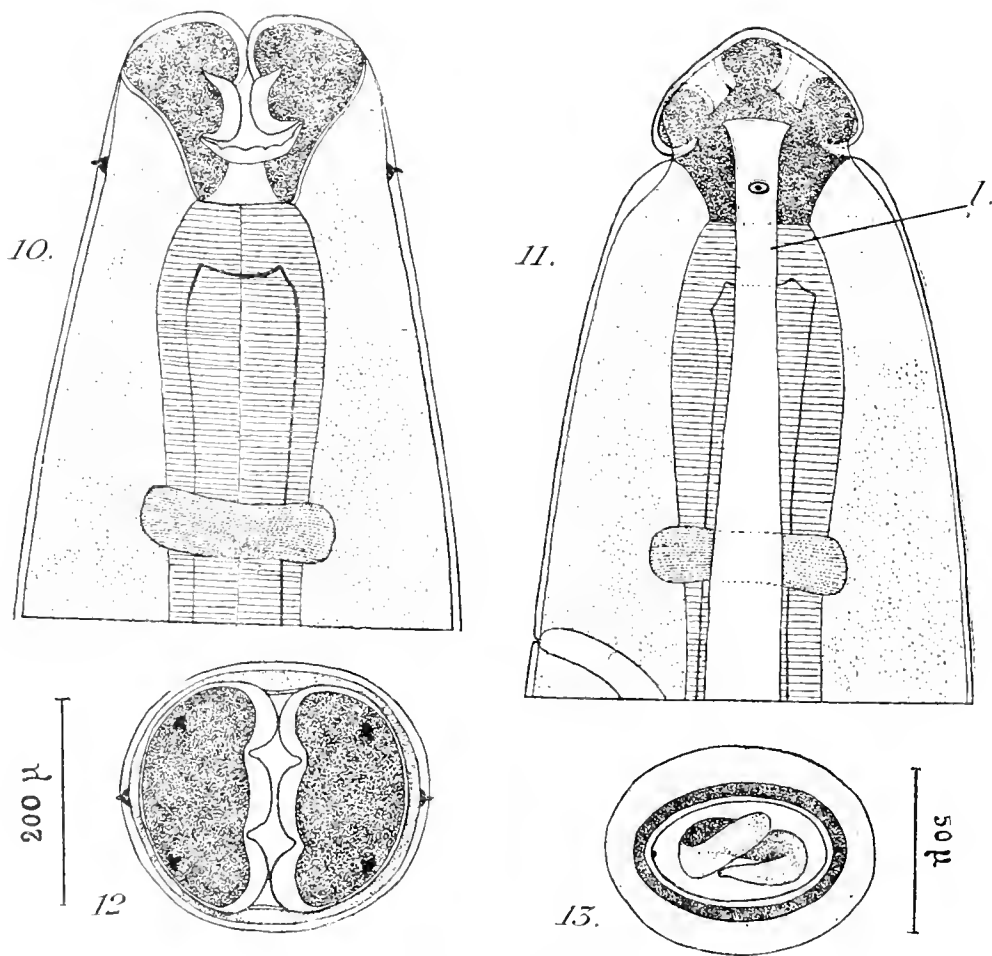


FIG. 10 à 13. *Hartertia obesa* n. sp.

10. Région antérieure du corps, vue par la face ventrale.
11. La même, vue latéralement. l. aire latérale.
12. Tête vue de face.
13. Œuf mûr, larvé.

(Le grossissement est le même pour les figures 10, 11, 12 et représenté par l'échelle 200  $\mu$ .)

Les œufs, larvés à maturité présentent un type de structure tout particulier: leur coque épaisse, mesurant 56  $\mu$  de longueur sur 35  $\mu$  de largeur, est doublée d'une membrane vitelline très apparente, épaissie à l'un des pôles; cette coque présente, dans un plan méridien, un anneau mince de 10  $\mu$  de largeur (fig. 13) se



colorant plus fortement que l'œuf lui-même par le pierocarmine; cette expansion aliforme donne à l'œuf l'aspect de la samare de l'orme.

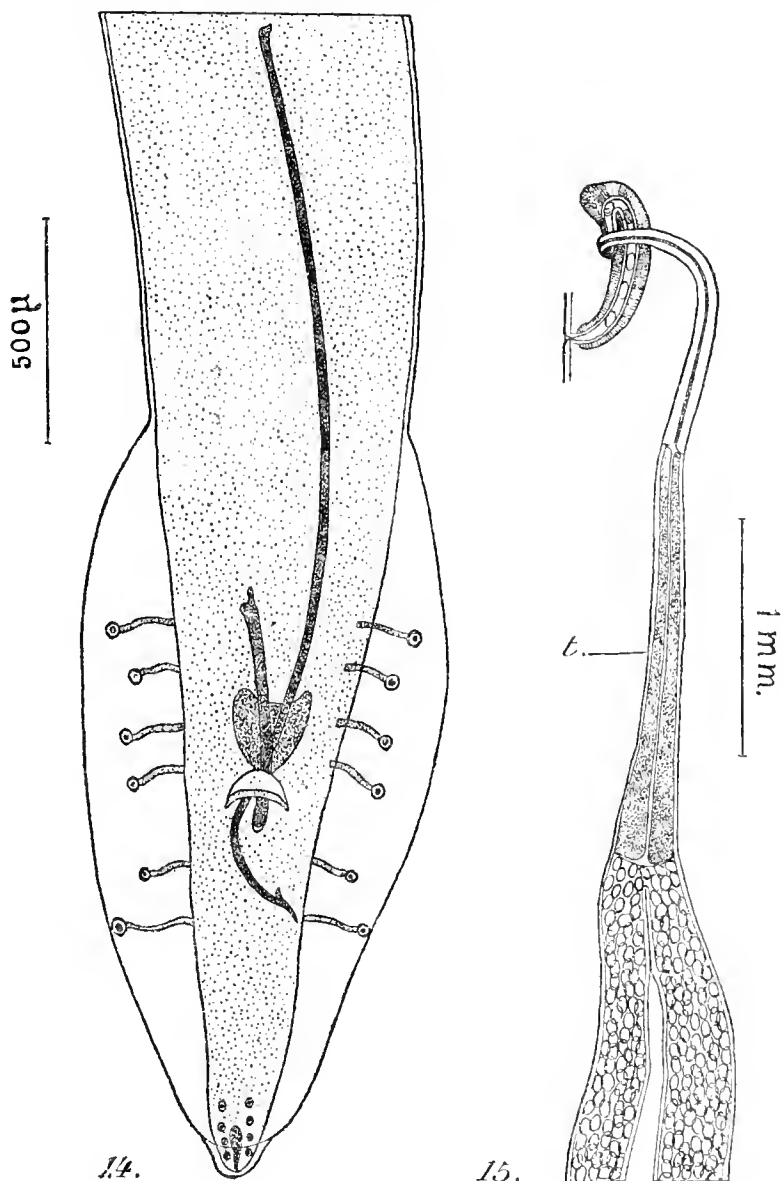


FIG. 14 et 15. *Hartertia obesa* n. sp.

14. Queue du mâle vue par la face ventrale.

15. Ovjecteur; *t.*, branche impaire de la trompe.

*Mâle* — Longueur totale 23 mm. 5; épaisseur maxima, au niveau du tiers antérieur, 1 mm. 070.

Corps courbé en arc à concavité dorsale, régulièrement atténué aux deux

extrémités. Tête très petite, distincte, séparée du tronc par un étranglement très net. Papilles précervicales situées à  $145\ \mu$  de l'extrémité céphalique. Cavité buccale  $160\ \mu$  : la longueur de l'œsophage est le sixième de celle du corps.

Queue droite, non enroulée, à ailes caudales étalées.

La face ventrale, dans la région voisine du cloaque, et les ailes sont couvertes de petits écussons cuticulaires régulièrement disposés en rangées longitudinales.

Distance du cloaque à la pointe caudale  $750\ \mu$ . Ailes caudales larges, longues de 1 mm. 290, portant six paires de papilles longuement pédonculées, disposées symétriquement, les deux extrêmes plus longues que les quatre autres ; en outre, quatre paires de petites papilles sessiles un peu en avant de la pointe caudale (fig. 14).

Cloaque limité par une lèvre supérieure à peine en saillie, occupant un espace triangulaire lisse, privé d'écussons cuticulaires.

Spicules très inégaux (rapport de longueur : 4), le droit court ( $500\ \mu$ ), massif à extrémité libre mousse, arrondie, le gauche, grêle, filiforme, très long (2 mm. 100) terminé par un crochet en hameçon \* dont la barbe mesure  $85\ \mu$  ; la garde est formée non par un crochet unique, mais par une lame sexdentée.

Un gorgéret, de  $200\ \mu$  de longueur.

Le testicule remonte vers l'avant jusqu'à la moitié de la longueur de l'œsophage ; en ce point il se replie vers l'arrière.

*Habitat*.—Intestin du *Caccabis petrosu spatzi* Richw. ; 7 mâles, 8 femelles, Oned N'za, 14 avril 1914.

*Affinités*.—Ce nouveau parasite de la Perdrix du Sahara se rapproche, par la disposition des ailes caudales et la forme des spicules, du *Spiroptera penihamata* Molin, trouvé entre les tuniques de l'estomac de divers *Strix* du Brésil. Il en diffère notablement par ses dimensions, plus particulièrement par son épaisseur exagérée et également par son habitat dans un hôte et un organe différents.

La conformation de la région céphalique est identique à celle du *Elaria rotundata* Linst., que nous avons rangé récemment dans le genre *Habronema*.† Ces deux formes présentent d'autres similitudes : même disposition des papilles caudales, même forme de l'ovéjecteur ; nous les rangerons donc dans le nouveau genre *Hartertia*. L'*Hartertia rotundata* (Linst.) se caractérise d'ailleurs très nettement par les ailes latérales qui ornent la région antérieure du corps. Le *Spiroptera penihamata* Molin paraît devoir être rattaché aux genre *Hartertia*, ainsi que divers autres *Spiroptera* à deux lèvres dont l'organisation est encore mal connue, le *Spiroptera verrucosa* Molin, par exemple.

Les *Hartertia* se rapprochent, par leur organisation interne, des *Habronema*, dont ils diffèrent par leur bouche à deux lèvres trilobées, les *Habronema* ayant, au contraire, une bouche à 4 lèvres, dont deux latérales simples (*Habronema microstoma* Schn.) ou trilobées (*H. muscae* Dies., *H. chevreuxi* Seurat). D'un autre côté, la conformation de la bouche rapproche les *Hartertia* des *Protopharynx* Seurat, ces derniers étant d'ailleurs nettement caractérisés par la conformation primitive de l'ovéjecteur.

Le nouveau genre *Hartertia* Seurat constitue par suite un lien entre les *Protopharynx* et les *Habronema* les plus primitifs.

\* Cette conformation du spicule se retrouve chez plusieurs Nématodes, en particulier le *Spiroptera penihamata* Molin, le *Spiroptera crassicauda* Creplin et l'*Acanria hamata* (Linst.).

† Bull. Soc. Hist. Nat. Afriq. Nord, 1914, No. 5, pp. 117-119, fig. 1.

Genre **Habronema** Diesing 1861.

Corps orné d'ailes latérales. Papilles sensorielles situées en avant de l'anneau nerveux. Bouche limitée par quatre lèvres, deux latérales entières ou trilobées et deux dorsale et ventrale. Vulve petite, située en avant du milieu du corps. Ovéjecteur à vestibule piriforme, en rapport avec un sphincter courbé en S. Utérus divergents. Œufs à coque épaisse, larvés à maturité. Ailes caudales très larges, repliées sur la face ventrale. Quatre paires de papilles préanales; papilles postanales asymétriques. Deux spicules inégaux et un gorgeret.

**Habronema unilateralis** (Molin 1859) (= **Filaria tulostoma** Schneider 1866).

Nous avons donné précédemment \* la description de ce Spiroptère, remarquable par l'existence d'une aile latérale unique, s'étendant sur la moitié antérieure gauche du corps et l'avons rattaché au genre *Habronema*.

*Habitat*.—Gésier du Pernoptère (*Neophron pernopterus* L.), entre les tuniques de l'estomac; Hammam Meskoutine, province de Constantine, 30 avril 1914.

Sept femelles de 11 à 14 mm. de longueur, deux mâles de 8 mm.

## FAM. ACUARIDAE Seurat 1913.

## S.-FAM. PHYSALOPTERINAE.

Genre **Physaloptera** Rud. 1819.

Corps robuste, massif. Cuticule épaisse, finement striée transversalement, détachée du corps dans la région céphalique où elle forme une collerette annulaire qui sert à la fixation du parasite. Aires latérales très larges privées d'expansions cuticulaires aliformes. Deux papilles sensorielles dans la région œsophagienne, insérées en *arrière* de l'anneau nerveux. Pore excréteur s'ouvrant sur la ligne médiane ventrale, en arrière des papilles et en rapport avec un canal cuticulaire dirigé obliquement de bas en haut et d'arrière en avant.

Bouche limitée par deux grosses lèvres latérales garnies de dents sur leur face interne; le cadre buccal porte des papilles près de leur base d'insertion. Cavité buccale courte. Œsophage musculaire entouré par l'anneau nerveux, se différenciant nettement, par sa couleur claire, de l'œsophage glandulaire, lequel est opaque, de couleur foncée.

Vulve petite, non saillante, située en avant du milieu du corps, en rapport avec un ovéjecteur tubuliforme très allongé, le plus souvent dirigé vers l'arrière. Utérus parallèles. Œufs à coque épaisse, larvés à maturité.

Ailes caudales amples, *étalées*, à bord externe limité par un ourlet cuticulaire, portant quatre à cinq papilles longuement pédonculées qui encadrent la région cloacale. Deux spicules, le plus souvent inégaux. Pas de gorgeret.

**Physaloptera alata** Rud. 1819

Papilles sensorielles céphaliques situées au delà de l'anneau nerveux, au niveau de la région terminale de l'œsophage musculaire; pore excréteur s'ouvrant un peu en arrière du niveau des papilles.

\* *Bull. S. II. Nat. Afriq. Nord*, 1911, No. 6, pp. 149-153, fig. 1 à 6.

Deux lèvres latérales portant une dent triangulaire externe et trois dents plus petites, internes ; trois papilles sur le cadre buccal, près de l'insertion de chaque lèvre. Œsophage musculaire allongé, entouré par l'anneau nerveux un peu en arrière de son milieu (aux  $\frac{1}{3}$  de sa longueur). La longueur de l'œsophage entier est le cinquième de celle du corps chez la femelle, le quart chez le mâle.

*Femelle*.—Longueur totale 17 mm. 4 (femelle immature) à 27 mm. Queue longue ( $\frac{1}{21}$  de la longueur totale), conique, régulièrement atténuée, portant à  $250\mu$  en arrière de l'anus, de chaque côté de la ligne médiane ventrale, les orifices des deux glandes caudales.

Vulve située à  $250\mu$  au delà de la terminaison de l'œsophage, au cinquième antérieur de la longueur du corps, en rapport avec un ovéjecteur très allongé, dirigé vers l'arrière. L'ovéjecteur comprend un vestibule tubuliforme, s'étendant sur 1 mm. 5 de longueur, musculo-cuticulaire, à section étroite, juste suffisante pour laisser passer les œufs un à un. La trompe, musculo-épithéliale, est dilatée dès son origine en un réservoir beaucoup plus long que large, où s'accumulent les œufs ; au delà, elle reprend le calibre du vestibule et après un trajet de  $300\mu$  se divise en deux branches qui rejoignent les utérus. Utérus parallèles ; leur extrémité est différenciée en un réceptacle séminal non délimité de l'utérus. Oviductes et ovaires entortillés dans la région postérieure du corps, en avant de l'anus. Œufs à coque épaisse, larvés à maturité ; ils sont allongés et étroits, mesurant  $52$  à  $55\mu$  de grand axe sur  $25\mu$  de petit axe.

*Mâle*.—Longueur totale 20 mm. ; distance du cloaque à la pointe caudale  $650\mu$ .

Région circumcloacale couverte de petits écrous cuticulaires. Ailes caudales étalées, très allongées, à bord externe limité par un ourlet cuticulaire ; elles portent cinq paires de papilles longuement pédoncées qui encadrent la région cloacale : deux paires de ces papilles sont en avant du cloaque, une paire se trouve au niveau de celui-ci, les deux autres sont postanales. Trois papilles sur le bord antérieur du cloaque, la médiane plus petite. Cinq paires de papilles postanales, sessiles en courtement pédoncées : la première est située à peu près au milieu de la distance du cloaque à la pointe caudale ; la seconde est très petite et peu apparente ; les quatrième et cinquième sont contiguës et situées sur le bord postérieur même du cloaque.

Spicules subgêaux, courts et grêles, mesurant respectivement  $280$  et  $265\mu$ .

*Habitat*.—Estomac et œsophage du *Falco biarmicus erlangeri* Kleinschm., Biskra, 1 avril 1914.

Les Rapaces de l'Afrique du Nord nous ont présenté plusieurs Physaloptères ayant une grande similitude et en particulier le même nombre de papilles caudales ; ces Nématodes ont certainement été confondus et signalés sous le nom de *Physaloptera alata* Rud.

1°. Les Eperviers (*Accipiter nisus* L.) de la région de Bône nous ont donné un *Physaloptera alata* qui ne diffère de la forme précédemment décrite que par la position plus reculée vers l'arrière des papilles postcervicales et du pore excréteur.

2°. Dans l'œsophage d'un jeune Epervier pris au nid, à Mascara et sacrifié un mois plus tard, nous avons trouvé un Physaloptère caractérisé par la position très antérieure des papilles postcervicales, situées au niveau du bord postérieur de l'anneau nerveux et du pore excréteur, ce dernier, situé en avant de la terminaison de l'œsophage musculaire ; ce Nématode que nous avons décrit récemment sous le nom de *Physaloptera crosi* diffère du *Physaloptera alata*

par les dimensions plus faibles de l'ovéjecteur, en particulier du vestibule qui est très court, par la brièveté de la queue de la femelle et par la disposition des papilles caudales ; celles-ci sont en même nombre, mais elles sont plus éparpillées que chez le *Physaloptera alata* : la première paire de papilles postanales est plus rapprochée de la pointe caudale et d'autre part, la première des cinq paires de papilles longuement pédunculées qui encadrent la région cloacale est éloignée des suivantes, par conséquent du cloaque.

3°. Le quatrième Physaloptère des Rapaces, que nous avons nommé *Physaloptera galinieri*, a été trouvé à Aïn Onssera dans l'estomac de l'Aigle (*Aquila rapax belisarius* Levaill.) ; il diffère des précédents par la structure des lèvres buccales : la dent externe est très petite, tandis que les trois dents internes très grandes, fortement chitinisées, font saillie au dehors et sont, de ce fait, très apparentes. Les papilles postcervicales et le pore excréteur sont rejetés très loin en arrière ; l'œsophage musculaire est très court. La disposition des papilles caudales est celle qui est réalisée chez le *Physaloptera crosi* Senrat. La particularité la plus appréciable de cette forme réside dans la position éloignée de la vulve qui se trouve à peu de distance en avant du milieu du corps, aux  $\frac{2}{5}$  de la longueur et dans la disposition de l'ovéjecteur qui remonte vers l'avant.

Les Physaloptères des Rapaces de l'Afrique mineure peuvent se distinguer de la façon suivante :

- |   |   |  |
|---|---|--|
| (1) Dent externe, conique, très grande ; 3 dents internes petites, peu apparentes. Vulve antérieure.                  | { | Les 5 papilles longuement pédunculées groupées autour du cloaque. <i>Physaloptera alata</i> .<br><br>Première papille très éloignée des suivantes et du cloaque. <i>Physaloptera crosi</i> . |
| (2) Dent externe très petite ; 3 dents internes très grandes et très apparentes. Vulve rapprochée du milieu du corps. | { | . . . . . <i>Physaloptera galinieri</i> Senrat.  |

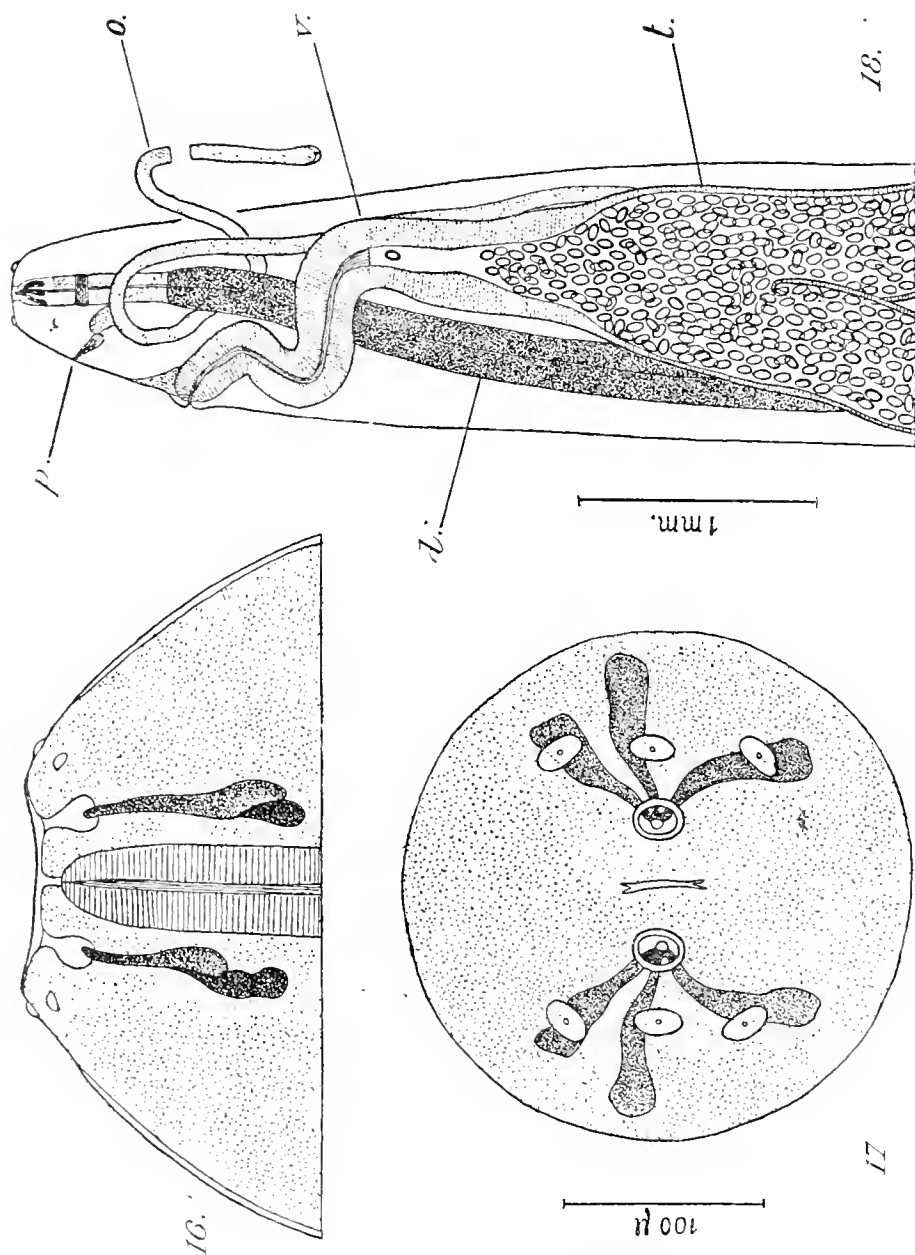
## FAM. FILARIIDÆ Claus 1885.

### 1. *Diplotrixena tricuspis* (Fedtschenko).

Corps cylindrique, très allongé, arrondi aux extrémités, allant en s'atténuant légèrement d'avant en arrière. Bouche petite et étroite, fente allongée dorso-ventralement. A environ 100  $\mu$  de la bouche le cadre buccal porte, à droite et à gauche, trois grosses papilles. En dedans des papilles médio-latérales se trouvent deux dépressions en cul-de-sac au fond de chacune desquelles fait saillie une dent à trois racines\* ; ces deux dents tricuspidés, dont la longueur dépasse 100  $\mu$ , flanquent l'œsophage musculaire à droite et à gauche. Au point de vue morphologique, elles semblent correspondre aux lèvres latérales des Physaloptères.

Œsophage musculaire court, se différenciant par sa teinte plus claire de l'œsophage glandulaire ; il est entouré par l'anneau nerveux un peu en avant de son

\* Ces dents sont parfois évaginées partiellement, ce qui donne à cette Filare l'aspect du *Filaria nodulosa*.

FIG. 16-18.—*Diplotriena triuspis* (Fedts.)

16. Extrémité antérieure vue par la face ventrale.

17. Tête vue de face.

(Le grossissement est le même pour ces deux figures et indiqué par l'échelle 100 $\mu$ .)18. Extrémité antérieure vue latéralement: *d.*, œsophage glandulaire; *o.*, ovaire; *p.*, pore excréteur; *t.*, trompe; *r.*, limite du vestibule et de la trompe.

milieu. La longueur de l'œsophage est le dixième de la longueur totale chez le mâle, elle varie du vingt-deuxième au trente-quatrième de la longueur chez la

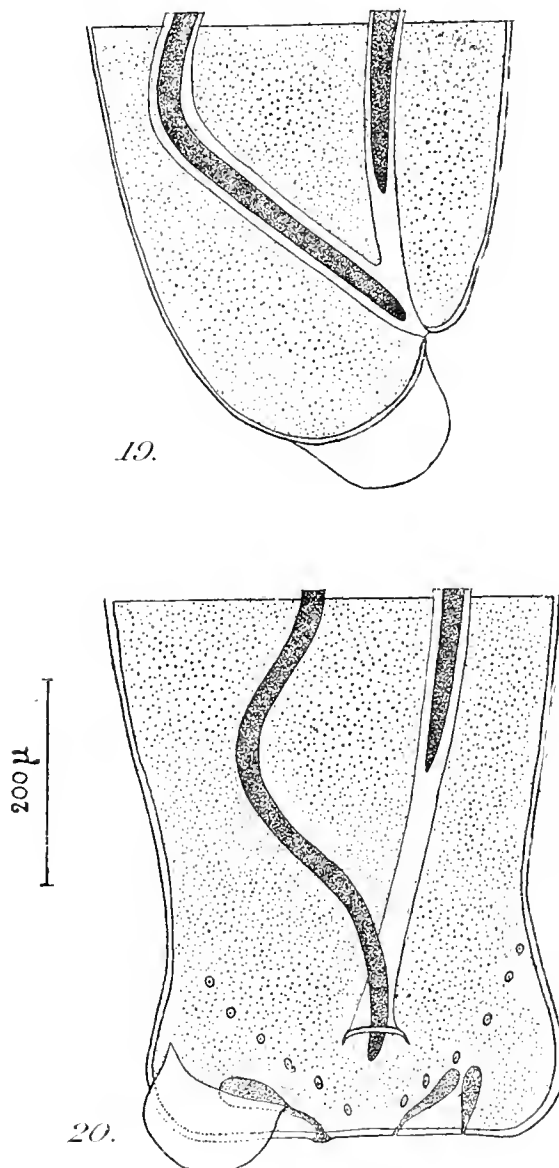


FIG. 19, 20. *Diplotriana tricuspis* (Fedts.).

19. Extrémité caudale du mâle vue de profil.

20. La même vue par la face ventrale.

femelle. Intestin fortement coloré, en noir-jais ou en vert-sombre; chez la femelle, il constitue un axe autour duquel sont enroulées les branches de l'utérus

Lignes latérales très distinctes, de  $400\mu$  de largeur, à nombreux noyaux.

Pore excréteur situé sur la face ventrale, à peu de distance de la bouche, au milieu de la distance de la bouche à la vulve chez la femelle.

*Femelle*.—Longueur totale 186 mm.5; épaisseur maxima  $950\mu$ ; œsophage 5 mm.5.

Anus subterminal, situé à  $80\mu$  de l'extrémité caudale; les glandes caudales s'ouvrent de chaque côté de la ligne médiane ventrale, à l'extrémité de la queue.

Vulve très antérieure, située à une distance de 0 mm.5 à 0 mm.8 de l'extrémité céphalique. L'ovéjecteur, d'une longueur totale de 4 mm.2, comprend un vestibule cylindrique, de 1 mm.5 de longueur, à parois musclaires très épaisses tapissées d'une membrane cuticulaire. La trompe impaire comprend deux parties: la partie attenante au vestibule est caractérisée par une assise musculaire très épaisse, stratifiée; l'assise musculaire s'amincit, au contraire, considérablement dans la seconde partie.

La trompe se divise en deux branches parallèles qui se dirigent vers l'arrière et vont rejoindre les utérus. Ces derniers courent côte à côte sur une partie de la longueur du corps, puis se séparent, l'utérus antérieur remontant vers la région céphalique tandis que l'utérus postérieur se dirige vers la région caudale. Dans la plus grande partie de la longueur du corps on trouve ainsi trois branches utérines bourrées d'œufs, enroulées autour de l'intestin: utérus postérieur et branches directe et réfléchie de l'utérus antérieur.

L'extrémité distale des utérus est différenciée en un réceptacle séminal piriforme très volumineux, de  $660\mu$  de diamètre maximum; le réceptacle séminal antérieur est situé en arrière de l'œsophage, à 11 mm. de l'extrémité céphalique, le réceptacle séminal postérieur à 12 mm. de la pointe caudale. Oviducte grêle ( $100\mu$ ), de 10 mm. de longueur, ovaires entortillés aux deux extrémités du corps; les anses de l'ovaire antérieur arrivent au contact des dents œsophagiennes. La longueur de chacun des ovaires est de 60 mm.

Œufs à coque épaisse, larvés à maturité, mesurant  $60\mu$  de longueur sur  $41\mu$  de largeur. Ces œufs éclosent dans le sang de l'Oïseau; le sang des Corbeaux porteurs de Filaires adultes renferme de nombreuses larves très agiles, du premier stade.

*Mâle*.—Longueur totale 53 mm.; épaisseur maxima  $710\mu$ ; aire latérale de  $150\mu$  de largeur. Œsophage musculaire entouré en son tiers antérieur par l'anneau nerveux; la longueur totale de l'œsophage est de 4 mm.950, celle de l'œsophage musculaire étant de  $540\mu$ .

Extrémité caudale brusquement coupée, à peu de distance ( $130\mu$ ) en arrière de l'anus. Six paires de papilles courtement pédonculées, dont quatre préanales.

Spicules inégaux, le gauche rectiligne mesure 1 mm.400, le droit, sinueux  $800\mu$ , soit un peu plus de la moitié.

*Habitat*.—(1°) *Corvus corax tingitanus* Irby, cavité thoracique, Biskra, 15 mars 1914.

Trois ♀♀ de 130 à 167 mm. de longueur et un ♂ de 35 mm. de longueur.

(2°) *Garrulus glandarius cervicalis* Bp., Djebel Taza, 23 mai 1914.

(3°) *Alcedo diponti*, Aïn Oussera, 15 mai 1914.

(4°) *Motacilla flava flava*, Oued N'za, 19 avril 1914.

Nous avons souvent trouvé cette Filaire à Bou Saada chez le Corbeau; un de



ces Oiseaux, capturé en avril 1914, nous a donné dix spécimens, 3 mâles et 7 femelles, logés dans la cavité thoracique ; la longueur des individus femelles variait de 100 mm. à 190 mm. Elle est également fréquente chez le *Galerida theklae hilyerti* Hart. et Rothsch., de la même localité.

## 2. *Filaria nodulosa* Rud.

Corps cylindrique, arrondi aux extrémités, diminuant légèrement de calibre d'avant en arrière. Cuticule finement striée, marquée en outre de petits boudons. Cellules musculaires très grandes (1200  $\mu$  de longueur), étroites, à limites nettes dessinant une striation longitudinale.

Bouche largement ouverte, allongée dorso-ventralement, limitée latéralement par deux lèvres chitineuses au centre de chacune desquelles s'élève, en forme de lamelle verticale, une dent quadrangulaire de 10  $\mu$  de largeur. Deux papilles latérales pédonculées un peu en dehors de ces lamelles ; sur un cercle plus extérieur sont insérées quatre paires de papilles, 2 paires latéro-dorsales et 2 paires latéro-ventrales.

Nous considérons les deux dents ou lamelles latérales comme l'équivalent morphologique des tridents du *Diplotriana tricuspis*.

Oesophage musculaire ne se différenciant pas de l'oesophage glandulaire. La longueur totale de l'oesophage est le  $\frac{1}{3,4}$  chez le mâle, le septième chez la femelle, de la longueur totale. L'intestin est un tube très long et très grêle, de couleur brune, qui court à la face ventrale du corps. Sur la face ventrale, au tiers de la distance de la bouche à la vulve chez la femelle, s'ouvre l'orifice excréteur.

*Femelle*.—Longueur totale 68 mm. Anus subterminal, très petit (15  $\mu$  de diamètre), mais cependant très distinct. Rectum allongé, où s'ouvrent deux glandes annexes volumineuses.

Vulve très rapprochée de la bouche, à lèvres saillantes. Vestibule de 1 mm. de longueur ; trompe impaire 1 mm. Utérus d'abord parallèles, se séparant ensuite en un utérus antérieur et un utérus postérieur ; ce dernier s'arrête à 1 mm. 8 de la pointe caudale.

Ouf mûr, à coque épaisse, larvé, mesurant 55  $\mu$  de longueur sur 35  $\mu$  de diamètre transversal. Coque légèrement épaissie, du côté interne, à l'un des pôles.

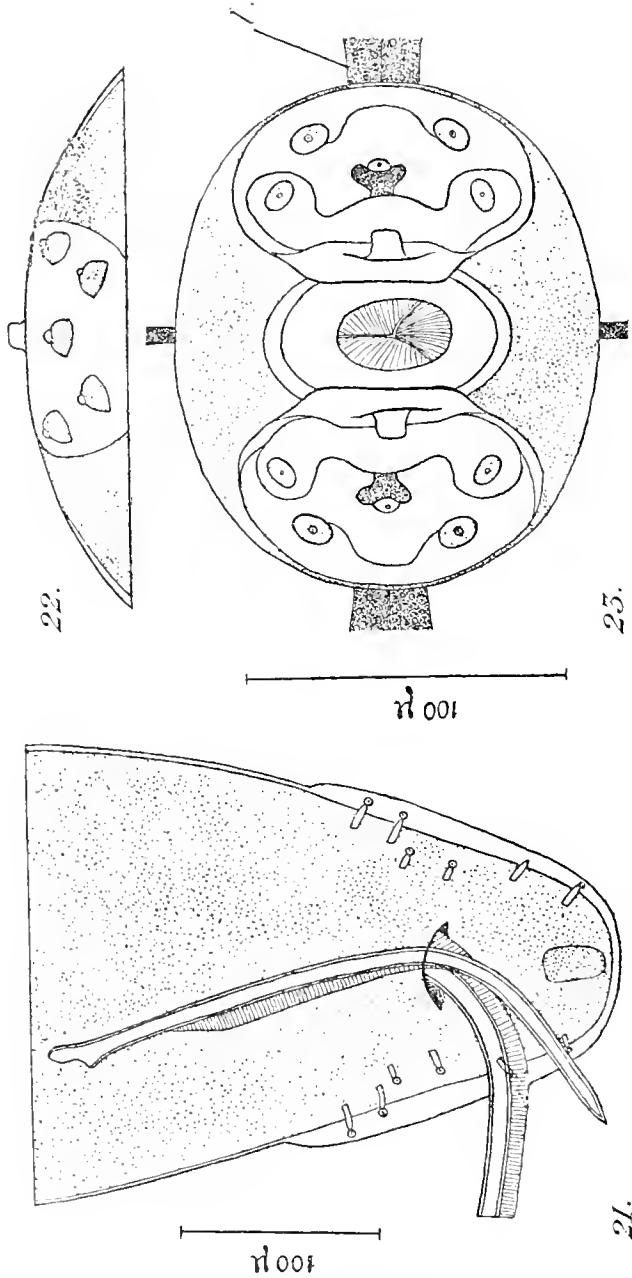
*Mâle*.—Longueur totale 24 mm. ; épaisseur maxima 630  $\mu$ . Oesophage 7 mm., soit le  $\frac{1}{3,4}$  de la longueur totale. Queue arrondie ; la distance du cloaque à l'extrémité est de 70  $\mu$ .

Ailes caudales très étroites (10  $\mu$  de largeur), de 175  $\mu$  de longueur. Papilles pen apparentes : quatre paires de papilles préanales, disposées sur deux rangs, une rangée plus externe et une rangée plus rapprochée de la ligne médiane ; deux paires de papilles postanales.

Spicules très épais, surtout le gauche, effilés à leur pointe et très inégaux (rapport de longueur 6) ; le droit, faiblement arqué, mesure 325  $\mu$  ; le gauche, pourvu d'une aile très large dans sa partie proximale est très long (1 mm. 950) et arqué à l'extrémité libre.

*Habitat*.—*Lanius elegans* Swains., Biskra, 14 mars 1914 ; 4 femelles, de 45 à 57 mm. de longueur, et un mâle de 24 mm.

*Lanius excubitor elegans*, sous la peau du crâne, Oued N'za, 19 avril 1914 ; 12 femelles, pas de mâles.

FIG. 21, 22, 23. *Filaria nodulosa* Rud.

21. Extrémité caudale du mâle vue par la face ventrale.

22. Tête vue latéralement.

23. La même, vue de face; l, aire latérale.

(Le grossissement pour les figures 22 et 23 est indiqué par l'échelle 100  $\mu$  placée à-gauche de la fig. 23.)

### 3. *Filaria attenuata* Rnd. 1819 (= *Filaria guttata* Schneider 1866).

Corps filiforme, s'atténuant régulièrement d'avant en arrière, arrondi aux deux extrémités. Cuticule marquée de stries transversales régulièrement espacées de  $10\ \mu$ . Cellules musculaires allongées, parallèles, à noyau très apparent.

Bouche limitée par deux lèvres latérales, à bord externe arrondi, fortement épaissi et trilobé; 2 paires de papilles près de chaque base d'insertion. Cavité buccale presque nulle, en rapport avec un œsophage musculaire étroit et très court. Œsophage glandulaire épais, coloré, très allongé: l'œsophage entier atteint le quart de la longueur totale chez le mâle, le septième chez la femelle. Intestin de couleur brune, beaucoup plus étroit que l'œsophage. Rectum court, avec deux glandes annexes.

*Femelle*.—Longueur totale 98 à 160 millimètres; épaisseur au niveau de la vulve  $700\ \mu$  (chez une femelle de 145 mm.). Anne subterminal, à  $30\ \mu$  de l'extrémité caudale; queue arrondie.

La vulve, très apparente, limitée par deux lèvres cuticulaires très proéminentes, est une fente transversale de  $100\ \mu$  de largeur, située à  $700\ \mu$  de la tête.

Ovjecteur conformé comme celui du *Diplotriana tricuspis*: vestibule et sphincter confondus en un tube cylindrique, à forte musculature circulaire, de  $600\ \mu$  de longueur, renferment quelques rares œufs; la trompe impaire, qui fait suite, dépasse un millimètre de longueur (1 mm. 980); un certain nombre d'œufs y sont accumulés. Les trompes paires courent parallèlement vers l'arrière et vont rejoindre les utérus.

Utérus très allongés: ils cheminent d'abord parallèlement, puis l'utérus antérieur se replie et remonte vers la tête, tandis que l'utérus postérieur se développe vers l'arrière. Leur extrémité distale est différenciée et dilatée en un réceptacle séminal piriforme énorme, de  $750\ \mu$  de longueur sur  $300\ \mu$  de largeur maxima, bourré de spermatozoïdes qui lui donnent une couleur sombre. Oviducte grêle ( $60\ \mu$  de largeur) de près de 3 mm. de longueur; ovaire long de 6 mm. 5.

Les oviductes et les ovaires entortillés sur eux-mêmes occupent les régions subterminales du corps.

Œufs larvés à maturité, à coque épaisse, mesurant  $50\ \mu$  de longueur sur  $32\ \mu$  de largeur.

*Mâle*.—Longueur totale 41 mm. 5 à 45 mm. \*; épaisseur maxima  $410\ \mu$ ; l'épaisseur en avant des ailes caudales n'est plus que de  $155\ \mu$ .

Œsophage musculaire étroit, de  $240\ \mu$  de longueur; la longueur de l'œsophage entier est de 10 mm. 5.

Ailes caudales étroites, courtes, arrondies, à surface lisse, dépassant la pointe caudale où elles s'unissent.

La distance du cloaque à la pointe caudale est de  $120\ \mu$ . Quatre paires de papilles préanales, dont deux plus externes longuement pédonculées; trois paires de papilles postanales externes, longuement pédonculées, et deux paires de papilles plus rapprochées de la ligne médiane, soit au total cinq paires de papilles postanales. Cette disposition des papilles postanales est à peu près celle que donne Linstow (1899); elle diffère de celle que donne Schneider (1866).

Spicules inégaux (rapport de longueurs: 2); le gauche, de  $720\ \mu$  de longueur,

\* Cette longueur est inférieure à celle que donnent divers auteurs: Dujardin indique 136 à 148 millimètres.

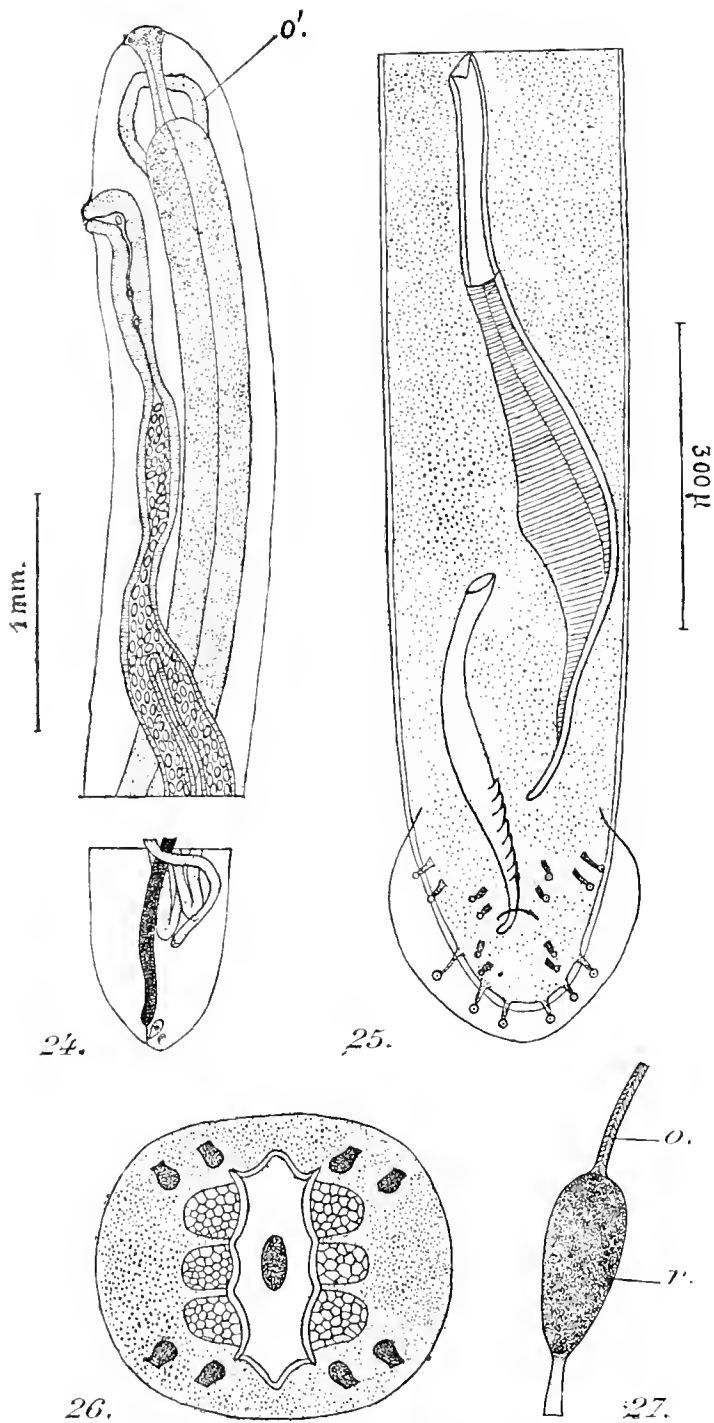


FIG. 24-27.—*Filaria attenuata* Rud.

24. Extrémités antérieure et postérieure de la femelle; o', ovaire.  
 25. Extrémité caudale du mâle vue par la face ventrale.  
 26. Tête vue de face.  
 27. Réceptacle séminal; r, réceptacle séminal; o, oviducte.

est pourvu d'ailes très larges, striées transversalement ; dans sa région moyenne, il présente une articulation à  $220\ \mu$  de son origine. Spicule droit long de  $360\ \mu$ , arqué à l'extrémité et dentelé en scie sur son bord convexe. Pas de gorgeret.

*Habitat.*—*Falco biarmicus erlangeri* Kleinschm., Biskra, 1 avril 1914, deux mâles ; *Falco b. erlangeri* et *Circus pallidus*, Hassi Rebib, Oued Nça, 17 avril 1914, un mâle et une femelle.

*Affinités des Filaires d'Oiseaux.* Les affinités de ces Filaires sont assez difficiles à préciser. La conformation de la bouche, plus particulièrement celle du *Diplotricena tricuspis*, celle de l'ovéjecteur, l'absence d'un gorgeret chez le mâle montrent une affinité avec les Physaloptères. Le genre *Acanthocheilonema* Cobbold établit d'ailleurs la liaison entre les Filaires et les Physaloptères.

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## THE BIRDS OF DAMPIER ISLAND.

By THE HON. WALTER ROTHSCILD, F.R.S., Ph.D., AND ERNST HARTERT, Ph.D.

DAMPPIER ISLAND, or Krakar, is one of the islands along the coast of north-western New Guinea, stretching in a line from Umboi or Rook Island (see *Nov. Zool.* 1914, p. 297) to Vulcan Island (*vide infra*). It lies about 16 or 17 km. north of Cape Croisilles, is almost round, and about 22 by 23 km. in area. It rises to 1500 m. in the form of a cone, and is inhabited on the coast.

No ornithological collector appears to have been at work on this island, except Dahl, who has touched the coast and collected three species: *Sterna anaetheta*, *Orthorhamphus magnirostris*, and *Gallinago megala* (cf. Reichenow, *Jögl. d. Bismarckinseln*, pp. 23, 33, 37).

Mr. Meek, owing to bad health, was not able to go to Krakar in person, but he sent his boat with its well-trained staff of collectors and crew there, who collected on it from January to March 1914.

The island is named in honour of William Dampier, who, after perhaps the most adventurous life known in history, discovered New Britain, this and many other islands, in the year 1700. The native name is Krakar.

On account of the proximity to the mainland of Papua, the ornithology of Dampier Island is chiefly that of north-western New Guinea, but there are some elements of the insular fauna of the Bismarck Archipelago, such as *Myzomela sclateri* and *Carpophaga rhodinolaema*, while *Hypocharmosyna rubrigularis krakari*, a close ally of a New Britain form, and *Macropygia rufa krakari* appear to be peculiar to this isle.

### 1. *Tringa hypoleuca* L.

*Tringa hypoleucos* Linnaeus, *Syst. Nat.* Ed. x. 1, p. 149 (1758—"Europa." Restricted typical locality: Sweden).

2 "♀" Dampier Island, February 1914 (Nos. 6686, 6710).

### 2. *Eulabeornis tricolor tricolor* (Gray).

*Rallina tricolor* Gray, *Proc. Zool. Soc. London*, 1858, p. 52 (Aru Islands).

♀ ad., Dampier I., 12.iii.1914 (No. 6803). "Iris brownish red or maroon; bill green and black; feet dark olive green."

We cannot see how the New Guinea form can be separated from the Aru bird, as no series is at hand for comparison. It is impossible to separate such closely allied races after comparison with one or two specimens; we therefore do not accept Mr. Mathews' name "*E. tricolor grayi*," by which he calls the Papuan birds (*B. Australia* i. p. 295). The skin from Dampier Isle agrees well with Papuan ones. The abdomen is hardly barred, but the amount of barring varies a good deal in our examples. We can, at present, only recognise three races:

*E. tricolor tricolor*: Arn, Papua (Dorey, Sattelberg), New Hanover, Dampier Island.

*E. tricolor robinsoni* Math.: North Queensland.

*E. tricolor cieta* (Hart.): Tenimber, Koer, Dammer.

[Mr. Mathews (*Nov. Zool.* 1911, p. 193) separates *E. tricolor* generically from

"*Rallina*" and *Eulabeornis*, as *Tomirdus tricolor*, saying that he pointed out its differences from *Eulabeornis* and *Rallina* in *B. Australia* i. p. 204.

We fail to understand this from his text, but find that he says, on the contrary, that *Rallina tricolor* and its subspecies "agree quite well in structural features with *Eulabeornis*, though they are admittedly not typical." Further on he proves, with the help of "*Rallina woodfordi*" Grant, that "*Rallina tricolor*" and "*Eulabeornis*" agree "in every structural character," and consequently he unites *tricolor* with *Eulabeornis*. This decision seems to us to be quite wise and satisfactory, and we accept it here, instead of the undefined genus "*Tomirdus*," the type of which by original designation is *tricolor*. If one places side by side *Eulabeornis castaneoventris* (the type of *Eulabeornis*), *poecilopterus*, *woodfordi*, and *tricolor*, one cannot draw a line between them, and must unite all under the name *Eulabeornis*. The "weaker" "*fusciata*" might be kept separate, under the name *Rallina*, but even this does not appear to be necessary.]

### 3. *Gymnocrex plumbeiventris* (Gray).

*Rallus plumbeiventris* Gray, *Proc. Zool. Soc.* 1861, p. 432 (Morty Island).

♀ ad., Dampier I., 21. ii. 1914 (No. 6716). "Iris brown; bill dark horn-colour, greenish yellow towards base; feet red."

This bird had a nest on the ground between the roots of a large tree. It contained eight eggs.

These have a smooth glossy shell of a light pinkish cream-colour, with rufous-brown spots and patches and underlying purplish grey markings. They measure  $41.2 \times 31.4$ ,  $41.3 \times 31.3$ ,  $41.1 \times 30.8$ ,  $41.2 \times 31.2$ ,  $42 \times 31.5$ ,  $41.8 \times 30.4$ ,  $42 \times 31.5$ ,  $41.6 \times 31.4$  mm.

### 4. *Demigretta sacra* (Gm.).

*Ardea sacra* Gmelin, *Syst. Nat.* i. 2. p. 640 (1789—Tahiti!).

♀ ad., slate-coloured, Dampier Island, 6. ii. 1914 (No. 6600).

### 5. *Megapodius duperreyi duperreyi* Less. & Garn.

*Megapodius Duperreyi* Lesson et Garnier, *Bull. Soc. Nat.* viii. p. 113 (1826—Dorey).

6 ♂♂ (Nos. 6546, 6597, 6599, 6680, 6781, 6782) and 3 ♀♀ (Nos. 6543, 6550, 6770) Dampier Island, February and March 1914. "Iris dark brown; bill dull yellow, base brown; feet black and dull greenish brown."

While we find *M. d. eremita*—or what we suppose to be *eremita* (cf. *Nov. Zool.* 1914, p. 208!)—on the chain of islands from the Ecliquerie to the Admiralty and other islands of the Bismarck Archipelago, also the Solomon Islands, and certainly on Rook Island, *M. duperreyi duperreyi* is the form of the mainland of Papua and of the islands close to it, such as Dampier and Vulcan Islands.

The generally lighter colour, more brownish abdomen, slightly less bare forehead and longer crest serve to distinguish *M. d. duperreyi* from *eremita*.

### 6. *Caloenas nicobarica nicobarica* (L.).

See *Nov. Zool.* 1914, pp. 208, 286.

3 ad. (Nos. 6681, 6688, 6737), 4 juv. (Nos. 6598, 6621, 6640, 6765), February and March 1914, Dampier Island.

7. *Chalcophaps stephani* Puch. & Jacq.

See *Nov. Zool.* 1914, pp. 208, 286.

1 ♂ ♀, Dampier Island, February 1914 (Nos. 6511, 6539, 6571, 6616, 6702, 6703, 6709, 6719, 6732, 6733, 6735).

8. *Phlegoenas margarithae* (D'Alb. & Salvad.).

See *Nov. Zool.* 1914, p. 208.

1 ♂ ad. (No. 6523), 2 ♀ ♀ ad. (Nos. 6788, 6805), and 9 juv. (Nos. 6524, 6568, 6569, 6570, 6591, 6760, 6772, 6777, 6793).

The adult male has the throat and chest pure white, while in the adult female there is a buffish grey wash.

9. *Phlegoenas beccarii johannae* Sel.

*Phlegoenas johannae* Selater, *Proc. Zool. Soc. London* 1877, p. 112, pl. xvi (exact locality not known, but evidently Duke of York I., where Dahl collected it).

1 ♂ ad. (No. 6731), 2 ♀ ♀ ad. (Nos. 6657, 6730), 2 ♀ ♀ juv. (Nos. 6667, 6792), Dampier I., February 1914.

We take this to be the typical *johannae*, as the male appears to agree in every way with a male from New Hanover, and with the descriptions; unfortunately, however, we have no skins from the original locality.

"Iris dark brown; bill black (in young birds partly brown); feet, ♂ ♀ ad., dark red (in the young birds dull brownish red)."

10. *Macropygia rufa krakari* subsp. nov.

In colour hardly different from *M. rufa rufocastanea* from the Solomon Islands, though less bright, a shade lighter, and with a delicate "bloom" on the underside.

Wings much longer: 147–150.5 mm., as compared with 138–146 mm. in *M. r. rufocastanea*. Type, ♂ ad., Dampier I., 4. ii. 1914 (No. 6565).

9 ♂ ♀, all apparently adult, Dampier (or Krakar) I., February 2 to 8, 1914 (Nos. 6538, 6545, 6565, 6578, 6579, 6586, 6593, 6617, 6641).

The iris is described as: "Reddish yellow, yellow, yellowish red, bright red; bill black; feet bright red, crimson, cerise."

11. *Myristicivora spilorrhoea* (Gray).

*Carpoplaga spilorrhoea* Gray, *Proc. Zool. Soc. London* 1858, p. 186 (Aru Islands?).

(Cf. *Nov. Zool.* viii. 1901, p. 116.—There is no proof, so far, that several forms of *Myristicivora* breed in the same localities, while all seem to be more or less migratory. Cf. Meyer & Wigglesworth, *B. Celebes* ii, pp. 627–31.)

2 ♂ ♂, 2 ♀ ♀ ad., Dampier Island, February 1914 (Nos. 6558, 6572, 6633, 6704).

"Iris dark brown; bill, tip dull yellow, base slaty blue; feet slate-blue."

12. *Carpophaga pinon astrolabiensis* Meyer.

*Carpophaga westermanni astrolabiensis* A. B. Meyer, *Abh. & Ber. Mus. Dresden* no. 4, p. 14 (1891—Astrolabe Bay, German New Guinea).

♂ ♀ ad., Dampier Island, 7. and 12. ii. 1914 (Nos. 6602, 6644).

"Iris dark red; bill slate blue; feet red."

Wing, ♂ 282, ♀ 258 mm.



The differences of the various forms of *C. pinon* (viz. *pinon*, *rubensis*, *salvadorii*, *westermanni*, and *astrolabiensis*) have been explained in *Nor. Zool.* 1901, pp. 114, 115.

### 13. *Carpophaga rhodinolaema* Sel.

*Carpophaga rhodinolaema* Selater, *Proc. Zool. Soc. London* 1877, p. 555 ("Hab. Ins. Admiralitatis").

*Antrà*, p. 209.

♂ ad., Dampier I., 31. i. 1914 (No. 6519).

### 14. *Megaloprepia magnifica poliura* Salvad.

*Megaloprepia poliura* Salvadori, *Ann. Mus. Civ. Gen.* xii. pp. 426, 427 (1878—S.E. New Guinea and Jobi. Restricted terra typica, Mount Epa, S.E. New Guinea!).

Cf. *Nor. Zool.* 1901, p. 111.

8 ♂ ♀ ad., Dampier Island, February 1914 (Nos. 6537, 6555, 6564, 6577, 6591, 6613, 6628, 6649).

"Iris dark red; bill dull yellow, base greenish; feet yellowish-green, pea-green."

### 15. *Ptilinopus superbus* (Temm.).

*Columba Superba* Temminck, in Knip & Temm. *Pigeons*, p. 75. pl. 33 (1811—"O-taifti," errore! Patria subst. Halmahera).

7 ♂ ♂, 3 ♀ ♀, Dampier Island, January to March 1914 (Nos. ♂ 6510, 6547, 6592, 6619, 6647, 6654, 6807, ♀ 6646, 6726, 6787).

### 16. *Ieracidea berigora novaeguineae* A. B. Mey.

*Ieracidea novaeguineae* A. B. Meyer, *Journ. f. Orn.* 1894, p. 89 ("Nova Guinea orientali," types from German New Guinea).

♀, Dampier Island, 25. ii. 1914 (No. 6736).

"Iris dark brown; bill slate-blue, tip black; feet pale slate-blue."

Wing 371 mm.

The only differences between typical *I. berigora* and these Papuan specimens (i.e. one from Dampier, one from Vulcan, and others from the Sattelberg, Ougarra on the Angabunga, and Avera on the Upper Aroa River) appear to be the almost unspotted upper wing-coverts, which have only concealed rufous spots on the basal portions, generally darker shoulders, crown and sides of the head of the Papuan race. These differences, except the darker shoulders of the reddish individuals, are, however, also seen in N.W. Australian specimens (*Ieracidea berigora melvillensis* Mathews, *Austral Avian Rec.* i. p. 34, "Melville Island and Northern Territory"). As it is, further study will be required to prove the distinctness of *I. berigora berigora*, *occidentalis*, *novaeguineae*, and *melvillensis*; but Mr. Mathews' diagnosis of his "*melvillensis*"—"larger size and black cheeks"—is not a convincing one, and the larger size in any case appears to be not constant.

### 17. *Tyto alba meeki* (Rothsch. & Hart.).

*Strix flammea meeki* Rothschild & Hartert, *Nor. Zool.* 1907, p. 416 (Collingwood Bay, north-east coast of British New Guinea).

2 ♀ ♀ ad., Dampier Island, 2. ii. and 7. iii. 1914 (Nos. 6535, 6784).

These two specimens agree in every detail with the type specimens, and bear

fully out the characters by which to distinguish *T. a. meeki* from its nearest allies. The wings measure 284 mm.

### 18. *Ninox connivens assimilis* Salvad. & d'Alb.

Cf. *Nov. Zool.* 1907. p. 445.

♀. Dampier Island, 25. ii. 1914 (No. 6739).

This specimen agrees very well with the one mentioned, *loc.*, and two others from the Giritu River in British New Guinea, collected by A. S. Meek in 1907.

"Iris chrome yellow; bill black; feet darkish yellow."

### 19. *Nasiterna pusio* ?

*Nasiterna pusio* Selater, *Proc. Zool. Soc. London*, 1865, p. 620, pl. 35 ("Solomon Islands," error!)  
The type probably came from Duke of York Island).

We are not sure if these birds should be united with *pusio*, but rather think that they should be separated as a new subspecies. We have accepted (*Nov. Zool.* 1901, p. 81 and elsewhere) the view of Count Salvaduri, who allowed *pusio* to range from "Duke of York Island, New Britain, St. Aignan's Island to S.E. New Guinea" (*Cat. B. Brit. Mus.* xx. p. 144), and have thus united with *pusio* our specimens from St. Aignan, Sudest Island, Fergusson, Milne Bay, and Konstantinshafen—while we called the examples from the Kumusi River *N. pusio salvadorii*, originally described (*Nov. Zool.* 1901, p. 81) from Takar, Humboldt Bay, and Lower Ambernoh River. This distribution does not look very convincing, and we are afraid that it will turn out to be partially wrong. The skin from Konstantinshafen, collected by Kubary, has a distinct wide yellow superciliary line, and agrees much better with our *salvadorii*, but the sides of the head are not so yellow as in the type specimen, and the same can be said of our series from the Kumusi River, north of the Owen Stanley range. On the other hand the specimens from the Aroa River, Milne Bay, and Louisiades, are more rufous and hardly distinguishable from typical *pusio*, and among the latter we have also an example with a distinct yellowish line.

It may be that we shall have to separate at least three subspecies:

*N. pusio*: New Britain, New Ireland, Duke of York Island.—Superciliary and sides of head yellowish rufous.

*N. pusio* subsp. nov.?: Kumusi River, Milne Bay, D'Entrecasteaux and Louisiade Islands, mountains of British New Guinea (Aroa River).—There is a yellowish superciliary line in most specimens, but see remarks above.

*N. pusio salvadorii*: Lower Ambernoh River, Takar, Humboldt Bay.—Superciliary line and greater part of sides of head yellow.

Larger series, especially from the islands of the New Britain group and the north coast east of Geelvink Bay, are required to confirm these doubtful races.

We have received two males, shot in February and March 1914, on Dampier Island (Nos. 6740, 6797).

"Iris dark brown; bill black and slate-blue; feet ashy blue."

### 20. *Trichoglossus haematodus massena* Bp.

*Trichoglossus massena* Bonaparte, *Rev. et Mag. Zool.* 1854, p. 157 ("Mus. Paris ex Ins. Polynesia."  
No exact locality known).

14 ♂ ♀ ad. and juv., Dampier Island, February 1914 (Nos. 6522, 6548, 6554, 6557, 6693, 6797, 6714, 6715, 6724, 6725, 6744-6747).

"Iris yellowish red, reddish yellow, dark red, bright red; bill red, tip orange or yellow; feet ashy blue."

Young birds have the bill brownish red, iris brownish red, the colours of the head duller, cheeks and chin more greenish, the red of the breast a bit duller, and the blackish fringes to the breast-feathers a little wider and less sharply defined.

## 21. *Hypocharmosyna rubrigularis krakari* subsp. nov.

Comparing our fine series from Krakar or Dampier Island with one inferior skin (unsexed) collected by Dr. Dahl at Ralun (New Britain), and with the descriptions by Selater, Salvadori, Reichenow, as well as with the figure in Mivart's "*Loriidae*," fig. 1, plate L, we come to the conclusion that the race from Dampier Island is different from *H. rubrigularis*. It differs as follows:

There is, instead of a red patch on the upper throat only, a large red patch extending over the greater part of the throat, and this red patch appears to be of a slightly brighter red; moreover, it is bordered below by a yellow patch which is absent or only indicated in *H. r. rubrigularis*. The fourth outer primary seems to have red at base in all specimens of the latter, but this is entirely absent in three of our examples, indicated in one, distinctly present in three, while in one the fourth outer primary is wanting. Moreover, our birds are slightly larger. Wing, ♂ 95.5-98, ♀ 94-95; tail ♂ 98-101, ♀ 96.5-97; culmen from cere 11.5-12 mm.

Type: ♂ Dampier Island, 16.ii.1914. (No. 6678.)

We have received six skins.

4 ♂♂ (Nos. 6677, 6678, 6723, 6758) and 4 ♀♀ (Nos. 6679, 6756, 6757, 6809) collected on Dampier or Krakar Island in February, and one in March 1914.

"Iris yellowish red or red; bill the same; feet yellowish red or reddish yellow (once)."

## 22. *Scythrops novaehollandiae* Lath.

*Scythrops novaehollandiae* Latham, *Ind. Orn.* i. p. 141 (1790—"Nova Hollandia." Restricted terra typica New South Wales, Mathews, 1912, 1913).

♂ (?), Dampier Island, 10.iii.1914 (No. 6790).

"Iris dark red; bill light horn-colour and black; feet pale slaty blue."

It must be left for further research, whether Australian specimens reach larger dimensions than those in the Papuan and Moluccan subregions, but as the size varies considerably, even in Australia, in the same districts, this seems to be doubtful. Mr. Mathews has separated a smaller subspecies from the "Northern Territory" and N.W. Australia, but the wing-measurement (341) which he gives is quite usual in females. His subspecies, therefore, requires further investigation.

## 23. *Eudynamis orientalis rufiventer* (Less.).

*Cuculus rufiventer* Lesson, *Foy. Coquille, Zool.* i. p. 623 (1828—New Guinea. Restricted terra typica: Dorey, where Lesson collected. Cf. *Nor. Zool.* 1903, p. 238, 1907, p. 440.

6 ♂♂, 5 ♀♀, Dampier Island, February and March 14, 1914 (Nos. 6530, 6531, 6552, 6553, 6561, 6582, 6604, 6605, 6624, 6684, 6808).

"Iris dark red in both sexes; bill slate blue (pale); feet slate blue." Wings of males, 190-200, of females 184-195 mm.

24. *Cuculus optatus* Gould.

*Cuculus optatus* Gould, *Proc. Zool. Soc. London*, pt. xiii, 1845, p. 18 (1845—"Port Essington, Australia").

♂, Dampier Island, 12. ii. 1914 (No. 6653).

"Iris lemon yellow."

25. *Cacomantis sepulcralis assimilis* (Gray).

*Cuculus assimilis* Gray, *Proc. Zool. Soc. London*, 1858, pp. 184, 195 (Aru Is.) ; cf. *Nov. Zool.* 1907, p. 434 ; 1912, p. 334 ; 1914, p. 212 (no. 21).

10 ♂ ♀ ad. and juv., Dampier Island, February 1914 (Nos. 6596, 6609, 6615, 6637, 6655, 6673, 6685, 6708, 6728, 6729).

26. *Chrysococcyx malayanus poecilurus* Gray.

*Chrysococcyx poecilurus* Gray, *Proc. Zool. Soc. London* 1861, pp. 431, 437 ("Mysol and New Guinea"). (Type from Mysol in Brit. Museum ; *Nov. Zool.* 1907, p. 438.)

*Chrysococcyx malayanus poecilurus* Stresemann, *Nov. Zool.* 1914, p. 116.

2 ♂ ♂ ad., 1 ♀ ad., Dampier Island, 2., 11. ii., 3. iii. 1914 (Nos. 6526, 6631, 6764).

"Iris brownish red, brown, chocolate ; bill black, in the female slate at base of lower mandible ; feet slate-blue, dark slate-blue black."

In *Nov. Zool.* 1907, p. 438, we mentioned that we had also specimens from Cape York. Mathews, *List. B. Australia*, p. 157, separates the Cape York form as *russatus* Gould, described from Cape York. Probably Mr. Mathews is perfectly right in separating this form which we would call *C. malayanus russatus* Gould.

27. *Tanysiptera hydrocharis meyeri* Salvad.

[*Tanysiptera hydrocharis* Gray, *Proc. Zool. Soc. London* 1858, pp. 172, 190 (Aru Islands).]

*Tanysiptera meyeri* Salvadori, *Orn. Pap. e Molucc.*, Aggiunte, i. p. 54 (1889—Kafu ; north coast of German New Guinea, opposite the Guilbert and Bertrand Islands).

(See also *Nov.* 1901, p. 161 ; about the name *hydrocharis* versus *dea* : Hartert, *Nov. Zool.* 1903, p. 48.)

10 ♂ ♀ ad., Dampier Island, 2.-13. ii. 1914 (Nos. 6527, 6576, 6606, 6620, 6634, 6645, 6651, 6652, 6656, 6661).

"Iris dark brown ; bill bright red ; feet yellowish or greenish yellow."

We are unable to separate this series from 14 adult specimens from German New Guinea and Takar. It is rather interesting to find that these birds are indistinguishable from those of the opposite coast of New Guinea, while, on the other hand, the series from Vulcan Island is sufficiently distinct to recognise it as a different subspecies ; if the two series are side by side on the table the difference is obvious, even though the measurements do not make it very striking.

We wish here to correct our views of 1901, when (*Nov. Zool.* p. 161) we expressed our opinion that *T. microrhyncha* was not separable from *T. hydrocharis galatea*. With a series from Milne Bay, Collingwood Bay, Mambare River, Kumusi River, Mount Camerou, Mount Victoria, Aroa River, Brown River, and Port Moresby, we are bound to admit, that the form from South-eastern New Guinea must be separated from that of North-western Papua ; its bill is generally much smaller, although occasionally a specimen of *T. h. microrhyncha* may not be separable from one of *T. h. galatea* ; the wing is also on the average shorter in the former, measuring 102, 102, 102, 103, 103, 103, 103, 103, 103, 103, 104, 104, 104, 104,

104, 104, 104, 105, 105, 105, 106, 106, 106, 106, 106, 108, 109, 109, 110 mm., as against 107-113 in *T. h. galatea*; a skin from Waigin has the wing even 117 mm. long, but another from the same island has it barely 110 mm. The crown and shoulder-patch in *microrhyncha* is of the same darker, more bluish colour as in *galatea*, not paler as in *meyeri* and *vulcani*. In one of our specimens of *microrhyncha* the longest tail-feather has the enormous length of 362 mm.

## 28. *Alcyone azurea lessonii* Cass.

*Alcyone Lessonii* Cassin, *Proc. Acad. Philadelphia*, v. 1850-1851, p. 69 (1852—Dorey, Dutch New Guinea).

Most of the specimens from Dampier Island are rather pale on the underside. The wings are in both sexes 72.5-76 mm., and there is no difference between the sexes. Size and colour of underside very variable.

We have received 9 adult males and females, collected from February 1 to March 3, 1914 (Nos. 6520, 6549, 6691, 6692, 6712, 6713, 6743, 6762, 6766).

## 29. *Ceyx solitaria solitaria* Temm.

*Ceyx solitaria* Temminck, *Pl. Col.* 595, fig. 2 (1836—Lobo Bay, New Guinea, collected by Salomo Muller).

7 ♂ ♀, Dampier Island, February 14 to March 11, 1914 (Nos. 6665, 6699, 6706, 6761, 6798, 6785, 6799). "Iris dark brown; bill black (some, apparently less aged, with a pale tip); feet reddish yellow."

These birds appear to be inseparable from the true *solitaria*. The wings measure 55-59 mm.

It seems that there are two ill-defined races in New Guinea: one, a slightly larger one, in the western parts and along the north coast to Simbaug in German New Guinea, with the wing 55, or generally 56 to 59.5 mm.; another, slightly smaller one, in British New Guinea and Fergusson Island, with the wing 52 to 54, seldom 55, and once 56.5 mm. (See also *Bull. B. O. Club*, xxxv. p. 24).

We should like to postpone the naming of the smaller race until we have still better series, though many forms have been based on similar material and similar differences in size only.

## 30. *Halcyon sancta* (Vig. & Horsf.).

*Halcyon sanctus* Vigors and Horsfield, *Trans. Linn. Soc. London*, xv. p. 206 (1827—Australia; evidently New South Wales; cf. Mathews, *List B. Austr.*, p. 149).

2 ♂ ♂, 2 ♀ ♀, Dampier Island, end of February and March 1914 (Nos. 6748, 6759, 6763, 6804).

## 31. *Eurystomus orientalis crassirostris* Schl.

*Eurystomus crassirostris* Slater, *Proc. Zool. Soc. London* 1869, p. 121 (Solomon Islands).

1 ♂, 2 ♀ ♀, Dampier Island, February and March 1914 (Nos. 6697, 6734, 6778).

## 32. *Caprimulgus macrourus* Horsf.

*Caprimulgus macrourus* Horsfield, *Trans. Linn. Soc. London*, xiii. p. 142 (1821—Java).

♂ (moulting), Dampier Island, 5. iii. 1914 (No. 6779).

We have, so far, not been able to separate the Papuan birds from typical *macrourus*.

33. *Collocalia fuciphaga hirundinacea* Stres.

*Collocalia fuciphaga hirundinacea* Stresemann, *Verh. Orn. Ges. Bayern* xii. p. 7 (1914—"Westl. Neu-Guinea"; mistake for Eastern New Guinea! Type: No. 4438, Upper Setekwa River, 28. vii. 1910, in Tring Museum).

♀ ad., Dampier Island, 20. ii. 1914. Wing 117 mm. (No. 6795).

The differences of this very closely allied form have been well described by its author, and they are confirmed by the specimen under consideration.

34. *Collocalia esculenta esculenta* (L.).

*Hirundo esculenta* Linnaeus, *Syst. Nat.* ed. x. i. p. 191 (1758—"China," errore! The correct locality is Amboina! Ex Rumphius).

3 ♂♂, Dampier Island, 7., 14. ii. 1914 (Nos. 6608, 6662, 6663).

35. *Pitta atricapilla atricapilla* Quoy & Gaim.

Cf. *Nor. Zool.* xx. 1913. p. 492.

8 ♂♀ ad., Dampier Island, February and March 1914 (Nos. 6618, 6700, 6701, 6738, 6789, 6800, 6801, 6802).

36. *Chelidon javanica* (Sparrm.).

Cf. *Nor. Zool.* xx. 1913. p. 492.

10 ♂♀ ad., Dampier Island, February and March 1914 (Nos. 6574, 6575, 6717, 6720, 6721, 6741, 6742, 6750, 6752, 6771).

37. *Monarcha chalybeocephalus chalybeocephalus* (Garn.).

*Muscivora chalybeocephalus* Garnier, *Voy. Coquille, Zool. Atlas*, pl. xv, fig. 1 (♀), i. 2. p. 589 (1826, 1828—New Ireland); cf. *Nor. Zool.* 1903. p. 457, nos. 10 and 11.

5 ♂♂ ad., 3 ♂♂ juv., 2 ♀♀, Dampier Island, January and February 1914 (Nos. 6509, 6525, 6541, 6566, 6567, 6587, 6603, 6610, 6611, 6612).

These specimens seem to agree in every way, *i.e.* in size of bill and wing, and in the purplish gloss of their plumage, with typical *chalybeocephalus*, from New Ireland, Rook, Manns (Admiralty Islands), and other localities.

With sufficient series on hand the birds from South-eastern New Guinea might be separated, but not with satisfaction, as far as we can see at present.

38. *Monarcha inornatus inornatus* (Garn.).

*Muscivora inornata* Garnier, *Voy. Coquille, Zool., Atlas* pl. xvi, fig. 2. i. 2. p. 591 (1826-1828—Dorey).

9 ♂♀ ad., 2 juv., Dampier Island, February 1914 (Nos. 6580, 6607, 6622, 6625, 6670, 6682, 6683, 6695, 6698, 6718, 6727).

"Iris dark brown; bill blackish, light horn-colour at base; feet slate-blue."

It is peculiar that nearly every specimen has the base of the bill light-coloured, while this is only occasionally seen, and apparently only in less adult individuals, in our series of *M. inornatus* from other localities, in which the bill is usually bluish slate, with the distal portion of the cutting edges light-coloured. Our specimens (except two) appear, however, to be in adult plumage. We cannot, at

present, explain these facts, but call the attention of collectors to it, in order that they may, one day, explain if this is seasonal, or a local character, as it does not appear to be due to age.

### 39. *Myiagra nitida novaepomeraniae* Rehw. (?)

Cf. *Nor. Zool.* 1914, p. 215.

1 ♀ (or ♂ juv.), Dampier Island, 7. iii. 1914. (No. 6786.)

This specimen does not bring us any further in the question of the various forms of *M. nitida*, but we have to add that the adult male (No. 5897) from Rook Island has the upperside, and especially the throat, more greenish glossy than it is in the males from other localities.

### 40. *Gerygone conspicillata ramuensis* Rehw.

*Gerygone ramuensis* Reichenow, *Orn. Monatsber.* 1897, p. 26 (Ramu, German New Guinea).

*Gerygone conspicillata ramuensis*, *Nor. Zool.* 1903, p. 474.

We have only three mediocre skins from "Friedrich Wilhelm's Hafen," and one from Collingwood Bay, collected by Mr. Meek in 1907, to compare, and cannot discover any essential differences between these and a series from Dampier Island; it is true that the majority of the Dampier (and Vulcan) skins are somewhat darker in colour, but it must be remembered that they are very fresh and beautifully made skins, and also that one of the three from Friedrich Wilhelm's Hafen is equally dark.

We have received nine skins from Dampier, collected about the middle of February 1914 (Nos. 6632, 6642, 6643, 6648, 6650, 6660, 6669, 6671, 6672).

"Iris dark red; bill black; feet slate-colour or slaty black."

Wings: males, 55-59 mm.; females, 53-54.5 mm.

### 41. *Cinnyris jugularis flavigastra* (Gould).

*Nectarinia flavigastra* Gould, *Proc. Zool. Soc. London*, 1843, p. 104 (New Ireland).

*Cinnyris jugularis flavigastra*, *Nor. Zool.* 1914, p. 297.

6 ♂ ♂ ad., 5 ♀ ♀, Dampier Island, 31. i.—6. ii. 1914 (Nos. 6152, 6513, 6532, 6533, 6534, 6551, 6562, 6563, 6585, 6589, 6590).

These specimens belong distinctly to the eastern more yellow form.

### 42. *Cinnyris sericeus sericeus* Less.

*Cinnyris sericeus* Lesson, *Dict. Sciences Natur.* i, p. 21 (1827—"Doréry" = Dorey).

*Cinnyris aspasia aspasia* Less., *Rothsch. & Hart.*, *Nor. Zool.* 1903, p. 211; cf. also Stresemann, *Nor. Zool.* 1914, p. 143.

5 ♂ ♂, 5 ♀ ♀, Dampier Island, January 31 to March 10, 1914 (Nos. 6517, 6529, 6536, 6560, 6583, 6584, 6596, 6780, 6783, 6791).

### 43. *Myzomela sclateri* Forbes.

*Myzomela sclateri* Forbes, *Proc. Zool. Soc. London*, 1879, p. 265, pl. xxv. 2—(Palakuru = Credner Island, between New Britain and Duke of York Island).

3 ♂ ♂, Dampier Island, 21., 24., 28. ii. 1914 (Nos. 6711, 6722, 6751).

"Iris dark brown; bill black; feet slate-blue." Wings 62, 63, 65 mm.

These three skins agree perfectly with the original description and figure, and

also with a skin from the late Godeffroy Museum, collected at "Nannka," 26. v. 1879, by Th. Kleinschmidt. The distribution of this very rare species is interesting. It is only known from the Credner Islands, Uatom (a small island to the north of the Gazelle Peninsula), and from "Nannka": where this place is, we cannot find; it is not likely to be "Nannk," inland in the Gazelle Peninsula, as *M. selateri* was not found there by Dr. Dahl, nor anywhere else on the great island of New Britain. It appears to be a bird of outlying small islets, and it is most interesting to find it on Dampier Island, far west of the New Britain group of islands.

#### 44. *Dicaeum geelvinkianum rubrocoronatum* Sharpe.

*Dicaeum rubrocoronatum* Sharpe, *Nature*, 1876, p. 339 ("Port Moresby").

5 ♂♂, 5 ♀♀, Dampier Island, 4. ii.—13. iii. 1914 (Nos. 6559, 6573, 6588, 6614, 6623, 6626, 6627, 6794, 6795, 6806).

It is very curious that this bird, which we have hitherto only had from south-eastern New Guinea and the D'Entrecasteaux Islands, occurs on Dampier and Vulcan Islands.

#### 45. *Motacilla boarula melanope* Pall.

*Motacilla Melanope* Pallas, *Reise d. versch. Prov. d. Russ. Reichs* iii. p. 696 (1776—Dauria).

♂, Dampier Island, 11. iii. 1914 (No. 6796).

Part of body plumage and throat moulting.

#### 46. *Erythrura trichroa goodfellowi* O.-Grant.

*Erythrura trichroa goodfellowi* O.-Grant, *Bull. B. O. Club* xxix. p. 29 (1911—Moroka Mountains, British New Guinea).

The races of *E. trichroa* have now reached the number of seven! Five of them have been discussed by one of us in *Nor. Zool.* 1900, pp. 6 and 7. Since then Mr. Ogilvie-Grant described a bird from the Moroka Mountains, British New Guinea, and Stresemann one from Ceram. Mr. Grant (*Bull. B. O. Club* xxix. p. 29) compared his new race only with "*E. trichroa* Kittl.," instead of the two geographically nearer, *E. trichroa papuana* from Arfak and *E. trichroa modesta* from the Northern Moluccas. From *modesta* his *goodfellowi* differs only in the less yellowish tinge of the plumage and the deeper blue of the forehead and ear-coverts, but some Moluccan skins are hardly separable! The type of *E. t. papuana* Hart. differs by the great extent of the blue on the crown (see original description), and has a huge bill. A similarly large bill and equally long wing is found in some specimens from the mountains of British New Guinea, in the Tring Museum, but not one of those before us has the blue equally far extended on the head. It seems, therefore, that we have to distinguish seven races, as follows:

*E. trichroa trichroa* (Kittl.)—Caroline Islands.

*E. trichroa modesta* Wall.—Northern Moluccas.

*E. trichroa pinaiae* Stres.—Southern Moluccas (Ceram): the differences stated by Stresemann are obvious, but the new race has been rather daringly described from only one adult and one semi-adult male!

*E. trichroa papuana* Hart.—Arfak, New Guinea.

*E. trichroa goodfellowi* O.-Grant.—Mountains of British New Guinea, probably nearly the whole of Eastern New Guinea, as we have received a series from Vulcan and Dampier Islands, which we cannot separate from those of British Papua.



We have now received of this *E. t. goodfellowi* (if different from *E. t. papuana*) 2 ♂♂ ad., 4 ♀♀ ad., and 3 young and semi-adults, collected on Dampier Island in January and February 1914 (Nos. 6514, 6515, 6516, 6518, 6521, 6542, 6544, 6581, 6601).

The iris of all is described as dark brown, bill black, feet light horn-colour.

The wings of the adult males measure 61 and 64 mm.

#### 47. *Lonchura tristissima* (Wall.).

*Munia tristissimæ* Wallace, *Proc. Zool. Soc. London*, 1865, p. 479 (N.W. Peninsula, New Guinea).

11 ♂♀, Dampier Island, February and March 1914 (Nos. 6749, 6753, 6754, 6755, 6767, 6768, 6769, 6773, 6774, 6775, 6776).

"Iris dark brown; bill and feet slate-blue."

#### 48. *Aplonis cantoroides* (Gray).

*Calornis cantoroides* G. R. Gray, *Proc. Zool. Soc. London*, 1861, pp. 431, 436 (Mysol). (Cf. *Nov. Zool.* 1914, p. 218).

11 ♂♀ ad., about half moulting, chiefly on wings, body plumage, some on tails, shot on Dampier Island from February 2 to 18, 1914 (Nos. 6540, 6556, 6630, 6636, 6658, 6674, 6675, 6687, 6689, 6690, 6694).

"Iris crimson, bright red, or yellowish red."

#### 49. *Aplonis metallica metallica* (Temm.).

*Lamprotorus metallicus* Temminck, *Pl. Col.* 266 (1824—"Timor," "Celebes"—errore! Corrected terra typica Amboina!)

The Shining Starling from Dampier Island is quite typical "*metallica*."

Mr. Stresemann has written a very useful little article on the forms of *Aplonis* (or *Lamprocorax* as he called it then) *metallicus* in *Nov. Zool.* xix. p. 311. We cannot, however, agree with him in all points. First of all, we think that the Australian form must be separated, because the purple area on the back encloses a much larger and much more conspicuous dark green patch than in *A. m. metallica*. The Australian form must be called *Aplonis metallicus purpurascens* (Gray). (Cf. *Calornis purpurascens* Gray, *Handl. Birds* ii. p. 26, no. 6377, name based on Gould's plate in *B. Australia* (sub nomine *metallica*), terra typica = Cape York.) Secondly, we cannot see that the specimens from the Lonisiade and D'Entrecasteaux Islands are anything but typical *metallica*, and we cannot see in them an approach towards *A. met. nitidus*, as Mr. Stresemann maintains.

We have received from Dampier Island 8 ♂♀ ad. (Nos. 6595, 6629, 6635, 6638, 6639, 6659, 6664, 6666) and 1 juv. (No. 6528), all collected in February 1914. It is of course established beyond doubt that the sexes are alike, and that all the birds with the underside white and striped with metallic green are more or less young. Two of the adult birds are moulting.

## THE BIRDS OF VULCAN ISLAND.

By THE HON. WALTER ROTHSCILD, F.R.S., PH.D., AND ERNST HARTERT, PH.D.

VULCAN Island, or Mannumdar, is an immense cone with an active volcano, covered with the richest and most beautiful vegetation, and rising to above 1300 m. It is not more than about 12 km. from the nearest point of New Guinea, and about 15 by 8 km. in size. No collections have, to our knowledge, been made on this island, but Meek's party has brought together, in December 1913 and January 1914, a very fine lot of birds.

With regard to the character of the ornithology of Vulcan Island, almost the same may be said as what we have said about Dampier or Krakar: it is mainly that of the opposite coast of New Guinea, but even here we find a trace of the insular fauna of the Bismarek Archipelago, in *Carpophaga rhodinolaema*; and *Macropygia amboinensis meeki*, *Tangsiptera hydrocharis vulcani*, and *Monarcha chalybeocephalus mannumdari* are new forms, the latter deserving special attention, as on Dampier Island, which is farther away from the mainland of Papua, the wide-spread *M. chalybeocephalus chalybeocephalus* is found.

### 1. *Tringa hypoleuca* L.

Cf. *Antea*, p. 26.

♂ ♀, Vulcan Island, 3. i. 1914. (Nos. 6501, 6502.)

### 2. *Tringa (Heteractitis) incana brevipes* (Vieill.)

*Totanus brevipes* Vieillot, *Nouv. Dict. d'Hist. Nat.* vi. p. 410 (1816—terra typica Timor, cf. Pucheran, *Rec. and Mag. Zool.* 1851, p. 370).

♂ ad., Vulcan Island, 24. xii. 1913. (No. 6484.)

### 3. *Numenius phaeopus variegatus* (Scop.).

*Tantalus variegatus* Scopoli, *Del. Flor. et Faun. Insubr.* ii. p. 92 (1786—Luzon).

♂ ad., Vulcan Island, 3. i. 1914. (No. 6593.)

### 4. *Megapodius duperreyi duperreyi* Less. & Garn.

*Antea*, p. 27.

5 ♂♂ (Nos. 6292, 6342, 6387, 6479, 6491); 3 ♀♀ (Nos. 6388, 6446, 6462), Vulcan Island, November and December 1913.

An egg of female No. 6388 is perfectly glossless and pale buff-pink (like No. 20, pl. IV. of Ridgway's *Nomencl. Col.* 1886). It measures 82.2 × 46.5 mm.

### 5. *Chalcophaps chrysochlora chrysochlora* (Wagl.).

*Columba chrysochlora* Wagler, *Syst. Ar., Columba*, sp. 79 (1827—"Ceylon, Java, Sumatra et China," errore! Substituted locality: Australia, because the description refers solely to the Australian form. Cf. Hartert, *Nor. Zool.* 1904, p. 183).

8 ♂♂, 3 ♀♀, Vulcan Island, November and December 1913. (Nos. 6269, 6302, 6397, 6313, 6314, 6354, 6371, 6377, 6396, 6417, 6432.)

6. *Phlegoenas margarithae* (D'Alb. & Salvad.).*Antea*, p. 28.

1 ♂ ad., 2 ♀ ♀ ad., 3 juv. from Vulcan Island, December 1913, January 1914. (Nos. 6415, 6444, 6494, 6500, 6506.)

"Iris dark brown : bill black ; feet red." In the young birds the feet are "dull reddish brown."

7. *Reinwardtoena reinwardtsi griseotincta* Hart.

*Reinwardtoenas reinwardti griseotincta* Hartert, *Nov. Zool.* iii. p. 18 (1896—New Guinea, type Mts. of British Papua).

(Cf. *Nov. Zool.* viii. p. 127.)

♂ ad., Vulcan Island, 5. xii. 1913. (No. 6366.)

"Iris dark red ; bill light and dark horn-colour with red base ; feet purplish red."

8. *Macropygia amboinensis meeki* subsp. nov.

♂ ad.: nearest to *M. a. maforensis* Salvad. from the island of Mafor in the Geelvink Bay, but the upperside is darker, almost without the slightest rufous admixture, like a dark sepia or clove-brown (Ridgway's nomenclature), not dark chestnut brown, as in *M. a. maforensis*. The feathers of the breast are more vinous ; the abdomen appears to be slightly less rusty yellow. The tail-feathers are also less rufous, being dark brown, almost exactly the same as the colour of the back. Wings ♂ ad., 164–165, tail 190–194, culmen 21 mm.

♀. Top of head brown, with very little rusty spotting, feathers of hind-neck with wide dark metallic-green or greenish purple tips and narrow buffy fringes, as if powdered with buff at the utmost borders ; back dark brown, rump and upper tail-coverts with ferruginous tips. Tail dark brown (clove-brown), outer rectrices blackish at base, with an oblique black bar and a similar bright rufous bar in the middle, tip rufous, shaded with grey. Feathers of foreneck and chest sooty grey with brownish buff fringes.

♂. "Iris red with slaty blue inner circle ; bill black ; feet bright red."

♀. "Bill dark brown ; feet purplish or brownish red."

Type : ♂ ad., Vulcan Island, 28. xi. 1913. (No. 6308.)

3 ♂ ♂ ad. (Nos. 6308, 6320, 6393) ; 1 ♂ fere ad. (No. 6317) ; 5 ♀ ♀ (Nos. 6275, 6295, 6297, 6303, 6356), Vulcan Island, November and December 1913.

9. *Myristicivora spilorrhoea* (Gray).*Antea*, p. 28.

2 ♂ ♂, 1 ♀ ad., Vulcan Island, November and December 1913. (Nos. 6325, 6397, 6398.)

10. *Carpophaga pinon astrolabiensis* Meyer.*Antea*, p. 28.

2 ♂ ♂ ad., Vulcan Island, 3 and 21. xii. 1913. (Nos. 6344, 6472.)

Wing 286 mm. (one moulting).

11. *Carpophaga rhodinolaema* Schl.*Antea*, p. 29.

♂ ad., Vulcan Island, 3. i. 1914. (No. 6505.)

12. *Megaloprepia magnifica poliura* Salvad.*Antea*, p. 29.

9 ♂ ♀ ad., Vulcan Island, November and December 1913. (Nos. 6293, 6294, 6323, 6333-6, 6369, 6412.)

13. *Ptilinopus superbus* (Temm.).*Antea*, p. 29.

8 ♂ ♀, Vulcan Island, November and December 1913. (Nos. 6281, 6304, 6331, 6332, 6339, 6409, 6431, 6481.)

It is remarkable that the violet-purple bars in the middle of the feathers of the chest are sometimes ill defined or even wanting.

14. *Ptilinopus coronulatus quadrigeminus* A. B. Meyer.

*Ptilinopus quadrigeminus* A. B. Meyer, *Ibis* 1890. p. 421 (Constantine Harbour, German New Guinea).

*Nov. Zool.* 1901. p. 102

3 ♂ ♂ ad., 1 ♀ ad., Vulcan Island, December 1913. (Nos. 6445, 6458, 6473, 6477.)

"Iris yellow; bill pea-green; feet dark purple red or cherry-colour."

The differences of the various forms of *P. coronulatus* have been explained by us in 1901, *l.c.*

The female is considerably smaller than the male. Wings of males 109-112.5, females 106 mm. The middle of the throat of two of the males is sulphur yellow, almost as bright as in *P. c. geminus*.

15. *Ptilinopus iozonus jobiensis* Schleg.

*Ptilinopus humeralis jobiensis* Schlegel, *Mus. Pays-Bas, Columbae*, p. 16 (1873—Jobi Island).

*Cf. Nov. Zool.* 1901, p. 104.

8 ♂ ♀, 1 juv., Vulcan Island, November and December 1913. (Nos. 6270, [juv.], 6287, 6343, 6345, 6346, 6349, 6350, 6360, 6370.)

"Iris dull or cadmium yellow; bill greenish, dull or pale yellow, base slate-colour; feet dark purplish red."

(In 1901 we thought that *Ptilinopus birói* Madarász, from Friedrich Wilhelms-hafen, *Term. Füz.* xx. pt. i. p. 47, pl. i., was the same as *P. iozonus iozonus*, but we are now convinced that *P. birói* is a juvenile specimen of *P. i. jobiensis*. The very little attenuated first primary and absence of the lilac-ashy lesser upper wing-coverts prove that the type is a young bird. The absence, when seen from above, of the grey apical tail-band shows that *birói* is not *P. i. iozonus*, but *jobiensis*. It is interesting to find that one male (No. 6346) has narrow purple-red tips to some of the grey lesser upper wing-coverts, thus approaching a step towards *P. i. humeralis*. The same peculiarity was found by Madarász, *l.c.*, in his "*P. humeralis jobiensis*" from the same place where the type of *P. birói* was found!)

16. *Ieracidea berigora novaeguineae* A. B. Mey.*Antea*, p. 29.

♂ ad. (not ♀ !), 28. xii. 1913, Vulcan Island. (No. 6488.)

"Iris dark brown; bill black and chalky blue; feet chalky blue."

Wing 353 or 354 mm.

The sexes differ evidently in size, but it is a mistake to suppose that the reddish individuals are females—in fact, the colorations seem to be merely individual, and neither dependent on sex nor on age.

17. *Haliastur indus girrenera* Vieill.

Cf. *Nor. Zool.* 1914, p. 210.

♀, Vulcan Island, 9. xii. 1913. (No. 6404.)

Interesting specimen in adult plumage with the exception of some quills which are still of the juvenile brown plumage.

18. *Tyto alba meeki* (Rothsch. & Hart.).

*Antea*, p. 29.

♂ ad., Vulcan Island, 28. xii. 1913. (No. 6457.)

Entirely like the specimens from Dampier Island and Collingwood Bay.

19. *Ninox connivens assimilis* Salvad. & d'Alb.

*Antea*, p. 30.

♂ ♀, Vulcan Island, December 1913. (Nos. 6408, 6410.)

"Iris bright yellow; bill black; feet dull yellow."

These two birds have the upperside somewhat darker than those from the Giriwn River and Dampier Island, and the longitudinal white spots on the underside stand out in rather sharp contrast. Perhaps this is only due to their being in very fresh plumage, but it would be interesting to compare larger series.

20. *Nasiterna pusio*?

*Antea*, p. 30.

12 ♂ ♂, Vulcan Island, end of November and December 1913. (Nos. 6312, 6411, 6420, 6423, 6424, 6425, 6454, 6455, 6456, 6459, 6461, 6560.)

Two of these specimens are young and have a dark dull green, not blue, crown.

21. *Trichoglossus haematodus intermedius* Rothschild & Hart.

*Trichoglossus haematodus intermedius* Rothschild and Hartert, *Nor. Zool.* 1901, p. 70 (Kaiser Wilhelm's Land, type from Stephansort).

10 ♂ ♀, Vulcan Island, November and December 1913. (Nos. 6278, 6279, 6280, 6282, 6300, 6348, 6355, 6359, 6363, 6374.)

"Iris dull red, yellowish red (mostly), bright red; bill bright red, once bright red and yellow; feet ashy blue."

It is very interesting to find this bird, hitherto only known from Stephansort, Limbang, Bongu, and Sattelberg\*) on Vulcan Island, while *T. h. massena* lives on Dampier, which must have received it from the Bismarek Archipelago.

22. *Scythrops novaehollandiae* Lath.

*Antea*, p. 31.

3 ♀ ♀ ad., Vulcan Island, November and December 1913. (Nos. 6299, 6421, 6426.)

\* See also *Nor. Zool.* xxi. 1914, p. 101

### 23. *Centropus bernsteinii* Schleg.

*Centropus Bernsteinii* Schlegel, *Ned. Tijdschr. v. Dierkunde* iii. p. 251 (1866—no locality; id. *op. cit.* iv. p. 11 (1871—Salwatti!).

This appears to be a somewhat rare species generally. Schlegel stated that Bernstein discovered it on Salwatti: this locality has so far not been corroborated, though the late A. B. Meyer acquired a specimen said to have come from Salwatti. The locality of Wallace's specimens is uncertain! We had specimens from the Sattelberg, Stephansort, and from the Upper Setekwa River.

We received 9 adult males and females and a semi-adult male from Vulcan Island, collected in December 1913. (Nos. 6289, 6381, 6391, 6416, 6441, 6478, 6489, 6490, 6495, 6496.)

"Iris dark brown; bill and feet black."

Wings, males and females, 180–201 mm.

Unless half our specimens are wrongly sexed, the sexes are perfectly alike, females at least as large as males.

Four eggs, evidently all from incomplete clutches, found at various dates in December on Vulcan Island, are white, almost without any gloss, shining through creamy white when held against the light. They measure  $36.6 \times 29$ ,  $38 \times 27.6$ ,  $35.5 \times 28.3$ ,  $33.1 \times 27.4$  mm. The last is even less glossy than the others, and perhaps a badly developed, unfertile egg, being so much smaller than the rest.

### 24. *Eudynamis orientalis rufiventer* (Less.).

*Antea*, p. 31.

6 ♂♂, 5 ♀♀, Vulcan Island, November and December 1913. (Nos. 6277, 6283, 6306, 6341, 6347, 6394, 6395, 6440, 6447, 6449, 6457.)

Wings of males 188–199, of females 187–193 mm.

### 25. *Cuculus optatus* Gould.

*Antea*, p. 32.

A bright reddish female, Vulcan Island, l. i. 1914. (No. 6497.) "Iris brownish yellow."

### 26. *Cacomantis sepulcralis assimilis* (Gray).

*Antea*, p. 32.

2 ♂♂ ad., 4 juv., Vulcan Island, December 1913, January 1914. (Nos. 6329, 6373, 6378, 6463, 6498, 6504.)

### 27. *Chrysococcyx malayanus poecilurus* Gray.

*Antea*, p. 32.

♂ juv., Vulcan Island, 14. xii. 1913. (No. 6433.) "Iris dark brown; bill black; feet slate-blue."

### 28. *Tanysiptera hydrocharis vulcani* subsp. nov.

(See *antea*, p. 32.)

A series from Vulcan Island is distinctly larger than eleven adult birds of *T. hydrocharis meyeri* from German New Guinea and Takar (Konstantinshafen and

Stephansort) and ten from Dampier Island. The wings of the Vulcan Island specimens measure as follows :

109, 111.5, 112, 112, 113, 114, 115, 116, 116, 118 mm. ; *i.e.* 109-118 !

Those from Stephansort, Konstantinshafen and Takar measure :

102, 102, 102, 103, 103, 103, 104, 104, 104, 104.5, 107, 109 mm., *i.e.* 102-109 !

The Dampier Island birds are exactly like those from north-eastern New Guinea, viz. :

102, 103, 103.5, 104, 104, 105.5, 107, 108 mm. ; *i.e.* 102-108 !

The examples from Vulcan Island are also generally larger, as is especially shown by their beaks, the bill reaching up to 33 mm. from nostril to tip, while in the Dampier Island examples it goes as far as 30.7, but is generally less. In coloration there is no difference at all. Both the Dampier and Vulcan Island birds have paler heads than *T. hydrocharis galatea*, and the central rectrices have a great deal of white at the base, the basal third or nearly half being white with a blue shaft-line, which often does not reach the base ; they thus agree with *T. hydrocharis meyeri*, except that *T. hydrocharis vulcani* is larger.

The type of *T. hydrocharis vulcani* is an adult male shot on November 30 (No. 6324) ; in this the longest of the central rectrices is 312 mm. long, the other 298, the base is white for about 11 cm., the white " flags " are about 38 mm. long.

We have received 10 adult males and females, and 3 young birds from Vulcan Island, collected in November and December 1913. (Nos. 6262, 6276, 6284, 6285, 6305, 6309, 6316, 6324, 6327, 6330, 6338, 6480, 6507.)

### 29. *Halcyon saurophaga* Gould.

*Halcyon saurophaga* Gould, *Proc. Zool. Soc. London*, 1843 p. 103 (New Guinea) ; *Nor. Zool.* 1901, p. 156.

♀ ad., Vulcan Island, 15. xii. 1913. (No. 6437.)

This specimen is somewhat small, even for a female, the wing measuring only 123 mm., but we have two similarly small examples from other localities.

### 30. *Caprimulgus macrourus* Horst.

*Antea*, p. 33.

♂ ad., Vulcan Island, 27. xi. 1913. (No. 6294.)

### 31. *Monarcha chalybeocephalus manumudari* subsp. nov.

♂. Differs from that of *M. ch. chalybeocephalus* in being larger, having a wider and generally longer bill and a longer wing and tail, and in the somewhat more greenish gloss of the plumage, which is chiefly noticeable in the crown and breast.

Differs from that of *M. ch. lucida* (cf. *Nor. Zool.* 1903, p. 458) only in the larger size of wings and tail, and in the generally more greenish gloss.

Looking at the series of beautiful skins from Dampier and Vulcan Islands, side by side, the larger size and more greenish sheen of the latter is at once obvious ; the same can be said from comparison with the other males, though one of the Rook Island examples is as greenish as *manumudari*, and the same may be said of two of the Woodlark Island males, while four others are as purplish as typical *chalybeocephalus* ; the large beak of the Woodlark examples has already been mentioned in 1903, but their wings are not a bit longer than in typical *chalybeocephalus*.

The wings of the Dampier males measure 88–93.5, and once 95 mm., those of the Vulcan males 95–99, once 94, the tails of the former 75–80, of the latter 79–82 mm. The difference in size of the two forms is also obvious when comparing the first primaries.

Type of *M. ch. manumudari*: ♂ ad. Vulcan or Manumudar Island, 4. xii. 1913. (No. 6358 in the Tring Museum.)

We have received 7 males and 3 females, collected on Vulcan or Manumadar Island from the end of November to the end of December 1913. (Nos. 6315, 6358, 6372, 6401, 6429, 6464, 6482, 6485, 6486, 6493.)

"Iris dark brown: bill chalky blue with black tip; feet black."

### 32. *Monarcha inornatus inornatus* (Garn.).

*Antea*, p. 34.

Five immature birds from Vulcan Island, collected end of November and in December 1913. (Nos. 6304, 6326, 6367, 6400, 6459.)

All have the base of the bill largely light-coloured.

### 33. *Myiagra nitida novaepomeraniae* Rehw. (?)

Cf. *Nov. Zool.* 1914, p. 215, and *antea*, p. 35.

2 ♂♂ juv. (in the plumage of ♀ ad.), 1 ♀, Vulcan Island, 15. xii. 1913 and 2. i. 1914. (Nos. 6438, 6439, 6499.)

### 34. *Rhipidura setosa gularis* Müll.

*Rhipidura gularis* S. Müller, *Verh. Nat. Gesch. Ned.-Ind., Land- en Volkenkunde*, p. 185 (1843—Lobo, Utanata).

10 ♂♀, Vulcan Island, 22. xi. to 7. xii. 1913. (Nos. 6263, 6264, 6268, 6310, 6311, 6340, 6351, 6357, 6379, 6380.)

There seems to be no difference from Papuan examples. The specimens from Goodenough Island (cf. *Nov. Zool.* 1914, p. 5), have generally somewhat smaller bills, but this character is variable.

### 35. *Gerygone conspicillata ramuensis* Rehw.

*Antea*, p. 35.

11 ad. and juv., Vulcan Island, November 26 to December 24, 1913. (Nos. 6291, 6298, 6365, 6375, 6376, 6382, 6386, 6392, 6418, 6419, 6483.)

Some of these specimens are quite as pale as our others from Friedrich Wilhelm's Hafen, while others are indistinguishable from those of Dampier Island. The young birds are pale yellow on the underside, their iris is brown, base of lower mandible light brown.

### 36. *Cinnyris jugularis flavigastra* (Gould).

*Antea*, p. 35.

5 ♂♂, 3 ♀♀, Vulcan Island, December 8, 1913, to January 3, 1914. (Nos. 6383, 6384, 6385, 6406, 6414, 6428, 6430, 6508.)



37. *Cinnyris sericeus sericeus* Less.*Antea*, p. 35.

5 ♂♂, 5 ♀♀, Vulcan Island, November 22 to December 12, 1913. (Nos. 6267, 6271, 6272, 6273, 6286, 6288, 6337, 6403, 6407, 6436.)

38. *Dicaeum geelvinkianum rubrocoronatum* Sharpe.*Antea*, p. 36.

5 ♂♂ ad., 2 ♂♂ juv., 2 ♀♀ ad., 1 ♀ juv., Vulcan Island, November and December 1913. (Nos. 6265, 6266, 6290, 6328, 6364, 6413, 6422, 6427, 6474, 6448.)

39. *Cisticola exilis* (Vig. & Horsf.).

*Malurus Exilis* Vigors & Horsfield, *Trans. Linn. Soc. London*, xv. p. 223 (1827—Australia! Terra typica restricta—Mathews—New S. Wales.)

7 ♂♂ in breeding plumage, 2 ♀♀, 1 juv., Vulcan Island, 4.-31. xii. 1913. (Nos. 6352, 6353, 6361, 6362, 6430, 6434, 6435, 6442, 6443, 6492.)

For descriptions of the various plumages of *C. exilis* we refer to Oates, *B. Brit. Burma* i. p. 117, 1883, and Stresemann, *Nov. Zool.* xx. p. 362, 1913; but it is remarkable that the young bird (No. 6434) shot on December 15 has only the throat pale yellowish, the middle of breast and abdomen being white, not yellow, as is usual in the young of *C. exilis*.

40. *Erythrura trichroa goodfellowi* O.-Grant.*Antea*, p. 36.

12 ♂♀ ad. and juv., Vulcan Island, December 1913. (Nos. 6451, 6452, 6453, 6465, 6466, 6467, 6468, 6469, 6470, 6471, 6475, 6476.)

The wings of the four adult males measure 61, 61, 63, 61 mm.

41. *Lonchura castaneothorax sharpii* (Mad.).

*Donacivola sharpii* Madarász, *Bull. B. O. Club*, iii. p. xlvii (June 1891—Finisterre Mountains in German New Guinea; id., *Aquila*, i. p. 96, pl. i. fig. 1).

Of this hitherto rare, distinct, and interesting subspecies we have 5 ♂♂ and 5 ♀♀ from Vulcan Island, collected in November and December 1913. (Nos. 6318, 6322, 6389, 6402, 6405 [males], 6274, 6319, 6321, 6390, 6399 [females].)

"Iris brown; bill chalky blue; feet slate blue."

The females are very much like the males, but the crown and nape are darker and duller, more brownish grey, and the back is generally darker brown. Wings of the males 50-51.1, of the female about 49-52 mm.; but these measurements can only be regarded as approximative, because the majority of our skins have the tips of the wings slightly worn.

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## NOTES ON PAPUAN BIRDS.

BY THE HON. WALTER ROTHSCILD, F.R.S., PH.D., AND  
ERNST HARTERT, PH.D.

(Continued from Vol. XVII., p. 446.)

For most of the localities mentioned in these notes see "Introduction" to this series in *Nov. Zool.* 1901, pp. 55-61, and the maps, plates II. and III. in the same volume. The former portions of this series of articles have appeared as follows: Vol. viii. pp. 55-88 (Introduction, *Pittidae*, *Psittaci*), pp. 102-62 (*Columbae*, *Megapodiidae*, *Rallidae*, *Limicolae*, *Alcedinidae*; vol. x. pp. 65-116 (*Paradisidae*, *Corvidae*, *Laniidae*, *Dicruridae*, *Oriolidae*, *Artamidae*, *Sturnidae*), pp. 196-231 (*Meropidae*, *Coraciidae*, *Podargidae*, *Caprimulgidae*, *Cypselidae*, *Campephagidae*, *Nectariniidae*, *Dicaeidae*, the genus *Myzomela*, *Motacillidae*, *Sylviidae*, *Timeliidae*), pp. 435-80 (*Meliphagidae*, the genus *Zosterops*, *Hirundinidae*, *Muscicapidae*, additions to *Dicaeidae*, *Laniidae*, *Timeliidae*); xiv. pp. 433-16 (*Unculidae*, *Strigidae*).

## XXXII.

## ACCIPITRES.

1. *Spizaetus gurneyi* (Gray).

*Aquila (Heteropus) gurneyi* G. R. Gray, *Proc. Zool. Soc. London* 1860, p. 342, pl. clxix. (Batjan).

*Limnæus gurneyi* Gurney, *List of Diurnal B. of Prey*, p. 49, note 5 (1884—type of the species from Batjan, collected by Wallace, in the Norwich Museum). Sharpe (*Cat. B. Brit. Mus.* i. p. 274) was, of course, quite wrong in saying that a skin from Waigiu in the British Museum is the type.

1 ad., "New Guinea"; bought from A. Boncard.

1 ♀ (?) ad., Goodenough Island, 3. xii. 1896. No. 11, A. S. Meek coll.

"Iris dark yellow with irregular brown marks; bill slate, tip black; feet pale dirty yellow."

1 juv., "acheté d'un chasseur qui avait chassé à Waigiu et à Salwatti." Ex Bruijn coll.

1 juv., "New Guinea"; purchased from A. Boucard.

1 juv. without indication. Ex Bruijn coll.

2. *Hieraaetus weiskei* (Rehw.).

*Eudolmæus weiskei* Reichenow, *Orn. Monatsber.* 1900, p. 185 (Astrolabe Mountains, 3000 ft. Emil Weiske coll.).

♂, Avera, Aroa River, British New Guinea, 26. iii. 1903. No. A 462. A. S. Meek coll. Wing 308 mm.

"Iris grey; bill black and bluish slate; feet yellow-green."

This bird agrees perfectly with the type, which is now in the British Museum, except that it is smaller; the type is said to be a female.

More material of this very rare bird is perhaps required, in order to decide whether it should be looked upon as a species or a subspecies of the Australian *H. morphnoides*, but we think that the former is the best course at present. The difference in size is very great, and as far as we can judge from the few specimens we have examined, the colour appears to differ as well.

3. *Haliaëtus leucogaster* (Gm.).

*Falco leucogaster* Gmelin, *Syst. Nat.* i. 1. p. 257 (1788—Australia! Restricted terra typica New S. Wales—Mathews, 1912).

♀ juv., Waigin, ex Bruijn coll.

1 juv., Aroa River, December 1899 or January 1900. E. Weiske coll.

4. *Pandion haliaëtus cristatus* (Vieill.).

*Buteo cristatus* Vieillot, *Nouv. Dict. d'Hist. Nat.* iv. p. 481 (1816—"Nouvelle Hollande").

*Pandion haliaëtus leucocephalus* of modern authors up to 1912.

1 ad., "acheté d'un chasseur qui avait chassé à Waigin et Salwatti." Ex Bruijn coll.

2 ♂♂, Waigin. Ex Bruijn coll.

♂, Dorey, March 1874. Ex Bruijn coll. (Specimen *a* of Salvadori's list on p. 12 of vol. i. of the *Orn. Pap. e Molucche*.)

♀, Nicura, British New Guinea. Lix coll.

♀, May 1887, Konstantinshafen, German New Guinea. J. Kuby coll.

2 ad., New Britain. Kleinschmidt coll.

1 ad., Duke of York Island, October 1880. Kleinschmidt coll.

1, New Ireland. Collected by a missionary.

♂ ♀, Egum group, S.E. of New Guinea, 25. vii. 1895. A. S. Meek coll.

5. *Haliastur indus girrenera* (Vieill.).

Cf. *Noe. Zool.* xxi. 1914. p. 210.

♀ ad., Nicura, British New Guinea, 21. vii. 1893. Lix coll.

♂ ad., Yule Island, S. New Guinea, August 1875. D'Albertis coll.

(Specimen *c*, p. 17, Salvadori, *Orn. Pap. e Molucche* i.)

♂, in moult, Yule Island, 26. v. 1875. D'Albertis coll.

(Specimen *r*, p. 18, Salvadori, *Orn. Pap. e Molucche* i.)

Ad., Brown River, Brit. New Guinea, 1898. E. Weiske coll.

♂ ad., Fergusson Island, 7. ix. 1894. A. S. Meek coll.

Ad., Dobbo, Aru Islands, 10. v. 1896. Cayley Webster coll.

♂ ad., Wokan, Arn Islands, 29. ix. 1900. H. Kühn coll.

♂ ad., Rook Island, 5. viii. 1913. No. 5926, A. S. Meek coll.

Ad., New Hanover, 9. ii. 1897. Cayley Webster coll.

6. *Haliastur spheurnus* (Vieill.).

*Milvus spheurnus* Vieillot, *Nouv. Dict. d'Hist. Nat.* xx. p. 564 (1818—Australia!).

♂ med., Kataw River, British New Guinea, October 1876. D'Albertis coll. (Specimen *d* of Salvadori's list, *Orn. Pap. e Mol.* i. p. 20.)

1, Nicura, British New Guinea. Lix coll.

♂ ad., Stephansort, German New Guinea, xii. 1899. E. Nyman coll.

♂, Kumusi River, 11. viii. 1907. No. 3402, A. S. Meek coll.

7. *Milvus migrans affinis* Gould.

*Milvus Affinis* Gould, *Proc. Zool. Soc. London*, "1837," p. 140 (1838—Australia!); *Syn. B. Austr.* pt. iii. pl. 47 (1838—Australia. Type from New S. Wales, according to Mathews).

♀ ad., Stephansort, German New Guinea, 13. xii. 1899. E. Nyman coll.

1 juv., Stephansort, 1901. Müller coll. Purchased from Rolle.

Ad., Mt. Cameron, British New Guinea, 8. xii. 1897. Cole coll.

♂, Nicura, British New Guinea, 23. vii. Lix coll.

1, Nicura, Lix coll.

♂ ad., Yule Island, 12. v. 1875. D'Albertis. Specimen D of Salvadori's list.

♂ ad., Fergusson Island, 21. xi. 1894. A. S. Meek coll.

### 8. *Henicopernis longicauda* (Garn.).

*Falco longicaudus* Garnier, *Fay. Coqu.*, *Zool.* i. p. 588. pl. 10 (1828—Dorey).

♂ ♀, Dorey, Bruijn coll. (Specimens *a* and *b* of Salvadori's list, *op. cit.* i. p. 23.)

2 ♂ ♂, Andai. Bruijn coll.

♀, Mansinam, 28. v. 1875. Bruijn coll. (Specimen *f* of Salvadori's list, *loc. cit.*).

1, inland of Holnicote Bay, British New Guinea. Rohn coll.

♀ ad., foot of Snow Mountains, 2000 ft., Dutch New Guinea, 14. x. 1910. A. S. Meek coll.

♀ ad., Avera, Aroa River, 6. iii. 1903. A. S. Meek coll.

1 ad., Mountains of Kotoi, August 1898. A. S. Anthony coll.

1, British New Guinea, 5. vi. 1896. A. S. Anthony coll.

1 ad., British New Guinea, 1901. A. S. Anthony coll.

♀ juv., Wokan, Arn Islands, 25. ix. 1900. Heb. Kühn coll.

(Probably subspecies nova? The specimen is very small, but being evidently young, too much importance cannot be attached to its small size. Moreover, *H. longicauda* varies in size individually, and some—probably females—are much larger than others. But compare Salvadori's note, *Orn. Pap.* i. p. 24, where he says that specimens from Arn and the Fly River are smaller!)

### 9. *Machaerhamphus alcinus* Westernm.

*Machaerhamphus alcinus* Westernm., *Bijdr. tot de Dierkunde* i. part 2. p. 29. pl. 12 (1848—Malacca): Rothschild & Hartert, *Nor. Zool.* xix. p. 190 (1912—Kumusi River).

♂ ad., Kumusi River, N.E. Brit. New Guinea, 14. vii. 1907. No. 3312, A. S. Meek coll.

### 10. *Baza subcristata reinwardtii* (Müll. & Schleg.)

*Falco (Lophotes) Reinwardtii* Müller & Schlegel, *Verh. Nederl. Overz. Besitt.*, *Zool. Aves* p. 35. pl. 5. fig. 2 (1839-44—"Celebes, Borneo." Error! Patria substituta: Amboina).

*Baza subcristata reinwardtii* Rothschild & Hart., *Nor. Zool.* 1913. p. 483!

1, "Waigin Gulf," Oct. 1884. Collector unknown.

♂ ♀, Waigin, 26. xii. 1902. From John Waterstradt's collectors.

♂, Misol, 23. i. 1900. Heb. Kühn coll.

♀, Salawatti, 29. vi. 1875. Odoardo Beccari coll. (Specimen *m* of Salvadori's list, *Orn. Pap.* i. 28).

♂ Salawatti, 11. v. 1875. Bruijn coll. (Specimen *i* of Salvadori's list, *loc.*)

♂ juv., Andai, 1879. Bruijn coll.

♂, Ron, July 1897. Will. Doherty coll.

1 ♂, 2 ♀ ♀, Kapaur, December 1896. Will. Doherty coll.

"Iris bright yellow; feet dirty or bluish whitish, joints of scales ferruginous, claws blackish; bill black, base of upper and lower mandible bluish or leaden grey; cere leaden or blue-grey."

1 ad., Lower Ambernoh River. J. Damas coll.

2 ♂♂, 2 ♀♀ ad., Upper Setekwa River, July to November 1910. A. S. Meek coll. See *Nov. Zool.* xx., 1913, p. 483.

♂ ♀, Knmusi River, 4. vi., 14. viii. 1907. Nos. 3107, 3411, A. S. Meek coll.

♀ ad., Mt. Cameron, Owen Stanley Range, 13. ix. 1896. A. S. Anthony coll.

1 ♂, 2 ♀♀, Milne Bay, 11. iv., 25. x., 24. xi. 1898. A. S. Meek coll.

♂ ad., Fly River, 6. ix. 1877. D'Albertis coll. (Specimen *z* of Salvadori's list, *Orn. Pap.* i. p. 29.)

1 ad., Mts. of Kotoi, British New Guinea, August 1898. A. S. Anthony coll.

♂ ad., Dobbo, Aru Islands, 7. xii. 1883. Guillemard coll.

Jun. Waunambai, Aru Islands, 28. vi. 1896. Cayley Webster coll.

### 11. *Baza subcristata megala* Stres.

*Baza subcristata megala* Stresemann, *Nov. Zool.* xx. p. 307 (1913—Fergusson Island); cf. *Nov. Zool.* xxi. p. 3 (Goodenough I.).

2 ♂♂, 1 ♀, 1 sex undetermined, Fergusson Island, collected by A. S. Meek in 1894 and 1897. (♀ no. 627: type of *megala*.)

♂ ad., Goodenough Island, 1. iv. 1913. No. 5530, A. S. Meek coll.

There is absolutely no difference between *megala* and *reinwardtii* except the very slightly larger size of the former, which, however, cannot be denied.

### 12. *Baza subcristata bismarcki* Sharpe.

*Baza bismarcki* Sharpe, in Gould's *B. New Guinea* i. pl. 4 (1888—Bismarck Archipelago).

2 ad. (apparently males), Expedition Bay, New Hanover, 24. iii. 1897. Cayley Webster coll.

♂, Tobera, New Britain, October 1905. C. Wahnes coll.

For the differences of the various forms of *B. subcristata* see *Nov. Zool.* 1901, pp. 378, 379, and for measurements Stresemann, *op. cit.* 1913, p. 308.

### 13. *Falco peregrinus calidus* Lath.

*Falco calidus* Latham, *Incl. Orn.* i. p. 41 (1790—India. Ex Latham, *Suppl. Gen. Synops.* p. 35, no. 112).

"♂ ♀," Sariba Island, British New Guinea, 23. xi. 1909, 17. iv. 1910. Received from A. S. Meek.

(For distribution see Hartert, *Vög. pal. Fauna* ii. p. 1047.) We have seen no other record for New Guinea.

### 14. *Falco peregrinus ernesti* Sharpe.

*Falco ernesti* Sharpe, *Ibis* 1894, p. 545 (Borneo, collected by Mr. Ernest Hose).

♀ ad., Dutch New Guinea. From native hunters. Wing 319 mm.

♀ juv., Kunusi River, British New Guinea, 15. vi. 1908. A. S. Meek coll.

♂ ad., Eafo district, between Mts. Alexander and Bellamy, October 1895. A. S. Anthony coll. Wing 280 mm.

♀ fere ad., Woodlark Island, 3. viii. 1895. A. S. Meek coll.

### 15. *Falco severus* Horsf.

*Falco severus* Horsfield, *Trans. Zool. Soc. London*, xiii. p. 135 (1821—Java).

Messrs. Meyer & Wigglesworth, in their admirable work on the *Birds of Celebes* (vol. i. p. 84), have separated three subspecies of *Falco severus*: *F. severus severus*,

which they call an intermediate race from the Sunda Islands, Celebes, and probably other islands of the Archipelago; *F. severus indicus*, the western extreme, which is to be lighter in colour, and *F. severus papuanus*, the extreme eastern, darkest form. As we have said before (*Nor. Zool.* 1905 pp. 251, 252), we cannot see the slightest differences between Papuan and Sunda Islands specimens, while our examples from British India are generally slightly paler, but our series from there is poor. We must therefore call the Papuan birds *F. severus severus*, or simply *F. severus*, until the value of the Indian race is better established.

Mr. Stresemann (*Nor. Zool.* 1914, p. 77), evidently following Salvadori, quotes as a synonym of *Falco longipennis*: *F. religiosus* Sharpe, *Cat. B. Brit. Mus.* i. p. 397. This is evidently not quite correct, as Sharpe describes in the first instance a bird (and probably the identical one) as figured in fig. 5 on plate 2 of Schlegel's *Vog. Nederl. Ind., Valkvogels*, which is a *F. severus*, and afterwards the melanistic specimen, of which he says that it is marked as the type of *religiosus*, "but probably in error." What that really means is not clear, as Sharpe was the first to publish the name *religiosus*, and to give a description of it. Salvadori corrects (*Orn. Pap.* i. p. 36) Sharpe's statements with regard to Schlegel's views, and, having examined the dark bird, comes to the conclusion that it is a melanistic *F. longipennis* (*lunulatus*). The name *religiosus* should therefore be quoted with "partim" in the synonymy of both *F. severus* and *F. longipennis*.

We have the following skins of *F. severus* from the Papuan Islands:

♀ ad., Waropen, near Kurudn, April 1897. Bought by Will. Doherty.

♂ ad., Sattelberg, Huon Gulf. Bought from Prof. Förster.

♂ juv., Owgarra, Angabunga River, 6000–8000 ft., 18. ii. 1905. No. A 2112, A. S. Meek coll.

2 ad., 1 juv. Mt. Victoria, Owen Stanley Range 5000–7000 ft. A. S. Anthony coll.

♂ ad., Mt. Cameron 16. viii. 1896. A. S. Anthony coll.

♀ ad., Moroka, Owen Stanley Mts., 3000–6000 ft. A. S. Anthony coll.

♀ juv., Milne Bay, 23. iii. 1899. A. S. Meek coll.

#### 16. *Ieracidea berigora novaeguineae* A. B. Mey.

*Hieracidea novaeguineae* A. B. Meyer, *Journ. f. Orn.* 1894 p. 89. ("Nova Guinea orientalis," types from German New Guinea.) See *antèd.*, p. 16.

♀ Dampier Island, 25. ii. 1914. No. 6736, Meek coll.

♂ ad., Vulcan Island, 28. xii. 1913. No. 6488, Meek coll.

2 ♂♂, 1 ♀, Owgarra, Angabunga River, Oct. 1904–Jan. 1905. A. S. Meek coll.

♀, Avera, Arha River, 3. vi. 1903. A. S. Meek coll.

1 juv., Sattelberg, German New Guinea, 17. xi. C. Wahnes coll.

♀ ad., Simbang, German New Guinea, 8. vii. 1899. E. Nyman coll.

#### 17. *Harpyopsis novaeguineae* Salvad.

*Harpyopsis novae guineae* Salvadori, *Ann. Mus. Civ. Gen.* vii. p. 682 (1875–Andui!).

1, "New Guinea," bought from Gerrard. (Evidently a skin collected in British New Guinea by Goldie.)

2 ♂♂, Kabadi, British New Guinea, November 1899. Emil Weiske coll.

1, Sogeri district, British New Guinea, purchased from Messrs. McIlwraith & Co.

♀, Mt. Musgrave, 7. viii. 1898. Anthony coll.

♂, Avera, Aroa River, 5. xi. 1903. A. S. Meek coll. "Iris dark fawn; bill dark horn-colour, lighter at tip; feet pale dirty yellow."

### 18. *Megatriorchis doriae* Salvad. & d'Alb.

*Megatriorchis doriae* Salvadori and d'Albertis, *Ann. Mus. Civ. Gen.* vii. p. 805 (1875—S.E. New Guinea).

This genus was separated on account of its short rounded wings, the very small difference in length between primaries and secondaries, and the long tail (in the original diagnosis is a misprint, "remigibus primaries paulo brevioribus" instead of "paulo longioribus"; this is evident from a look at the bird and from Salvadori, *Orn. Pap.* i. p. 42).

Later on Sharpe united *Megatriorchis* with *Erythrotriorchis*, but we cannot accept this alteration; it was done on the strength of a bird which Sharpe wrongly identified with *M. doriae*, and which we were obliged to describe as a new species. In the typical *Erythrotriorchis* (type *E. radiatus*) the wings are much longer, the distance between the longest primaries and secondaries considerable, viz. 11–13.5 cm., as against 25–35 mm. in *Megatriorchis*. The tail in *Erythrotriorchis* is shorter and more even than in *Megatriorchis*, so that the bird has altogether a very different appearance.

Of *M. doriae* we have so far the following skins:

1, Triton Bay, 25. vii. 1896. Cayley Webster coll.

1 jun., German New Guinea. Cotton and Webster coll.

1 ♀ ad., Mts. inland of Huon Gulf, German New Guinea. Purchased from Schneider.

1 ♂ ad., Astrolabe Bay. C. Wahnes coll.

♀ Kumusi River, British New Guinea, 5. viii. 1907. A. S. Meek coll.

Needless to say, the females are larger than the males: wing ♀ 350, ♂ 285–92 mm.

### 19. *Accipiter (Astur) eudiabolus* Rothschild & Hart.

*Accipiter eudiabolus* Rothschild & Hartert, *Bull. B. O. Club*, xxxv. p. 8 (October 1914—Babooni, British New Guinea).

Ad., Babooni, 3000 ft., September 1903. H. C. Pratt coll. (type).

### 20. *Accipiter novaehollandiae leucosomus* (Sharpe).

*Astur novaehollandiae* subsp. n. *A. leucosomus* Sharpe, *Cat. B. Brit. Mus.* i. p. 119 (1874—"New Guinea and adjacent islands").

Though the difference in size is enormous, there is no other difference between the larger Australian white Goshawk and the smaller Papuan race. The whole plumage is snow-white; the iris and cere yellow; bill horn-black; feet yellow. Wings of males 210–212, females 242–252 mm., against 251–272 (males) and 293–308 (females) in *A. novaehollandiae novaehollandiae*.

♀ ad., Arfak Mts., June 1883. E. Mus. H. Guillemard. "Iris yellow."

♀, Arfak—preparation.

♂ ♀, "N. Guinea," probably Arfak region. Purchased from Boucard.

♂, "Arfak," purchased from R. van Duivenbode.

♂ ♀, Sariba Island, February 1909. Albert Eichhorn coll., ex A. S. Meek.

♀, Collingwood Bay, 3. vi. 1899. No. 2551, A. S. Meek coll.

21. *Accipiter poliocephalus* Gray.

*Accipiter poliocephalus* Gray, *Proc. Zool. Soc. London*, p. 170 (Aru Islands).

The young is slate-coloured on the upperside and the under surface is white with a more or less distinct creamy tinge and brownish black shaft-stripes. The sexes differ only in size.

Sharpe described a hawk from Jobi Island in Geelvink Bay as "*Astur Meyerianus*" (*Journal Linn. Soc. London, Zool.*, xiii, p. 458, 1878). Salvadori afterwards identified this new bird with *A. albicularis* from the Solomon Islands, but doubtless erroneously. The wing of *A. meyerianus* is, according to Sharpe, 315 mm. long, but Salvadori measures it even 320. This measurement is far too big for *A. albicularis*, the largest females of which have their wings not longer than 256 mm. Moreover, *A. meyerianus* being uniform black on the upperside, appears to be an adult bird, and adult *albicularis* have as a rule no black markings underneath. Even the distribution "Solomon Islands and Jobi" would have been a very unlikely one.

Of *A. poliocephalus* we have now the following specimens :

♀ ad., Waigiu, 4. i. 1903. John Waterstradt coll.

♂ juv., Mysol, 20. i. 1900. H. Kühn coll., No. 1908.

♀ ad., Kaririri, Jobi Island, May 1897. Purchased from natives by W. Doherty.

♂ ad., Traugan, Aru Islands, 18. ix. 1900. H. Kühn coll., No. 2458.

♀ ad., Wammar, Aru Islands, 8. xii. 1883. Dr. Powell coll.

♀ juv., "Arfak." Bought from Boneard.

♂ (not ♀) ad., Anday. Ex Bruijn coll.

♀ ad., near Humboldt Bay, January 1899. J. Dumas coll.

♀ ad., Stephansort, 1899. E. Nyman coll.

♀ ad., Bihagi, head of Mambare River, 13. ii. 1906. A. S. Meek coll., No. A 2404. "Iris brown; bill black; feet dark yellow."

♂ ad., Aroa River, December 1899 or January 1900. Emil Weiske coll.

♀ juv., Sariba Island, British New Guinea, 18. iv. 1910. From A. S. Meek.

2 ♂, 1 ♀ juv., Fergusson Island, xii. 1894, 18., 24. vi. 1897. A. S. Meek coll.

♂ juv., Milne Bay, 18. iii. 1899. A. S. Meek coll., No. 2399.

2 ♂ ad., St. Aignan, Louisiade group, 19. viii. 1897. A. S. Meek coll., Nos. 842, 843.

22. *Accipiter fasciatus polycryptus*.

"*Astur fasciatus*" was first described by Messrs. Vigors & Horsfield from "Australia" in 1827, and this name, as pointed out by Hartert in 1905, stands before *A. approximans* on the same page, which latter name has been arbitrarily chosen for these hawks by Gould, Sharpe, and others. Mr. Mathews in his most recent list of the Birds of Australia, pp. 103, 104, separates three races :

*A.* (or *Urospiza*, as he calls them) *fasciatus fasciatus* (= *approximans*), from the Eastern parts of Australia.

*A. fasciatus cruentus*, from Southern and Mid-west Australia.

*A. fasciatus didimus*,\* from Melville Island and the Northern Territory.

We have nine adult females and one adult male (besides some young birds, which are of no use for distinguishing such closely allied subspecies) from Queens-

\* Probably misspelt for *didymus*.



land, an adult pair from the Alligator River in "Northern Territory," and an adult pair from West Kimberley and Point Cloates. These seem to confirm the three races accepted by Mr. Mathews. The two birds from the Alligator River are not so brownish, but more reddish underneath, and the white cross-bars in the male are narrower and more numerous. The female from Point Cloates and the male from West Kimberley are somewhat larger, and the underside is more cinnamon-rufous, less brownish; the white bars are rather narrow.

The series from Queensland would be *A. fasciatus fasciatus*, the pair from the Northern Territory *A. fasciatus didimus*, the pair from Point Cloates and West Kimberley *A. f. cruentus*.

In addition to these races, which require further confirmation by better series from the northern and western parts of Australia, we have another from New Guinea, at least a number of birds, undoubtedly of a race hitherto undescribed and in our opinion a form of *A. fasciatus*. We name this race

***Accipiter fasciatus polycryptus* subsp. nov.**

It differs from (the males of) *A. f. fasciatus* very strikingly by the more reddish colour of the underside with very narrow, in places obsolete, whitish bars, and smaller size. It is therefore more similar to *A. f. cruentus* and *didimus*, but still more and lighter reddish underneath and less sharply barred, also markedly smaller. The colour of the upperside is also slightly more bluish. None of our females is adult; the one showing a rufous underside with narrow white bars has still some feathers of the juvenile plumage (white with brown stripes), and has as yet only a few grey feathers on the upperside, which shows mostly still the brown juvenile feathers.

We have the following specimens of *A. f. polycryptus*:

♂ ad., "Sogeri district," 2000–3500 ft., British New Guinea (evidently a Weiske-skin). Purchased in London (type of subspecies). Wing 230 mm.

♂ ad., Nieura, British New Guinea, 24. vii. 1893. Lix coll. "Iris jaune orange, pattes jaune orange." Wing 232 mm.

♂ ad., Kumusi River, British New Guinea, 6. vii. 1907. No. 3293, A. S. Meek coll. "Iris golden yellow; bill black and slate; feet lemon yellow." Wing (worn) about 230 mm.

♀ semi-ad. Stephansort, German New Guinea. Müller coll., 1901 (purchased from Rolle).

♀ juv., German New Guinea. Cotton & Webster coll.

♀ juv., "Sogeri district," 2000–3500 ft. (evidently a skin made by Emil Weiske). Purchased in London.

♂ juv., Owgarra, Angabunga River, 17. xi. 1904. No. A, 1865, A. S. Meek coll. "Iris steel grey; bill black and slate; feet dull pale yellow."

**23. *Accipiter hiogaster etorques* (Salvad.).**

[*Falco hiogaster* S. Müller, *Verh. Nat. Gesch. Nederl. Ind., Land- en Volkenk.* p. 110 (1841—Amboina).]

*Urospizias etorques* Salvadori, *Ann. Mus. Civ. Gen.* vii. p. 901 (1875—New Guinea and Salwatti). Cf. *Nor. Zool.* xii. p. 251; xxi. pp. 72, 73.

♂ ♀ ad., ♂ ♀ juv., Waigin, November and December 1902. John Waterstradt coll.

♀ ad., Mafor, March 1897. W. Doherty coll.

- ♀ juv., "Arfak." Purchased from Boucard.  
 2 ♂♂ ad., Takar, Dutch New Guinea, October and November 1896.  
 W. Doherty coll.  
 ♂ ad., Nieura, British New Guinea, August 1893. Lix coll. (This specimen has an unusually great amount of grey on the throat and chest.)  
 ♀ ad., Baw Boi, interior of British New Guinea, 6000 ft., August 1902.  
 A. C. Pratt coll.  
 ♀ ad., Moroka, British New Guinea, 3000-6000 ft. A. S. Anthony coll.  
 ♂ ad., Chads Bay, British New Guinea. No. 2666, A. S. Meek coll.  
 2 ♀♀ ad., Kumusi River, British New Guinea, 28. v., 16. viii. 1907. Nos. 3059, 3419. A. S. Meek coll.  
 2 ♂♂ ad., 4 ♀♀ ad., 1 ♂ juv., St. Aignan, Louisiade Islands, August 1897.  
 A. S. Meek coll.  
 (This series shows how variable the underside of this bird can be; while the cross-barring is generally obsolete, or even absent, it is sometimes well developed, and the cinnamon-rufous ground-colour varies also in shade.)  
 ♂ juv., Sudest Island, Louisiade Group, 26. iii. 1898. A. S. Meek coll.  
 ♂ ♀ ad., 2 ♀ juv., Fergnsson Island, June and October. A. S. Meek coll.  
 ♂ ad., Goodenough Island, 15. x. 1896. A. S. Meek coll. (This bird is very pale underneath.)  
 ♂ ♀ ad., Kiriwina Islands, S.E. of New Guinea, 4., 6. vii. 1895. A. S. Meek coll.  
 2 ♀♀ ad., Trobriand Islands, S.E. of New Guinea, May and June 1895.  
 A. S. Meek coll.  
 2 ♀ ad., Woodlark Island, April and August. A. S. Meek coll. (These two females are rather dark underneath, but they are approached by others from other localities.)

Two specimens from British New Guinea, one shot by Mr. Meek at Milne Bay, south-eastern British New Guinea, in February 1899, the other bought in London, apparently skinned by E. Weiske, but said to come from the low country near Port Moresby, have a peculiarly creamy underside with brown markings and rufous thighs; they are probably specimens of *A. h. etorques* in an intermediate plumage.

A female from Stephansort in German New Guinea, collected by a Mr. Müller, is underneath rather more brownish and barred with well-defined narrow whitish bars, much more distinct than usual; the upperside is brownish, showing that this bird is not fully adult; it is apparently also *A. h. etorques*.

The skin of a bird shot by Heinrich Kühn on Wokan, Aru Islands, 2. x. 1900, belongs perhaps to a different subspecies; the underside is paler and not so reddish as in our *A. h. etorques*, and strongly barred with whitish. The upperside is rather brownish, the tail somewhat widely barred. This specimen has the dimensions of adult females of *A. h. etorques*, with a very strong beak, but it is sexed "♂"; should it really be a male, it would be a considerably larger bird than *A. h. etorques*, but it may be wrongly "sexed." More material from the Aru Islands should be examined.

#### 24. *Accipiter hiogaster dampieri* (Gurn.).

*Urospizias dampieri* Gurney, *Ibis*, 1882. p. 453 (New Britain).

♀ ad., Blanche Bay, New Britain, 30. v. 1901. Mencke Exhibition. (Exchanged from the Berlin Museum.)

♀ ad., ♀ juv., Massawa, New Britain, October 1905. C. Wahnes coll.

♂ fere adult, ♀ juv., New Ireland. Collected by a missionary.

? (an subsp. nov.) ♀ me l., ♂ juv., New Hanover, 26. ii. 1897. Cayley Webster coll.

For specimens from Manus, Admiralty Islands, see *Nov. Zool.* xxi. p. 288.

## 25. *Accipiter hiogaster rooki* Rothsch. & Hart.

*Accipiter hiogaster rooki* Rothschild and Hartert, *Nov. Zool.* 1914. p. 288 (Rook Island).

2 ♂ ad., Rook Island, 24. vii., 2. viii. 1913. A. S. Meek coll. Nos. 5812, 5893.

## 26. *Accipiter melanochlamys melanochlamys* (Salvad.).

*Urospizias melanochlamys* Salvadori, *Ann. Mus. Civ. Gen.* vii. p. 905 (1875—Arfak).

♂ ad., Arfak, New Guinea, June 1883. E museo H. Guillemard; bought from Bruijn's hunters in Arfak.

## 27. *Accipiter melanochlamys schistacinus* Rothsch. & Hart.).

*Astur melanochlamys schistacinus* Rothschild and Hartert, *Nov. Zool.* xx. 1913. p. 482.

♂ ad., Mt. Goliath, 2. ii. 1911. No. 5278, A. S. Meek coll. (type).

♀ ad., Owgarra, Angabunga River, 13. xi. 1904. No. A 1842, A. S. Meek coll.

This female shows faint traces of bars on some of the feathers in the middle of the abdomen.

## 28. *Accipiter cirrhocephalus papuanus* (Rothsch. & Hart.).

*Astur cirrhocephalus papuanus* Rothschild and Hartert, *Nov. Zool.* xx. 1913. p. 482.

♀ ad., foot-range of Snow Mountains, 3000 ft., 23. x. 1910. No. 4883, A. S. Meek coll. (type).

♂ ad., Avera, Aroa River, 31. iii. 1903. No. A 168, A. S. Meek coll.

♂ ad., Milne Bay, 14. ii. 1899. No. 2317, A. S. Meek coll.

♂ ad., Mt. Victoria, British New Guinea, A. S. Anthony coll.

♀ ad., Sattelberg, German New Guinea, 1. xii. Wahnes coll.

♀ juv., N.W. New Guinea. W. Doherty coll.

♀ juv., Sariba Island, British New Guinea, 17. iv. 1910. A. S. Meek coll.

♂ juv., Aicora River, 21. ix. 1905. No. 9, A. S. Meek coll.

♀ juv., Rossel Island, 4. iii. 1898. No. 1537, A. S. Meek coll.

# XXXIII.

## FLOCEIDAE.

### 1. *Louchura monticola* (De Vis).

*Mania monticola* De Vis, *Ibis*, 1897. p. 387 (Mount Scratchley, 12,200 ft.).

1 ad., Mt. Scratchley. A. S. Anthony coll.

4 ♂ ♀ ad., Mt. Kuatsford, 11,000 ft., August 1898. A. S. Anthony coll. "Eye dark brown; bill bright blue; feet black."

The sexes are alike. Wings, 61–64 mm. This rare *Mania* is evidently an inhabitant of very high elevations. De Vis described it well enough, but we cannot agree to his statement that it "approaches *M. nigriceps*," with which it has nothing

to do. It is a much larger bird and has a softer plumage; the sides can hardly be called "barred" with black, but with black rather longitudinal markings than cross-bars.

In Sharpe's *Handlist* this species has been left out.

## 2. *Lonchura castaneothorax nigriceps* (Rams.).

[*Amadina castaneothorax* Gould, *Synops. B. Austral.* pt. ii. pl. 21. and text, 1837—"Australia."] *Donacola nigriceps* Ramsay, *Proc. Linn. Soc. N. S. Wales* i. p. 393 (1876—near Port Moresby, New Guinea).

(We have come to the conclusion that "*M. nigriceps*" and "*M. sharpei*" are best treated as subspecies of *castaneothorax*. The differences in colour are not very essential, but generally the crown is strikingly different. While the feathers of the crown in *castaneothorax* are brown with wide brownish grey edges, they are brownish black with narrower and smaller brownish grey tips in *nigriceps*, still paler brown than those of *castaneothorax*, and with pale brownish grey borders all round in *sharpei*, where they are often so wide that the crown appears to be whitish grey altogether. The colour of the rump and upper tail-coverts varies: although it is, as a rule, very different in the three forms, one can, sometimes, hardly find any difference.)

(The name *Lonchura* for this genus had been rejected on account of a prior *Lonchurus*, and *Munia* was generally accepted instead. Modern nomenclators will use *Lonchura* again, as has been done by Mathews, who separated also three new subspecies in various parts of Australia, which we cannot discuss for want of material, and without knowing on what material they were based, as the author does not enlighten us on that point.)

We have of *Lonchura castaneothorax nigriceps* the following specimens:

3 ad., inland of Holnicote Bay, British New Guinea. Rohu coll.

6 ad., without exact locality, British New Guinea. Purchased in London.

♂ ad., Milne Bay, 24. x. 1898. No. 2105, A. S. Meek coll.

3 ♂♂, 2 ♀♀ ad., Aroa River, January and February 1905. Nos. B 193, 194, 212, 213, 214, A. S. Meek coll.

4 ♂♂ ad., 2 ♀♀ ad., 1 juv., Kumusi River, British New Guinea, July and August 1907. Nos. 3337, 3350, 3371, 3383, 3445, 3446, 3447, A. S. Meek coll.

## 3. *Lonchura castaneothorax sharpii* (Mad.).

*Donacicola sharpii* Madarász, *Bull. B.O. Club*, iii. p. xlvii, (1894—"Finisterre" Mountains, German New Guinea); *Aquila* i. pl. i.

♀ ad., Astralobe Bay, German New Guinea. Kunzmann coll. (exchanged from Berlin Museum).

♂ ♀ ad., Stephansort and Friedrich-Wilhelms-Hafen, October and December 1898. E. Nyman coll.

5 ♂♂, 5 ♀♀, Vulcan Island. See *antea*, p. 45.

## 4. *Lonchura caniceps caniceps* (Salvad.).

*Munia caniceps* Salvadori, *Ann. Mus. Civ. Gen.* ix. p. 38 (1876—Naiabui, Hall Bay, S.E. New Guinea).

1 "♂" 4 "♀" ad., Yule Island, September 1904. A. S. Meek coll.

1 ♂ ad., Aroa River, 11. ii. 1905. No. B 218, A. S. Meek coll.

? 1 ♂ juv., Aroa River, 29. i. 1903. (No. A 149, A. S. Meek coll.) Feathers of crown brown with pale brownish grey edges; back rufous brown; upper tail-coverts not brownish orange, as in the adult birds, but with straw-colour; underside buff, more greyish and with glossy ashy silvery margins to the feathers on throat and breast. The abdomen shows brownish black feathers coming, and we therefore believe that this bird is a young *L. caniceps*.

? 9 ♂ ♀, apparently mostly young, like the young male just mentioned, Owgarra, on the Angabunga River, January and February 1905. A. S. Meek coll.

Some of these birds are quite young, being cinnamon brown above and below, lighter underneath, darkest on back.

We are not sure if these birds really are *L. caniceps* or another (unnamed) species. There is, among the adult birds from Yule Island, a male with just one feather on the back of the same colour as in those from Owgarra.

### 5. *Lonchura caniceps kumusii* (Hart.).

*Munia caniceps kumusii* Hartert, *Bull. B. O. Club* xxvii. p. 47 (1911—Kumusi River).

7 ♂♂ 4 ♀♀ ad., Kumusi River, June and July 1907. Nos. 3077, 3078, 3079, 3108, 3109, 3342, 3343, 3344, 3345, 3346, 3372, A. S. Meek coll.

"Iris brown; feet slate; bill black."

### 6. *Lonchura caniceps* (?) subsp. nov.

1 ad., inland of Holnicote Bay. Rohu coll.

This bird is much paler underneath than even the palest *kumusii*, having sides of head and throat creamy whitish grey, rest of under surface greyish brown, more brownish towards the vent. It is probably another race of *L. caniceps*, but it would be hazardous to name it from one single specimen without a very definite locality and elevation where found.

### 7. *Lonchura spectabilis* (Sel.).

*Donacicola spectabilis* Selater, *Proc. Zool. Soc. London* 1879. p. 449. pl. xxxvii (New Britain, Brown coll.).

2 ♂♂ ad., 1 juv. (first plumage) Ralum, New Britain, January 1894 (Cayley Webster coll.) (From spirits.)

♂ juv., New Britain, 13. v. 1880, Kleinschmidt coll. (From spirits.)

About a series of young birds see *Nov. Zool.* xxi. 1914, p. 217.

### 8. *Lonchura melaena* (Sel.).

*Munia melaena* Selater, *Proc. Zool. Soc. London*, 1880. p. 66. pl. vii. 2 (Kabakadai, on the coast of New Britain).

7 adult birds, Ralum, New Britain, 7. i. 1894. Cayley Webster coll. (From spirits.)

### 9. *Lonchura nigerrima* (Rothsch. & Hart.).

*Munia nigerrima* Rothschild and Hartert, *Orn. Monatsber.* vii. p. 139 (1899—New Hanover).

1 ♂ ad., 1 juv., New Hanover, 1897. Cayley Webster coll.

10. *Lonchura grandis* (Sharpe).

*Munia grandis* Sharpe, *Journ. Linn. Soc. London, Zool.* xvi. p. 319 (1882—Taburi in the Astrolabe Mountains, collected by Goldie).

1 ad., "Port Moresby." Purchased from dealer.

♂ ♀ ad., Milne Bay, British New Guinea, 24. x. 1898, 17. i. 1899. Nos. 2101, 2184, A. S. Meek coll.

5 ♂ ♀ ad., Kumusi River, in the northernmost part of north-eastern British New Guinea, July and August 1907. Nos. 3298, 3299, 3303, 3309, 3311, 3421, A. S. Meek coll.

"Iris dark brown; bill and feet slaty blue." Sexes alike.

1 ♀ fere ad. (some buff feathers on abdomen, brown ones on head and throat), 27. v. 1907. No. 3036, A. S. Meek coll.

♀ ad., Stephansort, 13. i. 1899. E. Nyman coll. (? an subsp. nov.) The edges to the central tail-feathers are lighter and more yellow, the back is perhaps a little more brown than in the specimens from British New Guinea. "Iris red."

11. *Lonchura tristissima* (Wall.).

*Munia tristissima* Wallace, *Proc. Zool. Soc. London*, 1865. p. 479 (N.W. Peninsula of New Guinea); Rothsch. & Hart., *Nor. Zool.* 1913. p. 520.

♂ ♀, Dorey, June 1897. W. Doherty coll. "Iris deep brown; bill pale blue or pale purplish blue; feet blue-grey."

Ad. "Mt. Maori" near Humboldt Bay, January 1899. J. M. Dumas coll.

7 ♂ ♀, Upper Setekwa River: cf. *Nor. Zool.* 1913 p. 520.

5 ♂ ♀ ad., Kumusi River, north-eastern British New Guinea, June to August 1907. Nos. 3202, 3338, 3339, 3359, 3385, A. S. Meek coll.

12. *Oreostruthus fuliginosus* (de Vis).

*Oreospiza fuliginosa* De Vis, *Ibis* 1897. p. 389 (Mt. Scratchley, 12,200 ft.).

*Oreostruthus fuliginosus* De Vis, *Report on New Guinea for 1897*, Appendix AA, p. 88 (1898—Mt. Scratchley at 12,200, Wharton Range at 11,100 ft.).

*Oreostruthus fuliginosus* Rothschild, *Nor. Zool.* 1899. p. 218. pl. ii. fig. 2.

2 ♂ ♂ ad., 1 ♂ med., 1 ♂ juv., 1 ♀ ad., Mt. Knutsford, 11,000 ft., 20., 21. viii. 1898. A. S. Anthony coll.

1 ♂ juv., 2 ♀ ♀, Mt. Winter-height, 24., 26. viii. 1898. A. S. Anthony coll. "Iris rufous; bill red; feet brown."

The copious and soft plumage of this mountain species is very characteristic.

13. *Erythrura trichroa papuana* Rothsch. & Hart.

*Erythrura trichroa papuana* Rothschild and Hartert, *Nor. Zool.* vii. 1900. p. 7 (Arfak Mts.).

1 (♂ ad.) "Arfak Mts." Purchased from Gerrard in London.

14. *Erythrura trichroa goodfellowi* Grant.

*Erythrura trichroa goodfellowi* Ogilvie-Grant, *Bull. B. O. Club* xxix. p. 29 (1911—Moroka Mountains, British New Guinea); Rothschild & Hartert, *antw.* p. 45.

2 ad., 2 juv. Aroa River, 4000 and 5000 ft., August 1899. Emil Weiske coll.

2 ♂ ♂, 1 ♀, Mts. Kotoi district, British New Guinea. A. S. Anthony coll.

♀ ad., Avera, Aroa River, 26. i. 1903. No. A 196, A. S. Meek coll.

♂ ad., head of Aroa River, 6. v. 1905. No. A 1782, A. S. Meek coll.

♂ ad. Bihagi, head of Mambare River, 5. ii. 1906. No. A 2346, A. S. Meek coll.  
 2 ♂♂, 4 ♀♀, Owgarra, Angabunga River, January 1905. No. A 1968, 2002, 2006, 2007, 2019, 2036, A. S. Meek coll.

## XXXIV.

## T U R D I

1. *Turdus papuensis* (Seeb.).

*Geocichla papuensis* Seeböhm, *Cat. B. Brit. Mus.* v. p. 158, pl. ix (1881—S.E. New Guinea : type, collected by A. Goldie, in the British Museum).

2 ♂♂, 1 ♀ ad., Aroa River, 3500 and 4000 ft., August, 1899. Emil Weiske coll. Wings 117.5–120 mm.

♀ ad., Snow Mountains, lower slopes, at 3000 ft., 18. x. 1910. No. 4849, A. S. Meek coll. : cf. *Nor. Zool.* 1913, p. 305. Wing 112 mm.

1 ad. (probably ♀) with nest and fragments of eggs, Sattelberg, 11. viii. 1911. Kaysser coll. Wing 112 mm.

As the two birds collected by Meek and Kaysser are so much smaller than those from the Aroa River, the latter are probably all three males, unless there are two subspecies.

♀, Choiseul, Solomon Islands : cf. *Nor. Zool.* 1905, p. 265. Wing 114.5 mm.

2. *Turdus melanarius* (Mach.).

*Merula papuensis* De Vis, *Report on Brit. New Guinea for 1899*, App. "Birds," p. 112 (4 of separata) (1890—Mount Victoria).

*Merula melanaria* Madarász, *Orn. Monatsber.* 1900, p. 23 (Astrolabe Mountains).

(The name *papuensis* cannot be used if the genera *Turdus*, *Merula* and *Geocichla* are united.)

3 ad., 1 juv., Mt. Scratchley, British New Guinea, 1897. A. S. Anthony coll.

2 ad., Mt. Knutsford, 11,000 ft., 18. viii. 1898. A. S. Anthony coll.

2 ad., 1 fere ad., 2 juv., Owen Stanley Mts., "3000–5000 ft." 1897 (probably higher). Native coll.

"♂ ♀," Mt. Busu, 2600 m., inland of Huon Gulf, 23. x. 1912. C. Kaysser coll.

The two birds from Mt. Busu appear to be smaller (wings 120 and 121.6 mm.) than those from British New Guinea, which have the wings 126–133 mm. If more material corroborates this difference, the form from the north must get a new name, as subspecies of *T. melanarius*.

## XXXV.

## BUCEROTES

1. *Rhyticeros plicatus ruficollis* (Vieill.).

[*Buceros plicatus* Pennant, *Spec. Faun. Ind.* p. 46. (1781—Ceram and New Guinea ; patr. restr. Ceram).] \*

*Buceros ruficollis* Vieillot, *Nouv. Dict. d'Hist. Nat.* iv. p. 600 (1816—Waigiu).

♂ ad., Waigiu. Bought from H. Whiteley.

♂ ♀ ad., Momos, Waigiu, 24., 25. x. 1883. Guillemard coll.

\* Cf. Stresemann, *Nor. Zool.* xxi. 1914, pp. 99–100. The author says that his series was lost during transit. Fortunately they have now turned up; how many there actually were, we cannot at this moment ascertain, but we have received 1 ♂ ad., Manusela, 15. vi. 1911, 1 ♂ juv., Manusela, 15. vi., ♀ ad., Sepa, 3. v. 1911, ♀ ad., Makariki, 1. v. 1911. The dark chestnut head and neck of the male easily distinguishes this race from *R. p. ruficollis*.

♂, Misol, 27. i. 1900. H. Kühn coll. "Iris golden brown."

5 nearly ad. ♂, 7 juv. and ♀ from Dutch New Guinea, but without definite localities. Ex Bruijn coll.

♂ ad., Dorey, June 1874. Specimen *q* in Salvadori's list in *Orn. Pap.*

♂ ♀ ad., Ron, June 1897. W. Doherty coll.

♂ ad., ♂ juv., Kapaur, December and February. W. Doherty coll.

♀, Takar, October 1896. W. Doherty coll. (♂ iris red or orange; ♀ brown with yellow outer ring.)

♂ ad., Jobi. Ex Bruijn coll.

1 ♂, 2 ♀ ♀, Stephansort, 1899. E. Nyman coll. (♀ iris yellow).

♀, Constantinhafen. Kubary coll.

2 ♀ ♀, Nieura, September 1893. Lix coll.

♂ ♀ ad., Oriori district, Owen Stanley Mts. A. S. Anthony coll.

♂ ad., Ferguson Island, 3. x. 1894. A. S. Meek coll.

2 ♂ ♂ ad., 1 ♀ ad., 1 ♀ juv. New Ireland. Collected by a missionary.

#### ADDITIONS TO *Nov. Zool.* 1903, p. 99.

#### ***Colluricincla brunnea tachycripta* subsp. nov.**

The specimens of which we said that we could not see any reliable difference between them and Australian ones, differ from the latter by being smaller, by the bill being slightly slenderer, and by the white of the lores extending in a narrow line over the eyes and in a short streak or spot, more or less indicated, behind the eye; the chest is also darker, thus throwing up the whitish throat in distinct contrast. Wings 121–127 mm.

Type: ♂ ad., Milne Bay, 19. iv. 1899. No. 2484, A. S. Meek coll.

Before *Pinarolestes megarhynchus* should be inserted:

#### ***Pinarolestes obscurus* (Meyer).**

*Rectus obscura* A. B. Meyer, *Sitzungsber. R. Akad. Wiss. Wien*, lxi. p. 390 (1874—Jobi).

1 ad., Ex Bruijn coll. Probably from Jobi.

2 ♂ ♂ ad., 1 ♀ Ansns, Jobi, April 1897. W. Doherty coll. "Iris crimson-brown."

♂ ad., Tana Mera, October 1896. W. Doherty coll. "Iris rich chestnut; bill black; feet blackish."

♀ ad., Takar, November 1896. W. Doherty coll. "Feet grey-blue; bill blackish."

1, Ambernoh River. J. Dumas coll.

In the females the bill appears to be blackish or slate, not really black.



## IN ALGERIA, 1914.

A JOURNEY TO THE M'ZAB COUNTRY AND OVER THE CENTRAL  
HIGH PLATEAUS.

BY ERNST HARTERT, PH.D.

(Plates I., II.)

## I. NARRATIVE.

IN the month of March 1914 Mr. Rothschild and I set out for our sixth visit to study the fauna of Algeria and the desert beyond. After a month's stay at dear old Biskra, spent not unprofitably in collecting certain eggs, birds and lepidoptera, I left Mr. Rothschild on April 8, wending my way once more southwards into the eternal silent solitudes of the Sahara. I was again accompanied by our faithful friend Carl Hilgert, whose name is well known to readers of this journal.

It was no longer necessary to make the long journey to Tougourt again on mules, as the railway to that large oasis was almost finished, and the train took us as far as Djamaa. There we pitched tents, and next morning rode to Ghamra. We passed the large, shallow salt lake which we had seen before in 1909 and 1912, and it was full of ducks. There being no cover to approach them, we were unable to shoot anything, but we distinctly recognised, besides innumerable *Fulica atra*, a number of *Anas querquedula*, a few *Anas crecca*, and hundreds of Sheld-ducks, *Tadorna tadorna*.

At Ghamra we slept, camping in a very picturesque place, near the extended oasis, and next morning we proceeded to Tougourt. It was Friday and market-day, and a crowd of people in the town. We said good morning to Monsieur Henry Chazelles, now in charge of the hotel, and saw one Sliman, the headman of the camel-drivers who went with us to In-Salah, and who was eager to travel with us once more. We then continued our march through the large oasis of Temacin and Zaonia-Tamellath to Bledet-Ahmar. Thinking we knew the way, we separated from the caravan and guide, but we both went wrong! I got so deep into the Chott that it was impossible to proceed, and had to turn back, unnecessarily losing much time, while Hilgert found a safe, though very slippery way through the swamps, and reached the place where we had camped in 1912; but alas, there was no living soul—the houses were deserted, some beginning to crumble to pieces. On account of the unhealthiness of the place Bledet-Ahmar had been moved about 5 kilometres farther eastwards.

On April 11 we rode to the Hassi-Dinar, through low, rolling sand-hills, generally with a good deal of vegetation. We passed a well with water of a pleasant taste, though a rotten dead Jerboa floated in it—discovered after we had indulged in the cooling draught. The walls of the well probably served the Desert-sparrow, *Passer simplex saharæ*, as a nesting-place, for a pair flew round it; but the camels were ahead and we had no ropes, or other means at hand, to make sure. The water in the well of Dinar is very brackish and supposed to be unhealthy, though it might serve in the place of the famous "Hunyadi Janos" water. *Sylvia nana deserti* was seen occasionally, and we admired the tall

bushes of *Limoniastrum guyonianum*. The next morning was one of those refreshing, though perfectly dry and quiet mornings one has in the Sahara in the winter, up to the beginning of May. The thermometer, at half-past five in the morning, showed only 6° C. On the 12th we reached El-Alia, a promising place, belonging to a wealthy marabu. Riding at the head of our caravan, we lost sight of it in a more or less slippery sebeha. We could distinctly see the palms of El-Alia in the distance, as they were visible between some rich yellow sand-dunes. We therefore troubled little about the way, and reached the place safely enough, but we crossed the dunes where they were widest, instead of where the belt was narrow, as we had done in 1912. Thus the crossing of the high dunes, where the sand was often so loose that the mules could only get through with great difficulty, took us nearly an hour. Here, as elsewhere, one did not realise the extent of the dunes, which appear as a yellow line on the horizon, until one is right among them.

At El-Alia the water of some of the wells is beautiful; the palms grow mostly in deep holes, as in El-Oned (see *Nor. Zool.* xviii. p. 461, plates xxii, xxiii.), without being artificially watered; and the population—mostly dark-coloured, probably of Berber origin and not Arab—is very hard-working. One sees little of them; they are generally at work, digging out holes, planting trees, or carrying sand out of the gardens, and seem to have no time to talk and stare at strangers. The marabu and his son (who had to do the honours of the place until his father returned) invited us to dinner and tea, and would not take a refusal. It was difficult to get away in time to catch a few lepidoptera, and we did not get any larger species. Here we began again to see the large Neuroptera of the family Myrmeleonides, among which we had discovered so many new species two years before (*Nor. Zool.* xx. p. 446). We saw two pairs of *Oenanthe leucopyga uegra*, which we had not seen here before.

On the 13th we reached the sandy plain of El-Arich, which I described, *Nor. Zool.* xx. p. 26, as an El-Dorado for ornithologists. It is no doubt a very interesting place, but we were this time a little disappointed. The vegetation appeared to be less rich than two years ago, and hundreds of camels were feeding on it. We could not come across *Caprimulgus aegyptius* at all, *Ammomanes phoenicurus arenicolor* was hardly seen near the place where we camped—we were unable to find our old camping-ground—*Alacmon alaudipes* was very rare, *Scotocerca* did not interest us any more, *Galerida theklae deichleri*, to our amazement, already had young. We were, however, not disappointed with *Sylvia nana deserti*. We took four nests with eggs, but one was, unfortunately, too hard set for blowing; it was, however, some time before we accidentally, close to the camp, came across the first nest. Formerly we had found them in bushes of *Tragacanthum*, *Calligonum*, and *Ephedra*. Our search among these was this time in vain, probably because these plants had suffered from drought and camels, and all nests seemed to stand in the thick bunches of "Drin," *Aristida pungens*, a grass characteristic of the desert sand. Unfortunately the weather was dull—no sun, and windy; it had been our intention to stay two days in the plain of El-Arich, but having succeeded in finding the eggs of the *Sylvia*, and the weather being bad for insects, we went on to the desolate hammada, in which is situated the well Hassi-Sidi-Mahmud, with very brackish water. Of the rare and beautiful lizard *Agama tournevillei*, on account of the absence of sun, only a single specimen was seen.

The chief object of this expedition was to collect eggs of some of the rarer species of desert-birds, especially of *Ammomanes phoenicurus arenicolor*, *Eremophila (Otocorys)* and others. It was therefore most discouraging when, soon after El-Alia, we saw the young of the *Ammomanes* running about; but our spirits were not long after revived by the finding of a clutch of fresh eggs! Another was taken near the well of Sidi-Mahmud.

On April 15 we came to Guerrara, where tents were pitched outside the town, near the tents of numerous Nomads. We were most kindly welcomed by the former Khalifa,\* Bassaïd-ben-Hadj-Daoud, who invited us for dinner. We first had tea with the post-master, and also met the Kaïd Kaci, who was absent when we came to Guerrara in 1912. We found him a pleasant gentleman, sixty years old, and Kaïd of Guerrara for the last forty years. At dinner we also met again Mohamed-ben-Ahmed, the educated and well-informed teacher. We spent the evening very pleasantly with these tactful Beni-Mزاب, and next morning bade adieu to the picturesquely situated town of Guerrara, which we are not likely to behold again. After a long march we arrived at our destination, the bordj (rest-house) of Hassi-Rebib, in the valley of the Oued Nça, which looked wonderful, filled as it was with luxuriant green, winding its course through the dusty brown hammada (Pl. I.). Wide portions were covered with excellent fresh grass, and our mules had a regular feast on it.

We now spent sixteen days at this place, devoting ourselves chiefly to the collecting of eggs. We succeeded in getting beautiful series of identified eggs of *Ammomanes phoenicurus arenicolor*, *Ammomanes deserti algeriensis*, *Eremophila alpestris bilopha*, *Calandrella brachydactyla rubiginosa*, *Corvus corax ruficollis*, *Falco biarmicus erlangeri*, *Cuculus petrosus spatzi*, and a few others, but we were most unlucky with the eggs of the Crested Larks. In 1912 we only met with *Galerida theklae carolinae* in this neighbourhood, and the same happened now during the first days. Somehow, in contradiction to our unexpected luck with the eggs of the other *Alandidae*, we did not come across a nest with eggs of a Crested Lark, but we had several brought in by boys, which were taken some distance away. I was satisfied that they could only be the eggs of *G. t. carolinae*, but soon after we found, to our dismay, that *Galerida cristata macrorhyncha* was also quite common in the same district! Therefore the eggs were useless, as the Arabs do not distinguish the two species. Well-identified series of eggs of the various forms of Crested Larks inhabiting the Sahara are still our desiderata. Those in the British Museum are almost all worthless, as most of them were not identified by the collector, and they cannot be named by localities alone, because almost everywhere two species occur or may occur side by side. Probably the eggs of each are most variable, and those of the two species indistinguishable in most cases, but more definite information is wanted.

The time spent at the Hassi-Rebib was very pleasant and very full of work, though the small room which we occupied was hardly large enough for two men to work, write, and sleep in (Pl. I.). Moreover the weather was not favourable, as we had no sun for more than half the time, and more or less heavy gales, filling the air with brown dust and sand, and once we even had a short shower of cold rain.

The river-bed was full of birds, nesting and on passage, but of residents nothing

\* *Khalifa* means representative, substitute. In the Mزاب towns the Khalifa, who is elected by the council for a few years, is the representative of the Kaïd, when the latter is absent.

but what was already known or to be expected was found. The most interesting mammal we obtained was a beautiful old Wild Cat, *Felis libyca margaritae* Loche; it is of special value because nearly from the typical locality. Hares were not as plentiful as in 1912; they were still mostly up in the hammada, coming to the river-bed a month later, when the vegetation on the plateaus dries up. Small mammals are scarce, probably on account of the periodical though apparently rare floods. The valley was very beautiful (Pl. II.). The *Zizyphus* bushes and huge old Terebinth trees were green, many small plants covered the banks in places, and a fair-sized bush, sometimes five or six and even seven feet high, was covered with golden-yellow flowers with a mild, sweet smell. This bush is closely allied to *Retama raetam*, and is *Boelia sphaerocarpa* Webb; it so much resembles the Retam that it is, apparently, often mistaken for it when not in flower, by non-botanists. I have only seen it in the valley of the Oued Nça and at Arefidji, between Tonggourt and Ouargla, but a twig from Arefidji was lost, so that it remained unmentioned in the list of my plants of 1912.

The Arabs call the *Boelia* "Baehlul." The "Harmal," *Peganum harmala* L., was also in full flower, its smell being rather unpleasant.

The catch of moths was below our expectations, doubtless chiefly because it was mostly too windy; and hardly more than three nights were really good ones, being quiet, fairly dark, and not too cold. Of butterflies only *Pyrameis cardui* was very numerous; they were partially worn, but many were just being hatched, and these generally rather small. On some days thousands were seen. On the *Zizyphus*-bushes the "Blue" *Tarucus teophrastus* was not rare, and twice a Swallow-tail was seen.

Of *Melitaea didyma harterti* Rothschild, caterpillars were observed, but no butterflies were flying yet. Of other insects some nice things were caught, but less than I had hoped for in a place so full of vegetation. One night we had an unpleasant surprise: a perfect invasion of a richly coloured winged Earwig, *Forficula lucasi* Dohrn. While attending the lamp we were already troubled by them, and when we came home to the "bordj" our faithful Sliman said we would have no sleep, for masses of little beasts with pincers filled the room. This was perfectly true: our beds were full of them, they crept over and entered—or tried to enter—everything, doing some damage to a few lepidoptera in papers, settling on our faces, justifying their name by creeping into nose and ear, and generally being a bother.

On the last of April we left the Oued Nça and passed the night about 26 to 27 kilometres westwards on the hammada, apparently close to where we camped two years before. The night was one of the grandest seen in Africa, though very far from comfortable. The northern sky was absolutely blue-black, for hours continually lit up by lightnings, often as many as four flashes at once, the thunder rolling incessantly, the sun setting and colouring the horizon to the west and south with blood-red shades. While rain fell in masses in the north, we escaped—though I actually felt three drops on my face—but the gale was strong and we were covered with sand and brown dust.

The next morning we continued our march to Ghardaïa, which we reached in time for luncheon. The hotel was newly whitewashed and painted, and the laborious hostess did all she could for us, the husband spending his time in looking pleased, serving out drinks, making up accounts—and last but not least enjoying his meals and claret. The food was excellent; all our old acquaintances were pleased to see us again.

The *Euchlor* were over, not a single one being seen, but *Teracolus nana* was common, and on the last day *Melitaea didyma harterti* appeared—possibly they were there before, but not seen, because there had been hardly any sun. A few Swallow-tails were caught, and *Tarucus teophrastus* was very numerous around some large *Zizyphus* bushes.

In the gardens only *Lanius*, *Crateropus*, *Emberiza striolata sahari* (nesting in houses), and Sparrows (all grey-headed!) were observed; once some Ravens and now and then a *Neophron* were noticed flying overhead. The surrounding hammada is rather poor in birds, vegetation being less luxuriant than near the Oued Nçà.

On May 5 we motored to Laghouat, finding a convenient occasion. In the terebinth trees of Tirlhempt *Sturnus unicolor* was feeding its young, *Corvus corax ruficollis* (= *umbrinus*) was distinctly seen, and the pretty little Scops-owl called in the middle of the day.

In Laghouat we had to spend a few days. Again, as before, I was struck with the height of the palm-trees, which surpassed those seen in Biskra and elsewhere. What is said to be the highest palm in Algeria, since the one in Sidi-Okba has been blown down, stands in a garden close to the hotel.

Of birds evidently nesting in the gardens we observed, besides grey-headed sparrows:

*Chloris chloris aurantiicentris*, feeding young; only seen in the gardens in the town, not farther out in the oasis; probably recently attracted by the pine-trees in the public garden.

*Carduelis carduelis africanus*, common.

*Parus caeruleus ultramarinus*, not rare; feeding young.

*Lanius senator senator*, a few here and there.

*Otus scops scops*, here and there.

*Emberiza striolata sahari*, a few observed.

*Hirundo rustica* and *arabica*, both species common, but apparently few nesting; some Martins at the hotel.

There are apparently no Turtle-doves, neither *Streptopelia turtur* nor *senegalensis* nesting in Laghouat. Migratory birds were still fairly numerous.

From Laghouat we proceeded by automobile-omnibus to Djelfa. Our object was to rediscover the "*Garrulus minor*" of Verreaux. So far nothing was known of it but the description and figure. I had united with it the "*Garrulus ocnops*" of Whitaker, from the Great Atlas of Morocco, but it was desirable to compare a series from the typical locality. There are forests with fairly large oaks not very far from Djelfa, but they are not near enough to be conveniently reached. Moreover it was windy and cold, and Jays are not easily obtained during the breeding season; so it happened that we only shot two specimens, but we also got a clutch of eggs. We were fortunate to make the acquaintance of Mr. Saby, the "garde général des forêts" for the district, who is greatly interested in natural history, and our thanks are due to him for kind help and pleasant hours.

From Djelfa we proceeded to Aïn-Oussera, where we collected *Galerida cristata randoni*, the type of which was shot there half a century ago, and at last we were right in the region of *Chersophilus duponti*, which we had expected (cf. *Noc. Zool.* xviii. p. 465).

From Aïn-Oussera we continued our journey northwards to Boghari, thence by train to Alger, and on May 17 we joined Mr. Rothschild again at the beautiful, idyllic Hammam Meskoutine, where we collected for nearly another fortnight. On

the 26th we had a hailstorm of pieces of ice generally measuring up to 55 by 40 mm. Fortunately they did not fall thick at Hammam Meskoutine, while one of the mountain forests consisting of oak bushes and wild olives was quite destroyed, and the hailstones fell so thick up there that the hillside looked white from the distance.

Early in June we returned to England, and thus ended our sixth journey to Algeria—full of more or less pleasant reminiscences, and not without results.

## II. NOTES ON SOME OF THE BIRDS AND THEIR NESTS AND EGGS.

### 1. *Corvus corax ruficollis* Less.

Cf. *Nor. Zool.* xx. p. 37.

This is the only kind of Raven found in the M'zab country. It nests on terebinth trees in the large oueds and in the dayats between Laghonat and Ghardaïa, and also on rocks. We obtained two clutches, both from terebinth trees, one of four and one of three eggs, both clutches partially incubated, on April 18 and 26. The eggs are quite like those of *C. corax tingitanus*, but smaller, especially less wide. Our two clutches measure  $47 \times 30.5$ ,  $45.4 \times 30.3$ , and  $43.3 \times 29.5$ ;  $45 \times 29$ ,  $44 \times 28.6$ ,  $42.4 \times 28.6$ , and  $39.3 \times 28$  mm.

A clutch of *C. corax tingitanus* taken by Hilgert from a rock near Biskra on April 4 measures  $48.5 \times 32$ ,  $44.9 \times 33.1$ , and  $44.2 \times 32.7$  mm.

In the Oued-Nça we found also a nest in a terebinth tree with three young birds. As these Ravens were very shy, and we saw no other way of getting a pair, I built a sort of hut of branches of Zizyphus and Retam, with a seat of Harmal, and waited until I had shot both birds, a beautiful pair of this desert Raven. In order to save the young birds from a cruel death I sent a boy up to bring them down; he succeeded only in getting two—which he accepted for eating with great pleasure—saying the third one could already fly and he was unable to catch it. Passing the tree again a couple of days after, I was astonished to see two old Ravens circling round, and afterwards disappearing into the tree which contained the nest. So the improvised hut was again resorted to for observation, and there remained no doubt that these two old Ravens had come to feed and take care of the last young bird. I record this fact, as it is absolutely established, and does not happen very frequently, I believe.

These Ravens do not only feed on offal, when animals have been killed for food, and on carrion, but also to some extent on lizards, as one I shot had in its bill an *Agama inermis*, and the same were found in their stomachs.

### 2. *Garrulus glandarius minor* Verr.

*Garrulus minor* Verreaux, *Rer. and Mag. Zool.* 1857, p. 439, pl. xiv. ("Algérie"); Loche, *Cat. Mamm. et Ois.* p. 52 (1858—"Djelfa"). Loche here mentions that he presented the type, evidently the sole specimen which he had, to the "exposition permanente d'Alger"; this exhibition was by no means permanent, but was distributed some years after, and we do not know where the specimen is now. The skin in the British Museum, which was described as *G. minor* by Sharpe in *Cat. B. Brit. Mus.* iii. p. 26, is *G. glandarius whitakeri* Hart.—See *Bull. B. O. Club* xxxiii. p. 141, June 1914.

A nest was found on May 8, about 12 kilometres from Djelfa. It stood 4 metres high in a dense oak tree. The nest was rather small, looking from

below not larger than a Blackbird's nest; it was built outside with dry twigs and lined with very fine grasses, but without any roots whatever. The four eggs are typical Jay's eggs. They are rather pale greenish with distinct spotting. The eggs of *G. g. cervicalis* I have been able to compare are distinctly larger, but probably unusually small ones could be found to match those of *G. g. minor*. The eggs of *G. g. glandarius* are also larger than those of *minor*, but exceptionally small ones occur which are equally small. The four eggs, which are the full clutch, being slightly incubated, measure:  $30.9 \times 22.3$ ,  $30.4 \times 21.5$ ,  $29.8 \times 21.8$ , and  $30.1 \times 22.2$  mm.

### 3. *Pica pica mauritanica* Malh.

The African Magpie is not rare in the forests north, west, and north-west of Djelfa. A number of old nests were found, and one containing young.

### 4. *Sturnus unicolor* Temm.

On May 5 we saw "Sardinian starlings" feeding young in the terebinth trees of Tihrempt, between Ghardaia and Laghouat.

### 5. *Oriolus oriolus oriolus* (L.).

While I was somewhat doubtful as to the nesting of the Oriole in Algeria, I have now sufficient proof of its breeding (if allowed to by men!) at Aïn-Onssera, in high tamarisks, in the mountain woods of the Djebel Faya, and doubtless elsewhere.

### 6. *Loxia curvirostra poliogyna* Whit.

Crossbills are common in the pine-woods of the Djebel Senalba, near Djelfa, but they were in such badly worn plumage when we were there (May 9) that we did not make a large collection of them. The specimens we shot are rather pale, no male was seen with much red, but Mr. Saby told me that bright red ones were common in autumn. The Djelfa specimens agree well with Tunisian *poliogyna*, while those from near Alger town are darker; as the latter were obtained much earlier in the year than any we have seen from Tunisia, Batna, or Djelfa, the darker coloration may be due to the season when they were shot.

### 7. *Erythrospiza githaginea zedlitzi* Neum.

Not rare near Hassi-Rebib in the Oued-Nça, where they used to come to the wet places near the cistern, where animals had been watered or water spilt. Two fresh eggs were found on April 25.

### 8. *Petronia petronia barbara* Erl.

On May 9 a nest containing seven quite fresh eggs was found on an empty building on the M'zabite cemetery, close to Djelfa, deep inside a hole.

### 9. *Passer hispaniolensis hispaniolensis* (Temm.).

At least during the first week of our stay at Hassi-Rebib, and perhaps all the time, a flock of over thirty red-headed and female Sparrows flew about in the

river-bed. They were exceedingly shy, and we obtained only a single male, which is a typical *hispaniolensis*. This is very interesting, because the M'zab country is, as far as we have been able to observe, entirely inhabited by *P. domesticus tingitanus*, more or less pure; at Ghardaïa and Guerrara no specimen with quite red crown or any stripes on the sides could be procured or observed. It is evident, however, that flocks of Sparrows immigrate occasionally; thus, besides this one at Hassi-Rebih, where they did not nest and were not known to the Arabs, a similar but smaller flock was observed at one of the lonely bordjs between Tougoumt and El-Oned, far away from any inhabited place, in April 1909.

#### 10. *Rhamphocorys clot-bey* Bp.

See *Nov. Zool.* xxi, 1914, p. 190, pl. viii.

Near Biskra this magnificent Lark is very rare during the breeding season. That it breeds there in small numbers is certain. On March 22, 1909, Hilgert shot a pair two miles from Biskra, the female of which had strongly enlarged eggs which would have been laid in about eight or ten days. On April 12, 1913, Count Zedlitz shot a pair about ten or twelve kilometres from Biskra, and in 1912 Messrs. H. M. Wallis and C. E. Pearson found young ones, which had just left the nest, on April 8, about six miles south of Biskra. This year Mr. Rothschild, Hilgert and I went over the same spot where Count Zedlitz shot the birds, and probably also to the place where Messrs. Wallis and Pearson discovered the young birds, but we did not see or hear anything of the "tarsha," as it is called by some Arabs (though only the nomads know this name, the townspeople of Biskra being acquainted with hardly any names of birds).

We failed also to come across the "tarsha" east of Guerrara, where we found it in 1912; but west of that town, nearing the Oned-Nça, we saw it, and it nested in the hammada all round Hassi-Rebih, though by no means in great numbers.

Clutches of two, three, and four eggs were obtained on April 19, 22, and 23. All were fresh, but the clutches of two eggs were probably not complete. The date of the young birds found by Messrs. Wallis and Pearson near Biskra is an exceptionally early one, according to the experience of Professor Koenig and of ourselves in West Algeria in 1913. According to our observations the second half and end of April is the best time for finding the eggs.

The nests and eggs agree fully with those found near Aïn-Sefra, but the majority of nests stood under the bushes of *Haloxylon articulatum*, which here almost entirely replace the *Artemisia herba-alba* of the Hautes Plateaux. The eggs are generally rather elongate and always much more pointed on the thin end, only a few being considerably shorter. The markings appear either in small dots, almost uniformly spread over the surface of the eggs, or in larger patches, less thickly spread, and often forming a zone round the thick end. Sometimes the reddish spots are darker, more brownish, and the ground-colour is purer white and more evident. The following are the outside measurements:

Clutch of three, 23. iv. 1914:  $29 \times 18.4$ ,  $27.9 \times 18.7$ ,  $25.7 \times 18.8$  mm.

Clutch of two, 27. iv. 1914:  $28.7 \times 19$ ,  $28.7 \times 18.4$  mm.

Clutch of four, 22. iv. 1914:  $26.7 \times 16.9$ ,  $26.5 \times 18.2$ ,  $26.2 \times 17$ ,  $25.7 \times 17.4$  mm.

Clutch of two (third broken), 23. iv. 1914:  $23.6 \times 18.4$ ,  $23.6 \times 18.2$  mm.



## (Alaemon alaudipes alaudipes Desf.

The "Muka" does not breed in the neighbourhood of the Hassi-Rebib, but a pair or two occur about halfway between the Oued Nça and Ghardaïa.

I must here correct an error in the account of the birds of the Western Sahara. In *Nor. Zool.* xx. p. 46 I described two supposed clutches of *A. a. alaudipes*. One was found in the usual way, in a nest on top of a small bush, and the eggs are typical "Muka" eggs. The other clutch was brought in by one of our men in the nest; he said the nest had stood on the ground, near a stone, but that it was nevertheless a "Muka." The nest resembled that found on the bush, the eggs also, except that they were much smaller. I remarked at the time (*l.c.*) that the position of the nest was an unusual one, and that the eggs were unusually small! I had then no eggs of *Ammomanes phoen. arenicolor* to compare, moreover we had seen plenty of *Alaemon*, but after many days the *Ammomanes phoen. arenicolor* only appeared again for the first time in that place—a single pair being seen. There can now be no doubt whatever that the two small eggs, measuring  $20 \times 16$  and  $20.1 \times 15.9$  mm., are eggs of *Ammomanes phoen. arenicolor*, and nests of *Alaemon alaudipes* are always placed on the top of small bushes! (Though we took no eggs in 1914, we saw again empty nests and one with young.)

11. "*Alauda arvensis harterti* Whit."

We have identified the Skylarks breeding near Batna and Lambèse and those on Djebel Mahmel as *Alauda arvensis harterti*, because—like the type of the latter—they differ from the Skylarks wintering in Algeria by a longer bill and browner coloration. With those birds from the Aurès Mountains and Batna agree those nesting on the Hauts Plateaux, near Aïn-Oussera. They are not rare on the clayey steppe and among the meagre cornfields.

It is desirable to compare a series from the breeding ground in North Tunisia. Zedlitz's specimens from Lac Fetzara appear to be darker than ours from the Plateaux and Aurès Mountain district, but being very strongly worn comparison is difficult.

12. *Calandrella brachydactyla rubiginosa* Fromh.

Cf. *Nor. Zool.* xxi, 1914, p. 192.

I have already mentioned, *Nor. Zool.* xx. p. 42, that the country east and west of Guerrara is probably the southernmost breeding-place of Short-toed Larks.

In April 1914 we found it not at all rare near the Oued-Nça and between the latter and Guerrara. We obtained fresh eggs, two and three in a clutch, on April 22nd, 23rd, 25th; also a full clutch of four near Aïn-Oussera on May 12. The eggs, as is well known, vary considerably; some are very elongate, others shorter and thicker, one clutch pyriform! They cannot be confounded with the larger eggs of *Ammomanes deserti algeriensis*, nor with those of *A. phoen. arenicolor*, but some of the exceptionally small eggs of the *Eremophila* are sometimes almost indistinguishable.

(*Calandrella minor* was **not** met with, although I was particularly on the look-out for it. It is a bird of the northernmost Sahara and parts of the Hauts Plateaux only.)

### 13. *Ammomanes deserti algeriensis* Sharpe.

The Algerian Desert-lark is not at all rare near the Oued Nça, but it is neither found in the river-bed nor, as a rule, on the endless monotonous plain to the south, but inhabits chiefly the undulated hill-country north of the oued, the slopes of ravines or depressions—in short, those parts where the ground is more broken.

The second half of April is apparently the principal breeding season, though it varies, and we found young birds already flying about on April 28, and a hard-set clutch of eggs was found near Biskra on April 1. Formerly we have also found fresh ones during the first half of May.

While clutches of four are usually not very rare, we have only seen clutches of three from the M'zab country this year, but some of them may not have been completed.

The eggs of *A. d. algeriensis* are, as a rule, easily distinguishable from all other eggs found in the Northern Sahara. They are thicker than those of the *Eremophila*, and the ground-colour is, as a rule, creamy or with a reddish hue; the markings consist in most cases of larger spots and patches of a rufous-brown, generally somewhat pale, sometimes darker, less frequently reddish. Between these brownish spots the pale grey or pale violet-grey, deeper-lying spots are distinctly visible. The markings frequently form a ring or zone round the thick end. Such "typical" eggs cannot be mistaken for any others found in the same country, but many varieties occur. The size—as usual in so many eggs—varies a good deal, and the markings are often quite fine, small spots; such eggs, if unusually small, may closely resemble certain varieties of the eggs of *Eremophila alpestris bilopha*. The ground-colour is occasionally quite white, and such eggs, if unusually small, would hardly be distinguishable from eggs of *Ammomanes phoenicurus arenicolor*.

The Arab name "BachHûla" is doubtless meant to represent the peculiar song of the male, which has the same number of syllables and the same cadence.

### 14. *Ammomanes phoenicurus arenicolor* (Sund.).

Near El-Alia with young flying about on April 13. The same day, however, clutches with fresh and about half-way incubated eggs were found, others from fresh to hard-set from that day onwards to the end of April.

The clutch consists generally of two eggs only, though three are not very rare, but more than three were not found. The nests stand usually by the side of a small bush, mostly *Haloxylon articulatum*, the "remeth" of the Arabs, a salsolaceous plant which on the stony plains between El-Alia, Gnerara and Ghardaïa generally takes the place of the *Artemisia herba-alba* of the Hauts Plateaux, which is not very common here. Sometimes the nest stands almost free, by the side of a stone, and once it was found on the east side of a large flat stone placed upright as a sign to indicate the "road." The nests are composed of small twigs of desert plants and a few grasses, interwoven with plant-wool, sheep's wool, and pieces of cloth. The nest is surrounded by a rampart of stones, sometimes quite elaborately, less frequently obsolete or almost wanting. There is no doubt that these ramparts of stones serve to keep the nest in its place, as a fortification against the frequent gales of the desert. All nests we saw were placed on the east or south-east side of the bushes or stones. The birds are quite tame and will come back to the nest within ten to twenty minutes, if not before, if one waits at some

distance and keeps quiet. The usual call is a fine and short whistle, quite characteristic, and the song is a shrill "e-hiht e-hiht e-hiht," as rendered by Koenig, or "ve-eet ve-eet ve-eet," uttered while flying in short curves over the ground.

The eggs are generally very easily distinguished from those of *A. d. algeriensis*, being smaller and especially not so thick, and having a white ground-colour, often, if held against the light, even with a faint light greenish hue. The markings are usually very small, of a dark brown or greyish brown, and the deeper-lying greyish spots are not very obvious; the latter are, exceptionally, quite absent, and only a few small spots of the deepest brown remain. Occasionally the markings are bolder and of a rufescent brown, and such eggs are hardly distinguishable from unusually small ones of *A. deserti algeriensis*.

The following are some measurements of the eggs of *A. phoenicurus arenicolor*:  
 $23.2 \times 15.5$ ,  $23.7 \times 15.1$ ,  $22.4 \times 15.5$ ,  $21.5 \times 15.5$ ,  $22 \times 15.6$ ,  $21.6 \times 15.4$ ,  
 $21.3 \times 15.3$ ,  $21.8 \times 16.9$ ,  $22.5 \times 14.9$ ,  $21 \times 16$ ,  $22.7 \times 14.4$ ,  $22.2 \times 13.7$ ,  
 $21.7 \times 15.7$ ,  $20 \times 14.4$ ,  $19.6 \times 14.9$ ,  $19.9 \times 15$ ,  $21.7 \times 14.5$ ,  $21.7 \times 15.2$ ,  
 $22.2 \times 15.1$ ,  $22 \times 14.7$ ,  $21.5 \times 15.7$ ,  $22 \times 15.5$ ,  $21 \times 15.9$ ,  $21.9 \times 15.2$ ,  $22 \times 15.5$ ,  
 $21.6 \times 15.4$ ,  $21.7 \times 15.2$ ,  $21.1 \times 15.6$ ,  $21.4 \times 15.5$ ,  $23.5 \times 15.3$ ,  $20.8 \times 15.1$ ,  
 $20.7 \times 15.5$ ,  $21.8 \times 15.5$ ,  $21.1 \times 15.6$ ,  $21.6 \times 14.5$ ,  $21 \times 15.7$ ,  $21.5 \times 15.4$ ,  
 $21.4 \times 15$ ,  $19.5 \times 15.5$ ,  $19.9 \times 14.6$ ,  $19.9 \times 14.9$ ,  $19.3 \times 14.4$ ,  $19.4 \times 14.7$ ,  
 $19.6 \times 15$ ,  $20.4 \times 14.9$ ,  $20.6 \times 14.1$ ,  $20 \times 14.7$ ,  $19.9 \times 14.9$ ,  $19.8 \times 15.5$ ,  
 $20 \times 14.8$ ,  $20 \times 14.5$ ,  $20.8 \times 15.5$  mm.

Koenig, *Journ. f. Orn.* 1895, pp. 451, 452, describes three clutches which he found in 1893. His measurements are  $19 \times 14$ ,  $20 \times 14$ ,  $19 \times 15$ ,  $19 \times 14$ ,  $20 \times 14$ ,  $20 \times 14$  mm. They give thus a very wrong idea of the average size of these eggs; if correctly measured his three clutches had unusually small eggs, though it is strange that we, among 100 eggs, should not have come across one as small as  $19 \times 14$  mm.; but Koenig mentioned only full millimetres, so that probably his measures are only approximate, or at least more so than mine. The parent birds we found by no means shy near their nests.

### 15. *Eremophila alpestris bilopha* (Temm.)

This exceedingly pretty little bird is quite common on the stony plateau where *Ammomanes phoenicurus arenicolor* and *Rhamphocorys* are found.

The call-note is a short whistle, but more drawn out and a little deeper than that of *A. ph. arenicolor*; these differences are hard to describe, but once one has heard them can be well distinguished. The song is a very fine warbling note, not at all loud, and almost impossible to describe. As a rule the birds are very tame.

There is no doubt that the second half of April is the chief breeding-time, as many fresh, little, and hard-set eggs were found from April 19 to 30. The nest is built like that of *A. ph. arenicolor* and not distinguishable from the latter. It stands also under small bushes of *Haloxylon articulatum*, thistles, close to a *Convolvulus supinus* (once), or, rarely, by the side of a stone. Koenig found several nests under *Helianthemum sessiliflorum*, with a beautiful golden-yellow flower, but we did not see a nest under that plant, though it is generally common on the hammada where *Eremophila* breeds. The nest is generally surrounded with a rampart of stones on the outside and, as a rule, on the east or south-east

side of the protecting bush or stone. The clutches consist of two or three eggs, but two are much more frequent than three. The eggs are remarkable for their elongate shape, the thin end being usually rather well pointed. The colour is variable, the ground-colour being cream-colour, greyish white, pale stone-grey, or dull pale reddish. The markings are generally fine tips and dots, equally spread over the surface of the egg, or the egg is clouded all over, thus appearing almost uniform. Sometimes the brownish markings are larger and the pale violet-grey deeper-lying spots are obvious between them. The markings sometimes form a well-marked ring round the thick end. Very rarely a greenish tinge is apparent in these eggs. The shell is stronger and thicker than in eggs of *Ammomanes*, so that an egg of this *Eremophila* will, as a rule, weigh as much as a larger egg of *Ammomanes deserti algeriensis*, some varieties of which are not with certainty distinguishable from heavy-spotted and large eggs of the *Eremophila*. The following are some measurements :

21 × 15.4, 21.4 × 15.4, 21.4 × 15.2, 21.8 × 15.6, 21.5 × 15.1, 22.5 × 15.2, 21.5 × 15.7, 21.7 × 15.8, 23.2 × 15.2, 24 × 15.1, 24 × 16, 24.7 × 15, 22 × 16.1, 23.2 × 15.5, 21.2 × 16.4, 23 × 15, 22 × 15.7, 22 × 15, 22.8 × 15.9, 22.2 × 15, 22.8 × 14.9, 22.1 × 15.7, 22 × 15.2, 21.6 × 14.8, 22.6 × 15.6, 22.7 × 15.5 mm. One egg measures only 19.7 × 14.8 mm. I should have taken it for an egg of *Calandrella* if it had not been verified, but I found the nest myself on April 30 on the way from the Hassi-Rebib to Ghardaïa; both Hilgert and I saw the bird on the nest. The other egg of the clutch was rather elongated and larger, but it was unfortunately broken by the Arab who handed it to me, while I was sitting on my mehari. Both eggs were very hard set, almost hatching.

The eggs of the *Eremophila*—though generally quite characteristic—run sometimes to extremes which are indistinguishable from certain eggs of *Ammomanes deserti algeriensis* and *Calandrella brachydactyla rubiginosa*, but they are more finely grained and their shell is thicker—peculiarities which are, however, not easily detected in dried empty shells.

#### 16. *Chersophilus duponti duponti* (Vieill.)

In *Noe. Zool.* xvii. p. 465 we said that we expected this interesting Lark to inhabit the Hauts Plateaux of Algeria. Our expectation was justified and realised. On May 10, travelling in a motor-omnibus from Djelfa to Ain-Oussera, the vehicle stopped for three or four minutes a few kilometres north of Guelt-es-Stel; there suddenly a curious song like "tssii dida diii" struck my ear, and knowing the song of every other bird which could be found on a desolate plain like the place where we stopped, I knew it could only be that of the coveted *Chersophilus*, a conclusion which was at once confirmed by Hilgert, who was acquainted with this Lark from Tunisia. I was rather sorry we could not stay at Guelt-es-Stel, but our arrangements were made for Ain-Oussera, and so we had to proceed onwards over the dusty plain to that caravanserai, and the very same afternoon we had shot two *Chersophilus*.

The country round Ain-Oussera is a clayey plain with innumerable single bushes of *Artemisia herba-alba*, halfa-grass and other plants, and here and there meagre corn-fields. It had been a dry year here on the plateau, while, on the other hand, the northern Sahara had been blessed with unusually much rain, so that the surroundings of Biskra looked greener than I had ever seen them—more so even

than in 1912. Some distance from Ain-Onssera *Chersophilus* was not quite rare, but these little brown birds run very swiftly over the ground, and harmonise so wonderfully with the soil that they are easily overlooked. They are generally shier than other larks, and it takes quite a time to get a series. The song by which their presence is easily detected is either as described above, or "tsii didla didla diii," the last note almost like the call-note of *Ammonanus phoenicea arenicolor*. A male coming to the nest once uttered a churring "terrrrrrrr." The song is uttered while the male soars skywards until it is almost lost to sight, often higher than skylarks.

On May 13, at the same time when full-grown young were running about, a nest with three fresh eggs was found. Though fresh, the clutch was completed, as we left it undisturbed for twenty-four hours, until the morning of our departure. The parents were rather shy, and it took a long time before they came back to the nest.

The nest stood rather deep and well hidden under a bush of *Artemisia herba-alba* and consisted almost entirely of rootlets, fibres and twigs, with one small bunch of hair. Another empty nest stood under a halfa bush, very well hidden, and without any hairs, feathers, or vegetable wool; both also quite without a rampart of stones. The eggs resemble some varieties of the Skylark: their ground-colour is a very pale brown and the markings are of a darker brown, bold on one, very fine on another, and intermediate on the third; one egg has fine black hair-lines. The eggs are thick, the thin end rather pointed, and measure  $24.6 \times 17.7$ ,  $23.8 \times 17.6$ , and  $24.4 \times 18$  mm.

The *Chersophilus* of the Hauts Plateaux is undoubtedly the typical dark form *Ch. duponti duponti*. The young birds have the upperside more rufous, most of the feathers have creamy white tips, and the deep brown centres are less developed than in the adult birds. The narrow white nuchal collar is very conspicuous. The feathers of the chest have roundish (not longitudinal) brown tips and creamy white fringes.

We have not seen a sign of *Chersophilus* on the Oued Nça, nor anywhere in the south. Tristram (*Ibis*, 1859, p. 427) says he shot the bird on the Oued Nça, where, he says, Loche also collected it. In the catalogue of his collection, Tristram mentions specimens from Ouargla and "near Mزاب," which would probably mean Ghardaïa. Loche says "Ras-Nili," a place which I cannot find, unless it is near the caravanserai of Nili between Laghouat and Ghardaïa. The specimens in the Tristram collection, kindly sent me from Liverpool by the authorities of the Museum, are: two labelled Ouargla ("Waregla") December 1856, and one received from Loche, "Sahara, near Mزاب." I doubt the full correctness of these statements. First of all, the statements do not agree, as Ouargla, Oued Nça and Mزاب are not the same, and "Ras Nili" is apparently still another place. Moreover so far south one would surely expect the South Tunisian *Chersophilus duponti margaritae*, and nobody has since come across *Chersophilus* near Ouargla, on the Oued Nça, or at Ghardaïa—neither we, nor Koenig, Spatz, Fromholz, or Geyr von Schweppenburg. I doubt, therefore, if *Chersophilus duponti duponti* is found near Ouargla and on the Oued Nça, and its occurrence in Algeria south of the Saharan or Southern Atlas has still to be verified. It may occur in the region of the Dayats, but we have there searched for it in vain in 1911. The neighbourhood of Ouargla appears to be quite unsuited for it, and if a *Chersophilus* should live there, it would not be *C. d. duponti*, but either *margaritae* or another subspecies.

17. *Galerida cristata macrorhyncha* Tristr.

While during our short stay in 1912 we had only come across *G. theklæ carolinae* in the Oued Nça, we found this year the long-billed Crested Lark almost as common. The two species were found close together, though generally the *carolinae* kept more to hammada bordering the river-bed of the Oued Nça, while *macrorhyncha* was met with, as a rule, in the tributary little oueds on its southern side, where the ground was less stony and where much small vegetation had sprung up. Out on the open hammada skylarks were never seen. In habits no marked difference was noticed, though *carolinae* was seen soaring skywards when singing, *macrorhyncha* only attempting to do so.

From *G. c. arenicola* the *G. c. macrorhyncha* only differs in its generally darker upperside (especially the crown); while the larger dimensions are only noticeable on an average, when series are measured.

18. *Galerida cristata randonii* Loche.

(See *Nov. Zool.* xviii. pp. 488, 493.)

As Mr. Rothschild and I have said before, *G. c. randonii*, if different, must be restricted to the great plains of the Hauts Plateaux. When rushing over them in 1911 we did not come across any form of *G. cristata*. In 1914 I decided to go to Aïn-Oussera, a wayside caravanserai where, according to Loche's *Catalogue* of 1858, the type of *randonii* had been shot. It was there still, but very rare, and we only managed to shoot two males. These, however, together with the old specimen from the Rioeur collection marked as *randoni*, show that this form has the bill stronger and apparently, as a rule, longer, the chest more heavily spotted, the crown (and perhaps the whole upperside as a rule) slightly darker. A larger series would also probably show that the wings are a little longer. Our ♂ from the Coll. Rioeur has the wing 116, our two from Aïn-Oussera 115.5 and 117 mm.

*G. c. randonii* was only seen on the clayey steppe, where some corn was trying to grow, while *G. theklæ hilgerti* was not rare along the roads.

19. *Anthus cervinus* Pall.

During the second half of April *Anthus pratensis* was often, *A. trivialis* sometimes, seen. On April 18 I saw two *A. cervinus* together, at once recognised by their reddish throats. They were somewhat shy, and after shooting one the other disappeared and was not seen again.

20. *Motacilla flava flava* L.

Flocks of Yellow Wagtails, apparently all *M. f. flava*, were noticed almost daily during our stay in the Oued Nça, also on May 5 at Tirlhempt.

21. *Motacilla flava melanogrisea* (Hom.)

On April 18 a black-headed Wagtail was seen among many *M. f. flava*. When shot it proved to be a female of *M. f. melanogrisea*, with the throat and chest pale whitish yellow.

**22. *Lanius excubitor elegans* Swains.**

Common in the Oued-Nça. All nests, old and new, were placed in *Zizyphus* bushes. Clutches were taken from April 17 to 30.

**23. *Muscicapa collaris* Bechst.**

An adult male shot at Biskra on April 5.

**24. *Hippolaïs pallida opaca* Cab.**

Undoubtedly nesting at Ain-Oussera and Hammam Meskoutine, but at Ain-Oussera at least we were too early, as an unfinished nest was seen.

**25. *Hippolaïs polyglotta* (Vieill.).**

Fresh and full clutches of four eggs each were found at Hammam Meskoutine on May 18, 27, and 28. The nests were placed in *Zizyphus* bushes from one to two metres high.

**26. *Sylvia nana deserti* (Loche).**

This beautiful little Warbler is, as we saw in 1912, by no means rare in the sand-district of El-Arich, between El-Alia and Guerrara. On April 13 and 14 we found three nests with fresh eggs, one with hard-set ones, several with naked young, and some others quite finished but as yet empty. The clutches consisted here mostly of four, sometimes of five eggs.

The nests stood this year all in the thick bunches of the Drin, *Aristida pungens*. All are deep for Warblers' nests, but some much more so than others, the depth varying from 6 to 10 cm. They were here all built of grey, dry grasses and fine stems, here and there interwoven and lined with woolly particles of flowers and seeds and with insect cocoons, especially those of the various *Myrmeleonides* which are so numerous in these districts, and of which I discovered so many new species in 1912.

The eggs agree with those described by Koenig and those found in 1909 and 1912.

**27. *Sylvia deserticola* Tristr.**

Quite commonly breeding in the mountain-woods of the Hauts Plateaux near Djelfa. On May 9 they had apparently not yet any eggs, and I saw a pair busy building a nest in a Rosemary bush.

**28. *Sylvia conspicillata conspicillata* Temm.**

A few pairs appeared to be nesting in the bushes of the Oued Nça.

**29. *Agrobates galactotes galactotes* (Temm.).**

By no means rare in the Oued Nça, but only during the last days of April they began to come into full song, and they had no nests yet at that time.

30. *Crateropus fulvus fulvus* (Desf.).

It is curious how very few nests were found in the Oued Nça, where the bird is common enough, and those we saw were empty. Only once, on the 25th, a boy brought us three eggs, of which one got broken.

31. *Monticola solitarius solitarius* (L.).

Evidently nesting near Hammam Meskontine.

32. *Oenanthe deserti homochroa* (Tristr.).

Nesting in small numbers near the Oued Nça. Hard-set eggs (three only) were found on April 22, others (three and four) quite fresh on April 25. The eggs are not distinguishable from those of *Oenanthe hispanica*. Measurements have been given, *Noë. Zool.* xxi. 1914, p. 198, under No. 65! By some unexplainable error these measurements, as well as the two lines at the top of p. 199, were misplaced under No. 65, while they belong of course to No. 63!

33. *Chelidon rustica* (L.).

(*Hirundo rustica*.)

34. *Hirundo urbica meridionalis* Hart.

Both *Chelidon rustica* and *Hirundo urbica meridionalis* nest in Laghonat, but farther south we have no evidence. In Laghonat *H. urbica meridionalis* breeds in fair numbers under certain colonnades—several streets, the hotel, and other buildings being colonnaded. *C. rustica* breeds in small numbers.

Both species of Swallows nest also at Sidi Maklouf and in other caravanserais between Laghonat and Boghari, *H. urbica* sometimes in hundreds, *C. rustica* always in a few pairs only.

35. *Apus melba melba* (L.).

On May 21 we received five fresh eggs, taken from nests under the tiles of some building in Constantine, together with the female taken on a nest. The five eggs were probably from three nests, but as to this no certainty could be gained. The bird is very pale ("*tuneti*" Tschusi), but I still doubt whether a North African race can be separated.

36. *Apus apus apus* (L.).

In April a few were seen on the Hassi-Rebib, but on the 22nd they were quite numerous.

37. *Caprimulgus aegyptius saharæ* Erl.

On April 24 a pair was found near Oamash, about fifteen kilometres from Biskra.

We were disappointed not to see a single specimen among the sands of El-Arich nor near Hassi-Rebib, though we had seen and shot young birds in both places in June 1912. In vain were we searching for them and waiting in the



evenings, until on April 25 they appeared in numbers—at least ten or twelve hawking about close to the bordj. We thought this was the arrival, but never again was a single specimen seen. Now what is the meaning of this? Are they migratory to some extent? Not really, I should say, because nowhere have they been found farther southwards. I am inclined to think that they move about in small flocks out of the breeding season, and possibly a number of pairs nest close together in suitable places, and these places are perhaps uncertain and variable.

### 38. *Cuculus canorus minor* Brehm.

While on March 30 *C. canorus canorus* (♂, wing 220 mm.) was still met with on migration near Biskra, the small North African race was by no means rare near Hammam Meskoutine from the end of April to the end of May. (Wings measure: ♀ 199, ♀ 205, ♀ 210, ? ♀ 197 mm.) A specimen (not sexed) obtained by Mr. Rothschild at Hammam Meskoutine on April 26, with a wing of 219 mm., belongs to the large race, and must have been still on passage. An egg found in the forsaken nest of *Sylvia melanocephala* in May is of a pale pinkish cream with rufous markings and some deeper-lying greyish patches. It measures  $20.5 \times 16$  mm., and is thus small compared with the eggs of *C. canorus canorus*. It closely resembles the two eggs found near Alger, and described in *Nor. Zool.* xviii. pp. 526, 527, in size and coloration.

### 39. *Merops persicus chrysocercus* Cab. & Heine.

and

### 40. *Merops apiaster* L.

Both species nest in small numbers on the banks of the Oued Nça, but neither of them had eggs up to the end of April. Eggs of *M. apiaster* were plentiful near Hammam Meskoutine on May 26 and 27.

### 41. *Falco biarmicus erlangeri* Kleinschm.

Nesting from the Hauts Plateaux to the Central Sahara. The nesting-site is more variable than I used to think. Formerly I only knew of nests on cliffs in small cavities or under ledges, partly high and almost inaccessible, sometimes quite low and easy to reach. This year a nest was found in a large cave, another on a cliff not far from Biskra in a Raven's nest (*Corvus corax tingitanus*), another in the nest of *Corvus corax ruficollis* in a Betonn (*Terebinthus*) tree in the Oued Nça, on the same tree where *Circus gallicus* nested in 1912. Also the food is more variable than I was aware of. Birds will doubtless be the chief food, especially during the migration period, when they are numerous. In the gizzards and stomachs we found *Emberiza calandula* (twice), *Anthus* or *Motacilla* (once), *Calandrella brachydactyla* (once), an unrecognisable bird (once). One female shot in the Oued Nça had gizzard and stomach full of remains of the Spine-tail Lizard, *Uromastix acanthinurus*, and once I found the jaw of a small hedgehog. The wings of adult birds measure in females 346, 353, and about 350 (worn), those of males about 309, 310 mm.

A clutch of four, slightly incubated, was found near Biskra on March 23, another hard-set one of four, and one of three in and near the Oued Nça on April 17 and 20.

The eggs measure:  $50.1 \times 40.8$ ,  $51.6 \times 40.7$ ,  $51.5 \times 41.4$ , and  $51.8 \times 40.7$ ;  $52.6 \times 39.4$ ,  $50.5 \times 38.5$ ,  $52 \times 38.7$ , and  $49.5 \times 37.8$ ;  $50.8 \times 37.7$ ,  $50.8 \times 39.5$ , and  $50.8 \times 40.2$  mm.

The clutch of slightly incubated eggs is beautifully red, the hard-set eggs are brown.

#### 42. *Circus aeruginosus aeruginosus* (L.).

Marsh Harriers were not rare near Biskra in March. In the gizzards and stomachs of two which we shot were found parts of a *Gallinula chloropus* and a number of frogs.

#### 43. *Circus macrurus* (Gm.).

Harriers were common near Biskra in March and early April, and one or two were seen every day in the Oued Nğa, also at Djamaa, Bledet-Ahmar, and Guerrara. The majority were undoubtedly *C. macrourus*, and those which we shot proved to belong to this species. In the stomachs were found only remains of birds, Pipits, *Calandrella*, and other Larks.

#### 44. *Comatibis eremita* (L.).

It is, of course, possible that other breeding-places have existed or may still exist in out-of-the-way places in Algeria, but it seems to be very unlikely, and up to now we are only acquainted with the one nesting-place on the rocks south of Boghari (cf. *Nor. Zool.* 1912, p. 540). At Boghari I inquired of the gentleman who sent us a male in 1911, but was told that the birds no longer nested in the old places, which had become much more noisy than before, as the railway had been built right through these ranges of rocks, and much blasting had taken place; single birds were seen rarely at intervals, but it would probably be next to impossible to obtain any further specimens. Supposing that these accounts are correct—and I have no reason to doubt them—this would be another instance where civilisation has been instrumental in destroying an old and, to ornithologists, historical breeding-ground of a most interesting and beautiful bird.

#### 45. *Tadorna tadorna* (L.).

Hundreds were observed on April 9 on a salt lake north of Tamerna, between Tonggourt and Djamaa.

#### 46. *Anas querquedula* L.

A number were frequenting the Oued Djeddi, near Biskra, during the last days of March. Several observed north of Tamerna, April 9; a large flock near Aïn-Oussera, May 12.

#### 47. *Erolia ferruginea* (Brunn.).

#### 48. *Erolia minuta minuta* (Leisl.),

and

#### 49. *Erolia temminckii* (Leisl.).

A flock of Sandpipers frequented the little lake near Aïn-Oussera on May 11 and 12, and out of it I brought down with one shot two *E. ferruginea* (= *subarquata*), one *E. minuta*, and one *E. temminckii*. There were only a few small ones (*minuta* and *temminckii*), the majority being *E. ferruginea*.

50. *Glareola pratincola pratincola* (L.).

A few were observed and shot on the lake not far from Aïu-Oussera on May 11 and 12. They had evidently no eggs, and there was no sign of their nesting there.

51. *Columba livia livia* Gm.

Wild Rock-doves are found on the rocks near the Hassi-Rebib, and several were shot flying overhead or sitting in sheltered places on the cliffs in a gale.

52. *Sterna nilotica* Gm.

A flock of these fine Terns frequented a small shallow lake on the Hauts Plateaux near Aïu-Oussera about the middle of May. They were sometimes very noisy.

53. *Hydrochelidon nigra* (L.)

and

54. *Hydrochelidon leucoptera* (Temm.).

Single specimens of each of these two Terns were seen on the lake near Aïu-Oussera, middle of May.

55. *Caccabis petrosa petrosa* (Gm.)

and

56. *Caccabis petrosa spatzi* Rehw.

We collected a number of eggs of both forms; of *C. p. petrosa* near Hammam Meskoutine (very hard set on May 22) and of *C. p. spatzi* near El-Ontaya, Biskra, and in the Oued-Nça, March 25, April 1 and 20. The eggs of the two subspecies are indistinguishable.

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# AN ANALYSIS OF THE SPECIES OF THE GENUS **CURETIS**, CHIEFLY BASED ON AN EXAMINATION OF THE SPECIMENS IN THE ZOOLOGICAL MUSEUM, TRING.

By T. A. CHAPMAN, M.D.

(Plates III.—XIX.)

A FEW species of this genus having come into my possession, I found myself considerably puzzled by them. I made some additions to my material and mounted some of the male appendages. The result was to demonstrate that the accepted views (if there are any accepted views) as to species within the genus were in need of being revised.

I obtained the loan, with permission to examine them, of specimens from Mr. Bethune-Baker, and especially from the Tring Museum and from other collections. I herewith present the results.

The Tring material especially is rich enough to have afforded a solution to most of the difficulties that were met with: it especially possesses the Felder types. I had also access, of course, to the types in the British Museum, and was able to verify other specimens with them, so that I did not feel it necessary to desire to dissect any of these.

De Nicéville (1890) regards the Indian species as being only two, and Bingham (1907) accepts this as correct and says, "until extensive breeding experiments are undertaken it will be impossible to attain any certainty as to whether there are two or a dozen distinct forms."

Both authors find the females to afford quite an insoluble problem, even within the Indian area, and de Nicéville says, "The females of both groups" (*bulis* and *thetis*) "appear to be dimorphic, some being white, others ochreous." I think I may say that in the Indian region there are no dimorphic females. Nevertheless I raise a very similar question as regards species in the Pacific region: *thetis* has a white female, yet in the Solomon Islands, a race that is otherwise *thetis* has an ochreous female, with markings different in form to typical *thetis*: are these races of *thetis*, or are they specifically distinct? Again, *tagalia* has an ochreous female, yet in the island of Palawan a form *palawanica* Staud. has a white female, and so was considered a form of *thetis*: are these one or two species? It is to be noticed that the dimorphism (if properly so called) does not occur within any one race, but only as between allied races—a somewhat different problem to that which de Nicéville felt.

Fruhstorfer has a survey of the known species of *Curetis* in the *Stettiner Ent. Zeitung* for 1908, p. 49, which may perchance be of some use in naming specimens. As a discussion of the actual specific value of the various forms very little can be said for it. He quotes de Nicéville's *Butterflies of India*, and says he makes no less than thirteen species from only North India and Burma, and that Distant makes five from the Malay Peninsula.

This misrepresents de Nicéville, who distinctly asserts his belief that he is

dealing with only two species, though he records thirteen described forms. Fruhstorfer himself makes five species in all. He is nearly correct as to *balis* and *acuta*, but his account of the other species is such a remarkable jumble that it seems useless to discuss it.

Though he appears to have a keen scent for local races and varieties, which one sometimes fears is merely a prejudice that every locality has a local race which wants naming, the arrangement of the forms of *Curetis* he recognises under the five species he accepts leaves everything to be desired.

In Moore's (Swinhoe) *Lepidoptera Indica*, vol. viii. p. 239, *thetis* and *phaedrus* are placed as one species, though they are not (the males at any rate) very difficult to distinguish apart from the examination of the appendages. The others are difficult or impossible without such examination: *e.g.* *gloriosa* and *saronis* are treated as distinct, and *stigmata*, *dentata*, *angulata* and *malayica* are also regarded as distinct species.

The species as decided by the structure of the male appendages fall distinctly into two sections, which correspond with de Nicéville's First group A and Second group B. There is one species, *insularis*, that is in some degree intermediate.

#### A. The *thetis* section.

All the species in this section agree in having a harpe apparently soft and clothed with hairs. The aedeagus, besides the eversible vesica, with its rows of cornuti, possesses an apparently separate piece, articulated and movable, close to the extremity. Its movements are, however, restricted, and it is not eversible. For convenience I call it the "shuttle" piece. They generally have beneath a lunulated postdiscal line, never apparently pointing to the apex, nor have they the dark margin of the forewing encroaching on the inner margin.

1. *thetis*. This form ranges from the plains of India to the Solomon Islands (and farther?), and has many forms; opinions may easily vary as to which forms, if any, are "good" species.
  - a. *barsine*.
  - b. *egena*.
  - c. *ribbei*.
  - d. *solita*.
  - e. *menestratus*.
  - f. *fergussoni*.
  - g. *bougainvillei* and a good many others named or nameable.
  - h. *lucifuga* (?).
2. *phaedrus* (♀ = *aesopus* Fabr.).
  - a. *arcuata*.
3. *celebensis*.
  - a. *cos* (?).
4. *saronis*.
  - a. *gloriosa*.
  - b. *nicobarica*.
5. *nesophila*.

6. *tagalica*.  
     a. *palauanica*.  
     b. *obsoleta* (ab. ?)  
     c. *talautensis*.  
 7. ? *saleyerensis* (♀ only).

Section A may be tabulated by the ♂ appendages :

1. Harpe with lateral (or rather ventral) process, shuttle piece serrated at side of extremity . . . . . 1. *thetis*.
2. Harpe as with a terminal cap, shuttle piece serrated across end . . . . . 2. *celebensis*.
3. Harpe simple :
  - a. Valves very long (3·2 mm. against 2·0 mm. or less), aedeagus very short . . . . . 3. *tagalica*.
  - b. Valves very broad but short (beyond harpe) . . . . . 4. *saronis*.
  - c. Harpe very short, aedeagus curved, very large shuttle piece . . . . . 5. *nesophila*.
  - d. Extremity of aedeagus highly chitinised, almost bulbous, and ending in a sharp point . . . . . 6. *phaedrus*.

To tabulate Section A by general aspect, etc., is more than difficult. I make the following attempt :

1. Habitat confined to Southern India and Ceylon, copper of pale tint, border very narrow . . . . . 1. *phaedrus*.
2. ♂ with a very distinct discal line on upperside forewing . . . . . 2. *celebensis*.
3. Underside markings generally filled in with much dark shading . . . . . 3. *tagalica*.
4. Hardly distinguishable from *tagalica*; the shading beneath is usually less heavy and the lunules between veins 5 and 7 of forewing beneath project less beyond the others. The margin of copper of forewing has a very regular circular curvature . . . . . 4. *nesophila*.
5. Postdiscal line always distinct, though it may be faint, lunules between 5 and 7 hardly project beyond others. . . . . 5. *saronis*.
6. Postdiscal line, when present, has lunules 5 and 7 of forewing well beyond others, border upperside broad except in S.E. distribution . . . . . 6. *thetis*.

I am not prepared to tabulate the females. Of most forms the corresponding males and females are fairly well recognised; to this knowledge I only add the recognition of the males of *celebensis* and of *egena*, of which the types are females and hitherto no males belonging to them have been described.

The species *insularis*, which is rather intermediate between the two sections, has the general facies of Section A. The harpe is soft and clothed with hairs as in A, except that the tip is chitinous as in B, and as in B there is no shuttle to the aedeagus. In its general aspect the species has one distinctive mark: the postdiscal line beneath, following the general direction as in Section A, can hardly be said to be at all lunulated, but rather follows one continuous curve, though curved, one may say a straight line rather than one broken into a succession of lunules,

In the appendages it is also distinct from all the other species in the dorsal hooks being short and square-ended.

### B. The *bulis* section.

Characterised by having the harpe smooth and hard.

The black border usually returns along the inner margin (except in forms *felderi* and *santana*) of forewing.

The underside markings, instead of being parallel to hindmargin, are diagonal, pointing to apex of forewing (except in *sperthis*).

This is the Section B of de Nicéville. It may be tabulated :

1. Aedeagus about or over 2.6 mm. to 2.9 mm. in length,  
*bulis*, with races
  - a. *felderi*.
  - b. *santana*.
2. Aedeagus about 2.0 mm. in length,
  - a. with square end, *acuta*.
  - b. with pointed end, *sperthis*.

The species as decided by the ♂ appendages appear to be as follows :

1. *bulis* with various named subspecies.
  - a. *disalis*.
  - b. *stigmata*.
  - c. a race occurring with *angulata* and hardly separable except by appendages.
  - d. *malayica*.
  - e. *felderi*.
  - f. *santana*.
2. *acuta*.
  - a. *dentata*.
  - b. *truncata*.
  - c. *angulata*.
  - d. *paracuta*.
  - e. „ *brunnea*.
3. *sperthis*.
  - a. *minima*.

The underside of *sperthis* brings it into relation rather with the *thetis* than the *bulis* section, but the upperside and the ♂ appendages indicate that its proper position is rather with *bulis*.

The underside markings of *bulis* and *acuta* differ as shown in figs. 1 and 2, but there are specimens that it would be difficult to place by this character.

Another very distinctive character is that the pale patches in the female are brown in *bulis*, white (or faintly bluish) in *acuta*; one item no doubt leading de Nicéville to consider the females in this genus were dimorphic in this respect. Another, to be referred to later, was no doubt the brown female of *gloriosa* (*saronis*), supposed to be a form of *thetis*.

How far the conclusions thus summarised are sound must be judged from the

detailed facts on which I have reached them, and which are given under each species.

In most cases I have no doubt that they are correct, the genitalia of the males being in each species very definite and easily recognised from those of other species. Nor do I myself entertain much doubt in the remaining cases, involving for the most part the difficult questions as to subspecies and geographical races, but I fully recognise that a considerably wider research is necessary to arrive at any result that may be accepted as founded not on some definite facts but on a sufficient number and variety of them, of which the breeding experiments that de Nicéville desired would be a very important section.

Such doubts as I have refer in some degree to the forms of *bulis*, and more particularly to those of *thetis*. Especially in the case of *C. thetis*, the general facies and the genitalia vary together, giving local forms that may be regarded as distinct or as geographical races. There is just sufficient gradation in the forms as one leaves India with typical *thetis* and goes southward and eastward, though the gradation is not very regular, to make one feel satisfied that there is only one species, though of course on the other hand there may be a score or possibly a hundred or more.

The belief that there is only one species commends itself most to me. Such questions must always arise in cases of closely allied forms, and one must recognise that until abundant breeding experiments with the allied forms are made, one's conclusions are, so far as they are crisp and definite, more a matter of faith and prejudice than of sound scientific appreciation.

### 1. *Curetis thetis* Drury.

Figs. 8, 9, Bornean example, under- and upperside.

" 14, 15, var. *bougainvillei* ♂ upper- and underside.

" 17, 18, " " ♀ " "

" 20, 21, " *egena* ♂, upper- and underside.

" 22, 25, " *fergussoni* ♂, upper- and underside.

Appendages fig. 53. Indian form.

" " 54. Ceram "

" " 55. British New Guinea.

" " 56. var. *barsine*.

" " 57. " *menestratus*.

" " 58. " *fergussoni*.

" " 59. " *bougainvillei*.

" " 60. " *egena*.

" " 61. " *ribbei*.

*thetis* Drury, *Ill. Ex. Ent.* ii. (1773) p. 16, pl. ix. figs. 3 and 4, ♀.

I am not prepared to assert that Drury's figures represent the species we accept as *thetis*, or whether they may not be *phaedrus*; the locality (Bombay) almost points to the latter, but it is probable that Bombay is rather the place of exportation than the locality of capture.

However, it has been agreed, apparently *nomine contradicente*, even by those who regard them as forms of one species, that the broad-bordered Indian form shall be *thetis* and the narrow-bordered one *phaedrus*, though it is quite possible that Drury's insect was really *phaedrus*.



I accept as *thetis* all those forms whose male appendages are, if not quite identical, still very nearly so, and differ abundantly from those of the forms I regard as distinct species.

With this definition, *thetis* has a very wide range, and a good deal of variety in several respects; and until the evidence of the genitalia appears, these forms seem in some cases to be more entitled to be accepted as distinct species than others that really are so, but have been by various authorities lumped with *thetis*.

*C. thetis* has usually a fairly broad dark border and large dark tip, whilst *phaedrus* has usually a comparatively very narrow border and tip, and the red colour is paler and yellower, or if not so in the field more readily becomes so in the cabinet.

On the underside both are given to be pure white with so little black marking that not much can be made of it. In better-marked specimens, however, there is a very marked distinction: in *phaedrus* the postdiscal line on both wings is fairly straight and regular, whilst in *thetis* it has a separate curve in each space, and varies in distance from the base, as it does in many other species; for comparison with *phaedrus* it may be sufficient to note that the line on each side of vein 5 of hindwing is markedly advanced to the margin.

In *Iris* xii. p. 247 (1899), Ribbe has some remarks on *solita* of Butler and *thetis* generally, that one must agree with. He says he has a specimen from Neu Pommern and one from Bongainville which he believes to be *solita*. He says the *Curetis* from the neighbouring regions are so much alike, that it is extremely difficult to distinguish between them. Dr. Pagenstecher, he says, desires to lump, but he would rather separate them; as for instance *thetis* Drury has females with white patches, *barsine* Felder with golden, and *solita* with nearly obsolete golden patches.

When one has examined the appendages of a number of these forms, much the same considerations hold. All these species (that is all I regard as being in this group), which I have examined, have appendages that agree very closely with those of *thetis*.

They all have the shuttle piece in the aedeagus of much the same form. The chief differences are in the harpes. In what I assume to be *thetis* (Drury) the harpe has at about 0.15 mm. from its extremity a projection or flap on the margin next the valve, giving it in fact two extremities, one direct, one lateral. In the forms of *thetis* from these islands, there seems to be considerable variation in these two extremities, which gradually approach each other, culminating in a broad and thickened end such as characterises *ribbei*.

It must be largely a matter of personal equation how many of these forms are held distinct and how many are geographical races of one species. Whilst the data are in so many directions defective we cannot answer the question which are distinct species? but only the more vague one, which shall we assume to be distinct species? In the Solomon Islands we have the females with brown, not white patches; we may assume this to be a good specific character, or minimise it as a kind of dimorphism. In *ribbei*, that seems distinct, the ♀♀ have all the appearance of fine large *thetis*. I should incline myself to call them all geographical races, and to expect to find a slightly different race on fairly separated islands or groups of islands, and with a sufficient series of such races to find a large amount of grading between the different forms. No doubt each

separate form might receive a varietal name. *C. solita* of Butler would be one of these. The form from Fergusson Island is very distinct, so that I venture to give it a name, and that from Bougainville Island is a very marked form with a very distinct female, and should be named; the others of this group have not come before me in more than odd specimens, which it is unsatisfactory to deal with, beyond placing them as representing races of *thetis*.

In dealing with *thetis* I speak of "forms of *thetis*." In doing so it is necessary to explain that I use the phrase in what may be called a new sense in this connection, but in reality in its ordinary and proper acceptance.

I begin by clearing the conception of *thetis* of all the species that used to be included in such a phrase as "forms of *thetis*," but which are all very distinct and definite species, such as *phaedrus*, *gloriosa*, *palawanica*, etc., and include only such forms as occur in various of the insular portions of its range, and as to which questions may be raised both on the superficial appearance and on the structure of the genitalia whether they are simply *thetis*, or are geographical races deserving of a name, or even have diverged far enough to be established species. *bursine* is perhaps as good an example of such a "form of *thetis*" as can be quoted, as it has for long had a recognised name. The Tring collection affords several marked examples of such forms, and also others probably equally definite were there more material. It is highly probable that no small proportion of the Pacific islands, from Sumatra to the Solomon Islands or even farther, have each a race of *thetis*, more or less possible to differentiate from others. I propose to deal only with those that are adequately represented in the Tring collection.

The males vary, especially in the width and proportions of the black border and of the invasion of the copper by dark shading. The appendages differ in the variations of the harpe elsewhere referred to. In the Solomon Islands, the ♀♀ have not white but brown (yellow?) patches, yet these forms have the more ordinary form of harpe. A Bornean form, on the other hand, has an extremely condensed one.

*bursine* Felder, *Sitzungsber. Kais. Akad. Wiss. Wien*, xl. (1860) p. 451; id., *Reise Novara, Lep.* p. 220 (1865) tab. xxviii. fig. 16. 17 (Amboina).

Has some claim to be regarded as a "good" species, but it may perhaps equally justly be held to be a geographical race of *thetis*.

The genitalia are almost identical with Indian *thetis*.

The type and other Felderian specimens are in the Tring collection.

*egeua* Felder, *Reise Novara, Lep.* p. 222 (1865) (no figure).

The type specimen, a ♀, of this species is in the Tring collection from Halma-hera (Gilolo). There are identical specimens from Batchian (= Batjan) collected by Doherty. One of these has a trace of white patches. These Batchian ♀♀ are almost certainly those corresponding to some males with identical locality labels. These males are very remarkable; they are, both on the upper- and undersides, very similar indeed to *tagalica* from Celebes. There are thus in Celebes and Batchian, taken together (probably also in other Moluccan Islands) three very distinct species of *Curetis*—viz. *egeua* (*thetis*), *tagalica*, and *celebensis*—that have, in the males at least, a nearly identical facies which is not the usual one of *tagalica* (in other districts) or of *thetis*.

I may say that till I examined the appendages of these insects, I was a good deal puzzled by them, and was inclined to regard them all as *celebensis*,

and that probably as a variety of *tagalica*. I may add that *nesophila* is also very close to these three species in appearance, but by the appendages is very distinct.

*C. thetis* ♂ is characterised by having the underside markings obsolete, or nearly so, though occasional specimens and some races show them in some degree. *C. egena* has these markings nearly as pronounced as in *nesophila* or *celebensis*, with some trace of the dark shading of *tagalica*. In the postdiscal line the curve across vein 1 of the forewing is much more prominent towards the hind-margin than in the other species. One curious point that makes these specimens approach *celebensis* and leads them right away from the usual form of *thetis*,\* is that towards the apex of the forewing the copper colour is divided by the veins as in that species; the black border is reduced all round more like *phaedrus* than *thetis*, really like *celebensis*.

The appendages are nearly as in ordinary *thetis*, but the branches of the harpe are a little approximated.

There is a specimen from Little Key that is apparently identical with *egena*; this is no doubt the form called *cheralda* by Fruhstorfer.

Two examples from Waigen, possibly the *gellinthias* of Fruhstorfer, have slightly wider borders, the apical portion of copper distinctly notched, almost divided, the underside markings almost faint; appendages as *egena*.

*fergussoni* nov. var.

There are two specimens from Fergusson Island (eastern end of New Guinea) that have a remarkable form hardly suggesting *thetis*, but the appendages are almost identical with those of the (continental?) New Guinea form *menestratus*, in the two branches of the harpe almost coalescing. Yet on close comparison it really agrees to a great extent with *menestratus*. The dark shading of the bases of the wings and of the inner side of the hindwing is rather greater and has a greater intensity and different character given it by the veins, especially of the hindwings, being much more outlined in black; indeed this feature is trifling in *menestratus*. The underside markings are the same; the ground colour is pure white.

*solita* Butler, *Ann. Nat. Hist.* (5). x. p. 149 (1882) (New Britain).

A ♂ specimen from Herbertshöhe, Neu Pommern (New Britain), is probably the ♂ of this species (the type is a ♀). It has all the appearance of *thetis*; it differs from *bougainvillei* in possessing a definite (though small) discal mark, and no detached pear-shaped marks. In a series it is very possible that it would prove that the two forms are more identical than they at present appear to be.

The appendages are nearly normal *thetis*.

*bougainvillei* nov. var.

Very close to a ♂ supposed to be *solita* (from Neu Pommern), but is without the discal mark of that insect, and has, which *solita* (?) wants, the pear-shaped costal detached portions of copper as in *celebensis*; the lateral process of the harpe is rather smaller than in *solita*, but both are very close to typical *thetis*. Expanse 46 mm. The females are large (44 mm.), very dark in colour, with

\* Found also in var. *menestratus* and a few other forms.

a moderate-sized rather pale brown patch on forewing; none on hindwing, except a trace in one specimen. Bongainville Island, 12 ♂♂, 5 ♀♀, in Tring collection.

*menestratus* Fruhst., *Stett. Ent. Zeit.* 1908, p. 50.

This seems to be the form in Dutch New Guinea. It has very broad black borders of fairly uniform width (except, of course, at apex), the pattern almost suggesting *Colias edusa* ♂, and there is considerable dark shading basally. The ♀ is very much like typical *thetis*, the appendages showing the branches of the harpe nearly fused (as in *ribbei*).

In British New Guinea the females are much the same, but in the males the borders are narrower, and in the appendages the branches of the harpe are separate, nearly as in typical *thetis*. The undersides are well marked in both forms, and are sometimes white, sometimes creamy—the former more frequent in the Dutch section, the yellowish in the British.

*ribbei* Röber, *Iris* i. p. 70. pl. v. figs. 2 and 3 (1886).

Well figured, though without colour. This form has perhaps diverged sufficiently from typical *thetis* to be a "good" species. It is small, very pale, and with a very narrow margin. The ♀ is exceedingly like that of *thetis*; it is larger than the ♂. Both sexes have the pure white underside of *thetis*; the chief difference from *thetis* in the ♂ appendages is in a tendency to approximation and fusion of the two branches of the harpe, in which it is very close to the New Guinea forms, though the superficial appearance is so different; the harpes are rather long and straight as compared with typical *thetis*; the aedeagus is almost typical *thetis*. Arn Islands.

*lucifuga* Fruhst., *Soc. Ent.* 1909, p. 121.

"*lucifuga* is probably the *thetis* form of the island." Formosa.

No figure.

I have not seen this.

## 2. *Curetis phaedrus* Fabr.

Fig. 7. Underside.

Appendages. Figs. 62, 63, 64, 78.

*phaedrus* Fabr., *Spec. Ins.* ii. p. 125, n. 566 (1781); Hübner, *Ex. Schm.* pl. 237. fig. 263, 264, underside (poor); Cramer, iii. pl. cccxxxviii. fig. c.

The aedeagus in *phaedrus* is very characteristic, and is distinguishable from that of any other species at first glance. The extremity is a conspicuous black mass, a little pear-shaped, and with a projecting point carrying a small spine or two.

The harpe is soft, clothed with hairs much like the valve, from which it is separate for only a short way.

*aesopus* Fabr., *Spec. Ins.* p. 125, n. 565 (1781); Distant, *Rhop. Mal.* Tab. xxiv. fig. 12 ♂. xliv. fig. 14 ♀.

The type specimen is a ♀, and Mr. Distant's comparison of his specimens with this may or may not be accepted.

My own examination of the type specimen leads me strongly to believe that they (there are two of them) are ♀♀ of *phaedrus*; so far as their collocation in the

Banksian collection goes, Fabricius' treatment of them and the assignment to them of the same locality, vague as it is, all go to suggest that the specimen of *phaedrus*, placed close to them in the Banksian collection and described by Fabricius under the following number, really came from the same place, and are ♂ and ♀ of the same species. Fabricius quotes Drury's figure of *thetis* as being the same insect. He quotes it, by the way, as *thetys*, a circumstance that accounts for the confused variation in the spelling of the name, which is common; Drury, however, says *thetis*.

The ♀ ♀ of *thetis* and *phaedrus* are so much alike that neither de Nicéville nor Bingham attempt to discriminate between them; they both, in fact, accept the two species in both sexes to be identical. They are, however, quite distinct; but, omitting this fact for the moment, I fully accept Bingham's conclusion as to *aesopus*, that it "falls as a synonym of *C. thetis*,"\* as acknowledged by Fabricius himself. The type, a ♀, is in the Banksian collection now in the British Museum, and is undoubtedly a ♀ of ordinary *C. thetis*, Drury."

I have examined a good many specimens claiming to be *aesopus*, and nearly all of these prove to be *bulis*, but I have two specimens whose ♂ appendages agree precisely with those of *C. sperthis* (*q.v.*).

*arcuata* Moore, *Proc. Zool. Soc. Lond.* 1883. p. 523. Pl. xlviii, fig. 3 (Malabar).

The figure and description agree with a specimen labelled "*Curetis arcuata* Moore," "Malabar," from the Moore collection, and apparently in Moore's writing. This specimen is *phaedrus*.

Unauthenticated specimens sent me as *arcuata* from Nias are forms of *bulis*.

*C. phaedrus* seems to have a comparatively restricted range, the extreme South of India, Balai, "Malabar," Ceylon, Bombay, Barraekpore. So far as I know, *phaedrus* is the only *Curetis* occurring in Ceylon; but it is surely highly probable that *thetis* occurs there also.

What any particular records mean is of course doubtful, so long as *phaedrus* and *thetis* are more or less confounded. On the other hand, the *thetis* of Moore's *Lepidoptera of Ceylon* is no doubt *phaedrus*.

### 3. *Curetis celebensis* Felder.

Figs. 23 and 24. Male, upper- and underside.

Appendages. Fig. 68.

*celebensis* Felder, *Reise Novara, Lep.* p. 220. Tab. xxviii. fig. 14, 15 (1865).

The figures are of the ♀ upper- and undersides, and agree exactly with the specimens. The reduction of the rusty marks on upperside to somewhat linear marks on the forewing, and tendency to divide that on hindwing into two portions, is characteristic.

There seems to be no figure of the male, and this sex does not appear to have been known to Felder. There are, however, in the Tring collection several males, collected by Doherty in South Celebes in August and September 1891.

The South Celebes specimens in the Tring Museum belonging to this species and to *C. tagalica* form a remarkable group. The two species are so much alike that in both sexes the distinction is at first sight difficult. Both seem to have been taken by Doherty at the same time and place. In the males in both species

\* *thetis* and *phaedrus* being in Bingham's view synonyms.

the veins run some little way into the wing as black lines from the black border. This black border and the outline of the wings is fairly identical in the two species, and it is to be remarked that in both, the dark veins cut off two or three small pear-shaped portions opposite the middle of the costa. Opposite the middle of the hindmargin of the forewing the sections of copper between the veins are rounded or convex in *celebensis* and somewhat concave in *tagalica*. In *celebensis* there is also a dark (discal) line down the discocellular nervure. I have called this form of *tagalica* var. *dohertyi*.

On the underside the specimens of *tagalica* have a good deal of the dark clouding that so often characterises that species. This is almost absent in *celebensis*. In *celebensis* the sections of the postdiscal line are more convex than in *tagalica*, in one specimen only the one descending to vein iv on both wings, instead of curving inwards as in other specimens and as in *tagalica*, continues obliquely outwards and meets vein iv much nearer the hindmargin than when the line continues on the other side of the vein.

The Appendages. The aedeagus is just over 2 mm. long. It much resembles that of *thetis*; the loose terminal plate is very large; there is an ordinary-looking series of cornuti. The hooks of the tegumen have their tips bent sharply round into a hook. The harpe is largely free from the valve, is clothed sparsely with hairs, and has the appearance of having a chitinous cap, overhanging towards the valve.

*C. thetis* var. *egena* (q.v.) is also a member of this mimetic group.

cos Röber, *Iris* i. p. 198. pl. vii. fig. 9 (1887).

I have not seen a specimen of this variety. The description and figure are of a ♀ specimen, and I have not met with any account of the male. The figure seems to be a very good one, except that, being photographic, the rusty areas are not shown. The underside markings leave little doubt that it is identical with *celebensis* Felder. The only difference is that it is a very small specimen—32 mm. against 40 mm. and upwards.

#### 4. *Curetis saronis* Moore.

Fig. 19. Male, underside.

Appendages. Fig. 65. *saronis* (Andamans).

„ „ 66. „ var. *nicobarica* (Nicobars).

„ „ 67. „ „ *gloriosa* (Rangoon).

*saronis* Moore, *Proc. Zool. Soc. Lond.* 1877. p. 587 (S. Andamans).

*gloriosa* Moore, *l.c.* 1883. p. 522. pl. xlviii. fig. 1. ♂.

*nicobarica* Swinhoe, *Ann. Mag. N. H.* (6). v. p. 451 (1890).

These three forms are one species: *gloriosa* is a continental race of large size, *saronis* is a smaller insular form. Of *nicobarica* I have not yet been able to obtain a specimen that did not prove on dissection to be *saronis*.

Referring to Col. Swinhoe a question as to a specimen I had as *nicobarica*, he informed me that the specimen came from the Andamans and was *saronis*, and that at one time specimens in his collection were marked *nicobarica* = *saronis*. He now differentiates *nicobarica* from *saronis* by the females—"the female of *nicobarica* is a brown insect, the female of this insect has white patches in the middle of the wings." To this I may say, however, that I have an Andaman female that has no white patches, and that ♀ *nicobarica* in the Tring and in my collection have the

outer corner of the pale patch of the hindwing white. These differences are very short of possessing specific value; the ♂♂ are indistinguishable either by wings or genitalia.

I had not noticed till after I had decided that *gloriosa* was a form of *saronis*, that Moore describes the female as having "forewing with broad golden yellow discal area, hindwing with a narrow curved discal streak." This confirms, had it been necessary, its relationship to *saronis*, and shows it to be unrelated to Indian *thetis*.

I have a specimen of *gloriosa* from the Moore collection that is interesting in two points: in the first place (labelled Sylhet) it is only 42 mm. in expanse against 52 mm. *gloriosa*, thus showing the difference in size between *gloriosa* and *saronis* to be of no specific value. It has the postdiscal lines beneath arched as in typical *gloriosa*; in *saronis* they are much straighter, but certainly variable, as I have a *nicobarica* almost identical in this (and other) respects with this small *gloriosa*. The other point of interest about this specimen is that it has attached to it a memorandum by Moore. "*Anops*, Sylhet x—near to *insularis* (Java), smaller, f.w. shorter, the red area smaller, rounded opposite the apex, the brown border of exterior margin much broader at the posterior end; h.w. with comparatively broader brown marginal border, the red area suffused with brown on abdominal border; underside greyish white, with bluish grey discal lunular band and submarginal lunular line. The discocellular streak, basal spots and inner margin of the lunular bands dark speckled. Hab. Sylhet. Coll. F. M."

The appendages of *saronis* are very distinct; the aedeagus is 1.9 mm. long, of *thetis* type, with movable accessory smaller than in *thetis*, the extremity less strongly chitinated than in *thetis*; the cornuti are very abundant, small, and very regularly arranged in ribbon form.

The most characteristic feature is the short, very broad valves, with a short harpe, conjoined to them more closely, or rather free from them for a much shorter distance than in any other species except *nesophila*, in which the outline both of valve and harpe is very different.

The distribution of the species would seem to be from Sylhet, by Rangoon, and the chain of Nicobars and Andamans to Sumatra, avoiding the Malay Peninsula.

### 5. *Curetis nesophila* Felder.

Fig. 10. Male, npperside.

" 28. " underside.

Appendages. Figs. 71, 72.

*nesophila* Felder, *Wien. Ent. Monats.* 1862, p. 289. Figured in Semper's *Philippinen*, pl. xxxi. fig. 28, 29, p. 158.

I find it very difficult to define this species by the general facies. Nor, indeed, am I quite confident that the species I am dealing with is the one described as *nesophila*. Nevertheless, by a process of exclusion, I conclude I am right, as the specimens accord with no other species, nor are there other specimens that can possibly be *nesophila*.

Semper's description of the black margin of the forewing having its inner margin circularly curved, is the best and most easily seized character I can find to distinguish it from other species and especially from *taqalica*.

The species is very much like *tagalica*, differing chiefly in being less clouded and by the dark shading on the underside.

The appendages are easily recognised; the aedeagus is short (1·7 mm.), and has a marked enrvature, the only species with this character; the loose shuttle piece is very long (0·65 mm.), but is possibly attached at its near extremity; the cornuti are small, and not very numerous. The valves have beyond the harpes parallel sides (for 1·3 mm.) and rounded ends. The harpes are free for a very short distance, and are so short that their free portion is triangular.

Fruhstorfer calls this species *insularis*: see remarks under that species.

There are specimens of *nesophila* from Penang and from Borneo.

## 6. *Curetis tagalica* Felder.

Figs. 26, 27, var. *dohertyi* (S. Celebes).

„ 11, 12, 13, 16, var. *talautensis*.

Appendages. Fig. 73. (Kalim Bungo).

„ „ 74. Sent me as *insularis*.

„ „ 75.

„ „ 76. var. *palawanica*.

„ „ 77. „ *talautensis*.

*tagalica* Felder, *Wien. Ent. Monats.* vi. p. 289 (1862) (Luzon); id., *Reise Novara, Lep.* p. 221. tab. xxviii, fig. 19, 20 (1865).

*thetys* var. *palawanica* Staud., *Iris* 1889. p. 121.

*obsoleta* Felder, *Wien. Ent. Monats.* 1862. p. 289.

*C. tagalica* appears to be a rather widespread species and has many varieties, some of very large size, some very small, some with very wide black borders, some with them very reduced, some in which the copper colour is very coppery, almost red, others in which it is pale, almost golden. The species with which it is most likely to be confounded are *celebensis*, *nesophila*, and *egena*. It may generally be recognised, at least in the ♂, by the large amount of dark shading on the underside, especially along the basal side of the postdiscal line.

The ♂ appendages are most characteristic, and are recognisable without a lens; they have the longest valves and the smallest aedeagus of any species. The remarkable circumstance that the males of *tagalica* and the form *palawanica* are indistinguishable both in facies and as to the appendages, whilst the ♀♀ have brown patches in *tagalica* and white in *palawanica*, shows that this colour variation has not such specific value in this genus as has been supposed, and in this case represents a dimorphism of the ♀ similar to that which occurs in other Lepidoptera.

There is another similar case in the genus: *C. thetis* has a ♀ with white patches, but the form of *thetis* from Bongainville, in the Solomon Islands, and from other localities in its south-eastern distribution, has a very different ♀ with brown patches, and these are of a different outline—so that, though the ♂ has not diverged from *thetis* more than would amount to a geographical race, the ♀ has diverged beyond what that aspect usually covers.

In the case of *palawanica* the divergence has not gone so far, and may be covered under some hypothesis suggestive of dimorphism, such as I have referred to.

*palawanica* is a variety not of *thetis* but of *tagalica*; that Standinger placed it as a variety of *thetis* was possibly due to his regarding *tagalica* as a variety of



*thetis*, but more probably to the fact that *palawanica* has a ♀ with white patches, whilst they are brown in *tagalica*. I have seen no white females of any other race.

*palawanica* ♂ is smaller than the largest *tagalica*, is of a rather paler copper, and has very narrow black borders; the underside is not often as dark as in *tagalica*, and may be quite pale; the markings are identical.

In the absence of specimens of the female it is impossible to say whether males more like *palawanica* than like typical *tagalica* belong to one form or the other.

In the Tring collection there are specimens (4) from Sula Mongola, which on personal appearance one would call *palawanica* without doubt, but which, looking to the habitat, are almost certainly *tagalica*.

The Felder specimens of *tagalica* include the type (Manilla) and eleven other specimens—4 ♂♂, 7 ♀♀—from Celebes, Luzon, and Borneo. From Sumatra there are 3 ♂♂ of a rather small form with the black border wide, with 3 ♀♀ apparently belonging to them, though not collected at same time and place. From South Celebes are 4 ♂♂ and one very large (50 mm.) ♀, and 2 ♂♂ from Dongola. From Mindoro 4 ♂♂, 3 ♀♀ (46 mm.) of average appearance; there is a fifth ♂ from Mindoro that differs from the others only in being small (37 mm.), and which agrees very closely with a specimen in the Felder collection that I take to be the type of *obsoleta*, though it is not so marked. This Felder specimen is labelled, however, Luzon, and *obsoleta* is said to come from Mindanao. All these localities are Philippine, but of course the labelling of the supposed type of *obsoleta* is rather against its being so. On the other hand, if this is not the type, where is it? It agrees well enough with the description, and is a very small specimen (36 mm.). Felder notes that *obsoleta* is the smallest species of the genus that he knows, and that it is very close to *tagalica*. The specimen is in poor condition, and is one of the most mended of the Felder examples. Bungao provides two rather small (42 mm.) ♂♂ of somewhat Palawanian facies; 2 ♂♂ from Bunguran have rather wider borders to the hindwing than usual, and 1 ♀. There is 1 ♂ from Manilla (much smaller than type specimen), 6 ♂♂ and 2 ♀♀ from Nias, 1 ♂ and 1 ♀ from Borneo.

*dohertyi* nov. var., South Celebes, mimics *celebensis*.

This form is referred to under *celebensis* and *thetis*, var. *egena* (q.v.).

*obsoleta* Felder, *Wien. Ent. Monats.* 1862. p. 289 (Mindanao).

Specimen (much mended) in Tring collection seems to agree with description. It has all the appearance of being a very dwarf specimen of *tagalica*. Though it has no label to that effect, it is with the highest probability the type specimen of *C. obsoleta* Felder.

*talantensis* nov. var.

There are four specimens from the Talant Islands, which I refer to *tagalica* as a variety, though they might claim specific rank.

They look very different from any other form of *tagalica* known to me, and only on examining the appendages are they seen to be very close to, if not identical with, that species.

The ♂ has a black border very wide at the apex of the upper wing, and it maintains its width down the hindmargin much more than in *tagalica*, but the width of the border of the hindwing is much as in *tagalica*. From these margins the

veins are marked inwards by black lines in a way that there is sometimes a trace of in *tagalica*, but is here very marked, and between these lines the copper is dusted with dark scales so as to give a heavy dark rich appearance, assisted by the darkness and brilliance of the copper and by dark shading from the base; in this respect there is no form of *tagalica* that approaches it. There is further a definite difference of wing-form: the apex of the forewing and the anal angle of the hindwing are both produced, so as to be obviously in contrast with *tagalica*. The underside has much the same lines as *tagalica*, but the appearance is very different, as the whole underside has the silvery whiteness of *thetis* with no dark shading, only the fine lines and marginal dots.

In the ♀ the upperside rusty markings are more reduced than any specimen (♀) of *tagalica*, though one approaches it; the underside presents no appreciable difference.

The appendages are but slightly different; the aedeagus is 2.1 mm. long (in *tagalica* 1.8 mm.), and the harpes are distinctly narrower.

### 7. *Curetis saleyerensis* nov. spec.?

Fig. 29. Upper surface, ♀.

„ 30. Underside, ♀.

There are two ♀♀ specimens from Saleyer Island (just south of Celebes), unfortunately unaccompanied by males; these are very unlike any other species I have seen, but belong, judging from the underside markings, to the *tagalica* section. It seems desirable to give them a name, provisionally, *saleyerensis*.

### 8. *Curetis insularis* Horsf.

Appendages. Figs. 69, 70 (N.E. Sumatra).

*insularis*, Horsf. *Cat. Lep. E.I.C.* p. 125. n. 52 (1829); id. and Moore, *Cat. Lep. Mus. E.I.C.* vol. i. p. 53. t. 1 a. fig. 14 (upperside); Distant, *Rhop. Malay.* Tab. xli. fig. 6, 7, ♂ ♀ (upper- and underside).

This is a very well-defined species, not likely to be confounded with any other.

The figure of the underside in Distant's *Rhop. Malay.* is very good. The distinguishing character is that the postdiscal line beneath is very smooth and regular, with hardly any or very slight undulations. There seems to be nothing in the assertion that the ground colour is of a creamy tint: some specimens are so, but some are quite white. The statement probably arises from the circumstance that *saronis* has some resemblance beneath to *insularis*, and is usually very white, but the real distinction is that *saronis* is less distinctly marked and the post-discal line is undulated.

The male appendages are equally distinctive: the dorsal hooks have the appearance of being broken off instead of being long, sweeping and pointed; they are rather short, taper very little if at all, and end in a square blunt tip.

The harpes have a lateral process very much like *thetis*, and the extreme end of the straight piece is smooth and chitinous; this, together with the *sperthis*-like aedeagus, in which the shuttle piece does not seem detached from the rest of the tube, indicates an alliance with the *bulis* section.

The specimens in the Tring Museum came from Sumatra, Java, Malay Peninsula, Banka, etc.

Frühstorfer (*Stett. Ent. Zeit.* 1908, p. 53) calls this species "a ♀ forma *pseudinsularis* nova (= *insularis* Dist. nec Horsfield)," and I received from Standinger, apparently in accordance with this, specimens of *insularis* labelled "*pseudinsularis*," and of *nesophila* labelled "*insularis*."

How this curious assertion arises I do not know; Standinger's *pseudinsularis* is certainly identical with the Horsfield type in the British Museum, as it is identical with specimens I have compared with the type, and I accept Distant's figures as fairly good of the species, which is so distinct in its underside markings that it can hardly be confused with anything else.

Frühstorfer makes this statement so categorically that one supposes he has examined Horsfield's type; if so, some mistake must have arisen in the notes taken, or in some other way. I have not studied Frühstorfer's paper closely enough to say that there are no other faulty identifications, but that is my impression.

The localities of the specimens at Tring are N.E. Sumatra, 7 ♂♂, 3 ♀♀; W. Sumatra, 2 ♂♂; Sumatra, 2 ♂♂; Mt. Tahan (Mal. Pen.), 2 ♂♂; Selangor, 1 ♀; Banka, 5 ♂♂, 5 ♀♀; Java (Felder coll.), 1 ♂; Borneo, 1 ♂.

#### 9. *Curetis bulis* Doubleday and Westwood.

Fig. 5. Underside, ♂.

Appendages. Fig. 31. Claspers.

"	"	32. Aedeagus.
"	"	33. var. <i>malayica</i> .
"	"	34. from Borneo.
"	"	35. labelled <i>angulata</i> .
"	"	36. from Sikkim.
"	"	37. var. <i>santana</i> (N. Borneo).
"	"	38. " " (Pahang).
"	"	39. " <i>felderi</i> (Borneo).
"	"	40. " " (Coll. Bethune-Baker).

*bulis* Doubleday and Westwood, *Genera Diurn. Lep.* ii. p. 473, pl. 75, fig. 5 (1852).

This species has had attributed to it portions, and indeed the whole of the following species, *acuta*.

The ♂ appendages at once distinguish them; the size and form of the aedeagus differ so as to be at once recognisable, and appear to be quite constant in the very considerable number of specimens that I have examined of each species; that is, the extreme variations in each species still leave a marked gap between them at their nearest approach to each other.

There are various named forms of *bulis*, such as *discaulis* Moore, *stigmata* Moore, *malayica* Felder, to which I add *santana* Horsf. & Moore, and *felderi* Distant, though these require a little more discussion.

*angulata* Moore is no doubt a form of *acuta*, but it so happens that there is a very similar form of *bulis*, and these two (both of which occur in collections under the name *angulata*) come from the same region (N.W. Himalayas), whether from the same localities or not I do not know, but this area is the extreme northern range of *bulis* and the extreme western of *acuta*.

In this, as in the other species and forms, I depend rather on the photographs than on description to convey the characters of the appendages; in *bulis* I note that the cornuti are very numerous and rather small, the aedeagus 2.6-3.0 mm. long, with a terminal form and armament that is very distinctive. The harpe is smooth, solid, sometimes rather pointed, more often rounded at the tip, rarely in some races inclined to broaden out. The valve is rather long and narrow, as in the species of this B section.

Unauthenticated specimens labelled *arcuata* Moore from Nias, but really *bulis*, have the harpes rather more blunt.

A specimen labelled *malayica* (in Moore's writing) from Burmah has the harpe rather sharp.

*malayica* Felder, *Reise Novara, Lep.* p. 221. Tab. xxviii. fig. 18 (1865); Distant, *Rhop. Malay.* p. 202. Tab. xxii. fig. 28 ♂ (1884).

The type specimen of *malayica* agrees with specimens I have examined, obtained from various quarters; these all prove to be forms of *bulis*.

Specimens of *bulis* from Penang and Province Wellesley have a very close resemblance on the upper surface to *acuta*; they are nevertheless *bulis*.

*santana* Horsf. and Moore, *Cat. Lep. Mus. E.I.C.* p. 54. n. 97. 1857. refer to Boisd., *Sp. Gén. Lép.* 1. Tab. 23. fig. 1. (1836).

This name has puzzled me a good deal: two examples so named from the Moore collection proved both by wing markings and genitalia to be *sperthis*; they both hailed from Java, and are no doubt the same as Staudinger's *javana* (see *sperthis*). Boisdual's figure is of the male upper surface, and might be *thetis* or various other species.

There is, however, in the Tring collection a specimen labelled *santana* that probably represents the name correctly; it is from the Felder collection, and has labels "Java ell. de Capellen." "Santana, Moore, Java, v. d. Cap."

I happen to possess a similar specimen, but from Borneo, at least as labelled. On the upper surface these are not at all unlike *thetis*, but there are one or two points, such as the produced anal angle of the hindwing, that receive their explanation when it is seen that the underside is that of *bulis*. Both these specimens have appendages the same as those of *bulis*.

It appears, then, that *santana* is a Javan race of *C. bulis*, in which the black border is not returned along the inner margin, a feature that characterises *bulis* almost everywhere else, but the extent of which is so variable that such a form as *santana* only carries this variation a trifle farther than usual. If my specimen is correctly labelled, which I doubt (it is from the Moore collection), this form also occurs in Borneo.

There are two specimens, one (No. 4) from the Straits Settlements, that has a certain amount of black along inner margin, and one (No. 20), purely *santana* in marking, from N. Borneo, that both show the enlarged harpe of *santana*.

*filderi* Distant, *Rhop. Malayana*, p. 203. Tab. xxiv. fig. 3. ♂ xxii. fig. 26 ♀ (1884).

Mr. Distant writes me that he believes the type specimen is in the Zoological Museum at Tring. I have seen only one specimen, not labelled "type," but "Felderi, Dist." apparently in Mr. Distant's writing, and a locality label "Sing

Ken" or something like that. This specimen belongs to the species I have called and believe to be "*nesophila*." The underside of *nesophila* is quite unlike that figured in *Rhop. Malay.* as *felderi*, so that if this is the type specimen it is lucky it is not so labelled; the upperside agrees well enough with the figure of *felderi*.

The underside figure of the male is clearly of the *bulis* group, a little blurred or rubbed, that of the female is highly suggestive of *nesophila*.

There is in Mr. Bethune-Baker's collection a specimen labelled "Felderi" that agrees well enough with the figure (♂) in *Rhop. Malay.* This specimen, however, is not Malayan, but comes from Sandakan, Borneo; this is not, of course, decisive against its being *felderi*.

My information, then, allows me (1) to leave the species alone, (2) to sink it as a synonym of *nesophila* (*nesophila* in the Tring collection is Malayan and Bornean), (3) to accept provisionally the Bakerian specimen as authentic. I adopt the latter course as more likely to advance knowledge, even if itself an error—as it proposes as *felderi* a form with strong claim to be a "good" species, but more especially because I believe it more nearly represents the fact.

This same locality produces ordinary *bulis* and also *sperthis*.

I conclude, in fact, that Mr. Distant had what I accept as *felderi*—namely, that of which he figures the male underside, and which is represented in Mr. Bethune-Baker's collection under the name *felderi*; he had also, and mixed with them, specimens of what I accept as *nesophila*. Of these he figured a female, and labelled as *felderi* the male in the Tring Museum.

*felderi* on this assumption is a subspecies (or distinct species) of *C. bulis*, differing from the usual form in having the black margins as in *santana* or *thetis*—i.e. narrowing to anal angle of forewing, and not extending at all along the inner margin. In this respect it does not differ from the form *santana*, of which I have a Bornean specimen.

The genitalia, however, of this specimen of *felderi* differ from ordinary (and usual Bornean) specimens of *bulis* by the dorsal hooks being shorter and blunter, and by the harpes being expanded to a blunt square tip. A variation of this sort is common in *C. acuta*, but the only specimen of *bulis* in which I have found it is another Bornean specimen—and in a minor degree a *bulis* (from Sikkim) and a *discalis*. This difference in the genitalia might give this *felderi* some claim to be a "good" species.

My numerous preparations of the ♂ appendages of *bulis* do not present a complete series in this matter of the harpe, from one extreme form to the other, but in view of the considerable variation in specimens from each locality, and that I have some localities poorly and many not represented, I conclude that a sufficient number of specimens would show the range of variation to be continuous.

Some few specimens present the discal mark that is more characteristic of the *dentata* form of *acuta*, but the range of variation on the upper surface covers nearly all the ground that de Nicéville assigns to the whole group, and it must be agreed that the upper surface at least gives no certain characters by which to separate *bulis* from the other species of the section.

*C. bulis* has a rather wide range: N.W. Himalayas (where it imitates the form *angulata* of *acuta*), Sikkim, S. Burmah, Malacca, Penang, Banka, Sumatra, Nias, N. Borneo.

10. *Curetis acuta* Moore.

Fig. 6. Underside, ♂.

Appendages. Fig. 41. var. *angulata* (Buxar).

" " 42. " " (Kangra).

" " 43.

" " 44. Burmah.

" " 45. " *dentata*.

" " 46. " "

" " 47. " *paracuta* (Formosa)." " 48. " *paracuta brunnea*.

*acuta* Moore, *Ann. Mag. N. H.* (4) xx. 50-51 (1877) (Shanghai); Pryer, *Rhop. Nihon.*, pl. iv. fig. 1 and 2. ♂ and ♀ (both surfaces).

*dentata* Moore, *Proc. Zool. Soc. Lond.* 1879, p. 137; 1882, p. 244.

*truncata* Moore, *Ann. Mag. N. H.* (4) xx. 50-51, ♀ (1877). [This seems to be a form of *acuta*. I have had no ♂ to examine.]

*paracuta* Nicév. = *acuta* Pryer nec Moore, *Journ. Bomb. N. H. Soc.* xiv. p. 248 (1902).

De Nicéville says *acuta* Moore = *truncata* Moore = *angulata* Moore. But *paracuta*, though it looks very different from *acuta*, agrees with that species as to the appendages, and must be regarded as the geographical race of that species inhabiting China, Formosa and Japan rather than as a distinct species.

*angulata* Moore, *Proc. Zool. Soc. Lond.* 1883, p. 522 pl. xlviii. fig. 2 (an angulated form of *bulis* much resembles and passes for *angulata*).

My own specimens of "*angulata*" from several sources all prove to be *bulis*; they were named no doubt from the form of the wings, and these angulated specimens of *bulis* are very similar indeed to true *angulata*, which, from its habitat (N.W. Himalayas) and its having a ♀ with white patches, is no doubt a form not of *bulis*, but of *acuta*.

*acuta* var. *brunnea* Wileman, *Annot. Zool. Jap.* vii. p. 88 (1909).

I do not know whether this is a distinct race of *paracuta*, or is aberrational.

In the preparation (and photograph) the aedeagus has unfortunately got crushed towards the extremity.

I should define

*acuta*: 1. Stigmatal mark distinct.

2. Harpe expanded at tip.

*paracuta*: 1. Stigmatal mark lost in the black area beyond it.

2. Harpe pointed at tip.

I see no objection to any one regarding these as good species, though I think it seems better to consider them geographical races of one species.

*C. acuta* differs from *bulis* in being usually provided with the dark tooth (*dentata*, *stigmata*) or stigma projecting from the costal dark border into the copper area. The *angulata* form of *bulis* is as angulated as any *acuta*, but *acuta* is usually angulated, *bulis* round-winged. On the underside, the oblique postdiscal line, which in these two species is more or less straight, in the *thetis* section lamulated, is comparatively, at its lower termination, decidedly farther from the

hind-margin (figs. 5 and 6) than in *bulis*. The varied intensity of the markings and the great range in wing form do not make this always self-evident.

The appendages differ from those of *bulis* chiefly in the aedeagus, which is 2.0 to 2.2 mm. long (*bulis*, 3.0 mm.), straight, and somewhat expanded towards its distal extremity. The actual extremity is much narrower than in *bulis*, almost pointed, and therefore carries only a few spines, which are more numerous down the margin.

The harpe varies as in *bulis*; in the *paracuta* form it is generally rather sharp; in the Indian forms it is blunt, and may be broad and tending to duplication at the end.

This is the only definite character in the appendages by which I could define *paracuta* from *acuta*, and the variation in *acuta* in this matter is so considerable that it does not seem to be a satisfactory character for the purpose.

The distribution of *acuta* seems to be North-West India, Nepal, Darjeeling, Burmah, Hainan, Upper Meku, Tenasserim; of *paracuta*, Japan, Formosa, China.

The pale patches in ♀ *acuta* are white, with a bluish aspect most pronounced in *paracuta*; in *bulis* ♀ they are brown.

### 11. *Curetis sperthis* Felder.

Fig. 1. Underside ♂.

„ 2. Upperside ♂.

„ 3. var. *minima*. Upperside.

„ 4. „ „ Underside.

Appendages. Fig. 49. Sent me as *santana*.

„ „ 50. „ „ *jacana*.

„ „ 51. „ „ *santana* (Sandakan, Borneo).

„ „ 52. var. *minima*.

*sperthis*, Felder, *Reise Novara, Lep.* p. 222 (1865).

*acesopus*, auct. pars, nec Fabr. (see discussion under *phaedrus*).

*Curetis minima*, Distant and Pryer, *Ann. Mag. N. H.* (5). xix. p. 265 (1887). Description agrees with specimen in Tring collection labelled "*minima* D. and P." "North Borneo"—which is either a type or a paratype.

Comparing these specimens with the type of *sperthis*, and accepting a specimen in the Tring collection which agrees absolutely with the type specimen for the examination of the appendages, shows all these named forms to be one species.

The figure of a male in Distant's *Rhop. Malay.* pl. xxiv. fig. 12 (called *acesopus*) is apparently the species under review, presenting—what is a characteristic of the species—the abundant irroration of the underside with black points, though the fasciae are rather too much in the *bulis* pattern.

The ♀ of *acesopus* is possibly that species (*viz.* *phaedrus*), but has nothing in that case to do with *sperthis* (*i.e.* pl. xxiv. fig. 12), nor probably does pl. xxii. fig. 27 represent the ♀ of *sperthis*, though so named.

I have not with certainty recognised the ♀ of *sperthis*. *C. sperthis* is a smaller insect than *bulis* or *acuta*, and in the form *minima* is the smallest form of *Curetis*. It may be distinguished from *bulis* and *acuta* by the underside band being rather of the lunulated *thetis* type, than of that of *bulis*, and by the underside being more frequently thickly irrorated with fine black points.\* These are seen in the

\* The black irroration beneath is a character of the *B. (bulis)* section; it is more frequently present in *sperthis* than in the other species, but it may be absent in *sperthis*, and is often present in *bulis* and still more in some forms of *acuta*.

photographs, figs. 4 and 5. Fig. 2, *acuta*, has a very similar appearance, but here the dots are damages to the specimens, much more visible to the camera than to the unaided eye.

The extent to which the black border invades the inner margin of the wing varies a good deal.

The appendages are on the same type as *bulis*; they may be at once distinguished by the aedeagus being much shorter (2.0 mm.); the extremity, instead of being square, has a pointed trowel-shaped form, and so looks much narrower; and instead of the long compound double row of very numerous small cornuti, it has only a few of comparatively very large size.

There are specimens of *sperthis* from Malacca, N.E. Sumatra, Java, and Borneo.

In mounting the abdomina of ♂ specimens of *Curetis* my attention was at once attracted by the existence of a fan on the basal abdominal segment, which I found in all the examples of the genus in which I looked for it. It is very similar to the fan that exists in Sphingæ, and still more like that found in some Noctuæ. I am not aware that a similar abdominal fan has hitherto been described in any butterfly. The fan consists of a large pencil of hairs arising from a special area on the lower posterior angle of the dorsal plate of the second abdominal segment. The hairs are rather more than 2.0 mm. long. No doubt, in use, they are spread and displayed and probably diffuse a scent, but I have not met with any record of their having been observed. At rest, they lie closely together in a special pocket, which crosses obliquely the sternite of the third abdominal segment and encroaches on the fourth. The precise disposition of the pockets will perhaps be better gathered from figs. 78 ( $\times 8$ ), 79 and 80 ( $\times 15$ ). In fig. 80, though all the hairs are in the pocket, a number have been torn away from their point of origin. Fig. 83 shows the hairs and their origin ( $\times 25$ ). Fig. 82 is similar, a number of the hairs have been lost, but one side of the pocket separated from its attachments is seen.

The scale sockets of the area about the pocket present the usual vase-like or dumb-bell outline (fig. 84,  $\times 300$ ); passing from these to the pocket, they gradually change their form, until in the pocket itself they have a flask-like, nearly globular form, and give rise not to scales, but to short tapering hairs (fig. 85,  $\times 300$ ).

It would seem that the sockets have been modified into scent glands, with a certain capacity to accommodate an accumulation of the scent material, and that the fine hairs served to conduct it to the hairs of the fan when about to be expanded.

The hairs of the fan have no spicules, but are very straight and simple, yet when highly magnified, have a spongy, corky look, not the smooth, polished surface of most insect hairs, so that one supposes them to be somewhat spongy in order to absorb a supply of scent.

The well-known scent-fans of Sphingæ much resemble these fans of *Curetis*, but their disposition differs somewhat; the fan or pencil of hairs in Sphingæ arises from the same segment, the second abdominal, not however from the tergite, but from the middle of the dorsal margin of the sternite; the pocket in which it rests is merely the fold of membrane between the dorsal and ventral plates.

In a Noctua (an American Acontian is figured) the fan arises from the first abdominal sternite, and occupies a pocket almost identical in appearance with that in *Curetis*; the difference from *Curetis* is in the point of origin of the fan and in the pocket being longitudinal instead of oblique; a photograph of a portion of this preparation is shown in fig. 81.



## EXPLANATIONS OF PLATES III.—XIX.

Figures 1 to 30 are the upper- and undersides of certain species, to show points of resemblance or distinction between them which are not well or not at all illustrated by figures already published.

They are enlarged something less than two diameters, generally as about 11, 12, or 13 to 7; and are from photographs by A. E. Tonge.

Figures 31 to 77 are photographs of ♂ genitalia, also by Mr. Tonge, and are magnified by 25 diameters.

Figures 78 to 85 illustrate the scent fans or pencils; these are by Mr. F. N. Clark.

I do not present any figures of the female genitalia. These appear to present items for specific characters in the structures of the eighth abdominal sternite, but the preparations I have made and had photographed refer to species whose distinctive characters are otherwise adequate, or to specimens whose determinations I am not sufficiently sure of to rely on them; these remain therefore for some future occasion, and I expect for some other observer.

**Imagines.**

Figs. 1 and 2. *sperthis* ♂, under- and upperside.

„ 3 and 4. „ var. *minima*, upper- and underside.

Note the numerous minute black dots on the underside, which are characteristic of the species. Fig. 6 appears to show similar dots, but in this figure these are blemishes of the specimen hardly visible to the naked eye, but picked up, as the figure shows, by the camera; in figs. 1 and 4 they are actual markings.

Fig. 5. *bulis* ♂ underside.

„ 6. *acuta* ♂ „

These show the different position of the oblique postdiscal line in the two species, especially how much nearer the base of the wing it is on the inner margin in *acuta*. Unfortunately both species vary so much in wing outline that it is often difficult to verify this difference.

Fig. 7. *phaedrus* ♂, underside, shows the postdiscal line faintly.

Figs. 8 and 9. *thetis* ♂ under- and uppersides. British North Borneo form.

A comparison of 7 and 8 shows that the advance towards the hind-margin of the lunulated line forward of vein 4, which obtains in various species, is absent in *phaedrus*, but marked in *thetis*. *C. thetis* from India is usually too devoid of markings to illustrate this.

Fig. 10. *nesophila*, upperside, shows the regular arch-like curve of the outer margin of the copper area, which is approached, but not so definite in other forms of *Curetis*, fig. 28, underside.

Figs. 11 and 12. *tagalica* var. *talautensis* ♂, upper- and undersides differ from the type form in the outline of the copper area and in the paleness of the underside.

Figs. 13 and 16. *tagalica* var. *talautensis* ♀, under- and uppersides; this differs less than the ♂ from the typical form.

Figs. 14 and 15. *thetis* var. *bougaincillei* ♂, under- and upperside.

„ 17 and 18. „ „ „ ♀, upper- and undersides. The figures sufficiently show the differences from typical (Indian) *thetis*.

Fig. 16. *talauteensis*. See fig. 13.

Fig. 19. *saronis* ♂, underside; beneath the upper wing the postdiscal line approaches the straightness that it has in *phaedrus*.

Figs. 20 and 21. *thetis* var. *egena* ♂, upper- and underside.

Note the mimetism between figs. 20, 23, and 26; 20 does not resemble typical *thetis*, nor 26 typical *tagalica*, as regards the uppersides, but beneath they agree well with those species, which the genitalia show them to belong to.

Figs. 22, 25. *thetis* var. *fergussoni* ♂, upper- and underside.

This has the wedge-shaped portions on the costal margin of the copper of upper wing, characteristic of other South-Eastern races of *thetis*, and found in *celebensis* and *tagalica* var. *dohertyi*.

Figs. 23, 24. *celebensis* ♂, upper- and underside.

„ 26, 27. *tagalica* var. *dohertyi* ♂, upper- and underside.

„ 28. *nesophila* ♂, underside (and fig. 10).

„ 29, 30. *saleyerensis* ♀, upper- and underside.

### Appendages.

Fig. 31. *bulis*, clasps.

These can be exhibited in this way only by separating them from the other parts; this gives a better idea of their structure than the other photographs, from specimens mounted to show (so far as may be) all the parts, and demonstrate specific differences.

Fig. 32. *bulis*, aedeagus.

Its characteristic form is equally evident in the four following figures.

Fig. 33. *bulis* var. *malayica*.

„ 34. „ (Borneo).

This is from the same specimen as fig. 5; on the upperside the black margin returning along the inner margin is little more than a line along vein 1, a close approach to var. *santana*.

Fig. 35. *bulis* (labelled *angulata*).

„ 36. „ a Sikkim specimen, shows thickening of ends of harpe approaching var. *santana*.

Fig. 37. *bulis* var. *santana* (North Borneo).

„ 38. „ „ „ (Pahang, Malay Pen.).

These show expansion of the end of the harpe unlike typical *bulis*; but fig 38 is not very different from fig. 36, and I have other similar specimens. The curve in the aedeagus in fig. 37 is due to a bend (in preparation) of which an indentation on its left side may be seen.

Fig. 39. *bulis* var. *felderi* (Borneo).

„ 40. „ „ „ (coll. Bethune-Baker).

Hardly differ from 37 and 38; in fig. 40 undue parsimony in amputating the abdominal extremity left behind portions of the aedeagus and sacculus.

Fig. 41. *acuta* var. *angulata* (Buxar).

„ 42. „ (Kangra).

„ 43. „

„ 44. „ (Burmah).

Attempts to mount the whole appendages in figs. 42 and 43 (as in fig. 31) are not very successful.

These figures show well the short, wide, nrceolate aedeagus and the variability of the harpes.

Figs. 45 and 46. *acuta* var. *dentata*.

Fig. 47. *acuta* var. *paracuta* (Formosa).

" 48. " " " ab. *brunnea* (coll. Bethune-Baker).

In the last preparation, the aedeagus has unfortunately been crushed (in preparing, probably).

All these are within the limits of variation shown in a number of preparations of *acuta*, of which figs. 41-44 are a sample; in fig. 48 the dorsal hooks are longer and more slender than usual, and 47 and 48 are altogether larger, especially in the tegumen.

Fig. 49. *sperthis* sent me as *santana*.

" 50. " " " *javana*.

" 51. " " " *santana* (Sandakan, Borneo).

" 52. " var. *minima*.

The aedeagus is shorter than in *acuta*, narrower, and has a characteristic pointed extremity.

Fig. 53. *thetis* India.

" 54. " Ceram (sent me as *phaedrus*).

" 55. " British New Guinea.

" 56. " var. *barsine* (coll. Bethune-Baker).

All these show the "shuttle" piece fairly well, 53 and 55 especially show the position of the serrations it carries.

Fig. 57. *thetis* var. *menestratus* Fruhst.

" 58. " " *fergassoni*.

Both these show the tendency to fusion of the two lobes of the harpe, giving some resemblance to the peculiar caplike end in *celebensis*.

Fig. 59. *thetis* var. *bougainvillei*.

" 60. " " *egea*.

These two are more like typical *thetis*; in one harpe of 59, and both of 60, the lateral lobe is folded over so as to be not so easily seen.

Fig. 61. *thetis* var. *ribbei*.

The aedeagus is typical of *thetis*, the harpes are rather lengthened for *thetis*, but the differences can hardly be said to be beyond those of geographical races.

Fig. 62. *phaedrus*.

" 63. " (Balai, India).

" 64. "

These show (as compared with *thetis*) the much broader valve, the shorter simple harpe and the heavy extremity of the aedeagus.

Fig. 65. *saronis*, type form from Andamans.

" 66. " var. *nicobarica* from Nicobars.

" 67. " " *gloriosa* (Rangoon).

These have a very broad valve, a short harpe, and a rather long shuttle.

Fig. 68. *celebensis*.

Differs from *thetis* in the caplike end of the harpe, and the serrations being at the end of the shuttle, and in minor points, such as the hooked extremity of the dorsal hooks, which are less suddenly curved at the end in *thetis*.

Fig. 69. *insularis*. N.E. Sumatra.

" 70. " " "

The abrupt end of the dorsal hooks is not met with in any other species, the valves are shorter than in *thetis*, the harpes have a side-process very similar to but not identical with those in *thetis*. The shuttle is very weakly chitinated.

Figs. 71 and 72. *nesophila*.

The base of the harpe is wide and cylindrical, the end short, the free portion of the valve straight and cylindrical, the cornuti are few, the shuttle is long; and the most noticeable character, because not occurring in other species, is the curvature of the aedeagus.

Fig. 73. *tagalica* (Kalim Bungo).

„ 74. „ sent me as *insularis*.

„ 75. „

These are conspicuous at once from their large size (the insect itself is not especially large), and the actually as well as comparatively short and slender aedeagus.

Fig. 76. *tagalica* var. *palawanica*.

„ 77. „ „ *talauteensis*.

„ 78. Abdomen of *C. phaedrus* ♂,  $\times 8$ , shows positions of origin of fan and of pockets.

„ 79. Shows position of fan and pocket on 2nd, 3rd, and 4th abdominal segments.  $\times 15$ .

„ 80. Another specimen.  $\times 15$ .

„ 81. A very similar fan and pocket in a *Noctua* (Acontian), but with quite a different point of origin for the fan.  $\times 20$ .

„ 82. Fan and portion of pocket.  $\times 25$ .

„ 83. Fan.  $\times 25$ .

„ 84. Scale sockets close to pocket.  $\times 300$ .

„ 85. Modified scale sockets (glands?) and hairs in the pocket.  $\times 300$ .

These (84 and 85) merge into each other at the margins of the pocket.

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## ON LEPIDOPTERA FROM THE ISLANDS OF CERAM (SERAN), BURU, BALI, AND MISOL.

BY THE HON. WALTER ROTHSCHILD, F.R.S., Ph.D.

THE material I am describing was collected during the "II. Freiburger Molukken Expedition," by Herr Erwin Stresemann, and, after the Expedition had split up, by Dr. Tanern. The fact that Herr Stresemann was an ornithologist and Dr. Tanern a geologist accounts for the disproportionately small number of species of lepidoptera compared with the fine collections of birds described in the preceding volumes of NOVITATES ZOOLOGICAE. That a large number of the specimens are defective is surely due to the season and the inexperience of their native hunters.

The most remarkable discovery faunistically was undoubtedly the capture on Ceram of *Papilio (Troides) procus* and *Papilio weiskei stresemanni*, both belonging to types hitherto considered exclusively Papuan.

I have arranged the *Rhopalocera* and *Grypocera* approximately according to "Seitz," and the *Heterocera* according to Sir George Hampson. There are of *Rhopalocera* and *Grypocera* from Ceram 140 species and subspecies, from Buru 17, and from Bali 87, all collected by Herr Stresemann, while from Misol there are 48, collected by Dr. Tanern. The total number of species of *Rhopalocera* and *Grypocera* is only 286, owing to several being common to two or more islands. It is curious that—in spite of the fact that Amboina and Ceram have furnished large quantities of species from the time of Linnaeus, and even Seba, for more than 180 years—there should still be large and conspicuous novelties on the latter island.

### RHOPALOCERA

#### PAPILIONIDAE

##### Papilioninae

#### 1. *Papilio (Troides) procus* (Rothsch.).

*Troides procus* Rothschild, *Nov. Zool.* vol. xxi, p. 262 (1914) (Interior of Ceram).

The specimen had slipped sideways in the box, so that we could not decide for certain which of the three localities in Ceram it came from; but I have no doubt that, like *P. weiskei stresemanni*, it came from above 1000 metres in Central Ceram.

1 ♀, Interior of Ceram.

It is a great pity no ♂ of this remarkable species was obtained.

#### 2. *Papilio (Troides) tithonus tithonus* (De Haan).

*Ornithoptera tithonus* De Haan, *Verh. Nat. Gesch. Ned. overz. bez.* p. 18, t. 1, f. 1 (♂) (1840) (New Guinea).

The single ♀ here enumerated agrees exactly with the ♀♀ collected by Doherty at Kapaur and those collected by the Pratts at Fak Fak and in the Ninay Valley. Whether, as in the case of other species of this group, the ♂ will prove very different remains for future collectors to discover.

1 ♀, Misol.

### 3. *Papilio* (Troides) *hypolitus hypolitus* Cram.

*Papilio Eques Trojannus hypolitus* Cramer, *Pap. Exot.* vol. i. part 1. p. 14, t. 10. ff. A, B. (♂) t. 11. ff. A, B. (♀) (1775) (Amboina).

2 ♂♂, 1 ♀, Wahai, North Ceram; 1 ♂, 1 ♀, Mansuela, Central Ceram, 650 metres = 2113 ft., 1912.

### 4. *Papilio* (Troides) *helenia oblongomaculatus* Goeze.

*Papilio Eques Trojannus oblongomaculatus* Goeze, *Entom. Beytr.* vol. iii. p. 44. No. 22 (1779) (ex Colonia Surinamensi!).

Singly in open country.—E. S.

16 ♂♂, 11 ♀♀, Manusela, Central Ceram, 650 metres, 1912.

### 5. *Papilio* (Troides) *helenia mannus* (Fruhst.).

*Troides helenia mannus* Fruhstorfer, *Intern. Entom. Zeitschr. Guben*, p. 238 (1908) (Bali).

1 ♂, Bali, 1912; 1 ♀, Kintamani, Bali, 4000 ft., February—March 1911.

### 6. *Papilio polydorus polydorus* Linn.

*Papilio polydorus* Linnaeus, *Amoen. Acad.* vi. p. 401. No. 50 (1763) ("India").

4 ♂♂, 2 ♀♀, Manusela, Central Ceram, 650 metres; 1 ♂, 2 ♀♀, Wahai, North Ceram.

### 7. *Papilio aristolochiae balinus* Fruhst.

*Papilio aristolochiae balinus* Fruhstorfer, *Entom. Zeitschr. Stuttgart*, p. 72 (1908) (Bali).

1 ♂, 1 ♀, Baleleng, North Bali, January—April 1911; 4 ♀♀, Bali, 1912.

### 8. *Papilio euchenor misolensis* Rothschild.

*Papilio euchenor misolensis* Rothschild, *Nov. Zool.* vol. xv. p. 169. No. 23 (1908) (Misol).

1 ♂, Misol.

### 9. *Papilio demolition demolition* Cram.

*Papilio Eques Achirus demolition* Cramer, *Pap. Exot.* vol. i. pt. viii. p. 140. t. 89. ff. A, B. (1776) (Java).

1 ♂, Gitgit, Bali, 1500—2000 ft.

### 10. *Papilio helenus enganius* Doh.

*Papilio (Charax) helenus* var. *enganius* Doherty, *Journ. As. Soc. Beng.* 1891. p. 31. No. 50 (Engano).

4 ♂♂, 1 ♀, Danau Bratan, Bali, 2500 ft., January 1911; 2 ♂♂, Kintamani, Bali, 4000 ft., February—March 1911.

### 11. *Papilio fuscus fuscus* Goeze.

*Papilio Eques Achirus fuscus* Goeze, *Entom. Beytr.* vol. iii. p. 87. u. 71 (1779) (Seba tab. 43 ff. 1. 2).

Seba's figures, though poor, are evidently the same insect as Cramer's *P. severus* from Amboina, which therefore becomes the typical locality. Ceram and Buru examples cannot be separated. Four aberrational forms occur:—

- (1) ab. *cinereo-maculatus* Goeze, with white spots beyond the cell of forewing ;
- (2) ab. *madanus* Fruhst., with a more or less complete postmedian white band on forewing ;
- (3) ab. *fuscus* Goeze, no white on forewing, band of hindwing long, becoming pointed towards the abdominal margin ;
- (4) ab. *castaneus* Goeze, white band on hindwing short, consisting only of four spots.

2 ♂♂, 3 ♀♀, Mamsela, Central Ceram, 650 metres, 1912 (1 ♂, ab. *cinereo-maculatus* ; 1 ♂, 3 ♀♀, ab. *fuscus*) ; 1 ♂, Waihai, North Ceram ; 1 ♂ (ab. *madanus*), Mgesawain, Central Buru, 800 metres = 2600 ft.

## 12. *Papilio polytes javanus* Feld.

*Papilio polytes* var. *javanus* Felder, *Verh. zool. botan. Gesell. Wien* (1862) p. 486, No. 127 (Java).

The *polytes* form of ♀ form *javanus* appears to be much rarer than the *cyrus* form of ♀ form *civilis* Rüb., for out of 7 ♀♀ sent by Herr Stresemann, only one is form *javanus*.

6 ♂♂, 3 ♀♀, Bali, 1912 (2 ♀♀ form *cyrus*, 1 ♀ form *javanus*) ; 2 ♂♂, 1 ♀, Kintamani, Bali, 4000 ft., February—March 1911 ; 1 ♂, 1 ♀, Gitgit, Bali, 1500—2000 ft. ; 1 ♂, 1 ♀, Danau Bratan, Bali, 2500 ft., January 1911 ; 1 ♂, Gunung Bratan, Bali, 4000—4500 ft., January—February 1911 ; 7 ♂♂, 1 ♀, Buleleng, North Bali, January—April 1911.

## 13. *Papilio polytes alphenor* Cram.

*Papilio Eques Trojanus alphenor* Cramer, *Pap. Erot.* vol. i. pt. viii. p. 141. t. 90. f. B. (1776) ("China"!).

3 ♂♂, 2 ♀♀, Waihai, North Ceram ; 1 ♂, Sukaradja, North-west Ceram ; 3 ♀♀, Mamsela, Central Ceram, 650 metres.

## 14. *Papilio ambrax ambrax* Boisd.

*Papilio ambrax* Boisdual, *Voy. Astrolabe Entom.* p. 40. No. 5 (1832) (New Guinea).

2 ♂♂ (ab. *ambrax*) Misol.

## 15. *Papilio gambrisius gambrisius* Cram.

*Papilio Eques Achirus gambrisius* Cramer, *Pap. Erot.* vol. ii. pt. xiv. p. 95. t. 157. ff. A. B. (1779) (Amboina).

1 ♂, Ceram ; 3 ♂♂, 2 ♀♀, Manusela, Central Ceram, 650 metres.

## 16. *Papilio aegaeus ormenus* Guér.

*Papilio ormenus* Guérin, *Voy. Coquille*, t. 14. f. 3 (1829) (no locality).

1 ♂ (ab. *pandion* Wall.) Misol.

## 17. *Papilio memnon memnon* Linn.

*Papilio Eques Trojanus memnon* Linnaeus, *Syst. Nat.* edit. x. p. 460. No. 12 (1758) (Asia).

5 ♂♂, Buleleng, North Bali, January—April 1911 ; 1 ♀ (form *homedon* Cram.), Bali, 1912.

18. *Papilio deiphobus deiphobus* Linn.

*Papilio Eques Trojanus deiphobus* Linnaeus, *Syst. Nat.* edit. x. p. 459. Nos. 6 (1758) (Asia).

5 ♂♂, 1 ♀, Manusela, Central Ceram, 650 metres.

19. *Papilio ulysses ulysses* Linn.

*Papilio Eques Achirus ulysses* Linnaeus, *Syst. Nat.* edit. x. p. 462. No. 20 (1758) (Asia).

9 ♂♂, Manusela, Central Ceram, 650 metres.

20. *Papilio aristeus aristeus* Cram.

*Papilio Eques Achirus aristens* Cramer, *Pap. Ecot.* vol. iv. pt. xxvii. p. 60. t. 318. ff. E. F. (1780) (Amboina).

1 ♂, Ceram; 1 ♂, Waihai, North Ceram.

21. *Papilio weiskei stresemanni* Rothsch.

*Papilio weiskei stresemanni* Rothschild, *Lepid. Brit. Ornith. & Moll. Exps.* p. 4 (1915) (Ceram).

This most surprising discovery proves once more how arbitrary our ideas of faunal limits usually are, for if any butterflies could be considered solely oceanopapuan in distribution, it was the *Papilio macleayanus* group (*P. gelon*, *weiskei*, and *macleayanus*), and now it turns up suddenly in the South Moluccas.

Only observed in the Central Mountains of Middle Ceram above 1000 metres = 3250 ft. It frequents light forest, and is found there on the flowers of an *Eugenia* species.—E. S.

8 ♂♂, Manusela, Central Ceram, above 3250 ft., 1912.

22. *Papilio codrus codrus* Cram.

*Papilio Eques Trojanus codrus* Cramer, *Pap. Ecot.* vol. ii. pt. xv. p. 127. t. 179. ff. A. B. (1777) (Amboina).

1 ♀, Manusela, Central Ceram, 650 metres; 1 ♂, Mgesawain, Central Buru, 800 metres.

23. *Papilio sarpedon sarpedon* Linn.

*Papilio Eques Trojanus sarpedon* Linnaeus, *Syst. Nat.* edit. x. p. 461. No. 14 (1758) (Asia).

2 ♂♂, Danau Bratan, Bali, 2500 ft., January 1911.

24. *Papilio sarpedon anthedon* Feld.

*Papilio anthedon* Felder, *Verh. zool. bot. Gesell. Wien* (1864) p. 305. No. 217 and p. 350. No. 124 (Amboina).

3 ♂♂, Manusela, Central Ceram, 650 metres.

25. *Papilio doson evemonides* Honr.

*Papilio jason* var. *evemonides* Honrath, *Berl. Entom. Zeitsch.* Bd. xxviii. p. 396. t. 10. f. 2 (1884) (Malacca; S.E. Borneo).

1 ♂, Bali, 1912.



**26. *Papilio eurypylus eurypylus* Linn.**

*Papilio Eques Acheius eurypylus* Linnaeus, *Syst. Nat.* edit. x. p. 464. No. 37 (1758) ("in Indiis").

1 ♂, Ceram : 1 ♂, Wabai, North Ceram ; 3 ♂♂, Manusela, Central Ceram, 650 metres.

**27. *Papilio macfarlanei cestius* Fruhst.**

*Papilio macfarlanei cestius* Fruhstorfer, *Soc. Entom.* 1903. p. 49 (locality unknown).

1 ♂, 3 ♀♀, Manusela, Central Ceram, 650 metres.

**28. *Papilio agamemnon plisthenes* Feld.**

*Papilio plisthenes* Felder, *Verh. zool. bot. Gesell. Wien* (1864) p. 306. No. 232 ; id. *Reise Novara, Lep.* vol. i. p. 70. No. 53. (1865) (Amboina).

1 ♂, 3 ♀♀, Wabai, North Ceram ; 3 ♂♂, 3 ♀♀, Manusela, Central Ceram, 650 metres.

**29. *Papilio agamemnon meton* Fruhst.**

*Papilio agamemnon meton* Fruhstorfer, *Ins. Börse* 1904. p. 181 (Lombok).

1 ♂, Bali, 1912.

**Pierinae****30. *Leptosia xiphia chlorographa* Hübn.**

*Leptosia chlorographa* Hübn., *Zutr. Ecot. Schmelt.* ff. 47, 48. (1818) (Java).

1 ♂, Danau Bratan, Bali, 2500 ft., January 1911.

**31. *Delias dorimene dorimene* (Cram.).**

*Papilio dorimene* Cramer, *Pap. Ecot.* vol. iv. pt. xxxiii. pl. 387. ff. C. D. (1782) (Amboina).

1 ♂, 1 ♀, Manusela, Central Ceram, 650 metres.

**32. *Delias periboea wallacei* Rothschild.**

*Delias periboea* var. *wallacei* Rothschild, *Iris*, vol. v. p. 441. t. 5. f. 2. (1892) (S. Celebes !!).

4 ♂♂, 1 ♀, Buleleug, North Bali, January—April 1911.

Herr Fruhstorfer assumes that my type from S. Celebes was erroneously labelled and really came from Bali ; it certainly is strange that it has never turned up in Celebes again, but just the same as large *Papilios* have only been got on Celebes in single examples, so much more likely would a dirty, dingy *Pierid* be overlooked.

**33. *Delias mysis cruentata* (Butl.).**

*Pieris cruentata* Butler, *Proc. Zool. Soc. Lond.* 1865. p. 455. t. 26. f. 2. (Misol).

1 ♀, Misol.

**34. *Delias caeneus caeneus* (Linn.).**

*Papilio caeneus* Linnaeus, *Mus. Ludov. Urb.* p. 271 (1764) (Amboina).

1 ♂, 2 ♀♀, Manusela, Central Ceram, 650 metres, 1912.

35. *Delias duris duris* (Hew.).

*Pieris duris* Hewitson, *Exot. Butt.* vol. ii. *Pier.* t. 5. f. 34 (1861) (Ceram).

1 ♂, Mannsela, Central Ceram, 650 metres, 1912.

36. *Delias funerea buruana* Rothsch.

*Delias funerea buruana* Rothsch. *Nov. Zool.* vol. vi. p. 68 (1890) (Mt. Mada, Buru).

♀. *Above* differs from ♂ in the whole costa of forewing and the whole wing obliquely from termen above vein 4 to costa across upper half of end of cell being black, and in the hindwing being grey with the outer two-thirds between veins 4 and 7 black.

Below ♂ and ♀ are identical.

1 ♀, Wahai, North Ceram.

37. *Delias isse* (Cram.).

*Papilio isse* Cramer, *Pap. Exot.* vol. i. pt. v. t. 55. ff. E. F. (1775) (Amboina).

2 ♂♂, 1 ♀, Manusela, Central Ceram, 650 metres, 1912.

38. *Delias belisama balina* Frnhst.

*Delias belisama balina* Fruhstorfer, *Intern. Entom. Zeitschr. Guben*, 1908, p. 238 (Bali).

1 ♂, Bulcleng, North Bali, January—April 1911.

39. *Delias rothschildi* Holl.

*Delias rothschildi* Holland, *Nov. Zool.* vol. vii. p. 81 (1900) (Buru).

Herr Fruhstorfer was quite wrong in placing this species as a form of *dorimene*, though from no fault of his own; it is nearer *echidna* Hew.

The ♂ not being recorded, I describe it below, and also re-describe the ♀, the single ♀ type being in poor condition.

♂. *Above*. Forewing greyish white, apical half of wing obliquely across cell to tornus black. Hindwing white with broad black border; the yellow of underside shining through.—*Below*. Forewing black, five spots at apex and wing below vein 1 white. Hindwing golden yellow, a large irregular area at, around, and beyond tornus fiery orange, a broad black margin (one-sixth of wing) black with five large, almost coalescent golden and orange patches in it.

♀. *Above*. Forewing black with greyish white streak above inner margin. Hindwing base grey, rest of wing white, outer one-third of wing black.—*Below*. Forewing black, base greyish, a quadrate white spot beyond cell, five yellow patches at apex. Hindwing golden yellow, nervures broadly white, outer black border with slightly smaller yellow patches than in ♂.

1 ♂, Bara, N.W. Burn. [3 ♂♂, 1 ♀, Mt. Mada, Burn, 3000 ft., September 1898 (Dumas)].

40. *Delias stresemanni* sp. nov.

♂. *Above*. Forewing cream-white, apex broadly black running down in diminishing width along termen to vein 2, costa black. Hindwing cream-white narrowly edged with black.—*Below*. Forewing black-brown with strong metallic

bronzy glaze, a white dot at end of cell, three yellow spots in apex and three whitish small spots along termen. Hindwing black-brown strongly glazed with metallic bronze, an orange costal band and a terminal line of orange streaks, a white spot at apex of cell and a broad cloud-like whitish postmedian band.

♀. *Above*. Forewing, basal three-fifths obliquely pale grey, outer two-fifths obliquely black-brown with a curved subterminal row of grey streaks. Hindwing, basal two-thirds pale grey, outer one-third black-brown.—*Below*. Forewing black-brown glossed with metallic bronze basal and cellular areas slightly powdered with yellow scales, a subterminal curved band of white oblong spots. Hindwing black-brown strongly glossed with metallic bronze, a white spot at end of cell, basal streak and row of subterminal spots golden yellow.

Length of forewing : ♂ 30 mm., ♀ 27 mm. ; expanse, ♂ 64 mm., ♀ 58 mm.

1 ♂, 1 ♀, Mannsela, Central Ceram, 650 metres, 1912.

#### 41. *Anaphaeis java java* (Sparrrn.)

*Papilio java* Sparrrman, *Amoen. Acad.* vol. vii. p. 504. note. 1 (1767) (Java).

1 ♂, Kintamani, Bali, 4000 ft., February—March 1911 ; 9 ♂♂, 8 ♀♀, Buleleng, North Bali, January—April 1911 ; 1 ♂, 2 ♀♀, Bali, 1912 ; 1 ♀, ?.

#### 42. *Huphina nerissa corva* (Wall.).

*Pieris corva* Wallace, *Trans. Entom. Soc. Lond.* ser. iii. vol. iv. p. 339. No. 32 (1867) (Java, Bali).

1 ♂, 1 ♀, Buleleng, North Bali, January—April 1911 ; 3 ♂♂, 1 ♀, Bali, 1912.

#### 43. *Huphina aspasia aspasia* (Stoll).

*Papilio aspasia* Stoll, *Suppl. Cramer's Pap. Eccl.* pt. v. p. 148. pl. xxxiii. ff. 3, 3 c. (1790) (Amboina).

2 ♂♂, Wabai, North Ceram ; 19 ♂♂, 2 ♀♀, Sukaradja, N.W. Ceram ; 2 ♂♂, Mansuela, Central Ceram, 650 metres, 1912.

#### 44. *Huphina aspasia jael* (Wall.).

*Pieris jael* Wallace, *Trans. Entom. Soc. Lond.* ser. iii. vol. iv. p. 335. No. 20 (1867) (Buru).

2 ♂♂, Mgesawain, Central Buru, 800 metres.

#### 45. *Huphina perimale rachel* (Boisdu).

*Pieris rachel* Boisduval, *Hist. Nat. Ins. Spec. Gén. Lépid.* vol. i. p. 469. No. 46 (1836) (Java!).

There is some doubt about this form, as since Boisduval's time it has not been received from Java. Fruhstorfer in "Seitz" quite omits all mention of a form of *H. perimale* from the Moluccas. I, however, in addition to the 4 ♂♂ enumerated below, possess 2 ♂♂ from Buru, 1 ♀ from Ceram, 2 ♂♂ from Batjan, and 2 ♂♂ from Ceram Lant ; a ♂ from Obi is slightly different. As all these specimens agree with Boisduval's description of *rachel* in possessing the very large yellow subapical patch, which is less developed in all the other forms of *perimale*, I have come to the conclusion that the locality of Boisduval's type was wrong, and that *p. rachel* is the South Moluccan race.

2 ♂♂, Manusela, Central Ceram, 650 metres, 1912; 1 ♂, Sukaradja, N.W. Ceram; 1 ♂, Ceram.

46. ***Appias lyncida lyncida*** (Cram.).

*Papilio lyncida* Cramer, *Pap. Exot.*, vol. ii, pt. xi, p. 53, t. 131, f. B. (1777) (Java).

1 ♂, Bali, 1912.

47. ***Appias ada ada*** (Cram.).

*Papilio ada* Cramer, *Pap. Exot.*, vol. iv, pt. xxxi, p. 142, t. 363, ff. C. D. (1781) (Amboina).

1 ♂, Sukaradja, N.W. Ceram; 7 ♂♂, 1 ♀, Manusela, Central Ceram, 650 metres, 1912.

48. ***Appias melania antoniae*** Frnhst.

*Appias melania antoniae* Fruhstorfer, *Seitz Grossschm. der Erde*, vol. ix, p. 156 (1910) (East Ceram, Saparua).

1 ♂, 1 ♀, Manusela, Central Ceram, 650 metres, 1912; 2 ♂♂, Waihai, North Ceram.

49. ***Appias placidia*** (Stoll.).

*Papilio placidia* Stoll, *Suppl. Cramer's Pap. Exot.*, pt. iv, p. 133, pl. xxviii, ff. 4. 4 C. (1790) (Amboina).

Dr. Standinger separated the Batjan specimens as a subspecies under the name var. *maculata*, and Herr Fruhstorfer in "Seitz" followed him, adding the localities Halmaheira and Obi. I cannot agree to this, for out of seventeen ♀♀ sent by Herr Stresemann from Ceram, nine are like the ♂ unspotted above, seven are normal or like Standinger's *maculata*, while the other one has a band of large distinct yellow patches much stronger developed than in any of Standinger's *maculata*. I consider, therefore, at the most the yellow-spotted ♀♀ can only be treated as aberrations and must stand as ab. *maculata* Stand.

25 ♂♂, 15 ♀♀, Manusela, Central Ceram, 650 metres, 1912; 2 ♂♂, Kanike, North Ceram, 600 metres = 1950 ft., 1912; 1 ♂, 3 ♀♀, Waihai, North Ceram.

In large numbers on the ground where covered with leaves in high primeval forest with little undergrowth. In the coast region and Central Mountain Range. Never found in open country.—E. S.

50. ***Appias celestina celestina*** (Boisd.).

*Pieris celestina* Boisduval, *Voy. Astrolabe Lépid.*, p. 46, No. 1 (1832) (Waihiou).

When a good series of both the yellow and white forms of ♀ is available, the Misol form of *celestina* will have to be separated, but the three white ♀♀ obtained by H. Kühn are not sufficient for this purpose.

15 ♀♀, Misol [2 ♂♂, 3 ♀♀ (white form), Misol, January 1899 (Heinrich Kühn)].

51. ***Catopsilia pyranthe evangelina*** (Butl.).

*Callidryas evangelina* Butler, *Trans. Entom. Soc. Lond.* 1870, p. 11, No. 6 (Flores).

1 ♂, 1 ♀, Buleleng, North Bali, January—April 1911; 3 ♂♂, 2 ♀♀, Bali, 1912.

52. *Catopsilia crocale crocale* (Cram.).

*Papilio crocale* Cramer, *Pap. Ecot.* vol. i. pt. v. p. 87, t. 55, ff. C. D. (1775) (East Indies).

This insect is very variable, but in spite of its great range has developed into only four subspecies. The ♂♂ have two chief forms: a yellow one, ♂ forma *fluvescens* Fruhst., and a form with the outer half of wings white, ♂ forma *alcemene* Fabr. In the more western portions of its range three principal ♀ forms occur: ♀ forma *jugurtha* Cram. with narrow margins to the wings and more or less white hindwings; ♀ forma *crocale* Cram. with yellow hindwings and wider margins; and ♀ forma *latilimbata* Fruhst. with a lot of sooty black on the wings.

2 ♂♂ (♂ forma *alcemene*), 1 ♂ (♂ forma *fluvescens*), Buleleng, North Bali, January—April 1911; 2 ♀♀ (♀ forma *jugurtha*), Bali, 1912.

53. *Catopsilia crocale rivalis* Fruhst.

*Catopsilia crocale flava* ♀ forma *rivalis* Fruhstorfer, *Seitz Grossschm. Erde*, vol. ix. p. 163. t. 68. f. d. 4 and ff. d. 2-4 and e. 1-5 (1910) (Moluccas and Papua).

Herr Fruhstorfer applied the name *flava* Butler to the subspecies of *crocale* reaching from the **Moluccas** to the **Solomons**, and named the **Celebes** race *celebica*. He had evidently never looked up Butler's original description, or he would have seen that Butler's name *flava* was given to specimens obtained by A. R. Wallace in **Celebes** in 1858. I find that no other names have been given to the Molucco-Papuan race except the three ♀♀ forms *rivalis*, *crocalina*, and *jugurthina* Fruhst. As I do not wish to create a new name, I apply the name *rivalis* to the whole **subspecies** as it stands first on the page.

3 ♂♂, 1 ♀ (♀ forma *rivalis*), Waihai, North Ceram; 4 ♂♂, 4 ♀♀, Manusela, Central Ceram, 650 metres, 1912; 1 ♂, Misol.

54. *Catopsilia scylla scylla* (Linn.).

*Papilio scylla* Linnaeus, *Mus. Loude. Utr.* p. 242 (1764) (Java).

1 ♀, Kintamani, Bali, 4000 ft., February—March 1911.

55. *Catopsilia scylla moluccarum* Fruhst.

*Catopsilia scylla moluccarum* Fruhstorfer, *Seitz Grossschm. Erde*, vol. ix. p. 165. t. 68. c. ff. 4. 5 (1910) (Moluccas).

2 ♂♂, 2 ♀♀, Waihai, North Ceram; 1 ♂, 1 ♀, Manusela, Central Ceram, 650 metres, 1912.

56. *Terias hecabe sankapura* Fruhst.

*Terias hecabe sankapura* Fruhstorfer, *Seitz Grossschm. Erde*, vol. ix. p. 167 (1910) (Bawean, Java, Bali, and Lombok).

*Terias hecabe* is the most puzzling and variable insect. It varies locally, it has three seasonal forms which, however, all intergrade, it varies individually, and it varies both in colour and shape, and in some cases is sexually dimorphic and in others not. I have four local races to enumerate in this paper, but I shall only treat of them under their subspecific entities, as it would carry too far to split them up under the host of aberrational and formal names they possess.

3 ♂♂, 8 ♀♀, Buleleng, North Bali, January—April 1911; 1 ♀, Danau

Bratan, Bali, 2500 ft., January 1911; 1 ♂, 1 ♀, Gunung Bratan, Bali, 4000—6500 ft., January—February 1911 (this pair is quite unlike the other Bali specimens, for the ground colour of the ♂ is pale lemon-yellow and of the ♀ creamy white); 2 ♂♂, 2 ♀♀, Bali, 1912.

### 57. *Terias hecabe diversa* Wall.

*Terias diversa* Wallace, *Trans. Entom. Soc. Lond.* ser. iii. vol. iv. p. 324. No. 20 (1867) (Buru).

2 ♂♂, Bara, N.W. Buru.

### 58. *Terias hecabe biformis* Butl.

*Terias biformis* Butler, *Ann. Mag. Nat. Hist.* ser. v. vol. xiii. p. 196 (1884) (Amboina).

The colour of the ♂ type is exactly that of the Gunung Bratan ♂ of *h. sankapura*, while **none** of the series mentioned below is of that colour. The females vary in colour, some being pure white, while others are decidedly washed with lemon-yellow. Two males are paler yellow and have a broader black margin to hindwings.

13 ♂♂, 14 ♀♀, Manusela, Central Ceram, 650 metres, 1912; 5 ♂♂, 1 ♀, Wahia, North Ceram.

### 59. *Terias hecabe oeta* Fruhst.

*Terias hecabe oeta* Fruhstorfer, *Seitz Grossschm. Erde*, vol. ix. p. 168 (1910) (New Guinea).

1 ♂, Misol.

### 60. *Terias blanda blanda* Boisd.

*Terias blanda* Boisduval, *Hist. Nat. Ins. Spec. Gén. Lépid.* vol. i. p. 672. No. 32 (1836) (Batavia).

4 ♂♂, 1 ♀, Buleleng, North Bali, January—April 1911; 2 ♀♀, Bali, 1912.

### 61. *Terias blanda cingata* Fruhst.

*Terias blanda cingata* Fruhstorfer, *Seitz Grossschm. Erde*, vol. ix. p. 169 (1910) (Amboina).

11 ♂♂, 5 ♀♀, Manusela, Central Ceram, 650 metres, 1912.

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### 62. *Terias libythea drona* Horsf.

*Terias drona* Horsfield, *Cat. Lepid. Mus. E.I.C.* p. 137. t. 1. f. 13 (1829) (Java).

This subspecies has two seasonal forms: (1) seas. f. *drona* is the wet-season form, and (2) seas. f. *herlina* is the dry-season form.

2 ♂♂ (seas. f. *drona*), Danau Bratan, Bali, 2500 ft., January 1911; 1 ♀ (seas. f. *drona*), Gitgit, Bali, 1500—2000 ft.; 1 ♂, 1 ♀ (seas. f. *drona*), 13 ♂♂, 2 ♀♀ (seas. f. *herlina*), Manusela, Central Ceram, 650 metres.

### 63. *Terias laeta stigmatica* subsp. nov.

♂♀. Differs from *l. laeta* in the yellow underside and in the distinct black discocellular stigma.

1 ♂, 1 ♀, Kintamani, Bali, 4000 ft., February—March 1911.

64. *Terias tilaha tilaha* Horsf.

*Terias tilaha* Horsfield, *Cat. Lepid. Mus. E.I.C.* p. 136. No. 62 (1829) (Java).

2 ♂♂, 1 ♀, Danau Bratan, Bali, January 1911; 1 ♀, Gunung Bratan, Bali, 4000—6500 ft., January—February 1911.

65. *Terias norbana depicta* Fruhst.

*Terias norbana depicta* Fruhstorfer, *Seitz Grossschm. Erde*, vol. ix. p. 172 (1910) (Amboina).

1 ♂, 2 ♀♀, Manusela, Central Ceram, 650 metres, 1912.

66. *Terias candida candida* (Cram.).

*Papilio candida* Cramer, *Pap. Exot.* vol. iv. pt. xxviii. p. 83. pl. 331 (1780) (Amboina).

15 ♂♂, 13 ♀♀, Manusela, Central Ceram, 650 ft., 1912; 1 ♂, Snkaradja, N.W. Ceram; 1 ♀, Kanike, North Ceram, 600 metres, 1912; 4 ♂♂, 7 ♀♀, Wahai, North Ceram. Abundant in open places!!—E. S. [Hagen says **always only** in forest lands.]

67. *Terias candida papuana* Bntl.

*Terias papuana* Butler, *Ann. Mag. Nat. Hist.* ser. vii. vol. i. p. 60. No. 9 (1898) (Misol).

1 ♂, 9 ♀♀, Misol.

68. *Gandaca harina aiguina* Fruhst.

*Gandaca harina aiguina* Fruhstorfer, *Seitz Grossschm. Erde*, vol. ix. p. 173 (1910) (Obi, Moluccas, to New Guinea!).

The bulk of the New Guinea specimens have a much wider black apex to the forewing in the males, but I have specimens even more exaggerated from India, the Malay Islands, and the Philippines, so that before I venture to describe the Papuan race I require a better series from the Moluccas, for the eleven specimens enumerated below are all I have from there.

11 ♂♂, Manusela, Central Ceram, 650 metres, 1912; 1 ♂, Misol.

69. *Hebomoia glaucippe javanensis* (Wall.).

*Iphia glaucippe* loc. var. (3) *javanensis* Wallace, *Journ. Entom.* ii. p. 3 (1863).

1 ♂, 1 ♀, Buleleng, North Bali, January—April 1911.

70. *Hebomoia leucippe leucippe* (Cram.).

*Papilio leucippe* Cramer, *Pap. Exot.* vol. i. pt. iii. p. 57. t. 36. ff. A. B. C. (1775) (Amboina).

Fruhstorfer has separated the Ceram *leucippe* as a distinct subspecies under the name of *leucippe daemonis*. He gives as the differences the great reduction of orange above in the forewing and the **whitish not yellowish** underside of hindwing. This does not hold good: out of my seven Amboina females **five** have **more** black and **less** orange than Fruhstorfer's figure of his *daemonis* female, while six of them have the hindwing below white. Of my two Ceram females one has more orange in forewing than the figure shows.

1 ♂, Ceram; 1 ♂, Manusela, Central Ceram, 650 metres, 1912.

Rather rare in river valleys in open country.—E. S.

71. *Pareronia jobaea elsa* (Fruhst.).

*Nepheronia jobaea elsa* Fruhstorfer, *Berl. Entom. Zeitschr.* vol. xlviii. p. 98 (1903) (Ceram).

5 ♂♂, Sukaradja, N.W. Ceram.

72. *Saletara liberia liberia* (Cram.).

*Papilio liberia* Cramer, *Pap. Exot.* vol. iii. pt. xviii. p. 31. t. 210. ff. G. H. (1779) (Amboina).

6 ♂♂, 2 ♀♀, Mausnala, Central Ceram, 650 metres, 1912; 2 ♂♂, 2 ♀♀, Wabai, North Ceram; 1 ♂, Kanike, North Ceram, 600 metres, 1912.

In high virgin forest with little undergrowth on the ground where covered with leaves.—E. S.

73. *Saletara cycinna cycinna* (Hew.).

*Pieris cycinna* Hewitson, *Exot. Butt.* vol. ii. *Pier.* t. 4. ff. 23, 26 (1861) (Aru).

1 ♂, Misol.

## DANAIDAE

## Danainae

74. *Danaida chrysippus bataviana* (Moore).

*Linnaeus bataviana* Moore, *Proc. Zool. Soc. Lond.* 1883. p. 238. No. 5 (Java).

1 ♂, 1 ♀, Buleleng, North Bali, January—April 1911; 3 ♀♀, Kintamani, Bali, 4000 ft.; 4 ♂♂, Bali, 1912.

75. *Danaida chrysippus petilia* (Stoll).

*Papilio petilia* Stoll, *Suppl. Cramer's Pap. Exot.* pt. iv. p. 132. pl. xxviii. f. 3. (1790) (Coast of Coromandel).

3 ♂♂, 2 ♀♀, Manusela, Central Ceram, 650 metres, 1912; 1 ♂, Wabai, North Ceram; 2 ♂♂, Bara, N.W. Buru.

76. *Danaida plexippus intensa* (Moore).

*Salatura intensa* Moore, *Proc. Zool. Soc. Lond.* 1883. p. 240. No. 3 (Java).

4 ♂♂, 5 ♀♀, Kintamani, Bali, 4000 ft., February—March 1911; 1 ♂, Gitgit, Bali, 1500—2000 ft.; 2 ♂♂, 3 ♀♀, Danau Bratan, Bali, 2500 ft., January 1911; 1 ♂, 1 ♀, Buleleng, North Bali, January—April 1911.

77. *Danaida philene philene* (Cram.).

*Papilio philene* Cramer, *Pap. Exot.* vol. iv. pt. xxxii. p. 168. t. 375. ff. A. B. (1781) (Amboina).

This form varies much in the intensity of the brown colour, and Fruhstorfer has named the extreme pale individuals forma *luxurians*, and he states that this form has more often white marks on the upperside of hindwings. Out of the fifty specimens sent by Herr Stresemann, twenty-two are forma *luxurians* and twenty-seven forma *philene*, while one ♂ has almost entirely black hindwings. Now, of these fifty specimens only **two** have white on the hindwings above, one a ♂ forma *luxurians*, and the other the ♂ with almost black hindwings (*i.e.* the brown on hindwing having almost disappeared).



4 ♂♂, 3 ♀♀, Waihai, North Ceram; 30 ♂♂, 13 ♀♀, Manusela, Central Ceram, 650 metres, 1912.

Very abundant in open country in the Coast region and Central Mountain Ranges.—E. S.

78. *Danaida philene mysolica* (Moore).

*Salatura mysolica* Moore, *Proc. Zool. Soc. Lond.* 1883, p. 242. No. 13 (Misol).

One ♂ has, as in the preceding form, an almost black hindwing, but in this case it is more extreme.

4 ♂♂, 1 ♀, Misol.

79. *Danaida ismare ismare* (Cramer).

*Papilio ismare* Cramer, *Pap. Erot.* vol. iii. pt. xxiv. p. 156. pl. 279. ff. E. F. (1780) (Amboina).

7 ♂♂, 3 ♀♀, Manusela, Central Ceram, 650 metres, 1912; 1 ♀, Waihai, North Ceram.

80. *Danaida melissa melissa* (Cramer).

*Papilio melissa* Cramer, *Pap. Erot.* vol. iv. pt. xxxii. p. 172. t. 377. ff. C. D. (1781) (Java).

There are two well-marked forms of this insect found on Java—a large wet-season form, “forma” *myrsilos* Fruhst., with all the lines and spots much reduced, and a smaller dry-season form, “forma” *melissa*, with the lines and spots large and broad. On Bali the dry-season form is identical with that on Java, but the wet-season form has the narrow lines and small spots of *myrsilos*, but is if anything smaller than “forma” *melissa*.

I propose to call this “form. loc. *melissina* form. nov.”

1 ♀ (forma *melissa*), Buleleng, North Bali, January—April 1911; 1 ♀ (forma loc. *melissina*), Bali, 1912; 1 ♀ (forma loc. *melissina*), Kintamani, Bali, 4000 ft., February—March 1911.

81. *Danaida melissa nigra* (Mart.).

*Danaüs (Tirumala) melissa nigra* Martin, *Iris*, vol. xxiv. p. 24 (1910) (Ceram).

2 ♂♂, 3 ♀♀, Manusela, Central Ceram, 650 metres, 1912.

82. *Danaida aspasia philomela* (Zinken-Somm.).

*Euploea philomela* Zinken-Sommer, *Nora Act. Acad. Nat. Cur.* xv. p. 184. t. 16. f. 17 (1831) (Java).

1 ♂, Danau Bratan, Bali, 2500 ft., January 1911; 3 ♂♂, Gitgit, Bali, 1500—2000 ft.; 1 ♂, Bali, 1912; 1 ♂, 2 ♀♀, Buleleng, North Bali, January—April 1911.

83. *Danaida cleona cleona* (Cramer).

*Papilio cleona* Cramer, *Pap. Erot.* vol. iv. pt. xxxii. p. 173. t. 377. f. F. (1781) (Amboina).

16 ♂♂, 8 ♀♀, Manusela, Central Ceram, 650 metres, 1912; 2 ♂♂, 1 ♀, Waihai, North Ceram.

Common in open country on the coast, and in the Central Mountain Range.

84. *Danaida cleona lutescens* (Butl.).

*Danaïs lutescens* Butler, *Proc. Zool. Soc. Lond.* 1866, p. 172. No. 5 ; p. 173. f. 3. (Buru).

2 ♀ ♀, Mgesawain, Central Buru, 800 metres.

85. *Danaida albata gilva* Fruhst.

*Danaida albata gilva* Fruhstorfer, *Seitz Grossschm. Erde*, vol. ix. p. 209 (1910) (East Java).

5 ♂ ♂, 5 ♀ ♀, Gunung Bratan, 7020 ft., January—February 1911.

Only found on summit of Gunung Bratan —E. S.

86. *Danaida juvena juvena* (Cram.).

*Papilio juvena* Cramer, *Pap. Erot.* vol. ii. pt. xvi. p. 139. t. 188. f. B. (1777) (Java, Amboina, and Coast of Coromandel).

4 ♂ ♂, 2 ♀ ♀, Bali, 1912 ; 1 ♂, 1 ♀, Kintamani, Bali, 4000 ft., February—March 1911 ; 1 ♀, Gunung Bratan, Bali, 4000—6500 ft., January—February 1911 ; 2 ♂ ♂, 2 ♀ ♀, Buleleng, Bali, January—April 1911.

87. *Danaida juvena megarira* (Godt.).

*Danaïs megarira* Godart, *Encycl. Method.* vol. ix. p. 192. No. 51. (1819) (Java).

12 ♂ ♂, 10 ♀ ♀, Mamsela, Central Ceram, 650 metres, 1912 ; 7 ♂ ♂, 2 ♀ ♀, Wawai, North Ceram.

**Hestiinae**88. *Ideopsis stresemanni* sp. nov.

♂. Antennae black, club very large ; palpi white outside, black inside, tip of last segment black ; head black-brown, two spots on frons and two on vertex white ; thorax black-brown, white dots on tegulae and patagia ; abdomen seal-brown above. *Forewing* long and narrow, seal-brown ; a broad central band below vein 1, a large patch above it, patches between veins 2 and 3, 4 and 5, 5 and 6, a spot above vein 6, two spots (one above and one behind) apex of cell, and a row of six submarginal spots bright canary-yellow with a slight olive tinge. *Hindwing*, basal two-fifths bright olivaceous canary-yellow divided into patches by the seal-brown nervures ; outer three-fifths seal-brown, streaks along abdominal folds, a postdiscal band of seven large spots and three or four indistinct submarginal dots.

♀. Larger wings, much broader and rounder ; on forewing between vein 4 and towards the submarginal row of spots is double, and on hindwing there is a complete row of twin submarginal spots.

Expanse: ♂, 94 mm. ; ♀, 109 mm. Length of forewing: ♂, 45 mm. ; ♀, 52 mm.

20 ♂ ♂, 10 ♀ ♀, Mamsela, Central Ceram, 650 metres, 1912.

Abundant in light forest and in open spots above 500 metres = 1650 ft., and singly even as high as the summit of Gunung Pinaia, 2500 metres = 8150 ft. ; below 500 metres rarely to be seen.—E. S.

89. *Hestia idea* (Clerck).

*Papilio idea* Clerck, *Icones Insect. Rar. sect. secunda*, t. 38. f. 1 (1764).

*Hestia idea novella* Fruhstorfer, *Seitz Grossschm. Erde*, vol. ix. p. 224. pl. 75b. No. 1 (1910) (Banda, Goram, and Ceram).

Fruhstorfer has separated the Banda, Goram, and Ceram specimens as a subspecies, chiefly on the greater amount of black in the cell of Amboina specimens, but the distinction breaks down in a series.

6 ♂♂, 6 ♀♀, Manusela, Central Ceram, 650 metres, 1912; 10 ♂♂, 8 ♀♀, Wahai, North Ceram; 1 ♀, Kanike, North Ceram, 600 metres, 1912.

Solitary in tall virgin forest having scanty undergrowth. Native Moluccan name "Kupn Kupn Swangi" (Malayan name, "Kupn Kupn Hantu") = Ghost butterfly.—E. S.

**Euploeinae**90. *Euploea climena climena* (Cram.).

*Papilio climena* Cramer, *Pap. Exot.* vol. iv. pt. xxxiii. p. 297. t. 389. ff. E. F. (1782) (Amboina).

6 ♂♂, 7 ♀♀, Manusela, Central Ceram, 650 metres, 1912; 5 ♂♂, 5 ♀♀, Wahai, North Ceram.

91. *Euploea climena elwesiana* (Nicév.).

*Euploea (Vadebra) elwesiana* Nicéville, *Journ. As. Soc. Bengal*, vol. 66. pt. ii. No. iii. p. 543. No. 1 (1897) (Bali Lombok, Sambawa).

1 ♂, Kintamani, Bali, 4000 ft., February—March 1911.

92. *Euploea confusa confusa* Butl.

*Euploea confusa* Butler, *Proc. Zool. Soc. Lond.* 1866, p. 285. No. 52. p. 283. f. 3 (Waigiou).

3 ♂♂, 1 ♀, Misol.

93. *Euploea alecto* Butl.

*Euploea alecto* Butler, *Proc. Zool. Soc. Lond.* 1866, p. 275. No. 21 (Ceram).

3 ♂♂, Manusela, Central Ceram, 650 metres, 1912; 2 ♀♀, Wahai, North Ceram.

94. *Euploea duponcheli duponcheli* Boisd.

*Euploea duponcheli* Boisduval, *Voy. Astrolabe Lep.* p. 97. No. 6 (1832) (Buru).

1 ♀, Bara, North-west Buru.

95. *Euploea duponcheli anthracina* Butl.

*Euploea anthracina* Butler, *Proc. Zool. Soc. Lond.* 1866, pp. 280. 281. Nos. 39. 39a. f. 1 (Ceram).

15 ♂♂, 5 ♀♀, Manusela, Central Ceram, 650 metres, 1912; 1 ♂, 1 ♀, Wahai, North Ceram.

96. *Euploea melanopa cissia* Fruhst.

*Euploea melanopa cissia* Fruhstorfer, *Seitz Grossschm. Erde*, vol. ix. p. 243 (1910) (Misol).

7 ♂♂, 1 ♀, Misol.

97. **Euploea picina inaequalis** Butl.

*Euploea inaequalis* Butler, *Journ. Linn. Soc. Lond.* 1878, p. 302 (Ceram).

2 ♂♂, Manusela, Central Ceram, 650 metres, 1912.

98. **Euploea mulciber basilissa** (Cram.).

*Papilio basilissa* Cramer, *Pap. Erot.* vol. ii. pt. xi. p. 45. t. 127. ff. C. D. (1777) (Java).

Fruhstorfer has named the ♀♀ with no blue in apical one-third of wing *forma donada*.

4 ♂♂, 1 ♀, 1 ♀ f. *donada*, Buleleng, North Bali, January—April 1911; 1 ♂, 1 ♀, Gitgit, Bali, 1500—2000 ft.; 1 ♂, 1 ♀ f. *donada*, Bali, 1912; 1 ♂, 1 ♀, Danau Bratau, January 1911; 1 ♀ f. *donada*, Gunung Bratau, Bali, 4000—6500 ft., January—February 1911; 1 ♂, Kintamani, Bali, 4000 ft., February—March 1911.

99. **Euploea salabanda cledonia** (Fruhst.).

*Calliploea alyte? cledonia* Fruhstorfer, *Soc. Entom.* vol. 19. p. 68 (1904) (Ceram).

2 ♂♂, 1 ♀, Manusela, Central Ceram, 650 metres, 1912; 1 ♀, Waihai, North Ceram.

100. **Euploea mazares mazares** Horsf. & Moore.

*Euploea mazares* Horsfield & Moore, *Cat. Lep. Ins. Mus. E.I.C.* ed. ii. p. 127. No. 253 (1857) (Java).

1 ♀, Bali, 1912.

101. **Euploea corus defiguratus** (Fruhst.).

*Macroploea corus defiguratus* Fruhstorfer, *Intern. Entom. Zeitschr. Guben*, ii. p. 238 (1908) (Bali).

3 ♂♂, 1 ♀, Buleleng, North Bali, January—April 1911; 2 ♀♀, Gitgit, Bali, 1500—2000 ft.

102. **Euploea phaenareta phaenareta** (Schall.).

*Papilio phaenareta* Schaller, *Naturf.* vol. xxi. p. 177. t. 5. f. 1. 2 (1785) (Amboina).

13 ♂♂, 4 ♀♀, Manusela, Central Ceram, 650 metres, 1912.

103. **Euploea phaenareta hollandi** Fruhst.

*Euploea phaenareta hollandi* Fruhstorfer, *Iris*, vol. xvi. p. 303 (1903) (Buru).

1 ♀, Buru.

104. **Euploea nemertes nemertes** (Hübner).

*Lemnas mutabilis nemertes* Hübner, *Samml. Erot. Schmett.*, i. t. 26 (1806—1816).

9 ♂♂, 5 ♀♀, Manusela, Central Ceram, 650 metres, 1912; 1 ♂, 1 ♀, Waihai, North Ceram.

105. **Euploea nemertes bouruana** (Moore).

*Salpinx bouruana* Moore, *Proc. Zool. Soc. Lond.* 1883, p. 302. No. 9 (Buru).

1 ♀, Mgesawain, Central Buru, 800 metres.

106. *Euploea dentiplaga* sp. nov.

♀. Head, thorax, and abdomen velvety black, a row of white dots along edge of eye and a whitish band on sides of anal half of abdomen. *Forewing* pale coffee-brown, disc black-brown; a white spot in cell, a postmedian and postdiscal row of four white spots each, an indistinct white dot between veins 11 and 12. *Hindwing* black-brown, paler beyond vein 6 to costa, a postmedian band of large white blotches which are strongly dentate externally and less strongly internally.

Underside similar but much paler, postmedian band of spots on forewing bluish; a median band of spots and spot in cell on hindwing bluish white.

Expanse, 120 mm.; length of forewing, 57 mm.

This species is unlike anything I know, but its nearest allies are *leachi leachi* and *leachi coracina*.

4 ♀♀, Mannsela, Central Ceram, 650 metres, 1912; 1 ♀, Ceram.

Exclusively a mountain species, affects specially flowering *Eugenia* trees. Observed even at 2600 metres = 8450 feet on Gunung Pinaia.—E. S.

107. *Euploea crameri singaradha* Fruhst.

*Euploea crameri singaradha* Fruhstorfer, *Intern. Entom. Zeitschr. Guben*, p. 238 (1908) (Bali).

1 ♂, Gitgit, Bali, 1500—2000 ft.

108. *Euploea deione wallengrenii* Feld.

*Euploea wallengrenii* Felder, *Reise Novara, Lepid.*, vol. ii. p. 336. No. 465 (1867) (Java).

1 ♂, 1 ♀ (ab. *demaculata* Fruhst.), Bali, 1912.

## Palaeotropinae

109. *Tellervo assarica assarica* (Cram.).

*Papilio assarica* Cramer, *Pap. Erot.*, vol. iv. pt. xxxi. p. 142. t. 363. ff. A. B. (1781) (Amboina).

7 ♂♂, 10 ♀♀, Mannsela, Central Ceram, 650 metres, 1912.

110. *Tellervo zoilus coalescens* subsp. nov.

♂. Differs from *z. fallax* in the cell patch of forewing being much larger and almost coalescent with the subapical patch.

♀. Differs in the still larger subapical patch, which quite coalesces with the very large cellular patch.

3 ♂♂, 1 ♀, Misol.

## SATYRIDAE

## Satyrinae

111. *Ypthima pandocus pandocus* Horsf. & Moore.

*Ypthima pandocus* Horsfield & Moore, *Cat. Lepid. Ins. Mus. E.I.C.*, vol. i. p. 235. No. 506 (1857) (Java).

1 ♂, Buleleng, North Bali, January—April 1911; 3 ♂♂, Kintamani, Bali, 4000 ft., February—March 1911; 2 ♂♂, Danan Bratan, 2500 ft., January 1911.

112. **Ypthima philomela philomela** (Joh.).

*Papilio philomela* Johansson, *Amoen. Acad.* vol. vi. p. 404. No. 60 (1763) (Java).

2 ♂♂, Gitgit, Bali, 1500—2000 ft.; 1 ♀, Kintamani, Bali, 4000 ft., February—March 1911.

113. **Hypocysta osyris** (Boisd.).

*Satyrus osyris* Boisdual, *Voy. Astrolabe, Lep.* p. 154. No. 17 (1832) (Offak).

2 ♀♀, Misol.

114. **Lethe arete arete** (Cram.).

*Papilio arete* Cramer, *Pap. Exot.* vol. iv. pt. xxvii. p. 50. t. 313. ff. E. F. (1780) (Amboina).

2 ♂♂, Manusela, Central Ceram, 650 metres, 1912.

115. **Lethe europa europa** (Fabr.).

*Papilio europa* Fabricius, *Syst. Entom.* p. 500. No. 247 (1775) (America!!).

1 ♀, Danau Bratan, Bali, 2500 ft., January 1911.

116. **Mycalesis sirius manipa** (Boisd.).

*Satyrus manipa* Boisdual, *Voy. Astrolabe, Lep.* p. 150. No. 10 (1832) (Amboina).

1 ♂, 2 ♀♀, Mannsela, Central Ceram, 650 metres, 1912; 1 ♀, Waihai, North Ceram.

117. **Mycalesis terminus nemulia** (Cram.).

*Papilio nemulia* Cramer, *Pap. Exot.* vol. iii. pt. xx. p. 76. t. 237. ff. F. G. (1779) (Amboina).

21 ♂♂, 5 ♀♀, Mannsela, Central Ceram, 650 metres, 1912; 9 ♂♂, 3 ♀♀, Waihai, North Ceram.

118. **Mycalesis terminus wakolo** Fruhst.

*Mycalesis terminus wakolo* Fruhstorfer, *Verhand. zool. bot. Gesells. Wien* (1908), p. 164 (Buru).

2 ♂♂, Mgesawain, Central Buru, 800 metres.

119. **Mycalesis phidon phidou** Hew.

*Mycalesis phidon* Hewitson, *Exot. Butt.* vol. iii. *Mycol.* t. 3. f. 16 (1862) (Aru).

1 ♂, Misol.

120. **Mycalesis mehadeva mehadeva** (Boisd.).

*Satyrus mehadeva* Boisdual, *Voy. Astrolabe, Lep.* p. 151. No. 12 (1832) (Dorei).

2 ♂♂, 2 ♀♀, Misol.

121. **Mycalesis duponcheli umbonia** Fruhst.

*Mycalesis duponcheli umbonia* Fruhstorfer, *Soc. Entom.* vol. xxi. p. 91 (1906) (Waigiou).

1 ♀, Misol.

122. *Mycalesis janardana janardana* Horsf. & Moore.

*Mycalesis janardana* Horsfield & Moore, *Cat. Lepid. Ins. Mus. E.I.C.* p. 234. No. 502 (1857) (Java).

2 ♂♂, 1 ♀, Buleleng, North Bali, January—April 1911.

123. *Mycalesis sudra taunis* Fruhst.

*Mycalesis sudra taunis* Fruhstorfer, *Seitz Grossschm. Erde*, vol. ix. p. 355 (1910) (Bali).

10 ♂♂, 3 ♀♀, Danan Bratan, Bali, 2500 ft., January 1911.

124. *Orsotriaena medus zipoetina* Fruhst.

*Orsotriaena medus zipoetina* Fruhstorfer, *Verhandl. zool. bot. Gesells. Wien* 1908, p. 214 (Sumatra).

Fruhstorfer treats this as a **form. loc.** only; but as it appears to be the only form on Bali, I consider it must rank as a subspecies.

2 ♂♂, 3 ♀♀, Buleleng, North Bali, January—April 1911; 2 ♂♂, 2 ♀♀, Bali, 1912.

125. *Melanitis leda leda* (Linn.).

*Papilio leda* Linnaeus, *Syst. Nat.* ed. xii. vol. i. pt. 2. p. 773. No. 151 (1767) ("Asia").

1 ♂, 3 ♀♀, Manusela, Central Ceram, 650 metres, 1912; 1 ♀, Wahai, North Ceram.

126. *Melanitis leda simessa* Fruhst.

*Melanitis simessa* Fruhstorfer, *Seitz Grossschm. Erde*, vol. ix. p. 362 (1910) (Java).

2 ♂♂, 3 ♀♀, Buleleng, North Bali, January—April 1911; 1 ♂, Bali, 1912. (Both the wet-season form *lacrima* Fruhst. and the dry-season form *ismenides* Fruhst. are represented.)

127. *Melanitis leda buruana* Holl.

*Melanitis leda buruana* Holland, *Nor. Zool.* vol. vii. p. 61. No. 18 (1900) (Buru).

1 ♂, Bara, North-west Buru.

128. *Melanitis constantia constantia* (Cram.).

*Papilio constantia* Cramer, *Pap. Exot.* vol. ii. pt. xii. p. 57. t. 133. ff. A. B. (1777) (Amboina).

The males and females appear in two extreme forms and an intermediate third form. The ♂ form with barely any transverse band on forewing is ♂ f. *depicta* Fruhst., and for the ♀ form without ocelli in forewing above I propose the name of ♀ f. **inoculata** form. nov., and for the intermediate ♀ form with only one ocellus the name ♀ f. **semioculata** form. nov. If it is considered worthy of a name, the ♂ intermediate form could be called ♂ f. **intermedia** form. nov.

3 ♂♂, 7 ♀♀ (1 ♂ f. *depicta*, 2 ♂♂ f. *intermedia*, 1 ♀ f. *inoculata*), Manusela, Central Ceram, 650 metres, 1912; 1 ♀ (f. *semioculata*), Kanike, North Ceram, 600 metres, 1912; 1 ♂, Wahai, North Ceram.

129. *Melanitis amabilis crameri* (Butl.).

*Cylo crameri* Butler, *Entom. Mon. Mag.* vol. iii. p. 77. No. 4 (1866) (Oceania!).

1 ♂, Manusela, Central Ceram, 650 metres, 1912; 1 ♀, Ceram. (I have followed Fruhstorfer temporarily in applying Butler's name to the Ceram race.)

130. *Melanitis amabilis kajelana* Fruhst.

*Melanitis amabilis kajelana* Fruhstorfer, *Entom. Zeitschr. Stuttgart*, vol. xxii. p. 83 (1908) (Buru).

1 ♂, Bara, North-west Buru.

**Elymniinae**131. *Elymnias hypermnestra baliensis* Fruhst.

*Elymnias protogenia baliensis* Fruhstorfer, *Soc. Entom.* vol. xi. No. 18. p. 147 (1896) (Bali).

11 ♂♂, 3 ♀♀, Bali, 1912; 29 ♂♂, 5 ♀♀, Buleleng, North Bali, January—April 1911; 1 ♂, Kintamani, Bali, 4000 ft., February—March 1911.

132. *Elymnias nigrescens bulelenga* subsp. nov.

♀. Differs from *nig. sumbawana* Fruhst. in the submarginal spots of the forewing being smaller and much whiter, and in there being a submarginal line of whitish streaks on hindwing.

1 ♀, Buleleng, North Bali, January—April 1911.

133. *Elymnias vitellia ceramensis* Mart.

*Elymnias vitellia ceramensis* Martiu, *Iris*, vol. xxii. p. 65. No. 2 (1909) (Ceram).

This is rather a poor subspecies, as specimens occur with two, three, and four subapical spots. Fruhstorfer's ab. *suavium* I have not seen, but one of the Kanike specimens has a blue spot on hindwing above.

7 ♂♂, Manusela, Central Ceram, 650 metres, 1912; 2 ♂♂, Kanike, North Ceram, 600 metres, 1912.

134. *Elymnias agondas agondas* (Boisd.).

*Dychis agondus* Boisduval, *Voy. Astrolabe, Lep.* p. 138. t. 3. f. 5 (1832) (Vanikoro ? !).

2 ♂♂, 1 ♀ (♀ *f. bioculatus* Donbl. & Hew.), Misol.

**AMATHUSIIDAE****Amathusiinae**135. *Faunis arcesilans canens* Hübn.

*Faunis canens* Hübner, *Samml. Erot. Schm.* vol. ii. pl. 82. ff. 3. 4 (1820-1826).

3 ♀♀, Danau Bratan, Bali, 2500 ft., January 1911; 1 ♂, Gunung Bratan, Bali, 4000-6500 ft., January—February 1911.

136. *Taenaris urania pandemos* Fruhst.

*Taenaris urania pandemos* Fruhstorfer, *Seitz Grossschm. Erde*, vol. ix. p. 411 (1911) (Ceram).

11 ♂♂, 4 ♀♀, Manusela, Central Ceram, 650 metres, 1912; 8 ♂♂, Waihai, North Ceram.

137. *Taenaris selene gigas* (Stand.).

*Tenaris macrops gigas* Staudinger, *Erot. Tayf.* vol. i. p. 194 (1888) (Ceram).

Among the series sent by Herr Stresemann are two specimens (♂♀) which struck me at once as very strange: the ♂ has the forewing very much paler than



the remaining 15 ♂♂, fawn-grey or greyish fawn instead of sooty brown, and the hindwing, except the outer quarter obliquely from vein 3 to costa, which is fawn-grey, pure white, the ocellus having a narrow outer fawn ring; the ♀ has the whole forewing brownish grey with an oblique dirty white band from subcostal nervure beyond cell to termen between veins 3 and 4, broad nearest costa, narrowing sharply to termen, the hindwing has basal two-thirds white. This form I propose to call forma **pseudomacrops** form. nov.

On the ground in light forest occasionally abundant.—E. S.

16 ♂♂, 6 ♀♀ (1 ♂, 1 ♀, f. *pseudomacrops*), Manusela, Central Ceram, 650 metres, 1912.

### 138. *Taenaris myops praxedes* Fruhst.

*Taenaris myops praxedes* Fruhstorfer, *Entom. Zeitschr.*, vol. xviii. p. 119 (1904) (Salwatti?).

A poor subspecies.

13 ♂♂, 1 ♀, Misol.

### 139. *Taenaris artemis ziada* (Fruhst.).

*Taenaris artemis ziada* Fruhstorfer, *Insekten-Börse*, vol. xxi. p. 389 (1904) (Misol).

4 ♂♂, 3 ♀♀, Misol.

### 140. *Taenaris dimona offaka* Fruhst.

*Taenaris dimona offaka* Fruhstorfer, *Wien. Entom. Zeit.*, vol. xxiv. p. 82 (1905) (Waigiou).

1 ♂, Misol.

### 141. *Taenaris dimona desdemona* (Stand.).

*Taenaris dimona desdemona* Staudinger, *Erot. Tagf.*, vol. i. p. 201 (1888) (Ceram).

1 ♀, Manusela, Central Ceram, 650 metres, 1912.

### 142. *Taenaris catops fulvida* (Butl.).

*Taenaris fulvida* Butler, *Trans. Entom. Soc. Lond.* 1870. p. 487. No. 2 (Misol).

5 ♂♂, 2 ♀♀, Misol.

## NYMPHALIDAE

### Nymphalinae

### 143. *Ergolis ariadne ariadne* (Joh.).

*Papilio ariadne* Johansson, *Amoen. Academ.*, vol. vi. p. 407. No. 71 (1764) (Java).

1 ♂, 1 ♀, Bali, 1912; 1 ♂, Buleleng, North Bali, January—April 1911.

### 144. *Cupha erymanthis synnara* Fruhst.

*Cupha erymanthis synnara* Fruhstorfer, *Seitz Grossschm. Erde*, vol. ix. p. 467 (1912) (Java).

2 ♂♂, 1 ♀, Buleleng, North Bali, January—April 1911; 1 ♂, Gitgit, Bali, 1500—2000 ft.

145. *Cupha crameri crameri* (Feld.).

*Messaras crameri* Felder, *Sitzungsber. Akad. Wiss. Wien. Math. Nat. Cl.* xl. p. 449. No. 5 (1869) (Amboina).

1 ♂, 1 ♀, Wahai, North Ceram.

146. *Cupha lampetia lampetia* (Linn.).

*Papilio lampetia* Linnaeus, *Mus. Ludov. Utr.* p. 286 (1764) (Amboina).

3 ♂♂, 3 ♀♀, Manusela, Central Ceram, 650 metres, 1912; 2 ♀♀, Wahai, North Ceram.

147. *Cupha madestes turneri* (Bntl.).

*Messaras turneri* Butler, *Ann. Mag. Nat. Hist.* ser. iv. vol. xviii. p. 244. No. 17 (1876) (Misol).

2 ♂♂, 1 ♀, Misol.

148. *Atella phalanta phalanta* (Drury).

*Papilio phalanta* Drury, *Illustr. Exot. Entom.* vol. i. p. 41. t. xxi. ff. 1. 2. (1773) (China).

1 ♂, Buleleng, North Bali, January—April 1911.

149. *Atella alcippe alcippe* (Cram.).

*Papilio alcippe* Cramer, *Pap. Exot.* vol. iv. pt. xxxiii. p. 207. t. 389. ff. G. H. (1782) (Amboina).

2 ♂♂, 1 ♀, Manusela, Central Ceram, 650 metres, 1912.

150. *Issoria egista egista* (Cram.).

*Papilio egista* Cramer, *Pap. Exot.* vol. iii. pt. xxiv. p. 158. t. 281. ff. C. D. (1780) (Amboina).

3 ♂♂, 5 ♀♀, Manusela, Central Ceram, 650 metres, 1912; 1 ♀, Wahai, North Ceram.

151. *Cynthia arsinœ arsinœ* (Cram.).

*Papilio arsinœ* Cramer, *Pap. Exot.* vol. ii. pt. xiv. p. 100. t. 160. ff. B. C. (1777) (Amboina).

Fruhstorfer has separated *arsinœ* from Ceram as *arsinœ ardea* on the ground that the ♀♀ have the forewing tinged with cream-yellow, the green of the outer portion of the hindwing paler, and that also below they are paler and show less white on outer portions of wings. I cannot accept this as fact, for the ♀ enumerated below is much darker than most of my Amboina ♀♀, and has no cream-yellow above but a lot of white below, while several of my Amboina ♀♀ have all the characters Fruhstorfer gives for his *arsinœ ardea*.

Abundant in the Central Mountain chain on river banks. It often comes in large masses to fresh excrement.—E. S.

45 ♂♂, 1 ♀, Manusela, Central Ceram, 650 metres, 1912.

152. *Cynthia arsinœ rebeli* Fruhst.

*Cynthia arsinœ rebeli* Fruhstorfer, *Entom. Zeitschr.* vol. xix. p. 215 (1906) (New Guinea).

4 ♂♂, Misol.

153. *Cynthia arsinoë buruana* Fruhst.

*Cynthia arsinoë buruana* Fruhstorfer, *Iris*, vol. xiv. p. 329 (1901) (Buru).

Described from three ♂♂.

♀. Differs from ♀ *a. arsinoë* above in the forewing being much darker grey with a dark olive-green sheen and **no** suffusion of brown on rufous; the postmedian bands of white markings are absent, having been entirely suffused with dark scales; a median white band bordered outside with a greyish black crenulated line. Hindwing entirely grey with green sheen, the outer two-thirds suffused with dull orange; a median white band with crenulated line on outside followed by an indistinct greenish blue band; ocelli smaller than in *a. arsinoë* and the pale ring is deep orange, **not** pale yellow. Below there is a median white band on both wings **not found** in *a. arsinoë*, and on forewing there is a postdiscal red line **not** in the nametypical form. It has also an anal ocellus on hindwing above and below; in fact it almost agrees with ♀ *C. erota albotaeniata* except being darker grey.

6 ♂♂, 1 ♀, Mgesawain, Central Buru, 800 metres.

154. *Cirrochroa regina ducalis* Wall.

*Cirrochroa ducalis* Wallace, *Trans. Entom. Soc. Lond.* 1869, p. 340 (New Guinea).

1 ♂, Misol.

155. *Cethosia biblis narmadoides* Nicév.

*Cethosia narmadoides* de Nicéville, *Journ. Asiat. Soc. Bengal*, vol. 66. pt. ii. No. iv. p. 683. No. 85 (1898) (Bali).

1 ♂, Gitgit, Bali, 1500-2000 ft.; 1 ♂, Kintamani, 4000 ft., February—March 1911.

(The list of original references in *Seitz' Grossschmetterlinge der Erde* is most carelessly and inefficiently prepared; not only omissions but absolutely wrong quotations occur continually.)

156. *Cethosia biblis ceramensis* Fruhst.

*Cethosia biblis ceramensis* Fruhstorfer, *Stettin. Entom. Zeit.* vol. 63. p. 349 (1902) (Ceram).

10 ♂♂, Manusela, Central Ceram, 650 metres, 1912.

157. *Cethosia cydippe cydippe* (Joh.).

*Papilio cydippe* Johansson, *Amoenit. Academ.* vol. vi. p. 409 (1763) (India).

The question of authorship of this insect and the dates of publication are rather puzzling; however, it is quite certain that those **many** authors who attribute *cydippe* to Linnaeus are entirely wrong, as he only described it in 1767. It merely remains a question between Johansson and Clerck, who are both quoted as 1764.

Now Clerck's *Icones Insectorum Rariorum*, pt. ii. is dated "Holmiae 1764," and it is on plate 36, f. 1 that *cydippe* is figured.

Johansson's "Centuria Insectorum" forms article cxxi. of the periodical issued by Linnaeus entitled *Amoenitates Academicæ*, and is the twenty-first article

of the twenty-four composing vol. 6, and is dated "Upsaliae 1763, Junii 23," on p. 409 of which *cydippe* is described. It would at first sight be obvious that 1763 is earlier than 1764; but Johansson quotes Clerck, giving the plate 36 f. 1 correctly. I think, however, this may be explained by supposing that Clerck showed Johansson an advance proof of his work. It is a fact that the *Icones* of Clerck were never distributed through the booksellers, but only under the direct aegis of Queen Louisa Ulrica of Sweden.

I therefore consider Johansson to be the author of *cydippe*.

7 ♂♂, 3 ♀♀, Manusela, Central Ceram, 650 metres, 1912; 1 ♂, 2 ♀♀, Waihai, North Ceram; 2 ♂♂, Sukaradja, North-west Ceram; 1 ♀, Ceram.

#### 158. *Cethosia cydippe claudilla* Fruhst.

*Cethosia cydippe claudilla* Fruhstorfer, *Seitz Grossschm. Erde*, vol. ix. p. 509 (1912) (Dutch New Guinea).

I have adopted Fruhstorfer's name to save the coining of a new one; for in reality, as he says it is impossible to tell from the description whether Felder's name *damasippe* is founded on the N.W. or S.W. Dutch New Guinea form and proposes *claudilla* at random for the form which turns out **not to be** *damasippe*, the name cannot stand. Moreover, the type of Felder's *damasippe* is an aberration with the marginal dark portion of the hindwing **much** wider and the light part much darker than in any other specimen from the Papuan region which I have, so that it is impossible to say which form of the two it is. I therefore fix the type locality of Fruhstorfer's name as Misol.

7 ♂♂, 6 ♀♀, Misol.

#### 159. *Argynnis hyperbius javanica* Oberth.

*Argynnis niphe javanica* Oberthür, *Bull. Soc. Entom. France*, 1889, p. 236 (Java).

3 ♂♂, 1 ♀, Kintamani, Bali, 4000 ft., February—March 1911; 1 ♂, Gunung Bratan, Bali, 4000—6500 ft., January—February 1911; 1 ♂, Bali, 1912.

#### 160. *Precis iphita horsfieldi* (Moore).

*Junonia horsfieldi* Moore, *Lepid. Ind.* vol. iv. p. 82 (1899) (Java).

2 ♂♂, 1 ♀, Buleleng, North Bali, January—April 1911; 2 ♀♀, Danau Bratan, Bali, 2500 ft., January 1911; 1 ♀, Gitgit, Bali, 1500—2000 ft.; 3 ♂♂, 1 ♀, Bali, 1912.

#### 161. *Precis hedonia hedonia* (Linn.).

*Papilio hedonia* Linnaeus, *Mus. Ludov. Utr.* p. 279 (1764) (Amboina).

4 ♂♂, 5 ♀♀, Manusela, Central Ceram, 650 metres, 1912; 4 ♂♂, 1 ♀, Waihai, North Ceram.

#### 162. *Precis hedonia ida* (Cram.).

*Papilio ida* Cramer, *Pap. Exot.* vol. i. pt. iv. p. 66, t. 42. ff. C. D. (1775) (Java).

2 ♂♂, 3 ♀♀, Buleleng, North Bali, January—April 1911; 1 ♀, Kintamani, Bali, 4000 ft., February—March 1911; 4 ♂♂, 5 ♀♀, Bali, 1912.

163. *Precis hedonia zelima* (Fabr.).

*Papilio zelima* Fabricius, *System. Entom.* p. 492. No. 212 (1775) (New Holland).

2 ♂♂, 1 ♀, Misol.

164. *Precis atlites atlites* (Joh.).

*Papilio atlites* Johansson, *Amen. Academi.* vol. vi. p. 407. No. 72 (1763) (Asia).

1 ♂, Buleleng, North Bali, January—April 1911; 1 ♀, Bali, 1912.

165. *Precis atlites acera* Fruhst.

*Precis atlites acera* Fruhstorfer, *Seitz Grossschm. Erde*, vol. ix. p. 519 (1912) (Celebes).

2 ♂♂, 2 ♀♀, Mausnala, Central Ceram, 650 metres, 1912; 2 ♂♂, 3 ♀♀, Wahai, North Ceram.

166. *Precis erigone erigone* (Cram.).

*Papilio erigone* Cramer, *Pap. Erot.* vol. i. pt. vi. p. 97. t. lxii. ff. E. F. (1775) (Java).

2 ♂♂, Bali, 1912.

167. *Precis orithya minagara* (Fruhst.).

*Junonia orithya minagara* Fruhstorfer, *Insekten-Börse*, vol. xxi. nr. 41. p. 325 (1904) (Java).

2 ♂♂, Buleleng, North Bali January—April 1911; 1 ♂, Kintamani, Bali, 4000 ft., February—March 1911; 3 ♂♂, Bali, 1912.

168. *Precis orithya orthosia* (Godt.).

*Vanessa orthosia* Godart, *Encyclop. Méthod.* vol. ix. suppl. p. 821 (1823) (Amboina).

10 ♂♂, 4 ♀♀, Mannsela, Central Ceram, 650 metres, 1912.

169. *Precis almana javana* (Feld.).

*Junonia asteriae* var. *javana* Felder, *Verhand. zool. botan. Gesells. Wien*, vol. xii. p. 487. No. 136 (1862) (Java).

4 ♂♂, 3 ♀♀, Buleleng, North Bali, January—April 1911; 2 ♂♂, Danau Bratan, Bali, 2500 ft., January 1911; 9 ♂♂, 4 ♀♀, Bali, 1912.

170. *Pyrameis dejeani sambaluna* Fruhst.

*Pyrameis dejeani sambaluna* Fruhstorfer, *Iris*, vol. xi. p. 150 (1898) (Lombok).

The Bali form of *dejeani* is certainly identical with Lombok specimens; the differences from Java examples are very slight, but appear to be constant.

1 ♂, Kintamani, Bali, 4000 ft., February—March 1911; 3 ♂♂, 1 ♀, Danau Bratan, Bali, 2500 ft., January 1911.

171. *Symbrenthia hypselis optatus* Fruhst.

*Symbrenthia hypselis optatus* Fruhstorfer, *Seitz Grossschm. Erde*, vol. ix. p. 533 (1912) (Bali).

1 ♂, 1 ♀, Kintamani, Bali, 4000 ft., February—March 1911; 2 ♂♂, Bali, 1912.

172. *Symbrenthia hippoclus hippoclus* (Cram.).

*Papilio hippoclus* Cramer, *Pap. Exot.* vol. iii. pt. xix. p. 46. t. 220. ff. C. D. (1779) (Amboina).

3 ♂♂, 1 ♀, Manusela, Central Ceram, 650 metres, 1912.

173. *Symbrenthia hippoclus balinus* Fruhst.

*Symbrenthia hippoclus balinus* Fruhstorfer, *Seitz Grossschm. Erde*, vol. ix. p. 531 (1912) (Bali).

The wet-season form has narrow fulvous bands on hindwing, and the dry-season form very broad, but there is one narrow banded ♂ among the Danau Bratan January specimens. ♀ is white.

14 ♂♂, 2 ♀♀, Danau Bratan, Bali, 2500 ft., January 1911 (1 ♂ wet-season coloration) ; 1 ♂, Bali, 1912 (wet-season form).

174. *Mynes doubledaii doubledaii* Wall.

*Mynes doubledaii* Wallace, *Trans. Entom. Soc. Lond.* 1869. p. 79. No. 3 (Ceram).

1 ♂, Manusela, Central Ceram, 650 metres, 1912 ; 1 ♀ Ceram.

Y oma *sabina* (Cram.).

*Papilio sabina* Cramer, *Pap. Exot.* vol. iv. pt. xxv. p. 1. t. 289. ff. A. B. C. D. (1780) (Amboina).

2 ♀♀, Waihai, North Ceram.

176. *Hypolimnias antilope antilope* (Cram.).

*Papilio antilope* Cramer, *Pap. Exot.* vol. ii. pt. xvi. p. 132. t. 183. ff. E. F. (1777) (Amboina).

5 ♂♂, 1 ♀, Manusela, Central Ceram, 650 metres, 1912.

177. *Hypolimnias alimena alimena* (Linn.).

*Papilio alimena* Linnaeus, *Mus. Ludov. Ultric.* p. 291 (1764) (Amboina).

4 ♂♂, 1 ♀, Manusela, Central Ceram, 650 metres, 1912 ; 1 ♂, 1 ♀, Waihai, North Ceram.

178. *Hypolimnias misippus* (Linn.).

*Papilio misippus* Linnaeus, *Mus. Ludov. Ultric.* p. 264 (1764) (In Indiis).

1 ♂, Gitgit, Bali, 1500—2000 ft.

179. *Hypolimnias bolina* (Linn.).

*Papilio bolina* Linnaeus, *Mus. Ludov. Ultric.* p. 295 (1764) (In Indiis).

This insect, with its gigantic range from Socotra to the farthest Pacific Islands, is so extremely variable and inconstant that I do not venture to separate as yet the various subspecies. It is the ♀♀ which are so extremely variable ; the number of ♂ forms is not large. Herr Stresemann has collected on Ceram and Burn two very different forms, a small one whose ♂♂ have white ocelli edged with blue (violet), true *bolina* Linn., and the ♀♀ with broad white bands and white centres to hindwings = *auge* Cram. ; then a very large form with violet ocelli in the ♂♂ broadly surrounded with deep blue = *lisanassa* Cram., and the ♀♀ as

large as the largest *II. pandarus* ♀♀ with no white bands or white on hindwing = *manilia* Cram. Of these there are—

8 ♂♂ *bolina*, 9 ♂♂ *lisianassa*, 2 ♀♀ *auge*, and 2 ♀♀ *manilia*, Manusela, Central Ceram, 650 metres, 1912; 2 ♂♂ *bolina* and 1 ♂ *lisianassa*, Wahi, North Ceram; 3 ♂♂ *bolina*, 1 ♂ *lisianassa*, and 2 ♀♀ *auge*, Mgesawain, Central Buru, 800 metres; 4 ♂♂ *bolina* and 2 ♀♀ *auge*, Bara, N.W. Buru; 1 ♂ *lisianassa*?, 2 ♂♂ *bolina*, Bali, 1912; 1 ♀ *auge*, Buleleng, North Bali, January—April 1911; 1 ♀ intermediate between *euryanthe* Frhst. and *kezia* Butl., Buleleng, North Bali, January—April 1911.

#### 180. *Hypolimnias pandarus pandarus* (Linn.).

*Papilio pandarus* Linnaeus, *Mus. Ludovic. Ulric.* p. 198 (1764) (Amboina).

“Rather abundant in shady places in open country; often about midday they enter the cool houses, or settle on the clothes of human beings on the side away from the sun. The odour of sweat appears to attract this species, and often when on the march one is pursued and surrounded for considerable intervals of time by these insects.”—E. S.

22 ♂♂, 6 ♀♀, Manusela, Central Ceram, 650 metres, 1912.

#### 181. *Hypolimnias pandarus pandora* (Wall.).

*Diadema pandora* Wallace, *Trans. Entom. Soc. Lond.* 1869, p. 281, No. 6 (Buru).

7 ♂♂, Mgesawain, Central Buru, 800 metres; 1 ♂, Bara, N.W. Buru; 1 ♂, Buru.

#### 182. *Doleschallia melana sinis* (Gr. Smith).

*Doleschallia sinis* Grose Smith, *Rhopalocera Erotica*, vol. ii. *Doleschallia*, p. 2, pl. 1. ff. 2, 3 (1893) (Ceram).

3 ♀♀, Manusela, Central Ceram, 650 metres, 1912.

#### 183. *Cyrestis paulinus* Feld.

*Cyrestis paulinus* Felder, *Wien. Entom. Monats.* vol. iv. p. 247, No. xev (1860) (Moluccas).

2 ♂♂, Manusela, Central Ceram, 650 metres, 1912; 1 ♂, 4 ♀♀, Wahi, North Ceram; 1 ♂, 2 ♀♀, Sunkaradja, N.W. Ceram.

#### 184. *Cyrestis telamon telamon* (Linn.).

*Papilio telamon* Linnaeus, *Mus. Ludovic. Ulric.* p. 316 (1764) (Amboina).

6 ♂♂, Manusela, Central Ceram, 650 metres, 1912; 1 ♂, Wahi, N. Ceram.

“Mostly in open places in the Central Mountain Range, but occasionally also on the coast.”—E. S.

#### 185. *Cyrestis lutea doliones* Frhst.

*Cyrestis lutea doliones* Fruhstorfer, *Seitz Grossschm. Erde*, vol. ix. p. 585 (1912) (Bali).

10 ♂♂, Danau Bratan, Bali, 2500 ft., January 1911; 1 ♂, Gunung Bratan, Bali, 4000—6500 ft., January—February 1911; 1 ♂, Buleleng, North Bali, January—April 1911.

186. *Cyrestis thyonneus thyonneus* (Cram.).

*Papilio thyonneus* Cramer, *Pap. Exot.* vol. iii. pt. xix. p. 46. t. 220. ff. E. F. (1779) (Amboina).

1 ♂, 1 ♀, Mannsela, Central Ceram, 650 metres, 1912; 1 ♂, 1 ♀, Wahai, North Ceram.

187. *Cyrestis thyonneus buruanus* Mart.

*Cyrestis thyonneus buruanus* Martin, *Iris*, vol. xvi. p. 121. no. 22a (1903) (Buru).

1 ♂, Bara, North-west Buru.

188. *Cyrestis acilia misolensis* Mart.

*Cyrestis acilia misolensis* Martin, *Iris*, vol. xvi. p. 131. no. 27a (1903) (Misol).

1 ♀, Misol.

189. *Acca venilia venilia* (Linn.).

*Papilio venilia* Linnaeus, *Mus. Ludovic. Ulric.* p. 290 (1764) (Amboina).

7 ♂♂, 2 ♀♀, Mannsela, Central Ceram, 650 metres, 1912; 3 ♀♀, Wahai, North Ceram; 1 ♀, Kanike, North Ceram, 600 metres, 1912; 1 ♂, Sukaradja, North-west Ceram.

190. *Acca venilia mysolensis* subsp. nov.

♂. Above. *Forewing* differs from all other forms of *venilia* in the complete absence of any blue edging to white median band by the large white elongated patch below vein 1, in the presence of a few dots of a second submarginal row of white spots, in the absence of the small white cellular and postcellular spots, and in the reduction to four spots and one dot of the normal submarginal row which in *ven. venilia* consists of eight spots. *Hindwing* has no submarginal spots and no blue edging to white band. Below it differs in the complete two rows of submarginal pale spots on both wings, in the absence of the two postcellular spots and the very large cellular patches on forewing.

1 ♂, Misol.

191. *Neptis satina damarete* Fruhst.

*Neptis satina damarete* Fruhstorfer, *Ent. Zeit. Stett.* vol. 69. p. 357 (1908) (German New Guinea).

1 ♀, Misol.

192. *Neptis amphion amphion* (Linn.).

*Papilio amphion* Linnaeus, *Syst. Nat.* ed. x. vol. i. p. 486. No. 177 (1758) (Amboina).

8 ♂♂, Mannsela, Central Ceram, 650 metres, 1912; 2 ♂♂, Kanike, North Ceram, 600 metres, 1912; 2 ♂♂, Wahai, North Ceram.

193. *Neptis hylas satellitica* Fruhst.

*Neptis hylas satellitica* Fruhstorfer, *Seitz Grossschm. Erde*, vol. ix. p. 603 (1912) (Bali).

1 ♂, Buleleng, North Bali, January—April 1911; 1 ♂, 2 ♀♀, Danan Bratan, North Bali, 2500 ft., January 1911.



194. *Neptis columella bataviana* (Moore).

*Andrapana bataviana* Moore, *Lepid. Ind.* vol. iii. p. 225 (1898) (Java).

5 ♂♂, 5 ♀♀, Buleleng, North Bali, January—April 1911; 1 ♂, 4 ♀♀, Danan Bratan, 2500 ft., North Bali, January 1911; 1 ♂, Kintamani, Bali, 4000 ft., February—March 1911; 3 ♂♂, 5 ♀♀, Bali, 1912.

195. *Neptis vikasi fuscescens* subsp. nov.

♂. Differs from *v. vikasi* in the paler bands being much obscured (more so than in any other form).

1 ♂, Bali, 1912.

196. *Pantoporia perius perinus* (Fruhst.).

*Athyma perius perinus* Fruhstorfer, *Berl. Entom. Zeitsch.* vol. 48. p. 95 (1903) (Java).

1 ♂, Bali, 1912.

197. *Pantoporia nefte nefte* (Cram.).

*Papilio nefte* Cramer, *Pap. Ecot.* vol. iii. pt. xxii. p. 111. t. 256 ff. E. F. (1779) (Java).

1 ♂, Bali, 1912.

198. *Pantoporia eulimene eulimene* (Godt.).

*Nymphalis eulimene* Godart, *Encyclop. Méthod. Hist. Nat. Entom.* vol. ix. p. 429. No. 250 (1819—1824?) (Moluccas?).

1 ♂, Waihai, North Ceram.

199. *Parthenos sylvia brunnea* Stålgr.

*Parthenos sylvia* var. *brunnea* Staudinger, *Ecot. Tuff.* vol. i. p. 141 (1888) (Amboina).

11 ♂♂, 1 ♀, Manusela, Central Ceram, 650 metres, 1912; 1 ♂, Kanike, North Ceram, 600 metres, 1912.

"In open spots, particularly in river valleys of the coast region and Central Mountain Range. A very bold flier."—E. S.

200. *Parthenos tigrina mysolica* subsp. nov.

♂. Differs from all the other forms of *tigrina* in the very bright foxy red of the basal third of wings, the very large pure white semivitreous patches of the forewing, and the intense uniform black outer third of fore- and outer two-thirds of hindwing.

3 ♂♂, Misol.

201. *Tanaëcia palguna balina* Fruhst.

*Tanaëcia palguna balina* Fruhstorfer, *Intern. Entom. Zeitsch. Guben*, vol. ii. p. 238 (1908) (Bali).

1 ♂, 1 ♀, Buleleng, North Bali, January—April 1911.

202. **Euthalia aeropus aeropus** (Linn.).

*Papilio aeropus* Linnaeus, *Mus. Ludov. Ultric.* p. 256 (1764) (Amboina).

14 ♂♂, 4 ♀♀, Manusela, Central Ceram, 650 metres, 1912; 3 ♂♂, Waihai, North Ceram; 2 ♂♂, Kanike, North Ceram, 600 metres, 1912; 2 ♂♂, 1 ♀, Sukaradja, North-west Ceram.

203. **Dichorragia ninus ninus** (Feld.).

*Adolius ninus* Felder, *Wien. Entom. Monat.* vol. iii. p. 185, No. 9 (1859) (Amboina).

6 ♂♂, 2 ♀♀, Manusela, Central Ceram, 650 metres, 1912; 1 ♂, Kanike, North Ceram, 600 metres, 1912; 1 ♂, Ceram.

"In open country not common."—E. S.

204. **Apaturina erminea** (Cram.).

*Papilio erminea* Cramer, *Pap. Erot.* vol. iii. pt. xvii. p. 5. t. 196. ff. A. B. (1779) (Amboina).

1 ♂, Waihai, North Ceram; 1 ♂, Sukaradja, North-west Ceram.

205. **Prothoe australis australis** (Guér.).

*Nymphalis australis* Guérin, *Voy. Voy.* t. 14 bis. f. 14 (1829) (Waigiou).

1 ♂, Misol.

206. **Eulepis athamas attalus** (Feld.).

*Charaxes attalus* Felder, *Reise Novara, Lep.* vol. iii. p. 438, No. 714 (1867) (Java).

1 ♂, Buleleng, North Bali, January—April 1911.

207. **Eulepis pyrrhus pyrrhus** (Linn.).

*Papilio pyrrhus* Linnaeus, *Syst. Nat.* ed. x. vol. i. p. 462, No. 24 (1758) (In Indiis).

"In open country, rare."—E. S.

8 ♂♂, 1 ♀, Manusela, Central Ceram, 650 metres, 1912.

208. **Eulepis pyrrhus buruanus** Rothschild & Jord.

*Eulepis pyrrhus buruanus* Rothschild & Jordan, *Nor. Zool.* v. p. 582, No. 5. ff. 26 (1898) (Buru).

1 ♀, Bara, North-west Burn.

209. **Charaxes eurialus** (Cram.).

*Papilio eurialus* Cramer, *Pap. Erot.* vol. i. pt. vii. p. 116. t. 74. ff. A. B. (1775) (Amboina).

1 ♂, f. *eurialus*, Manusela, Central Ceram, 650 metres, 1912.

**Acraeinae**210. **Acraea moluccana buruensis** Rothschild.

*Acraea buruensis* Rothschild, *Nor. Zool.* vol. vi. p. 68 (1899) (Buru).

1 ♂, Mgesawain, Central Buru, 800 metres.

211. *Acraea vesta vestoides* (Moore).

*Pareba vestoides* Moore, *Lepidoptera Indica*, vol. v. p. 35 (1901) (West Java).

7 ♂♂, 2 ♀♀, Danau Bratan, Bali, 2500 ft., January 1911.

**LEMONIIDAE****Libytheinae**212. *Libythea myrrha myrrha* Godt.

*Libythea myrrha* Godart, *Encycl. Méthod. Hist. Nat. Entom.* vol. ix. No. 4 (1819) (Java).

1 ♂, Kintamani, Bali, 4000 ft., February—March 1911.

**Nemeobiinae**213. *Dicallaneura decorata sangha* Fruhst.

*Dicallaneura decorata sangha* Fruhstorfer, *Seitz Grossschm. Erde*, vol. ix. p. 787 (1914) (Misol).

1 ♂, 1 ♀, Misol.

**LYCAENIDAE**214. *Gerydus leos* (Guér.).

*Simaethus leos* Guérin, *Voy. Coquille*, t. 18. f. 8. (1829) (Buru).

This species in both sexes is very variable in the amount of white on the forewing; some also have the nervures of hindwing picked out in dirty white.

13 ♂♂, 16 ♀♀, Mausela, Central Ceram, 650 metres, 1912; 3 ♀♀, Waihai, North Ceram.

215. *Gerydus symethus* (Cram.).

*Papilio symethus* Cramer, *Pap. Erot.* vol. ii. pt. 13. p. 84. t. 149. ff. B. C. (1777) (Indes Occidentales!).

1 ♂, Buleleng, North Bali, January—April 1911; 1 ♀, Bali, 1912.

216. *Gerydus stygianus* Butl.

*Gerydus stygianus* Butler, *Ann. Mag. N. H.* (5) xiii. p. 194. No. 30 (1884) (Ternate).

1 ♀, Mausela, Central Ceram, 650 metres, 1912.

217. *Lycaenopsis akasa* (Horsf.).

*Polyommatus akasa* Horsfield, *Cat. Lepid. E.I.C.* p. 67. t. 1. ff. 1, 1a (1828) (Java).

3 ♀♀, Gunung Bratan, Bali, 4000—6500 ft., January—February 1911; 1 ♀, Danau Bratan, Bali, 2500 ft., January 1911.

218. *Lycaenopsis coalita* (Nicév.).

*Cyaniris coalita* Nicéville, *Journ. Bombay N. H. Soc.* vi. p. 363. No. 14. pl. F. figs. 12 ♂, 13 ♀ (1891) (Java).

1 ♂, Gunung Bratan, Bali, 4000—6500 ft., January—February 1911.

219. *Lycaenopsis subcoalita* sp. nov.

Very close to *coalita* but smaller, and above much paler and more leaden; below whiter and the pattern much obliterated.

Length of forewing, *coalita* ♂, 19 mm.; *subcoalita* ♂ ♀, 17 mm.

Expanse, *coalita* ♂, 42 mm.; *subcoalita* ♂, 37 mm., ♀ 38 mm.

3 ♂♂, Danau Bratan, Bali, 2500 ft., January 1911; 1 ♀, Gitgit, Bali, 1500—2000 ft.

220. *Lycaenopsis nedda* (Gr. Sm.).

*Cyniris nedda* Grose Smith, *Nov. Zool.* i. p. 572. No. 197 (1894) (Humboldt Bay, Batjan, Amboina, etc.).

10 ♂♂, 1 ♀, Manusela, Central Ceram, 650 metres, 1912.

221. *Lycaenopsis coalitoides* sp. nov.

Resembles *subcoalita* above in its more leaden blue colour; below it differs from *coalita* in the postdiscal line of coalescent lunules on both wings being farther away from the submarginal spots, and on the hindwing in the antemedian band of spots being joined into a complete line and there being two instead of one median spot above vein 5.

Length of forewing: 14–17 mm. Expanse 31–38 mm.

5 ♂♂, Manusela, Central Ceram, 650 metres, 1912.

222. *Lycaenopsis? cupidoides* sp. nov.

♂. Above. *Forewing* pearl-blue, outer quarter dull brown. *Hindwing* costal one-third brown, rest pearl-blue, marginal line black-brown. Below brownish grey suffused with dirty white; forewing with two antemedian black-brown spots below median vein, a brownish cellular stigma, a row of four dark brown postmedian spots below vein 5, and a double subterminal row of brownish spots; hindwing with three dark brown subcostal spots, two similar antemedian spots below median vein, a row of five similar postmedian spots below vein 6; cellular stigma and double row of subterminal spots brownish.

Length of forewing: 12 mm. Expanse: 27 mm.

1 ♂, Manusela, Central Ceram, 650 metres, 1912.

223. *Pithecopa hylax* (Fab.).

*Papilio hylax* Fabricius, *System. Entom.* p. 526. No. 351 (1775) (India Orient.).

3 ♂♂, Danau Bratan, Bali, 2500 ft., January 1911.

224. *Eupsychellus dionisius* (Boisd.).

*Lycaena dionisius* Boissduval, *Voy. Astrolabe, Lepidop.* p. 82. No. 11 (1832) (New Guinea).

10 ♂♂, 7 ♀♀, Manusela, Central Ceram, 650 metres, 1912; 3 ♂♂, 3 ♀♀, Wahai, North Ceram; 2 ♂♂, Misol.

225. *Castalius angustior* Staud.

*Lycaena (Castalius) roxus* God. var. *angustior* Staudinger, *Iris*, ii. p. 95 (1889) (Palawan).

1 ♀, Bali, 1912.

226. *Jamides astraptes* (Feld.).

*Lycæna astraptes* Felder, *Sitzb. Akad. Wiss. Wien Math. Nat. Cl.* xl. p. 455. No. 31 (1860) (Amboina).

1 ♂, 1 ♀, Manusela, Central Ceram, 650 metres, 1912.

227. *Catachrysops strabo* (Fabr.).

*Papilio strabo* Fabricius, *Entom. System.* vol. iii. pt. i. p. 287. No. 101 (1793) (India Orient.).

1 ♂, Waihai, North Ceram.

228. *Catachrysops lithargyria* (Moore).

*Lampides lithargyria* Moore, *Ann. Mag. Nat. Hist.* ser. 4, vol. 20. p. 340 (1877) (Ceylon).

This species has been united with *C. strabo* (Fabr.) by some later authors, but it is quite erroneous, as *lithargyria* is **always** distinguishable by the white mealy suffusion of the upperside, and on the underside by the whitish ground-colour and the much darker and stronger markings which stand out in bold relief; whereas the markings in *strabo* are scarcely darker than the ground-colour and not very apparent at first sight.

3 ♂♂, Manusela, Central Ceram, 650 metres, 1912.

229. *Euchrysops cnejus* (Fabr.).

*Hesperia cnejus* Fabricius, *Entom. System. Supplem.* p. 430. Nos. 100. 101 (1798) (India Orient.).

1 ♂, 1 ♀, Manusela, Central Ceram, 650 metres, 1912.

230. *Euchrysops suffusus* sp. nov.

♂. Near *luxonica* Rüb.

Above brown suffused with pale violet-blue decreasing in density distally; a black spot at base of tail and a smaller one at torus. Below differs from *cnejus* (Fabr.) in the whiter ground-colour and less distinct and reduced markings.

Length of forewing: 14 mm. Expanse: 31 mm.

1 ♂, Bali, 1912.

231. *Lampides masu* Doh.

*Lampides masu* Doherty, *Journ. As. Soc. Beng.* lx. 2. p. 184. No. 86. pl. 2. fig. 11 (1891) (Sumba-Sumbawa).

21 ♂♂, 6 ♀♀, Manusela, Central Ceram, 650 metres, 1912; 2 ♂♂, Waihai, North Ceram; 1 ♀, Kaike, North Ceram, 600 metres, 1912.

232. *Lampides stresemanni* sp. nov.

♂. Differs at first sight from *masu* by the fore- and hindwings being of a different colour. *Above*, forewing bright blue metallic, hindwing silvery blue washed slightly with darker blue. *Below*, differs from *masu* on forewing in having the second postdiscal white line, **not** the first, and the antemedian **instead of** the median complete. On hindwing the white lines on basal two-thirds of wing narrower and less distinct, the black triangles edged with white more acute and only one yellow patch above tail.

♀. *Above* more lavender-grey-blue, the outer brown band much broader, occupying outer one-third of forewing, the bands on hindwing less distinct, and all above vein 6 in outer two-thirds of hindwing brown. *Below* differs from *masu* ♀ as does ♂, but almost all yellow is absent.

1 ♂, 1 ♀, Wahai, North Ceram.

### 233. *Lampides tertius* sp. nov.

♀. *Above* pale lavender-blue, not bluish silver as in ♀ *masu*; black-brown border of forewing narrower and of even width from apex to above tornus; on hindwing submarginal band complete from costa to black ocellus above tail **not** broken into spots, postdiscal line in form of a slightly crenulate unbroken band, **not** a line of coalescent lunulate marks. *Below* the ground-colour is purer grey and on forewing there are two curved oblique median white bands from vein 1 to middle of cell and two similar ones beyond middle from vein 3 to costa; on hindwing the metallic spots at base of tail and at tornus are wanting, and the large orange patch is replaced by a yellow half-moon above black spot at base of tail.

Length of forewing: 19 mm. Expanse: 42 mm.

1 ♀, Mannsela, Central Ceram, 650 metres, 1912.

### 234. *Lampides pseudosias* sp. nov.

Similar to *osias* Röber, but much deeper blue above. Below it is dark uniform mouse-grey, and the white bands much more distinct.

1 ♂, Misol.

### 235. *Lampides butleri* sp. nov.

♂. Allied to *evanescens* Bntl., but rounder winged.

*Forewing* dark, margin narrower. *Hindwing* without marginal spots. Below the white bands are much broader and very distinct.

♀. Above beautiful opalescent blue, and below the orange zone is very large.

1 ♂, 2 ♀ ♀, Mannsela, Central Ceram, 650 metres, 1912.

### 236. *Polyommatus boeticus* (Linn.).

*Papilio boeticus* Linnaeus, *Syst. Nat.* ed. xii. vol. 1. pt. 2. p. 789. No. 226 (1767) (Barbaria).

1 ♂, Gitgit, Bali, 1900—2000 ft.; 1 ♀, Bali, 1912.

### 237. *Pepliphorus hylas* (Cram.) = *euchylas* (Hübner).

*Papilio hylas* Cramer, *Pap. Exot.* vol. iv. pt. xxxi. p. 142. t. 363. ff. E. F. (1781) (Amboina).

*Pepliphorus euchylas* Hubner, *Verzeich. bek. Schmett.* p. 71. n. 698 (1816) (nom. nov. *hylas* praeocc.).

One ♂ has the brilliant blue replaced by a leaden lavender hue; this I name ab. **plumbeus** ab. nov.

9 ♂♂, 1 ♀, 1 ♂ ab. *plumbeus*, Manusela, Central Ceram, 650 metres, 1912; 1 ♂, Sukaradja, North-west Ceram.

### 238. *Pepliphorus paralectus* (Gr. Smith).

*Lampides paralectus* Grose Smith, *Rhopal. Exot.* vol. ii. *Oriental Lycaenidae*, p. 7. pl. xi. f. 17 ♀ (1897), vol. iii. *Oriental Lycaenidae*, pl. xii. ff. 1. 2. ♂ (1897) (New Ireland).

1 ♂, Misol.

239. *Pepliphorus epilectus* (Gr. Smith).

*Lampides epilectus* Grose Smith, *Ann. Mag. N. H.* (6) xix, p. 179 (1897); *Rhopal. Escot.* vol. iii. *Oriental Lycaenidae*, p. 9, pl. xii, ff. 4, 5, 6 (1897) (Fergusson Island).

2 ♂♂, 1 ♀, Misol.

240. *Nacaduba berenice major* subsp. nov.

♂. Differs from *b. berenice* in being much larger and deeper purple above. Below all the white lines and spots are broader and more conspicuous.

1 ♂, Wahai, North Ceram.

241. *Nacaduba gerydomaculata* sp. nov.

♂. At once distinguished from all other *Nacaduba* by the bands and spots below resembling those of a *Gerydus*. Above, uniform deep purple, edged narrowly with black, and the edge of fringe brownish. Below wood-brown; *forewing* a deeper coloured quadrate spot edged with whitish in cell and a similar one at end of cell, a postmedian band of coalescent quadrate spots edged with whitish, a subterminal band of irregular spots coalescent above vein 3; *hindwing* with a sub-basal, an interrupted median, and an irregular postmedian band of somewhat quadrate coalescent spots edged with whitish, an irregular sinuate postdiscal band, a large black ocellus at base of tail ringed with orange, a white marginal line from tornus to vein 2.

Length of forewing: 16 mm. Expanse: 36 mm.

1 ♂, Mannsela, Central Ceram, 650 metres, 1912.

242. *Nacaduba dion* (Godt.).

*Polyommatus dion* Godart, *Encyclop. Méthod. Hist. Nat. Entom.* vol. ix. p. 679. No. 191 (1819) (Australia).

1 ♂, Mannsela, Central Ceram, 650 metres, 1912.

243. *Nacaduba nora* (Feld.).

*Lycaena nora* Felder, *Sitzungsb. Akad. Wissensch. Wien Math. Nat. Cl.* xl. p. 458. No. 37 (1860) (Amboina).

8 ♂♂, 4 ♀♀, Manusela, Central Ceram, 650 metres, 1912.

244. *Nacaduba felderi* sp. nov.

♂. Differs from *nora* Feld. in the underside being paler and more uniform grey and in the white lines being wider and more pronounced, while the interspaces between the white lines are uniform with rest of the ground-colour, **not** darker.

1 ♂, Mannsela, Central Ceram, 650 metres, 1912.

245. *Philiris ilias* (Feld.).

*Thecla ilias* Felder, *Sitzungsb. Akad. Wissensch. Wien Math. Nat. Cl.* xl. p. 454. No. 22 (1860) (Amboina).

1 ♂, 1 ♀, Mannsela, Central Ceram, 650 metres, 1912.

246. *Waigeum makrikii* Ribbe.

*Waigeum makrikii* Ribbe, *Iris*, xiii. p. 336, pl. 6. fig. 4 (1900) (Ceram).

2 ♀ ♀, Wahai, North Ceram.

247. *Thysonotis cyanea* (Cram.).

*Papilio cyanea* Cramer, *Pap. Exot.* vol. i. pt. vii. p. 120. t. 76. ff. C. D. (1775) (Indes Occident ! !).

The ♀ is figured erroneously by Grose Smith as the ♀ of *smaragdus* B. Baker & Druce.

1 ♂, 3 ♀ ♀, Manusela, Central Ceram, 650 metres, 1912.

248. *Thysonotis karpaia* Druce & B. Baker.

*Thysonotis danis* var. *karpaia* Druce and Bethune Baker, *Proc. Zool. Soc. Lond.* 1893, p. 540. pl. xlv. ff. 3. 4.

I have treated this as a species, and not as a subspecies of *danis*, because of the two collected on Ceram by Wallace, which are true *danis*, and no two subspecies can occur together. I have also one ♂ true *danis* from Ceram.

4 ♂ ♂, 2 ♀ ♀, Manusela, Central Ceram, 650 metres, 1912; 7 ♂ ♂, 8 ♀ ♀, Wahai, North Ceram. (In high virgin forest.—E. S.)

249. *Thysonotis danis* (Cram.).

*Papilio danis* Cramer, *Pap. Exot.* vol. i. pt. vi. p. 111. t. 70 ff. E. F. (1775) (Indes Occident. ! !).

The ♂ has the blue above replaced by leaden lilac and the green below by leaden grey. I propose for this the name ab. *plumbeus* ab. nov.

1 ♂, 3 ♀ ♀, Manusela, Central Ceram, 650 metres, 1912; 1 ♀, Wahai, North Ceram.

250. *Thysonotis apollonius* (Feld.).

*Lycarna apollonius* Felder, *Reise Novara, Lepid.* vol. ii. p. 265. No. 317. t. 33. f. 3 (1865) (New Guinea).

One ♂ has the blue above replaced by leaden lavender and the green below by leaden grey. This I call ab. *plumbeus* ab. nov.

13 ♂ ♂, 5 ♀ ♀, 1 ♂ ab. *plumbeus*, Misol.

251. *Thysonotis wallacei* (Feld.).

*Lycarna wallacei* Felder, *Reise Novara, Lepid.* vol. ii. p. 265. No. 318. t. 33. ff. 8, 9, 10 (1865) (Waigiou).

1 ♂, Misol.

252. *Thysonotis hymetus* Feld.

*Thysonotis hymetus* Felder, *Sitzungsab. Akad. Wissensch. Wien Math. Nat. Cl.* xl. p. 459. No. 44 (1869) (Amboina).

1 ♂, Manusela, Central Ceram, 650 metres, 1912.

253. *Thysonotis albomarginata* sp. nov.

♀. *Abore*. Forewing sooty grey-brown, darker in outer third, a large irregular white patch occupies the disc of wing narrowest at inner margin and spreading upwards and outwards obliquely. Hindwing, base brown-grey, basal five-twelfths



white, rest brownish sooty black. A narrow white margin round both pairs of wings.—*Below*. Forewing white, a broad sooty-black band from base round apex to vein 3 enclosing a narrow metallic-blue line and broadly bordered with white. Hindwing, outer half black with five large blue rings and a broad white border, inner half white, a wide basal black band with blue streak in it.

Length of forewing : 18.5 mm. Expanse : 41 mm.

1 ♀, Misol.

254. **Hypolycaena sipylus** Feld.

*Hypolycaena sipylus* Felder, *Sitzungsb. Akad. Wissensch. Wien Math. Nat. Cl.* xl. p. 451. No. 12 (1860) (Amboina).

1 ♂, 1 ♀, Manusela, Central Ceram, 650 metres, 1912; 1 ♀, Waihai, North Ceram.

255. **Miletus polycletus** (Linn.).

*Papilio polycletus* Linnaeus, *Mus. Ludov. Ulric.* p. 336 (1764) (Amboina).

30 ♂♂, 5 ♀♀, Manusela, Central Ceram, 650 metres, 1912; 1 ♂, Waihai, North Ceram.

256. **Miletus anacletus** (Feld.).

*Thecla anacletus* Felder, *Sitzungsb. Akad. Wissensch. Wien Math. Nat. Cl.* xl. p. 454. No. 25 (1860) (Amboina).

1 ♀, Kanike, North Ceram, 600 metres, 1912.

257. **Amblypodia annetta anna** Staud.

*Amblypodia annetta* var. *anna* Staudinger, *Exot. Tugf.* vol. i. p. 282 (1888) (Amboina, Saparua).

The ♀ has the underside paler and more rufous.

5 ♂♂, Manusela, Central Ceram, 650 metres, 1912; 1 ♀, Waihai, North Ceram.

258. **Arhopala admete** (Hew.).

*Amblypodia admete* Hewitson, *Cat. Lycan. Brit. Mus.* p. 7. No. 24. t. 3. ff. 18, 19 (1863) (Ceram).

1 ♀, Kanike, North Ceram, 600 metres, 1912.

259. **Arhopala pseudocentaurus** (Doubt.).

*Amblypodia pseudocentaurus* Doubleday, *List Lepid. Ins. Brit. Mus.* ii. p. 24 (1847) (Java).

1 ♀, Gitgit, Bali, 1500—2000 ft.

260. **Arhopala hercules herculina** Staud.

*Arhopala hercules* var. *herculina* Staudinger, *Exot. Tugf.* vol. i. p. 280 (1888) (Waigeu).

6 ♂♂, 2 ♀♀, Misol.

261. **Arhopala leo** Druce.

*Arhopala leo* Druce, *Ann. Mag. Nat. Hist.* ser. 6. vol. 13. p. 254 (1894) (Humboldt Bay).

I cannot agree with Mr. Bethune Baker that this is a form of *hercules*, as I have it from Misol together with *herculina*. It is much greener below and always distinguishable by the narrower bands.

1 ♂, Misol.

262. *Arhopala araxes* Feld.*Arhopala araxes* Felder, *Reise Novara, Lepid.* vol. ii. p. 224. t. 29. ff. 3, 4, 5 (1865) (Celebes).

1 ♂, Danau Bratan, Bali, 2500 ft., January 1911.

263. *Arhopala nobilis* (Feld.).*Amblypodia nobilis* Felder, *Sitzungsb. Akad. Wissensch. Wien Math. Nat. Cl.* xl. p. 453. No. 18 (1860) (Amboina).

1 ♂, Manusela, Central Ceram, 650 metres, 1912.

264. *Arhopala helius anthelius* (Staud.).*Amblypodia helius* var. *anthelius* Standinger, *Erot. Tuff.* vol. i. p. 281 (1888) (Waigiu).

9 ♂♂, 1 ♀, Misol.

265. *Arhopala amytis* (Hew.).*Amblypodia amytis* Hewitson, *Cat. Lycaen. Brit. Mus.* p. 4. No. 16. pl. ii. ff. 7-9, ♀ (1862) (Aru).

1 ♀, Misol.

266. *Arhopala axiothea* (Hew.).*Amblypodia axiothea* Hewitson, *Illust. Diurn. Lepid. Lycaen.* p. 7. No. 21. pl. ii. ff. 10, 11. ♂ (1865) (New Guinea).

1 ♂, Misol.

## GRYPOCERA

## HESPERIIDAE

## Hesperiinae

267. *Casyapa corvus* (Feld.).*Chaetocneme corvus* Felder, *Sitzungsb. Akad. Wissensch. Wien Math. Nat. Cl.* xl. p. 460. No. 46 (1860) (Amboina).

1 ♂, Manusela, Central Ceram, 650 metres, 1912.

268. *Celaenorrhinus klossi* Rothschild.*Celaenorrhinus klossi* Rothschild, *Lepid. B.O.U. and Woll. Expeds.* p. 37. no. 182 (1915) (Snow Mts.).

1 ♂, Misol.

269. *Celaenorrhinus unipuncta* sp. nov.♂. Similar to *klossi*, but white oblique median band does not reach subcostal nervure and only just reaches vein 1. There is a single white dot above vein 4 in outer area of wing.

1 ♂, Kanike, North Ceram, 600 metres, 1912.

270. *Tagiades neira metanga* Ribbe.*Tagiades neira* Plötz, var. *metanga* Ribbe, *Iris*, ii. p. 265. No. 143. pl. v. f. 8 (1889) (Ceram).

2 ♂♂, 2 ♀♀, Manusela, Central Ceram, 650 metres, 1912.

**271. *Tagiades japetus* (Cram.).**

*Papilio japetus* Cramer, *Pap. Exot.* vol. iv. pt. xxxi. p. 145, t. 365. ff. E. F. (1781) (Amboina).

6 ♂♂, 5 ♀♀, Manusela, Central Ceram, 650 metres, 1912.

**272. *Tagiades bubasa* Swinh.**

*Tagiades bubasa* Swinhoe, *Ann. Mag. N. H.* (7). xiv. p. 418 (1904) (Humboldt Bay, Dutch New Guinea).

2 ♂♂, Misol.

**Ismeninae****273. *Hasora discolor* (Feld.).**

*Goniloba discolor* Felder, *Wiener Entom. Monatschr.* vol. iii. p. 405. No. 59 (1859) (Brazil !).

3 ♂♂, 1 ♀, Manusela, Central Ceram, 650 metres, 1912.

**274. *Hasora doleschalii* (Feld.).**

*Ismene doleschalii* Felder, *Sitzungsb. Akad. Wissensch. Wien Math. Nat. Cl.* xl. p. 460. No. 48 (1860) (Amboina).

9 ♂♂, 2 ♀♀, Manusela, Central Ceram, 650 metres, 1912.

**275. *Hasora amboinensis* Swinh.**

*Hasora amboinensis* Swinhoe, *Ann. Mag. N. H.* (8). iii. p. 91 (1909) (Amboina).

1 ♂, Manusela, Central Ceram, 650 metres, 1912.

**276. *Hasora hurama* (Butl.).**

*Hesperia hurama* Butler, *Trans. Entom. Soc. Lond.* p. 498. No. 2 (1870) (Cape York).

1 ♂, Waihai, North Ceram.

**277. *Hasora celaenus* (Cram.).**

*Papilio celaenus* Cramer, *Pap. Exot.* vol. iv. pt. xxxiii. p. 214, t. 393. ff. A. B. (1782) (Amboina).

1 ♂, Misol.

**Pamphilinae****278. *Erionota thrax* (Linn.).**

*Papilio thrax* Linnaeus, *Syst. Nat.* ed. xii. vol. i. pt. ii. p. 794. No. 260 (1767) (Java).

1 ♂, Bali, 1912.

**279. *Padraona sunias* (Feld.).**

*Pamphila sunias* Felder, *Sitzungsb. Akad. Wissensch. Wien Math. Nat. Cl.* xl. p. 462. No. 54 (1860) (Amboina).

1 ♂, Manusela, Central Ceram, 650 metres, 1912.

**280. *Padraona dara* (Koll.).**

*Hesperia dara* Kollar, *Hügel's Kaschmir*, vol. iv. pt. ii. p. 455 (1848) (Himalaya).

1 ♀, Danau Bratan, Bali, 2500 ft., January 1911.

281. *Padraona subfasciata* sp. nov.

♂ ♀. Similar to *P. fasciata* Rothsch. but smaller, and differs below in the postdiscal line on hindwing being much closer to margin, and consisting of a line of spots, not a zigzag continuous line.

Length of forewing, *subfasciata*, 11 mm.

" " " *fasciata*, 15 mm.

1 ♂, Manusela, Central Ceram, 650 metres, 1912; 1 ♀, Wahai, North Ceram.

282. *Ocybadistes marnas* (Feld.).

*Pamphila marnas* Felder, *Sitzungsb. Akad. Wissensch. Wien Math. Nat. Cl.* xl. p. 462. No. 53 (1860) (Amboina).

2 ♂♂, Manusela, Central Ceram, 650 metres, 1912; 1 ♀, Wahai, North Ceram.

283. *Telicota affinis* Rothsch.

*Telicota affinis* Rothschild, *Lepid. B.O.U. & Woll. Expeds.* p. 40. no. 198 (1915) (Snow Mts.).

1 ♂, 1 ♀, Manusela, Central Ceram, 650 metres, 1912; 1 ♀, Misol.

284. *Chapra brunnea* (Snell.).

*Pamphila brunnea* Snellen, *Tijdschr. Entom.* vol. xix. p. 164. No. 75. t. 7. f. 4 (1876) (Java).

1 ♂, Danau Bratan, Bali, 2500 ft., January 1911.

285. *Notocrypta restricta* (Moore).

*Plesioneura restricta* Moore, *Lepid. Ceyl.* vol. i. p. 178 (1881).

1 ♀, Danau Bratan, Bali, 2500 ft., January 1911.

286. *Udaspes folus* (Cram.).

*Papilio folus* Cramer, *Pap. Erot.* vol. i. pt. vii. p. 118. t. 74. f. F. (1775) (Surinam !).

1 ♀, Gitgit, Bali, 1500—2000 ft.

(To be continued.)

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ON THE GENUS *FREGATA*.

BY THE HON. WALTER ROTHSCILD, F.R.S., PH.D.

IN the *Austral Acian Record*, vol. ii. No. 6, Mr. Mathews gives a synopsis of the genus *Fregata*.

There are several points in this synopsis which need revision. As Mr. Mathews has stated, in the catalogue of birds only two species of the genus are recognised under the names of *F. aquila* and *F. ariel*. It is therefore of great importance to science that Mr. Mathews, by his careful study of the group, was enabled to show that there are a number of other species and several subspecies that have been overlooked. I regret much, however, that Mr. Mathews has fallen into a fundamental error in regard to the species which must bear the name *minor* Gmel. As he quite correctly states, the type of this name is the bird figured on plate 399 of Edwards' *Gleanings*; but he has failed to assign this plate correctly, for by only taking note of the fact that Edwards' bird was of unknown origin, he arbitrarily fixed the type locality as Jamaica. If he had studied the plate and read the description carefully he could not have failed to see that in Edwards' bird the throat and foreneck are white, while in all the West Indian birds it is blackish. There is considerable internal evidence in the text, besides the fact of the white throat, which proves the bird received by Edwards to have come from the eastern half of the Indian Ocean, so I must fix as the typical *Fregata minor* of Gmelin the birds of that area.

A second error of Mr. Mathews is his placing the larger species found on the Galápagos Islands as a subspecies of *F. minor* under the name of *F. minor "magnificens."* This bird does not differ from the West Indian Frigate Bird except that my unique ♀ has the largest beak of any recorded Frigate Bird; my three males do not differ at all from birds killed by Dr. Ernst Hartert in the West Indies. This bird, which appears to occur on both sides of the American continent south of Florida, is quite a distinct species; the ♂ has entirely black wing-coverts and the ♀ a black throat and foreneck.

Mr. Mathews has made two subspecies of *F. ariel* Gould to occur in Australia; as he founds his *F. ariel tannyi* on size alone, and it resolves itself into about 2 mm. difference in the bill and 15 mm. in the wing, this form is untenable.

Below I give a key to the species and subspecies of *Fregata* of which the following is a list:

*F. aquila* Linn., Ascension Island.

*F. andrewsi* Math., Christmas Island.

*F. magnificens* Math., Coasts and Islands of America.

*F. minor minor* Gmelin, Eastern Indian Ocean.

*F. minor alabrensis* Math., Western Indian Ocean.

*F. minor palmerstoni* Gmelin, Laysan, Fanning and other West Pacific Island groups.

*F. minor ridgwayi* Math., Galápagos Islands.

*F. minor nicolli* Math., South Trinidad.

*F. ariel ariel* Gould, Australia.

*F. ariel iredalei* Math., Western Indian Ocean.

## MALES.

1. { Large white patch on sides of abdomen . . . . . 9.  
   { No white patch on sides of abdomen . . . . . 2.
2. { Wings black . . . . . 3.  
   { Wings with brown band . . . . . 4.
3. { Back metallic green . . . . . *F. aquila*.  
   { Back metallic purple . . . . . *F. magnificens*.
4. { Abdomen and vent black . . . . . 5.  
   { Abdomen and vent white . . . . . *F. andreusi*.
5. { Breast black . . . . . 7.  
   { Breast brown . . . . . 6.
6. { Wing band very broad and pale, breast greyish brown . . . *F. minor nicolli*.  
   { Wing band narrower and darker brown, breast dark umber brown . . . *F. minor palmerstoni*.
7. { Wing band pale greyish brown . . . . . *F. minor ridgwayi*.  
   { Wing band very dark brown . . . . . 8.
8. { Smaller, wing 530-550 mm. . . . . *F. minor minor*.  
   { Larger, wing 580-600 mm. . . . . *F. minor aldabrensis*.
9. { Bill larger, 80 mm. . . . . *F. ariel ariel*.  
   { Bill smaller, 68-70 mm. . . . . *F. ariel iredalei*.

## FEMALES.

1. { Entirely dark below . . . . . *F. aquila*.  
   { Breast white . . . . . 2.  
   { With distinct white nuchal band . . . . . 6.
2. { Breast white, abdomen dark . . . . . 3.  
   { Breast and abdomen white . . . . . *F. andreusi*.
3. { Throat and foreneck black . . . . . *F. magnificens*.  
   { Throat and foreneck greyish white . . . . . 4.
4. { Back black-brown . . . . . *F. minor ridgwayi*.  
   { Back paler brown . . . . . 5.  
   { Back metallic . . . . . *F. minor aldabrensis*.
5. { Wing band pale and broad . . . . . *F. minor nicolli*.  
   { Wing band darker and narrower . . . . . *F. minor palmerstoni*.  
   { Wing band very dark . . . . . *F. minor minor*.
6. { Bill larger, 95 mm. . . . . *F. ariel ariel*.  
   { Bill smaller, 80 mm. . . . . *F. ariel iredalei*.

In addition to these I have examined a female with black throat and foreneck and a huge bill from the Gambia, and a male from Cape Verd Islands, in the British Museum, the latter with black wings, but the back is steel black, **not** metallic green or purple. Further material will probably prove these to belong to a new sub-species of *magnificens*.

There is also in the British Museum a ♂ Frigate Bird from the Hume collection, which is labelled as coming from the Malay Peninsula. This specimen is indistinguishable from the Ascension Island males. It is either a stray bird blown out of its course or the label has been erroneously transferred.

Mr. Mathews' contention that *Fregata minor ridgwayi* breeds only on Culpepper and Wenman Island, while *magnificens* occurs only on the other islands, is disproved by Beck's photographs (California Academy), which show both species breeding on Hood Island.

NEW PALAEARCTIC AND EASTERN *NOCTUIDAE* IN THE TRING MUSEUM.\*

By W. WARREN, M.A., F.E.S.

1. *Batracharta albistrigosata* spec. nov.

*Forewing*: grey-brown, thickly sprinkled with coarse black dots and traversed by white interlacing strigae; basal area blackish, its outer edge oblique but diffuse, preceded and followed in cell by dull red-brown patches, the veins through it from base dotted with snow-white, the costa marked with white oblique strigae; subterminal line pale, diffuse, brownish ochreous, lunulate-dentate, the veins before it reddish; terminal area beyond it narrow, blackish fuscous, swollen on each fold; fringe pinkish olive.

*Hindwing*: pale brownish grey, with a diffuse dark terminal line; the costal area white, except at apex; fringe yellowish white.

Underside greyish ochreous; in the forewing suffused with fuscous, leaving the inner margin for two-thirds white below submedian fold; the costa ochreous striated with brownish grey; a round diffuse dark cellspot; hindwing ochreous with a faint brownish flush in parts; a large, round black cellspot.

Face, pectus, and legs black; the tarsi white-dotted; tegulae and patagia dark brown mixed with reddish; dorsum like hindwing; palpi brown with blackish shades, the terminal segment pale ochreous; venter ochreous, tinged with brown on anal half; with a white dot at middle of hinder edge of each segment.

Expanse of wings: 44 mm.

2 ♂♂ from the Khasia Hills, Assam, taken by native collector in May and June 1896.

2. *Batracharta ochreipennis* spec. nov.

*Forewing*: like *irrorata* Hmps., but rather paler and brighter; the dark terminal area preceded by a diffuse pale wavy band as in the preceding species; the upper projection of outer line above median vein more prominent; the white dotting stronger.

*Hindwing*: pale ochreous, with the veins dark and thickened towards termen; the dark cellspot showing through.

Underside ochreous; in the forewing fuscous grey between subcostal vein and submedian fold, below which the inner margin is white throughout; the outer line grey and dentate at costa; termen ochreous, with a line of dark lunules; fringe brown at tips; hindwing pure ochreous; cellspot oval, large and black.

Head, thorax, pectus, and forelegs black; palpi black-brown, the third segment ochreous; dorsum and venter ochreous, flushed with brown.

Expanse of wings: 46 mm.

1 ♂ from the Ninay Valley, Central Arfak Mts., Dutch New Guinea, 3500 ft., February and March 1909.

\* The manuscript of this article was among the papers left by the late Mr. W. Warren.—K. J.

3. *Sypna nocturna* spec. nov.

Differs from *S. tenebrosa* Wlk. in being deep dark brown with a purplish tinge and traversed by wavy purplish lines; the submarginal line thicker and blacker throughout; reniform stigma slightly marked with ochreous; outer line double, regularly lunulate, distinct throughout; subterminal spots black dotted with pale.

*Hindwing*: deep brown to base, the costa alone paler; the lines obscured; the pale yellow mottling of the fringe in apical half more striking.

Head, thorax, and abdomen dark brown.

Underside as in *tenebrosa*.

Expanse of wings: 65 mm.

4 ♂♂, 3 ♀♀ from Kinabalu, N. Borneo (Waterstradt) (type); 1 ♂ from the Peurisen Mts., Sarawak, June 1892 (Everett); 1 ♀ from Pengalengan, Preanger, Java. From Gnnung Ijan, Perak, a blue-scaled form has been received—ab. **decorata** ab. nov.—in which not only the inner and outer edges of the antemedian band, but the band itself, except along costa and inner margin, are suffused with bluish scales; but there is no blue visible in the hindwing, nor along the rows of subterminal spots, though these are externally much yellower and more distinct than in the type form.

4. *Perigramma triangulifera* spec. nov.

*Forewing*: ochreous grey, dusted with darker; inner line pale, edged on both sides with dark, waved and more oblique outwards than that of *circumducta* Led., to which it is most nearly allied; stigmata grey-white; the orbicular wider, especially above, both sides outcurved, not oblique; reniform smaller, not projecting below vein 4; a black triangle in cell before the orbicular, and a dark hourglass-shaped blotch between the two stigmata; the pale blotch below the white median vein reduced to a very shallow semi-elliptical mark; a black triangle with the apex touching vein 1 below submedian fold at base; the fold and space above it at base white; outer line very indistinct; the median area only slightly blackish, not well defined between the two lines, as in *circumducta*; subterminal line pale, inwardly edged with blackish at costa and beyond cell.

*Hindwing*: grey with diffuse dark grey cellspot and obscurely marked subterminal shade.

Head, thorax, and abdomen grey, the face and vertex browner.

1 ♂ from Tjutju-ho, 400 kilometres north of Wladiwostock, 1909 (W. Man); somewhat wasted and with the fringes worn; sent along with a typical ♂ of *circumducta*; in the new species the basal and costal areas of forewing are both much paler.

5. *Sideridis sericea* spec. nov.

*Forewing*: silky pale greyish ochreous, slightly tinged with pale brown; the veins pale; the costal streak pale ochreous thinning to a point at apex; a black subbasal costal dot and one at base of cell; inner line oblique from costa to submedian fold, then inwardly oblique, marked by a black dot on costa, in cell, and on the fold, and one on vein 1 nearer base; outer line excurved beyond cell, marked by black dots on veins, which are really the teeth of a lunulate-dentate line; black terminal dots between the veins; a fine white dash at end of median



vein, with a black point above it at lower end of cell; the ♂ has a faint brown shade from base below cell, forming a small brown cloud beyond lower end of cell; fringe silky ochreous.

*Hindwing*: grey-brown, the base and inner margin paler, especially in the ♂; cellspot cloudy, dark; fringe whitish ochreous.

Underside pale ochreous; the costa in both wings speckled with black; disc of forewing fuscous; a black spot on costa beyond middle; hindwing with cellspot and outer line of dots; both wings with black terminal points.

Head, thorax, and abdomen brownish ochreous; the patagia paler with a few scattered black scales.

Expanse of wings: ♂ 44 mm.; ♀ 48 mm.

1 ♂, 2 ♀♀ from Mt. Goliath, Dutch New Guinea, 5000—7000 ft., January 1911 (A. S. Meek). Very much like *Hyphilare pseudargyrea* Beth.-Baker, but not quite so dark.

#### 6. *Sideridis subrubescens* spec. nov.

*Forewing*: yellowish white, dusted and suffused in places with brown; the veins white interlined with brown; the intervals with brown streaks; median vein with a thick white dash at extremity, slightly hooked, containing a black dot at lower end of cell; inner line black, dentate, sharply angled outwards on submedian fold and inwards on vein 1; outer line black, lunulate-dentate, indented on submedian fold and angled outwards on vein 1; an oblique pale streak of ground-colour from apex to middle of inner margin and a shorter one beyond outer line from vein 4 to inner margin, the terminal area browner; dark terminal dots between veins; the fringe brown.

*Hindwing*: reddish ochreous, with an outer curved line of dark vein-dots, beyond which the terminal area is browner; fringe pale with a brown line.

Underside ochreous, sprinkled with brown along costal areas; disc of forewing deep pink; a dark spot on costa beyond middle; hindwing with dark cellspot and outer line, beyond which the terminal area is tinged with pinkish.

Head and thorax pinkish ochreous mixed with brown, abdomen ochreous.

Expanse of wings: ♂, 40 mm.

A series of males from Mt. Goliath, Dutch New Guinea, 5000—7000 ft., February 1911 (A. S. Meek).

#### 7. *Tiracola rufimargo* ab. *derufata* ab. nov.

Differs from typical *rufimargo* Warr. in the forewing being entirely pale olive-grey brown, with no red tinge whatever; in one example only the terminal area, except at apex, is filled up with chocolate brown; the red tints of the hindwing are at the same time duller in colour and more restricted in extent.

5 ♂♂, two from Upper Setekwa River, the other three from Mt. Goliath, Central Dutch New Guinea, January 1911 (A. S. Meek).

#### 8. *Tiracola rufimargo* ab. *albifusca* ab. nov.

*Forewing*: whitish grey, striated with darker grey or pale brownish; the median area between the inner and outer lines and the terminal area, except at apex, filled up with fuscous brown; subterminal line yellow, with slight dark scaling before it; an isolated dark spot above vein 7.

*Hindwing*: with the red tints duller and more restricted.

Head and thorax grey or brownish according to the ground colour of the forewing.

2 ♀♀ from Mount Goliath, Central Dutch New Guinea, January 1911 (A. S. Meek).

9. *Tiracola plagiata* ab. *nigriclathrata* ab. nov.

Resembles the ordinary form of the ♀ of *plagiata* Wlk., but the space below and beyond the reniform stigma filled up with blackish between the veins, which are marked with yellow scales across the black.

1 ♀ from the Khasia Hills, Assam.

10. *Perigea semirubra* ab. *semibrunnea* ab. nov.

Along with 1 ♂ and 2 ♀♀ of the ordinary form of *P. semirubra* Warr. received from Mr. A. S. Meek there came 1 ♀, rather larger than the rest, with the forewing deep brown and the powdering and lines white; the inner and outer lines marked with oblique white streaks at each extremity: the dark blotch beyond the reniform hardly visible; head and thorax brown like the forewings; this form I propose to call ab. *semibrunnea* ab. nov. The four specimens were taken on Mount Goliath.

11. *Conservula indica malayana* subsp. nov.

Differs from the type form *indica* Moore in the median brown area being scarcely darker than the rest of wing, so that the general coloration appears more uniform; the inner and outer lines of forewing are more broadly pale.

3 ♀♀ from Padang Rengas and 1 ♀ from Gunung Ijan, in the Tring Museum; all agree in this respect.

12. *Colobochyla similis* spec. nov.

Closely resembling *C. bilinealis* Leech from Japan, but smaller; the inner line waved below the angulation instead of straight; the outer not simply outcurved beyond cell, but bluntly angled on vein 6, then irregularly sinuous; the discal mark darker and angulated; hindwing paler fuscous, with the fringe concolorous instead of yellowish.

1 ♂ from Foochan, China, April 1886.

13. *Serrodus caesia* spec. nov.

*Forewing*: rufous grey in median area, leaden slate-colour in basal and post-median fields; inner line pale oblique outwards, angled below median vein, and incurved to vein 1, then excurved to a black dot on inner margin; followed by a velvety black band, which swells out into a rounded blotch below costa and above vein 1; median line scarcely visible itself, but the area beyond it above middle more rufous; at the end of cell and in the intervals between the bases of veins 2, 3, 4, 5 are some small spots of greenish ochreous scales partly edged with black; in middle of cell a small pale dot; outer line black, lunate-sinuate, bluntly projecting below middle, then sinuate to inner margin, followed by a brown line, along which the slate-coloured postmedian area is edged with a brown shade; terminal area beyond the indefinite subterminal line dark olive fuscous, including the fringe.

*Hindwing*: olive fuscous tinged with brown, darker with a slaty flush in outer half beyond a brown pale-edged median line; a pale wavy subterminal line from anal angle, and a small patch of bluish white scales on termen below vein 2; fringe dark brown.

Underside pale grey-brown with deep brown fringes; median and outer lines darker; the outer line of forewing marked with a pale spot on costa; all the veins marked with sparse pale scales.

Head and thorax brown speckled with pale; patagia with a slight slaty gloss; abdomen olive brown; tips of the anal scales pale ochreous; pectus and legs dark brown; the tarsi with pale joints; the spurs with pale tips.

Expanse of wings: 66 mm.

1 ♂ from the Upper Setekwa River, August 1910, and 1 ♀ from near the Oetakwa River, Snow Mts., Dutch New Guinea, October to December 1910 (A. S. Meek).

In the ab. **perfusa** ab. nov. the median area also is purplish slate-colour, its outer costal half the darkest. Of this form there are 1 ♂ and 2 ♀♀ in the Tring Museum, taken along with the type ♂, on the Upper Setekwa River in August 1910, and 1 ♀ from the Upper Setekwa River, taken with a typical ♀. The examples of the aberration are all slightly smaller than those of the type form in both sexes.

#### 14. *Ophiusa dentilinea* Beth.-Baker

ab. **albifusa** ab. nov. and ab. **rectilimes** ab. nov.

The ab. *albifusa* differs from typical *dentilinea* in having the oblique ante-median space between inner and median lines filled up with white in place of brown, its inner half dusted with brown; the inner line is more strongly marked, and the whole basal area within it filled up with dark fuscous; the black markings which go to form the prae-submarginal shade are all larger and more decided, and the space between them and the outer line is brown. In the ab. *rectilimes* the oblique median line, which in the type form and in *albifusa* is bisinuate, is fine and straight, and the whole wing is tinged with reddish brown, the ground colour appearing darker throughout.

The type of the ab. *albifusa* is a ♀ from the Oetakwa River, Snow Mts., Dutch New Guinea, taken from October to December 1910, by A. S. Meek; that of *rectilimes*, which may probably prove a separate species, also a ♀, is from Welsch River, British New Guinea (Weiske).

#### 15. *Ophiusa conspicua* spec. nov.

*Forewing*: bright whitish grey tinged with lilac and dusted with blackish atoms; subbasal and inner lines brown edged with pale, the former straight, reaching median vein, the latter oblique, slightly concave outwards and parallel to the median line; the basal area is filled up with grey-brown, and the inner half of the antemedian belt is dusted with blackish; outer line obliquely concave outwards to vein 6, there angled, then straight and oblique to inner margin, before which it is shortly curved outwards, meeting median line at a point; space included very broad, deep chocolate brown; the outer line is edged by a bright white line, followed above angle by a space of pale ground colour, and below it by a narrow brown shade, limited by the dentate-lunulate subterminal line, and widened to tornus; a deep black-brown narrow apical blotch, inwardly edged by a short white line; outwardly indented, its lower end intent to touch the angle of outer line; terminal area and fringe of the pale ground colour, with a row of dark terminal dots.

*Hindwing*: blackish, the basal area paler before a slight pale oblique median

band; a white subterminal streak at anal angle to vein 2; the termen above vein 2 shortly whitish grey; fringe whitish grey with paler basal line, above vein 6 blackish.

Underside grey-brown, with the termen and fringe lilac-grey; the cellspots and lines darker; the subterminal preceded by a brown shade, and edged with pale grey at anal angle of hindwing.

Head, thorax, and abdomen brownish; venter and pectus paler; tarsi brown with pale joints; the fringe of mid-tibiae white.

Expanse of wings: 58 mm.

1 ♂ from the Ninay Valley, Central Arfak Mts., Dutch New Guinea, November 1908 to January 1909. Superficially resembling *O. copidophora* Hamp., also from New Guinea, but the dark postmedian area is three times as wide.

#### 16. *Ophiusa aviceps* spec. nov.

*Forewing*: grey-brown, flushed with fuscous along costa; subbasal and inner lines parallel, oblique outwards, chestnut brown with paler edges; antemedian band paler towards inner margin, reddish grey, the veins across it paler; a white dot on discocellular; median line strongly curved, towards costa pale edged, coalescing with outer line below costa; this obliquely sinuous outwards to vein 6, there angled and incurved evenly to inner margin close to median line; it is edged by a fine, pale line followed by a dark one; the space between median and outer lines deep brown; a dark grey shade before subterminal line, which is obscurely dentate-lunulate, the teeth marked on vein by black white-tipped dashes, with a spot of white scales at inner margin; a triangular brown blotch at apex, nearly reaching the angle of outer line; minute black subterminal dots: fringe iron-grey.

*Hindwing*: dark shining olive fuscous, with a spot of white scales at anal angle; the fringe blackish grey, with pale basal line.

Underside dull greyish fuscous; the lines darker; the subterminal edged with paler; a pale grey cloud at apex of forewing.

Head and thorax brown; the abdomen fuscous; spurs of middle- and hindlegs black dotted with snow-white.

Expanse of wings: 58 mm.

1 ♂ from Biagi, Mambare River, British New Guinea, April 1906 (A. S. Meek).

#### 17. *Ophiusa curvilimes* spec. nov.

*Forewing*: with the basal area grey-brown with some darker spots and striae, edged by the vertical, straight, pale, inner line, with a dark line before it; space beyond to median line pinkish ochreous, shaded with grey-brown in its inner half, more broadly towards costa; median line strongly arched, from before middle of inner margin to middle of costa; outer line outwardly oblique and curved to vein 6, where it is acutely angled outwards, then evenly incurved, followed by a fine pale line with darker line beyond, and a broad diffuse brown shade; space between median and outer lines deep olive-brown; terminal area lilac-grey; the apex with a large dark brown curved blotch, edged on inner and outer sides by a yellowish line, the latter curved to meet angle of outer line; a row of black subterminal spots; fringe pinkish grey with a pale basal line.

*Hindwing*: olive fuscous, the terminal half darker; the termen itself from vein 6 to 2 narrowly grey; fringe grey, fuscous at apex.

Underside dull grey-brown, with darker cellspots, median, and outer lines; the subterminal lines, termen, and fringe lilac-grey.

Head and thorax brown, the abdomen fuscous grey.

Expanse of wings: 50 mm.

1 ♂ from Palaboehan Ratoe, Wyukoopsbaai, Java (Fruhstorfer). Belongs to the group including *acuta* Moore, *maturata* Moore, *duplexa* Moore, etc., from all which it is distinguished by the pinkish ochreous antemedian belt.

#### 18. *Ophiusa flexilinea* spec. nov.

*Forewing*: brownish fuscous to outer line, crossed before middle by an oblique whitish belt, broader at each extremity, where it is slightly discoloured by pinkish brown suffusion, and containing a small dark dot in cell; the outer line, limiting the brown area, narrowly white, obliquely curved outwards from costa to below vein 6, incurved to 4, then vertical to 3, and sinuous to inner margin, above which it is shortly again outcurved; terminal area whitish grey tinged with brown, which forms a shade parallel to outer line, widening to tornus and containing two dark blotches on veins 3 and 4; a dark brown triangular apical blotch, its apex reaching vein 6 and bent inwards to outer line; terminal line blackish, preceded by a row of black dots; fringe grey with a pale base.

*Hindwing*: blackish fuscous, with a faint pale median curved band; a short whitish subterminal striga above anal angle; the termen irregularly yellowish white from middle to below vein 2.

Underside dull fuscous grey, with outer and subterminal lines dark in each wing, and dark discal spots.

Head, thorax, and dorsum fuscous brown; palpi externally, the fore- and mid-tibiae and femora also fuscous; pectus and venter grey.

Expanse of wings: 50 mm.

A series from the Solomon Islands; Vella Lavella (type), New Georgia, Bougainville, Choisenl, Florida, and Guadalcanar.

#### 19. *Ophiusa cuneilineata* spec. nov.

*Forewing*: grey-brown, suffused with fuscous and black-speckled in basal half of wing and beyond outer line; subbasal and inner lines brown edged with paler, slightly inwardly oblique; median line also brown and parallel, without pale edging; outer line brown, externally edged with yellow, excarved below costa and oblique to vein 6, outwardly toothed on 6, 5, and 4 and inwardly between the veins, highly excurved from the tooth below vein 4 to submedian fold, on which it is angled inwards, followed by a dark grey diffuse fascia; a brownish apical mark becoming deep black between veins 6 and 7, outwardly edged by a yellow line bent inwards along vein 6; terminal area beyond the obscurely marked subterminal line, paler; subterminal spots black; fringe dark grey with yellowish basal line.

*Hindwing*: dark fuscous, darker subterminally; the termen dull grey.

Underside pale grey-brown with indistinct darker lines and cellspots.

Head and thorax brownish; the abdomen pale fuscous.

Expanse of wings: 42 mm.

1 ♀ from Lifu, Loyalty Islands. The outer line much resembles that of *dentilinea* Beth.-Baker, but the other lines are altogether different.

## SOME NEW ORIENTAL *CYMATOPHORIDAE* IN THE TRING MUSEUM.\*

By W. WARREN, M.A., F.E.S.

### 1. *Gaurena marmorata* spec. nov.

*Forewing*: brownish ochreous suffused with darker brown; two black spots outwardly margined with white in a line beneath median vein at base; inner line white, oblique, blotchy to submedian fold, below it forming a crescent externally and angled basewards on vein 1; three oblique crinkly dark brown lines, forming a sort of inner band; four blackish brown lines, all angled outwards in the middle of wing, forming an outer band; on the costa, the median vein and veinlets, and vein 1, the pale spaces between all these lines become white and the dark lines themselves blacker; the outer band is limited, as the inner is, preceded by a blotchy white line, which is continuous only at costa and inner margin, followed here by a velvety black block at anal angle, and on costa by a brown triangle; subterminal line a row of white vein-spots, that on vein 2 larger and yellowish, emitting an angled line beyond the black anal blotch; towards costa it becomes continuous, and is met by an oblique white streak from below apex, above which is a whitish brown-sprinkled apical blotch; a row of large white lunate spots before termen; fringe pale brown; orbicular stigma a large white spot; reniform two small white dots placed obliquely on the discocellular.

*Hindwing*: ochreous with a diffuse grey subterminal band and greyish suffusion; the fringe and termen paler.

Underside uniform glossy ochreous.

Head, thorax, and abdomen ochreous, the thorax spotted with brown; palpi externally and front of pectus dark brown; forelegs brown-spotted.

Expanse of wings: 42 mm.

The ♂♂ nearly always darker than the ♀♀.

2 ♀♀ from the Angabunga River; 1 ♂ from Biagi, Mambare River; 6 ♂♂, 2 ♀♀ from Mt. Goliath, Central Dutch New Guinea, 5000—7000 ft., January 1911 (A. S. Meek) (type).

### 2. *Gaurena papuata* spec. nov.

*Forewing*: pale olive, suffused in parts with dark olive fuscous; inner line white, fine and mixed with olive above middle, projecting and twice bent below, broadly white, then inbent, dentate inwards on vein 1 and above inner margin, preceded below median by dark suffusion; outer line outer-convex, lunulate-dentate, marked with white from costa to vein 6 and again from vein 2 to inner margin, where it is followed by a black triangular mark; from costa to vein 4 it is followed by a pale olive curved band with darker centre; median area, except on inner margin below vein 1, suffused with dark fuscous, the dark waved cross lines alternated with olive lines; orbicular stigma a white dot; a large white apical blotch, narrowing to a point at vein 6, connected by three white dots on veins 3, 4, 5 with

\* The manuscript of this article was among the papers left by the late Mr. W. Warren.—K. J.

an angulated white mark on inner margin beyond the black triangle ; a row of white black-edged spots before termen ; fringe pale olive.

*Hindwing* : dull greyish ochreous with darker subterminal shade.

Underside ochreous, the costa of forewing browner ; tips of fringe of forewing black.

Face, terminal segment of palpi, and thorax yellowish ; tegulae, rest of palpi, pectus, and legs fuscous.

Expanse of wings : 36 mm.

1 ♂ from Mt. Goliath, Central Dutch New Guinea, 5000—7000 ft., January 1911, 1 ♂ Biagi, Mambare River (A. S. Meek) (type).

### 3. *Habrona concinna* spec. nov.

*Forewing* : black-brown, inner and outer lines slender, ochreous ; the inner obliquely curved outwards and roundly bent on submedian fold, inangled on vein 1 ; the median vein ochreous from base to inner line, which is slightly inbent at the point ; outer line bluntly rounded in midwing ; orbicular stigma obsolete ; reniform black with a snow-white or yellowish dot at centre ; on each side of it a pair of waved black lines, sometimes united below middle, where the inner margin is sometimes paler brown ; veins at termen forming pale brownish ochreous spikes, that on vein 2 reaching outer line, finely white-edged, and with a white angled line below it to vein 1 ; a paler apical blotch and submarginal shade scarcely visible ; terminal area pale brown beyond a fine white line interrupted by the veins ; fringe brown, paler in outer half and rayed with darker.

*Hindwing* : fuscous, paler at base ; the veins at termen and the fringe ochreous.

Underside greyish fuscous ; the inner margins of both wings ochreous ; tips of fringe of forewing dark.

Head and thorax black-brown ; abdomen greyish ochreous ; pectus whitish ; forelegs dark with the joints ochreous.

Expanse of wings : 48–52 mm.

3 ♂♂, 3 ♀♀ from Mt. Goliath, Central Dutch New Guinea, 5000—7000 ft., January 1911 (type) ; 1 ♂, 1 ♀ from Biagi, Mambare River, 5000 ft., British New Guinea, April 1906 (A. S. Meek).

### 4. *Habrona caerulescens* spec. nov.

*Forewing* : dark olive-fuscous ; the median area crossed by five blackish waved lines angled at middle, of which the median is thickest ; other lines bluish white ; subbasal line indicated by diffuse scales in basal area ; inner line waved, oblique to submedian fold, then inbent, more diffuse and partially double above middle ; outer obscurely lunulate-dentate, outwardly oblique, bent below vein 4 and inangled on veins 1 and 2, more distinctly double above middle ; subterminal line zigzag from costa to vein 6, forming inner edge of a slightly paler apical blotch, then interrupted, and again forming a slight angular mark on vein 2 beyond outer line ; stigmata marked by bluish-white dots ; a row of bluish-white dashes before termen ; fringe concolorous.

*Hindwing* : fuscous ; the base and inner margin ochreous.

Underside grey ; the inner margins ochreous.

Head, thorax, pectus, and forelegs fuscous ; abdomen greyish ochreous.

Expanse of wings : 50 mm.

8 ♂♂, 1 ♀ from Mt. Goliath, Central Dutch New Guinea, 5000—7000 ft., February 1911 (type), and 1 ♂ from Biagi, Mambare River (A. S. Meek).

### 5. *Palimpsestes semiobsoleta* spec. nov.

*Forewing* : pearl grey ; subbasal line angled outwards below costa and forming an oblique black dash near base of submedian fold, with a reddish tinge around and below it ; inner line bigeminate, forming a dark band ; the innermost line divergent and marked with a black spot on vein 1 ; the outermost, blackest, oblique and excurved below middle, then indented ; the space beyond grey with the lines subobsolete ; outer line treble, marked on costa mainly, followed at a distance by another equally obscure, and preceded by the crenulate median line, which passes between the stigmata ; these are small, pale grey, the orbicula round, the reniform long and narrow ; subterminal line indicated by some black marks beyond it, ending above in a curved black streak to apex ; close before termen a row of black dashes between veins ; fringe white, cut with dark grey beyond veins.

*Hindwing* : pale dull grey, with broad fuscous terminal border and indistinct dark outer band ; fringe white.

Underside glossy pale grey ; terminal borders darker ; costa of forewing striped with dark grey.

Head, thorax, and abdomen mixed dark and light grey ; underside and legs pale grey ; the tarsi dotted with black.

1 ♂ from Pengalengan, Preanger, Java. Nearest to *orbicularis* Moore, *anguligera* Hmps., etc.

### 6. *Polyploca curvicosta* spec. nov.

*Forewing* : dull grey tinged with brownish ; the inner line fine and black, at one-third, curved, bent on submedian fold ; preceded by two dark lines at costa, which become divergent and double towards inner margin, more or less filled in with dark, forming a band ; a black spot near base of submedian fold, followed by a tuft of pale scales ; outer line fine and black, with another parallel close beyond it, outcurved above, bent inwards at vein 4, and indented on submedian fold, where it approaches inner line ; followed by two dark-grey outcurved strongly lunulate-dentate lines ; subterminal line pale, lunulate, followed by dark lunulate marks, and met by a strong black streak from apex ; a fine black terminal festoon ; fringe grey, with a fine pale line at base ; stigmata plumbeous, outlined with yellow ; the orbicular rounded, placed above the cell-fold ; the reniform somewhat pyriform, broad below and curved beneath orbicular ; a small round plumbeous spot ringed with yellowish above vein 6 beyond the outer line.

*Hindwing* : fuscous brown, darker along termen ; the fringe pale brown.

Underside glossy grey, the termen darker in both wings ; costa of forewing beyond middle whitish grey, swollen into a small triangular blotch just below apex.

Head, thorax, and abdomen rufous grey ; palpi pale, with the upper edge broadly and two narrow lateral lines externally, dark olive.

Expanse of wings : 32 mm.

1 ♂ from the Khasia Hills, Assam, November 1896 (native collector). Distinguished by the shorter forewing with strongly curved costa.



7. *Polyploca nigripunctata* spec. nov.

*Forewing*: bluish white speckled with pale grey; the inner and outer bands and the terminal area tinged with brownish; inner line black, waved, from two-fifths of costa to near middle of inner margin, as in *renalis* Moore, preceded by three thick waved dark lines filled in with brown; a dark spot near base of submedian fold, followed by a black pointed dash; the basal area limited by a curved dark line; outer line black, double, vertical at costa, then excurved to vein 2 and again to vein 1, approaching inner line on inner margin; a pale and dark grey dentate line beyond; subterminal line white, defined by the dark terminal area beyond, and an oblique black streak from apex; a black terminal festoon; the fringe dark grey; orbicular stigma round, formed by a tuft of black scales; reniform elongate, white with some raised scales, outlined with black; a fine dentate-lunulate median grey line.

*Hindwing*: dull fuscous.

Underside glossy whitish grey, with a paler outer band in both wings; costa of forewing white, with two black patches beyond middle, and three black spots before apex.

Head and thorax dark and light grey mixed; tips of tegulae and upper edge of palpi blackish; abdomen wanting.

Expanse of wings: 32 mm.

1 ♂ from Sikkim, September 1889 (Col. Pilcher).

8. *Polyploca griseata* spec. nov.

*Forewing*: dull cinereous, speckled with blackish, most thickly in terminal area; a blackish spot at base on submedian fold; inner line black, before one-third, evenly outcurved and insinuate on vein 1; preceded by two indistinct dark parallel lines; the basal area limited by a thicker enrvd wavy line; outer line black, concave outwards from costa to vein 4, on which it is bent, then oblique inwards to submedian fold, and vertically sinuous to inner margin, followed immediately by a dark parallel line and at a distance by a dark wavy line; subterminal line pale grey between blackish shades, met by a curved black streak from apex; a black terminal festoon; fringe dark grey with thick middle line and bright pale basal line; stigmata pale with black outlines; the orbicular large, rounded; the reniform narrow, inwardly oblique, with a dark linear centre; the orbicular is filled up with dull yellowish, showing glossy in certain lights.

*Hindwing*: fuscous, the veins darker; the fringe whitish with a grey line. Underside shining pale brownish grey, with a faint outer band in both wings between slightly darker lines; costa of forewing whitish, more broadly in apical half, where it is marked by two short dark streaks and three black strigae.

Head, thorax, and abdomen pale and dark grey mixed; tarsi grey dotted with black.

Expanse of wings: 42 mm.

1 ♂ from Kangra (Hocking) from the Elwes collection.

Nearest to *orbicularis* Moore, but certainly distinct.

9. *Polyploca castaneata* spec. nov.

*Forewing*: fawn-colour, shaded on each side of the narrow central area and along inner margin in basal half with dull chestnut-brown; an oblique black

streak near base on submedian fold; inner line just before middle black, slightly curved, and indented on each fold, preceded by two curved brown shades, the inner strongly outcurved at middle; median fascia extremely narrow, towards inner margin whitish; the outer line blackish, slender, crenulate, and slightly projecting on vein 4, followed by two thick brown shades with deeper centres, and then by a black lunulate-dentate line, angled above vein 5; subterminal line pale fawn between darker shades, met at vein 6 by a thick somewhat interrupted streak from apex; a row of fine black lunules before termen; orbicular and reniform stigmata represented by linear black marks of raised scales, with some paler scales on their inner edge, lying on the inner and outer lines respectively; fringe pale fawn, rayed with darker, with a dark broad middle line and bright pale basal line.

*Hindwing*: brownish fuscous; the fringe pale, with thick dark middle line.

Underside dull cinereous; each wing with three dark curved lines in outer half, the middle one dentate on the veins; costa of forewing fawn-colour.

Head, thorax, and abdomen fawn-colour; the tegulae with two ill-defined lines and their tips blackish; tarsi with the joints blackish; foretibiae in front with three black dots.

Expanse of wings: 34 mm.

1 ♂ from Sikkin, August 1889 (Col. Pilcher).

#### 10. *Polyploca nigrifasciata* spec. nov.

*Forewing*: whitish suffused with brown and fuscous, the whiter scaling only showing in the terminal third of wing; a short white streak at base below median vein, and often the base of costa white; median area brown, traversed by four or five irregularly crenulate black lines; the inner most excurved above middle and indented below on submedian fold, partially edged with whitish scales; the outer followed by a whitish band with a black crenulate line at middle; a dark fuscous band before subterminal line, mixed with whitish grey scales at costa and below middle; a white costal patch at apex above the black oblique apical streak; terminal line black, lunulate; fringe pale grey mottled with black beyond veins; reniform stigma a strong black linear mark of raised scales; the whitish areas are generally more developed in the ♀, and the black fascia and outer band stronger; the white basal scaling is also edged with black.

In another form, ab. **semifascia** ab. nov., the whole ground colour is dull chalky white, with the dark median fascia cut off at median vein, its edges only indicated on inner margin; some slight dark shading at base round the white scaling; the black apical streak present, and a grey spot on inner margin before subterminal line; the grey markings rather better defined in the ♂. A third form, ab. **nigrilineata** ab. nov., mimics the form of *orbicularis* Moore called *bifasciata* Hmps., only the black edgings of the median fascia being shown, the inner of two black lines, the outer of one only except at costa; in both of these aberrations the orbicular stigma, as well as the reniform, is represented by a linear black mark.

*Hindwing*: fuscous, the fringe paler.

Underside dark fuscous, paler in the ♀; the costa of the forewing white with black strigae.

Head, thorax, and abdomen mixed black and white, the white predominating in the pale aberrations; tarsi thickly spotted with black.

Expanse of wings: ♂, 36 mm.; ♀, 38 mm.

2 ♂♂ from Sikkim (O. Möller); 2 ♀♀, Sikkim, September 1889 (Col. Pilcher); 2 ♂♂, 1 ♀ of ab. *semifascia*, Sikkim, September 1889 (Col. Pilcher); 1 ♀ of the ab. *nigrilineata*, Sikkim (O. Möller).

### 11. *Polyploca bilineata* spec. nov.

*Forewing*: dark grey slightly reddish-tinged; inner line thick, black, a little before middle, nearly vertical, incurved to costa; outer line just beyond middle, more slenderly black, oblique outwards to vein 4, there acutely angled and oblique inwards; subterminal pale, very obscure; an oblique black streak from apex; a row of black terminal spots; a tuft of blackish scales just beyond inner line represents the orbicular stigma, and a smaller tuft at lower end of discocellular, just before the angle of outer line, the reniform.

*Hindwing*: blackish fuscous.

Underside dull cinereous; the costa of forewing paler.

Head, thorax, abdomen, venter, and legs reddish grey.

Expanse of wings: 30 mm.

1 ♂ from Darjiling (Col. Pilcher).

A small species of dull appearance, somewhat resembling *ruficollis* of Europe.

### 12. *Polyploca acutangula* spec. nov.

*Forewing*: whitish, suffused with ochreous yellow, especially towards costa, where it is also somewhat browner; the veins finely darker; lines finely brown; inner line double, curved in costal half, the outer arm touching the oblique black orbicular stigma; outer line also double, acutely angled outwards on vein 4, marked by brown teeth on the veins, followed at a distance by another brown line, which is acutely angled outwards below vein 6, and then runs inwards close to the outer line, also marked by dark teeth on the veins; and followed by another line more bluntly angled or only bent; a dark oblique streak from apex; a line of dark marks along termen; fringe yellow.

*Hindwing*: pale grey.

Underside grey; the costa of forewing yellowish.

Head and thorax ochreous yellow; abdomen grey; pectus whitish.

Expanse of wings: 30 mm.

1 ♀ from Sikkim, August 1889 (Col. Pilcher).

A narrow-winged small species, which otherwise much resembles the ab. *ochracea* of *polychromata* Hmps.; the unique example is slightly worn towards base and inner margin.

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## OBITUARY.

WILLIAM WARREN, M.A.

*Died October 18, 1914, aged 75.*

FOR a number of years W. Warren had suffered from an internal complaint, which was now and again intensely painful, and compelled him at times to take a rest for a few days. But in spite of this intermittent illness he was wonderfully well, and, considering his advanced age, one could but admire the energy with which he still devoted himself to his work. Early in October last the trouble became acute, and after a week's struggle Warren had to give in and remain at home. During the intervals between the attacks of pain he was as cheerful as usual, and we all expected a speedy recovery. The doctor proposed an operation, which might bring relief, but at first the patient would not hear of it. However, when passing the house on Saturday, 17th, at noon, I saw Warren standing dressed at the open window of his room, and we talked together for some time about his illness and his affairs. He told me that he was going to the infirmary at Hemel Hempstead, where, if it was thought necessary, he would undergo an operation. He appeared pale, but was otherwise much the same as usual. Next morning a telegram from the infirmary announced his death. He had fainted in an attack of pain, and passed away without recovering consciousness.

William Warren was born January 20, 1839, as the eldest son of the late Wm. Warren, J.P., of Cambridge. He was educated at Oakham School, which he left in 1857, entering the University of Cambridge in 1858. He took a great interest in cricket and boating, being a very good bowler and rowing in the Lady Somerset boat. But the pursuit of sport did not collide with his studies. He was a scholar, prizeman, and exhibitioner at St. John's College, and in 1861 took first-class honours in classics. Choosing the scholastic career as his vocation, Warren, on leaving the University, accepted an appointment as master at Sedbergh School, becoming subsequently tutor to the present Lord Shuttleworth. From 1866 to 1877 he was second master at Doncaster Grammar School, and in 1880 went as master to Stubbington House School for army and navy cadets at Fareham, his application for a headmastership at some other school being unsuccessful.

The testimonials given to Warren—and which are before me—speak in very favourable terms of him as a teacher; private reasons, however, compelled him to give up the scholastic profession about 1882, since when he has devoted his time to his favourite pursuit of entomology.

A very keen and competent collector and an untiring walker, Warren was indefatigable in the field. He was the first to draw attention to the entomological treasures of the Fens, and his earlier publications consisted of notes on his discoveries in that district. The Microlepidoptera were his chief subject of study, and although he was in later years obliged to work almost exclusively at other groups of

Lepidoptera, he preserved to his last days a tender love for the smallest of moths.

When he had relinquished his career as a schoolmaster, he remained without a regular salaried employment, living on the rather considerable fortune left him by his father. The inheritance, however, soon dwindled away, and the means of subsistence became more and more precarious. But his outlook on life was optimistic, and the frequent embarrassments in which he found himself up to the last five or six years of his life could not daunt his spirits; they were forgotten as soon as circumstances appeared to assume a brighter aspect. He was separated from his wife, but remained in communication with his only son to the end.

In 1888 Warren began work at the British Museum as an outside assistant, being engaged to arrange the Pyralis and Geometridae. He published some papers on the former family in 1890, 1891, and 1892; but nearly all the names that he gave to the numerous new species of *Geometridae* contained in the British Museum collection remained unpublished for the time. Through the kind intermediation of Dr. Günther, Warren offered his services to Mr. Rothschild, and in 1892 came to Tring in order to name and arrange the *Geometridae* and a few other families, such as the *Drepanulidae*, *Thyrididae*, and *Uraniidae*. He lived at Tring for a couple of years, but subsequently removed to London. Although his principal work consisted in the naming of specimens in the Tring Museum and in describing the new genera and species found among our material, Warren was at liberty to assist other entomologists with his rapidly increasing knowledge of the families at which he was working, and many of the new exotic species published by others during the last twenty years had previously been submitted to him.

When Dr. Seitz asked me if I knew of some one who could undertake to describe the *Noctuidae* for his work, *Die Grossschmetterlinge der Erde*, I mentioned Warren, who at that time was living in London and had very little to do. The *Geometridae* having already been assigned by Dr. Seitz to a very competent specialist, Warren agreed to come to Tring and devote himself to the Noctuids, and from that time until his death he was happy in having continuous employment without being strictly bound to official hours.

The number of new species and genera published by Warren is very large, and he will remain known to posterity as the chief specialist in *Geometridae* of the last two decades. He was assisted in his work by a catalogue he had compiled, containing a description of each species and variety, and, if a specimen had been accessible to him, a carefully executed pencil-drawing. This enormous work, amounting to several cubic feet of manuscript, cannot be published for various reasons, but it will nevertheless remain accessible at the Tring Museum. Some manuscripts on British Microlepidoptera were also found among Warren's papers, but are antiquated by more recent discoveries, and must unfortunately remain unpublished. Several small manuscripts on new species were ready for publication, while some others require arranging and revising before they can go to press.

Although Warren was essentially an entomologist of the older school, he paid more careful attention to the structure of the wings, antennae, and legs, as far as these organs can be studied with an ordinary lens, than did (and do) some of his contemporaries, and for this reason his work will be more highly appreciated by the specialist than by the general collector.—K. JORDAN.

## LIST OF PUBLICATIONS BY W. WARREN.

1578. 1. Economy of the larva of *Ephippiphora nigricostana*.—*Ent. Mo. Mag.* xv. p. 15.
2. *Elachista stabilella* bred.—*L.c.* xv. p. 16.
3. Food-plant of *Elachista stabilella*.—*L.c.* xv. p. 69.
1879. 4. *Bryophila glandifera* (var. *par*?).—*L.c.* xvi. p. 110.
5. Larva of *Coleophora deauratella* in Cambridgeshire.—*L.c.* xvi. p. 113.
1880. 6. *Bryophila par*.—*L.c.* xvii. p. 115.
7. Addition of *Bryophila par* to the British Fauna.—*Entom.* xiii. pp. 225-226.
8. *Zelleria insignipennella* bred.—*Ent. Mo. Mag.* xvi. p. 116.
9. Captures of Lepidoptera in the vicinity of London.—*L.c.* xvi. p. 137.
1881. 10. Occurrence of *Nepticula sericopeza* near Cambridge.—*L.c.* xviii. p. 142.
1883. 11. On the probable identity of the species known as *Agrotis tritici*, *aquilina*, *obelisca*, and *nigricans*.—*L.c.* xix. p. 278.
12. On the habits of the larva of *Eupoecilia rupicola*.—*L.c.* xx. p. 17.
13. On the hibernation as full-fed larvae of some species of *Nepticula*.—*L.c.* xx. p. 17.
14. The young larva of *Coleophora lilella*.—*L.c.* xx. p. 18.
15. The larva of *Plusia orichalcea*.—*L.c.* xx. p. 116.
16. Some further remarks on *Nepticula*.—*L.c.* xx. p. 186.
1884. 17. *Bryophila impar*, n. sp., distinct from *B. glandifera*.—*L.c.* xxi. p. 22.
1885. 18. Note on *Dichrorhampha tanacetii*.—*L.c.* xxi. p. 190.
19. The *Nepticulae* of the Mountain Ash.—*L.c.* xxii. p. 131.
1886. 20. *Gelechia rilella* bred fifteen years ago.—*L.c.* xxii. p. 212.
21. Some captures of Lepidoptera in 1885, with remarks.—*L.c.* xxii. p. 254.
22. Queries concerning the habits of certain British *Tortrices*.—*L.c.* xxii. p. 279.
23. Description of the larva of *Gelechia rilella*, Zell.—*L.c.* xxiii. p. 89.
1887. 24. Occurrence of *Stigmonota pallifrontana*, Z., in England.—*L.c.* xxiii. p. 232.
25. The generic position of *Grapholitha* (?) *caecana*.—*Entom.* xx. p. 38-39.
26. Occurrence of another British example of *Euzophera oblitella*, Z.—*L.c.* xx. p. 233.
27. Occurrence of both *Steganoptycha pygmaeana*, Hb., and *S. abiegana*, Dnp., in England, and the latter species identified as the *Tortrix subsequana* of Haworth.—*Ent. Mo. Mag.* xxiv. p. 6-8.
28. *Halonota obscurana*, Stph. (1834) versus *ravulana*, H.-S. (1849).—*L.c.* xxiv. p. 8.
29. Description of the larva of *Eupoecilia flaviciliana*.—*L.c.* xxiv. p. 88-89.
30. Description of the larva of *Stigmonota pallifrontana*, Z.—*L.c.* xxiv. p. 89.
31. On a species of the family *Gelechiidae*, hitherto unrecognised in England.—*L.c.* xxiv. p. 104.
32. Occurrence of *Lozotaenia* (*Cacoecia*, Hb.) *decretana*, Tr., in Norfolk.—*L.c.* xxiv. p. 125-126.
33. Description of the larva of *Eupoecilia degregana*.—*L.c.* xxiv. p. 134.

34. Notes on the species of Heinemann's family CHAULIODIDÆ that occur in England.—*Ent. Mo. Mag.* xxiv. p. 141-147.
1888. 35. Notes on the larva of *Olinidia ulmana*, Hb.—*L.c.* xxiv. p. 230.
36. On Lepidoptera collected by Major Yerbury in Western India, in 1886 and 1887.—*Proc. Zool. Soc. Lond.* p. 292-338.
37. Concerning some of Haworth's types of British Micro-Lepidoptera.—*Ent. Mo. Mag.* xxv. p. 5-8.
38. The habits of *Opostega salaciella*, Tr., etc.—*L.c.* xxv. p. 145-146.
39. *Retinia posticana*, Zett., a new British Tortrix.—*L.c.* xxv. p. 146-147.
40. Notes on the larva of *Gelechia peliella*, Tr.—*L.c.* xxv. p. 161.
1889. 41. On the habits, etc., of certain British Micro-Lepidoptera.—*L.c.* xxv. p. 171-175.
42. A Rejoinder on *Retinia posticana*, Zett.—*L.c.* xxv. p. 196-199.
43. *Retinia posticana*, Zett., bred.—*L.c.* xxv. p. 397.
44. On the *Pyralidina* collected in 1874 and 1875 by Dr. J. W. H. Trail, in the Basin of the Amazons.—*Trans. Ent. Soc. Lond.* p. 227-295.
1890. 45. Descriptions of some new genera of *Pyralidae*.—*Ann. Mag. N. H.* (6) vi. p. 474-479.
46. Entomological papers in Continental periodicals.—*Entom.* xxiii. p. 316-318.
47. Some descriptions in Swinhoe, "The Moths of Burma."—*Trans. Ent. Soc. Lond.* p. 292-293.
1891. 48. Descriptions of new genera and species of *Pyralidae* contained in the British Museum collection.—*Ann. Mag. N. H.* (6) vii. p. 423-437, 494-500, and viii. p. 61-70.
49. Notes on British Lepidoptera; extracted from Continental journals.—*Entom.* xxiv. p. 33-37.
50. Synonymic notes; *Pyralidae*.—*L.c.* xxiv. p. 180-185.
1892. 51. Descriptions of new genera and species of *Pyralidae*, contained in the British Museum collection.—*Ann. Mag. N. H.* (6) ix. p. 172-179, 294-302, 389-397, 429-442.
1893. 52. On new genera and species of Moths of the family *Geometridae* from India, in the collection of H. J. Elwes.—*Proc. Zool. Soc. Lond.* p. 341-434, pl. 30-32.
1894. 53. New genera and species of *Geometridae*.—*Nor. Zool.* i. p. 366-466.
54. New species of Indian *Geometridae*.—*L.c.* i. p. 678-682.
1895. 55. New genera and species of *Pyralidae*, *Thyrididae*, and *Epiplimidæ*.—*Ann. Mag. N. H.* (6) xvi. p. 460-477.
56. New species and genera of *Geometridae* in the Tring Museum.—*Nor. Zool.* ii. p. 82-159.
1896. 57. New genera and species of *Pyralidae*, *Thyrididae*, and *Epiplimidæ*.—*Ann. Mag. N. H.* (6) xvii. p. 94-106, 131-150, 202-216.
58. New species of *Pyralidae* from the Khasia Hills.—*L.c.* xvii. p. 452-466, and viii. p. 197-119, 163-177, 214-231.
59. New *Geometridae* in the Tring Museum.—*Nor. Zool.* iii. p. 99-148.
60. New species of *Drepanulidæ*, *Uranidæ*, *Epiplimidæ*, and *Geometridæ* from the Papuan region, collected by Mr. Albert S. Meek.—*L.c.* iii. p. 272-306.
61. New Indian *Epiplimidæ* and *Geometridæ*.—*L.c.* iii. p. 307-321.

62. New species of *Drepanulidae*, *Thyrididae*, *Uraniidae*, *Epiplemidae*, and *Geometridae* in the Tring Museum.—*Nor. Zool.* iii. p. 335-419.
1897. 63. New genera and species of moths from the Old-World regions in the Tring Museum.—*L.c.* iv. p. 12-130.
64. New genera and species of *Drepanulidae*, *Thyrididae*, *Epiplemidae*, *Uraniidae*, and *Geometridae* in the Tring Museum.—*L.c.* iv. p. 195-262, pl. 5.
65. New genera and species of moths from the Old-World region, in the Tring Museum.—*L.c.* iv. p. 378-402.
66. New genera and species of *Thyrididae*, *Epiplemidae*, and *Geometridae* from South and Central America and the West Indies, in the Tring Museum.—*L.c.* iv. p. 408-507.
1898. 67. New species and genera of the families *Thyrididae*, *Uraniidae*, *Epiplemidae*, and *Geometridae* from the Old-World regions.—*L.c.* v. p. 5-41.
68. New species and genera of the families *Drepanulidae*, *Thyrididae*, *Uraniidae*, *Epiplemidae*, and *Geometridae* from the Old-World regions.—*L.c.* v. p. 221-258.
69. List of the *Geometridae*, *Epiplemidae*, *Drepanulidae*, and *Thyrididae* collected on the Key Islands by Mr. H. Kühn.—*L.c.* v. p. 421-432.
1899. 70. New species and genera of the families *Drepanulidae*, *Thyrididae*, *Uraniidae*, *Epiplemidae*, and *Geometridae* from the Old-World regions.—*L.c.* vi. p. 1-66.
71. New *Drepanulidae*, *Thyrididae*, and *Geometridae* from the Aethiopian region.—*L.c.* vi. p. 287-312.
72. New *Drepanulidae*, *Thyrididae*, *Epiplemidae*, *Uraniidae*, and *Geometridae* from the Oriental and Palaearctic regions.—*L.c.* vi. p. 313-358.
1900. 73. New genera and species of *Thyrididae* and *Geometridae* from Africa.—*L.c.* vii. p. 90-98.
74. New genera and species of *Drepanulidae*, *Thyrididae*, *Epiplemidae* and *Geometridae* from the Indo-Australian and Palaearctic regions.—*L.c.* vii. p. 98-116.
75. New genera and species of American *Drepanulidae*, *Thyrididae*, *Epiplemidae*, and *Geometridae*.—*L.c.* vii. p. 118-225.
1901. 76. New *Thyrididae*, *Epiplemidae*, and *Geometridae* from the Aethiopian region.—*L.c.* viii. p. 6-20.
77. New *Uraniidae*, *Epiplemidae*, and *Geometridae* from the Oriental and Palaearctic regions.—*L.c.* viii. p. 21-37.
78. *Drepanulidae*, *Uraniidae*, and *Geometridae* from the Palaearctic and Indo-Australian regions.—*L.c.* viii. p. 190-201.
79. *Drepanulidae*, *Thyrididae*, *Epiplemidae*, and *Geometridae* from the Aethiopian region.—*L.c.* viii. p. 202-217.
80. New American moths.—*L.c.* viii. p. 435-492.
1902. 81. *Drepanulidae*, *Thyrididae*, *Uraniidae*, and *Geometridae* from the Oriental region.—*L.c.* ix. p. 340-372.
82. New African *Drepanulidae*, *Thyrididae*, *Epiplemidae*, and *Geometridae* in the Tring Museum.—*L.c.* ix. p. 487-536.
1903. 83. New moths from British New Guinea.—*L.c.* x. p. 120-126.



84. New *Drepanulidae*, *Thyrididae*, *Uraniidae*, and *Geometridae* from the Oriental region.—*Nov. Zool.* x. p. 255-270.
85. New African *Thyrididae* and *Geometridae* in the Tring Museum.—*L.c.* x. p. 271-278.
86. New *Uraniidae*, *Drepanulidae*, and *Geometridae* from British New Guinea.—*L.c.* x. p. 343-414.
87. Two new species of *Lepidoptera* from the Wady-el-Natron, Egypt.—*Entom.* xxxvi. p. 225, 226, pl. 4 (in collab. with N. C. Rothschild).
1904. 88. New American *Thyrididae*, *Uraniidae*, and *Geometridae*.—*Nov. Zool.* xi. p. 1-173.
89. New *Drepanulidae*, *Thyrididae*, *Uraniidae*, and *Geometridae* from the Aethiopian region.—*L.c.* xi. p. 461-482.
90. New *Thyrididae* and *Geometridae* from the Oriental regions.—*L.c.* xi. p. 483-492.
91. New American *Thyrididae*, *Uraniidae*, and *Geometridae*.—*L.c.* xi. p. 493-582.
1905. 92. Some new South American moths.—*Proc. U.S. Nation. Mus.* xxix. p. 347-352.
93. New species of *Thyrididae*, *Uraniidae*, and *Geometridae* from the Oriental region.—*Nov. Zool.* xii. p. 6-15.
94. New species of *Geometridae* from the Aethiopian region.—*L.c.* xii. p. 34-40.
95. New *Thyrididae*, *Uraniidae*, and *Geometridae* from South and Central America.—*L.c.* xii. p. 41-72.
96. New American *Thyrididae*, *Uraniidae*, and *Geometridae*.—*L.c.* xii. p. 307-379.
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102. New *Drepanulidae*, *Thyrididae*, *Uraniidae*, and *Geometridae* from British New Guinea.—*Nov. Zool.* xiii. p. 61-160.
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104. American *Thyrididae*, *Uraniidae* and *Geometridae* in the Tring Museum.—*L.c.* xiv. p. 187-323.
1908. 105. New *Thyrididae* in the Tring Museum.—*L.c.* xv. p. 325-351.
106. Descriptions of new species of South American *Geometrid* moths.—*Proc. U.S. Nation. Mus.* xxxiv. p. 91-110.
1909. 107. New American *Uraniidae* and *Geometridae* in the Tring Museum.—*Nov. Zool.* xvi. p. 69-109.
108. New species of *Uraniidae* and *Geometridae* from the Aethiopian region.—*L.c.* xvi. p. 110-122.

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- 1112, 1145. *Noctuidae* in Seitz, *Macrolepidoptera of the World*, xi.
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1148. New *Noctuidae* in the Tring Museum mostly from the Indo-Oriental regions.—*Nor. Zool.* xix, p. 1-51.
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124. *Noctuidae* (continuation) in Seitz, *Macrolepidoptera of the World* xi.
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BORDJ AT HASSI REBIE.



STONY DESERT (HAMMADA) NEAR HASSI REBIE



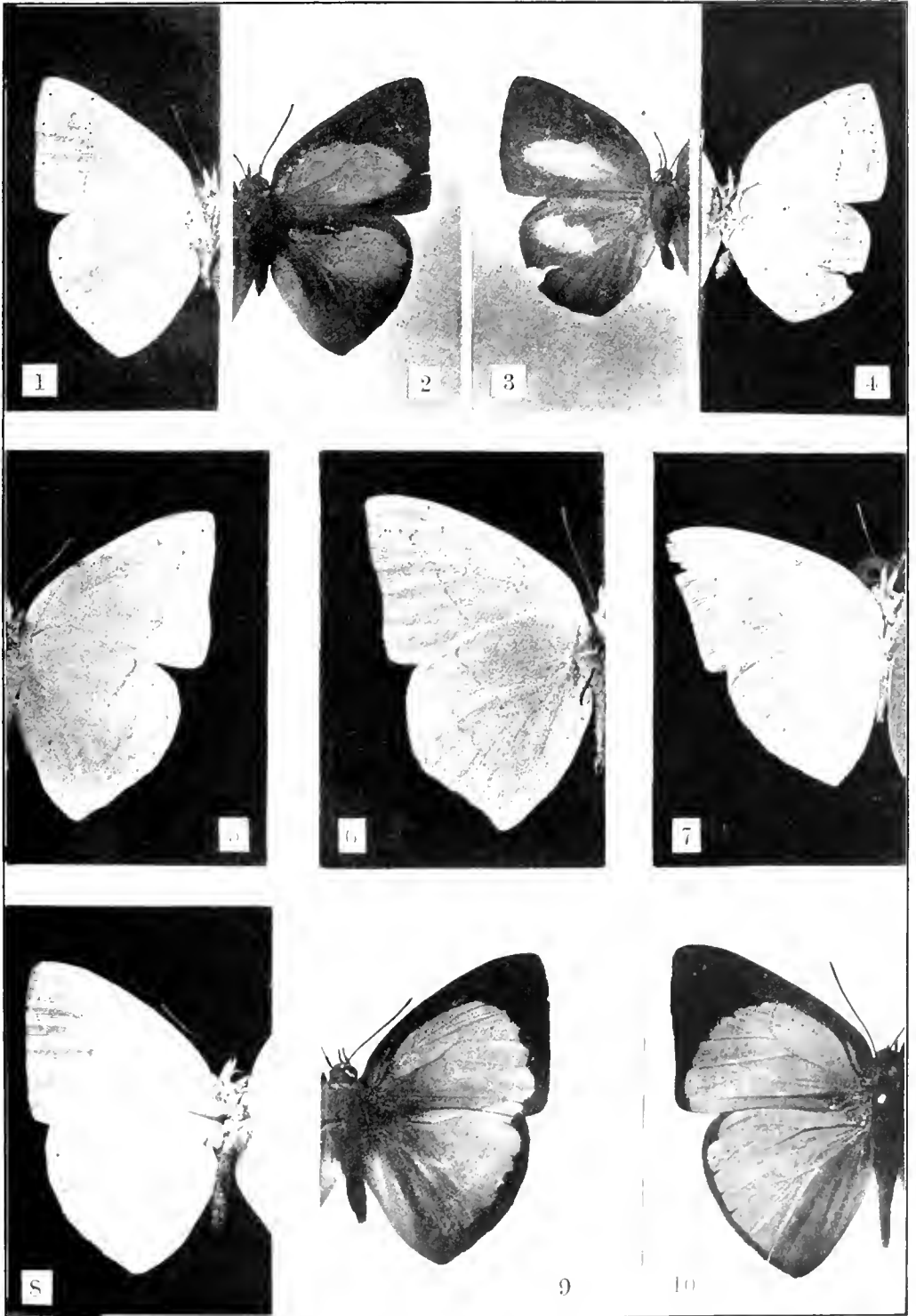


LARGE TEREBINTH TREE WITH RAVEN'S NEST IN THE OUED NÇA.



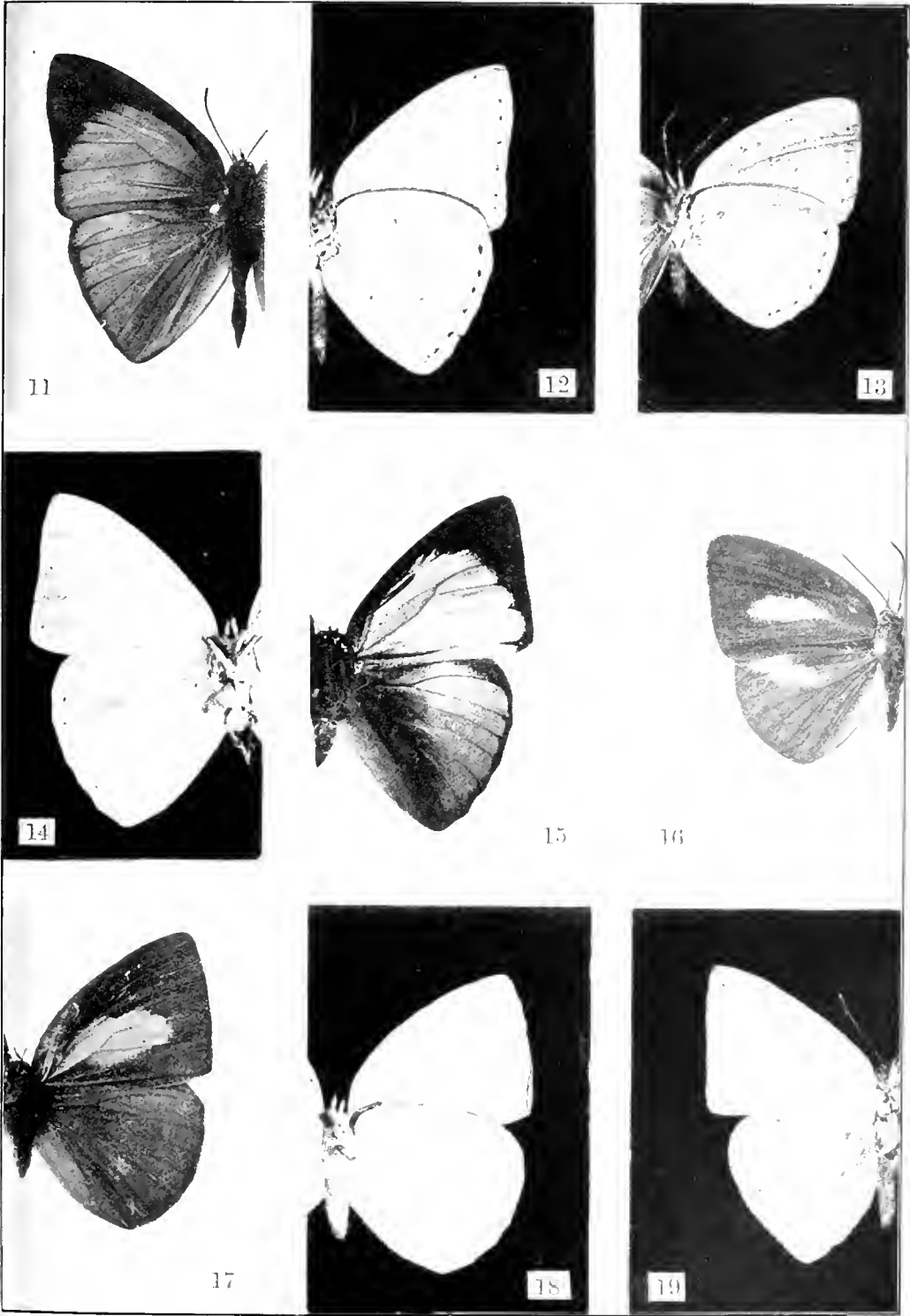
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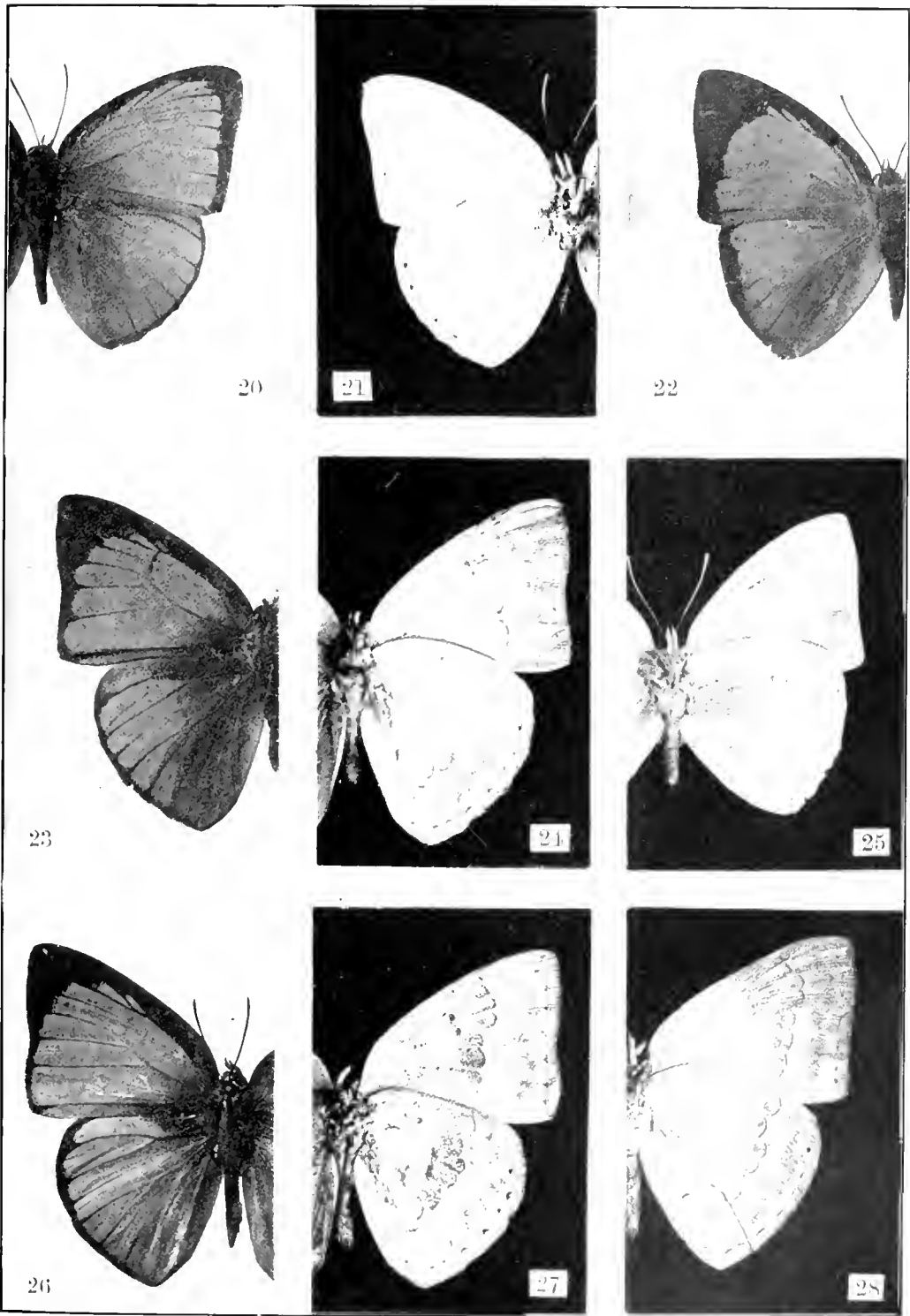




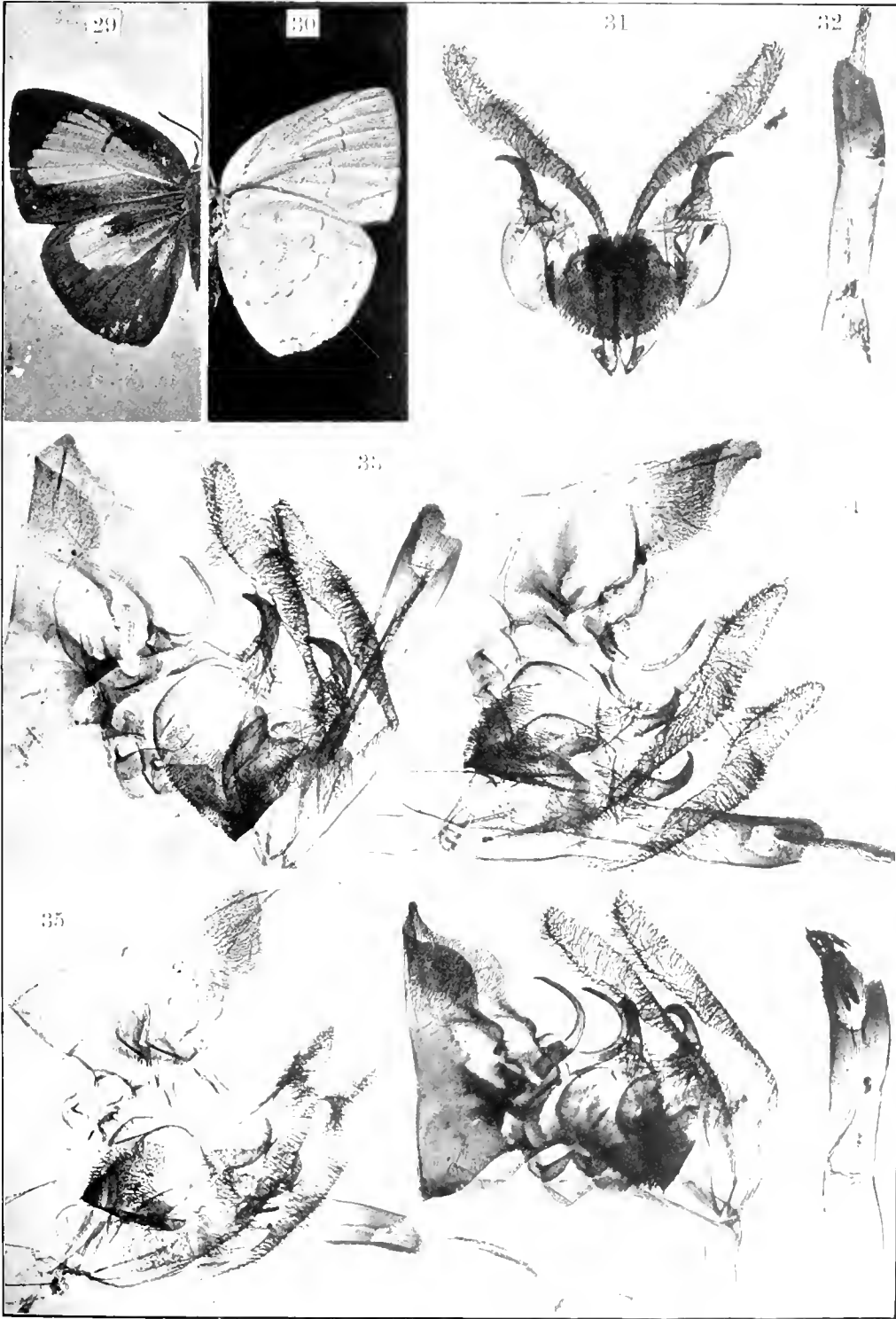






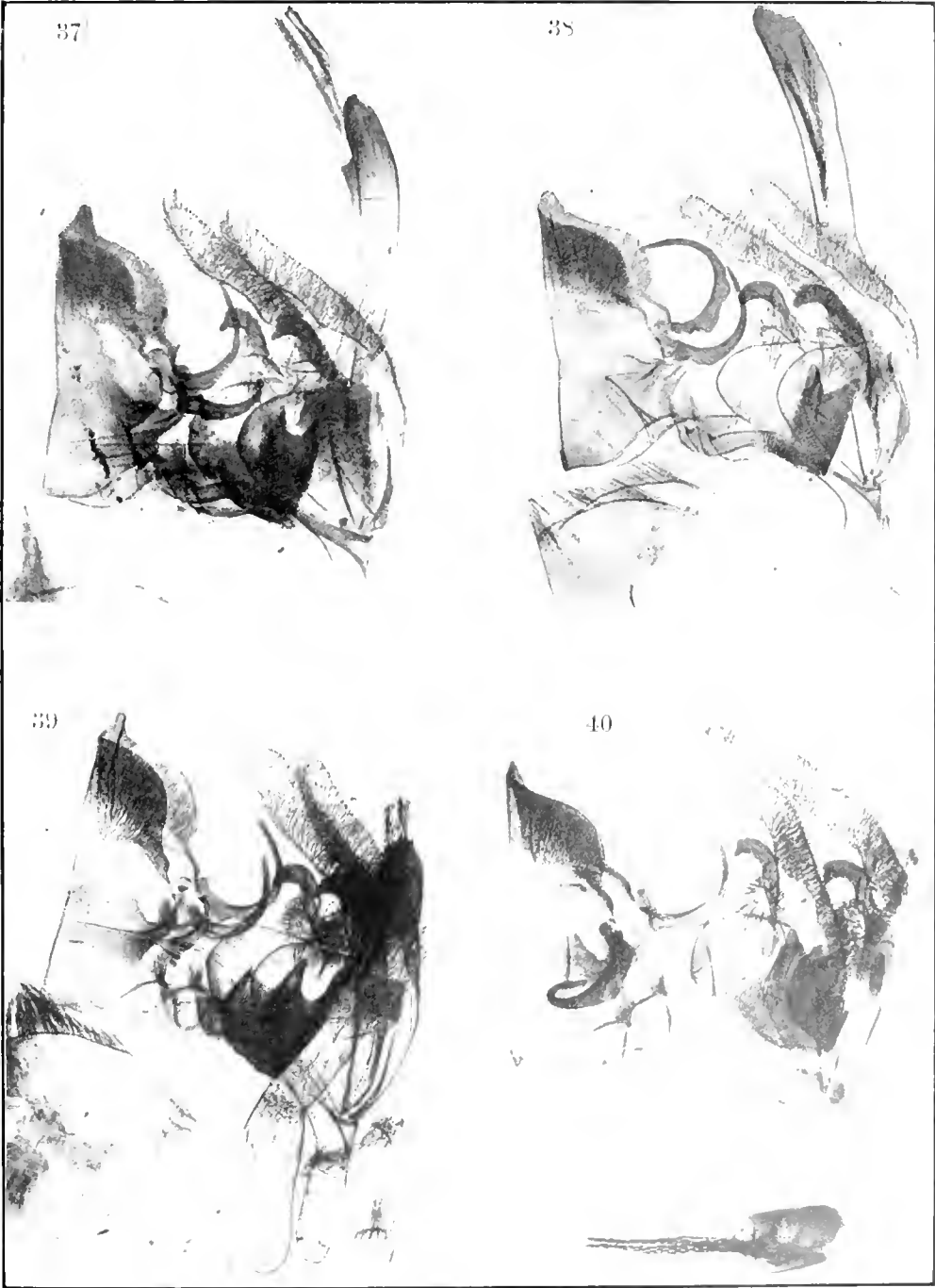






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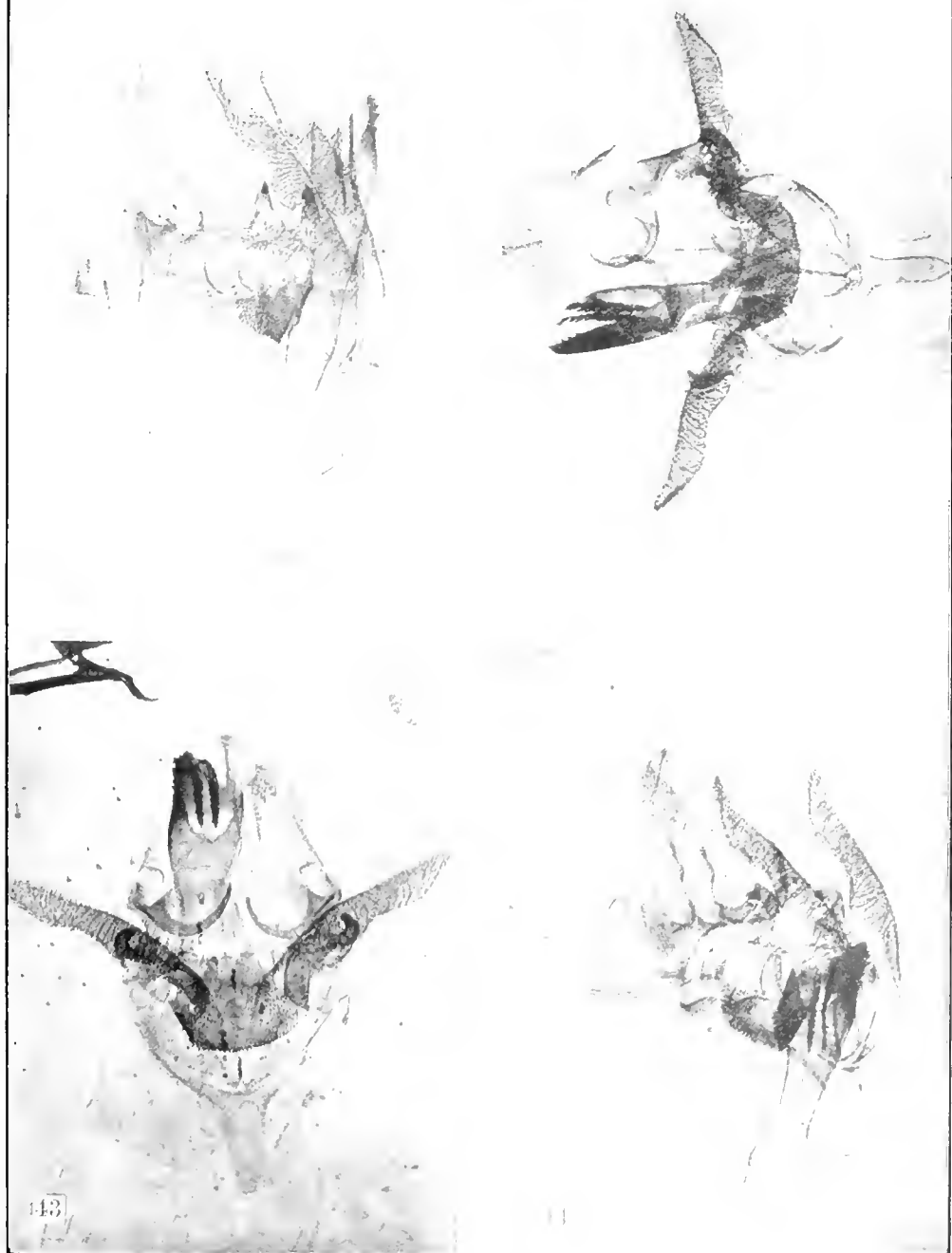


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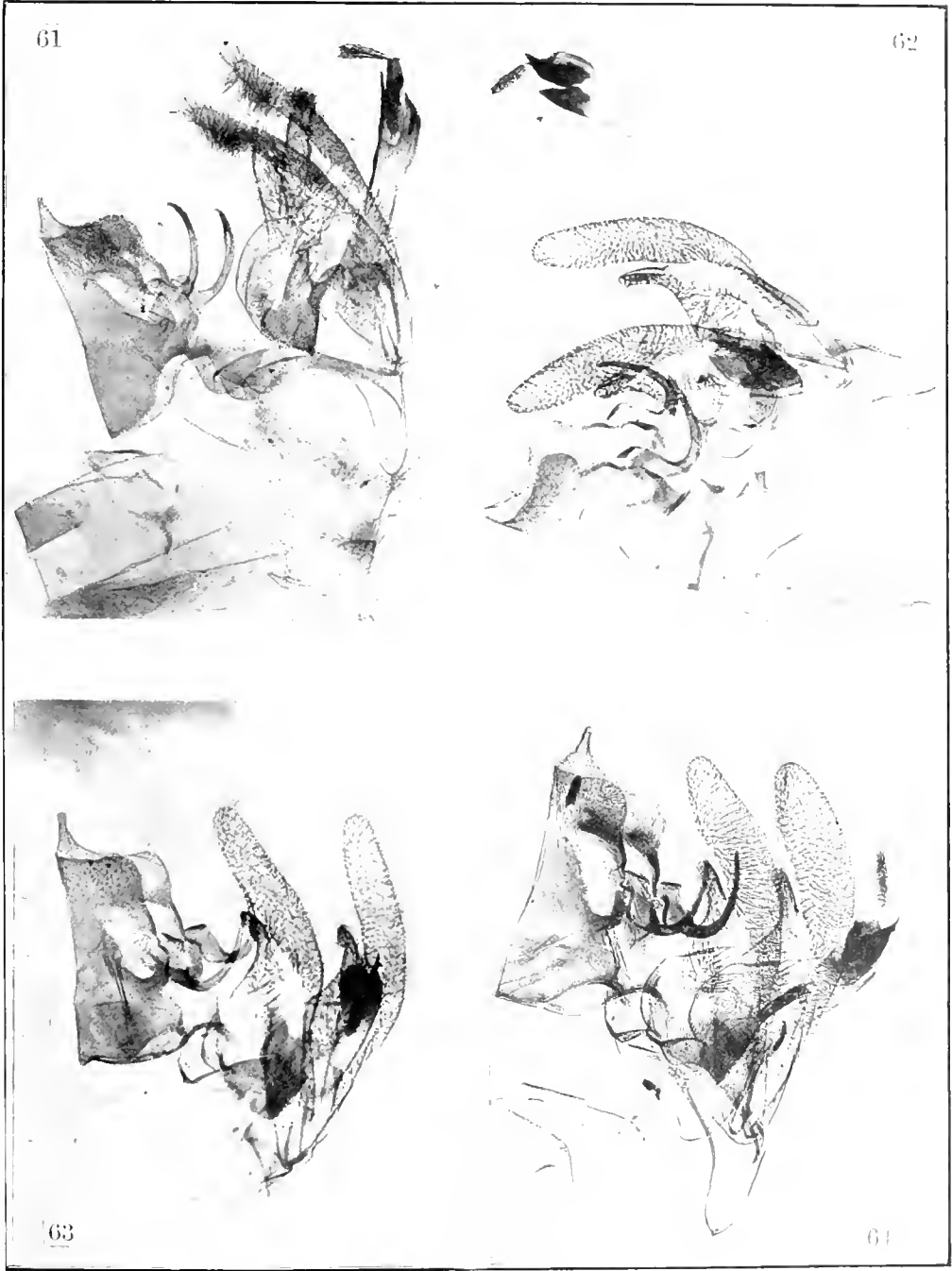
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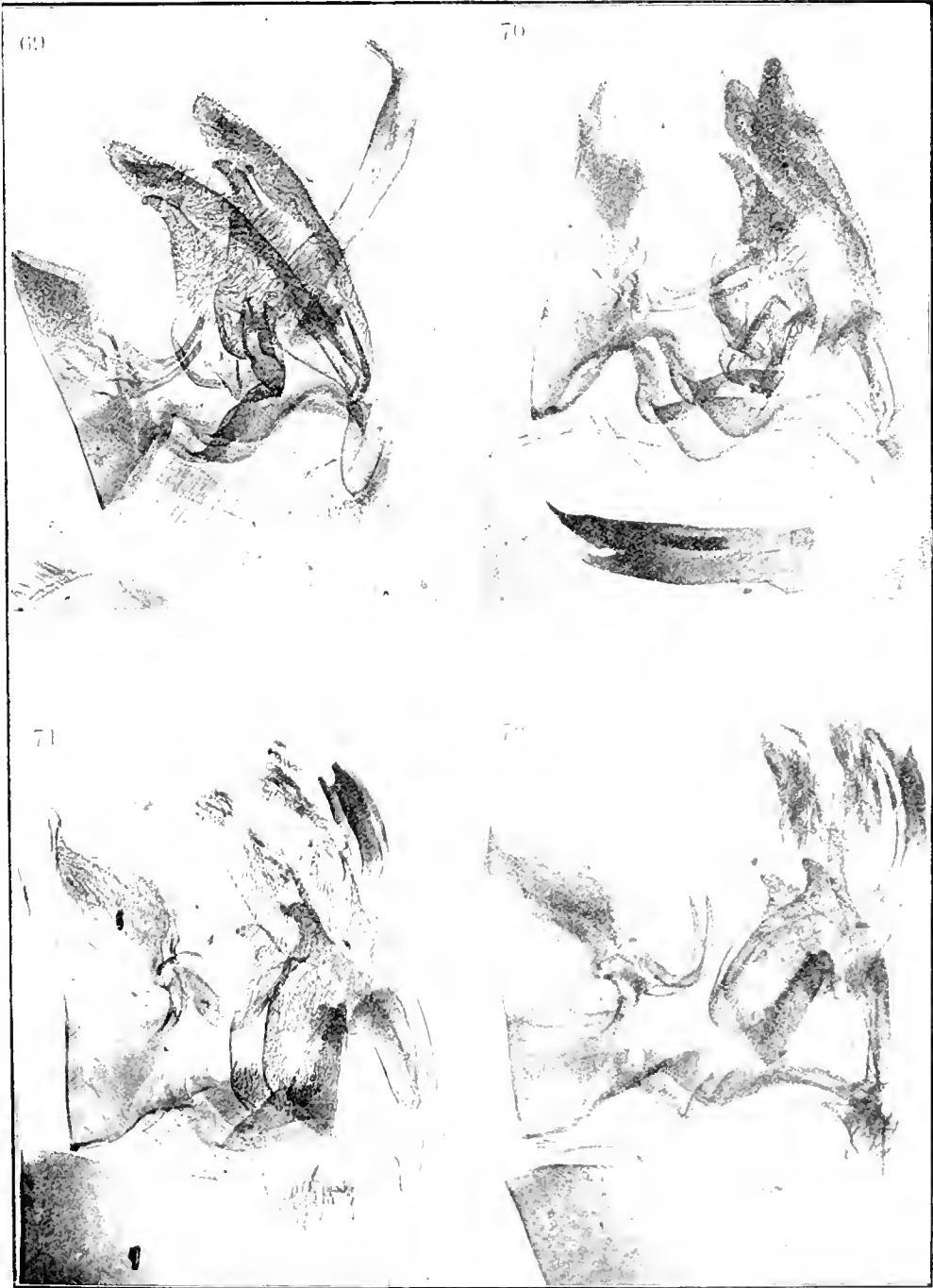
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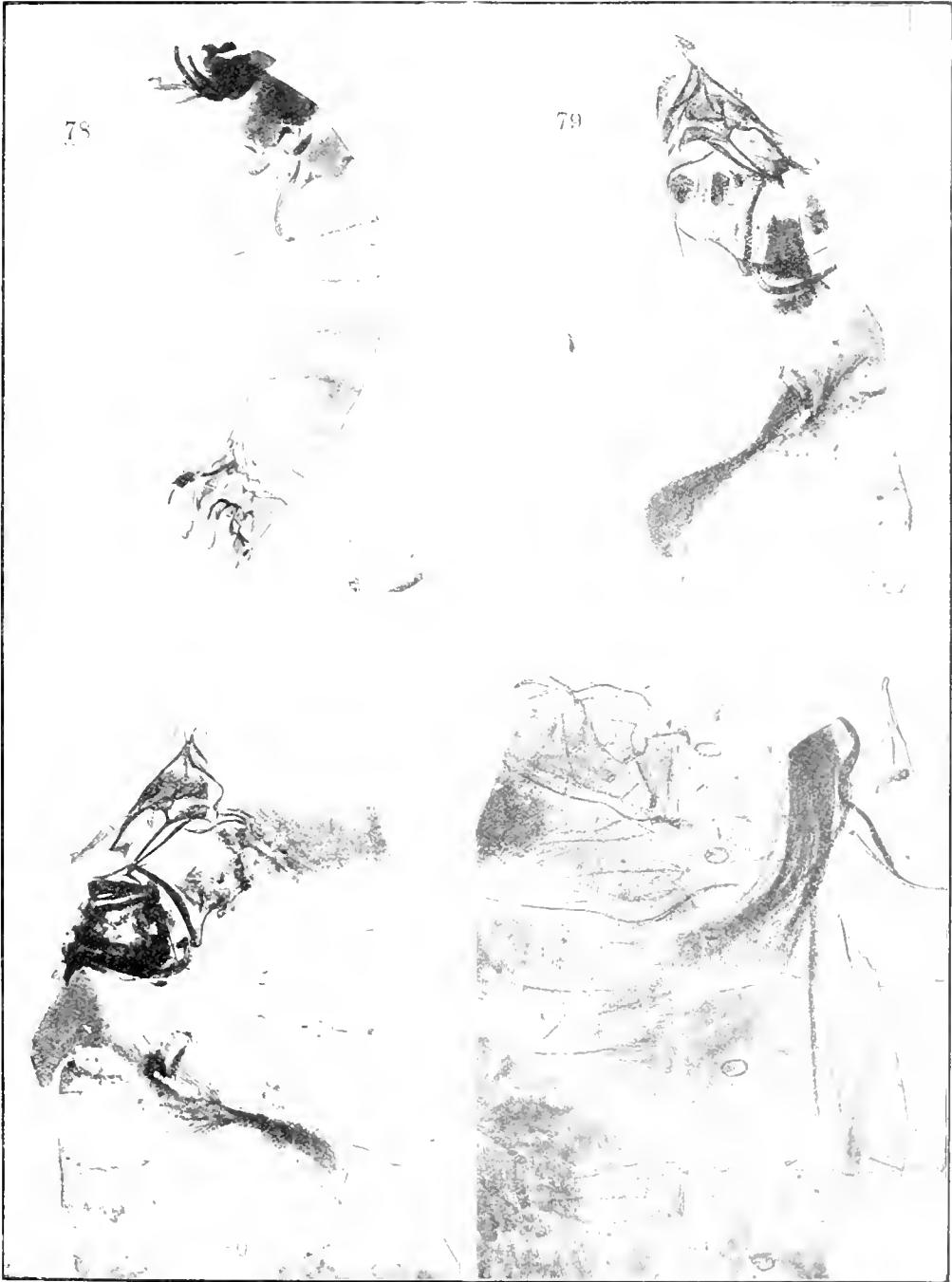
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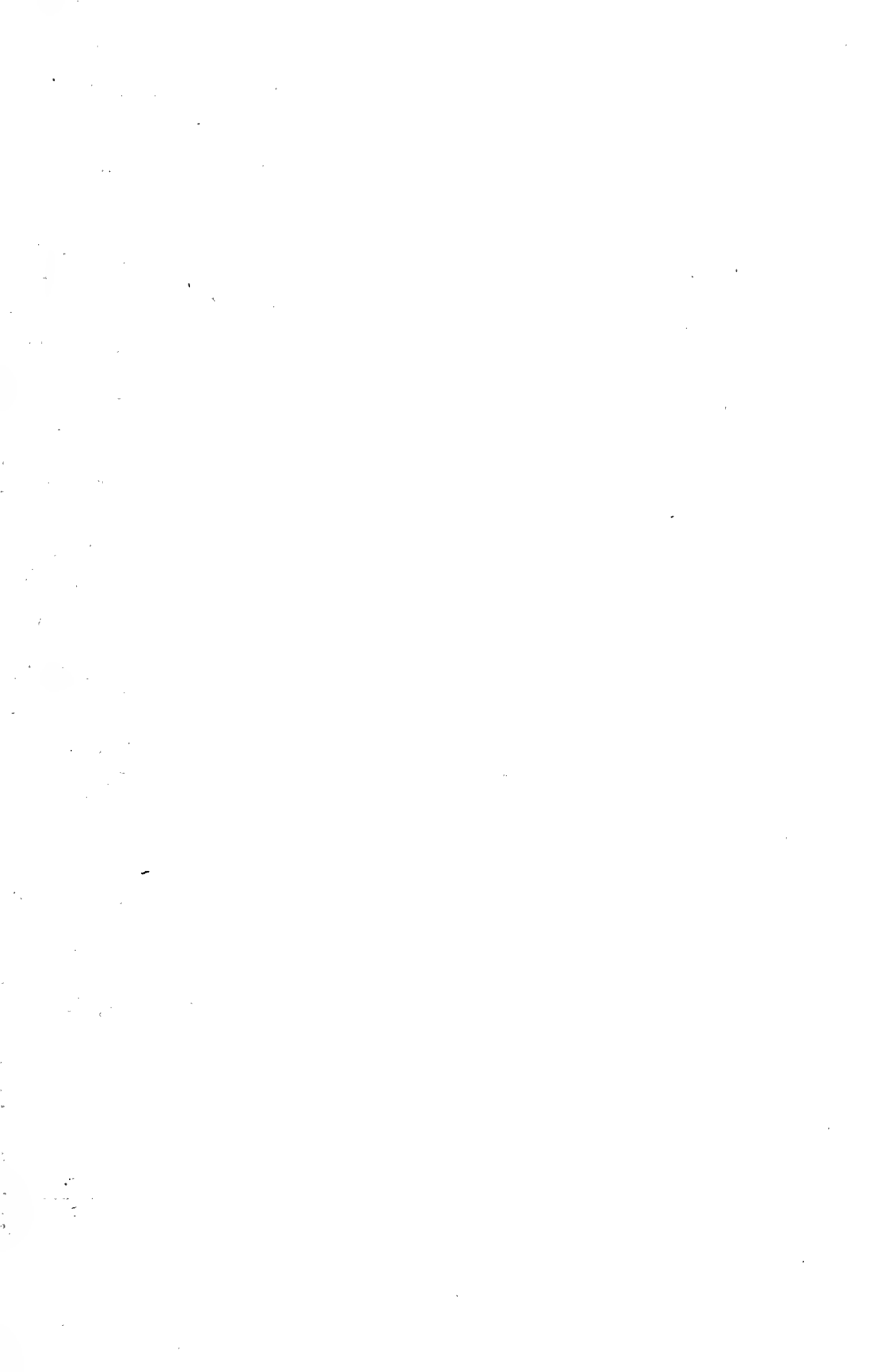
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## NOVITATES ZOOLOGICAE.

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# NOVITATES ZOOLOGICAE.

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No. 2.

## NOTES ON FALCONS.

By ERNST HARTERT, PH.D.

YEARS ago, when Professor Oscar Neumann worked at the Tring Museum, he and I met each other in our deep interest in the Falcons. Ever since when a boy in Breslau I saw a Peregrine chase pigeons round an ancient church tower, and when, a few years after, I saw them chasing their prey on the shores of the Baltic and the Masurian Lakes, and climbed the tall pine-trees in the forests of Rominten, took the beautiful red eggs and shot the adult birds, the Falcons have been my favorite birds; while Neumann was deeply interested in them, since he collected most interesting specimens in East Africa and Abyssinia. We went together to Norwich and made notes there on the wonderful series in the Museum, but the chief object of that trip of pleasant memories was the comparison of the type of "*Tinnunculus arthuri*," which had, until then, been quite wrongly interpreted.

We then made extensive notes, and intended to publish together a series of "Falkennotizen" in the *Journal für Ornithologie*, but the difficulty of solving certain questions, other pressing work, and, most of all, the distance apart of our residences, made us postpone, and at last forget altogether, our plans. Since then I had occasion to go through the palaearctic forms of Falcons and many of their allies, and to review them in Part VIII. of my *Vögel der paläarktischen Fauna*. Many new facts have come to light, but, looking over the MS. notes made by us six to eight years ago, I find that much of it might still be published with advantage, as it supplements what I wrote in my book, or refers to forms not mentioned there, and other notes seem to be of some interest, as they go more into detail than it has been possible in my book, or have become necessary from new facts known to me since the publication of Heft VIII. of the book, in August 1913.

Though I know better than others that the mere seeing and handling of material does not prevent an author from making mistakes, I may as well state that I have doubtless examined, and more or less minutely compared and studied, more Falcons than any one else. Apart from the magnificent series in the Tring Museum, I have spent many an hour over those in the British Museum, I have visited the Norwich and Leyden Museums and handled many Falcons there, have seen and partially studied the Falcons in the Museums at Berlin, Milan, Turin, Florence, Paris, Havre, and Marseilles, have had in my hands most of the specimens in the Koenig, Erlanger, and Kleinschmidt collections in Germany, the Tristram and Dresser collections in Liverpool and Manchester, and some skins have been sent to me from Sarajevo and Budapest, by Witherby and other friends.

## I.

*TINNUNCULUS ARTHURI.*

In his *List of Diurnal Birds of Prey*, Appendix I., p. 156, Gurney sen. described as a new species a Kestrel, which he named *Tinnunculus arthuri*. Sharpe, in his *Hand-list of Birds*, i. p. 277, enumerated it as a species, placing it between the European Kestrel and its Indian representative *saturatus*. Thus he appears to have had the same idea as Reichenow and Erlanger, who used the name *arthuri* for the richly coloured, dark Abyssinian form of our Kestrel. In his description of *T. arthuri*, however, Gurney compared it with *T. rupicoloides* from South Africa, saying that it is nearest to the latter, but differs from it by its much inferior size and certain differences in coloration. When we came to the Norwich Museum, we asked first of all to be shown *Tinnunculus arthuri*, and as soon as we saw it we exclaimed simultaneously "That is nothing but a diminutive *rupicoloides*, and should be a subspecies of the latter." A closer examination proved our first impression to be correct. It is not clear how Sharpe (who might have compared the type), Reichenow, and Erlanger came to consider *T. arthuri* to be a dark form of *tinnunculus*, as not a word in its original description, nor the locality (Mombassa), justify this point of view.

As it is, *arthuri* differs from *rupicoloides* only by its generally paler coloration, the closer barring of the upperside, and darker light spaces on the tail, as well as inferior size. The beautiful *T. fieldi* (Elliot, Field Columbian Mus., No. 2, *Orn.*, p. 58, 1897) from Somaliland is paler, lighter, and larger again. *T. rupicoloides*, *arthuri*, and *fieldi* are, therefore, not species which might be placed here or there and in various places in the genus to which they belong, as Sharpe did (*Hand-list*, i. p. 277), but geographical representatives, subspecies of one species :

*Falco rupicoloides*,

though not difficult to distinguish. Their nomenclature and distribution is as follows :

*Falco rupicoloides rupicoloides* Smith—South Africa.

*Falco rupicoloides arthuri* (Gurney)—East Africa ; probably only the steppe districts ; known to us from Mombassa and Machakos.

*Falco rupicoloides fieldi* (Elliot)—Somaliland.

In these birds the sexes do not differ, except in size ; both males and females have the sides marked with dark cross-bars.

The bird which was erroneously called *arthuri* by Sharpe, Reichenow, and Erlanger, has been named by Neumann and myself *Falco (Cerchæus) tinnunculus carlo* (*Journ. f. Orn.* 1907. p. 592).

## II.

THE SUBSPECIES OF *FALCO PEREGRINUS*.

Just as in *Corvus corax*—Kleinschmidt and I were the first to point out clearly the striking differences between the Spanish and Sardinian Ravens—ornithologists have, until quite recently, almost universally recognised only one form of Peregrine in Europe, or, if they had noticed that certain South-European birds differed from the "typical" Peregrine, they united it with the one inhabiting the whole of Africa Minor, which they called either *punicus* or *barbarus*—though Sharpe

(*Hand-list*, i. p. 274) admitted two species under those two names, both as occurring in the "Mediterranean countries" (thus in the same area!), and separating these two "species" by Australian and South American forms!

The distribution and nomenclature of the various forms of *Falco peregrinus* are, according to my views, at present as follows:

### 1. *Falco peregrinus peregrinus* Tunst.

*Falco Peregrinus* Tunstall, *Orn. Brit.* p. 1 (1771)—The name is based solely on "*B. Z.* 136," i.e. on the "Peregrine Falcon" on p. 136, vol. i. of the octavo edition of 1763 of Pennant's *British Zoology*. There is no doubt that the bird described there is an adult Peregrine; the terra typica for the name *peregrinus* is therefore Northamptonshire in England).

*Falco abietinus* Bechstein, 1805,

*Falco cornicum* Brehm, 1831,

and *Falco griseiventris* Brehm, 1833, refer to German Peregrines; if any one should separate German Peregrines from the British race, the name *abietinus* would have to be used, but I cannot, after having examined a good many specimens, a number of which were shot from nests in western, central, and eastern Germany, see any possibility of separating them. (For full references see *Vög. pal. Fauna*, ii. p. 1043.)

*Falco barbarus* subsp. *germanicus* Erlanger, *Journ. f. Orn.* 1903, p. 294 (Heldra, near Treffurt. I have compared the type in the Erlanger Collection, and there can be no doubt whatever—as already pointed out by Kleinschmidt, *Falco* i. p. 4—that this bird is an ordinary German Peregrine with a rufous nape-patch, which occurs occasionally, though rarely, either indicated or distinctly developed).

*Falco peregrinus rhemus* Kleinschmidt, *Berajah* 1913, "*Falco peregrinus*," pl. ix. (Kleinschmidt was of opinion that birds from the Rhine formed a separate subspecies, but I cannot confirm his views).

*Falco peregrinus britannicus* Erlanger, *Journ. f. Orn.* 1903, p. 296 (Great Britain. Type: Isle of Man, in Tring Museum. Erlanger had not understood or not looked up the original description of *Falco peregrinus* and thus created a clear synonym of *peregrinus*).

This form inhabits Europe from North Sweden and North Russia at least to the Pyrenees, Alps, and Italy, Bulgaria, Bosnia, Montenegro, Albania, Rumania. (For further details see *Vög. pal. Fauna*, ii. p. 1045.)

Mr. Rud. von Thanner informs me, in litt., that he shot a specimen on Fuertaventura (Canary Islands), the first known to have occurred there. It would be interesting to compare it, as it might possibly belong to *calidus*.

### 2. *Falco peregrinus calidus* Lath.

*Falco calidus* Latham, *Ind. Orn.* i. p. 41 (1790)—*India*. This appears to be the first description of the eastern race, and there is no doubt that it is that of a Peregrine.

*Falco lunulatus* Daudin, 1800, is a "better" name for *calidus*; *Falco leucogenys* Brehm, 1851, was given to German and Egyptian migrants.

Butorlin has described two other races: *F. p. ussuriensis* from Ussuriland and Japan and *F. p. harterti* from the Lower Lena to Anadyr, common on the Kolyma. I have seen his types, but in my opinion there is no ground on which to separate several Siberian races.

I have to add nothing to the characters which distinguish this race from *F. p. peregrinus*, as described on p. 1046, nor can I state with absolute certainty how far westwards it extends, but it seems as if it begins in West Siberia and perhaps even in the Kirghize steppes (where in any case it occurs as a migrant), and reaches eastwards to Anadyr and Kamtschatka. Its migrations are enormous, as is to be expected from a bird inhabiting countries with a very severe winter; while those of the North European race are very limited, since it remains in most of its habitats, and is only known, as a rule, to go south to the Mediterranean islands (Sardinia) in winter. *F. p. calidus* migrates regularly to India, the Lakkadive

Islands, Ceylon, Andamans, Greater and Lesser Sunda Islands, the Moluccas and New Guinea, Japan and China as far south as Hainan and Formosa. It occurs also in small numbers in Africa Minor: there is a fine specimen from Tunisia in Koenig's Collection in Bonn, and F. W. Riggenbach shot another in the district of Haha, south of Mogador in West Morocco, on November 20, 1905, where it is said to be known as a rare and precious bird to the falconers.

### 3. *Falco peregrinus anatum* Bp.

*Falco anatum* Bonaparte, *Geogr. & Comp. List*, p. 4 (1838—New Jersey).

North America from Alaska and Greenland to South Carolina; in winter the West Indian Islands, Panama, and South America. Twice in England.

It is, however, not quite certain that all North American Peregrines belong to one and the same race. I wish to call attention to the possible occurrence of a smaller and lighter race in the southern states, because an adult ♀ from Texas does not well agree with others, and migrants from South America differ perhaps more in size than we find to be the case in Europe and Asia.

### 4. *Falco peregrinus brookei* Sharpe.

*Falco Brookei* Sharpe, *Ann. & Mag. Nat. Hist.* (4) xi. p. 21 (1873—Sardinia. Type collected by A. B. Brooke, in Brit. Mus.)

*Falco caucasicus* Kleinschmidt, *Falco* iii. p. 62 (1907—N.E. Caucasus).

(This is the *Falco puniceus* of various authors. It is most beautifully figured in Irby's *Orn. Straits of Gibraltar*, pl. opposite p. 191, under the name "Mediterranean Falcon.")

This is a small Peregrine with dark and bright underside. The amount of slaty black barring varies a good deal, as in all Peregrines; sometimes the male is closely barred from the under tail-coverts to the crop-region, which itself is spotted with black; the sides and thighs are very light though distinctly grey, and the middle of the under-surface with a reddish or creamy-red tinge. Sometimes the barring is scarce, and in that case the reddish colour of the underside is very dark and bright, while the sides are rather paler greyish. From *F. p. peregrinoides* this bird is distinguished at a glance by the darker upperside, greyish sides, heavier barred and spotted under-surface and slightly larger size.

This bird inhabits Spain (how far north I am unable to say), the northern peninsula of Morocco, Corsica, Sardinia, doubtless the Balearic Isles; and most probably the Falcons nesting on Elba, Monte Christo and other Mediterranean islands belong to *brookei*, probably also the birds nesting on Sardinia and in parts of South Italy. It also occurs in South France, for there is at least one very fine adult male from the neighbourhood in the museum at Marseilles, but whether it nests there or occurs only as a straggler, I am unable to say. It has been obtained in North Tunisia, as there is a fine example in Koenig's collection, and Giglioli and Whitaker mention Tunisian specimens, the latter, however, only immature ones. As *F. p. peregrinoides* appears to nest in Algeria and Tunisia up to the Northern Atlas range (at least on the Djebel Taya and elsewhere in Eastern Algeria) our *F. p. brookei* can, in my opinion, only be a somewhat rare straggler in the country. Eastwards *brookei* ranges through Malta, Greece, Cyprus, Rhodes, and Asia Minor to the Caucasus. The type of *F. caucasicus* Kleinschm. agrees perfectly with Spanish and Sardinian examples. The Asia Minor birds were considered by Dresser to belong to "*F. minor*," but later on he



discovered his error and united them with "*punicus*," to which he assigned the distribution "North Africa, Rhodes, Asia Minor rarely." This was correct, but not half enough, and involuntarily misleading. "North Africa" extends from Morocco to Egypt, but our bird is only known to breed in the Northern Peninsula of Morocco, near Tangier; moreover Southern Spain is not mentioned, though Mr. Dresser should have known that it nested there, if only from the beautiful plate in Irby's *Ornithology of the Straits of Gibraltar*.

(It must be added that these birds, like *F. p. pelegrinoides*, get richer and darker reddish underneath in captivity, at least in England. In former years *F. p. pelegrinoides* used to be introduced into England from Mogador by the dealer Castang of Leadenhall Market, and one was kept at Tring by Mr. Rothschild for a number of years, and when it died it was very dark and bright rufescent underneath. The same occurs in *F. p. peregrinus*; a ♀ which lived in Sarajevo is quite rust-red underneath; see also figures in *Berajah* 1912 and 1913.)

### 5. *Falco peregrinus pelegrinoides* Temm.

*Falco pelegrinoides* Temminck, *Pl. Col.* 479 (October 1829 or January 1830—Nubia! Good plate only spoiled by the bright yellow iris, which, of course, is brown).

*Falco punicus* Levaillant jun., *Explor. Algér. Ois.* pl. i. (1850—a much discussed plate, which, however, cannot be meant for *F. p. brookei*, but only for *pelegrinoides*, as is specially clear from the longitudinal rufous patches on the sides of the hind-neck, which do not occur to that extent in *F. p. brookei*. Loche and Kleinschmidt had correctly interpreted Levaillant's plate, most authors between the two having misunderstood it.)

(This is the *Falco barbarus* of most authors. The name *Falco barbarus* can, however, not be accepted for any Falcon. *F. barbarus* Linnaeus, *Syst. Nat.* ed. x. i. p. 88, 1758, is only a name for Albin's "Barberry-Falcon" (Albin, pl. 2). Albin's figure is unrecognisable: it has no black or blackish stripe on the sides of the head, and it has large white patches on the upper wing-coverts. There is no Falcon of this group which lacks the dark stripe under the eye, or which has white patches on the wing-coverts.)

One might be in doubt if this Falcon should be treated as a subspecies of the Peregrine, or as a distinct species, but I have no doubt that—from my point of view—the former course is the right one. I am glad to say I agree in this with Neumann, Kleinschmidt, and many others.

This bird breeds on the eastern Canary Islands, in Middle and Southern Morocco to the Southern Atlas Chain, Algeria as far south as the Aurès Mountains and El-Kantara, Tunisia north of the Atlas, Egypt and Nubia. Near Chartum, according to Mr. A. L. Butler, it is not rare, at least in the winter, but we have, as far as I know, no record of its nesting so far south. How far east this bird ranges is as yet uncertain. Birds of this group have been shot in South Arabia and in Eritrea. Professor Neumann shot an adult bird at Lahej in South Arabia, where also Dodson obtained it on August 25 (adult male in moult!), and in September (young). These birds were called "*Falco barbarus arabicus*" (Erlanger, *Journ. J. Orn.* 1903, p. 293). Whether this form is separable from *F. p. pelegrinoides* cannot at present be settled, as too few specimens are extant. These appear to be slightly darker on the upperside, and are somewhat greyish laterally, but there is not sufficient evidence to show that this supposed form can be separated. If that should be the case, Abyssinian birds would belong to the same form. Mr. Schrader shot an adult and a young bird in Eritrea in January, and the former is also rather dark on the upperside for typical *pelegrinoides*. Whether these birds nest in Abyssinia or in South Arabia is uncertain. Erlanger's diagnosis of his *F. b. arabicus* is not clear. He talks of differences from "East- and South-African birds," where,

however, no allies are found, according to Erlanger's own list, as he (cf. p. 300) placed "*Falco minor*," which he wrongly confused with Temminck's *pegrinoides*, in another group.

The real discovery of this Falcon as a resident on the Canary Islands is due to Captain Polatzek. Cabrera had one specimen, and therefore thought it was an irregular straggler. Meade-Waldo mentioned it under the name of "*Falco barbarus*," but he had only seen it from a distance, and therefore his identification was only guesswork. Polatzek has, with much loss of time and great perseverance, collected several specimens, of which the Tring Museum possesses four, evidently all which the collector obtained. A fine adult female was shot on Fuerteventura on June 27, 1902, an adult male on June 22, 1904, and a young female in much worn plumage on May 13 of the same year. An adult female was shot on Lanzarote on November 12, 1904. Polatzek saw a nest on Lanzarote, and he observed the species on Montaña Clara, where, years after, it was seen by Mr. Bannermann, who also procured a fine specimen on Lanzarote.

By some unexplainable oversight I have, in *Vög. d. pal. Fauna*, ii. p. 1053, omitted the Canary Islands as a habitat of *F. p. pegrinoides*, though specimens and notes were lying before me on the table when I wrote.

The habits of this fine Falcon are in every way those of a Peregrine. In Algeria I have seen it carrying a Wood-pigeon and chasing Rock-doves, and it is said to be a great enemy of *Caccabis*. On the eastern Canary Islands Polatzek saw it chasing and striking, or otherwise ascertained as its food, wild and tame pigeons, sandgronse, domestic fowl, and a kestrel.

I copy the following untranslated detailed note from one of Polatzek's labels of the adult male: "Oberschnabel: Spitze und Zahn schwärzlichblau, nach rückwärts in Blau übergehend, noch weiter nach hinten in gelb übergehend; Unterschnabel: Spitze dunkelblau, nach rückwärts lichter, seitlich gelblich, rückwärts mattgelb. Wachshaut orangegeb. Iris matt, sehr dunkelbraun. Augenlid orange. Füsse orangegeb."

## 6. *Falco peregrinus babylonicus* Sel.

*Falco babylonicus* Selater, *Ibis* 1861, pp. 218-20, pl. vii. (Oudh, Babylonia, ? Abyssinia). (Types in the Norwich Museum compared by Neumann and myself).

(Generally Gurney is quoted as the author of the name *babylonicus*, but not correctly; the "author" of a species is, of course, the person who "distinguished" it or gave a diagnosis of it. In the article mentioned above (p. 218) Irby says: "Mr. Selater kindly supplied me with the following remarks on this hitherto undescribed bird." Then follows a description by Selater, in which he says: "Mr. Gurney proposes to use the name *Falco babylonicus*, the first specimen having been obtained in Babylonia by the Euphrates Exploring Expedition." Farther on he says: "Besides Capt. Irby's specimen I am acquainted with the following individuals." Selater is, therefore, the author, notwithstanding that Gurney had suggested to him the name *babylonicus*).

Sclater, Gurney, Irby, and Sharpe were perfectly right in separating this form from what they called "*barbarus*," though it is the nearest ally to the latter, i.e. our *pegrinoides*. Blanford (*Fauna Brit. India*, Birds, iii. p. 417, 1895) and Dresser (*Man. Pal. B.*, p. 546, 1902) united it with their "*barbarus*," and Kleinschmidt called it "schwer definierbar," and mentions of its characteristics only the greater extent of red on the head. In fact, *F. p. babylonicus* differs also constantly and strikingly by the narrower and less black streak on the sides of the head, and generally—at least in freshly moulted birds—by the lighter bluish-grey colour of the upperside: this character is, however, not so distinct in females, which are

generally darker. The greater amount of red on the head is also striking, but it varies greatly; sometimes the red extends almost over the whole crown, which has merely a brown spot in the centre. Between this extreme and typical *pelegrinoides* all intergradations can be found, but every specimen of *babylonicus* has more red than any *pelegrinoides*. In all other points *babylonicus* agrees with *pelegrinoides*. It is a mistake to associate *babylonicus* with the group of *biarmicus* and *tanypterus*; it is an ally of the Peregrines, and closely allied to *pelegrinoides*.

This bird is found from Turkestan to the desert of Gobi (teste Koslow), to Mesopotamia, Persia and Baluchistan. In winter it is not very rare in North-West India. A. E. Brehm shot a male at Luxor in Egypt on March 9, 1852; Koenig a female at Oschematto, not far from Dongola, on February 19, 1903, which Koenig and I consider to belong to *babylonicus*. Though *pelegrinoides* is the bird nesting in Egypt, there is no reason why *babylonicus* should not stray there in winter.

### 7. *Falco peregrinus minor* Schleg.

*Falco minor* Schlegel, *Abh. Geb. Zool. & Vergl. Anat.* 2 Heft, iii, p. 20 (about 1844—Cape of Good Hope).

(For names which cannot be used for this form and further details about synonymy see *Vög. pal. Fauna*, ii, p. 1050.)

Very closely allied to *F. p. brookei*, but differs as follows: Head and upper back are, as a rule, still darker, rump and upper tail-coverts generally more distinctly barred with black. There is, in the specimens which we have been able to examine, no reddish patch on the nape, though, when one lifts the nape-feathers, a reddish hue is often discernible. The underside is more or less pale reddish, the sides distinctly grey. Generally smaller than *brookei*: ♂ ad. Zanzibar (Tring Museum): wing 274 mm. (not 173 as said by Erlanger); ♂ ad. Songea: wing 287 (not 187); Stanley Pool, Congo: wing 282; "Cape of Good Hope," ex Verreaux, locality, therefore, possibly inexact (in Norwich Museum): wing 275; ♂ ad. breeding, Fazogli, 4. v. 1911, A. L. Butler coll.: wing 275 mm. Schillings shot a young bird in Masailand (Berlin Museum). Young birds appear to be lighter underneath than those of *brookei*. This form nests in tropical Africa, north to Fazogli on the Blue Nile (A. L. Butler), and in South Africa. Dresser and others formerly believed that the Peregrines nesting in Asia Minor belonged to this form; but that is not the case: they are *F. p. brookei*, the Mediterranean race.

### 8. *Falco peregrinus radama* Hartl.

*Falco radama* (ex Verreaux MS.), Bonaparte, *Rev. & Mag. Zool.* 1854, p. 535\* (Nomen nudum!);

Hartl., *Journ. f. Orn.* 1861, p. 12 (Nomen nudum! Madagascar); Hartlaub, *Oen. Beitr. Fauna Madagascars*, p. 17 (1861—First description!).

This interesting form was first "described" by Hartlaub in 1861. He is therefore the author of the name *radama*, although he did not recognise it as different from *minor*, on p. 10 of his work on the birds of Madagascar in 1877. Nor was it separated by Messrs. Grandidier and Milne-Edwards in their great work on Madagascar.

Erlanger, *Journ. f. Orn.* 1903, p. 300, characterised *F. p. radama* well, stating how it differed from *minor*, which he erroneously called "*peregrinoides* Smith." The head, nape and back are still deeper and purer black than in *minor*,

\* Not 536!

and the black reaches farther backwards. Rump and upper tail-coverts are still more distinctly and more sharply barred with black. The sides of the head are almost black, as in *F. p. peregrinus*. The young birds which I have examined are underneath white, with a faint yellowish tinge, and with wide, sharply defined black longitudinal streaks. An adult male from East Madagascar (Tring) has the wings 289 and 285 mm. An adult male from West Madagascar, Voeltzkow coll., 30.iv.1891, in the Berlin Museum, has the wings, according to Neumann, 276 mm. There are also young birds collected by Hildebrandt and by the late Rev. Wills, in the Berlin and Tring Museums, and I have seen others in Paris.

### 9. *Falco peregrinus peregrinator* Sund.

*Falco peregrinator* Sundevall, *Physiogr. Sällskapetets Tidskr.* Lund i, p. 177, pl. 4 (1837—caught under 6° 20' north lat. at sea between Ceylon and Sumatra, 70 Swedish miles from the Nicobar Islands).

For synonyms see *Vög. pal. Fauna* ii. p. 105f, where also a short description is given.

Forests of India, east to South China.

### 10. *Falco peregrinus ernesti* Sharpe.

*Falco ernesti* Sharpe, *Ibis* 1894, p. 545 (Borneo, collected by Mr. Ernest Hose).

This is the darkest of all Peregrines. The top of the head, sides of head and back are deep bluish-black, the underside of adult birds is closely barred with black.

This beautiful race is found and appears to breed on the greater Sunda Islands, the Philippines and New Guinea. Cf. *antea*, p. 49. Birds from Java are either *F. p. calidus* in winter quarters, or *ernesti*, but certainly not "*melanogenys*."

Peregrines have also been collected on the Fiji Islands, in New Caledonia, and on the New Hebrides. If they were resident on those groups, a series of adult birds would perhaps show them to differ from their allies, but they are more likely only stragglers of "*melanogenys*," or maybe of *ernesti*; young birds are very dark. Dr. Sarasin did not come across Peregrines in New Caledonia, but Layard obtained specimens on the east and west coast (Sarasin, *Die Vögel Neu-Caledoniens und der Loyalty-Inseln*, p. 9, 1913).

### 11. *Falco peregrinus macropus* Swains.

*Falco macropus* Swainson, *Anim. in Menag.* p. 341 (January 1838—Tasmania).

*Falco melanogenys* Gould, *Synops. B. Austral.* pt. iii. pl. 42 and text (April 1838—"Australia generally."—Mathews, *List B. Australia*, p. 111, says "Tasmania;" but Gould says distinctly "Australia generally," and also in the contemporary description in *Proc. Zool. Soc. London*, part v. 1837, p. 139, published in December 1838, he says, "Hab. per totam Australiam." Mr. Mathews can therefore not say "Tasmania." If, in some way, he has found out that Gould's type—though he probably had a number of specimens from various parts of Australia—came from Tasmania, he must quote "'Australia generally,' which is erroneous, as Gould had only one skin from Tasmania, as shown in such and such a way").

This well-known form is not rare in several portions of Australia and Tasmania. I must say that I am not thoroughly convinced that Swainson's description is that of a Peregrine.

It runs as follows: "Above, cinereous black, immaculate; beneath, fulvous white, striped with blackish; wings as long as the tail; feet very large; middle toe and claw much longer than the tarsus."

"Form and structure of *F. cucullatus*. Total length near 16 in.; wings  $12\frac{1}{2}$ ; tail, base 7; tarsus  $1\frac{7}{10}$ ; middle toe 2; the claw  $\frac{6}{10}$ ; total  $2\frac{6}{10}$ . A perfectly adult bird. The stripes beneath are dark and well defined; and there is no detached maxillary stripe. The ground of the under plumage is cream-colour; the inner covers with broad transverse bands, leaving cream-coloured spots between; the bill and feet are very large; the tail short, and nearly even."

Is this undoubtedly the Australian Peregrine? If so, the name *macropus* must replace the well-known *melanogenys*, as Mr. Mathews discovered that Swainson's work appeared three months before that of Gould! "Unfortunate discovery" P. L. Selater would have said.

Mr. Mathews (*Austral Arian Record*, i. p. 33) separated another Australian Falcon under the name of *Falco peregrinus submelanogenys*. His diagnosis is: "Differs from *F. p. melanogenys* in its much more rufous under-surface and larger size." "Type, South-west Australia, No. 4489." Such a diagnosis is next to useless; nothing is said about the dimensions, nothing of the number of specimens compared, whether they were adult or not. Had Mr. Mathews been acquainted with the colour-variations of all forms of Peregrine Falcons he would probably not have created this new name. We should have been thankful for fuller details, which appear to be indispensable in such a difficult case.

## 12. *Falco peregrinus pealei* Ridgw.

? Partim: *Falco nigriceps* Cassin, III. *B. California, Texas*, etc., "1856," p. 87 (1853—California to Chile).

*Falco communis* var. *pealei* Ridgway, *Bull. Essex Inst.* v. p. 201 (December 1873—Oregon).

? *Falco rufolphi* Kleinschmidt, *Falco* v. p. 19 (1909—Hakodadi, North Japan).

Very much like *F. p. peregrinus* and *anatum*, but the crown and nape are not so blackish, more slate, the throat and breast have generally black shaft-lines and often tear-shaped longitudinal marks, also frequently hidden basal cross-bars or irregular cross-markings. Tail mostly very dark, rump widely barred. Young birds are very dark; the feathers of the upperside have no rusty-brown edges, even when in fresh plumage; the under-surface has very deep brown and wide stripes, sometimes nearly black. The bill is, as a rule, very powerful.

The distribution is peculiar: according to the *A. O. U. Check-list* it inhabits the Pacific coast region of North America, from the Commander and Aleutian Islands to Oregon, breeding throughout its range. According to Stejneger's careful researches (*Res. Orn. Expl. Commander Islands and Kamtschatka*, 1885, p. 296), one of the birds which he collected on Bering Island agrees perfectly with the type of *F. p. pealei*. In the Tring Museum are a pair of adult birds, the female with bare incubating-patches, shot on May 11 on Dionisio Island, Vulcan Group, south of Hondo (Japan); these birds agree, I think, in every way with *F. p. pealei*. Their beaks are very powerful, the sides of the head very black, the white indentation behind the black cheek-stripes are very short, the crown is slate-coloured, sides ashy grey (a little lighter in the ♀). Wings: ♂ 318, ♀ 367 mm. The type of *Falco rufolphi* (knowing that it is a Peregrine our friend might have indicated this in his name by trinomials) appears to agree perfectly with our female from Dionisio

Island; its wing measures, according to Kleinschmidt, in litt., 366 mm. Stejneger gives the wings of his specimens from Bering Island as follows: ♂ ad. 324, ♀ ad. 382 and 385 mm.; but Ridgway measures his American specimens as 317–331 (males) and 369–375 (females). The young birds which Mr. Stejneger described are possibly specimens of *F. p. calidus* which were on passage. More material of breeding birds is desired, to understand better the characters and distribution of this Falcon.

### 13. *Falco peregrinus cassini* Sharpe

*Falco Cassini* Sharpe, *Annals & Mag. Nat. Hist.* (4) xi. p. 221 (1873—"Straits of Magellan and Chili").

A form with extremely black sides to the head and generally very dark. It appears to inhabit southern South America, at least from Chile to the Falkland Islands. I am inclined to think that all South American breeding Peregrines must belong to *cassini*, while *anatum* is a winter visitor, and so might possibly be *pealei*.

### 14. *Falco peregrinus riphaeus* But.

*Falco peregrinus riphaeus* Buturlin, *Psorcia i Razheimia Okhota* xiii. 7. p. 99 (1907—Southern Ural Mountains. In Russian!).

Buturlin wrote to me that this form is "still darker than typical *F. peregrinus* from Western Europe, which Menzbier calls *cornicum*." That is all we know of this bird in Western Europe! It is a great inconvenience that Russian ornithologists treat us with descriptions of new species and subspecies in Russian sporting magazines and in the Russian language. The object of describing new forms ought to be to increase the knowledge of the scientific world, and not merely to gain priority for a name by a description which is not available to and is not understood by nearly all ornithologists out of Russia.

No specimens are known to me in any Museum outside of Russia.

### *Falco fasciinucha* Rehw. & Neum.

*Falco fasciinucha* Reichenow & Neumann, *Orn. Monatsber.* 1893, p. 1114 (Ndara, Teita, February 1895, collected by Oscar Neumann); Neumann, *Journ. f. Orn.* 1899, p. 52, pl. 1.

I have seen the type and unique specimen—unfortunately not "sexed"—in the Berlin Museum, but I must confess that I would not like to give a definite opinion about it without comparing more specimens, and, if possible, unmounted (as skins) and sexed. Neumann (*Journ. f. Orn.* 1899, p. 52) compared the bird with *Falco carieri*, which is not an ally of the Peregrines, but I am inclined to share the opinion of Kleinschmidt and Erlanger (*Journ. f. Orn.* 1903, p. 292) that it is a form of Peregrine. It is to be hoped that one day more such birds may reach our European museums.

## III.

### THE LANNER FALCONS.

This group of Falcons rivals the Peregrines in beauty and interest. It is a grand sight to see them from afar enthroned on the cliffs of the bare mountain ranges which extend across the Sahara in the clear atmosphere and grand desert sun, or to see them dashing after their prey along the gours or the oneds of the plateau of Tademaït and its southern escarpment.

Until quite recently the various forms have not generally been understood. Even ten years ago so great an ornithologist as Mr. Dresser did not separate the obviously different form *feldeggi* from *tanypterus* and *erlangeri*. One can easily understand that *erlangeri* was not separated from *tanypterus*, as they are hardly separable, though the former is certainly a little smaller, but the lumping of *feldeggi* with *tanypterus* is incomprehensible; that it has been practised so often, is evidently only because the true *feldeggi* is, in collections, a somewhat rare bird.

If one examines a series of these various forms, it becomes evident that they can only be regarded as subspecies of one species, though perhaps *feldeggi* is the most distinct of the five races, while *biarmicus* and *erlangeri* are connected through *abyssinicus* and *tanypterus*. In all "Lanners" the first primary is abruptly scooped out before the tip, and the second shows also a distinct, though not so sharp a narrowing of the inner web, sometimes, especially in birds in immature plumage, quite indistinct.

### 1. *Falco biarmicus biarmicus* Temm.

*Falco biarmicus* Temminck, *Pl. Cul.* 324, livr. 55 (1825—Caffraria and Cape Colony).

Undoubted synonyms are *chiquoides* Smith 1830, *cervicalis* Schlegel 1844, and *capensis* Schlegel 1862; cf. *Vögl. d. pal. Fauna*, ii. p. 1057.

Generally distinguished from its allies by the coloration of the underside, which is almost uniform and of a very rich hue, only the flanks showing a few black spots or short bars.

Inhabits South Africa, in the west, north to Angola; in East Africa it appears to go as far north as the Victoria Nyanza and Lake Kivu, but the specimens from these countries are exceedingly puzzling. Rudolf Graner shot an adult female at Kissenyi, on the shores of Lake Kivu, on September 25, 1907, and an adult male in the Rutschnu plain, between Lakes Albert Edward and Kivu, on January 14, 1908 (Nos. 1840 and 1127 of his collection). Both have a perfectly unspotted breast and middle abdomen, but are cross-barred and spotted on the flanks, a little more than in South African typical *biarmicus*.

I should consider these two birds as belonging to *F. biarmicus biarmicus*, but this form seems to merge into *abyssinicus* in East Africa. At Irangi and on Lake Victoria Nyanza specimens occur which, though perfectly adult, have black spots on breast and abdomen, while others are like typical *biarmicus* (Neumann, in litt., from examination of good series in Berlin Museum).

### 2. *Falco biarmicus abyssinicus* Neum.

*Falco biarmicus abyssinicus* Neumann, *Journ. f. Orn.* 1904, p. 369 (Abyssinia, Shoa, Galla countries).

Type, ♂ ad. from Shoa (Turrabolonka in Kolla), 21. ix. 1900, collected by the author, in the Tring Museum.

This form has been well characterised by Neumann, in the *Journ. f. Orn.* 1904, pp. 369–371 and 405–406. Its underside is more and more largely spotted than in *F. b. biarmicus*, and this is the only difference from the latter; it is therefore strange that it has been united with *F. b. tanypterus*, and not with *biarmicus*, though Professor Reichenow allows both forms to be found in Abyssinia. From *F. b. tanypterus* this form differs by its more intense coloration; the black frontal band is always wide and undivided, the crown dark rufous with a cinnamon tinge, the blackish colour of the upperside is deeper, darker, the under-surface more reddish than in *F. b. tanypterus*, though occasionally difficult to distinguish. Measurements:

♂ ad. 326-346, ♀ ad. 363-375, according to Neumann, in litt., even 385 is a specimen in the Berlin Museum.

This is the tropical representative of *F. b. tanypterus* and *erlangeri* in Africa. It is found in the mountains of Abyssinia, from Eritrea and Shoa to the Galla countries; it occurs on the Blue and White Nile, and probably throughout the Sudan, in suitable localities, to Nigeria, and probably also to Senegambia. There are three specimens from Togo in the Berlin Museum; one of these is an adult female, and very pale; though its colour is about as pale as in some specimens of *F. b. erlangeri*, there is no doubt that it must belong to *abyssinicus*, because the latter is not rare in Hausaland; the other two examples are young birds and therefore not very enlightening. That these birds are palaearctic *erlangeri* is not to be supposed; Reichenow's idea that *F. b. tanypterus*—at that time *erlangeri* was not yet separated—strayed on migration from the Mediterranean countries into tropical Africa is unjustified, because all these Falcons are residents and not at all migratory; in fact, they seem generally to inhabit rather limited areas throughout the year, only *F. b. feldeggii* seems to stray about a little more, though it is not a real migrant either.

Lorenzo Poggiolini sent us the following specimens from Nigeria:

♀ ad. Zaria, Hausaland, 6. x. 1912; in beautiful fresh plumage, outer primaries not fully grown.

♀ ad. Zaria. 9. xi. 1912. In full plumage.

♂ ad. Kaduna River, province of Zaria; no date; wings and some of the body feathers still growing.

These birds inhabit the isolated, steep, rocky hills which are found here and there in Northern Hausaland; it was doubtless these Falcons which I saw in 1885 on the rocks of Kotorkoshi, in the province of Samfara, and not "*F. barbarus*," as I suspected then; unfortunately I was then unable to shoot any of these birds, for we were travelling and could not make unnecessary stops; my ammunition, after the loss of the bulk of it on the Niger, was scarce, and the malaria had so weakened me that I was not good for long tramps and rock-climbing after a day's march.

### 3. *Falco biarmicus tanypterus* Schleg.

*Falco tanypterus* Schlegel, *Krit. Verh.* ii. p. 11 (1844—"Nubien und Abyssinien." Thus "partim!"); id. *Abh. Geb. Zool. u. vergl. Anat.*, 2. Heft, iii. pp. 8, 16, pl. xii, xiii.—"Nubien."

Synonyms are *Falco lunarius alphanet* Schlegel, and *Falco lunarius nubicus* Schlegel. Cf. *Vög. pal. Fauna*, p. 1056.

Not so dark on the upperside as *F. b. abyssinicus*, also generally paler underneath. Dimensions similar. This form has been well described and figured by Schlegel, though he changed its name afterwards.

The plate xii. (see above) is taken from the specimen no. 998 in the Berlin Museum, plate xiii., either from a Leiden example or from no. 1002 in Berlin. Both the Berlin specimens were collected by Hemprich and Ehrenberg. Other specimens from Upper Egypt and Nubia, collected by Brehm, Koenig, and others, agree fully with the above.

This fine Falcon appears to be less widely spread than its allies, though it ranges from Egypt and Nubia to Arabia, Palestine, and Fao on the Persian Gulf. In collections it is therefore now probably the rarest, since so many collections have been made in many parts of tropical Africa and in Africa Minor. In Brehm's



times it was probably more numerous in Egypt and Nubia than it is nowadays. The Tring Museum has, at present, the following specimens :

(1) ♀ ad. Maufalut, Middle Egypt, 20. x. 1851, A. E. Brehm coll. A magnificent specimen with the cheek-stripe very faintly marked ! Upperside pale, very "typical" *tanypterus*.

(2) ♀ ad. Label lost ! A. E. Brehm coll. Upperside almost as dark as in *abyssinicus*, underside paler.

(3) ♂ ad. from the Rioconr collection. "D'Égypte." This bird had an interesting label on the stand. It is first called "*Falco lanarius*"; then is added : "*Falco lanarius græcus*," "identifié à Leide par M. Schlegel." On the side of the label is, in P. L. Sclater's handwriting : "true *lanarius* (J.H.G.), eye ought to be hazel." This last remark because the bird-stuffer had inserted eyes with a yellow iris !

The name *lanarius* Linné has been used sometimes for the Nubian Lanner, sometimes and more often for the Saker (*F. cherrug*). Schlegel himself was not sure about his *græcus*, a name under which he seems to have assembled specimens of *feldeggii* and *tanypterus*.

(4) ♀ ad. Jerusalem, 24. i. 1899. Bacher coll. Bought from Schlüter.

(5) ♀ ad., but apparently not very aged, Raïs, near Tibouk, Palestine, 13. iii. 1912. J. Aharoni coll. This bird is underneath exceptionally heavily spotted, each feather having a dark brown shaft-stripe and a similarly coloured large roundish spot near the tip ; there are hardly any cross-bars on the flanks.

(6) ♀ juv. Kom Ombo in Nubia. A. E. Brehm coll. Original label lost, but label in C. L. Brehm's handwriting, who marked it "*Falco Feldeggii*, ♀ prima hieme."

(7) ♂ juv., El Tabbe, Nubia, 8. ix. 1851. A. E. Brehm coll. The collector had called it "*Falco lanarius*," and this had been altered by his father into "*cervicalis*," "*tanypterus*," and "*biarmicus*."

(8) ♂ ad., Upper Egypt, 3. iii. 1852. A. E. Brehm coll. Original label lost. Label by C. L. Brehm, called "*Falco biarmicus*," and with the note that it was killed with same shot with a paired female ; the latter is probably the specimen under (2) which has no label.

In the British Museum is a skin from Aden which both Neumann and I considered to belong to this form, also one from Fao, Persian Gulf, collected by Cumming.

The specimens in the British Museum said to be from Persia are probably wrongly labelled. No collector's name is stated, and they were evidently bought from a dealer by the late R. B. Sharpe.

There is, however, in the Tring Museum a specimen from Sarepta, on which I have commented in *L'og. pal. Fauna*, ii. p. 1956. If the bird actually came from Sarepta it must have been astray. The date (May) is probably wrong.

#### 4. *Falco biarmicus erlangeri* Kleinschm.

*Falco Hierofalco erlangeri* Kleinschmidt, *Aquila* viii, p. 33 (1901—Tunisia and Tanger in North Morocco). (Type : ♀ ad. Djebel Sidi-Âli-ben-Aoun, in Kleinschmidt's Collection, collected by Carlo von Erlanger).

*Falco Hierofalco tschousii* Kleinschmidt, *Falco* 1907, p. 103 (Tanger in North Morocco).

This form is so closely allied to *F. b. tanypterus* that it will not be separated by many ornithologists. There is, however, no doubt that it is, on the whole,

smaller, especially the females; it is also more constantly very pale, both above and below; but this is not so confidently to be affirmed, because I have now been able to examine ten times as many as of *F. b. tanypterus*. The wings of fifteen adult males measure 308–324, generally 310–314; those of seventeen adult females 338–359, generally 340–350 mm.; while in *F. b. tanypterus* the males range from 314–325, females 355–373 mm.

This beautiful Falcon is the “Lanner” of Africa Minor. It nests near Tanger (North Morocco), and ranges in Tunisia right up to the north, close to the Mediterranean coasts. Koenig found it breeding on the Djebel Batteria, Erlanger met with it frequently in Central Tunisia, and the dealer Blanc, in the town of Tunis, is frequently receiving freshly killed specimens from natives. At the same time Mr. Whitaker writes: “This fine species is a resident in Tunisia, and the commonest of the large Falcons, particularly in the more southern regions.” In Algeria we have not with certainty seen or received this Falcon from the north; the large Falcons from North Algeria which we have examined were all *F. peregrinus pelagrinoides*. It nests, however, on the Hauts Plateaux between Laghouat and Djelfa, between El-Kantara and Batna, and southwards from the southern slopes of the Atlas regions, far south into the Sahara, at least to the southern slopes of the plateau of Tademaït, where I have seen it dashing through the picturesque gorge of Aïn-Guettara, the “dribbling well,” as it is so justly called.

This Falcon is well known to the Arabs, who still use it for hunting hares and also Bustards, probably also *Caccabis* and Sandgronse. This sport, however, has much declined, and appears now to be only known as far south as Biskra and Laghouat, and not in the north of Algeria, where the Arab chiefs are too much “civilised” or effeminated. It is, as it was of old in Europe, of course only the sport of noblemen, as it is essential to have good horses for falconry. It can, therefore, not be practised in the more southern parts of the desert, where horses, on account of the scarcity of water, are rare; and hard-soiled plains, as on the Hauts Plateaux or near Biskra and Laghouat, are essential for fast riding, while it is impossible among the sand-dunes and in the slippery sebcha plains as well as on the rough hammada. The Arabs call these Falcons “Tair” or “Tail-el-hor,” the latter meaning the “Noble Falcon”; they do not, however, seem to distinguish between the Lanner and the “Barbary Falcon,” i.e. *F. p. pelagrinoides*. In former times falconry was a much more beloved and practised sport in Algeria; it was a prerogative of the aristocracy, and, I believe it is still. Certain tribes were particularly called the “hell-el-tair,” i.e. falcon-people. Such were, in the middle of the nineteenth century, according to the late General Margneritte, the Oulad-Mokhtar, Oulad-Chaïd, Oulad-Naïl, Oulad-Aïssa, and the Bon-Aïche. The celebrated Emir Abd-el-Kader was a great friend of falconry and had an intimate knowledge of the various kinds of falcons; he distinguished between five different kinds of falcons used for sport. Even then the “Lanner” was the principal falcon used, and they were, among others, caught in the dayats near Tihrempt. Hares were chiefly the victims, but sometimes even gazelles. Eagles were not used, but the falconers were in great fear of them, and tried to call their birds back when eagles appeared. In the middle ages northern falcons were introduced into Africa Minor from Scandinavia, as we are told by Margneritte, who hunted with Abd-el-Kader.

The nests of *F. biarmicus erlangeri* stand chiefly in crevices and large holes or caves on cliffs, sometimes very high, sometimes quite low and easily accessible.

Near Biskra, however, we found a nest on a cliff in an old raven's nest, and in the Oned Nça in the Mزاب country old nests of ravens on the terebinth trees are used, and doubtless the same takes place in the dayats between Laghouat and Ghardaïa, where this Falcon still occurs.

The food consists chiefly of birds, but not entirely, for we found in one shot on the Oned Nça the gizzard and stomach full of remains of the Spine-tailed Lizard, *Uromastix*. Doubtless Rodents and other small mammals are sometimes taken as well, or else these falcons could not be used for hawking hares, and we found in one the jaw of a hedgehog!

These birds are apparently not entirely confined to Africa Minor, where they are found from the west coast of Morocco to Tunisia, and doubtless also in Tripoli, though no specimens have so far been obtained there. It appears that in southern Spain falcons of the Lanner group breed on trees, in nests of other raptorial birds, and they would probably belong to this subspecies. It is most desirable that specimens should be procured in Spain during the spring and carefully compared. (Cf. Irby, *Orn. Straits Gibraltar*, 2nd ed., p. 193, also Jourdain in litt.)

### 5. *Falco biarmicus feldeggii* Schleg.

*Falco Feldeggii* (doubtless error for *feldeggii*) Schlegel, under plate 8a in *Vogel Europas von Sassenühl mit Text von Schlegel* (about 1843 or 1844). The plate appeared doubtless later than plates 8 and 9, as it is printed on different paper, and is not mentioned in the text to the first forty-six plates. It must, however, have appeared before the description in the *Abhandlungen*, because it is there quoted on p. 31.

*Falco Feldeggii* Schlegel, *Abh. Ges. Zool. u. vergl. Anat.* iii. pp. 2, 3. pl. 10, 11 (about 1844—, Dalmatia, discovered by Feldegg).

(For synonyms see *Vög. pal. Fauna*, pp. 1057, 1058.)

Ad., crown dark, upperside always distinctly barred with greyish pink (in *F. b. erlangeri* this barring is sometimes very distinct, more often absent); underside nearly always strongly spotted, though in a varying degree; thighs barred across.

Breeds in Italy and Dalmatia to Greece, Albania, Montenegro (common), Bulgaria (not numerous), Herzegovina, South Italy, chiefly Calabria, Puglie, northwards to Rome, north of the Etruscan mountains apparently only an irregular visitor, but not nesting, Sicily.

We have, at present, the following specimens in the Tring Museum:

1. ♂ ad., Crna Zemlja, North Albania, 15. ii. 1900. L. von Führer coll. Wing 344 mm.
2. ♀ ad., Crna Zemlja, 4. xi. 1900. L. von Führer coll. Wing 374 mm.
3. ♀ ad., Crna Zemlja, 7. ii. 1900. L. von Führer coll. Wing 358 mm.
4. ♂ ad., near Foggia, Puglia, South Italy, 28. v. 1907. Wing 323 mm.
5. ♂ ad., Foggia, Puglie, May 1909. Wing 307 mm.
6. ♂ ad., Aviano di Puglia, South Italy, 10. i. 1913. Wing 317 mm.
7. ♀ ad., Manfredonia, Puglie, 10. i. 1912. Wing 345 mm.
8. ♀ ad., Lecce, South Italy, October 1912. Wing 360 mm.
9. ♀ ad., San Severo di Puglia, 12. xii. 1912. Wing 357 mm.; head, neck, back, and outermost primaries in moult.
10. ♀ ad., Anguillara, Sabazia, near Rome, October 1912. Wing 362 mm.
11. ♀ ad., Montefiascone, near Lago di Bolsena, Middle Italy, 29. v. 1906. Wing 358 mm.

12. ♀ ad., Montefiascone, 15. v. 1906. Wing 356 mm.
13. ♀, San Severo di Puglia, 11. viii. 1911. This bird is in adult plumage, but a few brown feathers (juvenile) remain on wings and back. Wings in full moult.
14. ♀ ad., Foggia, 14. ix. 1912. Outermost wing-feathers still growing.
15. ♀, San Nicandro di Puglia, 4. i. 1910. Head and neck in fresh plumage of adult; on back and rump a few adult feathers in the juvenile plumage; underside with longitudinal marks.
16. ♂, Terracina, near Rome, 14. xii. 1910. In full moult from juvenile to adult plumage, except on tail and wing.
17. ♀, Canepina, near Viterbo, Middle Italy, 14. iv. 1911. Moult from juvenile to adult plumage beginning on upperside.
18. ♂, Viterbo, November 1910. Like No. 17. Most advanced on head and neck.
19. ♂, Foggia, Puglia, 10. i. 1906. Upperside in moult from juvenile to adult plumage.
20. ♂, Viterbo, Middle Italy, 10. xi. 1907. Above and below moulting into adult plumage, but less underneath.
21. ♀ juv., San Severo, Puglia, 10. iv. 1907. First sign of moult into adult showing on neck and rump.
22. ♂ juv., Oriolo Romano, near Rome, 10. x. 1906.
23. ♀ juv., Foggia, Puglia, 10. x. 1907. Moult into adult beginning on back.
24. ♀ juv., near Foggia, 14. v. 1908. Moult on neck.
25. ♂ juv., Foggia, 5. v. 1911. Moult beginning on neck and mantle.
26. ♀ juv., Terracina, near Rome, 16. iii. 1911.
27. ♀ juv., Foggia, December 1910.
28. ♀ juv., Manfredino, Puglia, January 1911. Upperside moulting into adult.
29. ♀ juv., Terracino, near Rome, 11. xii. 1908. Like No. 28.
30. ♀ juv., Foggia, January 1913. Little moult on mantle.
31. ♀ juv., Apricena, Puglia, 7. viii. 1906.
32. ♀ juv., Foggia, Puglia, 2. xii. 1909.

#### IV.

##### *FALCO CHERRUG.*

I have nothing to add to what I said in *Vög. pal. Fauna*, pp. 1959–1962, about the “Saker” and its subspecies. I consider it to be a totally distinct species, and I have not been able to convince myself that it “intergrades” with any form of *Falco biarmicus*. I call special attention to what I said *loc. cit.*, p. 1960.

#### V.

##### THE NORTHERN FALCONS.

These Falcons surpass the rest in beauty, but also in the difficulty of their elucidation.

I now distinguish the following forms:

*Falco rusticolus rusticolus*: N. Scandinavia to North Russia.

*Falco rusticolus islandus*: Iceland only.

*Falco rusticolus candicans* : Greenland and Arctic America.

*Falco rusticolus obsoletus* : Labrador.

*Falco rusticolus uralcensis* : North Siberia.

I am afraid some lengthy explanations are necessary—though partially given in *Vög. pal. Fauna*, ii. pp. 1064–1069—to justify my view, and I shall compare it with three other recent attempts to separate these Falcons into species and sub-species : each different from mine as well as from each other !

First with regard to nomenclature :

In the most important point of this I agree, as usual, with the *A. O. U. Check-list*, as far as priority is concerned. I also accept the name *rusticolus*, which is the oldest of all, dated from Linnaeus, 1758. Though its diagnosis in the *Syst. Nat.* Ed. x. i. p. 88, is very meagre, the fuller description in *Fauna Suecica*, 2nd ed., 1761, enables us to understand, in my opinion, what Linnaeus meant with his *rusticolus*. It is therefore advisable, because it simplifies matters, to accept the name rather than let it stand with a query and threatening to be taken up afterwards by any purifier of nomenclature. Thus *Falco gyrfalco* becomes a synonym of *rusticolus*.

The Greenland bird can only be called *candicans*, and in this we all agree. The Iceland bird is, by general consent, called *islandus*, though Brünnich united the Iceland and Greenland Falcons.

American ornithologists (*A. O. U. Check-list*, 1910, p. 163) allow to occur in North America :

1. *Falco islandus*.
2. *Falco rusticolus rusticolus*.
3. *Falco rusticolus gyrfalco*.
4. *Falco rusticolus obsoletus*.

This is obviously wrong. First of all they seem not to have grasped the fact that **the Northern Falcons vary individually like Buzzards**. They evidently distinguish their four forms by some colour-differences ; but how such closely allied forms as the *F. islandus* and the Gyrfalcons can be more than subspecies, I do not understand, and less, how two birds described from Sweden can be two different subspecies, both breeding in North America.

Mr. Ogilvie-Grant has shown me at least one evidently adult dark Falcon from Labrador, which has convinced me that there is such a form as "*obsoletus*"; this is most fortunate, as otherwise, if it were based on dark young *candicans*, the name *obsoletus*, being older than *candicans*, would have to be used for the Greenland Falcon !

With regard to the American *islandus*, it is the Greenland form, our *candicans*, while their *F. rusticolus rusticolus* and *gyrfalco* are merely colour-variations of *candicans*. Should a bird occur in North America which is indistinguishable from the Scandinavian form, it would by me be regarded as either a stray bird, or as a proof of the correctness of my view, that all Northern Falcons are but subspecies, because sometimes indistinguishable.

In the *Hand-list of Birds*, vol. i. p. 276, Sharpe distinguished between :

1. *Hierofalco* \* *candicans* : Arctic Regions, Greenland, N.E. America, W. Europe (occasional).
2. *Hierofalco islandus* : Iceland.

\* An unnecessary burden ! Moreover wrongly limited, because all the Lanner group belong to the same section, having absolutely the same structure of the feet and otherwise.

3. *Hierofalco holboellii*: S. Greenland.
4. *Hierofalco rusticolus*: Arctic America.
5. *Hierofalco obsoletus*: Labrador.
6. *Hierofalco gyrfalco*: N. Europe.

There are some obvious errors in this classification.

1. With regard to No. 1 I agree, except that I should not have unhesitatingly placed as a synonym *Falco uralensis* of Menzbier; but I shall later on come back to this question.

2. About *islandus* I agree.

3. There can, in my opinion, be no doubt, and I believe every ornithologist who has studied these Falcons agrees with me, that Sharpe's *holboellii* is based on dark specimens of the Greenland Falcon, because there are obvious intergradations between the two. Moreover, this variety is not restricted to South Greenland, but found as far north as Falcons have been found.

4. Why *rusticolus* should be restricted to North America is incomprehensible, as it was based on Swedish birds!

5 and 6. I agree with Sharpe's distribution and names.

Quite recently some Falcons have been discussed by Mr. Ogilvie-Grant in the *B. O. U. List of British Birds*, which appeared in February 1915. The author admits two species: *Falco* (called *Hierofalco*) *gyrfalco* and *islandus*. The former he makes to inhabit North Europe, Greenland, and Arctic America to Alaska, and he mentions the Labrador Falcon as a subspecies of *gyrfalco*. The Iceland Falcon he splits into *H. islandus* and *H. islandus candicans*. He says that *H. islandus* (which he should have called *H. islandus islandus*) inhabits Iceland, Jan Mayen, South Greenland, and Northern Siberia, and he considers Sharpe's *holboellii* to be a synonym, as being based on dark Greenland birds, which are like Icelanders, *H. uralensis* being another synonym, based on Siberian specimens of *islandus*.

The question of the Iceland and Greenland Falcons has always been a vexed one. The fact is that many of the Greenland birds are indistinguishable from the Iceland ones, while—as far as I can make out—on Iceland the darker race alone nests, never the lightest one. It is, however, not true that the darker birds alone breed in Southern Greenland, where white ones nest also, nor that the dark form is restricted to the southern parts of Greenland, because it ranges as far north as any Falcons have been shot, and that during the breeding season. There is therefore no question of there being two subspecies, but the light and dark birds from Greenland can only be either two species or one and the same. In the Tring Museum and elsewhere are so many variations and intermediate varieties, that I cannot possibly admit their specific distinctness. On the other hand, as white birds do not nest on Iceland, I have tentatively kept separate, as a subspecies, the Iceland birds.

Another difficult question is the status of the so-called *uralensis*. It is not yet possible to pass final judgment on the Siberian birds. "*Hierofalco uralensis*" was first described by Sewertzoff and Menzbier, in Russian, from the Ural. There is a French extract of the description in *Journ. f. Orn.* 1883, p. 413. In 1885 Sewertzoff described another Falcon from Bering Island as *Hierofalco Grebnitzkii*. Menzbier united *uralensis* and *grebnitzkii*, and supposed this Siberian Falcon to range as far north as the Altai. I should certainly have hesitated to unite *grebnitzkii* with *uralensis*, but it is significant that it was done by Menzbier, who had both types in hand, and there is in the original description of *grebnitzkii* a statement that

the length of the various primaries is different. This statement, however, seems to be confused, and by some unfortunate accident it became differently confused and quite misleading in *Vög. d. pal. Fauna* ii. p. 1069. I there said that in two adult and one young Falcon from West Siberia I found the first primary at least as long as the third, which is perfect nonsense, as it should have read: Fourth not shorter, but at least as long as first primary! In half a hundred Falcons from Greenland and Iceland this character was not found once, while I found it in two adult females and one young bird from West Siberia, though another young one does not show it. This peculiarity forbids me to unite "*uralensis*" (? including *grebnitzkii*) with the Greenland or Iceland form. In colour the two adult females closely resemble adult Icelanders and differ from Norwegian Gyrfalcons (*rusticolus*) in having whiter heads and being cross-barred with whitish, not pale grey, on the upperside.

With regard to the Scandinavian race, *Falco rusticolus rusticolus* L., I cannot understand why it should be treated as specifically, and not subspecifically, distinct from the other northern Falcons. Some specimens, even sometimes fully adult birds, are by colour not with certainty distinguishable from Icelanders or adult Greenlanders; but they are constantly smaller. As a rule the crown is darker, and they are always darkish, never white.

I am therefore convinced that I am right in treating all northern Falcons as subspecies of one species, as there is no proof that two forms nest in the same country. But more material must be collected of the Siberian form or forms.

For further details see *Vög. pal. Fauna* p. 1064 ff. I have not included among the races of *F. rusticolus* the *Falco altaicus* (Menzbier), as I am by no means sure that it belongs there. Nothing definite can be said about it until more specimens are available for study.

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# A PRELIMINARY ACCOUNT OF THE LEPIDOPTEROUS FAUNA OF GUEL'T-ES-STEL, CENTRAL ALGERIA.

By LORD ROTHSCHILD, F.R.S., Ph.D.

(Continued from Vol. XXI. p. 357.)

## PYRALIDAE

### Crambinae

#### 333. *Crambus saxonellus* Zinck.

*Crambus saxonellus* Zincken, *Germ. & Zinck. Mag. d. Entom.* iv. p. 255 (1821) (Europe).

1 ♂, August 8, 1913 (Victor Faroult).

#### 334. *Ancylolomia hipponella* Rag.

*Ancylolomia hipponella* Ragonot, *Ann. Soc. Entom. France* (6) viii. p. 279, pl. 6. ff. 11, 13 (1888) (Bône).

5 ♂♂, 1 ♀ were sent in by Victor Faroult from September 1913.

### Phycitinae

#### 335. *Myelois fuscicostella* Mann

*Myelois fuscicostella* Mann, *Wien. Entom. Monatsch.* v. p. 183, t. 2, f. 10 (1861) (Amasia).

1 ♂, April 22, 1912, W. R. and K. J.

#### 336. *Myelois cribrella* Hübn.

*Myelois cribrella* Hübner, *Saun., Europ. Schmett. Tin.* f. 67 (1827-41) (Europe).

2 ♂♂, 2 ♀♀, May 1913 (Victor Faroult).

#### 337. *Pristarthria brephiella* (Staud.)

*Salschria brephiella* Staudinger, *Hor. Soc. Entom. Ross.* xv. pp. 193, 194 (1880) (Macedonia).

1 ♂, W. R. and K. J., April 22, 1912.

#### 338. *Myrlaea serratella* Rag.

*Myrlaea serratella* Ragonot, *Roman. Mém. Lépid.* vii. p. 399, pl. xv. f. 23 (1893) (Mardin).

1 ♂, April 22, 1912, W. R. and K. J.

#### 339. *Bazaria expallidella* Rag.

*Bazaria expallidella* Ragonot, *Ann. Soc. Entom. France*, 1887, p. 234 (Tarcomenic).

1 ♂, April 17, 1912, W. R. and K. J.

#### 340. *Caina micrella* Rag.

*Caina micrella* Ragonot, *Roman. Mém. Lépid.* vii. p. 465, pl. vi. f. 25 (1893) (India).

1 ♂, April 22, 1912, W. R. and K. J.



341. *Epischnia prodromella* Hübn.

*Epischnia prodromella* Hübner, *Samml. Europ. Schmett. Tic.* p. 254 (1827-41) (Europe).

We captured 4 ♂♂, two on April 15 and two on April 22, 1912, and Victor Faroult sent two ♂♂ from May 1913, 1 ♂ from November 1913, and 1 ♀ from August 1913.

342. *Epischnia illotella* Zell.

*Epischnia illotella* Zeller, *Isis*, 1839, p. 178. No. 5 (Sicily).

1 ♂, April 21, 1912, W. R. and K. J.

343. *Epischnia boisduvaliella* Guen.

*Epischnia boisduvaliella* Guenée, *Ind. Meth. Microlep. Eur.* p. 81 (1845) (Europe).

1 ♀, April 22, 1912, W. R. and K. J.

344. *Epischnia ragonotella* sp. nov.

♀. Antennae dark brown; head, thorax, and abdomen dark brown variegated with buffish white.

*Forewing*: dark olive-brown; costal area white from four-fifths of its length from base, the distal half of this white portion being powdered irregularly with olive-brown, basal fourth of inner margin white; a white bar runs in from inner margin towards cell one-third from base, a postdiscal white band from inner margin to vein 8, a subterminal white line from apex to vein 3.

*Hindwing*: semihyaline pale wood-grey, subterminal area darker.

Length of forewing: 9.5 mm.

Expanse: 21 mm.

1 ♀, April 21, 1912, W. R. and K. J.

### Pyrulinae

345. *Aglossa pinguinalis* (Linn.)

*Phalaena pinguinalis* Linnaeus, *Faun. Suec.* p. 351. No. 1350 (1761) (Sweden).

1 ♂, May 19, 1913 (Victor Faroult).

346. *Aglossa dimidiata* (Haw.)

*Crumbus dimidiatus* Haworth, *Lepid. Brit.* p. 372. No. 12 (1810) (Britain).

1 ♂, October 18, 1912 (Victor Faroult).

347. *Ulotricha algerialis* Hampsn.

*Ulotricha algerialis* Hampson, *Trans. Entom. Soc. Lond.* 1900, p. 377. No. 2, pl. iii. f. 18 (Biskra).

1 ♂, June 2, 1913 (Victor Faroult).

348. *Constantia canifusalis* Hampsn.

*Constantia canifusalis* Hampson, *Trans. Entom. Soc. Lond.* 1900, p. 381, pl. iii. f. 16. No. 7b (Biskra).

2 ♂♂, August 1913 (Victor Faroult).

349. *Constantia faroulti* sp. nov.

♀. Antennae white closely ringed with grey-brown; palpi, head, thorax, and abdomen pale testaceous brown freckled with darker brown.

*Forewing*: testaceous brown, fawn-brown beyond postdiscal line; a dark-brown zigzag postbasal line, outer and upper part of disc with irregular white clouding, a strongly sinuated and angled postdiscal line edged outwardly with white.

*Hindwing*: testaceous brown; a whitish subterminal line, fringes of both wings irregularly chequered black and white.

Length of forewing: 13 mm.

Expanse: 30 mm.

2 ♀♀, July 30 and August 1, 1913 (Victor Faronlt).

350. *Actenia brunnealis ocellata* subsp. nov.

♀. Differs from *b. brunnealis* by having at the end of cell a large ocellate ring instead of a dot.

1 ♀, September 3-7, 1912 (Dr. Nissen).

351. *Actenia gadesialis albolineata* subsp. nov.

♂. Differs from *g. gadesialis* in the pure white transverse lines of forewing.

1 ♂, May 13, 1913 (Victor Faronlt).

352. *Cledeobia biformis* sp. nov.

♂. Antennae, head, and thorax rusty or sandy buff; abdomen yellowish brown-grey.

*Forewing*: rusty sandy buff slightly washed with pale olive-brown; four or five brown spots on costa, a black-brown antemedian band becoming less distinct in costal region, a postdiscal pale-brown line edged outwardly with yellow, a dark terminal line.

*Hindwing*: greyish testaceous brown with a pale postdiscal hair line.

♀. Antennae and head orange-buff; thorax black-brown freckled with greyish; abdomen pale wood-grey brown freckled with darker brown.

*Forewing*: sooty black-brown; a pale grey-buff oblique antemedian band, a sinuate grey-buff postmedian line.

*Hindwing*: basal half pale wood-grey, outer half dark wood-grey.

Length of forewing: ♂, 9 mm.; ♀, 9-11.5 mm.

Expanse: ♂, 23 mm.; ♀, 23-27 mm.

1 ♂, 4 ♀♀, August-September 1913 (Victor Faronlt), ♀ type.

353. *Cledeobia testacealis* sp. nov.

♂. Antennae pale whitish buff, pectinations brown; palpi, head, and thorax testaceous buff; abdomen buff.

*Forewing*: dark testaceous olive-buff; a sharply angled double antemedian band inwardly white, outwardly dark chocolate-brown, a postdiscal double band inwardly black-brown, outwardly white; between this postdiscal band and the point of the angle of the antemedian band is a white longitudinal bar along and across vein 2.

*Hindwing*: satiny whitish cream, edged and suffused on outer one-fifth with dark buff, a postdiscal olive-grey line from veins 2 to 5.

♀. Darker, more grey.

Length of forewing: ♂ 14.5–17 mm., ♀ 17 mm.

Expanse: ♂ 33–38 mm., ♀ 38 mm.

2 ♂♂, 1 ♀, May 1913 (Victor Faronlt).

### Pyraustinae

#### 354. *Evergestis renatalis* (Oberth.)

*Orohena renatalis* Oberthür, *Bull. Soc. Entom. France*, 1887, p. xcix. (Bou Saada, etc.).

2 ♂♂, 10 ♀♀, April and May 1913 (Victor Faronlt).

#### 355. *Nomophila noctuella* (Schiff.)

*Botys noctuella* Schifferrmüller, *System. Verz. Schmelt. Wien*, p. 136 (1776) (Vienna).

2 ♂♂, 2 ♀♀, April 1912, W. R. and K. J.; 3 ♂♂, May 1913 (Victor Faronlt).

#### 356. *Mecyna gilvata* (Fabr.)

*Phalaena gilvata* Fabricius, *Ent. Syst.* iii. 2, p. 208, No. 296 (1794) (India Or.)

2 ♂♂, 2 ♀♀, July–August 1913 (Victor Faronlt).

#### 357. *Cynaeda dentalis* (Schiff.)

*Pyralis dentalis* Schifferrmüller, *System. Verz. Schmelt. Wien*, p. 120 (1776) (Vienna).

1 ♀, May 30, 1913 (Victor Faronlt).

#### 358. *Metasia mzabi* Rothschild.

*Metasia mzabi* Rothschild, *Nov. Zool.* xx, p. 141, No. 155 (1913) (Oued Nğa).

3 ♀♀, June, July, August 1913 (Victor Faronlt).

#### 359. *Pionea numeralis* (Hübner.)

*Pyralis numeralis* Hübner, *Samml. Europ. Schmelt. Pyp.* f. 89 (1827–41) (Europe).

3 ♂♂, April 21, 1912, W. R. and K. J.; 1 ♂, 2 ♀♀, May, 1 ♀, October 1913 (Victor Faronlt).

#### 360. *Pyrausta arenicola* Hampson.

*Pyrausta arenicola* Hampson, *Ann. Mag. N. H.* (8) xii, p. 28 (1913) (Algeria).

1 ♂, May 25, 1913 (Victor Faronlt).

#### 361. *Pyrausta nubigena* sp. nov.

♀. Antennae brown; head and thorax wood-brown, collar buffy brown; abdomen greyish wood-brown.

*Forewing*: pale cinnamon-brown; basal two-thirds and outer one-fifth densely clouded with olive-wood-brown.

*Hindwing*: basal three-fourths semihyaline yellowish wood-grey, outer one-fourth olive-wood-brown.

Length of forewing : 12 mm.

Expanse : 28 mm.

1 ♀, September 4, 1913 (Victor Faroult).

### 362. *Noctuelia simillella* sp. nov.

♂. Nearly allied to *N. allardalis* Oberth.

Differs on *forewing* in the antemedian line being oblique outwards from inner margin, in the postcellular stigma being larger and more dilute and in the post-discal band being oblique from apex to inner margin, **not** curved round to costa well before apex as in *allardalis*.

It also differs in the *hindwing* being buff, not wood-grey.

Length of forewing : 14 mm.

Expanse : 31 mm.

1 ♂, October 31, 1913 (Victor Faroult).

### 363. *Noctuelia desertalis* (Hübner)

*Pyralis desertalis* Hübner, *Samml. Europ. Schneett. Pyp.* f. 171 (1827-41) (Europe).

1 ♀, April 27, 1913 (Victor Faroult).

The following is a list of the species of *Heterocera* taken by Dr. Nissen which were not obtained by us or by Victor Faroult. I give the names as received from Dr. Nissen.

## NOCTUIDAE

*Euxoa cos* Hübner, July 1913.

*Euxoa signifera improcera* Ersch., October 1912.

*Euxoa hastifera* Douz., October 1913.

*Polia dysodea* Schiff. (*chrysozona* Bkh.), September, October 1912, 1913.

*Epia nesus* Germ., March, April 1913.

*Oligia literosa subarcta* Stand., September 1912.

*Eumiektis solieri* Boisd., September, October 1912.

*Leucochlaena hispidus* Hübner, October 1913.

*Margelana lenis* Stand., October 1913.

*Aporophila australis ingenua* Frr., October 1913.

*Athetis quadripecta* Fabr., April 1913.

*Athetis germainii* Dup., September, October 1912, 1913.

*Enargia ulicis* Stand., October 1913.

*Amathes pistacina* ab. *grisea* Trt., October 1913. (I did not record this by an oversight, as I have a number.)

*Calophasia platyptera* Esp., April 1912, 1914. (? Erroneous identification. I have seen only one *platyptera* from Hammam Rhira; all those from elsewhere in Algeria are *almoracida*.)

*Cucullia oberthuri* Rothschild, April, May 1912, 1914.

*Chloridea armigera* Hübner, April 1913.

*Eublemma mozabitica* Rothschild, April 1913.

**GEOMETRIDAE**

- Rhodostrophia calabraria* Zell., May, June 1912, 1913.  
*Psychopoda emutaria* Hübn., April 1913.  
*Larentia multipunctata* Stand., November 1914.  
*Larentia haasi* Hedem., October 1913.  
*Tephroclystia mnemosynata* Mill., October 1913.  
*Tephroclystia innotata tamariscata* Err., October 1912.  
*Tephroclystia variostrigata* Alph., October 1912.  
*Chemerina caliginearia* Rmbr., November 1912, March 1913.  
*Nychiodes licidaria andalusiaria* Mill., April 1913.  
*Hemerophila solieraria powelli* Oberth., April and October 1913.  
*Boarmia tenietaria* Stand., April, August, and October 1913.  
*Gnopharmia colchidaria* Ld., September 1912.  
*Gnophos obscuraria* Hb., October 1912.  
*Gnophos dumetata daubearia* Boisd., October 1912.  
*Selidosema erebaria* Oberth., September 1912 and 1913.  
*Egea culminaria* Ev., April and May 1913.  
*Phasiane binacata* Mab., October and November 1913 and 1914.  
*Phasiane partitaria* Hübn., October 1912.

**MEGALOPYGIDAE**

- Somobrachys unicolor* Oberth., September 1913.

**ZYGAENIDAE**

- Ino pruni* Schiff.? !, June 1913. (? ! *Ino cirtana* Luc.)  
*Ino notata* Zell., May 1913.

**PSYCHIDAE**

- Amicta oberthuri* Heyl., August and September 1912 and 1913.

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**ERRATA—Nor. Zool. xxi.**

p. 316: Sir George Hampson says that Nos. 61 and 62 are not *Centropodia*, but true *Eucoa*. See Errata, vol. xxi. p. viii.

p. 322, No. 104: *Polia trisagittata* is a very dark form of *Epia silenens* Hbn., and must stand as ***Epia silenens trisagittata*** Rothsch.

p. 338, No. 209 = *Eublemma virginalis* (Oberthür), *Étud. Entom.* vi. p. 90, pl. xi. f. 1 (1881) (Sebdou).

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# ON THE LEPIDOPTERA IN THE TRING MUSEUM SENT BY MR. A. S. MEEK FROM THE ADMIRALTY ISLANDS, DAMPIER, AND VULCAN ISLANDS.

By LORD ROTHSCILD, F.R.S., PH.D.

WHILE making his very successful collection on Rook Island, Mr. Meek had the misfortune to contract a bad sunstroke, so that the three last collections were made by his assistants during his convalescence. With the exception of a few specimens got by the *Challenger*, and a very small lot of Rhopalocera received quite recently by Herr Niepelt, no collections have ever been made on the Admiralty Islands. Captain Webster collected a few butterflies on St. Gabriel, a small satellite island of the Admiralty group. From Dampier a few insects were obtained by Dr. Hagen, and Dr. Werner collected eight species on Vulcan Island. The insects from the Admiralties were all procured at and around the trading station established on the main island about January 1913 by the Germans. The expedition collected on the Admiralty Islands during September and October 1913, on Vulcan Island during November and December 1913 and January 1914, and on Dampier Island in February and March 1914. Dampier Island is near the Astrolabe Bay, and Vulcan Island lies considerably to the west of it.

## RHOPALOCERA

### PAPILIONIDAE

#### Papilioninae

#### 1. *Papilio priamus poseidon* (Dbl.)

*Ornithoptera poseidon* Doubleday, *Ann. Mag. Nat. Hist.* (1) xix. p. 173 (1847) (Darnley Island).

The specimens from both Dampier and Vulcan Islands show no appreciable difference from those from the mainland of German New Guinea, though the ♀♀ include a preponderance of individuals having the light spots reduced in size. 1 ♂ from Dampier has three black spots on the hindwing, but the rest have either two or none at all (ab. *pegasus* Feld.).

7 ♂♂, 8 ♀♀, Vulcan Island; 4 ♂♂, 5 ♀♀, Dampier Island.

#### 2. *Papilio priamus admiralitatis* subsp. nov.

This form is nearest to *P. p. bornemannii*, but very distinct.

♂. *Above*. Differs from *bornemannii* in the entire absence of green scaling on the veins in disc of forewing. On the hindwing it differs by having a golden yellow patch in the costal area, in the much denser green scaling, and in the much larger and more distinct black spots.

*Below*. On forewing there is more green scaling between veins 8 and 9. On hindwing the yellow subcostal patch is also present, the black patches are very large, yellow tornal patch is smaller, and the black dot in it much enlarged.

♀. *Above*. Differs from *bornemannii* in its shorter rounder wings and more blackish-grey brighter ground colour. On the hindwing the pale patches run up

closer to the cell and four of the eight ♀♀ have a white spot in the cell; the margin is much more deeply scalloped.

*Below.* On the hindwing the dark spots in the light patches are very much larger.

1 ♂, 8 ♀♀, Manus, Admiralty Islands.

### 3. *Papilio helena papuensis* (Wall.)

*Ornithoptera helena* local form *papuensis* Wallace, *Trans. Linn. Soc. Lond.* xxv. p. 38. sub. No. 7 (1865) (New Guinea, Salwatty).

Indistinguishable from specimens from mainland of New Guinea.

5 ♂♂ and 6 ♀♀ (♀-f. *papuensis*), Vulcan Island; 1 ♂, Dampier Island.

### 4. *Papilio polydorus dampierensis* Hag.

*Papilio polydorus dampierensis* Hagen, *Jahrb. Nass. Ver. Nat.* l. p. 50. No. 6 (1897) (Dampier Island).

5 ♂♂, 6 ♀♀, Dampier Island.

### 5. *Papilio polydorus vulcanicus* subsp. nov.

♂♀. *Above.* Differ in the white patches beyond cell, and the white spot in the cell being larger and less suffused with black scales.

*Below.* The band of red spots on hindwing is generally smaller, and the red smear below vein 2 is much reduced. On the forewing the white is more extended.

5 ♂♂, 8 ♀♀, Vulcan Island.

### 6. *Papilio polydorus utuanensis* Ribbe

*Papilio polydorus utuanensis* Ribbe, *Iris*, 1898. p. 68 (New Ireland and Duke of York Island).

I cannot separate the Admiralty specimens from *utuanensis*.

7 ♂♂, 6 ♀♀, Manus, Admiralty Islands.

### 7. *Papilio euchenor euchenor* Guér.

*Papilio euchenor* Guérin, *Voy. Coquille*, t. 13. f. 3 (1829) (New Guinea).

4 ♂♂, 4 ♀♀, Vulcan Island.

### 8. *Papilio euchenor subcoerulea* subsp. nov.

♂♀. Differ from *P. e. godarti* on the underside by the longer streaks emitted by the uppermost of the subapical spots on the forewing, and in the much greater extent of the blue subterminal markings on the hindwings.

7 ♂♂, 4 ♀♀, Dampier Island.

### 9. *Papilio phestus reductus* subsp. nov.

♂. *Above.* Nearest to *P. ph. parkinsoni*, but differs from all the three described races in having no indication whatever of any light spot in cell of hindwing.

*Below.* It resembles most *P. ph. phestus*.

♀. *Above.* At once distinguishable from all three described races on the

hindwing in the absence of any white spot in the cell and in the strong reduction in size and number of the discal white spots, there being only two small ones in two specimens, and in the remaining two an indication of a third.

1 ♂, 2 ♀ ♀, Manus, Admiralty Islands. (♀ Type).

#### 10. *Papilio aegaeus ormenus* Guér.

*Papilio ormenus* Guérin, *Voy. Coquille*, t. 14. f. 3 (1829) (New Guinea).

The ♂ from Vulcan is ♂-f. *pandion* Wall., an extreme example with no trace of a subapical band on the forewing either above or below. The ♂ from Dampier Island is ♂-f. *ormenus* Guér. with a well-developed subapical band.

1 ♂, Vulcan Island; 1 ♂, Dampier Island.

#### 11. *Papilio weymeri* Niep.

*Papilio weymeri* Niepelt, *Lepidop. Niep.* part i. p. 53 (1914) (Admiralty Islands).

This is a most distinct species, of which the ♂ is described below for the first time.

♂. *Above.* Nearest to *P. bridgei*, but band on forewing curves inwards gradually from vein 2. On hindwing the band is broader but does not run in more than half the distance to base of wing above vein 7.

*Below.* It is unlike any of this group as it has a cream-coloured band of broad patches traversing both fore- and hindwing with imperfect blue moons beyond on hindwing and a large anal red blotch.

6 ♂♂, 6 ♀ ♀, Manus, Admiralty Islands.

#### 12. *Papilio ulysses autolyceus* Feld.

*Papilio autolyceus* Felder, *Verhand. zool.-bot. Ges. Wien*, 1864. p. 321. No. 428 (New Guinea) (Nom. nud.); id. *Reise Novara II. Lepid.* p. 114. No. 86 (1865) (New Guinea).

2 ♂♂, Vulcan Island.

#### 13. *Papilio ulysses melanotica* Hag.

*Papilio ulysses autolyceus* ab. *melanotica* Hagen, *Jahrb. Nass. Ver. Nat. u.* p. 56 (1897) (Moluccas).

The ♂ is undescribed.

♂. *Above.* Differs from *P. u. autolyceus* in the blue being darker and less metallic; on forewing above median nervure it barely reaches apex of cell and is absent in costal area; below median nervure the patches are cut short exactly in a straight line with apex of cell. On hindwing the blue is much reduced and sharply cut off rectangularly.

*Below.* The whole colour is much darker.

7 ♂♂, 5 ♀ ♀, Dampier Island.

#### 14. *Papilio ulysses gabrielis* Rothsch.

*Papilio ulysses gabrielis* Rothschild, *Nor. Zool.* v. p. 217 (1898) (St. Gabriel).

9 ♂♂, Manus, Admiralty Islands.

#### 15. *Papilio codrus auratus* Rothsch.

*Papilio codrus auratus* Rothschild, *Nor. Zool.* v. p. 218 (1898) (St. Gabriel).

The ♂ has the golden colour of the median band very distinct and brilliant.

2 ♂♂, 2 ♀ ♀, Manus, Admiralty Islands.



16. *Papilio codrus medon* Feld.

*Papilio medon* Felder, *Verh. zool.-bot. Gesell. Wien*, 1861, p. 306, No. 238, and p. 351, No. 136 (New Guinea) (Nom. nov. for *P. codrus* De Haan).

While the specimens from Vulcan Islands are typical *medon*, several of the Dampier Island ones have the median band quite as narrow as in true *codrus*.

1 ♂, 3 ♀♀, Vulcan Island; 4 ♂♂, 7 ♀♀, Dampier Island (1 ♀ bred).

17. *Papilio sarpedon messogis* Fruhst.

*Papilio sarpedon messogis* Fruhstorfer, *Entom. Zeit. (Stuttgart)*, xxi, p. 183 (1907) (Key, Arn).

4 ♂♂, 4 ♀♀, Vulcan Island.

18. *Papilio eurypylus lycaonides* Rothschild.

*Papilio eurypylus lycaonides* Rothschild, *Nor. Zool.* ii, p. 439 (C.) (1895) (New Guinea).

1 ♀, Vulcan Island.

19. *Papilio macfarlanei admiralia* subsp. nov.

♀. *Above*. Differs from *P. m. cestius* Fruhst. (*Amboina* fixed Jordan) in the smaller green spots in cell, in the much wider and more apple green median band of the forewing, and the almost obsolete small subterminal spots. On hindwing it differs in the larger green and whitish costal and cellular markings, and the reduction of the subterminal band of spots to two dots.

*Below*. Differs in the smaller cell spots and almost obsolete subterminal dots on forewing, and on hindwing in having only two small subterminal green dots, and an extra red spot above tornus.

7 ♀♀, Manus, Admiralty Islands.

20. *Papilio agamemnon admiralis* subsp. nov.

♂♀. Nearest to *P. a. salomonis* Rothschild.

*Above*. Differs in the subterminal line of spots on forewing being much smaller.

*Below*. Differs on hindwing in the smaller red spots at anal angle and on each side of vein 7, also in the absence of any postmedian or tornal red spots.

3 ♂♂, 5 ♀♀, Manus, Admiralty Islands.

**Pierinae**21. *Catopsilia crocale rivalis* Fruhst.

*Catopsilia crocale flava* ♀-f. *rivalis* Fruhstorfer, *Seitz Grossschm. Erde*, ix, p. 163, pl. 68, f. d. 4 (1910) (Moluccas, New Guinea, etc.).

Fruhstorfer applied the name given by Butler to the New Guinea race, and renamed the Celebes form, so I have unfortunately had to apply an aberrational name to the New Guinea race.

3 ♂♂, 6 ♀♀, Vulcan Island; 1 ♀, Dampier Island.

22. *Terias candida diotima* Fruhst.

*Terias candida diotima* Fruhstorfer, *Seitz Grossschm. Erde*, ix, p. 172 (1910) (German New Guinea and Vulean).

4 ♂♂, 4 ♀♀, Vulcan Island.

23. *Terias candida papuana* Butl.

*Terias papuana* Butler, *Ann. Mag. Nat. Hist.* (7) i. p. 60. No. 9 (1898) (Misol, etc.).

5 ♂♂, 3 ♀♀ Dampier Island.

24. *Terias hecabe octa* Fruhst.

*Terias hecabe octa* Fruhstorfer, *Seitz Grossschm. Erde*, ix. p. 168 (1910) (New Guinea Region).

6 ♂♂, 3 ♀♀, Vulcan Island; 3 ♂♂, 3 ♀♀, Dampier Island; 5 ♂♂, 1 ♀, Manus, Admiralty Islands.

**DANAIDAE****Danainae**25. *Danaida philene bonguensis* (Fruhst.)

*Salatura mytilene bonguensis* Fruhstorfer, *Berl. Entom. Zeitschr.* 1899. p. 68 (German New Guinea).

4 ♂♂, 6 ♀♀, Vulcan Island; 4 ♂♂, 4 ♀♀, Dampier Island.

26. *Danaida mytilene decipientis* Strand

*Danaida mytilene decipientis* Strand, *Lepid. Niep.* pt. i. p. 25 (1914) (Admiralty Islands).

6 ♂♂, 2 ♀♀, Manus, Admiralty Islands.

27. *Danaida melissa leucoptera* (Butl.)

*Danaïs leucoptera* Butler, *Ent. Mon. Mag.* xi. p. 163 (1874) (Dorey).

4 ♂♂, 4 ♀♀, Vulcan Island; 1 ♂, 1 ♀, Dampier Island.

28. *Danaida juvena ribbei* (Fruhst.)

*Radena juvena ribbei* Fruhstorfer, *Iris*, xix. p. 163 (1906) (New Ireland).

5 ♂♂, 3 ♀♀, Manus, Admiralty Islands.

29. *Danaida juvena eugenia* (Fruhst.)

*Danaïs juvena eugenia* Fruhstorfer, *Iris*, xix. p. 161 (1906) (German New Guinea).

4 ♂♂, 4 ♀♀, Dampier Island.

**Euploeinae**30. *Euploea alecto misagenes* Fruhst.

*Euploea alecto misagenes* Fruhstorfer, *Seitz Grossschm. Erde*, ix. p. 233 (1910) (Dampier Island).

♀. Undescribed, is similar to ♂, but white spots in postdiscal bands of both wings larger.

The type from Dr. Hagen's collection, now in the Tring Museum, is rather worn, so that it is much paler in colour than those mentioned below.

4 ♂♂, 4 ♀♀, Dampier Island.

31. *Euploea aethiops coffea* Fruhst.

*Euploea aethiops coffea* Fruhstorfer, *Seitz Grossschm. Erde*, ix. p. 234 (1910) (German New Guinea).

2 ♂♂, Dampier Island.

32. **Euploea weneri** Fruhst.

*Euploea weneri* Fruhstorfer, *Entom. Zeit.* (Stuttgart) 1909, p. 277 (Vulcan Island).

5 ♂♂, 4 ♀♀, Vulcan Island.

33. **Euploea nobilis** Strand

*Euploea nobilis* Strand, *Lepidop. Niep.* pt. i. p. 27, pl. viii. ff. 6, 7 (ab. *simplicior* f. 10) (1914) (Admiralty Islands).

5 ♂♂, 1 ♀ *nobilis*, 2 ♂♂ ab. *simplicior*, Manus, Admiralty Islands.

34. **Euploea subnobilis** Strand

*Euploea subnobilis* Strand, *Lepidop. Niep.* pt. i. p. 27, pl. viii. f. 9 (1914) (Admiralty Islands).

2 ♂♂, Manus, Admiralty Islands.

35. **Euploea insulicola** Strand

*Euploea insulicola* Strand, *Lepidop. Niep.* pt. i. p. 28, pl. viii. ff. 4, 5 (1914) (Admiralty Islands).

1 ♂, 5 ♀♀, Manus, Admiralty Islands.

36. **Euploea nemertes affinita** Strand

*Euploea nemertes affinita* Strand, *Lepidop. Niep.* pt. i. p. 28, pl. viii. f. 11 (1914) (Admiralty Islands).

♂ differs from *E. n. erima* by being darker and by having a much larger mauve patch below vein 2.

1 ♂, 3 ♀♀, Manus, Admiralty Islands.

37. **Euploea nemertes quintia** Fruhst.

*Euploea nemertes quintia* Fruhstorfer, *Seit: Grossschm. Erde*, ix. p. 266, pl. 81a 2 (1910) (British New Guinea).

The subterminal bands of spots vary much in size, but in none are absent as in the ab. *rhodia*.

5 ♂♂, 6 ♀♀, Dampier Island.

38. **Euploea nemertoides** sp. nov.

This species occurs side by side with *nemertes affinata*.

♂. *Above.* Forewing deep black-brown, a white median spot below subcostal nervure, a pale mauve square spot below vein 2, and a curved subterminal band of four to six white spots ringed with mauve. Hindwing costal half slate-grey glossed with deep brown, androconia pale cinnamon; lower half deep chocolate suffused with chestnut, three postdiscal white dots.

*Below.* All wings deeper brown; area of forewing below vein 2 basal two-thirds clothed with pale cinnamon androconia, apical third grey-brown; hindwing with complete band of postdiscal white spots and four or five subterminal blue dots.

♀. Differs in having on hindwing, also above, a postdiscal band of white spots.

Length of forewing: ♂ 44 mm., ♀ 48 mm.

Expanse: ♂ 93 mm., ♀ 103 mm.

7 ♂♂, 3 ♀♀, Manus, Admiralty Islands.

39. *Euploea nemertes erima* (Fruhst.)

*Salpinx swierstrae* ab. *erima* Fruhstorfer, *Berl. Entom. Zeitschr.* xlv. p. 284 (1899) (German New Guinea).

4 ♂♂, 4 ♀♀, Vulcan Island.

40. *Euploea pumila salpinxoides* (Fruhst.)

*Calliploea salpinxoides* Fruhstorfer, *Berl. Entom. Zeitschr.* xlv. p. 9 (1900) (Finschhafen).

3 ♂♂, 4 ♀♀ *salpinxoides*, 1 ♀ ab. *sublucinda*, Vulcan Island; 1 ♂ *salpinxoides*, Dampier Island.

41. *Euploea pumila jamesi* (Butl.)

*Calliploea jamesi* Butler, *Proc. Zool. Soc. Lond.* 1876. p. 766 (British New Guinea; Fergusson Island).

5 ♂♂, 3 ♀♀, Dampier Island.

42. *Euploea pumila bismarckiana* (Fruhst.)

*Calliploea cygrammelli bismarckiana* Fruhstorfer, *Berl. Entom. Zeitschr.* xlv. p. 7 (1900) (New Britain).

9 ♂♂, Manus, Admiralty Islands.

43. *Euploea vulcanica* sp. nov.

♂. Resembles some forms of *pumila*, but the lappet below vein 1 of forewing is much smaller, and the patch of androconia on hindwing is less extensive.

*Above.* Forewing chocolate brown, more rufous towards termen, and strongly glossed with deep purple; a curved row of graduated violet subterminal spots. Hindwing basal half chocolate below cell, costal area and cell grey with pale cinnamon androconia; outer half reddish wood-brown.

*Below.* Pale chocolate brown; a spot above vein 2 and basal two-thirds of area above and below vein 1 of forewing grey; a minute grey dot on vein 7.

♀. *Above.* Pale chocolate brown fading into fawn on outer one-third of wings; a series of pale violet subterminal spots on forewing, and costal area of hindwing mauve-grey.

*Below.* Similar, but on forewing a spot above vein 2 and basal two-fifths of area above vein 1 pale mauve, and four white postdiscal dots on hindwing.

Length of forewing: ♂ 35 mm., ♀ 36.5 mm.

Expanse: ♂ 74 mm., ♀ 77 mm.

1 ♂, 1 ♀, Vulcan Island.

44. *Euploea callithoe hansemanni* Honr.

*Euploea hansemanni* Honrath, *Berl. Entom. Zeitschr.* xxxii. p. 248 (1887) (German New Guinea).

7 ♂♂, 3 ♀♀, Vulcan Island.

45. *Euploea callithoe admiralia* Strand

*Euploea callithoe admiralia* Strand, *Lepidop. Niep.* part i. p. 26. pl. viii. f. 1 (1914) (Admiralty Islands).

The ♂ shows similar differences to ♂ *callithoe* as the ♀ does to the ♀ of the typical form.

3 ♂♂, 5 ♀♀, Manus, Admiralty Islands.

46. **Euploea treitschkei eugenia** Fruhst.

*Euploea treitschkei eugenia* Fruhstorfer, *Iris*, xxiv. p. 55 (1910) (Vulcan Island).

5 ♂♂, 4 ♀♀, Vulcan Island.

47. **Euploea treitschkei intermedia** subsp. nov.

♂ ♀. Exactly intermediate between *E. t. olivacea* and *E. t. eugenia*.

5 ♂♂, 2 ♀♀, Dampier Island.

48. **Euploea treitschkoi ursula** (Butl.)

*Saphura ursula* Butler, *Ann. Mag. Nat. Hist.* (5) xi. p. 497 (1883) (D'Entrecasteaux Island, Admiralty Group).

Herr Fruhstorfer in *Seitz* has applied the name *ursula* to Fergusson Island specimens, mistaking D'Entrecasteaux Island for the D'Entrecasteaux group. The specimens from the D'Entrecasteaux group must bear the name *viridis* Butler, originally described from Thursday Island.

4 ♂♂, 4 ♀♀, Manus, Admiralty Islands.

**Palaeotropinae**49. **Tellervo zoilus hiempsal** Fruhst.

*Tellervo zoilus hiempsal* Fruhstorfer, *Seitz Grossschm. Erde*, ix. p. 273, pl. 78, c. 4 (1910) (German New Guinea).

5 ♂♂, 3 ♀♀, Dampier Island.

**SATYRIDAE****Satyrinae**50. **Melanitis constantia dampierensis** subsp. nov.

♂. Differs from *M. c. geluna* Fruhst. in the subapical pale band on forewing, being narrower and containing two ocelli.

♀. Resembles *M. c. dictatrix* Fruhst., but is larger, and the pale submarginal band on forewing is wider.

3 ♂♂, 1 ♀, Dampier Island.

51. **Melanitis amabilis insulicola** subsp. nov.

Differs from *M. a. valentina* Fruhst. in the broader pale subapical band in the ♂ and the deep maroon red of the ♀. Dampier specimens appear slightly larger.

6 ♂♂, 3 ♀♀, Dampier Island; 6 ♂♂, 3 ♀♀, Vulcan Island.

52. **Melanitis leda destitans** Fruhst.

*Melanitis leda destitans* Fruhstorfer, *Entom. Zeitschr. (Stuttgart)* xxii. p. 87 (1908) (German New Guinea).

4 ♂♂, 5 ♀♀, Vulcan Island; 3 ♀♀, Dampier Island.

53. *Melanitis leda dominans* Fruhst.

*Melanitis leda dominans* Fruhstorfer, *Entom. Zeitschr. (Stuttgart)*, xxii, p. 87 (1908) (Bismarck Islands).

4 ♂♂, 2 ♀♀, Mauns, Admiralty Islands.

54. *Mycalesis terminus matho* Gr. Sm.

*Mycalesis matho* Grose Smith, *Ann. Mag. Nat. Hist.* (6) xiii, p. 501 (1894) (New Britain).

2 ♂♂, Dampier Island.

55. *Mycalesis phidon phidonides* Fruhst.

*Mycalesis phidon phidonides* Fruhstorfer, *Verh. zool.-bot. Gesell. Wien*, 1908, p. 294 (German New Guinea).

8 ♂♂, Dampier Island.

56. *Mycalesis sirius antecanis* Fruhst.

*Mycalesis sirius antecanis* Fruhstorfer, *Verh. zool.-bot. Gesell. Wien*, 1908, p. 299 (German New Guinea).

4 ♂♂, 4 ♀♀; Vulcan Island.

57. *Mycalesis nerida theophila* Fruhst.

*Mycalesis nerida theophila* Fruhstorfer, *Verh. zool.-bot. Gesell. Wien*, 1908, p. 199 (German New Guinea).

7 ♂♂, 2 ♀♀, Vulcan Island.

58. *Mycalesis meeki* sp. nov.

Allied to *nerida*.

♂. *Above*. Antennae olive black above, below grey with club orange rufous; head, thorax, and abdomen dark olive brown. Forewing dark olive brown, cell and basal half paler; two small subapical ocelli; in outer half of wing below vein 4 is a large quadrate fulvous orange patch angled on inside, reach almost to inner margin and produced towards base of wing below vein 2; in this patch between veins 2 and 3 is a very large ocellus. Hindwing dark olive brown, basal half clothed with long paler olive hair; two large ocelli ringed with fulvous.

*Below*. Fulvous olive, not fulvous as in *nerida*, ocelli much larger than in *nerida*, and second from costa on hindwing flattened and shuttle shape, **not** round.

♀. Similar but larger and paler (four have four ocelli on hindwing above and two have three).

Length of forewing, ♂ 24 mm.; ♀ 26 mm.

Expanse, ♂ 52 mm.; ♀ 58 mm.

3 ♂♂, 4 ♀♀, Vulcan Island; 6 ♂♂, 3 ♀♀, Dampier Island. (Type ♂, Dampier Island.)

59. *Mycalesis subpersa* sp. nov.

♂. Allied to *perseus*, but the hindwings are longer and narrower and costa of forewing less arched.

*Above*. Sooty brown, a small black ocellus with white centre on forewing

above vein 2 on forewing; a sooty grey marginal band to hindwing with a black submarginal line.

*Below.* Same colour with purplish gloss; a double postmedian line innerside black, outer whitish, a band of orange-ringed ocelli with white dots.

♀. Similar, but larger and paler.

Length of forewing: ♂ 21 mm.; ♀ 24 mm.

Expanse: ♂ 45.5 mm.; ♀ 51.5 mm.

5 ♂♂, 5 ♀♀, Manus, Admiralty Islands.

#### 60. *Mycalesis subpersa vulcanica* subsp. nov.

♂. *Above.* Differs from *s. subpersa* in being paler, and the ocellus is almost obsolete.

*Below.* Differs in the ocelli being much smaller and the white outer part of double line more indistinct.

4 ♂♂, Vulcan Island.

#### 61. *Elymnias agondas dampierensis* subsp. nov.

♂. Differs from all other forms of *agondas* in having on both wings above a series of whitish blue submarginal spots.

*Above.* Velvety green-black with a metallic blue-green marginal band some seven millimetres wide, on the inner edge of which is the line of whitish-blue spots as in *lewitsoni*.

*Below.* Blackish chocolate glossed with purplish blue-green and the submarginal band of spots larger.

♀. Similar, but band of spots on upperside of forewing much larger.

8 ♂♂, 2 ♀♀, Dampier Island.

### AMATHUSIIDAE

#### Amathusiinae

#### 62. *Taenaris phorcas uranus* (Stdgr.)

*Taenaris anableps uranus* Staudinger, *Exot. Schmelt.* i. p. 200 (1888) (New Britain. *ex errore* New Ireland).

3 ♂♂, 5 ♀♀, Manus, Admiralty Islands.

#### 63. *Taenaris catops vulcanica* subsp. nov.

♂. Nearly resembles ♂ of *mylaecheoides*, but the dark grey on forewing almost to vein 6 and on hindwing to vein 4 is much wider.

♀. Resembles *adriana*, but sooty black on forewing only reaches to a fold between veins 3 and 4 **instead of** to beyond vein 2.

2 ♀♀ have lost the large black apical patches on forewing and the sooty black on hindwing is reduced to a narrow margin. This form I propose to call ab. **submylaecha** ab. nov.

5 ♂♂, 3 ♀♀ *vulcanica*, 2 ♀♀ ab. *submylaecha*, Vulcan Island.

#### 64. *Taenaris catops dampierensis* subsp. nov.

♂♀. Nearest to *T. c. appina* Fruhst., but the dark colour above much more extended; on hindwing of ♀ it occupies more than three-fifths of wing; the ocellus

near apical angle of hindwing shows through above more than in any other race, in fact resembling most *T. urania* Linn. from Amboina in this respect. One ♂ has a much narrower border, is very white, and the ocellus does not appear on upperside. This form I name ab. **subluna** ab. nov.

5 ♂♂, 1 ♀, *dampierensis*, 1 ♂, ab. *subluna*, Dampier Island.

65. **Taenaris rothschildi reducta** subsp. nov.

♂. *Above*. The grey is confined on forewing to costal edge and apex and a somewhat obsolescent band below vein 2. On hindwing the grey forms a smear over apical ocellus to vein 5; anal ocellus small and pale.

*Below*. The grey is confined in forewing to apex and costa, and on hindwing is reduced to a slight smear beyond apical ocellus.

♀. Similar, but grey below vein 2, widening more distinct with a reddish wash. 1 ♂, 1 ♀, Vulcan Island.

**NYMPHALIDAE**

66. **Issoria sinha admiralia** subsp. nov.

♂. Differs from *I. s. offaka* in the much narrower black borders to the wings and almost complete absence of black markings on disc of wings.

♀. Paler.

4 ♂♂, 1 ♀, Manus, Admiralty Islands.

67. **Cynthia arsinoë rebeli** Fruhst.

*Cynthia arsinoë rebeli* Fruhstorfer, *Entom. Zeitschr.* xix. p. 215 (1905) (German New Guinea).

6 ♂♂, 2 ♀♀, Vulcan Island.

68. **Cynthia arsinoë dampierensis** subsp. nov.

♂. Differs from *C. a. rebeli* in the much more distinct dark margin to both wings and the larger row of postdiscal spots.

♀. Differs in being much larger, forewing much blacker, hindwing much deeper rufous, and the dark bands of both wings wider and more distinct.

*Below*. Basal half of the wings of ♀ are washed with pale greenish olive, **not** rosy mauve, and all lines and spots more distinct.

Length of forewing: *rebeli* 52 mm., *dampierensis* 59 mm.

Expanse: *rebeli* 109 mm., *dampierensis* 123 mm.

4 ♂♂, 4 ♀♀, Dampier Island.

69. **Cethosia obscura manusi** subsp. nov.

♂. Very similar to *C. o. gabrielis* Rothsch.

*Above*. Differs in the white spots being smaller on forewing.

*Below*. The black bands in cell of forewing are much broader and white subterminal spots smaller.

♀. Has smaller white spots on forewing above and below.

5 ♂♂, 4 ♀♀, Manus, Admiralty Islands.



70. *Precis hedonia zelima* (Fabr.)

*Papilio zelima* Fabricius, *System. Entom.* p. 492. No. 212 (1775) (Nova Hollandia).

4 ♂♂, 3 ♀♀, Vulcan Island.

71. *Precis hedonia admiralitatis* subsp. nov.

♂♀. *Above.* Differ from *P. h. zelima* in the more grey **less** rufous wash and the much more strongly developed ocelli on forewing.

*Below.* Differ in the more purplish mauve wash and bands.

3 ♂♂, 5 ♀♀, Manus, Admiralty Islands.

72. *Precis erigone tristis* (Misk.)

*Junonia tristis* Miskin, *Bl. Book II. M. Col. Poss.* 1891. p. 117 (British New Guinea).

4 ♂♂, 4 ♀♀, Vulcan Island.

73. *Precis vellida astrolabiensis* (Hag.)

*Junonia vellida* var. *astrolabiensis* Hagen, *Jahrb. Nass. Ver. Nat. L.* p. 85 (1897) (Astrolabe Bay).

4 ♂♂, 4 ♀♀, Vulcan Island.

74. *Precis orithya novaeguineae* (Hag.)

*Junonia orithya* var. *novaeguineae* Hagen, *Jahrb. Nass. Ver. Nat. L.* p. 85 (1897) (German New Guinea).

7 ♂♂, 2 ♀♀, Vulcan Island.

75. *Yoma algina parvifascia* subsp. nov.

♂. *Above.* Very large, and ground colour brilliant velvety black, in size equal to the largest *Y. a. odilia* Fruhst., but subapical spots almost obsolete and median band much narrower.

*Below.* Resembles *a. odilia*, but basal two-fifths darker more olive grey; median band only half the width, and powdered with black scales, outer half much more suffused with black, and ocelli much more filled with bright blue.

♀. Unlike any other ♀ *Yoma* except ♀ of the following form (*a. vulcanica*).

*Above.* Forewing dark sooty olive-brown, costal terminal areas strongly glossed with blue, two pale mauve subapical dots; median band one-third the width of that of any other form, dark fulvous orange freckled with black. Hindwing dark sooty olive-brown; median band double as wide as on forewing from tornus to vein 6, and as wide as on forewing between veins 6 and 7, outer half dark bright rufous, inner half fulvous orange, ocelli deep black.

*Below.* Dark olive-grey, median band bright mauve. A second ♀ above has outer one-quarter of both wings strongly glossed with blue, three postdiscal white spots on forewing, the median band on forewing much more suffused with dark scales, and the median band on hindwing having outer half (rufous) absent.

6 ♂♂, 2 ♀♀, Dampier Island. (Type ♀).

76. *Yoma algina vulcanica* subsp. nov.

♂. Smaller than preceding form and outer half below much darker : median band below yellowish, not pure white.

♀. The three ♀♀ are quite different *inter se*. The first ♀ resembles ♀ of preceding form, but duller in ground colour, and median band on hindwing almost obsolete, a row of postdiscal white spots on forewing, below uniform olive-grey median band almost obsolete showing as a dull mauve cloud.

The second ♀ is paler olive-brown with pale yellowish wood-grey median band, a postdiscal row of white spots and a subterminal row of mauve spots. Hindwing has wood-grey median band, a subterminal row of white marks, and the ocelli have distinct dull orange rings. Below median mauve band more distinct.

The third ♀ has the median band of both wings pale mauve, and on hindwing an orange band beyond band of ocelli. Below mauve median band is distinct.

5 ♂♂, 3 ♀♀, Vulcan Island. (Type ♀).

77. *Yoma algina manusi* subsp. nov.

♀. Differs from *a. kokopona* and *a. helisson* in the gigantic ocelli on hindwing above and on both wings below.

*Above*. The ground colour is much deeper, more black, and the bands are brighter and more distinct.

*Below*. The colours are brighter, all markings more distinct, and the subterminal and terminal areas and lines mauve-purple.

1 ♀, Manus, Admiralty Islands.

78. *Hypolimnias antilope antilope* (Cramer.)

*Papilio antilope* Cramer, *Pap. Erot.* ii. t. 183. ff. E. F. (1779) (Amboina).

This insect is so scarce, and we have so few specimens from New Guinea, that I cannot say if this is a distinct race or not. It agrees fairly well with Dr. Wollaston's three ♂♂ from the Snow Mountains, and is the exact counterpart of a ♂ from Amboina, but my solitary specimen from British New Guinea is very different. There appears to have been confusion between this and the more common *H. pithoea* forms in the Papuan region.

1 ♀, Vulcan Island.

79. *Hypolimnias pithoea dampierensis* subsp. nov.

♂. *Above*. Differs from *H. p. pithoea* Kirsch and *H. p. uniformis* Salv. Godm. in its intense velvety black colour and broader wings. There is a subapical white patch, and a postdiscal row of white dots more or less obsolete on forewing, and a complete row of subdiscal white spots on hindwing, as well as intranervular terminal white spots. The postdiscal spots have **no** black rings as in *p. pithoea*.

*Below*. Paler brown-black, outer one-third of hindwing strongly glossed with purple : along basal half of subcostal a series of small patches of white scales, costa to white subapical patch fawn-brown ; a postdiscal row of pale-blue spots on both wings, and on hindwing a subterminal band of blue suffused markings.

♀. *Above*. Paler olive slaty black, and on forewing a subterminal band of indistinct ill-defined whitish markings.

*Below.* The spots are bluish white and the blue subterminal spots and purple gloss are absent from hindwing.

4 ♂♂, 4 ♀♀, Dampier Island.

#### 80. *Hypolimnias pithoea vulcanica* subsp. nov.

♀. *Above and Below.* Differs from ♀ *p. dampierensis* in its olive-black-brown colour, in its rufous-brown postcellular patch between costa and vein 5, and in the much larger postdiscal white spots. The second ♀ shows the rufous patch above less distinctly.

2 ♀♀, Vulcan Island.

#### 81. *Hypolimnias euploeoides* sp. nov.

This magnificent new species exactly resembles a large black, white-spotted *Euploea*.

♂ *Above.* Antennae black, club rufous; head, thorax, and abdomen black; a white spot at base of antennae, and two indistinct similar ones on collar. Forewing velvety brown-black; a white spot with a few blue scales above vein 2, and a minute white dot above vein 5. Hindwing sooty olive-brown, blackish towards base; a minute pale-blue dot above each of veins 2, 5, 6, and 7.

*Below.* Uniform chocolate-olive-brown, a series of white spots and marks below basal half of subcostal; an incurved postmedian band of pale-blue spots on forewing, and an outwardly curved similar sinuate band on hindwing.

♀. *Above.* Larger, forewing chocolate-olive-brown, a small whitish-blue dot, and beyond it a large oval spot below subcostal in cell; an incurved postmedian band of bluish-white spots. Hindwing paler olive-brown, an outwardly curved postmedian band of bluish-white spots.

*Below.* Similar to ♂, but all white markings larger.

Length of forewing: ♂ 47 mm., ♀ 53 mm.

Expanse: ♂ 100.5 mm., ♀ 112.5 mm.

1 ♂, 1 ♀, Manus, Admiralty Islands.

#### 82. *Hypolimnias alimena eremita* Butl.

*Hypolimnias eremita* Butler, *Ent. Mon. Mag.* xx. p. 56 (1883) (Dorey).

4 ♂♂, 4 ♀♀, Vulcan Island; 6 ♂♂, 2 ♀♀, Dampier Island.

#### 83. *Hypolimnias alimena manusi* subsp. nov.

♂. Differs from *H. a. eremita* in the bright maroon-crimson suffusion of the whole underside.

4 ♂♂, Manus, Admiralty Islands.

#### 84. *Hypolimnias misippus* (Linn.)

*Papilio misippus* Linnaeus, *Mus. Ludov. Utric.* p. 264 (1764) (In Indiis).

3 ♀♀, f. *diocippus*, Manus, Admiralty Islands.

85. *Hypolimnas bolina* (Linn.)

*Papilio bolina* Linnaeus, *Mus. Ludov. Ulric.* p. 295 (1764) (In Indiis).

Until all the chief varieties from every locality have been dissected, and the genitalia studied, I believe it is impossible to divide up this extraordinarily variable and widespread insect into subspecies. The ♂♂ enumerated below agree on the upperside almost exactly with true *bolina* Linn., while the ♀♀ are all the ♀-f. *iphegenia* Cram. The Admiralty ♂♂ have less white in the discal spot of the hindwing.

5 ♂♂, 5 ♀♀, Manus, Admiralty Islands; 5 ♂♂, 3 ♀♀, Vulcan Island; 3 ♂♂, Dampier Island.

86. *Hypolimnas deois deois* Hew.

*Hypolimnas deois* Hewitson, *Proc. Zool. Soc. Lond.* 1858. p. 464 (Aru Islands).

6 ♂♂, 2 ♀♀, Dampier Island.

87. *Hypolimnas deois panopion* Gr. Sm.

*Hypolimnas panopion* Grose Smith, *Nor. Zool.* i. p. 305 (1894) (Humboldt Bay).

1 ♀, Vulcan Island.

88. *Doleschallia browni* Salv. & Godm.

*Doleschallia browni* Salvin & Godman, *Proc. Zool. Soc. Lond.* 1877. p. 145, pl. xxii. ff. 3, 4 (Duke of York Island).

4 ♂♂, 3 ♀♀, Dampier Island.

89. *Doleschallia hexophthalmos ardys* Fruhst.

*Doleschallia hexophthalmos ardys* Fruhstorfer, *Seitz Grossschm. Erde.* ix. p. 561, pl. 113 a 1, 2 (1912) (German New Guinea).

2 ♂♂, Dampier Island; 1 ♀, Vulcan Island.

90. *Doleschallia rickardi* Gr. Sm.

*Doleschallia rickardi* Grose Smith *Ann. Mag. N.H.* (6) v. p. 171 (1890); id., *Rhop. Exot.* ii. *Doleschallia*, p. 1, pl. i. f. 1 (1893) (New Ireland).

♀. The female, till now undescribed, only differs from the male in the transverse band across apex of cell being almost white.

1 ♂, 2 ♀♀, Dampier Island.

91. *Cyrestis acilia* (God.)

*Nymphalis acilia* Godart, *Enc. Méth.* ix. p. 378. No. 94 (1819) (Waigiou)

7 ♂♂, 2 ♀♀, Dampier Island.

92. *Cyrestes achates achates* Butl.

*Cyrestes achates* Butler, *Proc. Zool. Soc. Lond.* 1865. p. 481. No. 2 (Misol).

6 ♂♂, 3 ♀♀, Vulcan Island.

93. *Acca consimilis stenopa* (Fruhst.)

*Rahinda consimilis stenopa* Fruhstorfer, *Stett. Entom. Zeit.* lxi. p. 267 (1908) (German New Guinea).

7 ♂♂, 1 ♀, Vulcan Island.

94. *Acca consimilis melanotica* subsp. nov.

♂. This form is a most remarkable melanistic race of *consimilis*, but much larger than *stenopa*.

*Above.* Deep brown-black; the oblique subapical patch is reduced to two dark rufous-brown semi-coalescent spots, and the band between vein 3 and inner margin is reduced to less than one-half its size, and is dark rufous-orange suffused with dark brown; the band on the hindwing is less than one-half as wide, and dark orange-brown. Another ♂ has the whole upper surface brown-black with only a faint indication of the band on the hindwing, and that below vein 3 on forewing.

*Below.* The angulated broad band of *stenopa* on forewing is reduced to two small dark-orange patches, and on hindwing the outer dark one-third of wing of *stenopa* is increased to one-half, and there is a median and subcostal rusty brown band in the orange basal one-half. The underside of the extreme ♂ described above has the entire forewing black except a brownish fulvous patch above inner margin, and on hindwing narrow basal median orange bands.

4 ♂♂, Dampier Island.

95. *Acca venilia dampierensis* subsp. nov.

♂♀. Differ from *A. c. anceps* in the much narrower entirely blue bands and almost obsolete subterminal dots on hindwing; in the blue band above inner margin of forewing is a white spot.

8 ♂♂, 3 ♂♂, Dampier Island.

96. *Neptis shepherdii damia* Fruhst.

*Neptis shepherdii damia* Fruhstorfer, *Entom. Zeit. Guben.* 1905, p. 101 (German New Guinea).

1 ♂, Vulcan Island.

97. *Neptis shepherdii reducta* subsp. nov.

♂. Very large, intense black, white markings in and beyond cell of forewing absent, five discal and four subterminal spots much reduced. On hindwing median band much narrower and broken, consisting of two or three separate spots.

♀. Differs from ♀ *damia* in bands and spots being smaller and narrower.

3 ♂♂, 1 ♀, Dampier Islands.

98. *Parthenos sylvia admiralia* subsp. nov.

♂♀. Differ from *P. s. couppei* Ribbe in the semihyaline band of patches on forewing being pure white and much more extensive, in the olive colour of forewing above vein 2 being strongly suffused with pale Nile blue, and in the olive on hindwing being brighter and also tinged with Nile blue. Below the semihyaline patches are much larger, the subternal black patch on forewing is very much larger and the whole underside is Nile blue.

4 ♂♂, 4 ♀♀, Manus, Admiralty Islands.

99. *Parthenos aspila aspila* Hbnr.

*Parthenos aspila* Hbnrath, *Berl. Ent. Zeitsch.* xxxii. p. 248, pl. v. I. 2 (1888) (German New Guinea).

Two specimens of this form were sent; as Vulcan Island is not far from the mainland they were probably blown across.

2 ♂♂, Vulcan Island.

100. *Parthenos aspila tenebrosa* subsp. nov.

♂ ♀. Differ from *P. a. aspila* by being much larger and very much darker, the rufous basal portions being suffused with green-black scales. The underside is strongly suffused with black.

Expanse: *aspila* ♂ 92 mm., ♀ 106 mm.

„ *tenebrosa* ♂ 114 mm., ♀ 122 mm.

4 ♂♂, 6 ♀♀, Dampier Island.

101. *Parthenos aspila vulcanica* subsp. nov.

♂ ♀. Differ from *P. a. aspila* in the basal area of wings being pale orange-rufous suffused with olive-green, a whitish patch at end of cell of forewing and below it, the outer three-quarters of wings strongly banded and barred and suffused with yellowish olive-green; two specimens lack the white in and below cell.

6 ♂♂, 6 ♀♀, Vulcan Island.

102. *Eulepis pyrrhus jupiter* (Butl.)

*Charaxes jupiter* Butler, *Lepid. Exot.* i. p. 14, pl. v. ff. 4 & 7 (1869) (Dorey).

4 ♂♂, 3 ♀♀, Vulcan Island.

103. *Eulepis pyrrhus admiralitatis* subsp. nov.

♂ ♀. Resemble *E. p. attila* Gr. Sm. above, and *E. p. seitzi* Rothsch. below.

*Above.* Differ from *attila* on hindwing in the discal white band being much narrower and edged much more distinctly with blue, there are also three large blue lunules beyond the band not present in *attila*. On the forewing the two post-cellular cream spots are larger, and there is on hindwing an orange patch at tornus wanting in *attila*.

*Below.* Differ from *seitzi* in the more rufous less olive ground-colour, in the absence of the large white patch in cell of forewing, and in the larger white marks beyond the cell and above veins 3 and 4. On hindwing they differ in the much wider black bands on basal half of wing and in the more uniform deep maroon of postdiscal band.

1 ♂, 5 ♀♀, Manus, Admiralty Islands.

(To be continued.)

## ON LEPIDOPTERA FROM THE ISLANDS OF CERAM (SERAN), BURU, BALI, AND MISOL.

By LORD ROTHSCHILD, F.R.S., PH.D.

(Continued from Vol. XXII, p. 144.)

### HETEROCERA

There are 104 species of *Heterocera* from Ceram, 2 from Buru, 8 from Bali, and 18 from Misol; 2 species are common to Ceram and Buru, and 2 to Ceram and Misol, so that the total number of species of *Heterocera* in the collection is 128.

### AMATIDAE

#### 287. *Ceryx evar* (Pag.)

*Syntomis evar* Pagenstecher, *Jahrb. Nass. Ver. Nat.* xxxix, p. 119 (1886) (Amboina).

1 ♂, Kaiike, North Ceram, 600 m., 1912: 1 ♀, Manusela, Central Ceram, 650 m., 1912.

### ARCTIADAE

#### Lithosianae

#### 288. *Caprimima quadripuncta* sp. nov.

♀. Antennae, head, and thorax sooty black; abdomen above black, laterally blackish chocolate, anal tuft white.

*Forewing*: sooty black; a large white quadrate patch begins one-quarter from base, and from inner margin to cell occupies nearly one-half of wing, it is sharply and angularly constricted distally two-fifths of its breadth and stops short at subcostal nervure; a postcellular white spot, a postmedian maroon-chestnut patch from subcostal to above vein 1, a white subterminal spot from vein 4 to just under vein 6.

*Hindwing*: basal three-fifths semihyaline white, outer two-fifths sooty black.

Length of forewing: 10 mm.

Expanse: 22 mm.

1 ♀, Manusela, Central Ceram, 650 m., 1912.

#### 289. *Caprimima rufobasalis* sp. nov.

♀. Antennae, head, thorax, and abdomen sooty black.

*Forewing*: costa black except where white median band reaches it, basal one-quarter chocolate red, broadly edged with black distally, and an irregularly excised pure white median band 5 mm. wide in widest part above vein 1, and 2 mm. wide at costa, outer half irregularly obliquely chocolate-red bordered with sooty black.

*Hindwing*: base and outer two-fifths sooty black, rest semihyaline white.

Length of forewing: 12 mm.

Expanse: 27 mm.

1 ♀, Manusela, Central Ceram, 650 m., 1912.

290. *Miltochrista apuncta* sp. nov.

♀. Antennae basal one-fifth scarlet, rest buffy yellow; head and thorax scarlet; abdomen buff tinged here and there with scarlet.

*Forewing*: scarlet intranervular spaces more or less yellow.

*Hindwing*: semivitreous buff suffused with pale scarlet.

Length of forewing: 13 mm.

Expanse: 30 mm.

1 ♀, Manusela, Central Ceram, 650 m., 1912.

**Arctianae**291. *Diacrisia niceta niceta* (Stoll)

*Phalaena niceta* Stoll, *Pap. Exot.* iv. pt. xxxi. p. 151. pl. cccxxviii. f. C. (1781) (Amboina)

1 ♀, Manusela, Central Ceram, 650 m., 1912.

292. *Diacrisia niceta mysolica* subsp. nov.

♀. Differs from *n. niceta* in the absolute absence of black spots from, and the cinnamon-buff colour of, the forewing.

1 ♀, Misol.

**AGARISTIDAE**293. *Immetalia saturata doleschallii* (Feld.)

*Agarista doleschallii* Felder, *Reise Novara*, pl. 107, ff. 2, 3 (1874) (Amboina).

1 ♂, Manusela, Central Ceram, 650 m., 1912.

294. *Ophthalmis lincea lincea* (Cram.)

*Phalaena lincea* Cramer, *Pap. Exot.* iii. pt. xix. p. 61, pl. cccxxviii. f. B. (1779) (Amboina).

2 ♂♂, 1 ♀, Manusela, Central Ceram, 650 m., 1912.

295. *Ophthalmis privata* (Walk.)

*Agarista privata* Walker, *List Lepid. Ins. Brit. Mus.* xxxi. p. 48 (1864) (Ceram).

3 ♂♂, 3 ♀♀, Manusela, Central Ceram, 650 m., 1912.

**NOCTUIDAE****Hadeninae**296. *Cirphis decisissima* (Walk.)

*Leucania decisissima* Walker, *List Lepid. Ins. Brit. Mus.* xxxii. p. 624 (1865) (Sikkim).

2 ♂♂, Manusela, Central Ceram, 650 m., 1912.

297. *Cirphis metargyria* sp. nov.

♂. Differs from *cryptargyria* B.-Baker in the darker abdomen, in having costal area of forewing to just before apex cinnamon-buff, in having the disco-terminal portion of wing cinnamon-buff, not whitish, and the pale band from apex



much straighter. Underside of hindwing entirely metallic pale gold ; terminal and basal one-fifth of forewing and costa cinnamon-brown, rest golden.

Length of forewing : 21 mm.

Expanse : 48 mm.

1 ♂, Manusela, Central Ceram, 650 m., 1912.

#### Acronytinae

##### 298. *Sesamia grisescens* Warr.

*Sesamia grisescens* Warren, *Nor. Zool.* xviii. p. 148. No. 22 (1911) (New Guinea).

1 ♂, Manusela, Central Ceram, 650 m., 1912.

#### Catocalinae

##### 299. *Erebus leucotaenia* (Guen.)

*Nyctipao leucotaenia* Guenée, *Hist. Nat. Ins. Sp. Gén. Lép.* vii. *Noct.* iii. p. 184 (1852) (Java !?).

One ♀ has almost lost all the white, *i.e.* the entire median band. Specimens with **no white** at all are *ab. obscura* B. Baker, so I propose for the present specimen the name *ab. subobscura* *ab. nov.*

3 ♂♂, and 1 ♂ and 1 ♀ in cop., Manusela, Central Ceram, 650 m., 1912 ; 2 ♂♂, Waihai, North Ceram ; 1 ♀, Sukaradja, North Ceram ; 1 ♀, Ceram.

##### 300. *Speiredonia remota* (Feld.)

*Spirama remota* Felder, *Sitzb. Akad. Wiss. Wien*, xliii. p. 43 (1861) (Amboina).

3 ♀♀, Manusela, Central Ceram, 650 m., 1912.

##### 301. *Dermoleipa juno* (Daln.)

*Noctua juno* Dalman, *Anal. Entom.* p. 52 (1823) (hab.?).

2 ♂♂, Manusela, Central Ceram, 650 m., 1912.

##### 302. *Chalciope cephise* (Cram.)

*Phalaena cephise* Cramer, *Pap. Ecot.* iii. part xix. p. 59. t. ccxxvii. f. C. (1779) (India Or.).

3 ♀♀, Manusela, Central Ceram, 650 m., 1912.

##### 303. *Mocis undata* (Fabr.)

*Noctua undata* Fabricius, *Syst. Ent.* p. 600 (1775) (India Or.).

1 ♀, Waihai, North Ceram.

##### 304. *Pterocyclophora hampsoni* Semp.

*Pterocyclophora hampsoni* Semper, *Reise Phil. Schmett.* ii. p. 541. pl. 60 f. 16 (1900) (Luzon).

1 ♀, Manusela, North Ceram, 650 m., 1912.

##### 305. *Anisoneura zeuzeroides* (Guen.)

*Anisoneura zeuzeroides* Guenée, *Hist. Nat. Ins. Sp. Gén. Lép.* vii. *Noct.* iii. p. 162 (1852) (hab.?).

1 ♂, Manusela, Central Ceram, 650 m., 1912.

## Noctuinae

306. *Claterna cydonia* (Cram.)

*Phalacro cydonia* Cramer, *Pap. Exot.* i. part ii. p. 34. pl. xxii. f. F. (1775) (Surinam).

1 ♂, Ceram.

307. *Azazia bolinoides* (Guen.)

*Hypospila bolinoides* Guenée, *Hist. Nat. Ins. Sp. Gén. Léop.* vii. Noct. iii. p. 358 (1852) (Java).

1 ♀, Manusela, Central Ceram, 650 m., 1912.

308. *Oglasa rufoaurantia* sp. nov.

♀. Antennae amber-brown, head cream-buff; thorax, tegulae cream-buff, patagia and rest of thorax cinnamon-mauve-brown; abdomen dark wood-grey-brown.

*Forewing*: cinnamon-orange-brown, washed on basal half with mauve; an antemedian zigzag band of brown almost resolved into a band of spots, a black dot in cell just beyond this line; a large postcellular sooty patch from which proceeds a brown and pale-cinnamon double line to inner margin, a curved brown line of spots runs from costa round edge of postcellular patch and joins double line below it; a subapical spot, a subterminal patch and fringe sooty black.

*Hindwing*: dark wood-grey; costa whitish, terminal line buff.

Length of forewing: 15 mm.

Expanse: 34 mm.

1 ♀, Manusela, Central Ceram, 650 m., 1912.

309. *Catephia leucomelas* (Linn.)

*Phalaena leucomelas* Linnaeus, *Syst. Nat.* ed. x. p. 518 (1758) (Europe).

1 ♂, Manusela, Central Ceram, 650 m., 1912.

310. *Hulodes caranea* (Cram.)

*Phalaena caranea* Cramer, *Pap. Exot.* iii. pt. xxiii. p. 140. pl. cclxix. ff. E. F. (1780) (Batavia).

1 ♂, Manusela, Central Ceram, 650 m., 1912.

311. *Ischyja manlia* (Cram.)?

*Phalaena manlia* Cramer, *Pap. Exot.* i. pt. viii. p. 141. pl. xcii. f. A. (1776) (Côte de Coromandel).

Hitherto at least three species have been confused under this name, viz. the Indian and Palaearctic true *manlia*, the Sumatra species recently separated, and the form which reaches in varying phases from the Moluccas to the Bismarck Archipelago. Whether the latter is divisible into several species or subspecies I have not yet been able to make out, but I hope in the second part of my article on the Lepidoptera from the Admiralty, Vulcan, and Dampier Islands to settle the matter definitely. I therefore at present place the pair sent by Herr Stresemann under the collective name *manlia* Cram.

1 ♂, Kanike, North Ceram, 600 m.; 1 ♀, Manusela, Central Ceram, 650 m., 1912.

**Hypeninae****312. *Hypena stygiana* Butl.**

*Hypena stygiana* Butler, *Illustr. Lep. Hist. Brit. Mus.* ii. p. 55. pl. xxxviii. f. 6 (1878) (Yokohama).

1 ♂, Manusela, Central Ceram, 650 m., 1912.

**313. *Hypena caerulealis* Walk.**

*Hypena caerulealis* Walker, *List Lepid. Ins. Brit. Mus.* xxxiv. p. 1142 (1865) (Moreton Bay, Swan River).

1 ♀, Danau Bratan, Bali, 2500 ft., January 1911.

**314. *Hypena obstupidalis* Swinh.**

*Hypena obstupidalis* Swinhoe, *Proc. Zool. Soc. Lond.* 1885. p. 471. pl. xxviii. f. 7 (India).

1 ♂, Kintamani, Bali, 4000 ft., February—March 1911.

**315. *Hypena stresemanni* sp. nov.**

♂ ♀. Antennae yellowish grey; palpi dark grey; head white; thorax and abdomen yellowish grey. Both wings pale greyish buff gradually deepening into ash-grey on outer third of wings; costa of forewing brownish grey.

Length of forewing: ♂ 17 mm., ♀ 18 mm.

Expanse: ♂ 38 mm., ♀ 40 mm.

1 ♂, 1 ♀, Kintamani, Bali, 4000 ft., February—March 1911 (♂ type; 3 ♂♂, Danau Bratan, Bali, 2500 ft., January 1911).

**316. *Hypena cirphoides* sp. nov.**

♀. The forewing is strigillated and coloured exactly like several species of *Cirphis*. Antennae greyish brown; head and thorax dark wood-brown; abdomen paler wood-brown.

*Forewing*: wood brown nervures and some striae paler; basal third below cell, a median band through cell to outer quarter of wing, and outer quarter of wing sooty wood-brown.

*Hindwing*: greyish wood-brown.

Length of forewing: 17 mm.

Expanse: 39 mm.

1 ♀, Manusela, Central Ceram, 650 m., 1912.

**LYMANTRIIDAE****317. *Redoa submarginata* Walk.**

*Redoa submarginata* Walker, *List Lepid. Ins. Brit. Mus.* iv. p. 826 (1855) (Sylhet).

1 ♂, Manusela, Central Ceram, 650 m., 1912.

**318. *Euproctis ateralbus* sp. nov.**

♀. Antennae sooty black; head buffy orange; thorax and abdomen sooty black, anal tuft greenish buff.

*Forewing*: deep sooty black; a very large apical patch pure white, a pure white spot above vein 2, and some white scaling above vein 3.

*Hindwing*: deep sooty black, three larger and one very small white sub-marginal spots between veins 2 and 6.

Length of forewing: 26 mm.

Expanse: 57 mm.

3 ♀ ♀, Maunsela, Central Ceram, 650 m., 1912.

### 319. *Lymantria lunata* (Cram.)

*Phalaena lunata* Cramer, *Pap. Ecol.* iv. pt. xxxi. p. 154. pl. cccxix. f. C. (1781) (Amboina).

1 ♂, Wahai, North Ceram; 1 ♂, Maunsela, Central Ceram, 650 m., 1912.

### 320. *Lymantria curvifera* (Walk.)

*Pegella curvifera* Walker, *List Lepid. Ins. Brit. Mus.* xxxv. p. 1922 (1866) (Philippines).

1 ♂, Misol.

## HYPSIDAE

### 321. *Azota heliconia heliconia* (Linn.)

*Phalaena heliconia* Linnaeus, *Syst. Nat.* ed. x. p. 511 (1758) (Amboina).

1 ♂, Wahai, North Ceram; 1 ♂, Maunsela, Central Ceram, 650 m., 1912.

### 322. *Azota heliconia doryca* (Boisd.)

*Aganais doryca* Boisduval, *Voy. Astrolabe Lépid.* p. 251. No. 4 (1832) (New Guinea, Dorey).

2 ♂ ♂, Misol.

### 323. *Azota orbona significans* (Walk.)

*Hypsa significans* Walker, *List Lepid. Ins. Brit. Mus.* xxxi. p. 815 (1864) (Aru).

1 ♀, Misol.

### 324. *Deilemema aeres* (Boisd.)

*Leptosoma aeres* Boisduval, *Voy. Astrolabe Lépid.* p. 198. No. 2 (1832) (Buru).

1 ♂, Mgesawain, Central Buru, 800 m., 1 ♂, 1 ♀, Maunsela, Central Ceram, 600 m., 1912.

### 325. *Deilemema stresemanni* sp. nov.

♂. Antennae heavily pectinated, white, pectinations black; head and thorax orange-golden spotted with black; abdomen orange-golden ringed with black.

*Forewing*: semihyaline cinnamon-ash-grey; a white streak from base two-fifths of distance to termen along fold above vein 1, an oblique white median band.

*Hindwing*: semihyaline basal two-thirds white, outer one-third and costal area above veins 6 and 7 cinnamon-ash-grey.

Length of forewing: 23 mm.

Expanse: 50 mm.

1 ♂, Maunsela, Central Ceram, 650 m., 1912

326. *Deilemera coleta* (Cram.)

*Phalaena coleta* Cramer, *Pap. Exot.* iv. part xxxi. p. 153. pl. cccxviii. f. H. (1781) (Amboina).

5 ♂♂, 17 ♀♀, Manusela, Central Ceram, 650 m., 1912.

327. *Deilemera mundipicta* (Walk.)

*Nyctemera mundipicta* Walker, *Journ. Linn. Soc. Lond. Zool.* iii. p. 184 (1859) (Singapore).

4 ♂♂, 8 ♀♀, Manusela, Central Ceram, 650 m., 1912.

["Common on the ground in tall virgin forest."—E. S.]

328. *Deilemera luctuosa* (Voll.)

*Leptosoma luctuosum* Vollenhofen, *Tijds. Dierk.* i. p. 42. No. 8 (1863) (Batchian).

1 ♂, Manusela, Central Ceram, 650 m., 1912.

329. *Deilemera pollex* (Linn.)

*Phalaena pollex* Linnaeus, *Syst. Nat.* i. p. 510. No. 75. (1758) (in Indiis).

1 ♂, Wuhai, North Ceram; 1 ♀, Manusela, Central Ceram.

330. *Deilemera nonapicalis* sp. nov.

♀. Very similar to *semperi*, but differs in not having white apex to hindwing.

Length of forewing: 26–28 mm.

Expanse: 57–61 mm.

2 ♀♀, Wuhai, North Ceram.

331. *Deilemera absurdum* (Swinh.)

*Leptosoma absurdum* Swinhoe, *Cat. East. Lepid. Oxf.* part i. p. 143. No. 665 (1892) (Salawatti).

1 ♂, Manusela, Central Ceram, 650 m., 1912.

332. *Deilemera absurdum latimargo* Rothschild.

*Deilemera absurdum latimargo* Rothschild, *Lepid. Brit. Orn. Union and Woll. Exped.* p. 78. No. 408 (1915) (Snow Mts.).

The single ♂ sent by Dr. Tanern from Misol has the dark distal portion of the hindwing a fraction narrower than the narrowest among Dr. Wollaston's 7 ♀♀; but as these vary between 4.5 and 6 mm., while the ♂ in question has this border 4 mm., I do not think that it could be separated.

1 ♂, Misol.

333. *Deilemera absurdum strictifascia* subsp. nov.

♀. Differs from *a. absurdum* in the absence of the orange head, and in the oblique white fascia on the forewing being only half as wide.

1 ♀, Danau Bratan, Bali, 2500 ft., January 1911.

334. *Deilemera immitans* sp. nov.

♂♀. Very much like a small example of *absurdum*, but much darker, and anal tuft almost black.

*Forewing*: blackish sooty brown; only vein 1 marked in white, no white streak in cell, white oblique patch much smaller and suffused with brown.

Dark border of *hindwing* much blacker and very sharply defined.

Length of forewing: *immitans*, ♂ ♀ 20 mm.

Expanse: 44 mm.

Length of forewing: *absurdum*, ♀ 23.5 mm.

Expanse: 51 mm.

7 ♂♂, 2 ♀♀, Manusela, Central Ceram, 650 m., 1912.

## SPHINGIDAE

### Acherontiinae

#### 335. *Herse luctifera* (Walk.)

*Macrosila luctifera* Walker, *List Lepid. Ins. Brit. Mus.* xxxi. p. 35 (1864) (Moluccas).

1 ♂, Manusela, Central Ceram, 650 m., 1912.

#### 336. *Meganoton rufescens thielei* Huwe

*Meganoton thielei* Huwe, *Berl. Entom. Zeitschr.* l. p. 316. No. 1. t. 6. f. 1 (1906) (Sumatra).

1 ♂, Manusela, Central Ceram, 650 m., 1912.

### Philampelinae

#### 337. *Macroglossum unguis* Rothschild & Jord.

*Macroglossum unguis* Rothschild & Jordau, *Rev. Sphingulac* p. 643. No. 581. t. 3. f. 7 (1903) (Burn, Amboina, Java, etc.).

1 ♂, Manusela, Central Ceram, 650 m., 1912.

#### 338. *Macroglossum corythus pylene* Feld.

*Macroglossa pylene* Felder, *Sitz.-Ber. Akad. Wiss. Wien*, xliii. p. 29 (1861) (Amboina).

1 ♀, Manusela, Central Ceram, 650 m., 1912.

## EUPTEROTIDAE

#### 339. *Tagora pallida asclepiades* (Feld.)

*Sphingognatha asclepiades* Felder, *Reise Novara, Lepid.* t. 94. f. 1 (1874) (Sumatra).

1 ♂, Danau Bratan, Bali, 2500 ft., January 1911.

## GEOMETRIDAE

### Geometrinae

#### 340. *Ectropis boarmiodes* sp. nov.

♀. Antennae dark brown, head dirty cream; thorax, tegulae basal portion pale yellowish brown, rest white; rest of thorax and abdomen whitish grey freckled with pale brown.

*Forewing*: greyish white strigillated with brownish wood-grey; two black-brown spots on basal and two pale-brown spots on outer half of costa, two

interrupted antemedian irregular bands pale brown, two postmedian pale-brown bands of coalescent sagittate spots.

*Hindwing*: greyish white, freckled and strigillated with brownish wood-grey; antemedian, median, and postmedian bands zigzag and pale brown, a blackish median stigma.

Length of forewing: 14 mm.

Expanse: 32 mm.

1 ♀, Manusela, Central Ceram, 650 m., 1912.

### 341. *Cypra delicatula* Boisd.

*Cypra delicatula* Boisdual, *Fog. Astrolabe, Léop.* p. 201. pl. 1. f. 3 (1832) (New Guinea).

1 ♀, Misol; 5 ♂♂, 8 ♀♀, Waihai, North Ceram; 1 ♂, 4 ♀♀, Manusela, Central Ceram, 650 m., 1912.

### 342. *Abraxas albiquadrata* (Warr.)

*Potera albiquadrata* Warren, *Noe. Zool.* iv. p. 89 (1897) (Batchian).

1 ♂, Manusela, Central Ceram, 650 m., 1912.

### 343. *Abraxas stresemanni* sp. nov.

♂. Antennae sooty brown-black; head black, a minute orange point on vertex; thorax black, collar, margins of tegulae, and patagia and hinder edge of thorax orange; abdomen black, sides of abdomen variegated with orange, sides and undersurface of anal tuft orange.

*Forewing*: white; basal one-fifth sooty black, with white dot on costa and orange marks in the black area; costal area, costal quarter of cell, and outer one-fifth of wing sooty black, a black discocellular stigma, a subterminal band of white patches.

*Hindwing*: white; basal one-sixth sooty black with two white spots, outer one-sixth sooty black with subterminal band of white patches.

Length of forewing: 29 mm.

Expanse: 63 mm.

1 ♂, Manusela, Central Ceram, 650 m., 1912.

### 344. *Craspedosis sobria* (Walk.)

*Celerena sobria* Walker, *List Lepid. Ins. Brit. Mus.* xxxi. p. 164 (1864) (Aru).

1 ♂, Manusela, Central Ceram, 650 m., 1912; 1 ♀, Kaiike, North Ceram, 600 m., 1912.

### 345. *Bursada tricinectaria* (Linn.)

*Phalœna tricinectaria* Linnaeus, *Syst. Nat.* ed. x. p. 523 (1758) (Amboina).

1 ♂, 1 ♀, Manusela, Central Ceram, 650 m., 1912.

### 346. *Bursadopsis basalis abasalis* subsp. nov.

♀. Differs from *b. basalis* Warr. in lacking the yellow on the thorax and in the absence of the orange subbasal patch on the forewing.

1 ♀, Manusela, Central Ceram, 650 m., 1912.

347. *Milionia glauca* (Cramer.)

*Phalaena glauca* Cramer, *Pap. Erot.* iv. pt. xxxi. p. 152. pl. cccclxviii. f. D. (1781) (Amboina).

1 ♂, 1 ♀, Waihai, North Ceram; 1 ♂, Manusela, Central Ceram, 650 m., 1912.

348. *Ascotis margarita* Warr.

*Ascotis margarita* Warren, *Nor. Zool.* i. p. 435 (1894) (West Java).

1 ♂, Manusela, Central Ceram, 650 m., 1912.

349. *Elphos hymenaria pallida* subsp. nov.

♀. Differs from *h. hymenaria* Guen. in being larger, in the basal two-thirds of forewing being much whiter, and in the whole hindwing having fewer dark markings.

1 ♀, Manusela, Central Ceram, 650 m., 1912.

350. *Noreia albifimbria* Warr.

*Noreia albifimbria* Warren, *Nor. Zool.* iv. p. 206 (1897) (Celebes).

1 ♂, Waihai, North Ceram.

351. *Gonaphaga cinnamomaria* sp. nov.

♂, Antennae pale cinnamon, pectinations ash-grey; head, thorax, and abdomen pale cinnamon.

*Forewing*: pale cinnamon, very sparingly freckled with rusty brown; a number of brown striae on costa, a widely interrupted antemedian row of brown spots, a median band rusty brown, a postmedian band of round blackish brown dots, a subterminal larger and two terminal smaller brown spots below apex.

*Hindwing*: pale cinnamon; antemedian rusty brown band, and a median band of blackish-brown dots.

Length of forewing: 21 mm.

Expanse: 46 mm.

1 ♂, Manusela, Central Ceram, 650 m., 1912.

352. *Tephрина normata* Walk.

*Tephрина normata* Walker, *List Lepid. Ins. Brit. Mus.* xxiii. p. 966 (1861) (Moreton Bay).

2 ♀ ♀, Kintamani, Bali, 4000 feet, February—March 1911.

353. *Dysphania militaris abrupta* (Walk.)

*Euschema abrupta* Walker, *Trans. Entom. Soc. Lond.* (3) i. p. 70 (1859) (Assam).

1 ♂, Buleleng, North Bali, January—April 1911; 1 ♀, Bali, 1912.

354. *Dysphania numana* (Cramer.)

*Phalaena numana* Cramer, *Pap. Erot.* iii. pt. xix. p. 59. pl. ccxxvii. f. A. (1779) (Amboina).

1 ♂, Waihai, North Ceram.



355. *Dysphania cyane* (Cram.)

*Phalaena cyane* Cramer. *Pap. Ecot.* iii. pt. xxiii. p. 137. pl. cclxvii. f. D. (1780) (Amboina).

1 ♂, 2 ♀♀, Manusela, Central Ceram, 650 m., 1912; 1 ♀, Kanike, North Ceram, 600 m., 1912; 1 ♀, Wahai, North Ceram.

**Larentiinae**356. *Sauris ceramica* sp. nov.

♀. Antennae grey-brown: head and thorax ash-grey freckled with white; abdomen buffish grey.

*Forewing*: dirty white; a postbasal dark mouse-grey band preceded by a spot on vein 1, beyond this band a number of paler grey slightly sinuate lines, a median dark mouse-grey band widening below cell to three times its width in and above cell, from the wide portion of median band branch off three almost contiguous narrow bands to costa, beyond which are a number of alternate light and darker grey transverse sinuate lines, a terminal row of quadrate black spots.

*Hindwing*: wood-grey.

Length of forewing: 17 mm.

Expanse: 37 mm.

1 ♀, Manusela, Central Ceram, 650 m., 1912.

**Hemitheinae**357. *Acolachroma suffusa* (Warr.)

*Actenochroma prasina* ab. *suffusa* Warren, *Nor. Zool.* iii. p. 283 (1896) (Fergusson Isl.).

1 ♀, Manusela, Central Ceram, 650 m., 1912.

358. *Anisozyga absona* (Warr.)

*Anisogamia absona* Warren, *Nor. Zool.* iii. p. 287 (1896) (Fergusson Isl.).

1 ♂, Misol.

359. *Ornithospila submonstrans* (Walk.)

*Geometra submonstrans* Walker, *List Lepid. Ins. Brit. Mus.* xxii. p. 526 (1861) (Sarawak).

1 ♂, Manusela, Central Ceram, 650 m., 1912.

360. *Comibaena subornataria* sp. nov.

♂. This species comes close to *ornataria* Leech. Antennae white, pectinations pale olive-green; head white, thorax white, tegulae and four spots on hinder part of thorax apple-green; abdomen white, last three segments buff.

*Forewing*: apple-green; apical three-fourths of costa white, a curved and bent white antemedian line from the upper angle of which runs a short white streak to a black stigma and from the lower angle of which runs a longer white bar above vein 1 to postmedian line, a postmedian white line which widens suddenly from vein 2 to inner margin into a quadrate white patch reaching termen and tornus; in the middle of this patch is a black-brown irregular patch, an angled white subterminal

line from costa to half-way between veins 3 and 4, touching termen at apex and half-way between veins 3 and 4.

*Hindwing*: apple-green, somewhat strigillated with white; a postdiscal zigzag white line widening out suddenly to termen as a large blotch between vein 4 and costa; in this white blotch is an irregular mauve-brown patch.

Length of forewing: 16 mm.

Expanse: 36 mm.

1 ♂, Manusela, Central Ceram, 650 m., 1912.

### Oenochrominae

#### 361. *Derambila melagonata* (Walk.)

*Zanopteryx melagonata* Walker, *List Lepid. Ins. Brit. Mus.* xxvi, p. 1619 (1862) (Ceram).

1 ♂, Manusela, Central Ceram, 650 m., 1912.

#### 362. *Derxena nivea nivea* (Kirsch)

*Acidalia nivea* Kirsch, *Matth. Mus. Dresd.* p. 134, pl. vii, f. 10 (1877) (New Guinea).

1 ♂, Misol.

#### 363. *Celerena lerne* (Boisd.)

*Callimorpha lerne* Boisduval, *Foy, Astrolabe Léop.* p. 207, pl. v, f. 2 (1832) (New Guinea).

4 ♂♂, 4 ♀♀, Misol.

#### 364. *Celerena mutata* Walk.

*Celerena mutata* Walker, *List Lepid. Ins. Brit. Mus.* xxxi, p. 167 (1864) (Misol).

2 ♂♂, Misol.

#### 365. *Celerena connexa* Walk.

*Celerena connexa* Walker, *l.c.* p. 168 (Amboina).

11 ♂♂, 6 ♀♀, Manusela, Central Ceram, 650 m., 1912.

#### 366. *Eumelia rosalia rosalia* (Cram.)

*Phalaena rosalia* Cramer, *Pap. Erot.* ix, pt. xxxi, p. 152, pl. cccviii, f. F. (1781) (Amboina).

1 ♂, Manusela, Central Ceram, 650 m., 1912; 1 ♂, 1 ♀, Ceram.

#### 367. *Eumelia aureliata* Guen.

*Eumelia aureliata* Guenée, *Hist. Nat. Ins. Sp. Gén. Léop.* ix, *Ur. & Phal.* i, p. 394, No. 631, pl. 22, f. 6 (1857) (Ceylon).

1 ♂, Wuhai, North Ceram; 1 ♀, Misol.

### URANIIDAE

#### 368. *Alcidis orontes* (Johan.)

*Papilio orontes* Johansson, *Amoen. Acad.* vi, p. 402, No. 51 (1763) (in Indiis).

4 ♂♂, Manusela, Central Ceram, 650 m., 1912; 1 ♀, Wuhai, North Ceram; 1 ♂, 1 ♀, Ceram; 1 ♂, Bara, N.W. Burn.

369. *Alcidis aruus* Feld.

*Alcidis aruus* Felder, *Reise Novara* ii, pt. ii, pl. 121, f. 1 (1875) (Aru Islds.).

The type of *A. aruus* Feld. is a ♀ collected by Lorquin, and agrees well with the ♂ and smaller ♀ collected by Dr. Tanern. The large ♀ sent by Dr. Tanern is very distinct, and might even be considered a good species if I had not received some ♂♂ among Dr. Wollaston's Snow Mts. collection, one of which is identical with this Misol ♀, while others are more or less intermediate between the latter and *aruus*. A ♀ without locality in the Felder collection agrees entirely with this larger Misol ♀.

This ♀ differs from typical ♀ *aruus* in its much larger size, in the blue-black, **not** green-black, ground colour, and in the fascii of the forewing and disc of hind-wing being clear turquoise-blue, **not** strongly suffused with golden-green. I propose for this insect the name ab **coerulea** ab. nov.

1 ♂, 1 ♀ and 1 ♀ ab. *coerulea*, Misol.

370. *Nyctalemon patroclus* (Linn.)

*Papilio patroclus* Linnaeus, *Mus. Ludov. Ulric.* p. 204 (1764) (Amboina).

2 ♂♂, Manusela, Central Ceram, 650 m., 1912.

371. *Acropteris striataria* (Clerck)

*Phalaena striataria* Clerck, *Icones Ins. Rar.* t. 55, f. 4 (1759) (Amboina?).

3 ♀♀, Manusela, Central Ceram, 650 m., 1912: 1 ♂, Waihai, North Ceram.

372. *Acropteris inchoata* (Walk.)

*Micronia inchoata* Walker, *List Lepid. Ins. Brit. Mus.* xxvi, p. 1624 (1862) (Misol).

1 ♂, Misol.

373. *Acropteris obliquaria* (Moore)

*Micronia obliquaria* Moore, *Proc. Zool. Soc. Lond.* 1877, p. 622, pl. ix, f. 17 (S. Andamans).

2 ♂♂, Manusela, Central Ceram, 650 m., 1912.

374. *Micronia fuscifimbria major* subsp. nov.

♂. Differs from *f. fuscifimbria* Warr., in being much larger, and in the markings being less distinct.

Length of forewing: 28 mm.

Expanse: 60 mm.

1 ♂, Manusela, Central Ceram, 650 m., 1912.

375. *Micronia aculeata responsaria* Walk.

*Micronia responsaria* Walker, *List Lepid. Ins. Brit. Mus.* xxiii, p. 823 (1861) (Celebes).

1 ♂, 3 ♀♀, Manusela, Central Ceram, 650 m., 1912.

**COSSIDAE****Zeuzerinae****376. *Duomitus hyphinoë* (Cram.)**

*Phalaena hyphinoë* Cramer, *Pap. Ecot.* ii. pt. xiii. p. 91. pl. cliv. f. B. (1777) (Amboina).

1 ♂, 1 ♀, Manusela, Central Ceram, 650 m., 1912.

**LASIOCAMPIDAE****377. *Taragama castanea pallida* subsp. nov.**

♀. Much paler than *c. castanea* Swinh.

1 ♀, Bali, 1912.

**CALLIDULIDAE****378. *Cleis evander* (Cram.)**

*Papilio erander* Cramer, *Pap. Ecot.* iv. pt. xxviii. p. 83. pl. cccxxxi. ff. F. G. (1789) (Côte de Guinée! ?)

A most variable species.

6 ♂♂, 12 ♀♀, Manusela, Central Ceram, 650 m., 1912; 1 ♀, Waihai, North Ceram; 1 ♂, Kanike, North Ceram, 600 m., 1912.

**379. *Cleis dichroa* (Boisd.)**

*Danius dichroa* Boisduval, *Voy. Astrolabe Lépid.* p. 260 (1832) (New Guinea).

1 ♀, Misol.

**380. *Tyndaris erycinata* (Walk.)**

*Callidula erycinata* Walker, *List Lepid. Ins. Brit. Mus.* xxxi. p. 60. (1864) (Dorey).

4 ♂♂, Misol.

**THYRIDIDAE****Thyridinae****381. *Rhodoneura fallax* (Warr.)**

*Phacambura fallax* Warren, *Ann. Mag. Nat. Hist.* (6) xviii. p. 229 (1896) (New Guinea).

9 ♂♂, 10 ♀♀, Manusela, Central Ceram, 650 m., 1912.

**382. *Rhodoneura myrtea plagifera* (Butl.)**

*Macrosea plagifera* Butler, *Trans. Entom. Soc. Lond.*, 1866, p. 420 (Tonga Island).

1 ♀, Misol.

**Hyblaeinae****383. *Hyblaea vasa* Swinh.**

*Hyblaea vasa* Swinhoe, *Ann. Mag. Nat. Hist.* (7) xi. p. 506 (1903) (Fergusson).

1 ♂, Manusela, Central Ceram, 650 m., 1912.

**PYRALIDAE****Crambinae****384. *Chilo parramattellus* Meyr.**

*Chilo parramattellus* Meyrick, *Proc. Linn. Soc. N.S.W.* iii. p. 178 (1878) (New South Wales).

2 ♂♂, Manusela, Central Ceram, 650 m., 1912.

**385. *Chilo suppressalis* (Walk.)**

*Crambus suppressalis* Walker, *List Lepid. Ins. Brit. Mus.* xxvii. p. 166 (1863) (Shanghai).

1 ♂, Manusela, Central Ceram, 650 m., 1912.

**Endotrichinae****386. *Cotachena histricalis orientalis* Rothsch.**

*Cotachena histricalis orientalis* Rothschild, *Lepid. B.O.U. & Woll. Exped* p. 117 No. 644 (1915) (Snow Mts.).

1 ♂, Manusela, Central Ceram, 650 m., 1912.

**Pyralinae****387. *Vitessa zemire* (Cram.)**

*Phalaena zemire* Cramer, *Pap. Exot.* iv. pt. xxxi. p. 149, pl. 367. f. I. (1781) (Amboina).

1 ♂, Manusela, Central Ceram, 650 m., 1912.

**Hydrocampinae****388. *Nymphula foedalis scitalis* (Led.)**

*Hydrocampa scitalis* Lederer, *Wien. Entom. Mon.* vii. p. 451 (1863) (Amboina).

1 ♂, Misol.

**389. *Aulacodes stresemanni* sp. nov.**

♂ ♀. Antennae amber-brown, closely ringed with white; head buffish cream; thorax white, tips of patagia buffish; abdomen white, anal tuft buffish.

*Forewing*: basal half, with exception of costal area, obliquely silvery white, a broad oblique band running basad from cell orange edged with dark chocolate outwardly; apical half and costal area orange, a large somewhat triangular patch in this half, white edged with a chocolate hair line, a silver subterminal band edged with chocolate, terminal line black.

*Hindwing*: white; outer two-ninths orange edged inwardly with black, a subterminal silver band edged for the greater part with black, five terminal black spots.

Length of forewing: ♂ 10 mm., ♀ 11.5 mm.

Expanse: ♂ 22 mm., ♀ 25 mm.

3 ♂♂, 3 ♀♀, Manusela, Central Ceram, 650 m., 1912.

390. *Aulacodes fuscicostalis* sp. nov.

♀. Antennae amber-yellow, base white; head and thorax buff; abdomen above buff, sides white.

*Forewing*: deep orange; costal area sooty black, upper part of cell and across discocellulars sooty black, rest of cell and an oblique patch beyond discocellulars white, a white subterminal band, widely edged with sooty black, a terminal line of black dots.

*Hindwing*: white; base, abdominal area, and outer one-third orange, a black line inside the orange border, and a row of double black spots along termen, the two upper enclosing white spots.

Length of forewing: 10 mm.

Expanse: 22 mm.

1 ♀, Manusela, Central Ceram, 650 m., 1912.

391. *Bradina modestalis* (Led.)

*Erilita modestalis* Lederer, *Wien. Entom. Mon.* vii, p. 426, pl. 16, f. 3 (1863) (Amboina).

1 ♂, Manusela, Central Ceram, 650 m., 1912.

392. *Bradina ceramica* sp. nov.

♂. Antennae amber-yellow; head, thorax, and abdomen whitish mixed with buff.

*Forewing*: golden brownish bronze; a large patch occupying almost the whole centre of basal half and a patch in basal portion of outer half below subcostal semihyaline pale yellow.

*Hindwing*: basal two-thirds semihyaline pale yellow, outer one-third golden brownish bronze.

Length of forewing: 13 mm.

Expanse: 28.5 mm.

1 ♂, Manusela, Central Ceram, 650 m., 1912.

393. *Piletocera violalis* Led.

*Piletocera violalis* Lederer, *Wien. Entom. Mon.* vii, p. 431 (1863) (Amboina).

1 ♀, Manusela, Central Ceram, 650 m., 1912.

**Pyraustinae**394. *Entephria jaguaralis* (Guen.)

*Spilonota jaguaralis* Guenée, *Hist. Nat. Ins. Spec. Gén. Léop.* viii, *Delt. et Pyr.* p. 283 (1854) (?).

1 ♀, Manusela, Central Ceram, 650 m., 1912.

395. *Zinckenia fascialis* (Cram.)

*Phalaena fascialis* Cramer, *Pap. Erol.* iv, part xxxiv, p. 236, pl. cccxvii, f. O, (1782) (Japan).

1 ♂, Manusela, Central Ceram, 650 m., 1912.

396. **Marasmia sordidalis** sp. nov.

♂ ♀. Antennae amber-brown; head and thorax dull wood-brown; abdomen basal half whitish, outer half dark wood-brown.

*Forewing*: wood-brown; basal two-thirds below cell paler more whitish wood-brown, an antemedian and postmedian line darker wood-brown, as is a stigma in cell.

*Hindwing*: basal three-fifths whitish, outer two-fifths wood-brown, a stigma and postmedian line darker wood-brown.

Length of forewing: ♂ 9 mm., ♀ 11 mm.

Expanse: ♂ 21 mm.; ♀ 25 mm.

1 ♂, 1 ♀, Maunsela, Central Ceram, 650 m., 1912.

397. **Syngamia floridalis** (Zell.)

*Stenia floridalis* Zeller, *Lepid. Micr. Caff.* p. 60 (1852) (Natal).

2 ♂♂, Maunsela, Central Ceram, 650 m., 1912.

398. **Samea trimaculalis extensalis** subsp. nov.

♂. Differs from *tr. trimaculalis* Kenr. in the subbasal white spots being larger and more elongated.

1 ♂, Maunsela, Central Ceram, 650 m., 1912.

399. **Bocchoris manuselalis** sp. nov.

♂. Antennae yellowish brown; head buff, a black spot on vertex; thorax and abdomen buff.

*Forewing*: buff; basal two-thirds with two yellow bands and numerous transverse lines, spots, and rings of deep number-brown, outer one-third with two very broad bands and portions of termen deep number-brown.

*Hindwing*: buff; two incomplete curved bands on disc, a subterminal very broad band and fringe deep number-brown.

Length of forewing: 9.5 mm.

Expanse: 22 mm.

1 ♂, Maunsela, Central Ceram, 650 m., 1912.

400. **Bocchoris onychinalis** (Guen.)

*Asopia onychinalis* Guenée, *Hist. Nat. Ins. Spec. Gén. Léop. viii. Delt. et Pyc.* p. 205. No. 158. (1854) (Côte de Coromandel).

4 ♂♂, Maunsela, Central Ceram, 650 m., 1912.

401. **Filodes fulvidorsalis** (Hübner.)

*Pimelia fulvidorsalis* Hubner, *Zuträge Erot. Schmelt.* iv. p. 15. ff. 643, 644 (1832) (Java).

1 ♂, 2 ♀♀, Maunsela, Central Ceram, 650 m., 1912.

402. **Nevrina procopia** (Cramer.)

*Phalaena procopia* Cramer, *Pap. Erot.* iv. part xxxi. p. 152. pl. cccxviii. f. E. (1781) (Amboina).

1 ♀, Maunsela, Central Ceram, 650 m., 1912.

403. **Dichocrocis nigrilinealis** (Walk.)

*Bolys nigrilinealis* Walker, *List Lepid. Ins. Brit. Mus.* xxxiv. p. 1410 (1865) (Sula Islands).

1 ♂, 1 ♀, Maunsela, Central Ceram, 650 m., 1912.

404. **Dichocrocis clioalis** (Walk.)

*Astara (?) clioalis* Walker, *List Lepid. Ins. Brit. Mus.* xviii. p. 549 (1859) (Sarawak).

1 ♂, Maunsela, Central Ceram, 650 m., 1912.

405. **Glyphodes indica** (Saund.)

*Eudiotis indica* Saunders, *Trans. Entom. Soc. Lond.* 1851. p. 163. pl. 12. ff. 5, 6, 7 (Java).

1 ♂, Maunsela, Central Ceram, 650 m., 1912.

406. **Glyphodes suralis** (Led.)

*Chlauges suralis* Lederer, *Wien. Entom. Mon.* vii. p. 405. pl. 14. f. 9. (1863) (Amboina).

1 ♀, Misol.

407. **Glyphodes glauculalis** (Guen.)

*Margarodes glauculalis* Guenée, *Hist. Nat. Ins. Spec. Gén., Léop.* viii. *Delt. et Pyr.* p. 306. No. 325 (1854) (?).

1 ♂, Maunsela, Central Ceram, 650 m., 1912.

408. **Glyphodes conjunctalis** Walk.

*Glyphodes conjunctalis* Walker, *List Lepid. Ins. Brit. Mus.* xxxiv. p. 1357 (Sula Islands).

1 ♂, Maunsela, Central Ceram, 650 m., 1912.

409. **Glyphodes conclusalis** Walk.

*Glyphodes conclusalis* Walker, *List Lepid. Ins. Brit. Mus.* xxxiv. p. 1354 (1865) (India).

1 ♂, Maunsela, Central Ceram, 650 m., 1912.

410. **Glyphodes analagoalis** sp. nov.

♂. Very similar to *caesalis* and *assimilis*, but larger than *caesalis*, and the outer two-fifths of both wings much darker.

Differs from *assimilis* in having the first three orange transverse bands of *forewing* broader and with much narrower black edges; the amalgamated postmedian and postdiscal bands are sooty fulvous, **not** orange, and more clouded with sooty black-brown. On *hindwing* median band is broad and distinct, and outer one-third of wing strongly clouded and suffused with black-brown.

Length of forewing: 15 mm.

Expanse: 34 mm.

1 ♂, Maunsela, Central Ceram, 650 m., 1912.

411. **Polythlipta globulipedalis** (Walk.)

*Glyphodes globulipedalis* Walker, *List Lepid. Ins. Brit. Mus.* xxxiv. p. 1359 (1865) (New Guinea).

2 ♂♂, Maunsela, Central Ceram, 650 m., 1912.



412. *Psara licarsilalis immundalis* (Walk.)

*Botys immundalis* Walker, *List Lepid. Ins. Brit. Mus.* xxxiv. p. 1448 (1865) (Java).

1 ♂, Manusela, Central Ceram, 650 m., 1912.

413. *Noorda subrufalis* sp. nov.

♀. Antennae amber-yellow, head and thorax cinnamon-amber-brown variegated with white; abdomen cinnamon-amber-brown ringed on basal half with white.

*Forewing*: basal three-fifths pale mouse-grey, outer three-fifths of costal area and below it sooty black-brown; a double black and white band borders the mouse-grey from inner margin to vein 3, a large wedge-shaped brick-red patch from inner margin to vein 7, outside this from vein 4 to subcostal is a double zigzag line, inside yellow, outside brick-red; a broad subterminal band of bright mauve, a terminal line of alternate buff and rufous spots.

*Hindwing*: three-quarters of costal, one-third of wing buff, two-thirds of rest pale mouse-grey followed by a curved and angled buff yellow line; a large brick-red patch from vein 1-6, a subterminal broad band bright mauve, a terminal line of alternate buff and rufous spots; fringe of both wings golden-yellow.

Length of forewing: 8 mm.

Expanse: 18 mm.

1 ♀, Manusela, Central Ceram, 650 m., 1912.

414. *Pyrausta cajelalis fortioralis* subsp. nov.

♂. Differs from *c. cajelalis* Holl. in being larger and darker, and the bands of spots are stronger and more pronounced.

1 ♂, Manusela, Central Ceram, 650 m., 1912.

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LEPIDOPTERA OF THE MZAB COUNTRY, SOUTH ALGERIA,  
COLLECTED BY DR. ERNST HARTERT AND CARL  
HILGERT IN 1914.\*

By LORD ROTHSCILD, F.R.S., PH.D.

RHOPALOCERA

**PAPILIONIDAE**

**Papilioninae**

1. *Papilio machaon saharae* Oberth.

*Papilio machaon* var. *saharae* Oberthür, *Etud. d'Entom.* iv. p. 68. sub. No. 192 (1879) (Laghouat).

1 ♀, Oued Nça, April 16-30 (1914); 2 ♂♂, 1 ♀, Ghardaia, May 1-3 (1914).

**Pierinae**

2. *Teracolus दौरا nouna* (Luc.)

*Anthocharis nouna* Lucas, *Explor. Scient. d'Algérie. Zool.* iii. p. 359. No. 14. t. 1. f. 2 (1849) (Algeria).

17 ♂♂, 4 ♀♀, Ghardaia, May 1-3 (1914).

3. *Pieris daphidice albidice* Oberth.

*Pieris daphidice* var. *albidice* Oberthür, *Etud. d'Entom.* vi. p. 47 (1881) (Algeria).

2 ♂♂, Ghardaia, May 1-3 (1914).

**NYMPHALINAE**

4. *Pyrameis cardui cardui* (Linn.)

*Papilio cardui* Linnaeus, *Fauna Suecica*, p. 276. No. 1051 (1761) (Sweden).

This species was as usual very abundant, but the bulk of the specimens were small.

2 ♂♂, Oued Nça, April 16-30 (1914).

5. *Melitaea didyma harterti* Rothschild.

*Melitaea didyma harterti* Rothschild, *Nov. Zool.* xx. p. 115. No. 13 (1913) (El Hadadra).

4 ♂♂, 1 ♀, Ghardaia, May 1-3 (1914).

**LYCAENIDAE**

6. *Tarucus theophrastus theophrastus* (Fabr.)

*Hesperia theophrastus* Fabricius, *Entom. System.* iii. p. 281. No. 82 (1793) (Morocco).

13 ♂♂, 8 ♀♀, Ghardaia, May 1-3 (1914).

\* For particulars of localities see *antea*, pp. 61-4.

## HETEROCERA

## SPHINGIDAE

## Choerocampinae

7. *Celerio euphorbiae deserticola* (Bartel)

*Deilephila mauretunica* ab. *deserticola* Bartel, in *Rühl, Palaearkt. Grossschmett.* ii. p. 79 (1899) (Mauretania).

Only the one specimen seen.

1 ♀, Oued Nça, April 16-30 (1914).

8. *Celerio lineata livornica* (Esp.)

*Sphinx livornica* Esper, *Schmett.* ii. p. 196 (1779) (Europe).

Very abundant but mostly worn.

1 ♂, 1 ♀, Oued Nça, April 16-30 (1914).

## LYMANTRIIDAE

9. *Albarracina warionis warionis* (Oberth.)

*Bombyx warionis* Oberthür, *Etud. d'Entom.* vi. p. 75. t. ii. f. 6 (1881) (Oran).

1 ♀, El Alia, between Touggourt and Guerrara, April 12 (1914).

## NOCTUIDAE

## Agrotinae

10. *Chloridea nubigera* (Herr.-Sch.)

*Heliothis nubigera* Herrich-Schäffer, *Syst. Bearb. Schmett. Eur.* ii. p. 366 (1845) (Europe).

4 ♂♂, 4 ♀♀, Oued Nça, April 16-30; 1 ♂, Ghardaia, May 1-3 (1914).

11. *Timora albida* Hampson.

*Timora albida* Hampson, *Ann. Mag. Nat. Hist.* (7) xv. p. 450. No. 197a (1905) (Hammam-es-Salabin).

2 ♀♀, Hassi Dinar, south of Touggourt, April 11; 4 ♂♂, 4 ♀♀, El Alia, between Touggourt and Guerrara, April 12; 3 ♂♂, El Arich, east of Guerrara, April 13; 1 ♂, Hassi Sidi Mahmud, between El Arich and the Oued Nça, April 14; 1 ♂, Oued Nça, April 16-30 (1914).

The late Mr. Warren and others have confused this very distinct species with *Oria (Argyrospila) striata* Staud.

12. *Euxoa oranaria* (Bang-Haas)

*Agrotis oranaria* Bang-Haas, *Iris*, xix. p. 133, pl. v. f. 9 (1906) (Sud Oranais).

12 ♂♂, 11 ♀♀, Oued Nça, April 16-30 (1914).

13. *Euxoa mauretunica* (Bang-Haas)

*Agrotis mauretunica* Bang-Haas, *Iris*, xxiv. p. 36, pl. 3. f. 4 (1910) (Süd-Oran).

12 ♂♂, 28 ♀♀, Oued Nça, April 16-30 (1914).

14. **Euxoa radius** (Haw.) (= *pallia* Hübn. et auct.)

*Bombix radius* Haworth, *Lepid. Brit.* p. 119 (1809) (England).

2 ♂♂, Oued Nça, April 16-30 (1914).

15. **Agrotis ypsilon** (Rott.)

*Noctua ypsilon* Rottenburg, *Naturforscher*, ix, p. 11 (1776) (Europe).

22 ♂♂, 19 ♀♀, Oued Nça, April 16-30 (1914).

16. **Lycophotia photophila ignipeta** (Oberth.)

*Agrotis ignipeta* Oberthür, *Etud. d'Entom.* i, p. 45, t. iv, f. 4 (1876) (Oran).

Differs from typical *photophila* in its paler hindwings and more distinct yellowish transverse bands on forewings.

3 ♂♂, Oued Nça, April 16-30 ; 1 ♀, Ghardaia, May 1-3 (1914).

(25 ♂♂ and 2 ♀♀, May 1-15 (1913), Ain Sefra, Sud Oranais, W. R. & E. H.)

**Hadeninae**17. **Scotogramma trifolii farkasii** (Treitsch.)

*Noctua farkasii* Treitschke, *Schweid. Europ.* x, pt. 2, p. 74 (1835) (Europe).

6 ♂♂, 9 ♀♀, Oued Nça, April 16-30 (1914).

18. **Scotogramma treitschkei** (Boisd.)

*Hadena treitschkei* Boisdual, *Ann. Soc. Linn. Paris*, 1827, p. 111, pl. 6, f. 2 (South France).

5 ♂♂, 3 ♀♀, Oued Nça, April 16-30 (1914).

19. **Odontelia griseola** Rothschild.

*Odontelia griseola* Rothschild, *Nor. Zool.* xx, p. 121, No. 37 (1913) (Mraier).

1 ♂, Hassi Dinar, S. of Tonggourt, April 11 (1914).

**Cucullianae**20. **Copiphana gafsana** (Blachier)

*Cleophana gafsana* Blachier, *Bull. Soc. Entom. France*, 1905, p. 53 (Gafsa, Tunis).

4 ♂♂, 3 ♀♀, ab. *albina*, Oued Nça, April 16-30 (1914).

21. **Cleophana vaulogerii** Staud.

*Cleophana vaulogerii* Staudinger, *Iris*, xii, p. 378, pl. v, f. 9 (1899) (Biskra).

2 ♂♂, 2 ♀♀, Oued Nça, April 16-30 (1914).

22. **Cleophana fatima** Bang-Haas

*Cleophana fatima* Bang-Haas, *Iris*, xx, p. 73, t. iii, f. 14 (1907) (Gafsa, Tunis).

1 ♀, Oued Nça, April 16-30 (1914).

**23. *Cleophana chabordis* Oberth.**

*Cleophana chabordis* Oberthür, *Etud. d'Entom.* i. p. 47. pl. ii. f. 2 (1876) (Bou Saada).

About half this huge series is ab. *albicans* and intermediates.

1 ♂, El Alia, between Tonggourt and Guerrara, April 12; 1 ♀, El Arich, E. of Guerrara, April 13; 24 ♂♂ and ♀♀, Hassi Sidi Mahmud, between El Arich and Oued Nça, April 14; 306 ♂♂ and ♀♀, Oued Nça, April 16-30 (1914).

**24. *Metapoceras omar* (Oberth.)**

*Cleophana omar* Oberthür, *Bull. Soc. Entom. France*, 1887, p. 57 (Oued Leber, Tunis).

1 ♂, 1 ♀, Oued Nça, April 16-30 (1914).

**25. *Harpagophana picturata* (Rothsch.)**

*Cleophana picturata* Rothschild, *Entom. Zutsch.* xxiii. p. 142 (1909) (Mraier).

The present specimen is the fourth recorded in five years, so that the species must be very rare.

1 ♀, Oued Nça, April 16-30 (1914).

**26. *Criophasia albolineata* (Blachier)**

*Calophasia albolineata* Blachier, *Bull. Soc. Entom. France*, 1905, p. 53 (Gafsa, Tunis).

1 ♀, Oued Nça, April 16-30 (1914).

**27. *Calophasia kraussi* Rebel**

*Calophasia kraussi* Rebel, *Verh. zool. bot. Gesell. Wien*, 1895, p. 348 (Ouargla).

All intergradations, except ab. *brunnea*, occur in this series between typical *kraussi* and ab. *albo-ochracea*, and one is entirely white.

1 ♂, 1 ♀, El Alia, between Tonggourt and Guerrara, April 12; 3 ♀♀, El Arich, E. of Guerrara, April 13; 25 ♂♂ and ♀♀, Oued Nça, April 16-30 (1914).

**Acronyctinae****28. *Iambiodes incerta* (Rothsch.)**

*Bryophila incerta* Rothschild, *Nor. Zool.* xx. p. 125, No. 51 (1913) (Oued Nça).

3 ♂♂, 2 ♀♀, Oued Nça, April 16-30 (1914).

**29. *Laphigma exigua junceti* (Zell.)**

*Caradrina junceti* Zeller, *Iris*, 1847, p. 445 (Spain).

4 ♂♂, 9 ♀♀, Oued Nça, April 16-30 (1914).

**30. *Rabinopteryx subtilis* (Mab.)**

*Epimecia subtilis* Mabilie, *Bull. Soc. Entom. France*, 1888, p. 51 (Gabès, Tunis).

3 ♀♀, Oued Nça, April 16-30 (1914).

**31. *Athetis clavipalpis* (Scop.)**

*Phalaena clavipalpis* Scopoli, *Entom. Carn.* p. 213 (1763) (Carniola).

1 ♂, Oued Nça, April 16-30 (1914).

32. **Athetis oberthuri** Rothschild.

*Athetis oberthuri* Rothschild, *Nov. Zool.* xx. p. 126. No. 57 (1913) (South Oued Mya).

1 ♂, 1 ♀, Oued Nça, April 16-30 (1914).

33. **Athetis approximans** Rothschild.

*Athetis approximans* Rothschild, *Nov. Zool.* xxi. p. 334. No. 187 (1914) (Guelt-es-Stel).

The capture of this insect in April finally settles any doubt that may have been felt that it could be the autumn brood of *flava* Oberth.

3 ♂♂, Oued Nça, April 16-30 (1914).

**Erastrinae**34. **Eublemma mozabitica** Rothschild.

*Eublemma mozabitica* Rothschild, *Nov. Zool.* xix. p. 126. No. 5 (1912) (Ghardaia).

3 ♀♀, Oued Nça, April 16-30 (1914).

35. **Eublemma albivestalis** Hampson.

*Eublemma albivestalis* Hampson, *Cat. Lepid. Phal. Brit. Mus.* x. p. 191. No. 592. pl. cliv. f. 25 (1910) (Palestine, Dead Sea) = *Talpocharus vestalis* Standinger, *Iris*, xii. p. 385 (1899) (Nom. praecoc.).

2 ♀♀, Oued Nça, April 16-30 (1914).

36. **Eublemma wollastoni** N. C. Rothschild.

*Eublemma wollastoni* N. C. Rothschild, *Nov. Zool.* viii. p. 430. No. 27 (1901) (Shendi).

3 ♀♀, Oued Nça, April 16-30 (1914).

37. **Eublemma lacteola** Rothschild.

*Eublemma lacteola* Rothschild, *Nov. Zool.* xxi. p. 339. No. 210 (1914) (Guelt-es-Stel).

1 ♂, 3 ♀♀, Oued Nça, April 16-30 (1914).

38. **Eublemma ernesti** sp. nov.

♂♀. Antennae above white, below amber-brown; head, thorax, and abdomen white.

*Forewing*: white; a grey spot at end of cell, a submarginal row of minute black dots.

*Hindwing*: creamy white.

Length of forewing: 11-12.5 mm.

Expanse: 25.5-28.5 mm.

2 ♂♂, 4 ♀♀, Oued Nça, April 16-30 (1914) (♀ Type).

39. **Eublemma conistreta** Hampson.

*Eublemma conistreta* Hampson, *Cat. Lepid. Phal. Brit. Mus.* x. p. 192. No. 5296. pl. cliv. f. 29 (1910) (Quetta, Beluchistan).

1 ♀, Hassi Dinar, South of Tougourt, April 11; 2 ♀♀, El Alia, between Tougourt and Guerrara, April 12; 1 ♀, El Arich, east of Guerrara, April 13; 1 ♂, 2 ♀♀, Hassi Sidi Mahmud, between El Arich and the Oued Nça, April 14; 3 ♂♂, 2 ♀♀, Oued Nça, April 16-30 (1914).

40. *Tarache biskrensis* (Oberth.)

*Acontia biskrensis* Oberthür, *Bull. Soc. Entom. France*, 1887, p. 58 (Biskra).

This species is almost as variable in the amount of white on wings and body as *T. lucida* (Hufn.).

1 ♂, 3 ♀♀, El Alia, between Tougourt and Guerrara, April 12; 2 ♂♂, 6 ♀♀, Hassi Sidi Mahmud, between El Arich and the Oued Nça, April 14; 2 ♂♂, 12 ♀♀, Oued Nça, April 16-30 (1914).

41. *Tarache lucida* (Hufn.)

*Noctua lucida* Hufnagel, *Berlin. Mag.* iii. p. 302 (1776) (Berlin).

2 ♂♂, Oued Nça, April 16-30 (1914).

**Catocalinae**42. *Anydrophila sabourodi* (Luc.)

*Palpangula sabourodi* Lucas, *Bull. Soc. Entom. France*, 1907, p. 180 (Zarcine, Tunisia).

These two specimens are the first to be recorded from Algeria, and, together with the type and a ♂ from Aseksen, north of the Hoggar Mountains, collected by Herr Geyr von Schweppenburg (also in the Tring Museum) are the only specimens recorded of this species.

2 ♂♂, Oued Nça, April 16-30 (1914).

43. *Cerocala algeriae* Oberth.

*Cerocala scapulosa* var. *algeriae* Oberthür, *Etud. d'Entom.* i. p. 55. pl. iv. f. 7 (1876) (Bou Saada).

Both the late Mr. W. Warren and Sir George Hampson have retained *scapulosa*, *insana*, and *sana* as three distinct species, while in the *Staudinger-Rebel Catalogue* they are treated as three forms of one species. Dr. Jordan has examined the Algerian forms for me and found that *insana* Herr.-Sch., and *sana* Stand. are certainly distinct species both from *scapulosa* and each other—differing in their antennae and genitalia as well as in marking. Now both Warren and Hampson have identified *algeriae* Oberth. with *insana* Herr.-Sch. I, however, have not adopted this view because (1) the pattern of the forewing is different and the hindwing is much whiter, and (2) the locality Cape of Good Hope must be taken into account. Although there is, as Hampson says, every probability that this locality is erroneous, yet at the same time we must remember that few if any Lepidoptera came from Algeria in Herrich-Schäffer's time. I therefore prefer to call this form *algeriae* Oberth. and put *insana* Herr.-Sch. under it with a ?.

1 ♀, Hassi Sidi Mahmud, between El Arich and the Oued Nça, April 14; 2 ♂♂, Oued Nça, April 16-30 (1914).

44. *Cerocala sana* Stand.

*Cerocala scapulosa* var. *sana* Staudinger, *Cat. Lepid. Palaearkt. Faun.* p. 241. No. 2594a (1901) (Syria).

1 ♀, El Alia, between Tougourt and Guerrara, April 12; 1 ♂, El Arich, E. of Guerrara, April 13; 2 ♂♂, 2 ♀♀, Oued Nça, April 16-30 (1914).

## Phytometrinae

45. *Phytometra ni deserticola* (Rothsch.)

*Plusia ni deserticola* Rothschild, *Nov. Zool.* xx. p. 129 (1913) (El Golea).

2 ♀ ♀, Oued Nça, April 16-13 (1914).

## Noctuinae

46. *Anumeta cecstis* (Mén.)

*Catephia cecstis* Menetries, *Mém. Acad. Impér. St. Pétersb.* vi. p. 290 (74) (1849) (Narun, Ross, Mer. Or.).

2 ♀ ♀, Oued Nça, April 16-30 (1914).

[In *Novitates Zoologicae* xx. p. 129 I identified the Algerian subspecies of *A. spilota* (Ersch.) as *Anumeta henkei* (Stand.). On p. 469 of the same volume I described this form as *A. henkei harterti*. I now find that I have referred this form to the wrong species, and it must stand as *Anumeta spilota harterti*, or, as some writers conclude (I disagree), as *Anumeta atosignata harterti*. Sir George Hampson has united my *harterti* with *spilota* as identical, but this is certainly not the case: *harterti* is paler, much more sandy yellow, and the markings are much sharper; it is a good local subspecies. The late Mr. W. Warren in *Seitz*, iii. p. 388 has mixed up my *A. h. harterti* with my *A. major* (*Nov. Zool.* xx. p. 130. No. 79 (1913) (N. of El Golea)). He figures *harterti* and describes *major*, and calls this combination *harterti*. The facts are that *A. major* is a perfectly distinct species, the ♀ of which is the largest of the genus. I have lately received from Herr Geyr von Schweppenburg 10 ♂ ♂ and 5 ♀ ♀ from the country round the Hoggar Mountains.]

47. *Aleucanitis philippina* (Aust.)

*Leucanitis philippina* Austaut, *Le Naturaliste*, 1880, p. 237 (Oran).

Mr. Warren has quite failed to understand the description of Austaut and also the *Staudinger-Rebel Catalogue*. Dr. Hartert's collection contains a ♂ and a ♀ which clearly have the black bar running in from the outer band to the base. *A. philippina* is quite a distinct species and not a form of *A. cailino*.

1 ♂, 1 ♀, Oued Nça, April 16-30 (1914).

48. *Aleucanitis cailino* (Lef.)

*Heliothis cailino* Lefebvre, *Ann. Soc. Linn. Paris*, 1827, p. 91. t. 5. f. 1 (Sicily).

1 ♂, 1 ♀, Oued Nça, April 16-30 (1914).

49. *Armada panaceorum distincta* subsp. nov.

♂. Much paler than *p. panaceorum*, and the markings on the forewing much more sharply defined. The white patch in the black band of hindwing is also much larger.

1 ♂, Hassi Sidi Mahmud, between El Arich and the Oued Nça, April 14; 3 ♂ ♂, Oued Nça, April 16-30 (1914).

50. *Apopestes cataphanes roseata* (Rothsch.)

*Spintherops roseata* Rothschild, *Nov. Zool.* xix. p. 126 (1912) (Ghardaia).

4 ♂ ♂, 1 ♀, Oued Nça, April 16-30 (1914).



51. *Apopestes dilucida rosea* (Stand.)*Spintherops dilucida* var. *rosea* Standinger, *Stett. Entom. Zeit.* xlix. p. 63 (1888) (Biskra).

9 ♂♂, 11 ♀♀, Oued Nça, April 16-30 (1914).

## GEOMETRIDAE

## Acidaliinae

52. *Glossotrophia romanarioides* (Rothsch.)*Acidalia romanarioides* Rothschild, *Nor. Zool.* xx. p. 131. No. 89 (1913) (South Oued Mya).

2 ♂♂, 4 ♀♀, Oued Nça, April 16-30 (1914).

53. *Acidalia luteofasciata* Rothsch.*Acidalia luteofasciata* Rothschild, *Nor. Zool.* xx. p. 132. No. 90 (1913) (Oued Nça).

2 ♀♀, Oued Nça, April 16-30 (1914).

## Larentiinae

54. *Rhodometra anthophilaria consecraria* (Ramb.)*Sterrhia consecraria* Rambur, *Cat. Syst. Lep. And.* t. xx. ff. 5. 6 (1858) (Andalusia).

1 ♀, Oued Nça, April 16-30 (1914).

55. *Lithostege fissurata* Mab.*Lithostege fissurata* Mabille, *Bull. Soc. Entom. France*, 1888, p. 58 (Gabès, Tunisia).

1 ♂, El Alia, between Tonggourt and Guerrara, April 12; 1 ♀, El Arich, east of Guerrara, April 13 (1914).

56. *Lithostege?* *marmorata* Bang-Haas*Lithostege marmorata* Bang-Haas, *Iris*, xx. p. 83. t. iii. f. 15 (1907) (Gafsa, Tunisia).

2 ♀♀, El Alia, between Tonggourt and Guerrara, April 12 (1914).

57. *Tephroclystia breviculata* (Donz.)*Melanidia breviculata* Donzel, *Ann. Soc. Entom. France*, vi. p. 478. t. 18. f. 7 (1837) (Hyères).

1 ♀, Oued Nça, April 16-30 (1914).

58. *Gymnoscelis harterti* sp. nov.

♂. Antennae black-brown, ciliae greyish; head and body cinnamon-wood-brown.

*Forewing*: pale cinnamon buff, costal area with seven or eight cinnamon-rufous patches, rest of wing with numerous sinuate cinnamon-rufous transverse lines, suffused and splashed with cinnamon-rufous.*Hindwing*: cinnamon-buff almost completely overlaid with cinnamon-rufous patches and lines.

♀. Much larger, creamy whitish grey densely overlaid with pale cinnamon grey lines and patches.

Length of forewing: ♂ 7 mm., ♀ 9 mm.

Expanse: ♂ 16 mm., ♀ 20 mm.

1 ♂, 1 ♀, Oued Nça, April 16-30 (1914).

**Boarmianae****59. Zuleika nobiliaria** (Bang-Haas)

*Scodionia nobiliaria* Bang-Haas, *Iris*, xix, p. 141, t. v. f. 13 (1906) (Gourine, Tunis ♂, Sud Oranais ♀)

1 ♀, Oued Nça, April 16-30 (1914).

**Cossidae****60. Cossus aries** Püng.

*Cossus aries* Püngler, *Iris*, xv, p. 145, t. vi. f. 22 (1902) (Palestine).

1 ♂, 1 ♀, Oued Nça, April 16-30 (1914).

**61. Dyspessa? suavis** (Stand.)

*Endagrija jordana* var. *suavis* Staudinger, *Iris*, xii, p. 355, t. v. f. 7 (1900) (Algeria).

This is quite distinct from *jordana*, and must stand as a good species.

1 ♀, El Arich, east of Guerrara, April 13 (1914).

[Dr. O. Staudinger described and figured a cossid (*Iris*, x, p. 155, t. v. f. 13, 1897) under the name of *Hypopta? vanlogeri* from Chellala, Algeria. In 1913 Dr. Hartert, Herr Carl Hilgert, and I succeeded in capturing 7 ♂♂ and 16 ♀♀ of this exceedingly rare insect at Ain Sefra, Sud Oranais, in May. I consider that although it is much more hairy than *D. jordana* and *D. suavis* it nevertheless belongs in the same genus. I believe, however, that eventually all three will, together with *asema* Püng., have to be put in a new genus.]

**PYRALIDAE****Gallerianae****62. Lamoria anella** (Schiff.)

*Tinea anella* Schiffermüller, *Syst. Verz. Schmett. Wien*, p. 135 (1776) (Vienna).

4 ♀♀, Oued Nça, April 16-30 (1914).

**63. Arenipsis sabella** Hampsn.

*Arenipsis sabella* Hampson, *Mém. Lepidop.* viii, p. 501, No. 93, pl. xxiv, f. 1 (1901) (Fao).

2 ♀♀, El Alia, between Tonggourt and Guerrara, April 12 (1914).

**Anerastianae****64. Pectinigera hilgerti** sp. nov.

♂. Antennae brownish buff; head, thorax, and abdomen creamy buff.

*Forewing*: buffish straw-colour, costal area paler.

*Hindwing*: semivitreous cream-white.

♀. *Forewing*: darker straw-colour, costal area whiter.

Length of forewing: ♂ 15 mm., ♀ 18.5 mm.

Expanse: ♂ 34 mm, ♀ 42 mm.

1 ♂, 5 ♀♀, El Alia, between Tonggourt and Guerrara, April 12 (1914).

65. *Lymire albicostalis* (Rothsch.)

*Enosoma albicostalis* Rothschild, *Nov. Zool.* xx. p. 138. No. 134 (1913) (S. of El Golea).

Sir George Hampson declared that my *Enosoma albicostalis* and my *Lymire lactealis* were ♂ and ♀, and the insect I put as ♀ of *lactealis* was a *Phycid*. In the present collection are true ♀ ♀ of *lactealis* as well as ♂ ♂ of *albicostalis*, and they are two quite distinct species.

2 ♀ ♀, Hassi Dinar, South of Tonggourt, April 11; 9 ♂ ♂, El Alia, between Tonggourt and Guerrara, April 12; 1 ♂, El Arich, east of Guerrara, April 13; 1 ♀, Hassi Sidi Mahmud, between El Arich and Oued Nça, April 14; 4 ♂ ♂, 2 ♀ ♀, Oued Nça, April 16-30 (1914).

66. *Lymire strictipennis* sp. nov.

♂. Antennae, head, and thorax wood-grey suffused with buff; abdomen dark buff.

*Forewing*: wood-brown, costal area pale buff.

*Hindwing*: semivitreous cream-white.

Length of forewing: 11 mm.

Expanse: 25 mm.

1 ♂, El Alia, between Tonggourt and Guerrara, April 12 (1914).

67. *Lymire lactealis* Rothsch.

*Lymire lactealis* Rothschild, *Nov. Zool.* xx, p. 138. No. 130 (1913) (Igosten).

1 ♀, Hassi Dinar, south of Tonggourt, April 11; 4 ♀ ♀, El Alia, between Tonggourt and Guerrara, April 12; 1 ♂, 1 ♀, Oued Nça, April 16-30 (1914).

68. *Anerastia ablutella* Zell.

*Anerastia ablutella* Zeller, *Isis*, 1839, p. 178 (Sicily).

4 ♀ ♀, Oued Nça, April 16-30 (1914).

**Crambinae**

69. *Eromene ocella* (Haw.)

*Palparia ocella* Haworth, *Lepid. Brit.* p. 486. No. 21 (1812) (Nr. London).

2 ♂ ♂, Oued Nça, April 16-30 (1914).

**Phycitinae**

70. *Myelois nivosella* Rag.

*Myelois nivosella* Ragonot, *Bull. Soc. Entom. France*, 1890, p. eix. (Lambèse).

2 ♀ ♀, Oued Nça, April 16-30 (1914).

71. *Myelois osseella* Rag.

*Myelois osseella* Ragonot, *Ann. Soc. Entom. France*, 1887, p. 226 (Beyrout).

1 ♂, Oued Nça, April 16-30 (1914).

72. *Myelois unipunctella* Chrét.

*Myelois unipunctella* Chrétien, *Ann. Soc. Entom. France*, lxxix, p. 517 (1911) (Algeria).

1 ♂, Oned Nça, April 16-30 (1914).

73. *Rhodophaea semistrigella* Mab.

*Rhodophaea semistrigella* Mabilie, *Bull. Soc. Entom. France*, 1908, p. 68 (Tunis).

1 ♂, Oned Nça, April 16-30 (1914).

74. *Nephopteryx cleopatrella* Rag.

*Nephopteryx cleopatrella* Ragonot, *Ann. Soc. Ent. France*, 1887, p. 231 (Gabès, Tunisia).

4 ♂♂, 2 ♀♀, Oned Nça, April 16-30 (1914).

75. *Nephopteryx genistella* (Dup.)

*Phycis genistella* Duponchel, *Hist. Nat. Lepid. France*, x, p. 178, pl. 278, f. 4 (1836) (Corsica).

1 ♂, Oned Nça, April 16-30 (1914).

76. *Nephopteryx albovariegata* sp. nov.

♀. Antennae whitish brown: head and thorax yellowish white; abdomen cinnamon-buff.

*Forewing*: cinnamon-brown, suffused and variegated with white; an oblique antemedian band of orange-cinnamon edged outwardly with white; disc with broad orange-cinnamon longitudinal bands joined to a postdiscal transverse band of the same colour; fringe fuscous-grey.

*Hindwing*: semivitreous yellowish white, an ill-defined, cloudy terminal band of orange-cinnamon. The El Alia ♀ has the orange-cinnamon colour replaced by olive-brown.

Length of forewing: 12 mm.

Expanse: 27 mm.

1 ♀, Hassi Dinar, south of Tonggourt, April 11 (type); 1 ♀, El-Alia, between Tonggourt and Gnerara, April 12 (1914).

77. *Nephopteryx griseola* sp. nov.

♂. Antennae white, closely ringed with dark brown, a blackish comb near base; head and thorax creamy white irrorated with dark grey; thorax buff, variegated with grey and white.

*Forewing*: white, suffused with buff and densely striated and powdered with sooty slate-grey, an oblique black band from before apex to vein 5.

*Hindwing*: wood-grey, washed with brown fringe, whitish.

♀. Paler, less striated.

Length of forewing: ♂ 12 mm., ♀ 10 mm.

Expanse: ♂ 27 mm., ♀ 23 mm.

2 ♂♂, 2 ♀♀, Oned Nça, April 16-30 (1914).

78. *Nephopteryx ardesiifascia* sp. nov.

♀. Antennae whitish, closely ringed with sooty brown; head and thorax greyish white, suffused with sooty black; abdomen pale ash-grey.

*Forewing*: greyish white, densely powdered with sooty slate-grey; a broad oblique antemedian band dark slate-grey; two oblique zigzag dark-slate lines; a broad terminal area brown irrorated with dark slate.

*Hindwing*: semihyaline white, a brown-grey terminal line from which a few smears of same colour run into wing.

Length of forewing: 13 mm.

Expanse: 29 mm.

1 ♀, Hassi Dinar, south of Tonggourt, April 11; 1 ♀, El Alia, between Tonggourt and Gnerrara, April 12 (1914).

#### 79. *Pristarthria brephiella* (Stand.)

*Nephoteryx brephiella* Standinger, *Hor. Soc. Entom. Ross*, xv. pp. 193, 194 (1879) (Macedonia).

19 ♂♂, 19 ♀♀, Oned Nça, April 16-30 (1914).

#### 80. *Metalosticha cinnamomea* sp. nov.

♂. Antennae, head, and thorax dark cinnamon; abdomen slightly paler.

*Forewing*: dark cinnamon; a postmedian black X with the arms partly filled in by a dusting of blackish scales; a brown-black terminal band.

*Hindwing*: semihyaline cinnamon-buff.

♀. Similar, but larger, and the postmedian X replaced by an irregular patch due to partial suppression of two of the arms of the X.

Length of forewing: ♂ 6.5 mm., ♀ 8 mm.

Expanse: ♂ 15 mm., ♀ 18 mm.

2 ♂♂, 1 ♀, Oned Nça, April 16-30 (1914).

#### 81. *Staudingeria calcariellina* Rothschild.

*Staudingeria calcariellina* Rothschild, *Nor. Zool.* xx. p. 136. No. 118 (1913) (Hassi-el-Hadjar).

2 ♂♂, 2 ♀♀, Oned Nça, April 16-30 (1914).

#### 82. *Staudingeria calcariella* Rag.

*Staudingeria calcariella* Ragonot, *Mém. Lepid. Rom.* viii. p. 135. No. 180. pl. xxviii. f. 13 (1901) (Gabès, Tunisia).

12 ♂♂, 6 ♀♀, Oned Nça, April 16-30 (1914).

#### 83. *Staudingeria griseolella* sp. nov.

♂♀. Antennae brown; head and thorax white, powdered with dark grey; abdomen greyish buff, powdered with grey.

*Forewing*: white, finely powdered with chocolate-brown, somewhat massed into stripes or bands.

*Hindwing*: semihyaline buffy white; a brownish terminal line suffused inwards into the wing.

Length of forewing: ♂ 10 mm., ♀ 8 mm.

Expanse: ♂ 22 mm., ♀ 18 mm.

12 ♂♂, 2 ♀♀, Oned Nça, April 16-30 (1914).

#### 84. *Staudingeria albinotella* Rag.

*Staudingeria albinotella* Ragonot, *Ann. Soc. Entom. France*, 1887, p. 249 (Sharad, Persia)

1 ♂, Oned Nça, April 16-30 (1914).

85. *Staudingeria lacteella* sp. nov.

♀. Antennae, head, thorax, and abdomen cream-white.

*Forewing*: greyish cream-white; a spot before apex, one at apex of and one in cell, a line on vein 1 and a slightly broken terminal line black-brown.

*Hindwing*: semihyaline greyish, white-terminal line darker.

Length of forewing: 8.5 mm.

Expanse: 19 mm.

1 ♀, Oued Nça, April 16-30 (1914).

86. *Heterographis deserticola* (Stand.)

*Myelois deserticola* Standinger, *Berl. Entom. Zeit.* xiv, p. 201. No. 39 (1879) (Sarepta).

3 ♂♂, 2 ♀♀, El Alia, between Touggourt and Guerrara, April 12; 1 ♂, Hassi Sidi Mahmud, between El Arich and Oued Nça, April 14; 1 ♂, 1 ♀, Oued Nça, April 16-30 (1914).

87. *Heterographis convexella* Led.

*Heterographis convexella* Lederer, *Verh. zool.-bot. Gesell. Wien*, 1855, p. 222. t. 4 f. 9 (Syria).

1 ♂, Oued Nça, April 16-30 (1914).

88. *Heterographis cinnamomeifascia* sp. nov.

♂. Antennae, head, thorax, and abdomen cinnamon.

*Forewing*: deep brown: costal area, an oblique antemedian band, subterminal band, fringe, a line above vein 1, and outer two-thirds of inner margin cinnamon.

*Hindwing*: semihyaline white outer two-fifths marked with pale cinnamon.

Length of forewing: 8.5 mm.

Expanse: 19 mm.

1 ♂, Hassi Dinar, south of Touggourt, April 11 (1914).

89. *Ancylosis ustella* Rag.

*Ancylosis ustella* Ragonot, *Ann. Soc. Entom. France*, 1887, p. 252. No. 141 (Sebdou).

1 ♂, 1 ♀, Hassi Dinar, south of Touggourt, April 11; 1 ♂, Oued Nça, April 16-30 (1914).

90. *Ephestia kuehniella* Zell.

*Ephestia kuehniella* Zeller, *Stett. Entom. Zeit.* xl, p. 466 (1879) (Germany).

1 ♀, Hassi Dinar, south of Touggourt, April 11 (1914).

91. *Syria arenosella* (Stand.)

*Anerastia arenosella* Staudinger, *Stett. Entom. Zeit.* xx, p. 227. No. 40 (1859) (Chiclana).

1 ♂, Oued Nça, April 16-30 (1914).

92. *Diviana pallidimarginalis* sp. nov.

♂♀, Antennae whitish brown with slightly darker rings; thorax brownish buff; abdomen pale buffy brown.

*Forewing*: brownish buff with a creamy band occupying costal area for basal

half of wing, from whence it widens to third of breadth of wing just before apex ; a few scattered dark scales on disc and an incomplete dark subterminal band.

*Hindwing* : semivitreous cream-buff.

Length of forewing : 10.5 mm.

Expanse : 23 mm.

1 ♂, Oued Nça, April 16-30 ; 1 ♂, 1 ♀, Hassi Dinar, south of Tougourt, April 11 (1914).

### 93. *Homeosoma nimbella* (Zell.)

*Anerastia nimbella* Zeller, *Isis*, 1839, p. 178 (Glogan).

♂. *Forewing* : buffish cream : two antemedian dark-grey spots and a post-discal dark-grey band, rest of wing slightly sprinkled with grey scales.

*Hindwing* : semivitreous grey paler towards base, fringe white.

Length of forewing : 10 mm.

Expanse : 22 mm.

1 ♂, Oued Nça, April 16-30 (1914).

## Pyralinae

### 94. *Aglossa rhodalis* Hampsn.

*Aglossa rhodalis* Hampson, *Ann. Mag. Nat. Hist.* (7) xvii, p. 218 (1906) (Cape Colony).

1 ♀, El Alia, between Tougourt and Guerrara, April 12 ; 6 ♂♂, 2 ♀♀, Oued Nça, April 16-30 (1914).

### 95. *Aglossa rubralis* Hampsn.

*Aglossa rubralis* Hampson, *Trans. Entom. Soc. Lond.* 1900, p. 378, No. (1a) (Syria).

2 ♂♂, 1 ♀, Oued Nça, April 16-30 (1914).

### 96. *Aglossa tenebrosalis* sp. nov.

♂. Antennae buff ringed closely with black-brown and with very long pectinations diminishing sharply on distal third ; head and thorax chocolate-brown powdered with buff ; abdomen brownish buff very sparsely freckled with brown.

*Forewing* : buff ; eight chocolate patches in costal region ; rest of wing densely suffused with patches of chocolate scales almost obliterating buff ground-colour and producing an effect of heavy clouding.

*Hindwing* : greyish buff costal and terminal areas clouded with brown.

Length of forewing : 15 mm.

Expanse : 34 mm.

1 ♂, Oued Nça, April 16-30 (1914).

### 97. *Aglossa harterti* sp. nov.

♂. Antennae pale cinnamon ; head, thorax, and abdomen rusty cinnamon.

*Forewing* : rusty cinnamon ; a row of buff spots along basal three-quarters of costa, a strongly curved antemedian band buff with some patches of deep rufous along its edges, a deep rufous stigma near apex of cell, a postmedian buff band edged inwardly and somewhat ill-definedly with dark rufous.

*Hindwing* : greyish buff indistinctly banded with a darker shade.

♀. Similar, but thorax dark rufous-cinnamon and abdomen pale cinnamon.

*Forewing* : deep rufous-cinnamon with markings less sharply defined.

Length of forewing : ♂ 13-15 mm., ♀ 11-14 mm.

Expanse : ♂ 29-33 mm., ♀ 25-31 mm.

3 ♂♂, 8 ♀♀, Oued Nça, April 16-30 (1914).

#### 98. *Ulotricha algerialis* Hampsn.

*Ulotricha algerialis* Hampson, *Trans. Entom. Soc. Lond.* 1900, p. 377. No. (2) pl. iii. f. 18 (Biskra).

1 ♀, El Alia, between Tonggourt and Guerrara, April 12; 3 ♂♂, Oued Nça, April 16-30 (1914).

#### 99. *Constantia canifusalis* Hampsn.

*Constantia canifusalis* Hampson, *Trans. Entom. Soc. Lond.* 1900, p. 381, pl. iii. f. 16 (Biskra).

1 ♀, Hassi Dinar, south of Tonggourt, April 11; 1 ♀, El Alia, between Tonggourt and Guerrara, April 12; 2 ♂♂, 1 ♀, Oued Nça, April 16-30 (1914).

#### 100. *Cledeobia chellalalis* Hampsn.

*Cledeobia chellalalis* Hampson, *Trans. Entom. Soc. Lond.* 1900, p. 383 (Algeria).

7 ♂♂, 3 ♀♀, Oued Nça, April 16-30 (1914).

### Hydrocampinae

#### 101. *Nymphula bleusei* (Oberth.)

*Synclera bleusei* Oberthür, *Bull. Soc. Entom. France*, 1887, p. lxxxii. (Biskra).

7 ♂♂, Oued Nça, April 16-30 (1914).

### Pyraustinae

#### 102. *Nomophila noctuella* (Schiff.)

*Pyralis noctuella* Schifferrmüller, *Syst. Verz. Schneit. Wien*, p. 136 (1776) (Vienna).

6 ♂♂, 5 ♀♀, Oued Nça, April 16-30 (1914).

#### 103. *Evergestes renatalis* (Oberth.)

*Orobena renatalis* Oberthür, *Bull. Soc. Entom. France*, 1887, p. xcix. (Bon Saada, etc.).

1 ♂, Oued Nça, April 16-30 (1914).

#### 104. *Metasia pseudobotys* Rothschild.

*Metasia pseudobotys* Rothschild, *Nor. Zool.* xx. p. 141. No. 154 (1913) (South Oued Mya).

1 ♀, Oued Nça, April 16-30 (1914).

#### 105. *Cornifrons ulceratalis* Led.

*Cornifrons ulceratalis* Lederer, *Wien. Entom. Monatschr.* 1858, p. 147. t. 4. f. 1 (Syria).

1 ♂, Hassi Dinar, south of Tonggourt, April 11; 2 ♀♀, El Alia, between Tonggourt and Guerrara, April 12; 3 ♂♂, 5 ♀♀, Oued Nça, April 16-30 (1914).



106. *Noctuelia floralis* (Hübner)

*Pyralis floralis* Hübner, *Samml. Europ. Schmettt., Pyr.* f. 142 (1793-1827) (Europe).

1 ♂, 1 ♀, Ghardaia, May 1-3 (1914).

107. *Noctuelia anaemicalis* Hampson.

*Noctuelia anaemicalis* Hampson, *Trans. Entom. Soc. Lond.* 1900, p. 400, t. 3, f. 28 (Biskra).

1 ♂, 1 ♀, El Alia between Tonggourt and Guerrara, April 11; 4 ♂♂, 1 ♀, El Arich, east of Guerrara, April 13; 1 ♂, 1 ♀, Hassi Sidi Mahmud between Guerrara and Oued Nça, April 14 (1914).

108. *Noctuelia desertalis* (Hübner)

*Pyralis desertalis* Hübner, *Samml. Europ. Schmettt., Pyr.* f. 171 (1793-1827) (Europe).

5 ♂♂, 7 ♀♀, Oued Nça, April 16-30 (1914).

109. *Noctuelia allardalis* (Oberthur)

*Orobena allardalis* Oberthur, *Bull. Soc. Entom. France*, 1887, p. 90 (Ain Sefra).

3 ♂♂, 2 ♀♀, Oued Nça, April 16-30 (1914).

110. *Noctuelia hilgerti* sp. nov.

♀. Antennae brown; head, thorax, and abdomen buffy white.

*Forewing*: sandy buff, somewhat suffused with white in central one-third; an antemedian somewhat indistinct curved brown band, a discocellular black stigma, a postmedian sinuate band of coalescent black spots, a broken black terminal line, fringe whitish.

*Hindwing*: buff, an obsolescent brown postmedian band and a black-brown terminal line.

Length of forewing: 8-10 mm.

Expanse: 19-23 mm.

2 ♀♀, Hassi Dinar, south of Tonggourt, April 11 (1914).

111. *Noctuelia affinis* sp. nov.

♂. Nearest to *anaemicalis* Hampson. Antennae dark grey; head, thorax, and abdomen cream-white, thorax freckled with grey.

*Forewing*: basal three-quarters cream-colour densely powdered with olive-brown, outer one-quarter pale blue-grey, a subterminal line black.

*Hindwing*: yellowish wood-grey.

Length of forewing: 7 mm.

Expanse: 16 mm.

1 ♂, Oued Nça, April 16-30 (1914).

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## LIST OF A SMALL COLLECTION OF BIRDS FROM HAUSALAND, NORTHERN NIGERIA.

BY DR. ERNST HARTERT.

OF the many parts of Africa, the ornithology of which is still insufficiently known, Northern Nigeria, and especially the interior of Hausaland, is still one of the least explored.

W. A. Forbes, who fell a victim to the climate of the country and died at Shonga, on the Niger, only touched the boundaries of Hausaland, along the Niger and the lower Benue (see *Ibis* 1883, pp. 494-562).

In 1885 and 1886 I traversed Hausaland from Loko on the Benue to Sokoto and Kano and back; but this journey was made under many difficulties, with little ammunition—most of which had been lost on the Niger,—without experience, and, last but not least, in bad health, suffering as I was severely from malaria, and also with other primary objects to attend to. Therefore my collections of birds were not large. What I was able to observe and to collect is recorded in *Journ. f. Orn.* 1886, and in *Nor. Zool.* 1901.

The late Boyd Alexander travelled through Hausaland at the beginning of his great expedition from the Niger to the Nile; but he traversed only the more eastern parts, as his journey passed from Ibi to Bauchi, and thence eastwards to Lake Chad. He collected many species of birds and described some novelties, but no list of them has as yet been published.

It was, therefore, with pleasure that Mr. Rothschild purchased some birds collected by Mr. Lorenzo Poggiolini, an Italian in the service of Mr. Montagu Perch in Nigeria. Though the collection is a very poor and incomplete one, the collector having had but little leisure and no knowledge of birds, I think it will be worth while to publish a list and a few notes on them.

Most of the specimens are from Zaria and the province of that name, but a few—unfortunately very few only—were collected on a journey from Sokoto to Timbuktu and thence to the Senegal.

### 1. *Phalacrocorax africanus* (Gm.)

♂ ad., Zaria, 2. x. 1912.

“Iris rufous.”

### 2. *Anhinga rufa rufa* (Lacép.)

♂ ad., province of Zaria, without date.

### 3. *Nyroca nyroca nyroca* (Güldenst.)

2 ♂, province of Zaria. Undoubtedly a winter visitor.—This appears to be the first record for Western Africa. In 1885 I saw ducks near Sokoto which I suggested might have been this species (*Journ. f. Orn.* 1886, p. 612).

4. *Spatula clypeata* (L.)

Two apparently younger females from the province of Zaria, unfortunately without dates.—There are, apparently, no records of Shovellers in West Africa, except Verreaux's statement that it was found on the Casamanze.

5. *Anas querquedula* L.

Two males and two females from Zaria, one with the date 15. xi. 1912.

I am not aware of any other record of Garganey from this part of Africa, except my own, as I saw very large flocks on the lakes of the province of Sokoto.

6. *Anas crecca crecca* L.

♀, Zaria, 17. xi. 1912.

I saw the Teal in flocks of hundreds near Sokoto.

7. *Anas acuta* L.

A moulting male from Zaria, without date.

8. *Dendrocygna viduata* (L.)

2 ♂♂ ad., Zaria, 7. xi. 1912.

This bird, as is well known, occurs in South America as well as in Africa. I have long believed that there were differences between the American and African birds, but I must admit that they are indistinguishable, and the same is the case with *Dendrocygna fulva*!

9. *Nettapus auritus* (Bodd.)

2 ♂♂, 1 ♀, October and November, Zaria.

Also from Niamei on the Upper Niger.

10. *Sarkidiornis melanotos* (Penn.)

♂ ad., ♂ juv., and ♀, Zaria, November. I saw this goose in great quantities on the lakes near Sokoto.

11. *Hydrochelidon leucopareia* (Temm.)

1, winter, Niamei, Upper Niger.

12. *Hydrochelidon leucoptera* (Meisner & Schinz)

1, winter, Niamei, Upper Niger.

13. *Pluvianus aegyptius* (L.)

One specimen, Zaria.

14. *Cursorius temmincki* Sw.

♂, Zaria, 9. xi. 1912.

Reichenow (*Iög. Afr.* i. p. 156) separated a form from Damaraland as "*damarensis*," because the red-brown colour of the crown "seemed to be paler." This supposed subspecies requires confirmation.

15. *Glareola pratincola limbata*?

An adult bird from Niamei on the Upper Niger. This bird is decidedly darker on the upperside than *G. p. pratincola*: the wings measure only 189 and 190 mm. The Pratincoles of Africa require further study. The European race migrates to Tropical Africa in winter, while in East and South Africa a darker and smaller form occurs and breeds—*G. p. fülleborni* Neum. (See *Orn. Monatsber.* 1910, p. 10.) Neumann separates also a *G. p. limbata* from Abyssinia, which appears to stand between *G. p. pratincola* and *fülleborni*. It is quite conceivable that *limbata* ranges from **N.E. Africa** to the Western Sudan, and that the Niger specimen belongs to this race, but our material is insufficient to settle this question.

16. *Lobivanellus senegallus senegallus* (L.)

Two without label, one ♀, Zaria, 5. x. 1912. The latter specimen has a white throat without black. This is supposed to be a character of young birds, but this specimen appears to be adult. It cannot be a peculiarity of the female, because other adult females have black throats like males. The wings measure 213—229 mm., thus remaining far below the N.E. African race, *L. s. major* Neumann (*Orn. Monatsber.* 1914, p. 8 = mountains of N.E. Africa).

17. *Hoplopterus spinosus* (L.)

♀ ad., Zaria, 9. xi. 1912.

Ad., Cuzanar, on the line from the Niger to the Senegal.

18. *Sarciophorus superciliosus* (Rehw.)

♀ ad., Zaria, 14. iv. 1913. The chestnut chest-patch is not so bright and deep chestnut as in other adult specimens, which are apparently males.

Dr. van Someren obtained this bird on Kikorongo Lake in Toro, Uganda Protectorate, 10. xii. 1910.

19. *Himantopus himantopus* (L.)

One specimen from Zaria without date.

20. *Tringa ochropus* L.

♂, Zaria, 22. xi. 1912.

21. *Tringa erythropus* (Pall.)

(" *Totanus fuscus* " auct.)

*Sceloporus erythropus* Pallas, Voeg's Cat. Coll., *Adumbratiuncula*, p. 6 (1764—Holland).

Three without dates, Zaria. One is moulting all the primaries at once. Is that an exception? The wings of the other two are fully grown.

22. *Machetes pugnax* (L.)

♀, Zaria, 15. xi. 1912.

23. *Erolia minuta minuta* (Leisl.)

♀, Zaria, 18. xi. 1912.

24. *Otis (Neotis) caffra denhami* Children

♂ ♀ ad., province of Zaria, 29. x., 6. xi. 1912.

This magnificent pair of Bustards is of great interest. The wings of the male measure (with tape measure) 63, those of the female 54 cm. The birds appear to be typical *denhami*, agreeing with the type, which was collected during Denham and Clapperton's famous expedition to the Western Sudan, probably near Lake Chad, and with specimens from Kordofan. *O. caffra caffra* seems to be very close, but to differ by having a white patch on the nape, while in *denhami* the rust-red of the hind-neck reaches right up to the grey and black colour of the crown. In size the South African form is similar or exceeding *denhami*, the wing of a male from the Transvaal measuring about 65 cm.

Between the so closely allied northern and southern races appears to live another of smaller dimensions. We have a female from Benguela (Langassim on the road to Lobango, 17. i. 1906, Dr. W. J. Ausorge coll.). The wings measure only about 45.5 cm.

Mr. Rudolf Graner shot two males in Central Africa, 1 Kyiowa in Karagwe (Bnkoba), German East Africa, 2. vi. 1907. The wing measures barely 61 cm. Another male, shot 120 km. west of Lake Tanganyka, 20. vii. 1908, is in moult, and the wing cannot be measured with good results, but it appears to be still shorter.

25. *Otis (Trachelotis) senegalensis senegalensis* Vieill.

2 ♂♂, 1 ♀, Zaria, 2. x. 1912.

There can be no doubt that *Otis (Trachelotis) barrorii* is a more richly and darker coloured subspecies of *O. senegalensis*. The wings of the Hausaland skins measure: ♂ 271, 276, ♀ 274 mm. (measured on ruler).

About other subspecies see Neumann, *Journ. f. Orn.* 1907, p. 307, who treats as forms of *O. senegalensis*: *O. s. senegalensis*, *O. s. somaliensis*, *O. s. canicollis* and *O. s. barrorii*.

Rüppell (*Mus. Senckenberg.* ii. p. 230, pl. 15) and other ornithologists have employed the name *rhaad* for this species. Gmelin and Latham based their *rhaad* entirely on the Rhaad of Shaw, *Trav. and Observ. in Barbary and Levant*. The bird figured by Shaw appears to me to be an *Otis tetrax*, and his description refers to the latter and another larger species, either the Great Bustard or *Otis arabs*, while *O. senegalensis* does not occur in Algeria. Latham said that Shaw's Rhaad inhabited Arabia, but he described it from Algeria.

26. *Otis (Lissotis) melanogaster* Rüpp.

♂ ♀, Zaria, without date.

These specimens appear to be very small, compared with South African specimens. A female, collected by Riggenbach in Northern Senegambia, is also rather small. Probably there exists a smaller race in N.W. Africa.

27. *Balearica pavonina pavonina* (L.)

*Ardea pavonina* Linnaeus, *Syst. Nat.* ed. x. i. p. 141 (1758—"Habitat in Africa." Restricted terra typica: Cape Verde Islands—ex Aldrovandus, *Orn.* liber 20, cap. 6, and Willoughby, *Orn.* p. 201).

Cf. *Journ. f. Orn.* 1886, p. 608; Blaauw, *Mon. Cygnus*, pp. 58, 59.

Two adult birds of equal size, province of Zaria, without date. Also the skin of a head and neck of a very young bird, with remains of down. The head,

including the crown, which consists of real long, narrow feathers, not webless and wire-like as in the adult bird, is deep ochraceous buff; the feathers of the neck are dull slate-black with pale ochraceous buff edges. These remains show that the bird, which is very numerous, and occurs in great flocks, breeds in Hausaland.

In the *Cat. B.* xxiii., in Reichenow's *Vög. Afr.* i. p. 264, and in Mr. Blaauw's "Monograph of the Cranes," good descriptions are given, but no mention is made of the difference in size of the sexes. The females are apparently very considerably smaller than the males.

I may say that I doubt Tristram's statement that he saw a Crane of this species in Algeria; mistakes are so easily made when seeing a bird from a great distance, that the occurrence of a tropical bird in countries north of the Sahara cannot be accepted from the evidence of a bird believed to have been seen once. Of course nobody believes nowadays that the species ever occurred on the Balearic Isles.

28. *Threskiornis aethiopicus aethiopicus* (Lath.)

One without date, Zaria. The Ibis is common in Hausaland.

29. *Anastomus lamelligerus lamelligerus* (Temm.)

Two fine adult birds from Zaria.

In the *Cat. B. Brit. Mus.* xxvi. p. 309 Sharpe dismissed *A. lamelligerus madagascariensis* Milne-Edwards as indistinguishable; Reichenow, *Vög. Afr.* i. p. 336, placed the latter as a synonym without discussion. It seems to me that what Milne-Edwards said is true—viz. that the Madagascar race, when adult, has wider, more regular striations on the sides of the beak, and that it is generally larger, though this appears not to be absolutely constant. Therefore *A. lamelligerus madagascariensis* must not be dismissed without further investigations.

30. *Leptoptilus crumenifer* (Less.)

1 ad., Zaria.

31. *Ciconia ciconia ciconia* (L.)

1 ad., Zaria.

32. *Nycticorax nycticorax nycticorax* (L.)

1 ♂ ad., Zaria, 22. iv. 1913.

33. *Butorides striatus atricapillus* (Afzel.)

2 ♀ ad., Zaria, 8., 9. x. 1912. "Eyes yellow."

34. *Ardea purpurea purpurea* (L.)

1 juv., Zaria.

35. *Ardea melanocephala* (Vig. and Children)

1 ad., Zaria.

36. *Ardea goliath* (Cretzschm.)

One fine adult bird, Zaria.

37. *Bubuleus ibis ibis* (L.)

♂ ♀, Zaria, November 1912, where they are very common.

38. *Treron waalia* (Gm.)

Kaduna River, Zaria.

Neumann's "*Vinago waalia cinereiceps*" (*Journ. f. Orn.*, 1904, p. 341) appears to me to be extremely doubtful. It is, in my opinion, a female, wrongly sexed as male. Specimens from Togoland and Senegambia seem to be indistinguishable from typical Abyssinian ones.

39. *Oena capensis* (L.)

1 ad., Zaria.

I do not think that *O. c. anonyma* Oberh. is separable. The supposed differences appear to be merely individual.

40. *Ptilopachus fuscus fuscus* (Vieill.)

1 ad., province of Zaria.

*P. f. keniensis* Mearns is evidently a synonym of the very distinct *P. f. florentiae* O.-Grant. *P. f. major* Neumann is also very distinct, and so is apparently *P. f. brehmi*; but the distribution of the latter is as yet uncertain, as darker birds occur also in parts of Kordofan.—(Cf. *Bull. B. O. Club* xxi. p. 68, *Ibis* 1915, p. 22.)

41. *Fringilla bicalcaratus* (L.)

2 ♂♂, Zaria, 1 River Niger, below Timbuktu.

These three birds are rather pale, like all from the Senegal colony, while specimens from Sierra Leone and Adamawa are darker; there is, however, much individual variation, even in the same localities.

42. *Serpentarius serpentarius gambiensis* (Ogilby)

*Gypogeranus Gambiensis* Ogilby, *Proc. Zool. Soc. London*, 1835, p. 105 (Gambia).

*Serpentarius orientalis* Verreaux, *Proc. Zool. Soc. London*, 1856, p. 352 (East Africa).

Two adult birds, province of Zaria.

These birds agree with others from Eritrea and N.E. Kordofan, west of Omdurman, in being slightly paler on the upperside, and especially on the wing-coverts. The under-surface is white, while in South African specimens there is generally a distinct, though very pale greyish tinge. It seems also that the crest-feathers are wider in *S. s. gambiensis*, but this is to be confirmed, as, apparently, they are wider in the male than in the female.

Erlanger (*Journ. f. Orn.* 1904, p. 156) and Zedlitz (*op. cit.* 1910, p. 366) used for this form the name *orientalis*, but I think that *gambiensis* must be accepted, though the diagnosis is not correct, except, perhaps, for the broader feathers of the crest. Erlanger's plate (*Journ. f. Orn.* 1904, pl. IV.) by Kleinschmidt is exaggerated; at least the South African *serpentarius* which I have seen are not as dark as on the plate.

Ogilby (*l.c.*) described also a Philippine species, after Sonnerat's figure in the *Voyage à la Nouvelle Guinée*, but needless to say the figure is somewhat incorrect

and no such bird has ever occurred on the Philippine Islands! It is always a bad custom to name a species from a figure, though it was regularly done in former times, and, unfortunately, even now.

43. *Circus macrourus* (Gm.)

♂ ♀, Zaria, 21. xi. 1912.

44. *Meliërax canorus neumanni* Hart.

*Meliërax canorus neumanni* Hartert, *Vög. pul. Fauna* ii. p. 1165 (Nubia to Northern Hausaland—type ♂ ad., near Merowe, Nubia.)

4 ♂ ♀ ad., 2 juv., Zaria, September and October 1912.

The adult birds vary considerably. Three have the secondaries and greater upper wing-coverts white, heavily mottled with ash-grey mottlings, while in a third they are much greyer, being grey with white mottlings.

45. *Polyboroides typicus typicus* Smith

♂ ♀ ad., Zaria (November).

Both specimens—the ♂ smaller, otherwise like the ♀—have the underside, from the chest downwards, barred. It is still, I think, a mystery what the meaning is of the fact that sometimes adult birds have the underside, with the exception of the vent, uniform grey, without white bars. We have in the Tring Museum two such examples, both marked males, but other males are barred.

46. *Kaupifalco monogrammicus monogrammicus* (Temm.)

♂ ad., Kaduna River, province of Zaria.

This specimen belongs distinctly to the lighter form, while the darker *K. m. meridionalis* is a more southern subspecies. The latter ranges in the west to Angola, while the distribution in the east is not exactly known. I am inclined to think that specimens from Usegua and Tauga (Neumann coll.) agree better with *meridionalis* than with typical *monogrammicus*.

47. *Accipiter badius sphenurus* (Rüpp.)

♂ ♀ ad., Zaria, September 1912.

Juv., Kadsena, Zaria.

The amount of barring on the underside varies considerably, and I am inclined to think that *A. riggenbachi* Neumann (*Bull. B. O. C.* xxi. p. 69) is based on exceptionally dark specimens of *A. b. sphenurus*, typical specimens of which are common in the Senegal colony, in the same place where the supposed "*riggenbachi*" was collected.

48. *Circaëtus gallicus* (Gm.)

2 ad., Zaria, November 1912.

This is about the southernmost place from where this species is known. It is, of course, only a winter visitor in tropical Africa.



49. *Circaetus cinerascens* Müll.

1 ad., Zaria.

1 juv., Kaduna River, province of Zaria.

This bird, as well as another collected on the Amanbara Creek, River Niger, by Braham, agrees with the description by Reichenow (*Vög. Afr.* i. pp. 573, 574).

50. *Lophoaëtus occipitalis* (Daud.)

♀ ad., Zaria, I. x. 1912.

1 ad., Kaduna River, province of Zaria.

51. *Aquila rapax albicans* Rüpp.

One, province of Zaria.

I suppose this Eagle must belong to the N.E. African race, *A. r. albicans*. It is a pale buffish-brown bird, evidently juvenile, and agrees fairly well with some Abyssinian examples. As so many forms range across the Sudan from N.E. Africa to Senegambia, there would be nothing strange in the occurrence of *A. r. albicans* in Hausaland. On the other hand, *A. r. belisarius*, the insufficiently known subspecies from Africa Minor, does not reach across the Sahara.

52. *Aquila (Hieraëetus) wahlbergi* Sund.

♀, Zaria, 24. xi. 1912.

Moulting from the pale creamy brown plumage into that of the adult, which is dark brown. Pale specimens are not old, but on the contrary in juvenile dress.

53. *Milvus migrans parasitus* (Daud.)

1 med., province of Zaria.

The bill is beginning to get yellow, thus showing that it is *parasitus* and not *M. m. migrans*. Another specimen in first plumage has the bill quite black, and might possibly belong to *M. m. migrans*.

54. *Elanus caeruleus caeruleus* (Desf.)

1 ad., province of Zaria.

55. *Nauclerus riocouri* (Vieill.)

3 ad., province of Zaria.

One of these has the wings 253, the tail 216 mm.; the other two wings 242 and 244, tails 178 and 200 mm. These differences are probably sexual, but nothing definite about this appears to be known. In 1885 I found this graceful bird, which is very beautiful on the wing, not rare in North Hausaland; its food was then Orthoptera.

56. *Falco biarmicus abyssinicus* Neum.

Cf. *Noc. Zool. antea*, p. 177.

2 ♀♀ ad., Zaria, 6. x., 9. xi. 1912.

1 ad., in moult, Kaduna River, province of Zaria.

57. *Falco chicquera ruficollis* Swains.

1 ♂ in the second year's plumage, Zaria.

This intermediate plumage appears not to have been described. The first juvenile plumage has the underside ferruginous buff, paler on the throat, jugulum with brown shaft-stripes, abdomen with blackish brown straight or angular cross-markings, nape rufous, crown chestnut-rufous with black lines, feathers of back, scapulars and wing-coverts with rufous margins. In the intermediate (second year's) plumage the underside is cream-coloured, the crop region with brown shaft-lines, breast and abdomen with narrow dark brown cross-bars; back light grey with slate-black cross-bars, crown dull rufous brown with black shaft-lines, nape reddish-buff. The plumage of the adult bird, with its bright chestnut-red crown and nape, white throat, vinous crop-region and the abdomen barred black and white, has been well described by Sharpe, Reichenow, W. L. Selater, and others.

58. *Falco naumanni naumanni* Fleisch.

Ad. and juv., province of Zaria, without dates.

59. *Falco tinnunculus tinnunculus* L.

♂ ad., Zaria, 18. xi. 1912. The "typical" *tinnunculus* winters in Nigeria.

60. *Falco tinnunculus carlo* (Hart. & Neum.)

♂ ad., Zaria, 20. x. 1912.

61. *Falco ardosiaceus* Vieill.

♂ ad. (in moult), province of Zaria; no date.

♀ ad., Zaria, 21. x. 1912.

♂ ad., Niger, below Timbuktu.

62. *Asio leucotis leucotis* (Temm.)

3 ad., province of Zaria.

These beautiful little Owls are the same in Senegambia, Hausaland, and N.E. Africa. Erlanger called the N.E.-African form *Asio leucotis nigrovertex* (*Journ. f. Orn.* 1904, p. 233), restricting the name *leucotis* to the South African birds; this, however, cannot be accepted, because the name *leucotis* had been given to Senegal birds; therefore Mr. Ogilvie-Grant correctly named the southern form *Asio leucotis erlangeri*, though placing it in the genus *Scops* (= *Otus* Pennant), (*Ibis*, 1906, p. 660), in which case the name must be altered to *granti* Koll.—It seems to me, that this species is rather an *Asio* than an *Otus* (*Scops* auct.), but I have not examined a specimen in the flesh, so as to be sure of this.

63. *Otus scops scops* (L.)

1 ad., Timbuktu.

64. *Otus capensis senegalensis* Swains.

Cf. *Vog. d. ind. Fauna*, ii. p. 982.

1 ad., province of Zaria.

65. *Tyto alba affinis* (Lay.)

Cf. *Vög. d. päl. Fauna*, ii. p. 1038; *Ibis*, 1915, p. 258!

♂ ♀ ad., November 1912, Zaria.

♂ wing 295, ♀ 287 mm.

66. *Bubo africanus cinerascens* Guér.

Cf. *Journ. f. Orn.* 1914, p. 37; *Ibis*, 1915, p. 252.

1 ad., province of Zaria.

67. *Chizaerhis africana* (Lath.)

1 ad., Kadsena, Hausaland.

68. *Musophaga violacea* Isert.

1 ad., province of Zaria.

69. *Centropus senegalensis senegalensis* (L.)

♂ ♀, Zaria, September and November 1912.

Also met with along the line from the Niger to the Benegal.

70. *Clamator glandarius* (L.)

One, province of Zaria.

71. *Clamator jacobinus*

? an potius

*Clamator jacobinus pica* (Hempr. & Ehr.)

♀ ad., Zaria, 3. xi. 1912. Wing 163 mm.

The forms of the "Pied Crested Cuckoo" are as yet insufficiently known; the fact of its very wide distribution over nearly the whole of Africa south of the Sahara and India is interesting in itself, and should have called forth a careful study. Comparing these birds, I cannot find any difference in colour, nor could any one else, but it is evident that in Africa larger dimensions are frequently reached than in India. I measure the wings of Indian specimens in the Tring Museum as 146, 146, 147, 149, 150, 153, 153, 153, those of African examples 144.5, 147, 147, 150, 151, 151.5, 152, 152, 153, 154, 154, 154, 154.5, 155, 158, 159, 159, 163, 163, 163; thus we have an average in India of 149.25, against one of 153 mm. in Africa.

In the British Museum, according to the *Cat. B. Brit. Mus.* xix. p. 218, the largest specimen from Africa exceeds the largest Indian one by 8 mm., but the difference in size is not much noticed in that series. Cf. Norman, *Ibis* 1888, pp. 404-406.

Are we under these circumstances justified in separating the two doubtful races nominally? Undoubtedly, though hitherto nearly all ornithologists, with the exception of Cabanis and Heine (cf. *Mus. Hein.* iv. p. 46!), have united them, Oberholser, Stresemann and others would separate them, and I am inclined to think that they should not be united without further research.

This, however, does not end the question of the subspecies of *C. jacobinus*. There are *C. jacobinus hypopinarus* in South Africa, and "*C. caroli*" from Gabon!

The former closely resembles *C. jacobinus pica*, but the throat and sides of the neck show some dusky streaks, and the underside a more or less distinct grey shade. This form replaces *C. jacobinus pica* in Cape Colony and Natal, and occurs in the Transvaal and Portuguese East Africa (Zomba). A good series from Benguela is apparently intermediate between *pica* and *hypopinnarus*, having very conspicuous dusky streaks on the throat, while there is generally not the distinct greyish tinge on the abdomen and breast. If it should be desirable—and I should say it would—to distinguish this form by a special name, perhaps the name *caroli* would be available, though the type would then be an exceptionally large specimen.

The Indian *C. jacobinus jacobinus* presents also some other features of interest. First of all it ranges northwards to Persian Baluchistan, where, according to Zarudny, it propagates. There is a fine adult male from the River Bampur in the Tring Museum, shot by Zarudny on July 4, 1898.

Then this bird ranges to Ceylon, where, like so many other Ceylonese birds, its dimensions are less. In the *Cat. B. Brit. Mus.* xix. p. 218, the smaller size of Ceylonese examples has already been commented on, and I find that the wings of three adult birds are only 138, 140, and 141 mm. long. There is not one before me with a wing so short as even 141, except from Ceylon. In his article on the birds he collected in Ceylon Madarász (*Térniszetről és Füzetek*, xx. p. 372) gives the wings also only 138, 137, and 140 mm. I cannot help, under these circumstances, naming the Ceylon form, and I propose for it the name

*Clamator jacobinus taprobanus*, subsp. nov.

Type ♂ ad., N.W. Ceylon, 26. xi. 1869, E. Holdsworth coll., in the Tring Museum.

The nomenclature of the **possibly** separable forms would thus be as follows:

1. *Clamator jacobinus jacobinus* Bodd.

*Concou lupé de la côte de Coromandel*, Daubenton, *Pl. Enl.* 872.

*Cuculus jacobinus* Boddaert, *Table Pl. Enl.* p. 53 (1783—based on Daubenton's pl. 872 ?)

*Cuculus melanoleucus* Gmelin, *Syst. Nat.* i. 1. p. 416 (1788—Coromandel; also based on Daubenton's pl. 872, and the text of "Builon," or rather Montbeillard).

India, north to Baluchistan (cf. Blanford, *B. India*).

2. *Clamator jacobinus pica* (Hempr. & Ehr.).

*Cuculus Pica* Hemprich & Ehrenberg, *Symb. Phys.* fol. r (1828—Ambukol in Dongola).

*Coccyzus leucomelas* Brehm, *Allg. D. naturh. Zeit.* 1856 p. 459 ("Bei Chartum oder doch in Sennaar").

Tropical Africa generally (cf. Reichenow, *B. Afr.* ii. p. 78).

3. *Clamator jacobinus caroli* Norman.

*Coccytes caroli* Norman, *Ibis*, 1888, p. 407 (Gabun).

? Benguela to Gabun (see above).

4. *Clamator jacobinus hypopinnarus* Cab. & Heine.

*Coccytes hypopinnarus* Cabanis & Heine, *Mus. Hein.* iv. p. 47 (1862—Cape).

South Africa, where, however, *C. j. pica* occurs also occasionally.

5. *Clamator jacobinus taprobanus* Hart.

Ceylon (see above).

("Coccytes brazzae" Onstaelet appears to be *Pachyococcyx calidus* of Reichenow. Cf. *Cat. Brit. Mus.* xix. p. 225.)

72. *Clamator cafer* (Licht.).

1 juv., province of Zaria.

73. *Cuculus gularis* Steph.

♀ ad., Zaria, 26. x. 1912.

I believe that *C. gularis* is the same all over Africa, south of the Sahara, but the question of the existence of various races has perhaps not received sufficient attention. In 1862 (*Mus. Hein.* iv. p. 34) Cabanis & Heine separated a *C. leptodectus*, under the impression that the northern race had narrower bars on the underside. This character is not constant, though there is in the Tring Museum a preponderance of specimens with wider bars in the south, while northern birds have often somewhat narrower bars.

74. *Pogonorhynchus dubius* (Gm.).

♂ ad., province of Zaria.

Judging from our specimens, the female is generally smaller and has the long silky white feathers on the sides finely spotted with black. The iris is chrome-yellow, the feet are "rotgelb" (Riggenbach, on labels).

75. *Lybius vieilloti rubescens* (Temm.).

4 ♂ ♀ ad., Zaria, September and November 1912.

The recognition of an eastern (*L. v. vieilloti*) and western form is almost too fine for me. There is, in fact, no difference on the underside. I cannot find that the western birds are more widely tipped on the feathers of the underside, as Mr. Ogilvie-Grant said; and Count Zedlitz's statement, that the red spots on the throat and foreneck are finer in *L. v. vieilloti*, wider and more running into each other in *L. v. rubescens*, is not correct, but the appearance is much altered by preparation. The only difference that can be found is the slightly greater extent of the white spots to the feathers of the back in *L. v. vieilloti* (as restricted by Grant and Zedlitz), while these spots are not quite as large in *L. v. rubescens*.

About the nomenclature, etc., see O.-Grant, *Ibis* 1902, p. 426, Zedlitz, *Journ. f. Orn.* 1910, p. 746.

76. *Lybius leucocephalus* (Fil.).

Two specimens, probably both females, Zaria. The wings measure only 85.5 and 86 mm., the white patches to the greater upper wing-coverts are somewhat smaller than in specimens from the Upper White Nile and Uganda (Torn); whether these slight differences are individual or peculiar to birds from Nigeria, cannot be decided from two specimens.

(A female from Tondola in Uganda, collected by Dr. van Someren, has the tail black with the exception of one of the middle rectrices, which is white.)

77. *Mesopicos goertae centralis* Rehw.

Zaria, Kaduna River, and Ilorin. I collected the same form at Loko, on the Binné.

No doubt *M. g. goertae* (Senegal), *M. g. centralis* (Gambia to Lake Victoria), *M. g. koenigi* (Nubia), and *M. g. abyssinicus* are good subspecies. I agree in this

with Neumann (*Journ. f. Orn.* 1904, p. 396) and Zedlitz (*op. cit.* 1910, p. 754). I also agree with the latter that it will be better to use Reichenow's name *centralis* than the uncertain name *poicephalus*, because Swainson failed to give an exact locality.

#### 78. *Dendromus punctatus* (Valenc.)

♀ ad., Sokoto.

The spots on the throat and chest are rather large, and specimens from the Kasamanze as well as one from Gambaga (Giffard coll.) agree with it, while a series from Thiès (Riggenbach coll.) have generally finer spots: but there is so much variation, that one could not separate two forms without further evidence.

#### 79. *Colius macrourus* (L.) (? subsp.)

Niaméi, Upper Niger.

I cannot here discuss the various races of this species, but from the material at hand cannot confirm the distinctness of "*senegalensis*" and "*pulcher*." Cf. Reichenow, *Vog. Afr.* ii. p. 210, Schater, *Genera Avium*, part 6, Coliidae, p. 4.

#### 80. *Eurystomus afer afer* (Lath.)

♂ ♀, Zaria, 25. x. 1912.

Neumann, *Journ. f. Orn.* 1905, pp. 184-186, has given an excellent review of the various forms of this Roller, with which I entirely agree.

#### 81. *Lophoceros erythrorhynchus erythrorhynchus* (Temm.)

Cuzanar, on the line from the Niger to the Senegal.

#### 82. *Lophoceros nasutus nasutus* (L.)

♀ ad., Zaria.

#### 83. *Ceryle maxima* (Pall.) (?)

An immature male was obtained at Zaria on April 17, 1913. It is rather largely spotted above, and thus appears to belong to *maxima* and not to "*sharppei*." For the latter Swainson's name *gigantea* will have to be adopted, if we suppose that the locality "Senegal," given in the original description (Swainson, *B. Afr.* ii. p. 93, pl. xi.), is erroneous. The question, whether *C. maxima* and *sharppei* (or *gigantea*) are representative subspecies or two species found locally in the same places has been raised, but there might be another solution of the supposed occurrence of the same form in the same places—*i.e.* that young *C. sharppei* are spotted, and only adult birds are uniform on the back: I suggest the possibility of this, because young birds of *C. maxima* are heavier spotted than old ones; in that case they would be subspecies, and they can hardly be anything else, being so closely allied, and Sharpe's view would be correct that "*sharppei*" extends from the forest-region of the Congo to Gabon, to which should be added Kamerun and Niger to Benué, where I shot typical *sharppei* at Loko. On the other hand, the spotted *maxima* would occur from the Senegal to Zaria, and in the greater part of tropical Africa, south to Cape Colony.

84. *Ceryle rudis rudis* (L.)

(About the subspecies cf. *Vög. pal. Fauna*, ii. pp. 877-879).

A semi-albinistic male, with most of the primaries (more on the left wing than on the right), and most of the rectrices white, was shot at Zaria, 22. x. 1912.

85. *Corythornis cristata cyanostigma* (Rüpp.)

♂ ad., ♀ and juv., province of Zaria. (Cf. C. H. B. Grant, *Ibis*, 1915, p. 263.)

86. *Halcyon senegalensis senegalensis* (L.)

♂ ♀ ad., juv., Zaria, October and November 1912.

These specimens agree perfectly with a large series collected by Riggenbach in the Western Senegal Colony. The same applies to those collected in the Galla countries by Erlanger and Zaphiro, while *H. senegalensis cyanoleuca* from Angola and South Africa is a very distinct, much larger subspecies. Erlanger (*Journ. f. Orn.* 1905, p. 450) never grasped the real differences, and cannot have made a careful comparison, as he only mentioned the colour, not the measurements.

There is apparently another form: *Halcyon senegalensis fuscipileus* (Reichenow, *Orn. Monatsber.* 1906, p. 171) from Kamerun, with a dark brown crown of the head, but we have not enough material to discuss its distribution; C. H. B. Grant (*Ibis*, 1915, p. 268) considers *fuscipileus* to be a synonym of *senegalensis*.

87. *Halcyon chelicuti chelicuti* (Stanley)

*Alauda* (err. typ.) *chelicuti* Stanley, Salt's *Abyssinia*, p. lvi (1814—Chelicut in Abyssinia).

One skin from the province of Zaria.

South African birds are markedly larger, and must be called *H. chelicuti damarensis* Strickl. In *Contr. Orn.* 1852, p. 153, Strickland described this race as being larger than *H. chelicuti*. *Alcedo variegata* Vieillot and *striolata* Lichtenstein refer to the Senegal form which is the same as the Abyssinian one, while *pygmaea* Cretzschmar, which seems also to be the same, was described from Kordofan and Eastern Abyssinia.

88. *Merops nubicus nubicus* Gm.

Zaria, November.

Specimens from Hansaland and Senegambia agree perfectly with others from N.E. Africa. *Merops nubicoides* agrees in everything so closely with *M. nubicus*, except in the blue throat and cheeks and somewhat larger size, that I should treat it as a subspecies of the latter. The young in first plumage has even a pale bluish throat, and the two forms represent each other geographically. This was also Parrot's view (*Genera Acium, Meropidae*, p. 8). See also *Ibis*, 1915, p. 300.

89. *Melittophagus bullocki bullocki* (Vieill.)

Cf. Neumann, *Journ. f. Orn.* 1905, p. 191 (not "186"!); Zedlitz, *op. cit.* 1910, p. 771.

Zaria, November.

Neumann and Zedlitz have clearly shown that *M. b. frenatus* is the eastern subspecies of the western *M. b. bullocki*, and there can be no doubt whatever that their view is thoroughly correct. See also *Ibis*, 1915, p. 298.

90. *Melittophagus pusillus pusillus* (?)

1 ad., province of Zaria.

Unfortunately the ocular region is not very well prepared. The specimen is quite as small as Senegambian specimens, *i.e.* typical *pusillus*, but over the right eye a few bluish feathers are visible. Cf. Neumann, *Journ. f. Orn.* 1905, p. 191, Zedlitz, *op. cit.* 1910, p. 771, C. H. B. Grant, *Ibis*, 1915, p. 294.

91. *Merops (Aerops) albicollis albicollis* (Vieill.)

♂ juv., Zaria, 5. xi. 1912.

This species appears to be rare in central and northern Hausaland, but I saw it in great numbers on the Benué in 1886. *M. albicollis major* Parrot is a very distinct large subspecies. Cf. Parrot, *Orn. Monatsb.* xv., 1910, p. 12, *Genera Acium, Meropidae*, p. 9.

92. *Irisor erythrorhynchos senegalensis* (Vieill.)

Cf. Reichenow, *Vög. Afr.* ii. p. 340, Neumann, *Journ. f. Orn.* 1905, p. 195, Zedlitz, *op. cit.* 1910, p. 778.

1 ad., province of Zaria. The bill is red.

Mr. C. H. B. Grant (see *Ibis*, 1915, p. 284) appears to me to have correctly united Reichenow's "*guineensis*" with *senegalensis*, which sometimes assumes a bright red bill. The differences supposed to exist by Zedlitz are not borne out by our series.

93. *Apus affinis affinis* (Gray & Hardw.)

4 ad., Zaria, November 1912.

I cannot distinguish West African and Indian *Apus affinis*, and must therefore unite them as above. On the other hand the Palestine birds as well as those from Africa Minor form a paler race. The November specimens are molting primaries and body plumage.

94. *Bradornis modestus* Shell.

♀ juv., province of Zaria.

This specimen belongs probably to the bird called *modestus* by Shelley. Reichenow (*Vög. Afr.* ii. p. 437) treats it as a subspecies of *pallidus*, Ogilvie-Grant (*Ibis*, 1913, p. 635) as a subspecies of *murinus*.

95. *Muscicapa striata striata* Pall.

Two without dates, province of Zaria.

96. *Platysteira cyanea cyanea* (P. L. S. Müll.)

♂ ad., Kaduna River, province of Zaria.

97. *Tchitrea viridis* (P. L. S. Müll.) (?)

A specimen from the Kaduna River, with a rufous tail, just beginning to show some white.

It seems that Nigerian specimens always assume a white tail, while—judging



from a good series collected by Rüggenbach—those from the Western Senegal Colony never do so. Professor Neumann has studied these questions, but has, unfortunately, not yet published his observations.

98. *Campephaga phoenicea* (Lath.)

1 ♀ ad. from the Kaduna River.

99. *Prionops plumata* (Shaw).

Ad., Zaria, November 1912, and Kaduna River.

The amount of grey on the occiput varies considerably. Sometimes the occiput is slaty grey, sometimes white, with just a butty grey tinge. In a series of skins collected by Rüggenbach in the Western Senegal Colony not one has the occiput so light, and few have such a long crest as the Zaria specimens, but this cannot be a local character, as specimens from the Niger are like the Senegal ones. A specimen of unknown locality in the Tring Museum has the occiput almost entirely pure white; it is labelled "Sudan, von Müller," and was bought from Schneider sen. in Basel; it came apparently from the collection of Schütt in Freiburg, and was certainly not obtained in the Eastern Sudan by Baron von Müller. Neumann mentioned it in *Journ. f. Orn.* 1905, p. 219.

100. *Corvinella corvina corvina* (Shaw).

Zaria and Kaduna River, province of Zaria.

101. *Nilaus afer afer* (Lath.)

♂♂, Zaria, 12. iv. 1913, and Kaduna River.

102. *Laniarius barbarus* (L.)

Kaduna, Kaduna River, Zaria, ♂, 17. ix., ♀, 27. ix. 1912. The ♂ (17. ix.) is moulting wings, tail and body plumage.

103. *Dryoscopus gambensis gambensis* (Licht.)

♂ ad., Zaria.

104. *Harpolestes senegalus pallidus* (Neum.)

*Telophonus senegalus pallidus* Neumann, *Journ. f. Orn.* 1907, p. 375 ("Ober-Guinea von der Goldküste bis zum Niger. Exemplare von der Küste, Accra, sind die typischsten. Exemplare aus dem Innern um ein geringes dunkler gefärbt. Typus: ♂ Accra, 4. xi. 1897, C. W. Sartey coll. in Tring Museum.")

♂♂ ad., province of Zaria, August 29; also Kaduna, on the Kaduna River.

Neumann separated this form on account of its paler coloration and smaller size from *T. senegalus senegalus*. As far as the material in the Tring Museum goes, this separation was justified. Our three Zaria skins are certainly lighter on the upperside than *T. senegalus senegalus* from the Senegal colony, but not smaller. Wings 88, 90, 92.5 mm.

There has been some discussion about the generic name of these Shrikes. Reichenow called them *Pomatorhynchus*, but I have elsewhere explained that I cannot share his view. I accepted *Telophonus* of 1837, but I had then overlooked

*Telophorus* of 1831, with a totally different bird as type of the genus. *Telophonus* of 1837 is clearly only a different spelling of *Telophorus*, and the genotype must be the same. The same objection as to *Pomatorhynchus* therefore holds good against *Telophonus*, and *Harpolestes* Cabanis must be accepted as the name of the genus.

105. **Lanius senator senator** L.

♂ ad., ♀ ad., ♂ juv., province of Zaria.

106. **Lanius excubitor leucopygos** Hempr. & Ehrenb.

(Cf. *Vög. pul. Fauna*, i, p. 428.)

1 ad., Timbuktu.

It is very interesting to find this bird, the Nubian and Sudanese representative of the Great Grey Shrike, inhabiting also the Western Sudan.

No doubt a careful exploration of the district of Timbuktu would be most interesting, and it would probably show more forms which have hitherto only been known from the Eastern Sudan, to extend to the western parts of the countries immediately south of the Sahara.

107. **Corvus corax ruficollis** Less.

*Corvus umbrinus* auct., cf. *Nor. Zool.*, 1913, p. 38.

1 ad., Sokoto!—This Raven was not known to occur south of the Western Sahara, though in the Eastern Sudan it extends to Sennaar and Kordofan.

108. **Corvus albus** P. L. S. Müll.

*Corvus albus* P. L. S. Müller, *Natursystem*, Suppl. p. 85 (1776—Senegal. Ex Buffon!).

*Corvus scapularis* auct.

Cf. Kleinschmidt, *Journ. f. Orn.* 1906, p. 90, Zedlitz, *op. cit.* 1911, p. 1.

Several adult birds from Zaria.

A male taken 11. xi. 1912 has freshly moulted plumage, though the body plumage is still partially moulting.

109. **Cryptorhina afra** (L.)

Kaduna, Kaduna River, and Zaria.

♀, 2. x. 1912: body plumage in moult.

110. **Dicrurus ater divaricatus** (Licht.)

*Muscicapa divaricata* Lichtenstein, *Verz. Doubl. Mus. Berlin*, i. p. 52 (Senegambia).

Province of Zaria and Kano.

It seems to me impossible to separate the eastern *lugubris* from the western *divaricatus*. The birds collected by Poggiolini agree perfectly with Senegambian ones, and do not belong to Oberholser's *atactus*. (Cf. *U.S. Nat. Mus.* xxviii. p. 920.

111. **Oriolus auratus** Vieill.

♂ ad. and juv., Kaduna River and Zaria.

112. **Buphagus africanus** L.

♂♂ ad. Zaria, 29. x. and 13. xi. 1912.

113. *Spreo pulcher pulcher* (P. L. S. Müll.)

Ad., Niamei, Upper Niger.

I agree entirely with Zedlitz (*Journ. f. Orn.* 1911, p. 9) that the birds from Eritrea, and as far as I can see from Abyssinia generally, are easily separable from Senegambian *S. p. pulcher* if series are compared, the former being richer, the latter paler in colour. I cannot, however, follow the Count in separating a third subspecies, "*S. p. intermedius*," to inhabit the Sudan from Nubia and Dongola to Adamaua! The specimens from Nubia (Shendy) and Sennaar are inseparable from Abyssinian ones.

The example from Niamei appears to me to belong to the Senegambian *S. p. pulcher*, but this is not very easy to say, though a series would be easily recognisable.

114. *Cinnyricinclus leucogaster leucogaster* (Gm.)

♂ ♀ juv., province of Zaria.

115. *Lamprocolius purpureus purpureus* (P. L. S. Müll.)

♂ ad., Zaria, 9. x. 1912. (Tail and inner secondaries moulting.)

116. *Lamprocolius caudatus caudatus* (P. L. S. Müll.)

2 ad., province of Zaria.

One has the upperside green, the other purplish blue; these are not subspecific differences, but individual ones. There may, however, be other local races.

117. *Sporopipes frontalis frontalis* (Daud.)

♂ ♀ ad., Zaria, 11, 12. xi. 1912.

Though rather pale on the neck, these two birds appear to agree with Senegal examples, collected by Riegenbach. Abyssinian specimens (Adarte, Mareb River, collected by Schrader) appear to agree in every way with the Senegal form, though Mearns has separated a form "*abyssinicus*."—About other possible forms I hope to give notes shortly.

118. *Plocens cucullatus cucullatus* (P. L. S. Müll.)

♂ ad., Zaria, August 1913.

119. *Pyromelana franciscana franciscana* (Isert)

♂♂ ad. in nuptial plumage, without date, ♂ in brown, non-nuptial plumage, 12. ix. 1912, Zaria.

I quite agree with what O. Neumann said in *Journ. f. Orn.* 1905, pp. 345, 346. The birds from Hausaland agree perfectly with those from the Senegal and Niger countries, while all the specimens collected by Zapphiro in the Galla countries (Harar, etc.) belong to my *P. f. pusilla*, or possibly to a race intermediate between the latter and *P. f. franciscana*.

120. *Pyromelana afra* (Gm.)

♂ ad., province of Zaria.

121. *Coliuspasser macrourus macrourus* (Gm.)

*Loria macroura* Gmelin, *Syst. Nat.* i. 2, p. 845 (1789—"Habitat in Africa, in regno Whidah, et ad fluvium Senegal." Ex Buffon, Latham, etc.)

♂ ♂ ♀, Zaria.

I find that the birds from Angola are larger than those from Sierra Leone, Liberia, the Gold Coast and Zaria: the wings of a series of adult birds from Angola ranging from 80–85.5 mm., while the others measure 76–81.5 mm. I therefore suggest that the two forms should be separated, and that the name "*flacoptera*" (sic) might be used for the southern form:

*Fringilla flacoptera* Vieillot, *Hist. Nat. Ois. Chant.*, Zone torride, p. 69, pl. xli. (1805—no definite locality).

*Fringilla chrysoptera* Vieillot, *Tabl. Enc. M th. Orn.* iii. p. 964 (1823—New, corrected name for *flacoptera*. "On trouve cette esp ce sur la c te occidentale de l'Afrique, particuli rement dans le royaume de Congo et de Caongo").

The distribution of *C. macrourus macrourus* and *C. macrourus flacopterus* is not yet certain, and possibly more than two forms might one day be separated. A male from Ilorin, Southern Nigeria, collected by E. C. Bryant, is too large for *C. m. macrourus*, having a wing of nearly 84 mm., while the specimens from Zaria have wings of 79 and 80, and others from Amambara 77–80 mm. Sierra Leone birds do not exceed 80 mm., except one male with a wing of 82. Males from Baraka, near the N.W. shore of Lake Tanganyika, in the Congo State, vary from 79 to 83 mm. Specimens from the Fatiko, Upper White Nile, belong to the small form, but an immature male from Igaga in Kavirondo (Ansorge coll.) has a wing of 83 mm.!

122. *Aidemosync cantans cantans* (Gm.)

1, province of Zaria.

123. *Estrilda cinerica* (Vieill.)

1 ad., province of Zaria

Our material is a very poor one and does not allow any discussion about possible subspecies.

124. *Vidua serena* (L.)

Common about Zaria. In September males in full plumage.

125. *Steganura paradisea aucupum* Neum.

*Steganura paradisea aucupum* Neumann, *Bull. B.O. Club* xxi. p. 43 (1908—"Upper Guinea, especially Senegambia." Type Djourbel, east of Dakar, Riggenbach coll.)

2 ♂ ♂ ad., near Sokoto.

For the majority of specimens Neumann's diagnosis fits beautifully, as all our specimens from the Senegal Colony have darker, more golden-brown hind-necks than our birds from Angola, South and North-East Africa. A male from Gambaga, however, is not so dark on the neck as the Senegal ones. Very curious is a male from Gambos in Mossamedes: its chest-patch is deep chestnut, darker than in any other specimen I have seen, and the hind-neck chestnut-rufous, at least as dark and even

darker than in Neumann's *aeuepum*. On the other hand a male from Humbe in Mossamedes has the hind-neck of as light a straw-yellow as we find in any N.E. African examples.

126. *Pyrenestes ostrinus ostrinus* (Vieill.)

(Cf. Neumann, *Journ. f. Orn.* 1910, p. 527, where an admirable revision of the interesting genus *Pyrenestes* is given.)

♂ ad., Kaduna, Kaduna River, province of Zaria.

Bill from nostril 13, wing 76 mm.

127. *Hypochaera neumanni* Alex.

or

*Hypochaera ultramarina* (Gm.)

An adult male from Zaria (17. x. 1912), like one which I shot at Loko on the Benuë, July 23, 1885, appear to me to belong to *H. ultramarina*, though they are slightly more steel-blue; this applies still more to a male collected in Dongola by Bohndorff. If the Nigerian birds are separable from *ultramarina*, they would have to be called *H. neumanni* (Alexander, *Bull. B. O. Club* xxiii. p. 33, described from Yo, near Lake Chad), though the types are still a slight shade more greenish, but hardly different from the one Dongolan bird, mentioned above. Other Nubian birds agree absolutely with those from Abyssinia, Lado, etc. I am therefore inclined to think that the more or less greenish gloss, to the extent in which it is seen in these birds, is merely individual, and that therefore the specimens of this bird from Nubia to Nigeria belong to the same form. Nigeria is an interesting country for *Hypochaera*; on the Niger (Borgu, Rabba, Amambara!) we find *H. wilsoni* Hart. (*Noc. Zool.* 1901, p. 342—named in memory of my unfortunate friend Captain Malcolm Wilson, who fell in a fight with natives on the Upper Niger). It is most interesting that this form, or at least a **very** close ally, also ranges to North-East Africa, as Mr. A. L. Butler of Khartum shot a male at Sheikh Tombé in the summer of 1909.

Then there is the bird from the Gongola River, which Boyd Alexander called *H. nigeriae* (*Bull. B. O. Club* xxiii. p. 15). It is a brown-winged bird and quite glossy green, totally different from *H. aenea* (= "*chalybeata*"). In the original description it is not said that the wings are brown, and with regard to "*H. neumanni*" it must be said that its comparison with "*chalybeata*" is misleading; it should have been compared with *ultramarina*, but perhaps Alexander meant the latter by what he called "*chalybeata*," as on p. 15 he called the Senegambian bird *aenea*. The latter appears to occur west of Sokoto!

128. *Hypochaera aenea aenea* (= *chalybeata*).

A male in moult from the brown plumage, shot at Dosso, west of Sokoto, appears to belong to the Senegal form.

129. *Ortygospiza atricollis atricollis* (Vieill.)

*Fringilla atricollis* Vieillot, *Nouv. Dict. d'Hist. Nat.* (nouy. éd.) xii. p. 183 (Senegal).

1 ♀, province of Zaria.

This specimen undoubtedly belongs to the uniformly brown-backed "typical" Senegal form. Mr. Ogilvie-Grant described a darker form from Ginnal in

Portuguese Guinea as *O. ansorgei* (*Bull. B. O. Club* xxv. p. 84). This form, judging by the material in the British Museum, is very distinct, but it requires further study. An adult male from Freetown, Sierra Leone, collected by Major Kelsall, agrees perfectly with the type of *O. ansorgei*, but it has a distinct white chin-spot, and this is even more pronounced in a female from the same locality; in the female from Zaria there is hardly an indication of the white chin-spot, and it appears to be usually absent in specimens from Senegambia and Nigeria.

Captain Lynes (*Bull. B. O. Club* xxxiii. p. 131) described the Gabon form as *O. gabonensis*; this form is very distinct, having a largely spotted upper surface. Specimens from Bihé (Angola), collected by N. Ansorge, appear also to belong to *gabonensis*, though they are not quite so brownish. A female shot by Dr. van Someren at Butiti, Uganda, seems also to be indistinguishable from the latter, while a male from Entebbe appears to be the same as *O. ansorgei* with a distinct white chin-spot! At Nairobi *O. polyzona* is not rare. Better series are required to understand the various species and subspecies of this genus.

### 130. *Passer griseus griseus* (Vieill.)

A couple from Zaria and two from Dosso, west of Sokoto, seem to belong to this form, though the latter are paler on back and shoulders.—About the races and nomenclature of this sparrow see *Nov. Zool.* 1900, p. 44, *Journ. f. Orn.* 1905, p. 352, 1911, p. 36.

### 131. *Passer luteus* (Licht.)

An adult male from Dosso, west of Sokoto.

It is most interesting to find this north-eastern species in the Western Sudan. It is another instance of the distribution of so many birds from N.E. Africa to Nigeria and Senegambia—in short, of a Sudan fauna extending south of the Sahara, right across Africa. The single specimen is a "mummy," and one can, of course, not say whether a series of skins would show any differences between the eastern and western birds, but the bird from Dosso is apparently not different.

### 132. *Eremopterix* \* *leucotis melanocephala* (Licht.).

♂ ♀ ad. and juv., Province of Zaria.

Unfortunately no exact locality or dates given. I only observed this bird near Sokoto and Wurno, a good deal north of Zaria.

The specimens sent by Poggiolini are typical *melanocephala* (*Alauda melanocephala* Lichtenstein, *Verz. Doubl. zool. Mus. Berlin*, p. 28, 1823, "e Nubia et Senegambia." Synonym: *otoleuca* Temminck), the lesser upper wing-coverts being all white. This is also the case in every specimen which Riggenbach collected at Kirtaona and Nguick, near Thiès, in the Western Senegal Colony. In Nubia (Atbara, Shendy, Khartum, etc.) many, nay the majority of males, have a large black-brown patch in the middle of the lesser upper wing-coverts, while others are indistinguishable from the western birds.

*E. leucotis leucotis* has the black patch still larger, occupying practically the whole of the lesser upper wing-coverts, and the back is much darker, chestnut-

\* *Eremopterix* (sic) Kaup, *Thierreich* ii. 1, p. 139 (1836—Types: *E. toleuca* and *crucigera*). This name has priority over *Pyrhulauda*. It was overlooked until 1902, when Richmond (*Proc. U. S. Nat. Mus.* xxiv. p. 682) pointed it out. Sharpe (*Handl.* v. p. 186) erroneously credits Bianchi with this discovery.

colour, without or with only a few whitish edges to the feathers of the back. *E. l. leucotis* was collected by A. L. Butler at Gedaref, while Emin Pasha shot *E. l. melanocephala* at Kudara.

133. ***Galerida cristata alexanderi*** Neum.

*Galerida cristata alexanderi* Neumann, *Bull. B. O. Club*, xxiii. p. 45 (1908—"Haussa Countries, between Lake Chad and the Benue River." Type from Bautchi, collected by Boyd Alexander; ♂, 11. ix. 1904, in the Tring Museum).

3 ♂ ♀ ad., Zaria, August and September 1912. Ad., Dosso, west of Sokoto.

The specimens from Zaria agree very well with the types of *G. c. alexanderi*. Their wings measure 94.5–103 mm. The one with the wing of 94.5 is a female, the 103 a male. The third specimen has the wing 100.5; it is marked ♀, but is undoubtedly a male. The specimen from Dosso is not a skin, but a carbolised mummy. It is a slight shade darker (perhaps due to the mode of preservation), and its wing measures 105 mm.

134. ***Macronyx croceus*** (Vieill.)

♂ ad. and juv., Province of Zaria.

135. ***Pycnonotus barbatus inornatus*** (Fras.)

*Icos inornatus* Fraser, *Proc. Zool. Soc. London*, 1843, p. 27 ("Cape Coast" in West Africa, Gold Coast).

*Pycnonotus barbatus inornatus* Hartert, *Vög. pal. Fauna*, i. p. 460.

Kaduna on the Kaduna River, province of Zaria, and Cuzanar, between the Niger and Senegal.

Wings 95–104.5 mm.!

136. ***Hedydipna platara platara*** (Vieill.)

♂, Zaria, 16. xi., ♀, 20. xi. 1912.

Wings 89.5 mm.

Zedlitz (*Orn. Monatsber.* 1910, p. 59, *Journ. f. Orn.* 1911, p. 61) separated specimens from the Adiabo Steppe in N.W. Abyssinia under the name of *H. platara adiabonensis*, which are much smaller. An adult male obtained by L. M. Seth-Smith at Fatiko, on the Upper White Nile, is inseparable from the W. African form, its wings measuring 89.7 mm.

137. ***Cinnyris cupreus cupreus*** (Shaw)

♂ imm. in full moult, Zaria, 14. xi. 1912.

138. ***Parus niger guineensis*** Shell. (?)

An adult bird from the Province of Zaria agrees with specimens of *P. n. guineensis* in having the lesser as well as the median and greater upper wing-coverts pure white, but its wing measures 84.5 mm.; while in *guineensis* the wing remains usually much under 80 mm., measuring as a rule about 70–77 mm.

Some specimens supposed to belong to this race, however, have longer wings: ♂, Upper Casamanze, 79.5; ♂ ad., Kirtaonda, near Thiès, Western Senegal Colony, collected by F. W. Rüggenbach, 81 mm. Other specimens from near Thiès are small.

*P. n. insignis* has the lesser upper wing-coverts partially black like *leucomelas*, but the outer edges of the lateral rectrices are narrowly white.

139. *Heliolaïs erythroptera erythroptera* (Jard.)

*Drynoica erythroptera* Jardine, *Contr. Orn.* 1849, p. 15 (W. Africa).

♂ ad., Zaria, 12. ix. 1912.

Wing 53 mm.

140. *Prinia mystacea* subsp. ?

1 ad. Kano, ♂ ad. Zaria, 13. ix. 1912.

There appear to be some separable subspecies of *P. mystacea*, but I cannot, at this moment, attempt to elucidate them.

141. *Cisticola strangei strangei* (Fras.)

♂ ad., Zaria, August.

142. *Thamnolaea coronata* Rehw.

*Thamnolaea coronata* Reichenow, *Orn. Monatsber.* 1902, p. 157; *Fög. Afr.* iii. p. 703, *Atlas*, pl. xxvi. fig. 2 (Tapong in Togoland).

*Thamnolaea claudi* Alexander, *Bull. B. O. Club*, xvi. p. 124 (1906—Pettia).

One fine adult male, province of Zaria, no date !

Some of the feathers of the crown of this freshly moulted bird have blackish tips, which would soon wear off. The wings measure 110.5 mm.

I am not aware that anything is known of this rare species, except the type in the Berlin Museum, from the interior of Togoland, and the specimens collected by Boyd Alexander in Nigeria. "*T. claudi*" is the female, which has the crown slate-grey, not white.

143. *Cossypha albicapilla giffardi* Hart.

*Cossypha giffardi* Hartert, *Bull. B. O. Club* x. p. 5 (Gambaga, collected by Capt. Giffard).

One adult bird from Kaduna, on the Kaduna River, province of Zaria, 1912.

*Cossypha albicapilla omoensis* Sharpe (*Bull. B.O. Club* xi. p. 28, 1900) is closely allied to *C. a. giffardi*, but the back is darker blackish, the underside darker rufous. The dusky markings on the outer tail-feathers, however, though somewhat variable, are the same in both subspecies. The wings of *C. a. omoensis* are shorter. Wings in *C. a. giffardi*: 137, 134, 126, 123.5; in *C. a. omoensis*: 119, 125, 116, 123, 126.5 mm.; the males much larger than the females, but some specimens apparently incorrectly sexed.

144. *Saxicola rubetra* (L.)

♀, Zaria, 22. x. 1912.

♂ freshly moulted, without date, province of Zaria.

The male is very pale and would appear to be *S. rubetra spatzi* (Erl.), while the female is darker and might pass as a *S. r. rubetra*: but these forms require further investigation.



## ON THE TWO ALGERIAN SPECIES OF *CEROCALA*, A GENUS OF *NOCTUIDAE*.

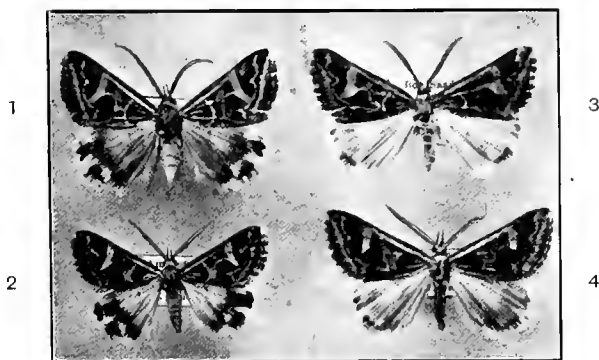
BY DR. K. JORDAN.

(With 10 text-figures.)

IN vol. xiii. of the *Catalogue of the Lepidoptera Phalaenae* p. 270 (1913), Sir George Hampson records one species of *Cerocala* from Algeria. The numerous specimens from that country contained in the Tring Museum, however, belong to the two species described by Hampson as *insana* H.-S. (1850) and *sana* Stand. (1901) respectively. According to Rothschild (*Nor. Zool.* xxi. p. 233) the name *insana* doubtfully applies to the Algerian insect, and therefore should be replaced by *algeriae* Oberth. (1876).

The species which Lucas describes and figures as *scapulosa* Hübn. in *Ann. Soc. Ent. France*, 1850, p. 103, tab. 2, fig. 3, from Algeria, and which Hampson (*l.c.*) refers to *insana* = *algeriae*, is really *sana*. Hampson's synonymy should be corrected accordingly.

The two species are outwardly so much alike that they are easily mistaken



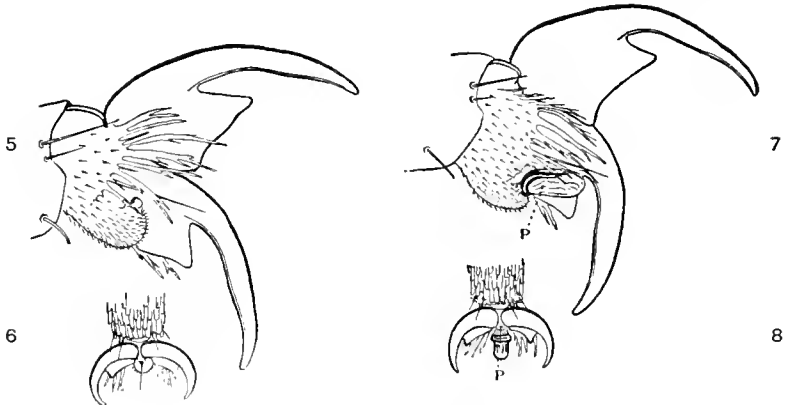
FIGS. 1 and 2.—*Cerocala sana*.  
" 3 " 4.—" *algeriae*.

one for the other. Size and markings are very variable in both. *C. sana* is on an average the larger species, but many specimens are much smaller than an average example of *algeriae*. In *sana* (text-figs. 1 and 2) the creamy or buffish discal band which extends from below the costa obliquely towards the submarginal line usually reaches this line, and has a straight outer edge below the costa; whereas in *algeriae* (text-figs. 3 and 4) the band is shorter posteriorly, and its outer edge is mostly convex near the costa. But these differences do not hold good, nor can I find anything else in the markings of the upperside of the forewing which can be relied upon for separating the two species. The black spots, however, which are found on the upper surface of the hindwing and on the underside of both

wings, are more strongly marked in *sana* than in *algiriae*, the diffuse brownish discal band of the hindwing above also being more pronounced in *sana* than in *algiriae*. This distinction is nearly constant, very few specimens of both species being intermediate.

The true differences between *sana* and *algiriae* do not appear to have ever been described. They are very striking, and are found in the venation and legs of both sexes and in the antennae of the males.

In Hampson's Key to the Genera of *Catocalinae* the relative length of the cell of the hindwing is employed as one of the distinguishing characters. If the Key were strictly adhered to, *Cerocala algiriae* and *C. sana* would be located in separate groups of genera; for the difference in the lengths of the cells of the hindwing is very marked in the two species. The proportion between the length of the cell measured from the base of the wing to the lower cell-angle and the length of the lower radial vein (= vein 4) is 4:5 in *algiriae*, and 4:7 in *sana*. These proportions place *algiriae* into the neighbourhood of *Euclidimera mi* and



FIGS. 5 and 6.—*Cerocala algiriae*.  
 „ 7 „ 8.— „ *sana*.

*Caenurgia fortalitim*, while *sana* has the shorter cell of the other (all?) species of *Cerocala*. However, it would be a very unnatural classification, if *algiriae* were placed far apart from *sana*.

The second distinction refers to the claw-segment of the tarsi. In *sana* the pulvillus or flap situated in between the claws has a very distinct black apical lobe (text-figs. 7 and 8, P), which can readily be seen with a fairly strong lens. This pulvillus is absent in *algiriae* (text-figs. 5 and 6). The majority of the other species of *Cerocala*, if not all, agree with *sana* in the possession of a distinct pulvillus. This character, in conjunction with the previous, renders it easy to separate both sexes of *sana* from *algiriae*.

While these are all the distinctions I have found between the females of the two species, the males exhibit further differences. If the antennae are compared side by side, the filamentous apical portion appears much longer in *sana* than in *algiriae*, which is due to a number of distal segments being simple or dentate in *sana*, while all the segments are pectinated in *algiriae*, with the exception of the last one or two. The difference in the shape of the segments and the length

of the branches is illustrated by text-figs. 9 (*sana*) and 10 (*algiriae*). The segments are so long and slender in *algiriae* that the dorsal scaling is plainly visible in a view from the underside, which is not the case in *sana*.

In the specimen from which text-fig. 10 is taken, the last two segments are fused together, and only one side-branch of the penultimate segment is developed, which often happens in antennae pectinated to the apex. The number of distal segments which are without long pectinations varies in *sana* to some extent, but

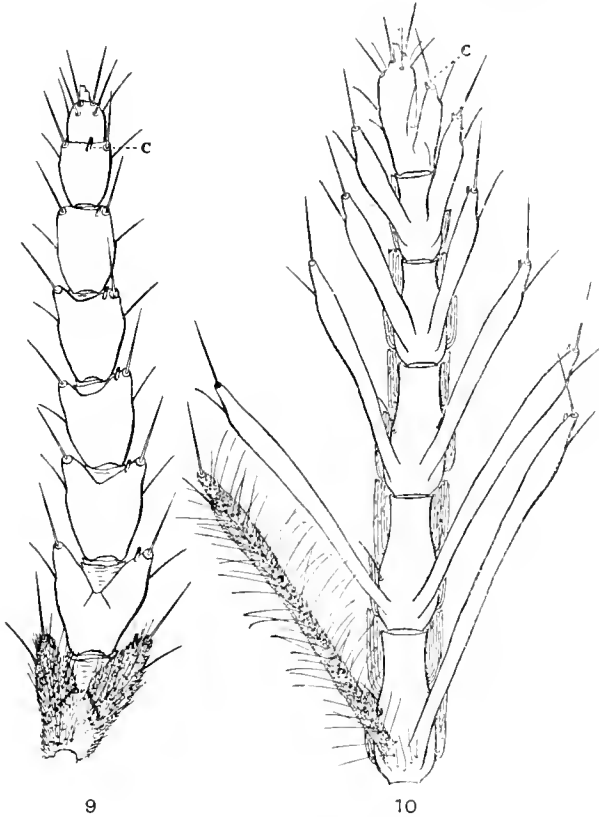


FIG. 9.—*Cerocala sana*.  
 „ 10.— „ *algiriae*.

there are always at least six segments which have no side-branches or in which the branches are shorter than the segments.

I mention incidentally an interesting morphological fact observed in *Cerocala* (and elsewhere). The ventral sensory cone (c) placed at the apices of the segments is central on the simple antennae of the females, and on the penultimate (simple) segment of the male of *sana* (text-fig. 9). From this central, normal position it wanders on to one of the branches of the antenna, having a nearly apical position on the pectinations of one side. The antennae figured are left ones; on the right antennae the cones are on the branches of the other side. The branches bearing the cones, therefore, are those nearest the forewing—i.e. the branches of the outer row.

The genitalia of the males of *algiriae* and *sana* are less different than one would expect. The distinctions are microscopical and so very slight that they can hardly be employed for identification purposes. The clasper (or valve, = plenum of ninth segment) is somewhat broader apically and more rounded in *algiriae* than in *sana*. The armature of the clasper consists of a long ventral process which extends to the apex of the clasper, and two short, concave dorsal processes which are placed close together. This armature is the same in the two species, except that the dorsal processes are a little slenderer and slightly less curved in *algiriae*.

The great similarity, almost amounting to identity, in the male genitalia of the two Algerian *Cerocala* is of special interest from the point of view of systematics and phylogeny. The similarity is weighty evidence that *algiriae* and *sana* are closely related, in spite of the difference in the lengths of the cells of the hindwing, in the tarsal claw-segments and the male antennae; and, on the other hand, shows that the apparent absence of obvious distinctions in the genitalia must not *eo ipso* be taken as proving specific identity. There are a large number of distinct species of Lepidoptera which we cannot separate by the genitalia, and there are also Lepidoptera which we can identify with certainty only by the genitalia.

Both species of *Cerocala* are common in the dry districts of the High Central Plateaux of Algeria, as well as in the desert. The larvae are not yet known.

## ON *PAPILIO DIXONI* GROSE-SMITH (1900) AND *PAPILIO KUEHNI* HONR. (1886) FROM CELEBES.

By DR. K. JORDAN.

(With 4 text-figures).

THE most interesting collection of *Rhopalocera* which our friend Dr. L. Martin made during his stay at Paloe, Central Celebes, in 1912 and 1913, contains a long series of a *Papilio* which Dr. Martin identifies as *P. kuehni* in *Iris*, 1914, p. 68 ff. We have drawn his attention to this error, the species not being *kuehni*, but *dixonii*. But Dr. Martin, *in litt.*, expresses the opinion that *dixonii* and *kuehni* are the same species, since his series shows all intergradations between specimens with a red discal band and red submarginal lunules on the hindwing (= *dixonii*) and specimens which have only the red band (= *kuehni*). The series of ♂♂ which Dr. Martin has been good enough to cede to the Tring Museum certainly contains these intergradations, but—the extreme individuals which lack the submarginal spots, and which Dr. Martin believes to be *kuehni*, are nevertheless *dixonii*, not *kuehni*. There is no *kuehni* in the series.

The differences between *dixonii* and *kuehni* are very marked. We have one ♂ and two ♀♀ of *kuehni* and fourteen ♂♂ of *dixonii*. The ♀ of *dixonii* has been figured by Grose-Smith in *Rhop. Exot.* iii., *Papilio*, pl. 21, fig. 3, 4 (1901).

The wings are much narrower in *kuehni* than in *dixonii*, particularly in the male, as shown in our text-figs. 1 and 2. The upperside of both wings of the male of *kuehni* is much more uniformly purplish blue than in *dixonii*, the pale stripes of

the forewing are missing above and much fainter beneath than in *dixonii*. The hindwing above is purplish blue to the distal margin in *kuchni*, whereas in *dixonii* the distal marginal area is velvety black in certain aspects. The abdominal patch

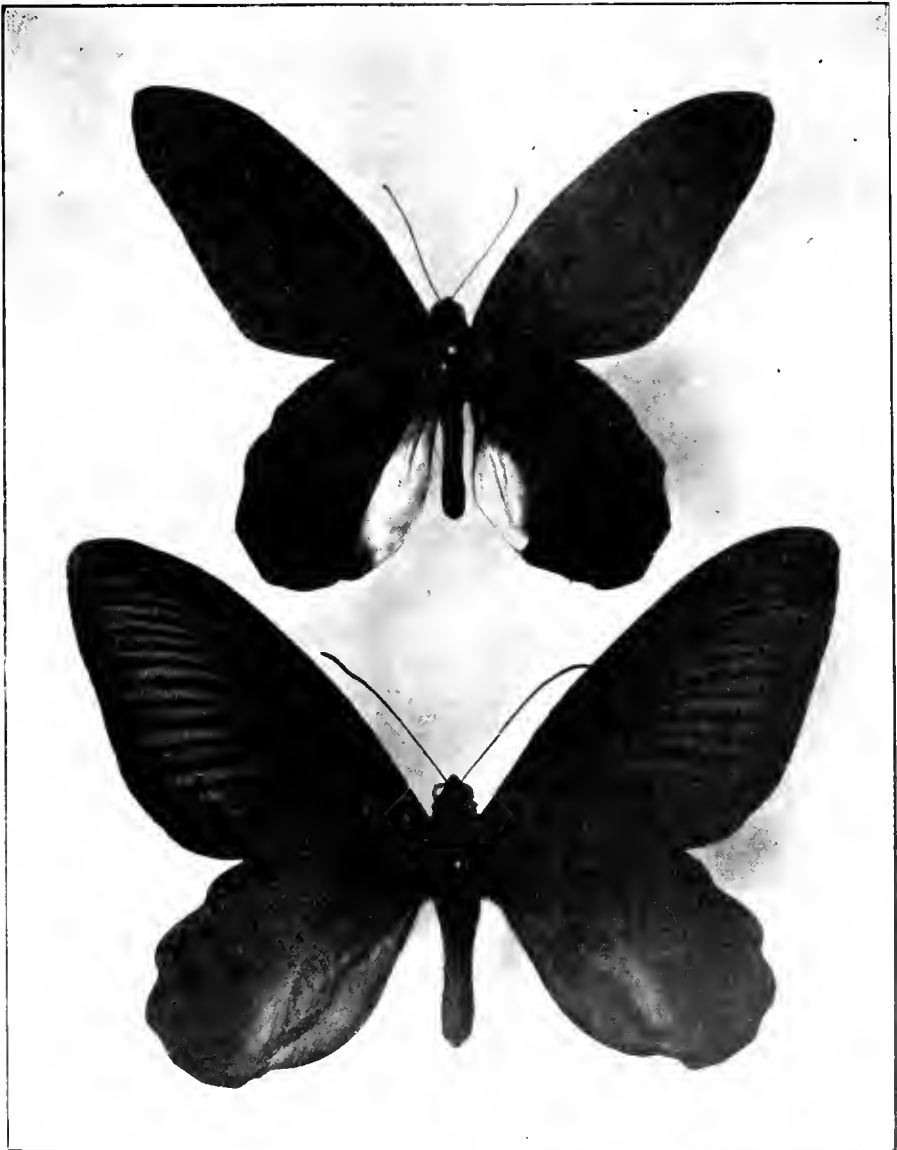


FIG. 1. — *Papilio kuchni*  
" 2. — " *dixonii*.

of *kuchni* contains a large, white, sharply defined patch, and the dark brown colouring around this patch is so much shaded with purplish blue that it scarcely contrasts with the colouring of the rest of the wing. In *dixonii*, on the contrary,

the whole abdominal area is pale brown up to the cell and sharply defined, the colouring contrasting very strongly with the wing. Moreover, the scaling inside the abdominal fold is not white, but only slightly paler brown than the scaling between the cell and the pouch. In the specimen of *kuehni* here figured, the pouch is entirely unfolded; in that of *dironi* the scent-organ is only unfolded once, the pouch itself being still closed.

The red discal band on the underside of the hindwing is much broader in *kuehni* than in *dironi*, and also extends somewhat farther towards the abdominal margin, the diameter of the band being at the upper median nervule about the same as the distance of the band from the distal margin. There is no trace of submarginal spots in *kuehni*.

The red lateral spot at the base of the abdomen appears to be smaller in *kuehni*

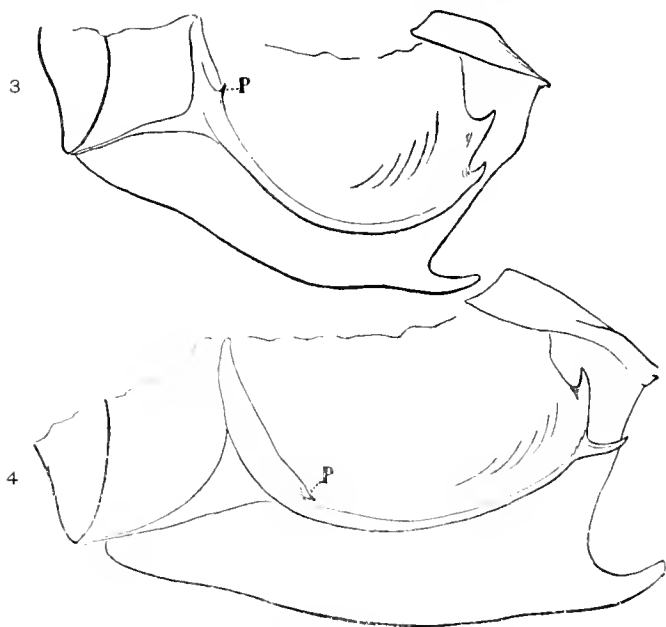


FIG. 3.—Genitalia of *Papilio kuehni*.  
 „ 4.— „ „ *dironi*.

than in *dironi*, and the claspers are less extended red. In some specimens of *dironi* there are scattered red scales on the sides of the segments preceding the claspers.

The distinctions in colour and wing-contour are abundantly supported by differences in structure.

The venuration exhibits in both wings some noteworthy characteristics easily recognised and sufficiently prominent for separating the species. Apart from the cell being, in both wings, somewhat narrower in *kuehni* than in *dironi*, which difference stands in connection with the lesser width of the *kuehni*-wings, we find the following distinctions: The distance between the points of origin of the second and third subcostals is in *kuehni* longer than the combined lengths of the two transverse discocellulars, in *dironi* shorter than or as long as these veins. The

stalk of the fourth and fifth subcostals is much shorter in *dixonii* than in *kuehni*, being in *kuehni* longer and in *dixonii* shorter than the transverse discocellulars. In the hindwing the lower median vein has a more distal position than the upper radial in *kuehni*, while in *dixonii* the inverse is the case. The first and second radials being closer together and the cell at the same time broader in *dixonii*, the apical portion of the cell is more abruptly narrowed in that species than in *kuehni*.

The genitalia of the ♂ also differ in the two species. The armature is very similar, but the proximal tooth (P) of the harpe is in *kuehni* longer and more dorsal than in *dixonii*, and the lower one of the two apical teeth of the harpe is directed distad in *dixonii*, while in *kuehni* it is in a plane with the upper tooth (cf. text-figs. 3 and 4). Moreover, the penis-funnel, i.e. the triangular sclerite supporting the penis-sheath on the ventral side and forming part of the ninth sternite, is more produced in *dixonii* than in *kuehni*. The individual variation in the genitalia shown by the specimens of *dixonii* which I have examined does not affect these distinctions.

The hindtibia of the ♂ of *kuehni* is more swollen than in *dixonii*, and the fringe of hairs at the extreme edge of the abdominal fold of the hindwing is very much longer and denser in *dixonii* than in *kuehni*.

The female of *dixonii* is paler than that of *kuehni*, particularly the basal areas of both wings, on the upperside. The submarginal spots of the hindwing are strongly marked below and distinctly indicated above by pale crescents. The red discal band of the underside is very broad in *kuehni*. The venation of the females is as in the respective males, except that the lower median nervule in the hindwing of *kuehni* is on a level with the upper radial instead of originating more distally than this vein.

The relationship of *dixonii* and *kuehni* is not so close as would appear at first sight. Now I have examined males of both species I have come to the conclusion that *kuehni* represents on Celebes the series *priapus*, *scorax*, *hageni*, *aidoneus*, *semperi*, whereas *dixonii* belongs to the series *zaleucus*, *caruna*, *nox*.

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## SOME NEW OR LITTLE-KNOWN HETEROCERA.

By DR. K. JORDAN.

(With 3 text-figures.)

## FAMILY AGARISTIDAE

1. *Hespagarista caudata eburnea* subsp. nov. (text-fig. 1, ♂)

♂. Colore eburneo magis extenso distinguenda.

*Hab.* Manow, German East Africa, 1 ♂, received from Messrs. Standinger and Bang-Haas.The forewing is slightly narrower than in *H. c. caudata* Dew. (1879), from Angola, and the posterior antemedian and the submarginal spots are larger. The

FIG. 1.

creamy-white area of the hindwing almost reaches to the base, and the black marginal band is narrower than in true *caudata*; moreover, there is no discocellular spot on the hindwing, and only the subcostal vein is distinctly black, the others being black at the marginal band, and the median nervure also at the base.2. *Damias amoena rookensis* subsp. nov. (text-fig. 2, ♂)In Seitz, *Grossschm.* xi. p. 13 (1912), I treated *chalybeata* Roths. (1896) and *amoena* Roths. (1896) as the sexes of one species, because we only had ♂♂ of the one and ♀♀ of the other. Meek has now sent us from Rook Island two ♂♂ and

FIG. 2.

one ♀ which are practically alike, agreeing almost exactly with the ♀ named *amoena* Roths. (1896). As it is not probable that the ♂ is dimorphic, I must reverse my opinion and consider *amoena* and *chalybeata*, distinct in spite of the absence of any tangible structural differences.



The Rook specimens are distinguished from *D. a. amoena* from New Britain, of which we have three ♀ ♀, in the band-like patch of the forewing being somewhat broader, particularly in extending to the cell before the lower median vein.

#### FAMILY GEOMETRIDAE

##### 3. *Eubordeta concinna* nom. nov.

*Eubordeta flammea* Jordan (nec *flammeus* B. Baker, 1910), *Nov. Zool.* xviii, p. 598, no. 3 (1911).

I propose the above name for the species called by me *flammea*. When publishing that name I entirely overlooked that there was already a *flammeus* in the genus, though mentioned by me on p. 597, *i.e.*

##### 4. *Milionia lepida* spec. nov.

♂. Nigra, cyanescens, alis anticis fascia recta obliqua mediana maculaque parva basali caeruleis, posticis a basi ad medium usque caeruleo-bistriatis.

Al. ant. long.: 21 mm.

*Hab.* Near Oetakwa R., Dutch South New Guinea, up to 3000 ft., October—December 1910 (A. S. Meek), 2 ♂ ♂.

Velvety black; body cyaneous, glossy, with a greenish tint in certain lights.

Wings, *upperside*: forewing with a small glossy-blue diffuse basal patch, widest before hindmargin, and a greenish blue straight oblique median band from below costa to hindmargin close to angle, 3.5 mm. wide, the outer edge of band incurved below M<sup>2</sup>.—Hindwing with a cyaneous tone, with two glossy-blue streaks, one on the median vein and the other on the submedian: fringe of both wings with grey tips.

*Underside*: band of forewing enlarged to a broad patch, which is rounded on the outer side and strongly tapers before hind angle, cross-veins about in centre of patch, while on the upperside they are nearer the outer edge of the band, basal patch almost joining the median one, interspace deep blue.—Hindwing: cell bordered with a broad glossy-blue streak anteriorly and posteriorly, a thin streak also at abdominal margin. No patch of modified scales near apex as in *M. callima* R. & J. (1905).

##### 5. *Milionia paradisea beata* subsp. nov.

♀. Alis posticis ad apicem anrantiaco marginatis distinguenda.

*Hab.* Goodenough, d'Entrecasteaux Islands, 2500—4000 ft., April 1913 (A. S. Meek), 2 ♀ ♀.

Band of forewing appreciably broader than in *M. p. paradisea*. Red band of hindwing, on the contrary, somewhat reduced, being shorter and ending anteriorly in a point; apical margin narrowly bordered with orange, this border a little longer below.

#### FAMILY LIMACODIDAE

##### 6. *Casphalia nigerrima* Holl. (1893)

*Casphalia nigerrima* Holland, *Psyche* vi, p. 397 (1893) (Ogowie R.).

Dr. Holland described the species from a ♂. The British Museum has a coloured figure of this ♂, and we have a specimen of both sexes. Our ♂ agrees

with the figure in the mesothorax bearing two round black dots on each side in front, as, for instance, in *C. extranea* Walk. (1869). The head is orange in front of the antennae, and the base of the third abdominal tergite is rather broadly orange and the bases of the following segments narrowly so. In both sexes the base of the costal margin of the forewing is creamy white like the anterior portion of the mesonotum.

In the ♀ the head is black; the base of the antenna bears some orange scaling; abdomen orange, with a broad dull black diffuse median stripe, which widens posteriorly, but is here much mixed with orange; legs deeper black than in ♂, and the femora less extended orange.

Our specimens came from Bopoto, Congo (Oram coll.).

### 7. *Casphalia citrimaculata* Auriv. (1905)

The species was described from a single ♀ from Victoria, Cameroons. The Oxford Museum contains a ♂ which agrees well with the description, except in some points which may be due to difference of sex. This ♂ was caught by Dr. W. A. Lamborn near Oni, 70 miles east of Lagos, east shore of Lekki Lagoon, Nigeria, 0-100 ft., in a forest with paths and natural clearings.

Forewing 14 mm. long; hindwing small, with the anal angle produced and the apex subacuminate. About fourteen segments of the antenna with long pectinations, scale-hairs at base of antenna orange-ferruginous. Foretarsus from apex of first segment pale yellow, mixed with some black scaling, particularly on fifth segment; the other tarsi less extended yellow beyond centre. A rather large orange-yellow lateral spot at base of abdomen extends on to metathorax. Marginal band of hindwing nearly as broad at anal angle as at apex, narrower in between, centre of hindwing slightly transparent.

Cell of hindwing truncate, stalk of subcostal and first radial half as long as the cell is broad.

### 8. *Casphalia elongata* spec. nov.

♀. *C. citrimaculatae* Auriv. (1905) colore similis, sed pectore abdomineque nigris unicoloribus.

Al. ant. long. 20 mm., lat. 7 mm.

*Hab.* Mombasa, British East Africa, October 1905 (F. J. Jackson), 1 ♀.

Body black, collar anteriorly orange, a few orange hairs at the base of the antenna, on palpus, forecoxa, and on the soles of the tarsi.

Forewing very long and narrow, without traces of hind angle, black like body, with a faint olive-brown tint; just outside cell an ovate lemon-yellow patch, which is pointed behind and extends from near costa to beyond  $R^3$ .—Hindwing lemon-yellow, small; abdominal margin half the length of distal one; anal angle obtuse, rounded off, not produced; apex subacuminate; black marginal band widest at apex, measuring here 3 mm. and only 1 mm. in its posterior half; costal margin very narrowly black; a distinct black discocellular spot.

*Neuration*: Forewing, subcostals 2 to 5 stalked together, 2 more proximal than 5.—Hindwing: subcostal and radial 1 in right wing on a very short stalk, in left wing separate; cross-vein between radials 1 and 2 very oblique, the upper cell-angle being much more produced than the lower; cross-vein  $D^3$  between radials 2 and 3 angulate; radial 3 and median 1 near together from lower cell-angle; median 2 from middle of cell.

9. *Casphalia elegans* spec. nov.

♂ ♀. Nigra; prothorace ferrugineo: mesothorace macula magna utrimque ante alam sita sulphurea notato: abdomine et pectore aurantiacis; alis anticis puncto minuto basali et fascia maculari subapicali pallide sulphureis; posticis aurantiaco-sulfureis (♂) vel aurantiacis (♀), nigro-limbatis, puncto medio nigro.

Al. ant. long. ♂ 13 mm., lat. 5 mm.

♀ 18 „ „ 7.5 „

*Hab.* Gambaga, Gold Coast Hinterland (Dr. Bury), 1 ♂ and 1 ♀.

Head, palpi, antennae, upperside of thorax, tibiae, tarsi, and upperside of femora, in ♂ also base of abdomen black, a few yellow hair-scales on frons and at base of antennae, and pale orange scaling on upperside of palpi; collar ferruginous orange; abdomen and breast orange, a large spot on each patagium in front of wing sulphur-yellow. Hair-scales on sole of hindtarsus partly clayish buff. In ♀ tip of abdomen black.

Wings, *upperside*: forewing in shape similar to that of *C. floricollis* Walk. (1856), dull brownish black, a small spot at extreme base, a macular subapical band sulphur-yellow, the band close to cell from radial 1 to below median 1, consisting of five spots, the upper two spots a little more proximal than the others and 2 to 3 mm. long, the next two somewhat smaller, the fifth small, in ♀ vestigial.—Hindwing in ♂ pale yellow shaded with orange, in ♀ orange; anal angle distinct, in ♂ projecting; a narrow black marginal band, in ♂ extending along abdominal margin to base; width of distal border at apex 1 mm. in ♂ and nearly 2 mm. in ♀, below centre  $\frac{1}{2}$  mm. in ♂ and very little more in ♀; abdominal border of ♂ a little over 1 mm., absent in ♀; a discocellular spot also black, joined to the diffuse black costal border in ♂, isolated in ♀, the costa not being black in ♀.

*Underside* similar to upper, sulphur-yellow basal spot of forewing absent, subapical band slightly wider, the last spot of it larger and better defined; black costal border of hindwing of ♂ somewhat broader.

Neuration essentially as in *C. extranea* Walk. (1869).

Genitalia of ♂: Tenth tergite and sternite longer and slenderer than in *C. extranea*, the apex of the tergite less abruptly bent downwards. Claspers much shorter, not produced into a long apical process, as is the case in *extranea* Walk. (1869), *nigridorsa* Anriv. (1905), and *nigerrima* Hoff. (1893).

*Zarachella* gen. nov.

♀. Prope *Casphaliam* Walk. (1866). Alarum anticarum costae subcostales 1<sup>a</sup> et 2<sup>a</sup> liberae, 3<sup>a</sup>, 4<sup>a</sup>, 5<sup>a</sup> petiolatae, radialis 1<sup>a</sup> ab cellulae angulo superiore fortiter producto emissa, medianae 1<sup>a</sup> et 2<sup>a</sup> petiolatae; alae posticae rotundati-ovatae, cellula inter costas radiales 1<sup>am</sup> et 2<sup>am</sup> aperta, radiali 1<sup>a</sup> cum subcostali longissime petiolata.

Genotypus: *Z. specularis* spec. nov.

The genus is a most interesting one as regards its neuration. On forewing subcostal 1 very little more distal than stalk of medians; upper angle of cell much produced; subcostal 2 from near upper angle, 3, 4, and 5 stalked, 4 halfway between 5 and apex of 3; radial 1 from very close to stalk of subcostals; cross-vein D<sup>2</sup> angulate, upper arm of angle long, lower short; radials 2 and 3 close together, 3 from above cell-angle; medians on a short stalk, which is longer in the left wing than in the right one. Hindwing with the costal and distal margins completely

rounded, ovate, small, without angles; costal and subcostal fused from base to one-fourth, then diverging, the costa following the strong curve of the costal margin, the subcostal throwing off radial 1 not far from margin; no cross-vein between radials 1 and 2, which are widely separated, the cell being bounded in front by the cell-fold; radials 2 and 3 and median 1 near together, median 2 much more proximal.

Otherwise agreeing with *Casphalia*. Longer spur of hindtibia about as long as the tibia is broad.

10. *Zarachella specularis* spec. nov. (text-fig. 3)

♀. Nigra, paululo purpurascens, fronte, pronoto atque metanoto albo-guttatis, alis anticis macula bipartita sub cellulæ angulum inferiorem sita et posticis altera magna centrali ovata albis subhyalinis ornatis.

Long. al. ant. 14·5 mm., lat. 5·5 mm.

„ „ post. 7 „ „ 5 „

*Hab.* Malvern, near Durban, Natal, 700—800 ft., November 18, 1903 (Ceil N. Barker); 1 ♀ in the Hope Department at Oxford.

The small size of the hindwing gives the specimens the appearance of a ♂; but it is a ♀, as proved by the antenna, genitalia, frenulum, and retinaculum.



FIG. 3.

Dull black with a slight purple tone. Scaling on apical fourth of antenna white. A central spot on the frons, a transverse one on each side of the collar, a lateral tuft on the metanotum, a small costal spot each on the forewing above and on the hindwing below, as well as a semitransparent patch on each wing white; the patch of the forewing consisting of two spots  $R^2-M^1$ , with an indication of a third, minute spot below  $M^1$ , the patch a little over 2 mm. long; the patch of hindwing central, ovate, a little nearer to the distal than to the costal and abdominal margins, the black border being narrowest at the lower median vein.

ON THE POSITION OF *MINETRA NODRICA* BoisD. (1832),  
A NYMPHALINE BUTTERFLY.

BY DR. K. JORDAN.

DESCRIPTIONS of species are frequently so short and superficial that identification from the description alone is very uncertain. It is a common complaint, particularly as regards some of the older authors. On the other hand, the determining of species from books often involves much greater labour than the investigator of the literature on the subject is inclined to bestow upon his task. He looks to the cataloguer as the saviour of trouble, investigation being cut short and remaining superficial. This also is a common complaint, well balancing the former.

My attention was drawn to *Minetra nodrica* BoisD. (1832) by Professor E. J. Gillet, of Nivelles, who has been helping for a short time in the arranging of the Lepidoptera in the Tring Museum. When classifying the genus *Parthenos* according to Fruhstorfer (in Seitz, *Grossschm.* vol. ix.) Professor Gillet, finding *nodrica* BoisD. described as a subspecies of *Parthenos sylveia* as well as of *P. tigrina* in Fruhstorfer's synopsis of the genus, appealed to me for a solution of this, for him extraordinary, puzzle. As the Professor was not satisfied with my general statement that the introduction of hustling into science must inevitably lead to such oversights, I had to investigate the matter, *volens volens*.

In *Voy. Astrolabe*, *Léop.* p. 126 (1832) Boisduval placed in his new indescript genus *Minetra* two species, the new *nodrica* (from Burn and New Guinea) and *sylveia* Cr. (1775). The subsequent career of *nodrica* BoisD. has been, until recently, a fairly smooth one.

Doubleday (1859) enumerates *nodrica* as a distinct species under *Minetra* Vollenhoven (1866) refers to *nodrica* as a species distinct from his *Minetra tigrina* Kirby (1871) has it under *Parthenos* along with *grambrisius*, *sylveia* and *tigrina*, *Minetra* being correctly sunk as a synonym of *Parthenos*.

Oberthür (1880) expresses the opinion that *nodrica* and *tigrina* are respectively the melanotic and albinotic forms of one species, and mentions a Waigen specimen almost identical with Boisduval's type of *nodrica*.

Pagenstecher (1884) refers without comment to Oberthür with regard to *nodrica*, and Nicéville (1898) records it from New Guinea, adding that he believes its occurrence on Burn to be more than doubtful. On the other hand, Holland (1900) identifies the Burn specimens of *Parthenos* obtained by Doherty as *nodrica*.

In his various articles on *Parthenos* (*Ent. Zeit. Stettin* lix. p. 249. 1898, issued 1899), *Iris* xvii. p. 137 (1904), and in Seitz, *Grossschm.* ix. pp. 646 and 647 (1913)) Fruhstorfer treats *nodrica* as a subspecies of *tigrina* or of *sylveia*, or of both. In 1899 he identifies the dark *Parthenos* from the Beron Peninsula as *nodrica*; in 1913 he says, under *sylveia*, that he does not know *nodrica*, but that Doherty found it in numbers on Burn, and under *P. tigrina* he states that *nodrica* is a dark form of *tigrina* from Andai and Dorey.

The authors referred to took it for granted that Boisduval's *nodrica* of 1832 was a form of *Parthenos*. The only author, as far as I know, who has been more careful

was Standinger, who quotes part of Boisduval's original description as proving that *nodrica* could not be the same as Standinger's *immaculata*. In this Standinger was certainly right; but it is nevertheless astonishing that after the perusal of the original description he states that he does not know *nodrica*. He knew it well enough, and even figured the male of it. The weight of Boisduval's name, apparently, was at that time still so great that nobody doubted *nodrica* being a *Parthenos* (= *Minetra*).

What is *nodrica* Boisd. (1832)? Those who are acquainted with Papuan butterflies will recognise the species at once from the original description, of which we quote here the French portion :

"Ailes arrondies, d'un brun noirâtre, avec une bande blanchâtre commune ; les supérieures ayant près de la côte un point, et trois près du sommet, blanchâtres ; leur dessous brunâtre, avec quelques traits basilaires bleus, et un anneau costal noir à prunelle bleue ; dessous des inférieures roussâtre, avec la base verdâtre tachée de bleu, et une rangée postérieure de gros points noirs."

There is only one Papuan Nymphaline known with a white band across both wings and a blue-pupilled costal eye-spot on the underside of the forewing ; the white-banded ♀ of *Symphædra acropa* L. (1758).

I restrict the name of *nodrica* Boisd. (1832) to "New Guinea" specimens, no white-banded ♀♀ of *acropa* being known from Bura.

An excuse can be found for every error. The confusion was started by Boisduval himself in the *Astrolabe* by describing *acropa* L. as *Lerias acropus* on p. 125, and a ♀ of it as *Minetra nodrica* on p. 126, and this is a kind of excuse for the continuation of the mistake.

The type of *nodrica* mentioned by Oberthür (1880) is certainly not the type, but a specimen subsequently placed by Boisduval in his collection as *nodrica*. The type of true *nodrica* may possibly be preserved in the Paris Museum.

The *Parthenos* from the north side of the Berau Peninsula is *P. sylvia immaculata* Stand. (1886), a name which is not mentioned in Seitz.

*P. tigrina* Vollenh. (1866) is not specifically different from *sylvia*.

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THIRTEEN NEW *SPHINGIDAE*.

By LORD ROTHSCILD, PH.D., F.R.S., AND K. JORDAN, PH.D.

(With Plate XX. and 7 text-figures.)

The types are in the Tring Museum if not otherwise stated.

1. *Coelonia brevis* sp. nov. (text-figs. 1, 2, 3, and Pl. XX. fig. 2).

♂. *C. fulvinoctuae* similis, sed minor, palporum articulo secundo basi lato, deinde conico glabro; alarum posticarum basi supra flava, subtus alba.

*Hab.* Miaramarivo, Madagascar, 1 ♂, received from Monsieur E. Le Moutt.

Antenna thicker than in *C. fulvinoctua* Butl. (1875). Palpus (text-fig. 3) quite different, the second segment being ventrally rough-scaled at the base and then abruptly smooth-scaled; this smooth portion comprises more than half the segment and is conical. Third segment small. Scent-organ of forecoxa not visible, probably as small as in *solani* Boisd. (1833) or smaller. Foretibia much less rough-scaled than in *fulvinoctua*, foretarsus without tufts. Outer spurs of mid- and hindtibiae more than half the length of the inner spurs. Pulvillus quite small.

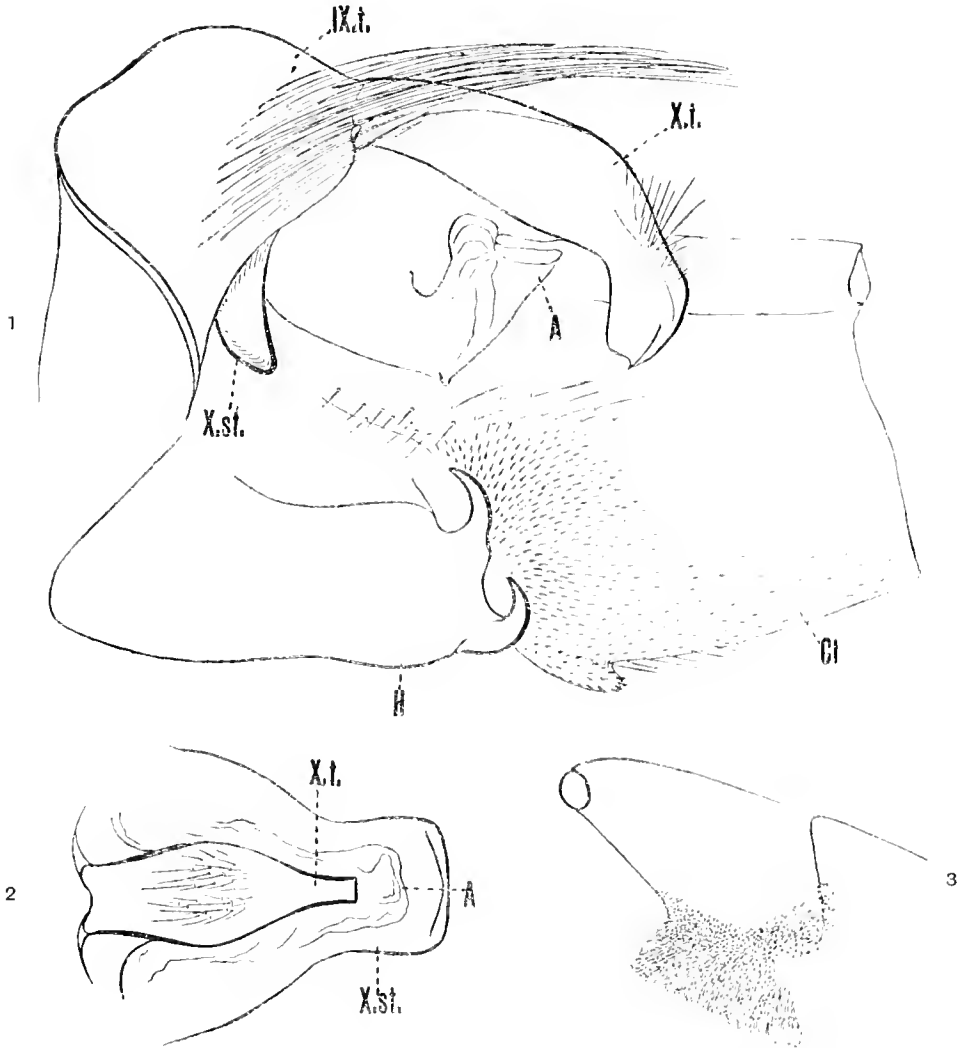
In colouring intermediate between *solani* and *fulvinoctua*. Face and anterior portion and sides of thorax (upperside) blackish brown irrorated with buff and grey hair-scales (centre of mesonotum rubbed, grey); metanotum on each side with black tuft edged with grey in front and buff behind, no pink tint as in *fulvinoctua*. First abdominal tergite for the greater part black, the other tergites dirty grey with indistinct blackish median line, second, third, and fourth segments with a yellow side-patch edged with black above and behind, the black subdorsal marking also present on the three following segments. Underside inclusive of first palpal segment white, base of second palpal segment buffish white, along eye a black line on first segment, continued on to second. Forecoxae with slight buff transverse band, legs brown, irrorated with white, the spurs, underside of the tarsi, and the apex of the hindtibia greyish white.

Forewing broader than in *fulvinoctua*; markings of *upperside* similar, but the ground-colour much more grey.—Hindwing blackish brown, with two indistinct blackish bands, anal area shaded with grey, basal area and four-fifths of the costal margin yellow, the yellow area not enclosing a black patch as in *fulvinoctua*.

*Underside*: Forewing washed with yellow along costal and inner margins, in outer half two indistinct deeper brown bands, the proximal one touching apex of cell.—Hindwing white at extreme base, almost white from base to anal angle, without a distinct yellow tone, a narrow deep brown median band outside cell more strongly marked than the discal band, which is very faint.

*Genitalia*: Anal tergite (tenth) in dorsal aspect (text-fig. 2, X. t.) elliptically widened before the apex, the latter narrow, truncate; in lateral aspect (text-fig. 1) the apex but slightly narrowed, curved downwards, truncate, with the upper angle produced as a small sharp tooth. Anal sternite (X. st.) truncate, with the angles

very strongly rounded and the apical margin not incurved. Clasper on outer surface with a patch of large, yellowish, multidentate, strongly striated scales; harpe (text-fig. 1, II) with two processes, which are both curved upwards, thorn-like, sharply pointed, the upper one being longer than the lower one; the inner



FIGS. 1-3.—*Coelonia brevis*.—IX.t. ninth tergite, X.t. tenth tergite, X.st. tenth sternite, A anus, Cl clasper, H harpe.

surface of the clasper bears a patch of short spines distally to the harpe, and in the apical area numerous long bristles pointing obliquely frontad.

Length of forewing : 39 mm.

Breadth of forewing : 17 mm.



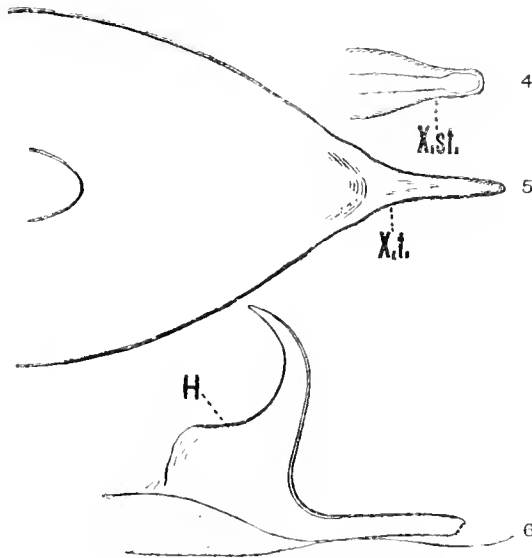
2. *Poliana leucomelas* sp. nov. (text-figs. 4, 5, 6 and Pl. 20. fig. 1).

♂. Corpore supra brunneo, albo-maculato, infra pro maxima parte albo, thorace sine linea nigra dorsali laterali. Alis anticis nigro- et albo-variegatis, area mediana costali nigrina in medio ad marginem exteriorem extensa; posticis nigro-brunneis, ad angulum analem et marginem abdominalem albo-signatis.

Long. al. ant. 66 mm.

*Hab.* Pnom Penh, Cambodia, 1 ♂ a dom. H. Donckier rec.

Nearest to *P. buchholzi* Plötz (1880), from W. Africa, larger, forewing more elongate, with the white area placed proximally to the black apical costal area larger and extended outward to the submarginal spots; behind this white patch the blackish median area, in which the white stigma is situated, is likewise produced to the outer-marginal black spots; the hindmarginal area of the forewing, moreover,



FIGS. 4-6.—*Poliana leucomelas*, genitalia.

is more extended white than in *buchholzi*. The genitalia are especially different in the harpe.

Scaling of antenna dark brown, grey at the base. Upperside of body dark brown, variegated with dispersed paler hair-scales; a white spot extends from before the antenna on each side of the head on to the pronotum; mesonotum without black lateral line, metanotum with a black double tuft edged with white and ochraceous; abdomen (rather worn) appears to bear two dorsal rows of white dots and at the sides a row of blackish patches partly edged with white. First segment of palpus and base of second greyish white. Breast white, brown near the wings, femora nearly quite white, also the hindtibia, midtibia brown with white ring in centre and at apex, tarsi brown, the segments tipped with white (forelegs missing, with the exception of one forefemur), fibial spur and underside of first hindtarsal segment white.

For pattern of forewing, *above*, cf. figure. Hindwing brown, fringe spotted

with white, costal margin buff as far as covered by forewing, abdominal margin for the larger part white, at anal angle a white patch divided by two blackish bars, at vein  $M^2$  a white submarginal diffuse spot.

The *underside* paler brown than the upper, with a slight purplish tint, white fringe-spots conspicuous, otherwise no distinct markings; forewing in outer half with three diffuse and very obscure darker brown bands, which, apparently, also run across the hindwing (this wing much abraded in our specimen).

Tenth tergite not divided longitudinally, ending in a slender pointed hook (text-fig. 5, X. f.); tenth sternite broader than the apical portion of the tergite, rounded at the tip (text-fig. 4, X. st., dorsal aspect), the sides being bent upwards, so that the sternite forms a channel. Clasper on the outer surface with a crest of elongate erect friction-scales which lean distad; harpe (text-fig. 6, II) very characteristic, being produced into two processes, one process being ventral and bearing some minute teeth at the tip, the other process directed upwards, being curved in sickle-shape and gradually narrowing to a sharp point. The penis-sheath, as in *P. buchholzi*, has no definite apical process as in *P. natalensis* Butl. (1875).

We received this interesting species from M. H. Dœnkier de Donzell, together with some Papilios and other true Oriental species, and have no reason to doubt that the specimen came from Cambodia.

### 3. *Libyoclanis major* sp. nov.

♀. *Clanis bicolor*, Rothschild & Jord., *Nor. Zool.* ix, Suppl. p. 219, no. 181 (1903) (partim).

♂ ♀. Major quam *L. bicolor* Roths. (1894) et *L. punctum* Roths. (1907); alis latioribus, anticis ut in *L. puncto* macula nigra subapicali costali notatis, margine exteriore convexo, posticis cinnamomeo-rufis.

Al. ant. long.: ♂ 50 mm., ♀ 61 mm.

„ „ lat.: ♂ 19 mm., ♀ 23 mm.

*Hab.* Sierra Leone, 1 ♂ in Mus. Oxon. (typus), 1 ♀ in Mus. Tring.

In the *Revision of the Sphingidae*, l.c., we placed the ♀ with *bicolor* Roths. (1894). The forewings of this specimen are rather worn, and do not well show the black subapical spot by which *major* and the two species mentioned below are distinguished from *bicolor*.

Head and thorax tawny olive, being slightly paler below than above; abdomen pale ochraceous buff.

Antennae slender and short, lateral and ventral outlines in ♂ almost straight, the segments being but very slightly dilated laterally above the side-groove and ventrally not incurved. One pair of spurs to hindtibia.

♂. Wings, *upper side*: Forewing clay-colour, paler than the thorax, shaded with purplish grey, in proximal half two parallel lines, the anterior one crossing cell at point of origin of lower median vein, the lines more oblique than in *bicolor*, in outer half an apical streak running into the disc as far as lower radial (vein 4), a diffuse double line from outside lower angle of cell to hindmargin and another farther distal, blackish brown like antemedian lines, continued to costal margin by diffuse clayish lines; marginal area shaded with purplish grey, except the posterior portion, which is cinnamon-colour; black subapical spot very distinct, with a cloud of purplish grey scales at its proximal side; cell measured from base to lower angle as long as upper median vein; distal margin concave below apex, then very distinctly convex.—Hindwing bright cinnamon-rufous, paler

distally, abdominal margin buff, distal margin somewhat convex in centre, cell shorter than lower radial.

*Underside* pale ochraceous buff, more buff than ochraceous, proximal half of forewing and abdominal margin of hindwing cinnamon-rufous, distal marginal area of forewing shaded with grey and fuscous, bordered by the very distinct oblique apical streak, apex with a fuscous costal cloud, both wings with two discal abbreviated lines.

♀ similar to ♂, markings of forewing *above* less distinct, probably owing to the inferior state of preservation of the specimen, outer margins of wings more convex, upperside of hindwing and the red colouring of the underside brighter rufous; rest of *underside* duller than in ♂, hindwing dirty pinkish buff, like underside of abdomen, the two discal lines nearly straight instead of being curved costally as in ♂.

*Genitalia* similar to those of *bicolor*. In ♂ the lobes of tenth tergite with the tip truncate, tenth sternite almost evenly rounded, being longest in the centre. Outline and armature of clasper as in *bicolor*, except that the apex of the harpe is less curved.—In ♀ both processes of the seventh sternite sharply pointed, the left process much broader than the one of the right side, but of about the same length.

#### 4. *Libyoclanis vicina* spec. nov.

♂ ♀. *L. puncto* Roths. (1907) similis, sed alis angustioribus, posticis margine exteriori parum concavo, antennis tenuioribus, segmento anali ventrali maris angusto rectangulatum truncato distinguenda.

Al. ant. long.: ♂ 35 mm., ♀ 39 mm.

„ „ lat.: ♂ 12 mm., ♀ 13.5 mm.

*Hab.* Cross R., Lower Niger (F. C. Martell), 1 ♂ (type), and Luluaburg, Congo, 1 ♀.

Antennae as in *L. major*, whereas in the ♂ of *punctum* (the ♀ is not yet known) each segment is laterally widened above the groove and ventrally incurved in the centre, the antennae of *punctum* being also longer and thicker. The shape of the wings is different, the wings of *vicina* being much narrower; cell in forewing distinctly, in hindwing a little longer than lower radial vein; distal margin of forewing longer and less convex than in *punctum*, the forewing also obviously narrower; distal margin of hindwing slightly but visibly incurved from apex to anal angle, not convex as in *punctum*.

Head, thorax, and base of abdomen above tawny in ♂, tawny-olive in ♀, the colouring in *punctum* being more buffish clay. Forewing rufescent clay-colour, with transverse lines similar to those of *L. major*, a double one in proximal half and three in outer half, the lines much darker and much more distinct in ♂ than in ♀, oblique apical streak to below second radial, marginal area shaded with fuscous and grey, subapical black-brown spot larger than in *punctum*.—Hindwing bright cinnamon-rufous, abdominal margin buff, as in the other species a diffuse fuscous marginal cloud in front of anal angle.

On *underside* the proximal half of forewing and abdominal margin of hindwing bright cinnamon-rufous, less pink than in *punctum*, rest of wings buffish clay, two abbreviated discal lines on both wings and a prominent apical oblique streak on forewing.

*Genitalia*: ♂, lobes of tenth tergite much narrower than in *punctum*, rotundate-

acuminate at the tips. Tenth sternite somewhat longer than it is broad apically, sides of the free portion parallel and the apex truncate, the angles being a little rounded off. Outline and armature of clasper as in *major*, the tip of the harpe slightly less spatuliform.—♀ : seventh sternite with two slender pointed lobes which are about equal in size.

### 5. *Isognathus rimosa molitor* subsp. nov.

*Isognathus rimosa rimosa* Rothschild & Jord., *Nor. Zool.* ix. Suppl. p. 358 (1903) (partim).

Corpore alisque anticis clarius griseo-albis et pronae faciei areis aurantiacis melius expressis ab *I. r. rimosa* facile distinguendus.

*Hab.* Haïti, type (♀) from Cape Haïtien.

In size equalling or surpassing large specimens of *rimosa* from Cuba. The upperside of the body and forewing purer greyish white. The mesothoracic patagia at most with a slight trace of a black longitudinal line. Forewing as in the palest ♀♀ of *rimosa*, in ♂ with the usual black discal streak. On *underside* the yellow areas of both the fore- and hindwing as distinct as in *I. rimosa inclitus* Edw. (1877), but slightly smaller, that of hindwing sharply defined, being distally bounded by a black band; rest of wings much more whitish grey than in Cuban specimens.

The ♂ and ♀ which we recorded (*l.c.*) from Cuba as *rimosa* came undoubtedly also from Haïti.

### 6. *Ampelophaga khasiana malayana* subsp. nov.

♀. Ab *A. khasiana* fascia postmediana brunnea alae anticae 5 mm. lata postice valde angustata distinguenda.

Al. ant. long.: 49 mm., lat. 20 mm.

*Hab.* Batang Padang valley, Perak, 1250 mm., September–October 1910 (E. Stresemann), 1 ♀.

The general tone of colouring as in *A. k. khasiana* Roths. (1894): upperside of abdomen paler from the third segment (discoloured?). Wings broader than in *khasiana*; forewing with the same number of chestnut bands, but the antemedian band perceptibly broader at the costal margin, and the postmedian one much broader from the costal margin to below the rather strong elbow, thence gradually narrowed, the fourth band thinner than in *khasiana*, undulated, its posterior two-thirds less distinct than the costal third, which gives the wing the appearance of having the oblique apical line continued straight to hindmargin.

### 7. *Maassenia heydeni comorana* subsp. nov.

♂. Minor quam *M. h. heydeni*, macula argentea interiore guttiformi majore.

Al. ant. long.: 30 mm.

*Hab.* Grande Comoro, September 1911 (C. F. Leigh), 1 ♂.

The dark chestnut band which runs on the forewing, *above*, from the costal margin to the hind-angle better defined than in the specimens from Madagascar, the silvery dot which is placed proximally to the lower cell-angle larger, and the proximal three-fourths of the hindwing slightly more greyish. Genitalia as in *M. h. heydeni*, but the apex of the penis-sheath truncate, not triangularly produced as in the only ♂ of *heydeni* examined.

8. *Panacra busiris marina* subsp. nov.

♂ ♀. Regione mediana alarum anticarum minus extensa et minus clare viridi ab *P. b. busiri* distinguenda.

Long. al. ant. : 30-32 mm.

*Hab.* Andaman Is., 2 ♂♂ and 2 ♀♀.

Similar in size to small specimens of *P. b. busiris* Walk. (1856), the forewing less strongly angulate at the distal margin and the upperside of head and thorax, as well as the median area of the forewing duller green, the median area also smaller, especially the narrow posterior portion, the broad costal portion much shaded with olive-black at the double line which bounds the green area distally; outer half of forewing also much more fuscous than in *P. b. busiris*. On the *underside* the basal area of the hindwing is less distinctly green than in *P. b. busiris* and contrasts less with the disc.

We also place here a much-damaged specimen which we have from the Nicobars.

9. *Temnora leighi* spec. nov.

♂. *T. fumosae* similis, magis griseus; subtus pallida, ala postica macula nigra pone cellulam sita notata.

*Hab.* Comoro Islands: larva found on Mayotte, emerged July 10, 1911, and Anjonan (type) July 15, 1911 (G. F. Leigh): 2 ♂♂.

Drab grey shaded with a clayish tone, centre of occiput and of thorax brown; below somewhat paler than above, palpi and anterior surface of foretibia whitish grey, a narrow line along eye on first palpal segment brown, widening into a patch on second segment.

Antenna slightly thicker than in *T. fumosa* Walk. (1856), scaling clayish grey mixed with brown, entirely brown on hook.

Wings as broad as in *T. fumosa peckoceri* Butl. (1877), apex of the forewing more produced, outer margin less convex below sinus; markings as in *fumosa peckoceri* ♂, but both wings paler, forewing greyer, antemedian band more curved, marginal and submarginal markings below apex less distinct.

*Underside* pale clayish shaded with drab grey, especially at distal margin; forewing black, or blackish brown, from base to disc; hindwing particularly more grey than in the forms of *fumosa*, the median band terminating below apex of cell with a black prominent spot, submarginal black dots small but distinct.

Claasper with three large friction-scales; harpe broader than in *T. fumosa*, truncate, not aciculate. Penis-sheath as in *T. fumosa* inside with a dense bundle of long stiff bristles. Tenth segment similar to that of *T. fumosa*.

10. *Macroglossum lepidum* sp. nov. (Pl. XX. fig. 5).

♂. *M. fruhstorferi* Huwe (1895) statura et colore subsimilis. Abdomine lateribus albo-penicillato, palpis subtus, sternis atque segmentorum duorum anticorum abdominalium macula mediana albo-griseis. Ala antica supra lincola discocellulari et linea margini exteriori parallela postice rectangulatum fracta albo-griseis notata; ala postica flava, basi extrema et fascia lata marginali brunneis.

Long. al. ant. : 19 mm.

*Hab.* Nias, 1 ♂.

Body olivaceous mummy-brown *above*, shaded in places with walnut-brown, the hair-scales on head and thorax tipped with grey, mesonotum with grey oblique stripe on the sides, abdomen with a double row of dark brown dorsal patches, on segments ii, iii and iv an orange-yellow side-patch, the first and third patch being smaller than the second and more transverse, the lateral tufts tipped with white, anal fan entirely brown. On the *underside* the palpi, central area of breast and a large patch on the first three abdominal sternites grey, an indication of a grey spot also at base of the next sternites, rest of abdomen mummy-brown with a tint of walnut, much less brightly coloured than in *M. fruhstorferi*; fore- and midtibiae and -tarsi buffish grey, hindleg brown, tuft of hindtibia hazel.

Wings, *upperside*: Forewing sepia-brown, an antemedian black band partly filled in with sepia-colour, widest at hindmargin, reaching costa proximally to apex of cell, basal area below cell with a streak of grey-tipped long scales from base to antemedian band; a grey discocellular transverse spot followed at hindmargin by a grey triangular spot, outside this interrupted band two black lines, incurved in centre, excurved below costa, parallel up to  $M^1$ , then diverging and from  $R^1$  converging, the outer line more strongly excurved at  $R^1$  than the inner and in front of this vein exteriorly bordered with grey, between these lines and distal margin, and almost parallel with them, a grey line which is slightly broken (not interrupted) at  $R^1$  and forms a right angle between the median veins, reaching the hindmargin  $1\frac{1}{2}$  mm. from distal edge, and costal margin  $4\frac{1}{2}$  mm. from apex, outside this grey line and partly fused with it another grey line commencing at  $R^1$  and disappearing before reaching hindmargin, costally to this line, *i.e.* in front of  $R^1$ , a deep brown patch preceded in front of  $SC^5$  by a diffuse chestnut patch, at apex the usual dark angle slightly outlined in grey, veins  $R^1$  and  $SC^5$  partly streaked with grey.—Hindwing orange-yellow, the extreme base and a sharply defined marginal band deep chestnut-brown, the band 4 mm. broad in centre, from below costal margin to below  $M^2$  of nearly even width, then suddenly narrowed, being only  $1\frac{1}{2}$  mm. broad at anal angle, fringe of abdominal margin brown.

*Underside*: Ground-colour a pale dull chestnut, shaded over with tawny-olive, much less bright than in *M. fruhstorferi*, distal marginal band deeper brown, extreme base of wings pale yellow, hindwing with orange-yellow elongate patch before hindmargin, extending to base, but not to margins.

Tenth abdominal (= anal) tergite gradually narrowed distally, with the tip truncate-rotundate; sternite spatulate, broader than the tergite, slightly acuminate, with the edges minutely serrate. Clasper without friction-scales; harpe very slender, almost cylindrical from near base to near apex, the tip deeper brown, narrower, curved upwards, slightly spatulate, no teeth, but before the curved-up apical portion a slight ventral hump bearing some bristles. Penis-sheath nearly as in *M. calescens* Butl. (1882), the apical process horizontal, very long, ending in a long thin whip; this process, which encircles three-fourths of the penis-sheath, bears some teeth at the ventral edge of the wide basal half, and there is a patch of teeth on the penis-sheath proximally to the base of the process; apical edge of sheath not produced into a lobe opposite the base of the process; inside the sheath one (?) rod only, which is obtuse.

The specimen also resembles *M. calescens* Butl. (1882), and *M. castaneum* R. & J. (1903), but is easily recognised by the more prominent grey markings on the upperside of the forewing and the grey patches on the underside of the abdomen.

11. *Gurelca montana* sp. nov. (text-fig. 7).

♂. *G. masuriensis* similis, corpore grisescente, alis anticis angustioribus, apicem versus linea transversa a margine costali ad rannum primum medianum usque extensa recta nigra atque quinque maculis marginalibus nigris acute triangularibus notatis, alis posticis subtus luteo-griseis, margine externo late fusco.

Long. al. ant. : 19.5 mm. ; lat. 7.3 mm.

*Hab.* Tibet, without more definite locality, received from Monsieur E. Le Moht.

Body much worn, apparently without any fawny and golden markings, but beneath with traces of clayish spots (faded?); the scaling which is left is grey, much mixed with black, palpi also without fawny.

Wings longer and narrower than in *M. masuriensis* Butl. (1875); *upperside* : ground-colour of forewing darker brown than in *masur. masuriensis*, but the grey shading more extended, giving the wing a more silky appearance, the grey scales remain dark in the centre, only the tips, or the tips and lateral edges, being grey; the grey discocellular bar accompanied on both sides by a black spot, the proximal



FIG. 7. *Gurelca montana*.

one of these black spots bordered by a grey half-moon, of which the horns join the grey discocellular bar, no fawny tone, about at two-thirds from apex of cell to outer margin a straight black line runs from costal margin to beyond  $M^1$  at right angles to the veins, at margin from apex to  $M^2$  fine blackish brown, elongate, acutely triangular spots edged with black and accompanied by a grey zigzag line, the upper spot small, apex of wing less pointed than in *masuriensis*, margin dentate also at  $M^2$ .—Hindwing almost as in *masuriensis*, greyish at abdominal margin; proximally to marginal band, posteriorly, traces of a separate black line.

*Underside* black-brown, with an obscure chocolate tint on forewing, a costal subapical spot and a straight but irregularly defined line before hind-angle up to  $M^1$  creamy-grey.—Hindwing creamy grey, outer area purplish black, broad anteriorly, narrow posteriorly, accompanied by short transverse black striae, costal lobe black, a line of the same colour runs from this lobe across lower angle of cell to submedian fold.

*Genitalia* similar to those of *G. masuriensis*; the tenth tergite and sternite narrower, particularly the sternite, the sides of which are almost parallel. Upper edge of harpe as in *masuriensis* excised at the apex, the apical tooth slightly longer than in *masuriensis*. Penis-sheath (text-fig. 7) different: the apical process

compressed, ascending in a spiral making three-quarters of a coil, the base of the process triangularly dilated proximad, then thin to two-fifths, rest broad and denticulate at both edges, the apex narrowing again.

12. *Celerio calida hawaiiensis* subsp. nov.

*Deilephila calida* Rothschild (nec Butler, 1881, err. determ.), *Nor. Zool.* ii. tab. 9, fig. 1, ♀ (1895); id. & Jord., *l.c.* ix. Suppl. p. 715, no. 672 (1903) (partim; Hawaii).

Alis posticis rufis dnabns fasciis una media abbreviata altera marginali completa nigris ornatis.

*Hab.* Hawaii, Sandwich Islands, 1 ♂ and 1 ♀ (type) in the Tring Museum, the ♀ from Mauna Kea, and 1 ♀ in the British Museum, bred by R. C. L. Perkins at Kan.

Whereas in true *calida*, from the islands of Oahu and Molokai, the upperside of the hindwing is black with a rufous discal band which does not quite reach the abdominal edge of the wing, the specimens from Hawaii have the hindwing for the greater part rufous, the extreme base, an abbreviated median band, and the distal border being black. This black median band is variable in width, and anteriorly more or less extended basad; the black sealing at the base is also variable in extent, being much more obvious in the type than in the specimen bred by Mr. Perkins.

The two specimens in the Tring Museum are not very well preserved; the body is somewhat worn, which accounts for the underside of the abdomen being for the greater part blackish instead of nearly uniformly rufous.

13. *Hippotion commatum* spec. nov. (Pl. XX. fig. 3).

♂. *H. veloci* simillimum, abdominis linea geminata dorsali magis distincta et lineolis lateralibus griseo-albis band obliquis, alis anticis pallide cinnamomeo suffusis, linea griseo-alba valde conspicua basin versus longiore; punctis marginalibus multo minoribus.

Al. ant. long.: ♂ 37-38 mm.

*Hab.* Rook Island, near New Guinea, July 1912 (A. S. Meek), 4 ♂♂.

Head, thorax above and below, underside of both wings, and upperside of forewing and abdomen, suffused with pale cinnamon. The lines on the body and forewing more sharply defined than in *H. veloci* F. (1793). Abdomen above and at the sides longitudinally pencilled with olivaceous black, with a single lateral line of greyish white elongate spots which are parallel to the dorsal line, not oblique.

Wings, *upperside*. Forewing: distal margin less angulate at second radial vein than in *velox*, the fringe-dots quite small, the greyish white line which divides the wing into a larger and darker costal area and a smaller and paler distal and posterior area more oblique and, on the distal side, more sharply defined: the line does not reach the hindmargin, but ends in front of it 4 mm. from base at an olivaceous black basal patch; the costal area similarly marked as in *velox*, subbasal black streak in cell prominent, farther distad another streak placed below the cell, discocellular dot very small. In distal area the following olive-black lines: a double line along main greyish white line, thin, but continuous; farther distally a much more prominent line, thicker, also continuous: these three lines parallel with the greyish white one and extending like this much nearer to the base than in *velox*, the proximal portion of the lines being almost parallel to the hindmargin. The



submarginal line, which is accentuated by vein-dots in *celox*, is continuous and not accentuated; between it and the preceding line a broad diffuse line widened posteriorly into a black spot or triangular patch.—Hindwing olive-black, with a very faint pale submarginal band, fringe pale, slightly darkened at the vein-ends.

*Underside* similar to that of *celox*, apart from the more yellowish colour of the ground; both wings with two lines in outer half, the distal line consisting of vein-dots, which are either separated or joined together.

*Genitalia* (only the type examined): Tenth tergite as in *celox*, but tenth sternite less pointed; harpe shorter than in *celox*, the free distal portion triangular; penis-sheath with four teeth on one side and one on the other.

## SOME NEW *SPHINGIDAE* IN THE COLLECTION OF THE BRITISH MUSEUM.

By LORD ROTHCHILD, PH.D., F.R.S., AND K. JORDAN, PH.D.

(Plate XX. figs. 4, 6).

### 1. *Amplypterus gannascus jamaicensis* subsp. nov.

♀. Ab. *A. g. gannasco* maculis nigris paginae inferioris plus minus obsolescentibus distinguendus.

Long. al. ant.: 62 mm.

*Hab.* Jamaica (Dr. Jackson), 1 ♀.

A large broad-winged specimen; *upperside* of body and forewing a greyish vinaceous cinnamon; subbasal band of forewing broad. The black bands of the hindwing narrow, the proximal one 6 mm. distant from the apex of the cell, *i.e.* more distal than in *A. g. gannascus* Stoll (1790), being partly shaded with red, 2 mm. broad in centre and slightly narrowed at both ends, second band a continuous separate line, subdentate on the veins, third band represented by spots on the veins, first three spots arrowhead-shaped, pointing proximad, and not quite isolated from one another, fourth spot a small dash on the vein, fringe of distal margin paler than in *gannascus*.

*Underside*: tawny ochraceous with a slight vinaceous tint; the black spots of the forewing obsolescent, the rounded discocellular spot being more distinct than the others; the grey marginal area broader in centre than in *gannascus*; the markings in the outer half of both wings vestigial, no distinct anal spot.

### 2. *Isognathus rimosa jamaicensis* subsp. nov.

♀. Alis anticis supra griseis sparsim nigro irroratis et maculatis, limbo nigro alarum posticarum lato, macula anali grisea fere absque lineolis transversis nigris. Alis subtus cum corpore fusco-brunneis, sparsim griscentibus, posticarum macula aurantiaca magna bene expressa.

Long. al. ant.: 51 mm.

*Hab.* Jamaica (Dr. Jackson), 1 ♀.

*Upperside* of body and forewing grey, with a faint pinkish tint which is particularly obvious if the specimen is held side by side with a specimen of *I. r. molitor* R. & J. (1915) from Haïti; \* pronotum, the central stripe on the

\* Cf. p. 286 of the present volume.

mesonotum and a short line on the patagia black; abdomen black, the middle stripe and the edges of the segments grey, sharply defined and not broader than in *I. r. rimosa*, from Cuba, on last segment the black more extended than the grey colouring; underside of abdomen greyish ochraceous buff.

Forewing, *above*, with only the costal portion of the lines distinct, the lines in outer half of wing indicated by dots on the veins, in between the veins more or less distinct thin black streaks which do not quite reach the fringe-spots, the extremities being the most distinct portion of the streaks, below the apex a blackish marginal spot followed by a larger submarginal spot, on the proximal side of which an angle-shaped spot is placed.—The border of the hindwing  $8\frac{1}{2}$  mm. broad in centre, bearing a large grey anal spot in which the usual two black bars are but faintly indicated, the black edge of anal margin very distinct, the orange colour of both the upperside and under of a deeper tint than in the other *rimosa*-forms.

*Underside* drab, much darker than in *I. r. rimosa*, *inclitus* and *molitor*, without transverse lines; on forewing two costal spots in outer half, a terraced oblique band from apex to upper radial, consisting of three contiguous spots, and a diffuse submarginal band from hindmargin some distance forward brownish black, basal area below cell orange.—Hindwing orange from centre of cell to abdominal margin, this area well defined, rest of wing like forewing slightly shaded with grey.

Nearest to *I. r. molitor* R. & J. (1915), from Haiti, but the latter is much more greyish white, particularly beneath, has more extended markings on the forewing above, and a distinct double bar in the grey anal patch of the hindwing; moreover, the yellow colour of the hindwing is paler in *molitor*, and, on the underside, just enters the cell instead of occupying more than half of it.

### 3. *Panacra busiris atima* subsp. nov.

♀. *Magis fuscata quam P. b. busiris* Walk. (1856), partibus viridibus sordidioribus ac in ala antea minoribus, alis posticis subtus ferrugineo marginatis.

Long. al. ant.: 34 mm.

*Hab.* Karwar, South India, rainy season, 1896 (T. R. Bell), 1 ♀.

Agrees best with the specimens from the Andamans, *P. b. marina* R. & J. (1915). The thorax and median area of the forewing are much less green than in *P. b. busiris*, the median area, moreover, is smaller and exteriorly much shaded with black-brown, the two oblique lines which bound this area on the outer side are farther apart, and the lines placed in *busiris* before the hindmargin outside that double line are represented by irregular black speckles, submarginal line slightly crenate.

On *underside* the outer area of the forewing ferruginous, brighter and more unicolorous than in *busiris*, also better defined and slightly narrower, the pale streak situated at the costal edge of this area proximally to the line of blackish dots very small. Distal marginal area of hindwing deep ferruginous, with a conspicuous grey submarginal band from near costal margin to near middle, continued by a greyish line, disc and abdominal area marked with ferruginous.

### 4. *Macroglossum oceanicum* spec. nov.

♀. *M. corytho* colore subsimilis, alarum anticarum apice obtusiore atque margine externo convexiore, posticis subtus aurantiaco suffusis, palpis subtus albo-griseis, abdomine aurantiaco-trimaculato, subtus luteo-griseo, versus latera plus minus fuscobrunneo, penicillo anali unicolore apice insensim pallidiore.

Long. al. ant.: 20 et 28 mm.

*Hab.* Ile Anglaise, Chagos I., Salomon Islands, Indian Ocean, June 29, 1905 (T. B. Fletcher), 1 ♀ (type), and Chagos Is. (J. S. Gardiner), 1 ♀.

*Upperside* of body and forewing Prout's brown (Ridgway, *Nomencl. Colours*, pl. 3. no. 11) shaded with drab, tail slightly darker, nearly burnt umber colour like the marginal band of the hindwing; abdomen with three moderately large orange-yellow side-patches, lateral tufts of segments 3 and 4 tipped with white, the white pencil of the fourth segment particularly distinct. Palpi below greyish white, breast and centre of abdominal segments grey, sides of venter diffusely dark brown, in large specimen the venter somewhat worn, creamy-buff shaded with tawny.

The general coloration of the *upperside* of the wings similar to that of *M. corythus* Walk. (1856), but the shape of the forewing differs, the apex being more obtuse and the distal margin more convex; moreover, the drab shading is not quite the same in the outer half of the wing: the brown submarginal band continuous from costal to hinder margin, broadest costally and gradually narrowing, being posteriorly scarcely half as wide as costally, outside this band the marginal area shaded with drab continuously from apex to hinder angle; none of the markings prominent.—On hindwing the yellow band sharply defined, continued to base in costal half and to apex at costal margin, in centre two-thirds the width of the marginal border.

*Underside* paler than in *M. corythus*; forewing Mars brown (Ridgway, *Nomencl. Colours*, pl. 3. no. 13) shaded with drab, cell and area surrounding it slightly darker, extreme base yellowish, on disc a vestige of a line.—Hindwing somewhat brighter brown than forewing, suffused with orange-yellow except outer margin, abdominal area pure orange-yellow with the exception of a narrow abdominal edge and a broader anal border, this orange-yellow patch not strongly contrasting with the rest of the wing on account of the orange-yellow suffusion of the latter.

The small specimen (type) collected by T. B. Fletcher has the appearance of being bred, which would account for its small size as compared with the large and somewhat worn specimen obtained by J. S. Gardiner.

##### 5. *Hippotion aurora gloriosana* subsp. nov. (Pl. XX. fig. 4).

♂. Minor quam *H. a. aurora* R. & J. (1903), alarum anticarum margine externo brevior et linea submarginali magis conspicua.

Long. al. ant. 31–32 mm., marg. ext. 15½–16 mm., lat. 11½–12 mm.

*Hab.* Gloriosa Island, N.W. of Madagascar, March 10, 1906 (Meade-Waldo), 2 ♂♂.

The oblique double line which joins the black basal patch is rather less prominent than in *H. a. aurora* from Madagascar, while the subbasal line is deeper olivaceous black. The hindwing is a trifle paler red, and the black submarginal band a little narrower. On the *underside* both wings have a row of vein-dots in the clayish buff area, but no lines.

The outer margin of the forewing is appreciably shorter than in *H. a. aurora*, and slightly more angulate before the centre at R<sup>2</sup>.

##### 6. *Hippotion aurora delicata* subsp. nov.

♂. Praecedenti similis, pallidior, alarum anticarum lineis una submarginali altera abbreviata obliqua apicali conspicuis, fascia rosacea submarginali alarum posticarum ad marginem costalem usque continuata.

*Hab.* Farquhar Island, N.E. of Madagascar, October 17, 1905 (T. B. Fletcher), 1 ♂.

The body is clayish buff on the upperside and creamy buff beneath; the central line on the patagia not very prominent. Forewing, *above*, paler than in the other two races of *aurora*, the oblique double line which reaches hindmargin 4 mm. from base less conspicuous; the oblique, abbreviated, apical line on the contrary very conspicuous, being as prominent as the submarginal line.—The black colouring of the hindwing more restricted, the red submarginal band continued to subcostal vein, and the pale marginal band reaching apex, only becoming narrower just below apex.

*Underside* pale ochraceous buff with a slight pink tone. The proximal half of forewing slightly shaded with fuscous, the marginal band quite indistinct, paler than the disc, anteriorly bordered by a brownish oblique line extending from the apex.—Hindwing uniform in colour, paler at abdominal margin, with hardly a trace of a marginal band.

The specimen is much injured, but the scaling of the body and what is left of the wings does not appear to have suffered.

7. *Thereetra orpheus scotinus* subsp. nov. (Pl. XX. fig. 6).

♂. Alis supra et subtus multo magis fusciscentibus quam in *Th. o. orpheo*, fascia pallida alarum anticarum obliqua postice solum albescente.

*Hab.* Hlesha, South Nigeria (Capt. L. E. H. Humfrey), 3 ♂♂.

The whole insect, with the exception of the underside of the body, of a much darker, blackish tint than the other known African races, agreeing on the upperside in facies best with *intensa* R. & J. (1903), from Grande Comoro. The pale band of the forewing which runs from the middle of the hindmargin towards the apex is posteriorly whitish grey for about 3 mm., but otherwise smoke-colour, like the greater portion of the area outside this band; the median costal area shows a very slight tawny tint.

The lines on the *underside* less prominent than in *o. orpheus* on account of the dark general colouring, the outer line of the forewing accompanied on outer side by a creamy buff band from hindmargin to centre, costal margin narrowly ochraceous buff, turning into grey at apex.—Hindwing blackish, costal margin buffish grey, abdominal area and an anteriorly abbreviated submarginal line grey.

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NEW EXOTIC *ZYGAENIDAE* IN THE TRING MUSEUM.

By DR. K. JORDAN.

1. *Eusphalera satisbonensis* spec. nov.

♂ ♀. Variabilis, *E. semiflavæ* Jord. (1904) vicina, abdomine supra flavo, capite et thorace et ventre nigro-cyaneis.

Al. ant. long.: 20–24 mm.

*Hab.* Goodenough I., d'Entrecasteaux Islands, March—May 1913, 2500–4000 ft. (A. S. Meek), a series of both sexes.

Agrees in the yellow upper surface of the abdomen most nearly with *E. lutescens* B.-Bak. (1908), but in the latter species the underside of the abdomen is creamy or pale straw-colour.

The species is very variable, both sexually and within each sex.

♂. Body black, with a cyaneous gloss, upper surface of abdomen yellow with the exception of segments 1 and 8, the former often having a yellow spot at the apex. Sometimes the yellow area of the abdomen suffused with black. According to the wing-markings we group the specimens as follows:

(a) **f. satisbonensis**.—Forewing, *above*, basal two-thirds orange-yellow or yellow, extreme base, costal edge, hindmargin and apical third dull black, with a faint purplish sheen on the veins and the fringe in certain lights, and sometimes traces of metallic subapical spots. Hindwing somewhat paler yellow or orange than forewing, costal and distal margins broadly bordered with black, the distal border slightly dentate at the veins, extreme base likewise black.—*Underside*: the yellow areas paler than above, base of forewing suffused with black in front of hindmargin almost to outer edge of yellow patch. Marginal border of hindwing with more or less distinct blue submarginal spots.

The yellow area of the forewing *above* sometimes invaded by black from the hindmargin. On *underside* the hindwing in some specimens with black longitudinal streak.

(b) **f. plagiata** nov.—Forewing, *above*, with bi- or tripartite orange subbasal spot and orange-yellow patch at end of cell more or less distinctly invading the disc proximally to lower angle of cell, the tint variable, but the basal spot deeper coloured than the patch. Hindwing as before.—*Underside*: patch of forewing replaced by a more or less abbreviated and strongly tapering band. Hindwing as before.

In one of the specimens the basal spot is enlarged and, moreover, connected below costa with the median patch; the latter is continued by some spots forming a narrow diffuse band directed towards hind angle. Transition towards form (a).

(c) **f. fasciata** nov.—Like (b), but the median patch replaced by a well-defined oblique band, which does not quite reach hind angle and is broadest anteriorly.

The genitalia of these three forms are alike. They are characterised by the clasper bearing a large tooth as in *E. semiflava*, and having the tip of the long slender apical process somewhat broadened, recurved and excavated.

♀. This sex appears in two forms, which are not connected by intergradations. The metallic markings are more conspicuous than in the ♂, at least below, the first

abdominal tergite and the sides of the second are velvety black, the extreme tip of the last tergite also black.

(d) *f. satisbonensis*.—Forewing as in ♂ *above* and *below*, but proximal black area of underside less extended. Hindwing black, with a central and an abdominal diffuse yellow patch; on *underside* the central patch less and the abdominal one more distinct.

(e) *f. fasciata*.—Forewing without subbasal spot, band orange red, reaching hind angle, posteriorly at least as broad as at costa, usually somewhat widened at both ends. Hindwing black, with broad yellow or orange-yellow central band from abdominal margin to beyond central fold of cell. This form bears some resemblance to several species of *Milionia* (Geometridae), *fi. M. callimorpha* Oberth. (1880) and the ♀ of *grandis* Druce (1882).

## 2. *Eusphalera casta* spec. nov.

♀. Nigro-cyanea, abdomine macula apicali sulphurea notato; alis nigris, anticis fascia alba mediana cyaneo marginata et altera angusta submarginali cyanea ornatis; posticis a basi ad angulum analem usque purpureo-cyaneis, macula submarginali luniformi aurantiaca. Subtus magis cyanea, alis posticis macula aurantiaca minore, fascia cyanea admarginali antice puncto grosso albo signata.

Al. ant. long: 24 mm.

Hab. Mt. Goliath, Dutch South New Guinea, 5000 ft., March 1911 (A. S. Meek), 1 ♀.

Near *Eusphalera splendens* B.-Bak. (1908), of which also only the ♀ is known. But in *splendens* the abdomen is pale grey above, and the hindwing, which has a large white patch, lacks the orange patch of *casta*. Possibly *E. splendens* is the ♀ of *E. bicolora* B.-Bak. (1908), which has a white band on the forewing and a large white patch on the hindwing.

Body and wings of *casta* velvety black. Body with a cyaneous gloss, on posterior half of abdomen the metallic colour less prominent and more green, seventh tergite with a sulphur-yellow patch. Frons anteriorly grey at each side.

*Upperside* of wings: forewing with white band proximally to apex of cell, 3 mm. broad in front, slightly narrower behind, crossing cell proximally to apex, the point of origin of lower median vein being situated in centre of band, outer edge of band  $2\frac{1}{2}$  mm. from extremity of second submedian vein, base, costal margin, edges of band and a narrow, submaular, submarginal band cyaneous.—Hindwing glossy blue from base to anal angle and to base of upper median vein (vein 3), somewhat purple, an orange, curved, comma-shaped spot from apex of cell towards extremity of lower median, widest anteriorly (about  $1\frac{1}{2}$  mm.), gradually fading away posteriorly.

*Underside*: forewing nearly as above, basal area shaded with purplish blue, and blue submarginal band more prominent.—Hindwing purplish blue, a large curved discal patch black, extending from costal vein across apex of cell to tip of second submedian, and bearing a small, diffuse, oblique, orange patch outside lower angle of cell and just entering apex of cell, close to distal margin a cyaneous line connected at costa with proximal blue area, in this line a white spot at apex of wing followed by vestiges of two smaller white spots.

This species recalls to some extent the species of *Eucorma*, particularly *E. intercesa* Walk. (1854), from Java, apart from the band on the forewing being white in *casta* and orange in *E. intercesa*.

**Clematoessa** gen. nov.

♀. Lingua brevis debilis; antenna apice acuta, ramis brevibus, fere non clavatis; alarum antecarum subcostales 3<sup>ia</sup>–5<sup>a</sup> et radialis 1<sup>a</sup> petiolatae, radiales 2<sup>a</sup> et 3<sup>ia</sup> separatae; posticarum radiales 2<sup>a</sup> et 3<sup>ia</sup> inter se valde distantes.—Genotypus: *Cl. xuthomelas* spec. nov.

Near *Eusphalera* Jord. (1907) and *Herpolasia* Jord. (1907), but easily recognised by the venuration.

Tongue quite weak and short. Palpus small. Antenna pointed, the branches about twice as long as the shaft is thick, their tips very slightly incrassate, branches of distal segments gradually shorter. Spines of tarsi short and few in number, sole of fifth tarsal segment at the most with a pair of weak apical spines, but with numerous curved, obtuse, sensory bristles.

*Venuration*: In forewing subcostal 1 anastomosing with costa, 2 free, 3 and 4 on a long stalk; from this stalk 5 and radial 1 branch off near cell either from a point or very shortly stalked, radials 2 and 3 separate, the cross-vein between them transverse, forming right angles with the veins, more than half the length of next cross-vein, which appears as a prolongation of the median nervure. In hindwing subcostal and radial 1 near together from upper angle of cell, but separate; radial 2 much nearer to radial 1 than to 3, cross-vein between radials 2 and 3 weak and about twice as long as the cross-vein between radial 3 and median 1.

**3. Clematoessa xuthomelas** spec. nov.

♀. Nigra, capite thoraceque cyaneo, alis anticis signatura anguliformi a basi ultra apicem cellulae atque inde in forma fasciae ad angulum posticum continuata, in cellula macula transversa parva nigra notata ornatis; posticis macula sulphurea subanali marginali signatis.

Al. ant. long.: 25 mm.

„ „ lat.: 13 „

*Hab.* Near Oetakwa R., Dutch South New Guinea, 3500 ft., October–December 1910 (A. S. Meek), 1 ♀.

Dull black, head, thorax, breast and some scaling on the femora more or less glossy cyaneous, edges of abdominal segments slightly glossy green, especially on the underside.

*Wings, upper side*: forewing with an orange band which runs from close to base to beyond apex of cell, occupying the whole cell and extending close to costal margin, and thence to hind angle, thus separating a large black hindmarginal area from the black apex, the distal edge of the orange band oblique, almost at right angles to costa, slightly irregular, the band a little widened at hind angle, in cell about 4 mm. from apex a black bar, extreme base of wing black, with blue scaling, apex of wing obtuse.—Hindwing with apex and distal margin strongly rounded, before anal angle a sulphur-yellow, somewhat diffuse, marginal patch, the fringe remaining black.

*Underside* similar to upper; forewing with blue scales on black cell-spot, and a subcostal patch of blue scales outside orange band, the latter paler than above, almost ochreous at hind angle.—Hindwing with a few blue scales in cell and near apex, subanal patch as above.

4. *Arniocera guttulosa* spec. nov.

♂ ♀. *A. auriguttata* Hopff. (1857) similis, alis anticis 12-14 guttis pallide anreis notatis diversa.

*Hab.* Harar, Abyssinia (E. Kristensen), 1 ♂ and 2 ♀ ♀.

In coloration of body and legs closely agreeing with *A. auriguttata* Hopff. (1857). The spots of the forewing more numerous and paler, distributed as follows: two in cell, two or three between cell and apex, one between third radial and first median veins, two between the median veins, four in front of submedian vein, and two or three at hindmargin: the proximal spots pale metallic golden, the distal ones cream-colour. In ♂ the hindwing with a creamy tear-shaped spot below the cell (type).

5. *Arniocera elata* spec. nov.

♂ ♀. Viridi-cyanea, capite, palpis, coxis anticis atque omnibus tibiis rubris; multo major quam *A. auriguttata* Hopff. (1857); alis anticis nigris viridi-cyaneo signatis, quatuor maculis anreis ornatis (1, 2, 1), quarum prima et quarta magnae; posticis cyaneis.

Al. ant. long: ♂ 18 mm., ♀ 20 mm.

*Hab.* Manow, German East Africa, 1 ♂ and 2 ♀ ♀, received from Messrs. Staudinger & Bang-Haas.

Much larger than *A. auriguttata* Hopff. (1857), with which it agrees in the general style of colouring. Head, palpi, forecoxae, all the tibiae and in ♂ also the tip of the abdomen (tip of 8th segment), in ♀ a trace of a red anal spot a brilliant carmine, a spot on the frons, the third segment of the palpi, and the bases and apices of the tibiae black.

Wings, *upper side*: forewing narrower in proportion to its length than in *A. auriguttata*, with four glossy golden spots, all edged with metallic blue, two of them placed before the hindmargin, the first large, connected with costa by a metallic blue bar, another metallic blue costal spot close to base large; second golden spot beyond middle, rounded, much smaller than the first; in one of our two ♀ ♀ the two connected on the left wing; third golden spot in cell proximally to apex, its metallic edging extended to costa, between this spot and the first a metallic blue costal spot; fourth golden spot 1-2 mm. outside apex of cell, transverse, extending from below costa to below  $R^3$  (in ♂) or  $M^1$  (in ♀ ♀); distal marginal area more or less shaded with metallic blue.—Hindwing glossy blue, in ♂ marked with blue-black in proximal half and on disc, a metallic band from anal angle forward and a subapical spot being more glossy in ♂ than rest of hindwing.

*Underside* purplish-blue in ♂, the forewing particularly dark purple, in ♀ greenish blue; forewing with the cell-spot and discal one as above, but not glossy.

Subcostals 4 and 5 of forewing on a long stalk, which is longer than the branches.

In ♂ the radiating hairs of the hindtibia dark brown, not creamy-white as in *A. auriguttata*. Anal claspers of ♂ pale yellow.

6. *Arniocera elegans borotsana* subsp. nov.

♂. Ut in *A. e. septentrionali* Auriv. (1905) thorax unicolor, sed gutta submarginalis posterior alae anticae adest.

*Hab.* Mpeta, Loangwa R., Barotseland, November—December 1895, beginning of rainy season (C. T. Coryndon), 1 ♂.



Connects *septentrionalis* with true *elegans*, the thorax being devoid of the red streaks of *elegans*, and the forewing having the posterior submarginal spot which is absent in *septentrionalis*.

### 7. *Arniocera cyanoxantha* Mab. (1893)

*Zygaena cyanoxantha* Mabille, *Ann. Soc. Ent. Belg.* p. 57 (1893) (Abyssinia); id. & Vuill., *Nov. Lepid.* xii. p. 151. tab. 21. fig. 6 (1895).

The specimen described and figured by Mabille is said to be a ♂ from Abyssinia. Mabille describes the tibiae as being red on the outer surface, which points to a ♀ rather than a ♂, judging from the specimens of *Arniocera* which I described in 1907 as *poecila*, in which only the midtibia has nearly the whole outer surface red. The abdomen has no red scaling. The forewing is blue according to the description, but has a decidedly green tint in the figure. We have a small number of specimens with blue forewing from Fort Crampel, French Congo, towards the Bahr-el-Ghazal. These may be true *cyanoxantha*. They are, moreover, distinguished from *poecila* by the black borders of the orange spots of the forewing being broad. The abdomen of one of the five ♂♂ and of the only ♀ has the tergites 3 to 7 red with diffusely black centre; in a second specimen very few red scales are present, while the three other ♂♂ are intermediate.

In the specimens from Uganda which I described as *poecila* Jord. (1907), the abdominal tergites 3 to 7 are bright red in both sexes, without black central spots. We now, however, have two ♂♂ from Eutebbe, Uganda, in which the abdomen has only a few red scales, and the British Museum has others without any red scaling on the abdomen. The dark-bodied and red-bodied specimens do not appear to differ in any other way. The body and forewing have a decidedly green tint in all these specimens, and the black borders of the orange spots are narrower than in the above-mentioned examples of *cyanoxantha*. This bluish green form is for the present best treated as a geographical dimorphic race: *A. cyanoxantha poecila* Jord. (1907), from Uganda and Toro.

Our only two examples from the Wemi R., Toro, obtained by Dr. J. W. Ansorge on April 21, 1899, have a peculiar pattern: ab. *angulifera* ab. nov. The posterior spot of the constricted median band joined to the posterior submarginal spot. In one of the two specimens the short lower arm of this angle-shaped marking is connected with the subapical spot on the right wing, whereas on the left wing only the black borders of the spots merge together. The abdomen red as in true *poecila*.

*A. elegans* Weym. (1903), from British and German East Africa, in which neither sex has red scaling on the abdomen, while the spots of the forewing are red, is perhaps a geographical race of *cyanoxantha*.

### 8. *Arniocera amoena* Jord. (1907)

In *Entom. Rundschau*, 1909, p. 108, Herr E. Strand describes two specimens of *Arniocera* from German East Africa as *A. imperialis* Butl. var. *taborensis* Strand and ab. *longimaculata* Strand. The two names are given to the same specimen. I doubt whether the examples belong to *imperialis* Butl. (1898). What Strand calls *imperialis* is probably *amoena* Jord. (1907). The two species are easily distinguished by the colouring of the head and thorax, *amoena* having a red head and red pronotum, *imperialis* a green head and pronotum and red shoulder-stripes.

We have two new geographical forms :

**Sa. A. amoena virgata** subsp. nov.

♂ ♀. Alae anticae trivirgatae.

*Hab.* Luitpold Mts., near Ikutha, British East Africa, 4 ♂♂ and 1 ♀.

The spots of the forewing form three bands, the first and second bands more regular than in those specimens of true *amoena*, from German East Africa, in which the subbasal and median spots are joined together as two bands. The third band of *virgata* more or less constricted, on the right wing of the ♀ specimen separated into two spots. The green-black discal spot of the hindwing small, either isolated (type) or joined to the marginal band.

**Sb. A. amoena angolana** subsp. nov.

♀. Alarum anticarum maculae exteriores triangulares, superior apicem approximata; posticarum fascia marginalis ad costam medianam inferiorem in dentem angustam vel brevem producto.

*Hab.* Angola: Loanda, February 8, 1875 (Swart, ex coll. Homeyer), 1 ♀ (type), and "Angola littoralis" (Wetwitsch, ex coll. Felder), 1 ♀.

The subbasal and median spots of the forewing form two bands; the subapical spot triangular, pointed distally and posteriorly, nearer the apex than in true *amoena*; the submarginal spot also triangular; its costal side shortest, its proximal edge about parallel with the median band, but straight, slightly longer than the outer edge. The marginal band of the hindwing on the whole narrower than in true *amoena*, with a short blunt tooth at M<sup>2</sup> reaching halfway to cell; in second specimen (type) the tooth replaced by a narrow band which reaches apex of cell, but is more or less diffuse, being on the underside represented by a few scales only.

**Neoprocris** gen. nov.

♂. Alarum anticarum costae subcostales 1<sup>a</sup>, 2<sup>a</sup>, 3<sup>a</sup> liberae, 4<sup>a</sup> et 5<sup>a</sup> cum ramo 1<sup>o</sup> radiali petiolatae; posticarum costa 1<sup>a</sup> radialis absens.

Genotypus: *N. saltuaria* spec. nov.

Tongue well developed. Frons more than twice as broad as the eye is wide in a frontal aspect, not obviously projecting. Antenna very slender, bipectinate, last ten to twelve segments dentate, the pectinations about twice as long as the shaft is broad. Foretibia with broad spur, which reaches a little beyond tip of tibia; hindtibia with one pair of spurs.

*Neuration*: forewing with twelve veins, subcostals 1, 2, 3 free into costal margin, 4 and 5 on a long stalk, which throws off near cell radial 1, radial 3 from lower cell-angle halfway between radial 2 and median 1, median 2 as far proximal as first subcostal.—Hindwing with seven veins distributed as in *Acoloithus basalis* Edw. (1887), cross-vein between costal and subcostal long, longitudinal, slightly oblique.

Differs from all the other known American Zygaenidae in subcostals 4 and 5 and radial 1 being stalked. To be placed before *Seryda* Walk. (1856).

**9. Neoprocris saltuaria** spec. nov.

♂. Viridis, nitens; alis anticis viridibus hebetibus angustissime cyaneo circumdatis, posticis nigris parum olivaceo-virescentibus; infra posticis et anticarum regione anteriore viridi-nitentibus.

Al. ant. long. 14.5 mm., lat. 5.8 mm., marg. ext. 6 mm.

*Hab.* Mapiiri, Bolivia, 1 ♂ received from Messrs. Standinger and Bang-Haas.

Body glossy green, with cyaneous reflections in certain lights. Upperside of antenna deep blue in proximal half, then bright glossy green-blue, apex black in our specimen. Tongue brown-black with pale apex.

Wings nearly shaped as in *Seryda constans* Edw. (1881), but distal margin of forewing somewhat less oblique, *i.e.* shorter, and that of hindwing rather longer.

*Upperside*: forewing dull green, densely scaled, distal margin and fringe blue-black, extreme costal and hind edges blue-green, costa proximally glossy, distally cyaneous.—Hindwing uniformly brown-black, with very slight green and blue reflections in certain lights.

*Underside* of forewing greenish blue, slightly glossy, proximal half more green and more glossy at costa and in cell.—Hindwing uniformly bluish green, more glossy than outer half or two-thirds of forewing.

The reddish purple tint on body and wings of our specimen is due to discoloration.

#### 10. *Urodopsis dryas* spec. nov.

♀. *U. pusillae* similis, parum major, nitidior, antennis alisque anticis cyaneis, alarum posticarum costa mediana inferiore basin magis approximata.

Al. ant. long.: 7.3 mm.

*Hab.* Rio Grande do Sul, S.E. Brazil, 1 ♀, received from Messrs. Staudinger and Bang-Haas.

The two original specimens of *pusilla* in the British Museum are very worn, but there is a third, fresh, example presented by Mr. Kaye. All these agree in venuration, differing from *dryas* in the two median veins of the hindwing being more distal and the distance one from the other more than twice as large at the outer margin as at the cell. The colouring of the fresh specimen of *pusilla*, moreover, is much duller than in *dryas*, there being hardly any gloss on the forewing.

In *dryas* the antenna, head, pronotum and patagia are purplish blue, while the rest of the body has a somewhat greenish blue metallic tint. Hindwing semi-transparent, somewhat iridescent in certain aspects, the scaling purplish blue.

Tongue and naked tip of abdomen pale yellow.

*Neuration*: Distance between median veins of hindwing less than twice as long at the distal margin as at the cell, that between upper median and lower radial about one-fourth shorter at the cell than at the margin.

Antenna (♀) strong, nearly reaching to apex of cell, with short pectinations on the outer side (towards the wing) and teeth on the inner side, both as densely scaled as the shaft, the teeth lying so close together that the antenna appears to have a deep channel along the under surface.

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## CONTRIBUTION TO OUR KNOWLEDGE OF THE *SIPHONAPTERA FRACTICIPITA*.

BY THE HON. N. CHARLES ROTHSCILD, M.A.

(With 6 text-figures.)

### 1. *Leptopsylla lauta* sp. nov. (text-figs. 1 and 2)

♂ ♀. Similar to *L. pectiniceps* Wagn. (1893), but differs in the modified abdominal segments and some other details.

*Head*.—The frons is slightly shorter than in *pectiniceps*. The club of the antenna is longer and narrower than in the only specimen (a ♀) of *pectiniceps* which we have.

*Thorax*.—The pronotum bears only one row of bristles, not two as in *pectiniceps*.

*Abdomen*.—There are on each side three antepygidial bristles in the ♂, the middle one being long; the ♀ bears three long and two short antepygidial bristles. The sternites of segments III–VI have on each side three bristles in the ♂ and three or four in the ♀.

*Modified segments*.—♂. The eighth tergite is produced into a rounded lobe below the stigma, the dorsal margin of this widened portion being horizontal and the distal margin strongly receding. There are six or seven bristles on this portion of the segment, two of them being placed below the apex of the lobe. The eighth sternite (text-fig. 1, VIII. st.) consists of a proximal vertical portion and a narrow horizontal distal portion. The latter is moderately curved, and bears a ventral row of five or six long bristles and some short ones. The process P of the clasper is very narrow and long, gradually narrowing. The movable "finger" F is widest proximally, being here produced downwards into a tooth-like prominence. From this tooth to the apex the "finger" gradually narrows, not being widened before the tip as is the case in *pectiniceps*. Proximally to the apex there are two long bristles. The horizontal arm of the ninth sternite is narrow, especially in the centre. It is rounded-widened ventrally in the distal half, and bears here a ventral row of bristles; above this row there is an irregular lateral row which extends to the tip of the segment, one of the apical bristles being stout.

♀. The seventh abdominal sternite (text-fig. 2, VII. st.) has on each side a row of seven or eight bristles and one or two smaller bristles in front of the row; the segment is ventrally deeply sinuate, the remaining lateral portion forming a broad, rounded lobe, of which the upper margin is strongly slanting. The eighth sternite bears two long bristles below the stigma and about twelve farther down on the sides and at the margin. The stylet is but slightly narrowed at the apex, and bears one long and two shorter bristles. The head of the receptaculum seminis is more regularly elliptical than in *pectiniceps*, and the tail somewhat shorter.

A series of both sexes from Djarkent, Semiretschenskoi, East Turkestan, March–April 1913, off *Cricetulus fulvus* and *Apodemus tscherga*.

### 2. *Leptopsylla pectiniceps* Wagn. (1893) (text-fig. 3)

We take the opportunity of figuring the seventh abdominal sternite of the female of *pectiniceps*. The characteristic feature of this sternite has not been

mentioned in the descriptions given by Wagner of *pectiniceps*. The segment is deeply sinuate, the upper lobe being very narrow and sharply pointed. In the specimen kindly given me in exchange by Dr. Wagner there are nine bristles on

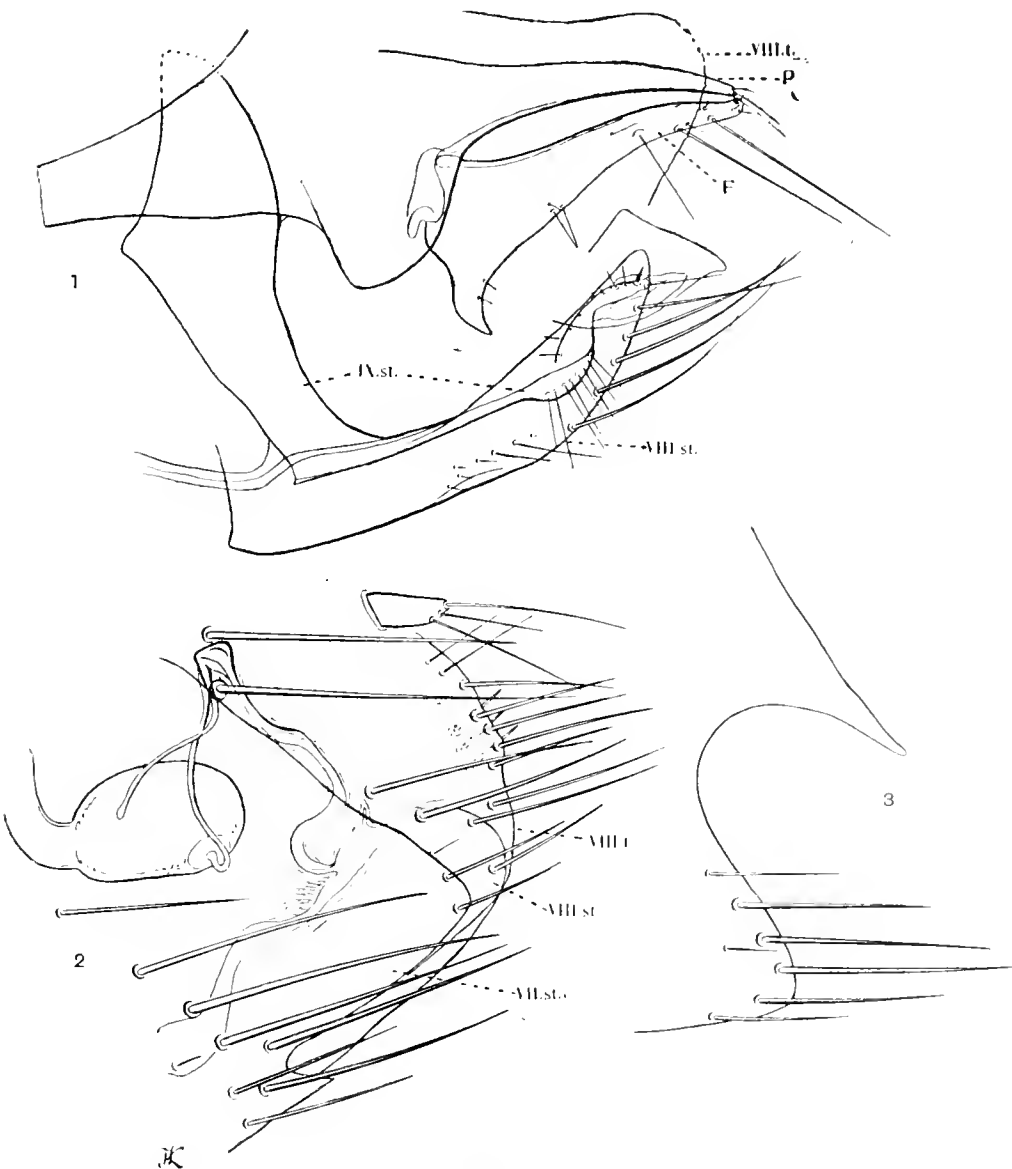


FIG. 1.—*Leptopsylla lauta*, ♂.  
 " 2.— " " ♀.  
 " 3.— " *pectiniceps*, ♀.

this sternite (on the two sides together), and one small bristle. The stylet of this specimen is strongly narrowed from the base to the apex, and bears only one lateral bristle, besides the long apical one.

### 3. *Leptopsylla hesperomys* Baker (1904)

We have a ♂ from Ithaca, New York, which appears to belong to this species. *L. hesperomys* was originally described from the female sex only, and we have a paratype from Dr. Baker's collection. The ♂ being as yet undescribed, the following notes may be found useful:

*L. hesperomys* is closely allied to *L. selenis* Roths. (1906), but differs in the modified abdominal segments and in the spatulate genal process. Moreover, the frons of the head usually bears in *selenis* one lateral bristle more than in *hesperomys*.

♂. The eighth abdominal sternite is excised at the apex, the lobe situated above this sinus being rounded and bearing three long bristles and a small one. The movable process of the clasper is larger than in *selenis*, and its bristles somewhat smaller. The ninth sternite is pointed and bears a row of ventral bristles, the longest bristles of this row also being shorter than the longest bristles of the ninth sternite of *selenis*.

The above-mentioned paratype (♀) agrees with Baker's description, except for some statements which are obviously erroneous—the mesonotum, *e.g.*, not being twice as long as the metanotum, as stated in the description. The stylet, which is said to be less than twice as long as it is broad and to bear several small bristles on the lower margin, is really but slightly longer than broad, and has only one lateral bristle. The seventh sternite, the shape of which was not noted by Baker, is deeply sinuated, the lobe placed above the sinus being triangular with the tip rounded off; the lower lobe is much broader, but we cannot state its length, as the lobe is much torn in our specimen on both sides of the body. The segment bears six long bristles on one side and eight on the other. The receptaculum seminis has an elliptical head which almost gradually merges into the tail.

### 4. *Leptopsylla adelpha* sp. nov. (text-fig. 4)

♀. Very close to *L. selenis* and *hesperomys*, but differs as follows:

The genal process is spatulate, but is less widened at the apex than in *L.*

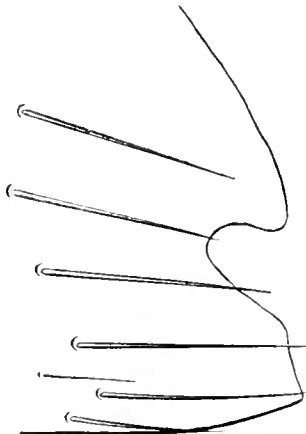


FIG 4.—*Leptopsylla adelpha*.

*hesperomys*. The seventh abdominal sternite bears a sinus somewhat deeper than in *L. selenis*—*i.e.* much less deep than in *L. hesperomys*. The lobe placed above

this sinus is triangular and subacuminate, being much narrower and longer than in *selenis*, and much shorter than in *hesperomys*; the lower lobe projects a little more than the upper. There are four antepygial bristles, of which the upper one is short. The narrow apical portion of the stylet is shorter than in the two species mentioned, the lateral bristle therefore being closer to the apical one than in those species. The long bristles of the tibiae and tarsi are shorter, as is also the case with the fourth hindtarsal segment, particularly than in *selenis*. The receptaculum seminis is longer than in *hesperomys* and *selenis*.

One ♀ from Paradise, Arizona, taken on *Mus* spec. on November 21, 1913, by O. C. Duffner.

### 5. *Leptopsylla himalaica* sp. nov. (text-figs. 5 and 6)

♂ ♀. Belongs to the group with two genal spines.

*Head*.—Frons angulate as in *L. musculi*, with an anterior row of eight strong bristles, all of which are drawn out into a long thin point; in front of the vestigial eye there are two long bristles, and between them and the anterior row another row of four, all these bristles being strong. Occiput with four rows of bristles and one or two additional bristles indicating a fifth row. Upper genal spine slightly curved upwards, completely concealing the genal process and being slightly longer than the lower, which is a little curved downwards. The genal edge does not project as a triangular lobe below the genal spines. The labial palpus reaches beyond the centre of the forecoxa. The bristles of the second segment of the antenna are short in both sexes.

*Thorax*.—The pronotum bears a comb of twenty long spines and a row of twelve bristles, on the two sides together. The mesonotum has altogether five or six rows of bristles, the anterior rows being irregular, the mesopleura bearing about ten bristles and the metanotum three rows. The metanotum, moreover, has four short apical spines on each side.

*Abdomen*.—The tergites bear two rows of bristles: the short apical spines on segments I–V are as follows (on the two sides together): 6, 5, 4 or 5, 4, 1 or 2. The sternites of segments III–VI have on the two sides together eight bristles in the ♀ and four to six in the ♂. Three antepygial bristles, of which the upper and lower ones are much shorter than the middle one in the ♂, whereas in the ♀ the lower bristle is nearly as long as the central one. In the ♀, moreover, this lower bristle is placed at a considerable distance from the others.

*Legs*.—Similar to those of *L. musculi*.

*Modified segments*.—♂. The eighth tergite (text-fig. 5, VIII. st.) bears four or five bristles below the stigma. The eighth sternite is abruptly narrowed in the centre into a somewhat tongue-shaped lobe; proximally to this lobe there are two or three long bristles, whereas the lobe itself bears three long bristles, two or three short ones proximally to these, and some very slender bristles at the rounded apex. Clasper longer than in *L. musculi*. The finger (F) is evenly curved at the base and of nearly the same width throughout; it bears three long bristles placed at almost equal distances from one another, there being a shorter bristle between the first and second, and another between the third long one and the apex. The horizontal arm of the ninth sternite is slender; and its apex is rather strongly curved upwards, and there is a row of thin bristles at the bend, as shown in the figure. —♀. The seventh sternite (text-fig. 6) is deeply sinuate, the upper lobe being narrow and long, and the upper margin of the large lower lobe strongly slanting. There are two rows of

bristles on this sternite, which exhibits twelve bristles altogether on each side. The eighth tergite has about a dozen large bristles and several small ones. The stylet

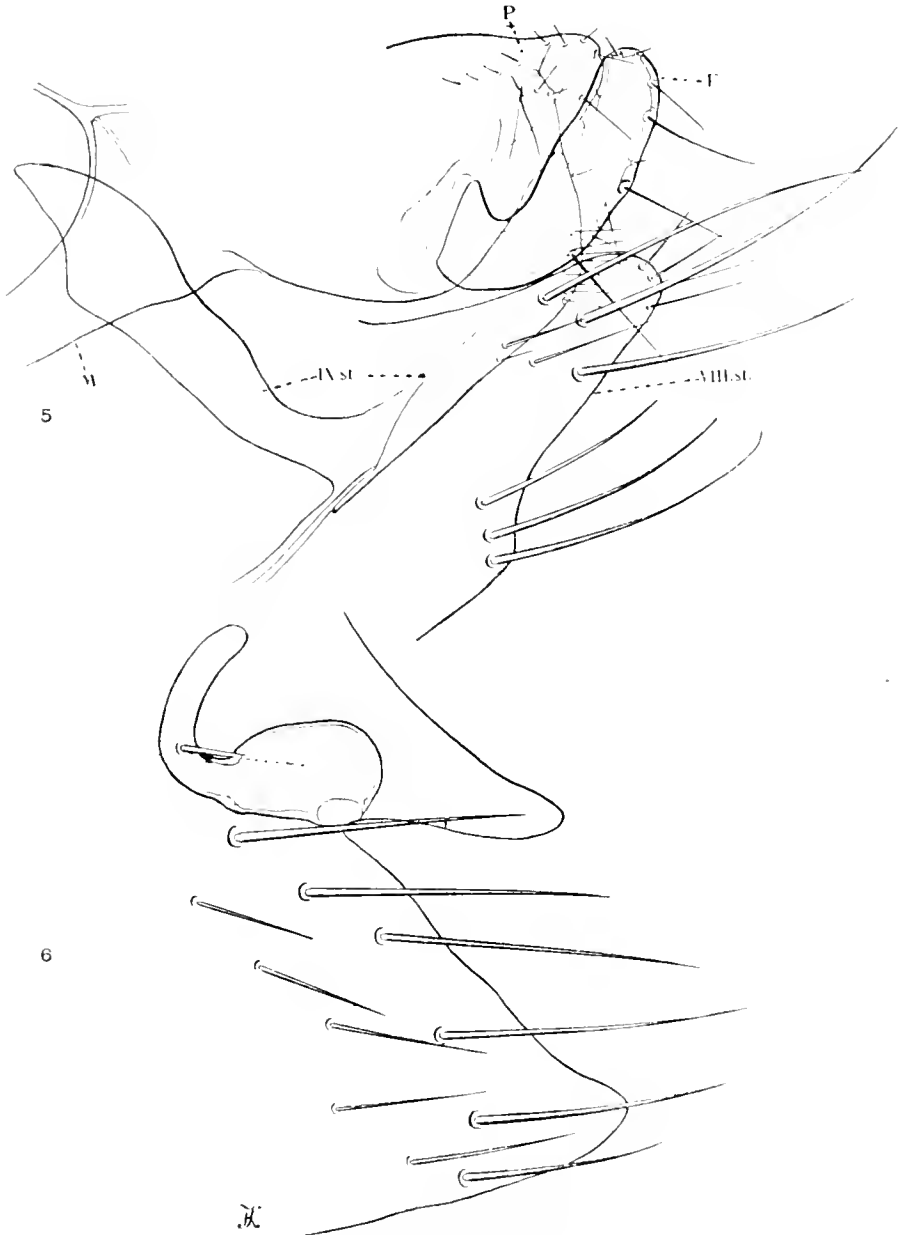


FIG. 5.—*Leptopsylla himalaica*, ♂.  
 " 6.— " " ♀.

is three times as long as it is broad near the base. The head of the receptaculum seminis is shorter than the tail, being widest near the apex.



4 ♂♂ and 2 ♀♀ from Simla, N.W. India, found in November and December 1911 on *Epimys decumanus* by P. T. Dodsworth.

The species of *Leptopsylla* can be grouped as follows, according to the number of spines in the genal comb :

- a. Genal comb of numerous spines : *pectiniceps* Wagn. (1893), *lauta* sp. nov.
- b. Genal comb of four spines : *masculi* Dugès (1832).
- c. Genal comb of three spines : *arthiopicus* Roths. (1908), *algira* Jord. & Roths. (1912), *amitina* Jord. & Roths. (1914), *taschenbergi* Wagn. (1898).
- d. Genal comb of two spines : *spectabilis* Roths. (1898), *silcatia* Mein. (1896), *fullax* Roths. (1909), *bidentatus* Kolen. (1863) = *sobrinus* Roths. (1909), *himalaica* sp. nov., *selenis* Roths. (1906), *hesperomys* Baker (1904), *adelpha* sp. nov., *hamifer* Roths. (1906).

### **Stenistomera** gen. nov.

Allied to *Leptopsylla* Jord. & Roths. (1911).

Frons strongly angulate, with tubercle at the angle; a row of spiniform bristles parallel with margin of frons from oral corner to base of antennal groove; oral edge rounded-dilated. No genal spines. Vestige of eye exceedingly slight, without pigment. Antennal groove open. Second segment of antenna widened apically into a broad rounded lobe which bears a row of long bristles at the edge and covers in ♂ one-third of the club, and in ♀ one-half; club of ♂ long and projecting on to the propleurum. Rostrum reaching beyond apex of coxa, consisting of four segments. Tergites of thorax and abdomen with one row of bristles, apart from the mesonotum, which bears in addition short spiniform bristles at the base. Episternum of metathorax completely fused with the sternum, and the epimerum incompletely separated from the metanotum; ventral angle of metasternum very strongly rounded. Hindcoxa very narrow. First hindtarsal segment as long as the hindtibia; the greatest width of the hindfemur nearer the centre than in *Leptopsylla*; tibiae with pseudocomb. Stylet of ♀ long, with five or six small bristles, besides the apical one, which is shorter than the stylet. Genitalia of ♂ recalling those of the African genus *Dinopsyllus* Roths. (1913).

*Type* : *S. alpina* Baker (1895, as *Typhlopsylla*).

### **Nearctopsylla** gen. nov.

♂♀. Nearly related to *Palaeopsylla* Wagn. (1902).

Genal comb vertical, consisting of five spines, of which the most dorsal one is short, broad and triangular, and the next three are lanceolate, the fourth spine (second from below) being the longest. Frons without tubercle. The labial palpus has five segments. The pronotal comb curves frontad ventrally, the most ventral spines being shorter and more frontal in position than the lateral and dorsal spines. One long antepygial bristle in the ♂ and two in the ♀, not accompanied by short ones. Hindcoxa with a row of short spines on the inside. Fifth segment of all tarsi with five (more rarely four) pairs of lateral bristles, there being no bristles in between the first pair on the ventral surface.

*Type* : *N. brooksi* Roths. (1904, as *Ctenopsyllus*).

Besides the genotype the following species belong here : *hygini* Roths. (1904) and *hyrtaci* Roths. (1904).

**Chiliopsylla** gen. nov.

♂. Agrees with *Nearctopsylla* in the frons being without a tubercle and in the genal comb consisting of five spines, but differs in the hindmargin of the pronotum being much less rounded laterally, the antepygidial bristle being short and accompanied by one small one, in the stigma of the eighth tergite being very large, the hindcoxa without spines on the inside, the first hindtarsal segment very little shorter than the four other segments together, and in the fifth segment bearing in all tarsi four lateral pairs of bristles and one ventral pair in between the first lateral pair.

*Type*: *C. allophylus* Roths. (1908, as *Ctenopsyllus*).

LIST OF *SIPHONAPTERA* COLLECTED IN ALGERIA IN  
THE SPRING OF 1914.

BY K. JORDAN, PH.D., AND THE HON. N. CHARLES ROTHSCHILD, M.A.

(With 2 text-figures.)

DURING April and May of last year the present Lord Rothschild and the senior author visited several places in Eastern Algeria for the purpose of collecting Lepidoptera and incidentally other insects. Their stay at Souk-Ahras and Hammam-Meskoutine was long enough to allow them also to devote some time to the trapping of small mammals. The fauna of these places is that of the northern Atlas district, the mammals obtained being the same species as those which were collected on a former occasion at Alger and Hammam-Rirha. Although individuals were fairly numerous, little variety as to species was obtained as regards hosts as well as parasites.

By far the commonest flea was *Ceratophyllus barbarus*, which occurred on nearly every sort of host found.

The most interesting species in the collection is *Leptopsylla amitina*, which was described by us in 1914 from a single ♂, but of which a small series of both sexes has been procured at Hammam-Meskoutine.

Hen-houses, and a large number of nests of Martins and Sparrows, as well as some other bird-nests, were examined, but only one flea found. The very numerous bats taken at Hammam-Meskoutine yielded no fleas.

1. ***Pulex irritans* L. (1758)**

At Hammam-Meskoutine.

2. ***Archaeopsylla erinacei maura* Jord. & Roths. (1911)\***

10 ♀ ♀, Hammam-Meskoutine, May 6, off *Erinaceus*.

3. ***Ceratophyllus barbarus* Jord. & Roths. (1912)**

Common at Hammam-Meskoutine, found on *Arvicanthis barbarus*, *Mus algirus*, *Mus musculus*, *Apodemus sylvaticus hayi*, *Dipodillus campestris*, *Crocidura russula*; also at Souk-Ahras on *Arvicanthis barbarus* and *Apodemus sylvaticus hayi*.

\* *Ctenocephalus canis* Curtis (1826) was obtained for us at Alger by our friend Dr. Nissen.

4. *Ceratophyllus henleyi mauretanicus* Jord. & Roths. (1912).

3 ♂♂, 1 ♀, Hammam-Meskoutine, May 4, off *Dipodillus campestris*.

5. *Ctenophthalmus russulae* Jord. & Roths. (1912)

Only 5 ♂♂, Souk-Ahras, April 12 and 16, off *Crocidura russula mauretanica*.

6. *Ceratophyllus numidus* spec. nov. (text-fig. 1)

♀. Similar to *C. hirundinis* Curtis (1832), but at once distinguished by the much smaller number of bristles on the abdominal sternites and on the hindfemur and hindtibia.

Labial palpus (in the only example obtained) consisting of four instead of five segments, the third and fourth segments being merged together. The pronotal



FIG. 1.—*Ceratophyllus numidus*.

comb contains twenty-seven spines, besides a small spine on each side. The apical portion of the metanotum is reduced as in *hirundinis*, and bears no apical spines. The metepimerum has four bristles, the subapical bristle being absent on one side and small on the other.

The abdominal sternites III, IV, and V have a row of three bristles on each side, VI bearing a row of four; there are no additional bristles in front of this row.

The hindfemur has, on the inside, a lateral row of five or seven bristles, the subapical ventral bristle not being counted. The hindtibia only bears four or five lateral bristles on the outer surface, the lateral row of the inner surface containing five or six bristles.

The seventh sternite (text-fig. 1) strongly rounded, the bristles less numerous than in *C. hirundinis*. The eighth tergite bears five bristles below the stigma and

about twenty on the widened lower portion of the segment. The stylet is longer than in *C. hirundinis*. The pygidium is shorter than its distance from the base of the stylet. The tail of the receptaculum seminis is longer and somewhat broader than in *C. hirundinis*.

1 ♀ from Hammam-Meskoutine, found in nest of *Chelidon urbica*, May 17, 1914.

7. *Leptopsylla amitina* Jord. & Roths. (1912) (text-fig. 2)

A small series of both sexes from Hammam-Meskoutine, off *Apodemus sylvaticus hayi*.

Originally described from a single ♂ obtained by Mr. Ruddle on the same host at Bon-Médine, Oran.

In the ♀ the two lower antepygidial bristles are equal in length, being

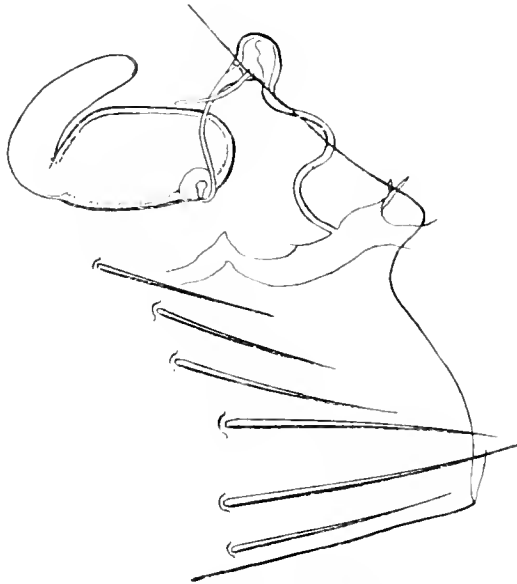


FIG. 2.—*Leptopsylla amitina*, ♀.

somewhat shorter than the third bristle, whereas the fourth (or most dorsal) is very much shorter. The apical edge of the seventh abdominal sternite bears a short narrow lateral lobe, which is sometimes barely indicated; below this lobe the segment is somewhat incurved and then excurved, as shown in the figure (text-fig. 2). The head of the receptaculum seminis is somewhat shorter than in *L. algira* Jord. & Roths. (1912).

8. *Stenoponia tripectinata* Tirab. (1902)

A series from Hammam-Meskoutine, off *Mus musculus*, *Mus algirus*, *Apodemus sylvaticus hayi*, and *Arvicanthus barbarus*.

On one individual of *Mus musculus* no less than twenty specimens of this large flea were found.

## NEW GENERA AND SPECIES OF AFRICAN GEOMETRIDAE.

By LOUIS B. PROUT, F.E.S.

SUBFAMILY OENOCHROMINAE

### Derambila Walk.

*Derambila* Walk., *List Lep. Ins.* xxvi. 1630 (1862).

*Chionoptyx* Snell., *Tijds. Ent.* xvi. 72 (1873).

*Rambara* Moore, *Lep. Ceyl.* iii. 458 (1887).

*Corium* Prout, *Gen. Ins.* 104, p. 75 (1910).

I find the venational differences on which I founded my genus *Corium* are not perfectly constant, and the name must sink in the synonymy of *Derambila*, although the venation will usually be helpful in determining the species. Even in the *puella* group, SC<sup>1</sup> oftener arises from the cell than from the stalk of the other subcostals. I have not yet found among the Indo-Australian species of *Derambila* a single exception to the given venation (SC<sup>1</sup> running into C), but in the African *D. synecdemus* Prout I have one example in which SC<sup>1</sup> again separates from C near the costal margin, while on the other hand I have before me a *D. iridoptera* (Prout, *Nor. Zool.* xx. 394, as *Corium*) in which they remain coincident. Moreover, a specimen from Uganda which Warren has labelled *punctisignata* Walk., and which (pending fresh study of Walker's type) I am inclined to accept as a large form thereof, has the *Corium* venation, as has also the closely allied *hyperphyes* (Prout, *Ann. Mag. Nat. Hist.* (8) viii. 704, as *Corium*).

#### 1. *Derambila delostigma* sp. nov.

♂, 26–30 mm. Head mostly white, palpus marked with brown at ends of joints. Antennal ciliation very short. Thorax white. Abdomen long and slender; white, with large light-brown dorsal spots. Hindtibia moderately dilated, with light-brown hair-pencil.

*Forewing* with apex acute and slightly produced; SC<sup>1</sup> from cell, anastomosing with C and with SC<sup>3+4</sup>; pure white, costal edge light ochreous brown, a rather strong irroration of the same extending to SC; lines light ochreous brown, formed of spots on veins and folds; antemedian series small, forming a curve from SC<sup>1</sup> at one-third to SM<sup>2</sup> before one-third, the spot on SC mixed with black scales; postmedian series larger, from SC<sup>4</sup> at 2 mm. from apex, rather nearer termen at SC<sup>5</sup>, R<sup>1</sup> and R<sup>3</sup>, slightly receding at R<sup>2</sup> and M<sup>1</sup>, forming a strong proximal curve behind, falling vertically on hindmargin before two-thirds; a strong black discal dot; small black terminal dots between the veins.—*Hindwing* with costa concolorous; first line wanting; cell-spot larger, subtriangular; postmedian spots rather smaller than on forewing, similarly arranged.

Underside white with small black cell-dots.

Mlanje, Nyassaland, March–May 1913 (S. A. Neave). Type in coll. Rothschild,\* others in coll. Brit. Mus. A worn example from Parumbira, Lake Nyassa, November 6, 1893 (Dr. Ansorge) in coll. Rothschild.

\* = Tring Museum throughout this article.

The rather strong anastomosis of  $SC^1$  with  $SC^{3-4}$  (quite exceptional in material heretofore studied in this genus) is constant in the ten examples known to me.

## 2. *Derambila jacksoni* sp. nov.

♀, 28 mm. Face ochreous-white. Palpus white, first and second joints with brown spot at end. Vertex white. Collar with one or two blackish spots. Thorax and abdomen white, the latter with a row of blackish dorsal spots.

Wings rather narrow.—*Forewing* with  $SC^1$  anastomosing with C: strongly iridescent; white, costal margin as far as  $SC^1$  mixed with light brown; lines light brown, formed of vein-dots; antemedian from  $SC^1$  at about two-fifths, oblique inwards, the dot on M placed at origin of  $M^2$ , that on  $SM^2$  at about one-third of the wing-length, preceded nearer base by one or two other vague brown dots on  $SM^2$ ; postmedian nearly as in the preceding species, the dots not quite so large, the curves not quite so strong; a further series of spots, confluent into a line (narrow bar), at 1 mm. from termen; discal black dot minute, terminals proportionally rather large, conspicuous.—*Hindwing* the same, except costa and first line.

Underside white, with weak discal dots.

Nairobi, British East Africa, August 1905 (F. J. Jackson). Type in coll. Rothschild.

Distinguished from the preceding by its rather narrower wings, forewing with  $SC^1$  not anastomosing with  $SC^2$ , by its minute discal dots, rather less ochreous markings, absence of black antemedian dot on  $SC^1$ , smaller but much darker abdominal spots, etc.

## SUBFAMILY HEMITHEINAE

## 3. *Victoria triplaga* sp. nov.

♀, 39 mm. Face and vertex reddish. Palpus reddish, paler beneath. Antenna without tuft at base; strongly bipectinate; reddish. Abdomen dorsally purplish brown, with a whiter admixture, particularly in the crests.

*Forewing* with termen not markedly crenate, the bend at  $R^3$  not strong; green with purplish markings: a large, circular, somewhat paler centred discal spot; a small spot at two-fifths hindmargin; two dark-edged spots at termen, namely a large one between  $SC^5$  and  $R^3$  and obliquely crossing  $SC^5$  close to termen, a smaller from  $M^2$  to torus.—*Hindwing* with termen only slightly prominent at  $R^1$  and  $R^3$ ; concolorous with forewing and with the same markings, but with the spot on hind-(inner-) margin much more elongate, the anterior terminal much smaller, reaching from  $R^1$  to midway between  $R^2$  and  $R^3$ .

Underside similarly but more weakly marked.

Mhonda, Ngurn, German East Africa. Type in coll. Rothschild.

As both hindlegs are lost, the generic position is not absolutely certain; if it prove to lack the proximal spurs it should be regarded as a *Cheroscelis* with obsolete tongue. The coloration is that of *C. palliata* ab. *ustipennis* Warr., but it cannot possibly be confused with any form of that variable species. The antenna is pectinated to nearly two-thirds of its length (in *palliata* to scarcely beyond one-half), and the branches are longer than in even the male of *palliata*; the hindwing has the costa relatively longer, the inner margin relatively shorter; the cell-spots are smaller and the number and position of the dark blotches are quite distinctive.

4. *Comibaena rhodolopha* sp. nov.

♀, 34 mm. Face green. Palpus long (over two-and-a-half times diameter of eye), white, strongly spotted with crimson. Antenna serrate, the shaft white, dotted with crimson. Thorax green above, white beneath. Legs white, femora with purple-brown spots, foretibia dotted with red, its tuft red. Abdomen red above, spotted with green on first segments, white beneath; white dorsal spots on first to fourth abdominal segments. Wings rather bright green, but more irrorated with whitish than in *esmeralda* Warr. (*Nor. Zool.* v. 15).

*Forewing* with  $SC^1$  free,  $SC^2$  arising a little before  $SC^3$ ,  $R^1$  scarcely stalked,  $DC$  gently curved,  $R^2$  scarcely before middle,  $M^1$  almost connate with  $R^3$ ; costal margin white, at apex crimson for about 1 mm.; no lines; discal dot large, crimson, with some blackish scales in the middle; terminal line thick, crimson, interrupted by white dots at vein-ends and very finely and interruptedly white-edged on extreme termen; fringe white, mixed with crimson (defective).—*Hindwing* similar, except costa, the cell-mark vaguely prolonged nearly to anterior end of  $Du^2$ .

Underside similar but paler.

Selukwe, S. Rhodesia, March 1912 (F. W. Short). Type in coll. L. B. Prout.

Near *esmeralda* Warr., abdomen with white spots, foretibial tuft red (in *esmeralda* fuscous), green ground-colour less smooth, discal spots larger. Can scarcely be a remarkable form of the variable *leucospilota* Walk., with the lines entirely obsolete, etc.

5. *Metacineta semialbifrons* sp. nov.

♂, 25 mm. Face red in upper half, white in lower. Palpus red above, white beneath. Vertex white; occiput green. Thorax above green. Abdomen on segments 2–6 each with a slightly raised white dorsal spot, partly surrounded with red, on segment 1, with a small posterior red mark, edged with black on each side, on segments 7–8 each with a very small red spot.

*Forewing* with termen slightly less convex than in the other species; bright green, with the usual whitish strigulation; a moderate red discal dot; a red terminal line, swelling slightly between the veins and here with minute, inconspicuous whitish dots; fringe pinkish white, with red spots opposite the veins.—*Hindwing* with termen scarcely at all bent at  $R^3$ ; like forewing.

Both wings beneath whitish green, without markings; slight suggestions of the terminal line and fringe-spots of upperside.

French Congo: Fort Crampel. Type in coll. L. B. Prout.

Nearest *vernica* Prout, but smaller, more strongly strigulated, etc., and especially distinguished by the particoloured face.

6. *Cheroscelis palliata* (Warr.)

*Rhomborista palliata* Warr., *Nor. Zool.* v. 16 (1898); viii. 206 (1901).

*Rhomborista ustipennis* Warr., *Nor. Zool.* v. 236 (1898).

Warren's type of *palliata* is a ♂, not "♀" as published, and the variation is neither sexual nor (apparently) seasonal; both colour-forms occur also in the ♀ and either with restricted or extended inner-marginal patch on hindwing. Of 3 ♀♀ from Degama (Niger) in coll. Rothschild, one (dated May 7, 1902) is of the *palliata* form, the other two (February 3 and April 29) of the ab. *ustipennis*.

7. *Bathycolpodes holochroa* sp. nov.

♀, 37 mm. Face blackish. Palpus, vertex and antenna mixed rufous and blackish. Thorax above green. Abdomen pale brownish, with rufous dorsal admixture, tending to form spots on the first segments.

*Forewing* with termen strongly excised between apex and  $R^3$ ; uniform green, about as in *Omphax plantaria* Guen., only the costal margin reddish-brown with coarse dark irroration or strigulation; a red-brown terminal line, this colour extending on to the fringe posteriorly; fringe pale ochreous, with dark spots opposite the veins.—*Hindwing* with costal margin rather broadly whitish straw-colour, otherwise like forewing.

Both wings beneath infuscated, leaving only a pale (whitish straw-coloured) submarginal band, that of forewing tapering strongly to costa, that of hindwing slightly tapering posteriorly.

Bitye, Ja River, Cameroons, 2000 ft., October—November 1910, 2 ♀♀ in coll. Rothschild.

8. *Prasinocyma nigrimacula* sp. nov.

♂, 30 mm. Face dull red. Palpus little longer than diameter of eye, third joint quite short; reddish above, whitish beneath. Vertex green, narrowly white in front. Antennal pectinations moderately long. Body dorsally green, becoming whitish towards anus; some fuscous dots on abdomen.

*Forewing* broad, shaped about as in *dohertyi* Warr.;  $SC^1$  anastomosing with  $C$ ,  $R^1$  not or scarcely stalked,  $M^1$  connate with  $R^3$ ; green, nearly as in *vermicularia* Guen. (very slightly deeper), similarly strigulated, costal edge very narrowly ochreous; discal dot black; a small black spot on hindmargin at about three-fifths; inconspicuous dark green dots at vein-ends; fringe green.—*Hindwing* with termen very slightly bent at  $R^3$ ;  $SC^2$  and  $M^1$  both moderately stalked; like forewing but without hindmarginal spot and ochreous costa.

Underside whitish green, costa of forewing narrowly ochreous, discal dots slightly showing through, dots at vein-ends black.

Entebbe, Uganda, February 1902 (Capt. Ratray). Type in coll. Rothschild. Also one from Nairobi (F. J. Jackson). Both have lost hindlegs.

9. *Prasinocyma gemmatimargo* sp. nov.

♂, 29 mm. Face dull reddish. Palpus with third joint quite short; reddish above, pale beneath. Vertex and antennal shaft white; pectinations rather long. Thorax and abdomen green above, white beneath. Femora and tibiae reddish; hindtibia in ♂ with strong white hair-pencil and short terminal process; hindtarsus short.

Wings shaped about as in *congrua* Walk.; blue-green with sparse white dots and small strigulae.—*Forewing* with costal edge ochreous; a small white spot on hindmargin at nearly three-fifths; a conspicuous row of white vein-dots at termen; fringe green proximally, grey distally.—*Hindwing* without the ochreous costa and white hindmarginal spot; terminal dots only well-developed from  $R^2$  to tornus.

Underside whitish green, unmarked; costal margin of forewing ochreous, more broadly and suffusedly at base.

Bitye, Ja River, Cameroons, 2000 ft., April—May 1911. Type in coll. L. B. Prout.



I believe I have seen other examples from the Cameroons and Nigeria, but generally in poor condition. The conspicuous white terminal dots are distinctive. In *albisticta* Warr. they are more elongate and are dark-edged proximally; *hadrata* Feld. is less strigulated, the hindwing more angled, the fringe with red-brown spots; both have long third joint of palpus. In *tundi* B.-Baker (*Ann. Mag. Nat. Hist.* (S) xi. 570) the white spots—not mentioned in the description—are at the base of the fringes, and it lacks the white hindmarginal spot of the forewing.

#### 10. *Prasinocyma triflifimbria* sp. nov.

♂ ♀, 35 mm. Face dull red. Palpus in both sexes with third joint relatively short; red above, white beneath. Vertex green, between the antennae white. Antenna in ♂ with rather long, close pectinations, decreasing rather rapidly in length, ceasing at about the thirty-second joint, a longish apical part merely ciliated. Thorax and abdomen green above, whitish beneath; foreleg mostly red on upper and inner sides (hindlegs in ♂ lost).

*Forewing* broad, apex moderate, termen curved;  $SC^1$  free,  $R^1$  very shortly stalked,  $M^1$  just separate; green, about as in *cermicularia* Guen., the white irroration and strigulation scarcely so strong; costal edge narrowly ochreous; a black discal dot; a small white spot on middle of hindmargin, accompanied distally by a few dark scales; fringe proximally green, in middle white, distally reddish grey.—*Hindwing* ample, inner margin long, hindmargin more strongly angled at  $R^3$  than in most of the genus (resembling *Thalassodes*);  $C^1$  shortly approximated to  $SC$  near base,  $DC^2$  oblique,  $DC^3$  somewhat curved,  $M^1$  very shortly stalked; concolorous with forewing; a black discal dot; fringe as on forewing.

Underside paler, unmarked.

Bitye, Ja River, Cameroons, 2000 ft., September—November 1911. Type and paratype in coll. L. B. Prout.

Differs from *congrua* Walk. in the shorter palpus and the tricoloured fringes. The only *Prasinocyma* known to me which shares with it this coloration of the fringe is the East African *pupillata* Warr., of which it is not absolutely impossible it may be a local race in spite of its red face, less acute apex, and lack of the pale circumscription to the discal dots.

#### 11. *Prasinocyma rugistrigula* ab. *albinotata* nov.

Differs from name-typical *rugistrigula* Prout (*Gen. Ins.* 129. p. 157) in having the blackish discal marks entirely obsolete or reduced to minute specks, and in developing a white spot at the middle of the hindmargin of forewing.

Bibianaba, 70 miles N.W. of Dimkwa, Gold Coast, 700 ft., October 20, 1909, ♂ type, November 19, 1910, ♀ (H. G. F. Spurrell), in coll. Brit. Mus.; Bitye, Ja River, Cameroons, ♂ in coll. L. B. Prout; Bopoto, Upper Congo (Rev. Kenred Smith), ♂ in coll. Rothschild.

Of name-typical *rugistrigula* I know only, besides the type from Coomassie, a ♂ in coll. Rothschild from Wassaw district, forty-five miles inland from Sekondi, Gold Coast, so that the new form would appear to be by far the more widely distributed. I suspect the two will prove to be racially distinct, but the occurrence of both in the Gold Coast and my lack of extensive material and of topographical information render it precarious so to treat them.

12. *Prasinocyma oculata* sp. nov.

♂, 38 mm. Face green. Palpus with third joint long; reddish brown above, white beneath. Vertex green. Antennal shaft white proximally (one-third or less), reddish distally; pectinations of moderate length. Thorax and abdomen blue-green dorsally, white ventrally and anally; foreleg red above and on inner side; middle and hindlegs largely duller and paler reddish; hindtibia dilated, with short terminal process and rather strong white hair-pencil.

*Forewing* of moderate width, apex less acute than in *pupillata* Warr., not at all produced; termen oblique, slightly curved; SC<sup>1</sup> free, R<sup>1</sup> just stalked, M<sup>1</sup> about connate; light blue-green, not very opaquely scaled, covered with fine white irroration and strigulation; costal edge very narrowly ochreous, discal spot rather large, red, very finely and somewhat incompletely white-ringed and in its centre overlaid with black; fringe concolorous, only with feeble suggestions of paler spots.—*Hindwing* with termen rather strongly bent at R<sup>2</sup>, faintly waved in posterior half; DC<sup>2</sup> as oblique as in *Thalassodes*, DC<sup>3</sup> less so, M<sup>1</sup> well stalked; coloured and marked like forewing.

Under-surface paler, the costal margin of forewing rather brighter, more reddish ochreous; discal marks faintly showing through.

Daro Forest, Toro, Uganda, 4000—4500 ft., October 26, 1911 (S. A. Neave). Type in coll. Brit. Mus. A ♀ from Kumasi, W. Africa (J. D. G. Saunders), also in coll. Brit. Mus., is possibly referable here, agreeing except in having the face reddish, mixed with green, the wings broader, with rather more rounded termen, the white strigulation less developed, a small white spot on middle of hindmargin of forewing. The third joint of the palpus—as would be expected in the ♀ of this species—is extremely long.

Very like *pupillata* Warr., from British East Africa, but differing in much longer palpus, less acute apex, much bluer-green colour, and absence of a white line in fringe.

13. *Prasinocyma centralis* sp. nov.

♀, 31–34 mm. Still closer to *pupillata* Warr., agreeing in the abbreviated third joint of palpus, but showing sufficient differences to prevent its being treated as a subspecies. Face dull red, very narrowly white below.

*Forewing* with costa somewhat more arched, apex less acute, termen much more curved; slightly bluer green (though much less so than in *oculata*), the dark distal edging of the white hindmarginal spot better developed; fringe green, only slightly paler distally.—*Hindwing* with apex more rounded, termen less straight anteriorly and posteriorly to the bend at R<sup>2</sup>; fringe as on forewing.

Rawenzori, 6000 ft., February 24, 1906 (type), January 13, 1906 (paratype); Entebbe, Uganda, 1905, 1 ♀ (E. A. Minchin); all in coll. Brit. Mus.

14. *Prasinocyma niveisticta adornata* subsp. nov.

Differs from name-typical *niveisticta* Prout (*Gen. Ins.* 129, p. 156) in having both tornal blotches considerably enlarged (about as in *Comibaena pustulata* Hufn.), and in addition on the hindwing an apical blotch, rather larger than the tornal ones, and a dark discal dot.

Ashanti (Mrs. D. Houston). Type in coll. Rothschild.

Possibly a separate species, as the cells are rather shorter, DC more oblique, R<sup>1</sup> of forewing stalked, M<sup>1</sup> of forewing shortly, of hindwing longer stalked.

**Gelasmodes** gen. nov.

Face smooth. Palpus rather long and slender, with appressed scales; third joint in ♂ moderate, in ♀ rather long. Tongue developed. Antenna in both sexes bipectinate nearly to apex with long branches. Femora glabrous. Hindtibia in ♂ not dilated, in both sexes with all spurs. Abdomen scarcely crested. Frenulum in ♂ developed, from before a moderate basal expansion; in ♀ wanting. Forewing with costa gently arched, apex moderate, termen slightly curved, oblique, tornus moderate; cell less than one-half,  $DC^3$  curved, becoming rather strongly oblique;  $SC^1$  shortly stalked, arising just before  $R^1$ , anastomosing at a point or moderately with C,  $SC^2$  before  $SC^5$ ,  $R^2$  from well before middle of DC,  $M^1$  connate or separate. Hindwing shaped about as in *Thalassodes*, the angle at  $R^3$  well developed; cell rather short, DC rather strongly oblique; C approximated to  $SC^1$  rather shortly near base (sometimes with anastomosis at a point), then rapidly diverging;  $SC^2$  stalked,  $R^2$  normal,  $M^1$  connate or closely approximated.

Type of the genus: *Gelasmodes fasciata* (Warr.) = *Leucoglyphica fasciata* Warr.

I have now seen, in addition to Warren's type, both sexes from Abanga River (Gaboon), Bitye, Ja River (Cameroons) and Aburi (Gold Coast). Distinct from *Thalassodes* in the strongly pectinate ♀ antenna, subcostal venation of forewing and non-stalking of  $M^1$  of hindwing.

**15. Chlorodrepana allevata** sp. nov.

♂, 32 mm. Face deep red. Vertex and antenna pale, mixed with reddish. Thorax and abdomen whitish ochreous, the latter with a tinge of red dorsally, the crests small, white.

*Forewing* rather deep, bright opaque green, costal and distal margins narrowly whitish ochreous, the former with the extreme edge red, a reddish admixture from base to beyond one-half and a few fuscous dots, the latter with a fine red terminal line; fringe whitish ochreous, with a purple-red dividing-line.—*Hindwing* with ground-colour, termen and fringe as on forewing, the costal margin broadly whitish ochreous, to the same extent as the salmon-colour of *C. cryptochroma* Prout (*Noc. Zool.* xx. 417).

Underside very much paler, the hindwing uniform, the forewing with costal border ochreous, in proximal part mixed with red; both wings with fringe nearly as above.

Entebbe, Uganda, November 1902. Type in coll. Rothschild.

A very distinct species, the distal borders more than twice as narrow as in *angustimargo*, costal area of hindwing whiter, underside quite different. Forewing with  $SC^1$  anastomosing rather strongly with C,  $R^1$  separate; both wings with  $DC^3$  curved, becoming extremely oblique,  $R^2$  arising quite near  $R^1$ ,  $M^1$  well separate. A manifest link between *Chlorodrepana* and *Omphac*.

**16. Metallochlora melanopsis** sp. nov.

♂ ♀, 36–37 mm. Face black, with a few red scales. Palpus blackish above, reddish on side, pale beneath. Antennal ciliation, even in the ♂, minute. Vertex and upperside of thorax and abdomen green; abdominal crests rather glossy, mixed brown and black. Legs tinged in places with rufous.

Wings shaped almost as in *Antharmostes interalbicans* Warr. (tail of hindwing

scarcely so long), nearly of the same green, only slightly deeper or more bluish.—*Forewing* with costal edge narrowly ochreous, slightly dark-dotted; antemedian line white, obsolete in anterior half, forming a white spot on M at one-third the wing-length, fine and excurved between M and SM<sup>1</sup>, thick and slightly oblique outward from SM<sup>2</sup> to hindmargin scarcely before middle; postmedian broken into ill-defined white vein-dots, that on R<sup>1</sup> 5 mm. from termen, that on M<sup>2</sup> 3 mm. or less from termen, that at SM<sup>2</sup> close to tornus, prolonged to hindmargin; a fine red-brown terminal line, scarcely interrupted at the veins; fringe ochreous-whitish, with brown spots opposite the veins.—*Hindwing* without first line.

Underside whitish green, palest at hindmargin of forewing and on hindwing; costal and distal margins and fringes as above.

Bitye, Ja River, Cameroons, 2000 ft., October–November, 1910 (♂, type), September–November, 1911 (♀, paratype). Both in coll. Rothschild.

Large and deeply coloured for the genus.

### 17. *Metallochloa* (?) *grisea* sp. nov.

♀, 23 mm. Face red. Palpus red above, whitish beneath. Crown olivaceous, narrowly whitish between antennae. Antennal shaft whitish proximally, red distally. Thorax and 1st segment of abdomen dorsally olivaceous; 2nd and 3rd segments of abdomen dorsally orange, with a few reddish dots on sides, the 3rd segment also marked with red beside the base of the crest, posterior segments light greyish olive; 2nd and 4th segments with strong but not metallic crests, slightly paler than the surfaces on which they stand. Foreleg red on upper and inner sides. (Other legs lost.)

*Forewing* grey, at base tinged with green, costal edge orange ochreous dotted with black; no differentiated discal spot; both lines white, mostly broken up into vein-dots, the postmedian continuous from before M<sup>2</sup> to hindmargin; accompanied on their approximated sides by narrow olive-green shades; antemedian line irregular, best marked in posterior part, bending outwards on fold and inwards on SM<sup>2</sup>, the green band which accompanies it reaching the discocellulars; postmedian from three-fourths costa, somewhat incurved between the radials and between M<sup>2</sup> and SM<sup>2</sup>, then excurved, reaching hindmargin close to tornus; termen with white dots at the vein-ends, the posterior two or three elongate; fringe grey, narrowly olive-green at base.—*Hindwing* shaped as in typical *Hemithea*: coloured like forewing, except the costa; inner margin narrowly green for some distance from base; antemedian line replaced by an elongate green cell-mark, postmedian corresponding to that of forewing.

Under-surface dirty white, forewing slightly tinged with ochreous in cell and costal region, costal edge deeper ochreous, dotted with black.

Congella, Durban, September 4, 1905 (G. F. Leigh). Type in coll. Rothschild.

In the absence of the hindleg the exact position is conjectural, but it is apparently very close to *M. glacialis* Btlr., from Madagascar; abdomen and crests quite differently coloured, postmedian line of forewing running nearer tornus, tail of hindwing stronger.

### 18. *Neromia impostura* sp. nov.

♂, 27 mm. Curiously similar to *Lophostola atridiscæ* Warr., the antenna and some other points of structure enhancing the similarity, yet the frenulum, venation

and absence of definite crests refer it to *Neromia*. Palpus still shorter than in the species named, reddish-ochreous (not whitish) beneath. Abdomen dorsally mixed with black on the segments which bear the crests in *atrifidica*.

Wings slightly bluish green. Forewing rather more pointed, hindwing less elongate, discal dots much smaller, postmedian line somewhat more visible between the veins (lunulate-dentate), terminal line and fringe almost as in *L. annuligera* Swinh., the former brown, the latter white, spotted with brown at vein-ends.

Congella, Durban, November 18, 1904 (G. F. Leigh). Type in coll. Rothschild. Umkomaas, January 27, 1914, a ♂ in coll. A. J. T. Janse.

Very distinct in coloration, etc., from all other *Neromia*.

#### 19. *Neromia clavicornis* sp. nov.

♂, 29-33 mm.; ♀, 38 mm. Superficially like *rubripunctilla* Prout, but larger, rather bluer green, more strongly irrorated with whitish, the red discal dots rather less minute, foreleg more strongly red; quite distinct in the ♂ antenna. Structurally like *phoenicosticta* Prout, forewing with apex slightly more pointed, the termen being straighter and rather more oblique, postmedian line rather thicker, not crenulate, further (4-4.5 mm.) from termen, discal spots much smaller. The variation is also as in *phoenicosticta*—SC<sup>1</sup> of forewing free or anastomosing with C, R<sup>1</sup> of forewing and M<sup>1</sup> of both wings short-stalked or just separate, dorsal ridge of abdomen and tips of fringe sometimes (1 ♂) crimson, sometimes (1 ♂, 1 ♀) whitish.

Selukwe, S. Rhodesia, August 1913, 2 ♂♂ (type and another), April 1913, 1 ♀, all collected by F. W. Short and presented to my collection.

I have long hesitated whether this might be a constant aberration or form of *phoenicosticta*, and even now do not think the possibility absolutely precluded, though the ♀ palpus seems to have slightly longer third joint; the difference of wing-shape is quite appreciable, and I have seen no intermediates. In both, the antenna is **reddish** rather than (as given in the description of *phoenicosticta*) "ochreous"; in *phoenicosticta*, so far as I yet know it (2 ♂♂, 3 ♀♀), the colour-difference in dorsal ridge and fringe is sexual.

#### 20. *Lathochlora perversa* sp. nov.

♀, 20-26 mm. Face dull olivaceous, somewhat mixed with reddish above. Palpus rather short and slender, second joint smooth, third joint small; tongue developed; antenna pubescent; vertex pale greenish; thorax and base of abdomen concolorous with wings; abdomen dorsally with dull red spots on segments 2-4, slightly mixed with fuscous at the posterior extremities of the segments.

*Forewing* with termen not prominent at R<sup>3</sup>; M<sup>1</sup> well stalked; grey-green; costal edge dull ochreous, spotted and strigulated with black; a large discal spot and two lines ochreous, probably discoloured from green, chiefly indicated by spots on the veins and the antemedian at posterior margin; postmedian from two-thirds costa, strongly incurved between radials and again between M<sup>1</sup> and SM<sup>2</sup>; terminal line not darkened, slight indications of pale dots at vein-ends; fringe concolorous proximally, less green distally.—*Hindwing* with pronounced angle at R<sup>3</sup> but not at R<sup>1</sup>, only the slightest suggestion of sinuosity between; discal spot, postmedian line, termen and fringe as on forewing.

Under-surface dirty whitish, least pure in basal and costal region of forewing, costal edge of forewing nearly as above, the black marking somewhat reduced.

Bondonkou, Ivory Coast, February 22, 1903 (H. Pemberton). Type in coll. Rothschild. A second ♀ (much larger, badly worn, identity therefore not absolutely certain), from Mpanga Forest, Toro, Uganda, 4800 ft., November 16, 1911 (S. A. Neave), in coll. Brit. Mus.

Superficially bears a remarkable resemblance to some of the less iridescent *Iodis* species or to the neotropical *Chloropteryx*—particularly *C. hemithearia* Warr.—or most of all to *Metallochloa grisea*, described above. The venation is that of *Lathochloa*, the shape different, the third joint of the palps shorter. The ♂♂ are still unknown both of typical *Lathochloa* (*inornata* Warr.) and of *percersa*.

## 21. *Heterorachis fuscoterminalata* sp. nov.

♀, 31 mm. Face deep red. Palps reddish, pale beneath and on inner side. Vertex and antennal shaft white; pectinations short. Occiput green. Thorax green above, white beneath. Foreleg red above and on inner side. Abdomen above green at base, then whitish with dense red-brown dusting; crests concolorous, not strong.

*Forewing* with apex acute; M<sup>1</sup> well separate from R<sup>3</sup>; green, as in *Heterorachis simplex* Warr.,\* the costal edge very narrowly white; a very slender but uninterrupted fuscous terminal line; fringe white, with small fuscous basal dots at vein-ends.—*Hindwing* with termen very faintly waved; SC<sup>2</sup> only very shortly stalked, M<sup>1</sup> widely separate; as forewing.

Underside paler green, otherwise as above.

Congella, Durban (G. F. Leigh). Type in coll. Rothschild.

Certainly related to *simplex*, but smaller, costa of forewing straighter towards apex, apex sharper, hindwing less regularly rounded, abdomen, termen and fringe different.

## 22. *Heterorachis dichorda* sp. nov.

♂, 32 mm. Face brownish, pale below. Vertex and antennal shaft whitish; occiput green. Thorax green above, whitish beneath. Femora and tibiae mostly red-brown; tarsi pale. Abdomen dorsally pale ochreous, somewhat mixed with fuscous; glossy red-brown crests on the second and third and a smaller one on the fourth segment.

*Forewing* with SC<sup>1</sup> free, M<sup>1</sup> well separate from R<sup>3</sup>; opaque green, as in *Omphax*, costal margin whitish, the extreme edge narrowly ochreous; two distinct, straight, whitish-ochreous lines, the antemedian from one-third hindmargin, not quite reaching the whitish costal shade, postmedian nearly 5 mm. from and almost parallel with termen, becoming slender anteriorly; fringe pale ochreous, narrowly greenish basally.—*Hindwing* with termen smooth, well rounded; DC<sup>3</sup> and M<sup>1</sup> as in *Omphax*; concolorous with forewing; a single straight line from costa at well beyond one-half to inner margin at about three-fourths.

Underside whitish green, costal margin of forewing whitish ochreous, both wings with whitish postmedian faintly showing through.

Mbale, German East Africa, 2 ♂♂ in coll. L. B. Prout.

Since preparing the above description I have found in coll. Rothschild a pair

\* *Hemistola haploa* Prout, *Gen. Ins.* 129, p. 227. In the type ♂ the frenulum was entirely concealed, and I left the species in the genus to which Warren assigned it, pending further study; and changed the name to avoid homonymy. I have now seen other males and find the frenulum present; my *simplicissima* (*l.c.*, p. 228) will probably sink.

from Mt. Elgon, Uganda, the ♀ much larger. *H. prouti* B.-Baker (*Ann. Mag. Nat. Hist.* (8) xi. 571) shows similar size-variation, and is not unlike *dichorda* in shape and markings, but very much paler, the abdominal crests white, rather slight, forming an almost continuous ridge, recalling that of some *Neromia* species, M<sup>1</sup> stalked, etc.

### 23. *Heterorachis* (?) *carpenteri* sp. nov.

♀, 20–24 mm. Marvellously like a miniature *H. lunatimargo* Prout, but with third joint of palpus long.

*Forewing* appears slightly narrower, the distal margin curving rather more strongly in middle so as to become more oblique posteriorly. The brown line which proximally bounds the ornate border is on both wings more strongly crenulate, being curved or almost angled inwards on the veins and outwards between; the dark terminal spots opposite its inward projections are rather more marked (in the Lagos specimen partly black).

Lutoboka (Fort Stanley), Bugalla Island, 0–25 ft., Sesse Archipelago, Victoria Nyanza, larva, forest edge, spun September 14, emerged October 1, 1912 (Dr. D. G. Hale Carpenter), type in coll. Oxford Mus.; Lagos, July 30, 1906 (G. L. Boag), 1 ♀ in coll. Brit. Mus.

### 24. *Celidomphax prolongata* sp. nov.

♂, 31 mm. Face pale green, a band on upper part, together with vertex and proximal part of antennal shaft, deep maroon brown. Thorax and first abdominal segment green above, the rest of the body ochreous, crests of the second and third segments blackish, that of the fourth less dark, redder. Legs (especially the tibiae) marked with dark red-brown.

*Forewing* with costal and distal margins relatively rather long, the latter scarcely convex; SC<sup>1</sup> free, R<sup>1</sup> free; smoothly scaled, bright green, with slight white strigulation; costal margin ochreous, deeper at extreme edge, basally deep maroon-brown; a few reddish-fuscons scales near tornus, a slight indication of a small reddish-fuscons spot near termen between R<sup>1</sup> and R<sup>2</sup>; fringe pale ochreous proximally, more reddish distally, especially opposite the anterior veins, where ill-defined reddish spots are formed.—*Hindwing* with termen and inner margin relatively long, the former bent at R<sup>3</sup> (shape of genus *Thalassodes*); concolorous with forewing, except costally; the reddish-fuscons spot between R<sup>1</sup> and R<sup>2</sup> slightly better expressed, the tornal obsolete.

Underside whitish green.

Kojokaji, Lado Enclave, June 1912. Type in coll. Rothschild.

Distinguished from the other species especially by its shape.

### 25. *Lasiochlora bicolor maculosa* subsp. nov.

Differs from name-typical *bicolor* Th.-Mieg, from Durban, in having the postmedian row of minute dark dots of forewing enlarged into spots on the radial and median veins, those on R<sup>3</sup> and M<sup>1</sup> the largest, containing some pale scales; hindwing without discal dot. Further distinctions, which perhaps betoken a separate species, are that the row of spots is rather more obliquely placed than the dots of *bicolor bicolor*, and that R<sup>2</sup> of both wings is much less approximated at its origin to R<sup>1</sup>, R<sup>1</sup> of forewing close to SC<sup>2-5</sup>.

Nairobi to Mt. Kenya. Type ♀ in coll. Rothschild.

26. *Euchloris undulilinea* (Warr.)

*Eucrostes undulilinea* Warr., *Nor. Zool.* xii, 384 (1905).

*Comostolopsis* (?) *undulilinea* Prout, *Gen. Ins.* 129, p. 238 (1912).

This distinct and pretty little species—of which, in addition to Warren's type, I have now seen a second example from Aburi, Gold Coast, is certainly a derivative of *Comibaena* with the ♂ frenulum obsolete—i.e. taxonomically a *Euchloris*, though some minor differences in structure and its geographical isolation suggest that it is rather a collateral development. The palpus and foreleg unmistakably reveal its relationship.

27. *Acollesis mimetica* sp. nov.

♂ ♀, 29–34 mm. Face pale green. Palpus pale green, marked with red on outer side. Vertex and antenna white. Occiput pale green. Thorax and abdomen pale green above, white beneath.

*Forewing* with costa more arched than in the type species;  $SC^1$  connected by short bar with C, well separate from  $SC^2$ ;  $R^1$  not stalked with subcostals; colour and markings of *Collesis mimica* Warr., the postmedian line rather farther from termen (3.35 mm. at hindmargin), almost entirely obsolete anteriorly to  $R^1$ .—*Hindwing* also as in *C. mimica*, the line crossing the middle of the wing (in *mimica* rather beyond).

Underside whitish green, with the postmedian line faintly discernible; costal margin of forewing slightly greener.

Mount Mlanje, Nyassaland, February 17 (type), March 18, November 19 and 29, 1913 (S. A. Neave), all in coll. Brit. Mus.

Marvellously like *Collesis mimica* (which occurred in the same locality in January and April 1913), except in venation. From *A. terminata* Prout it differs in its green face, absence of olivaceous terminal line, non-anastomosis of  $SC^1$  of the forewing with C, non-stalking of  $R^1$  and rather less extreme position of  $R^2$ .

28. *Acollesis umbrata densisquamata* subsp. nov.

♂, 32–36 mm. Both wings more densely and evenly scaled with grey-greenish than in name-typical *umbrata*, recalling the scaling of *Nothoterpna*; the white postmedian line of both wings rather more slender, not accompanied proximally by a green line or band; a strongly excurved whitish antemedian line faintly traceable on the forewing; discal dots slightly enlarged.

Caiala, Bihe, Angola, 2 ♂ ♂, December 1904 (Dr. Ausorge).

As I have only seen one example (the type) of name-typical *umbrata*, and that is rather worn, it is possible that *densisquamata* may prove to be a mere aberration.

*Ctenoberta* gen. nov.

Akin to *Berta* Walk., differing as follows: Antenna in ♂ bipectinate nearly to apex, in ♀ also strongly bipectinate.\* Forewing with base of  $SC^1$  obsolete, leaving it to arise out of C and anastomose strongly with  $SC^2$ , which arises just before  $SC^3$ . Hindwing not excised between radials, the tail at  $R^3$  not very long;  $M^1$  connate with  $R^3$ . Discocellulars of both wings only slightly indicating the *Berta* form. The palpus is not extremely long in either sex, though, as usual, with third joint longer in the ♀. The hindlegs are lost in the only known ♂.

\* Broken in the only known example.



Type of the genus : *Ctenoberta abanga*, sp. nov.

The only known African *Berta* (*persimilis* Warr.) agrees with *Ctenoberta* in the pectinate ♀ antenna, but cannot be removed here, on account of the rest of the characters.

### 29. *Ctenoberta abanga* sp. nov.

♂ ♀, 23–24 mm. Face olive-green. Palpus reddish above, pale beneath. Vertex and antennal shaft white, the latter becoming less pure white distally. Thorax and abdomen dorsally olivaceous mixed with white.

Wings coloured quite as in *Berta*—white, marked with dirty olive-green.—*Forewing* in the basal area olive-green costally and with some green suffusions posteriorly (here somewhat rubbed); traces of a thick green line from about one-fifth costa to one-fourth hindmargin; median area not very broad (occupying about middle third of costa, narrowing much posteriorly), bounded on each side by two or three zigzag, partly confluent green lines, and containing interrupted green suffusions; darker green markings on and proximally to DC<sup>2</sup> form a very irregular discal ocellus; distal area green along both costal and posterior margin, and containing a narrow green band and a green subterminal line, the former dentate-edged (especially distally), the latter dentate, both parallel with the termen, the white areas which intervene slightly intersected with green at the veins; terminal line green, slightly interrupted; fringe white, spotted with green opposite the veins.—*Hindwing* similarly but rather more clearly marked, the basal area whiter, the discal mark oblong, almost entirely filled in with green.

Underside white, unmarked; costal edge of forewing olivaceous, more broadly towards base.

Abanga River, Gaboon, October 1907 (Dr. Ansorge). Type in coll. Rothschild.

### 30. *Comostolopsis sladeni* sp. nov.

*Comostola laesaria* Fryer, *Trans. Linn. Soc. Zool.* xv (1) 16 (1912) (nec Walk.) (indescr.).

*Comostolopsis simplex* part. Proat, *Lep. Cat.* xiv. 161 (1913) (nec Warr.) (indescr.).

♂, 14 mm.; ♀, 16–17 mm. Smaller than *simplex* Warr., ♂ antennal pectinations coarser, deeper reddish.—*Forewing* with apex less pointed, costal edge more reddish, postmedian line apparently more deeply sinuous, but almost obsolete, the red dot which accompanies it proximally between R<sup>3</sup> and M<sup>1</sup> larger and brighter; fringe green, distally whitish.—*Hindwing* with corresponding differences, an additional, but minute, red dot sometimes present at R<sup>1</sup> proximally to the postmedian.—*Forewing* beneath with costal margin and suffusions redder.

Seychelles (Fryer, *l.c.*). Type in coll. Brit. Mus.

### 31. *Comostolopsis intensa* sp. nov.

♀, 17 mm. Face narrowly deep red at upper extremity, then narrowly orange, then green, fading off below. Palpus orange above, the second joint strongly marked with deep red, pale beneath. Vertex green, a narrow white fillet between the antennae. Antenna white at base, becoming reddish distally. Thorax and abdomen green above, white beneath.

*Forewing* full green, about as in *Hipparchus papilionaria* L.: a black discal dot, slightly tinged with red; an indistinct sinuous whitish postmedian line about 2 mm. from termen; terminal line red.—*Hindwing* the same.

Under-surface whitish green, the forewing, except towards posterior and distal margins, somewhat suffused with reddish.

Grande Comoro, September 23, 1911 (G. F. Leigh). Type in coll. Rothschild.

Almost equally distinct in colour from the blue *stillata* Feld. and the yellow-green *simplex* Warr., etc. No trace of red spots accompanying the postmedian line.

## SUBFAMILY ACIDALIINAE

### *Tanaotrichia* Warr.

This genus was erected by Warren (*Proc. Zool. Soc. Lond.* 1893, p. 360) for *prasonaria* Swinh. = *trilineata* Warr., and subsequently merged by Hampson in *Erythrolophus* and by its author (*Nor. Zool.* ii. 98) in *Rhodostrophia*. Unless it be made a section of the latter, with essentially different ♂ hindleg, I think it must be resuscitated. Typically it would contain only a few Indian and Chinese species (*prasonaria* Swinh.; *bisinuata* Warr., *Nor. Zool.* ii. 98 = *orientis* Prout, Seitz, *Macrolep.* iv. 44; *currata* Warr., *Nor. Zool.* ii. 98, erroneously sunk by Hampson to *Rhodostrophia rinaccaria* Moore), but it has various outliers, in part African and including the new genus about to be described. Hampson would probably regard them as subgenera of *Tanaotrichia*, as it seems impossible, in the present state of our knowledge, to assign them distinctive characters which are at the same time constant and shared by both sexes. Whether as sections or genera, the following rough key may help to show the present position. Before introducing the new genus, I point out that *Erythrolophus* differs from it in the long palpus, *Somatina*, *Nobilina*, and *Discoglypha* in the stalking of SC<sup>2</sup> of the forewing, etc.\*

The group has in common the rather short but strong palpus, less hairy pectus than the *Somatina* group, generally smooth scaling, double areole, with SC<sup>2</sup> arising from cell (rarely even connate with SC<sup>3-5</sup>, never stalked), R<sup>2</sup> of forewing about central, rather short cell of hindwing, SC<sup>2</sup> usually connate or short-stalked, but never long-stalked.

#### 1. Hindtibia in both sexes with two spurs

*Dithecodex* Warr. (= *Mnesithetis* Swinh.†).

Hindtibia in ♀ with more than two spurs . . . . . 2.

2. Antenna in ♂ not pectinate . . . . . *Dithalama* Meyr.

Antenna in ♂ bipectinate . . . . . 3.

3. Antenna in ♂ with two pairs of branches to each joint *Tanaotrichia* Warr.

Antenna in ♂ with one pair of branches to each joint . . . . . 4.

4. ♂ antennal pectinations short . . . . . 5.

♂ antennal pectinations long . . . . . 6.

5. ♂ antenna with fascicles of long cilia; ♀ hindtibia usually

with three spurs . . . . . *Discomiosis* nov.

♂ antenna without fascicles of long cilia; ♀ hindtibia

always with four spurs . . . . . *Lissoblemma* Warr.

6. ♀ antenna bipectinate . . . . . *Isopleunia* Warr.

♀ antenna not bipectinate . . . . . 7.

7. ♂ hindtibia without spurs . . . . . *Anacosymbia* Prout.

♂ hindtibia with spurs . . . . . *Epicosymbia* Warr.

\* *Discoglypha* has, however, much in common with the *Tanaotrichia* group, and the point of origin of SC<sup>2</sup> may not here be of much significance. Cf. *Somatina apicipuncta*, *infra*.

† Sect. II, only. Cf. *Ent.* xliv. 292.

**Discomiosis** gen. nov.

Face smooth. Palpi short, shortly rough-scaled. Tongue present. Antenna in ♂ with short, very slender pectinations, which are well ciliated and surmounted with fascicles of long cilia. Femora glabrous. Hindleg with femur, tibia, and tarsus about equal in length; hindtibia of ♂ with strong hair-pencil and a pair of terminal spurs; near to them a rather larger, compact, spur-like tuft; in ♀ with a pair of terminal spurs and one proximal (in *crescentifera* both). Forewing with termen smooth, oblique, gently curved; areole double,  $SC^2$  arising from cell;  $SC^3$  from posterior wall of distal areole, seldom near its apex;  $R^2$  from very slightly before middle of  $DC$ ;  $M^1$  separate. Hindwing with termen typically somewhat sinuous and subcrenulate;  $SC^2$  very shortly stalked with  $R^1$ , sometimes connate;  $M^1$  separate.

Type of the genus: *Discomiosis anfractilinea* sp. nov.

**32. Discomiosis anfractilinea** sp. nov.

♂ ♀, 23–26 mm. Face and palpi black, the latter pale beneath. Vertex and antennal shaft pale ochreous brownish. Thorax and abdomen concolorous with wings, the abdomen dorsally with two or three blackish belts on the anterior segments.

*Forewing* pale ochreous brownish, sometimes with a slight olivaceous tinge, sometimes more pinkish; scattered fuscous irroration; lines blackish fuscous, thickened at costa, deeply (the postmedian unusually deeply) inangled behind  $C$ , strongly and acutely projecting distad behind  $SC$  and more or less strongly zigzag throughout their course, at costa and hindmargin approximately equidistant; antemedian and postmedian generally fine and sharp, the latter with some long proximal teeth between the veins; median shade weaker and broader, outbent so as to pass far distally to the discal dot, which is minute but sharp; subterminal dark dashes and strong terminal black dots, both between the veins; fringe dark-spotted opposite the veins.—*Hindwing* with discal dot surrounded by a slightly raised oval white ring, of which the posterior part is sometimes almost obsolete (as in *Acidalia exiguaria* Walk. xxi. p. 368, nec Swinh. *Tr. Ent. Soc. Lond.* 1904, p. 569); a median dark line closely following this; postmedian line, distal area and fringe about as on forewing.

Under-surface very weakly marked, but scarcely glossy; forewing slightly suffused, hindwing paler, both with discal and terminal dots and traces of postmedian line; fringe weakly spotted.

Nairobi, 2 ♂♂, April 29 (at light) and May 28, 1911 (T. J. Anderson), the latter the type; both in coll. Brit. Mus. Escarpment, British East Africa, 6500–9000 ft., ♂ ♀, December 1900–January 1901 (Doherty), in coll. Rothschild.

**33. Discomiosis synnephes** sp. nov.

♂ ♀, 19–21 mm. Face and palpi blackish fuscous, the latter somewhat paler beneath. Vertex and antenna pale. Body and legs concolorous with wings; fore-coxa and femur partly infuscated.

*Forewing* rather glossy, light brown, variable in colour (the type ♂ much more ochreous, the ♀ duller, more greyish), the distal area throughout shaded with blue-grey; antemedian line almost entirely obsolete, sometimes discernible at costa;

discal dot rather sharp; median shade indicated by a slight darkening of the ground-colour, rather broad but ill-defined, excurved round the cell-dot; postmedian line from almost three-fourths costa, here well marked, but mostly indicated only by dots or small distally-directed teeth on the veins (where discernible between, innulate); oblique outwards from  $SC^1$  to  $R^1$ , slightly incurved between radials and between  $M^1$  and  $SM^2$ ; termen with black dots or very short strokes between the veins.—*Hindwing* with termen rounded; antemedian and median shade wanting, the rest as on forewing.

Underside paler, almost markingless; postmedian dots faintly indicated in anterior part of forewing; terminal dots present on both wings, weaker than above.

Taveta, British East Africa, type ♂, December 20, 1905, and a ♀, January 4, 1906 (K. St. A. Rogers), both in coll. Brit. Mus.

More glossy and *Dithecodes*-like than the preceding, which rather recalls an *Acidalia*.

#### 34. *Discomiosis* (?) *crescentifera* (Warr.)

*Sterrhia crescentifera* Warr., *Nov. Zool.* ix. p. 504 (1902).

Mr. Warren overlooked the double areole of this species, which was founded on a single ♂ from Barotse. I suspect it is a dark aberration, but await further material from the same district. Lighter ♀♀ from Sarnia (Natal) and Pretoria, which I believe to be referable to it, have the coloration and aspect of *Acidalia sagittilinea* Warr. (*Nov. Zool.* iv. p. 219) or of less zigzag-lined *Discomiosis anfractilinea*, and agree with the latter in structure except that the hindtibia has all spurs present.

#### 35. *Somatina syneorus* sp. nov.

♀, 40–45 mm. Face black. Palpus black above, pale beneath. Vertex blackish. Collar ochreous brown. Thorax and abdomen concolorous with wings.

*Forewing* with distal areole very small; brownish white, with a tinge of pink, whiter costally and distally, very sparingly sprinkled with blackish; lines brown; antemedian weak at costa, from about one-third, irregularly dentate, the deepest tooth being in cell, where it approaches the discal dot, the second deepest on  $SM^2$  (also pointing outwards); space between antemedian and median dark-shaded; discal dot small but sharp; median line thick, obsolete at costa, angled outwards at  $R^1$ , fairly straight to  $M^1$ , then incurved, reaching hindmargin at scarcely beyond one-half, near the antemedian; postmedian from costa at about two-thirds, very oblique outwards to behind  $SC^5$  (with a slight indentation on  $SC^5$ ), forming a small lobe before and behind  $R^1$  (indented on the vein), then incurved, then forming a second (M-shaped) projection before and behind  $M^1$  (larger than that at  $R^1$ ); a few blackish scales on this line; a thicker but rather less sharply defined line following it distally, with the projections rather more rounded, the median one more heavily dusted with blackish scales; a further line close to termen, thickening and slightly receding therefrom anteriorly; terminal interneural dots in anterior part of wing only.—*Hindwing* similar, without first line; cell-mark more elongate, median shade close to it, not angled.

Under-surface whitish, almost unmarked; a dark terminal line, thickening into dots between the veins.

Anda, Lake Azingo, Gaboon, December 4, 1907 (type); Abanga River, Gaboon, October 1907; both in coll. Rothschild (from Dr. Ansorge). Bitje, Ja River, Cameroons, one in coll. L. B. Prout.

Evidently near *chalybeata* Walk. (*Tr. Nat. Hist. Soc. Glasg.* i. p. 375), as is shown by the form of the postmedian lines, but broader-winged, less dark-marked, and with median line quite differently-shaped distally; shape and coloration strongly suggest *anthophilata* Gnen.

### 36. *Somatina lia* sp. nov.

♀, 32 mm. Head and upperside of palpus dull dark red, palpus beneath pale. Antennal shaft pale flesh-colour, at base dark red. Collar ochreous. Front of thorax paler ochreous, then whitish, then flesh-colour. Abdomen flesh-colour.

*Forewing* with apex acute, very minutely produced;  $R^2$  from scarcely before middle of  $DC$ ; flesh-colour, with costal margin whitish ochreous, the extreme edge less whitish; lines slender, yellowish white, nearly straight; first from beyond one-third costa to three-eighths hindmargin; second from before two-thirds costa to five-eighths hindmargin; third from costa midway between second and termen, almost inappreciably curved outward in the middle, virtually parallel with second throughout; an indistinct, acutely dentate subterminal, its points nearly reaching third line at the veins and termen between them; a black dot behind  $SC^1$  close to termen; discal mark scarcely differentiated, appearing slightly raised; terminal line fine, scarcely darkened.—*Hindwing* similar, without first line, the third slightly more excurved in middle, no subapical black dot.

Underside paler, with the lines slightly indicated.

Anjouan Island, Comoro Islands, June 27, 1911 (G. F. Leigh). Type in coll. Rothschild.

Rather rubbed, but so strikingly distinct from all known species as to be quite unmistakable.

### 37. *Somatina apicipuncta* sp. nov.

♀, 33 mm. Face blackish in upper half, white in lower. Palpus dark above, white beneath. Vertex and base of antenna blackish. Collar ochreous. Thorax and abdomen dirty white.

*Forewing* dirty white (white with very fine fuscous irroration), costal edge narrowly ochreous; lines greyish, extremely faint; no antemedian; median from just beyond middle of hindmargin, straight, obsolete anteriorly; postmedian and two subterminal slightly thicker, faintly wavy, scarcely defined; a conspicuous black dot behind  $SC^1$  close to termen; terminal line fine, ochreous, continued round apex.—*Hindwing* similar, without ochreous costal edge or black apical dot.

Both wings beneath dirty white, unmarked.

Gambaga, Gold Coast (Dr. Bury). Type in coll. Rothschild.

Closely related to *accraria* Swinh. (*Tr. Ent. Soc. Lond.* 1904, p. 564); forewing with  $DC^1$  shorter,  $SC^2$  arising from cell (exceptional in this genus; in *accraria* normal), termen of both wings smoother, with less dark shading, forewing with only two black terminal dots (before and behind  $SC^2$ ), the anterior, on the other hand, enlarged, median line of both wings fine and straight.

38. *Somatina ctenophora* sp. nov.

♂, 37 mm. Face white, narrowly purple-brown above. Palpus white, dark purple-brown on outer side. Vertex and base of antenna white; antenna of ♂ bipectinate except apically, the pectinations increasing gradually in length to about the eighth joint, longish (over three times diameter of shaft) from here to about the twentieth, then decreasing; each surmounted by fascicle of cilia. Thorax and abdomen white. Legs white, foreleg in part infuscated; hindleg in ♂ rather slender, without spurs, tarsus as long as tibia.

*Forewing* more elongate than in typical *Somatina*, termen strongly oblique, smooth, little curved; glossy cream-white, not very opaque; lines very feeble, rather broad, greyish; antemedian not or scarcely discernible; median far beyond cell, slightly lunulate, dentate outwards on the veins, somewhat curved anteriorly; postmedian more deeply lunulate; subterminals both present, lunulate in the reverse direction to the other lines, the proximal inclined to be thickened into internenral spots; terminal line complete, but fine and inconspicuous; fringe white. — *Hindwing* with termen smooth, scarcely convex, except anteriorly, tornus pronounced; coloured and marked as forewing, the median line scarcely appreciably lunulate.

Underside white, unmarked.

Nairobi (T. J. Anderson), April 26, 1911 (type), April 25, 1911; both in coll. Brit. Mus.

A ♀ from the Johannesburg district (E. A. Bacot), which has for many years stood unnamed in my collection, certainly belongs here. Larger (43 mm.), abdomen very robust, face inappreciably browned above.

This species and the following, together with *subviridata* Warr. (*Nov. Zool.* viii. 10), should form a new section of *Somatina*, sharing with the section *Somatynopsis* Warr. the non-aborted ♂ hindleg, with section (? genus) *Orthoserica* the pectinate ♂ antenna; forewing with  $R^2$  arising well before middle of discocellulars,  $DC^3$  incurved, hindwing with  $SC^2$  separate, aspect nearly of *Problepsis*. The African species show various intergrades between *Somatina* (areole double) and *Problepsis* (areole single) in a way that is very interesting to the evolutionist but very troublesome to the systematist. Thus *figurata* Warr. (*Nov. Zool.* iv. 61)—which, except in the ♂ antenna, perhaps comes rather near *ctenophora*—and *vestalis* Btlr. (*Ann. Mag. Nat. Hist.* (4) xvi. 419), both have the distal areole showing various grades of reduction and sometimes vanishing, occasionally not even symmetrical in this respect on both wings of a single specimen. I believe, however, that the genus *Somatina* remains tenable in that  $SC^5$  in these cases arises from the areole, or at latest close beyond its apex, while in *Problepsis* it is long-stalked with  $SC^{2-4}$ . *S. micrata* F. (= *canu* Hampson), the Indian ally of *vestalis*, may show similar variation; compare Hampson, *Faun. Ind. Moths* iii. 463 (with which my experience agrees) with Turner, *Proc. Linn. Soc. New S. Wales*, xxxii. 675.

39. *Somatina centrophora* sp. nov.

♂, 35 mm. Near the preceding, but the forewing slightly narrower, hindwing slightly more convex from  $SC^2$  to  $R^3$ , ♂ hindtibia with a pair of terminal spurs, the venation and wing-markings showing more manifest signs of the transition towards *Problepsis*. On the right forewing of the unique example a minute distal areole persists and  $SC^5$  is barely stalked beyond it; on the left the distal areole has

vanished and  $SC^3$  is appreciably stalked, though still quite otherwise placed than in true *Problepsis*.

*Forewing* with the grey lines less feeble than in *ctenophora*, an antemedian present from M to hindmargin, the median rather more curved posteriorly; a nearly reniform discal ring placed beyond the middle of the wing, its colour partly light ochreous brown, partly fuscous overlaid with silvery scales, a minute black streak projecting distally from it on  $R^2$ ; fringe tinged with grey in distal half. — *Hindwing* with the discal mark subobsolete, indicated only by a slight ochreous tinge on  $DC^{2-3}$  and the irregular silvery element. — Forewing beneath with costal margin more infuscated.

Grahamstown. Type in coll. Brit. Mus. received from the Albany Museum.

#### 40. *Antitrygodes dysmorpha* sp. nov.

♂, 31 mm. Face and palpus bright brown above, white below. Vertex and base of antennal shaft white; fascicles of cilia moderate, arising from minute teeth. Collar ochreous-tinged. Thorax and abdomen white. Foreleg reddish on inner side. Hindtibia with the hair-pencil dark-coloured; tarsus short and slender.

*Forewing* with termen waved, appreciably sinuate between  $SC^5$  and  $R^3$  and between  $M^1$  and  $SM^2$ , small rounded projections consequently indicated at  $R^3$  and  $M^1$ ; white, with a few scattered black scales, especially costally and about the lines; costal margin tinged with red-brown; antemedian line light brown, dotted with black scales, much interrupted and irregular, strongly oblique outward from costa, then oblique inward and strongly sinuous; a light olivaceous central shade, shaped nearly as in *Somatina vestalis* Btlr., but with a stronger distal projection between the radials; containing a double discocellular mark formed of blackish dots against  $R^1$  and  $R^3$ ; the costal commencement of a dark median line distally to this shade; postmarked by dark vein-dots in anterior part; followed distally by an irregular band of light olivaceous blotches, interrupted between the radials; terminal blackish line continuous, thickened between the veins, especially in each sinus of the wing-margin; fringe mostly white proximally, with smoky cloudings distally. — *Hindwing* with termen waved, roundly toothed at  $R^1$  and  $R^3$ , sinuate between; without costal markings or antemedian line, otherwise similar to forewing.

Under-surface white, virtually without markings.

Northern Nigeria; Kano (F. G. Brown), type in coll. Brit. Mus.; a worn ♀ from Zungern (G. B. Simpson), rather larger, above strongly irrorated throughout with reddish, may be the same or a closely allied species.

Perhaps nearest to *cuneilinea* Walk. (*List Lep. Ins.* xxvi. 1752), agreeing in venation, etc., but very distinct; intermediate in shape between that species and the typical group. Lacks the lateral abdominal tufts by which Turner (*Proc. Linn. Soc. N. S. Wales* xxxii. 637) distinguishes this genus from *Problepsis*, but they fail also in *cuneilinea* and I think in some other cases. Hampson's differentiation (*Faun. Ind. Moths* iii. 425) by wing-form gives results which coincide better with the general habitus and pattern of the totality of the known species. Both the authors named fail to distinguish *Antitrygodes* Warr. from the Neotropical *Trygodes* H.-Sch.

#### 41. *Acidalia (Pylarge) anoista* sp. nov.

♂, 21 mm. Face and palpus black. Vertex and antenna bone-colour; foreleg partly darkened on inner side; hindtibia not dilated, the pair of spurs well developed.

*Forewing* rather broad, with costa slightly and termen moderately curved; bone-colour, with a very few scattered black scales (somewhat more copious towards costa): first line almost obsolete; median shade very feeble, oblique outwards from middle of hindmargin, finer and parallel with postmedian in anterior half; postmedian fine, olive-grey, weak and broken into spots, becoming rufous and distinct posteriorly to fold; some slight rufous shading between these lines posteriorly, producing the effect of a subterminal spot; some slight olive-grey terminal shading; terminal dots small, black, in posterior half less well developed; fringe long, in proximal half slightly more ochreous, at tornus rufescent.—*Hindwing* with termen scarcely bent at  $R^3$ : lines of forewing continued, not rufous posteriorly; terminal dots present; fringe ochreous proximally.

Forewing beneath somewhat smoky from base to median shade, a darker antemedian line faintly indicated; a dark discal dot; postmedian line darker than above, followed distally by a weaker parallel line; terminal area clear, the termen itself with the dots almost connected into a dark line. Hindwing beneath unmarked, except for the terminal dots.

Bitye, Ja River, Cameroons. Type in coll. L. B. Prout.

#### 42. *Acidalia subpectinata* sp. nov.

♂, 29 mm. Face blackish. Palpus blackish, in part pale beneath. Vertex and antenna pale fleshy; antenna with fascicles of long cilia, arising (except on first few segments and in distal part) from rudimentary pectinations, the longest of which do not quite equal the diameter of the shaft. Collar darker. Thorax fleshy. Hindtibia dilated, spurless, with hair-pencil, tarsus about as long as tibia. Abdomen fleshy, with large fuscous dorsal spots.

*Forewing* flesh-colour, in places paler in middle of wing; lines more ochreous, ill-defined; antemedian from hindmargin before one-fifth, losing itself towards SC; median double (1 mm. apart), parallel, oblique, waved, slightly sinuate inwards about  $M^2$ , the proximal reaching hindmargin at middle, both obsolete at costa; a small black discal dot; postmedian fine, at 2–3 mm. from termen, incurved at radials and more slightly at fold, marked with blackish dashes in the radial cellules and with minute dots in most of the others; subterminal line indicated by very feeble shading proximally and distally; termen with small interneural blackish dots.—*Hindwing* with termen bent at  $R^3$ ; antemedian line wanting; the two median lines somewhat darkened, especially the proximal; a large black cell-dot interrupting the distal; postmedian with the radial dashes smaller; subterminal and terminal as on forewing.

Forewing beneath with the lines (except the postmedian) weaker, the first obsolete; discal dot present, terminals nearly obsolete, a feeble olivaceous terminal line, interrupted at the veins. Hindwing beneath paler, the discal dot and postmedian line well developed, a terminal line as on forewing.

Uganda, probably Entebbe district (Jackson). Type in coll. Rothschild.

#### 43. *Acidalia megalostigma* sp. nov.

♀, 25 mm. Face and palpus black. Vertex and base of antenna bright golden ochreous. Thorax paler ochreous. Abdomen concolorous with wings.

*Forewing* rather broad; whitish ochreous, inclining to yellowish, with slight darker admixture and faint traces of a sinuous ochreous postmedian line; discal



spot roundish, black, abnormally large for the genus, its diameter nearly 1 mm.; fringe concolorous.—*Hindwing* with termen entire, not appreciably bent at  $R^3$ ; like forewing.

Under-surface similar, costal edge of forewing deeper ochreous, cell-marks narrower.

Abanga River, Gaboon, October 1907 (Dr. Ansorge). Type in coll. Rothschild.

#### 44. *Acidalia macrocelis* sp. nov.

♂ ♀, 21 mm. Face and upperside of palpus black; vertex black. Antenna with joints projecting, ciliation in ♂ rather long, in ♀ very short; ochreous, proximally dark-marked above. Collar deep yellow. Thorax and abdomen bright yellow above, duller and more ochreous beneath. Hindtibia in ♂ thickened, with hair-pencil and with fringe of projecting scales on upper side; tarsus about one-half length of tibia.

*Forewing* rather broad, apex not very acute; bright yellow, slightly mixed at base with purple-fuscons; lines obsolete except at hindmargin, where they are represented by purple-fuscons spots; antemedian at one-third or rather before, in ♂ slight, ending about at fold, in ♀ stronger, nearly reaching M; postmedian at two-thirds or rather beyond, forming a large roundish or oval blotch which crosses  $M^2$  and reappears as a small dot (in the ♀ larger) on  $M^1$ ; discal dot small, purple-fuscons; costal edge distally and fringe deeper yellow, the latter becoming more rufescent at tips.—*Hindwing* with termen appreciably bent (rather roundly) at  $R^3$ ; concolorous with forewing; a small purple-fuscons spot (or thick line) from inner margin before two-thirds to  $M^2$ ; discal dot and fringe as on forewing.

Both wings beneath slightly paler yellow, unmarked.

Bitye, Ja River, Cameroons, type and another ♂; Fort Crampel, French Congo, a ♀; all in coll. L. B. Prout.

Advocates of "emendation" are asked to note that this species is named from the blotch on the forewing, not from the thickened tibia.

#### 45. *Acidalia omnisona* sp. nov.

♂, 17 mm. Face and palpus red. Vertex grey. Antennal shaft grey, dotted with red; joints slightly projecting, ciliation rather long (a little damaged). Thorax and abdomen pinkish grey, abdomen with a row of deep black dorsal spots. Legs grey, foreleg partly reddish on upper and inner sides; hindtibia rather long and dilated, with hair-pencil, tarsus about half as long.

*Forewing* with apex acute, termen oblique, rather straight, with the faintest concavity in anterior part and convexity in middle; pale pinkish grey (or violet-grey), with a few scattered black scales, extreme costal edge dark red-brown; lines fine, brownish, accentuated by black dots on costa and (except the median line) on veins; first at about one-fourth, nearly parallel with termen, slightly sinuous; median beyond middle, slightly sinuous, in posterior half forming a deep sinus inwards and becoming thick and black and bounded distally by a large reddish brown spot; postmedian from almost four-fifths costa to hindmargin close to tornus, twice sinuate inwards, followed at tornus by a small blackish spot; a small black cell-dot; terminal line somewhat crenulate, blue-grey, almost entirely covered with dense, deep black irroration; proximal half of fringe tinged with glossy blue-grey and bearing black dots opposite the veins, distal half ochreous-brownish.—

*Hindwing* with termen slightly bent in middle; coloured like forewing, first line wanting, both the others weak, marked with fine black vein-dots and ending in larger dots at inner margin; no cell-dot; termen and fringe as on forewing.

Forewing beneath whitish at hindmargin (more broadly distally) and very narrowly along termen, otherwise suffused with red; postmedian line present though not sharp; cell-dot obsolete; a dark reddish terminal line. Hindwing beneath whitish, without markings; a weak, interrupted reddish terminal line.

Madagascar, Antananarivo (Chulliat). Type in coll. L. B. Prout, received through Le Monlt.

#### 46. *Acidalia ludibunda* sp. nov.

♂. Exceedingly similar to *A. minorata* Bdv. (*Faune Ent. Madag.* 115) = *consentanea* Walk. (*List Lep. Ins.* xxii. 745), agreeing in size, shape, markings, the black face and upperside of palpus, etc.

Differs as follows: Antennal ciliation fully twice as long as diameter of shaft (in *minorata* scarcely longer than diameter), hindtarsus rather longer (over two-thirds tibia, in *minorata* little over one-half), ground-colour with a decided tone of yellow (in *minorata* whitish bone-colour to fleshy, or, when the irroration is strong, greyish), dark irroration very slight, discal dots generally smaller, terminal dots very minute (sometimes obsolescent posteriorly). The postmedian line does not show the darkened denticulations which are frequent in the *minorata* series.

Selukwe, S. Rhodesia; type, March 1912 and another May 1913 (F. W. Short); Transkei, 2 ♂♂ (F. Barrett); all in coll. L. B. Prout. New Hanover, Natal, April 1913, 1 ♂ in coll. A. J. T. Janse.

Hitherto mixed among *minorata* Bdv., which perhaps includes several closely allied and very difficult species, but from which the present one must certainly be disentangled.

#### 47. *Acidalia elegans* sp. nov.

♂, 22 mm. Face and palpus blackish. Antennal ciliation moderate. Vertex white. Collar ochreous. Thorax and abdomen white, the latter with a fuscous, black-mixed dorsal spot at the beginning of each segment from the second to the seventh. Foreleg fuscous above. Hindtarsus quite short.

*Forewing* pure white, with a very few black atoms; extreme costal edge marked with dark fuscous near base; lines fuscous; antemedian somewhat curved, much interrupted, chiefly showing at the veins (where it is slightly dusted with black) and as a black dot on costa; median shade thick and rather ill-defined, starting from a blackish spot just beyond middle of costa, forming a complete ring round (not touching) the large black discal dot, thick on distal side of the same, somewhat sinuous and deeply innulate-dentate (the teeth outwards) in posterior half; postmedian line marked by black dots at costa and hindmargin and smaller ones on some of the other veins, entirely interrupted between the radials and between M<sup>2</sup> and fold; accompanied distally by a band of fuscous shading, which is broken up into three patches by the interruptions at the places indicated; no terminal line; base of fringe dotted with fuscous at vein-ends.—*Hindwing* shaped as in *ornata* Scop.; no antemedian line; median shade obsolete on the distal side of the cell-dot; postmedian line less completely interrupted than on forewing, the shades distally to it more broken into spots; a thick, curved subterminal line from

near apex to  $R^3$ , then faint and bending to termen, which it reaches at  $M^1$ ; fringe as on forewing.

Underside white, unmarked, costal edge slightly infuscated.

Entebbe, 1905 (E. A. Minchin). Type in coll. Brit. Mus. Near Lagos: in forest half a mile from Oni camp, December 4, 1910 (dry season), 1 ♂; in forest about a mile east of Oni, August 18, 1911 (wet season), 1 ♀; both in coll. Oxford Mus., collected by Dr. W. A. Lamborn.

#### 48. *Acidalia beccarii* sp. nov.

♀, 27 mm. Face and palpus black, the latter pale-mixed beneath. Vertex white; occiput narrowly blackish; collar also darkened. Antenna slender. Thorax and abdomen dirty white, irrorated, especially above, with fuscous, the abdomen showing the same weakly banded appearance as in the allies.

*Forewing* dirty white with a slight tinge of ochreous-brownish and with fine blackish-fuscous irroration; markings as in *marginepunctata* Goeze, the median shade rather less thickened than is usual in that species, the pale subterminal rather less expanded between the radials, its dark proximal spots strong and well differentiated, that nearest the costa not weaker than the succeeding one, the terminal dark dashes longer.—*Hindwing* with termen almost entire and not very strongly convex; marked as forewing, without the first line.

Underside weakly marked, about as in *fibulata* Guen.

Eritrea: Asmara, October 17 and 28, 1905 (N. Beccari), 2 ♀♀, the latter the type, in coll. Rothschild.

This is probably the "*Craspedia fibulata*" which de Joannis (*Bull. Soc. Ent. Ital.* xliv. p. 136) records from the same country. Very similar to large examples of that species or its closest allies, but especially to *marginepunctata* Goeze; differs from all in the slightly narrower forewing, with rather more oblique termen, less convex hindwing (less crenulate than in *nigrinotata* Warr., *Nor. Zool.* iv. p. 52), less thick median shade, less expanded radial spot of subterminal, longer terminal dashes, etc.; from the hitherto described Indian and Aethiopian species in having the median shade less bent anteriorly, reaching the costa distally to, not opposite, the cell-dot. The lines do not spring from enlarged costal spots, the discal dots are on an average smaller than in the allies; the forewing beneath is not (as in *marginepunctata*, etc.) suffused with glossy fuscous.

#### 49. *Glossotrophia natalensis* sp. nov.

♂, 26 mm. Face and upperside of palpus black. Antennal joints projecting, the fascicles of cilia rather long. Vertex dirty whitish with a tinge of ochreous. Collar dark fuscous. Thorax and abdomen dirty whitish, coarsely irrorated above with dark fuscous; abdomen with one or two dark dorsal spots near base. Legs pale. Hindtibia long and slender, with both terminal spurs present, the outer the longer; tarsus well developed, nearly two-thirds tibia.

*Forewing* relatively rather narrow, the termen being strongly oblique; dirty whitish, thickly and coarsely irrorated with fuscous; line fuscous, distinct; ante-median from a slightly enlarged spot at costa, strongly angled outwards in and again behind cell (the points of the angles somewhat thickened), inwards at  $M$ , oblique inwards from second outward angle, but again, though more slightly, angled close to hindmargin, which it reaches at rather beyond one-fourth; discal

mark strong, somewhat strigiform; median line arising from a spot beyond middle of costa, dentate throughout, incurved so as to touch discal mark, but here vague, deeply incurved in submedian area, angled outwards at SM<sup>2</sup>, reaching hindmargin midway between the others; postmedian line rather deeply dentate, perpendicular from before three-fourths costa to R<sup>1</sup>, deeply incurved between radials and moderately deeply in submedian area; subterminal line little thickened except at the radial bend and to a less extent at the subterminal one; its lunules anteriorly and on each side of M<sup>1</sup> accompanied proximally by indications of dark spots; terminal marks thick and elongate, the intervals somewhat shorter than the marks; fringe dark-mottled.—*Hindwing* with termen somewhat irregularly waved (less irregular, especially near tornus, than in *Acidalia nigrinotata* Warr., *Nor. Zool.* iv. p. 52), an appreciable though very shallow sinus between the radials; SC<sup>2</sup>-R<sup>1</sup> very shortly stalked; concolorous with forewing; discal mark more roundish; first line wanting; median forming a deep bay (fully as deep as the width of its mouth) proximally to the discal mark, thence about as in the allies; postmedian also with the inward bend between the radials deeper than on forewing, a marked subcostal indentation also present; distal area nearly as on forewing.

Undersurface glossy and very weakly marked, the discal spot and postmedian line of forewing the most noticeable.

Mooi River, Natal. Type in coll. Rothschild.

Doubtfully referred to the Palaearctic genus *Glossotrophia*. The tongue is long, but not more extreme than in some *Acidalia* of the *marginipunctata* Goeze group. Colour of *Ptychopoda hispidata* Warr. (*Nor. Zool.* xi. p. 469) from Angola, of which only the ♀ is known, but which is shorter-winged and with the normal hindwing venation and shape of *Ptychopoda*, etc. Both this and one of the examples of *Discomiosis anfractilinea* (described above) have been labelled by Warren "*dentigerata* Walk.?"; but Walker's type at Oxford (*List Lep. Ins.* xxvi. p. 1603) is an *Acidalia*, identical with the species which passes (I think correctly) as *rudisaria* Walk. (*op. cit.* xxiii. p. 790); the type of the last-named is lost.

#### 50. *Ptychopoda ascepta* sp. nov.

♂ ♀, 19–20 mm. Aspect of the Indian *P. actiosaria* Walk., both wings slightly narrower, with costal margin relatively rather longer, termen of forewing more oblique, of hindwing less convex, face and upperside of palpus perhaps rather more blackish fuscous. Hindleg of ♂ short, more slender, without the strong hair-tufts of *actiosaria*.

*Forewing* sometimes coloured quite as in *actiosaria*, sometimes rather more reddish, markings about as in that species, variable in intensity, median shade sometimes stronger and thicker, postmedian line fine, rather nearer the termen, the proximal of the subterminal pair sometimes almost equally strongly expressed, placed near and parallel to the postmedian; fringe not, or only extremely weakly, dark dusted at base.—*Hindwing* marked about as in *actiosaria*, sometimes rather paler; fringe as on forewing.

Underside rather paler than in *actiosaria*, the discal dot and fine (often rather sharp) postmedian line alone developed.

Cape (probably Anushaw), type ♂ in coll. L. B. Prout; Anushaw, 3 ♀ ♀ (coll. L. B. Prout et coll. Brit. Mus.). All collected by Miss F. Barrett, mixed in coll.

C. G. Barrett with *Acidalia minorata* Bdv. A smaller (16 mm.) ♀, rather more strongly marked, from Deelfontein, March 14, 1902 (Col. Sloggett), in coll. Brit. Mus., may also be referred here.

### **Epicleta** gen. nov.

Face flat. Eye rather small. Palpus short, with rather long projecting scales from base beneath. Tongue rudimentary, concealed in cavity between palpi. Antenna in ♂ ciliated in fascicles. Pectus somewhat hairy. Femora glabrous. Hindleg of ♂ aborted, without spurs. Wings shaped and scaled as in *Cleta* Dup. Forewing with SC<sup>1</sup> free, not approaching the stalk of the other subcostals; SC<sup>2-3</sup> coincident; SC<sup>4-5</sup> coincident, stalked with SC<sup>2-3</sup>; M<sup>1</sup> separate. Hindwing with C anastomosing at a point near base; SC<sup>2</sup>—R<sup>1</sup> long-stalked; M<sup>1</sup> separate.

Type of the genus: *Epicleta calidaria* sp. nov.

Almost unique in the subfamily in the reduction of the number of the subcostal veins, a peculiarity shared only by the North American *Goniacidalia* Pack.; otherwise combining the structure of certain *Ptychopoda* with the facies of *Cleta*.

#### 51. *Epicleta calidaria* sp. nov.

♂, 10–11 mm. Head and body, with palpus, antenna and legs, brownish ochreous. Antennal joints somewhat triangularly projecting, with rather long, slender fascicles of cilia. Hindleg quite short, tibia slightly thickened, tarsus very short, slender, pointed.

*Forewing* with costa slightly arched at base and near apex, straight between, apex acute, termen sinuous; bright ochreous; costal area, especially at base, with more or less reddish-brown dusting; lines reddish-brown, slightly darkened and thickened at costa; antemedian, from about one-fourth costa, somewhat sinuous, less sharply expressed than the others; median line nearly straight, from midcosta (or just proximally thereto) to middle of hindmargin; postmedian at about three-fourths, rather less oblique than the termen, very slightly sinuous, accompanied distally by an irregular ill-defined band of red-brown shading; terminal line red-brown; fringe proximally ochreous mixed with red-brown, distally with the red-brown prevailing.—*Hindwing* with termen sinuous, roundly prominent about R<sup>3</sup>; concolorous with forewing, the median and postmedian lines continued, more sinuous than on forewing; distal area and fringe as on forewing.

Under-surface similar, but not quite so bright.

Transkei (Miss F. Barrett). Type in coll. L. B. Prout. Topotypes (2) in coll. Brit. Mus.

Strikingly like a miniature *Cleta ramosaria transiens* Prout (Seitz, *Macrolep.* iv. 88).

#### 52. *Traminda drepanodes* sp. nov.

♂, 33 mm. Head pale reddish. Palpus ochreous. Thorax pale ochreous; abdomen paler. Foreleg ochreous, tinged with red.

*Forewing* rather broad, with costa arched, apex minutely falcate, tornus pronounced; pale stramineous ochreous, with costal edge narrowly reddish; cell-spot large, irregularly shaped (more diamond-shaped than round or oval), violaceous or slightly rosy, mixed (except in centre) with blackish scales; a brown line (proximally greyer, distally warmer) from middle of hindmargin almost to apex, then

somewhat diffuse, bending rectangularly so as to run to costa, here accompanied distally by a small dull reddish spot; a dark dot in the apical hook; fringe mostly fuscous. — *Hindwing* with apex pronounced, termen scarcely bent at  $R^3$ ; concolorous with forewing, the line continued as antemedian (obsolete at costal extremity); fringe as on forewing.

Under-surface brighter ochreous; cell-spot of forewing obsolete; line scarcely discernible; fringe as above.

Bitye, Ja River, Cameroons, 2000 ft., September—November 1911. Type in coll. Rothschild.

Very distinct from all the hitherto known species, superficially suggesting a *Drepanodes*.

#### SUBFAMILY LARENTIINAE

##### 53. *Conchylia gamma* sp. nov.

♂, 28 mm. Head, body and legs dirty whitish, with a decided tinge of brown.

*Forewing* shining white, costal margin with a bright brown streak from towards middle to near apex, pointed at both ends, widening gradually between; markings brown, forming narrow bars, slightly darker edged; antemedian from hindmargin at 3 mm. from base, rather oblique to origin of  $M^2$ , then more curved to cell-fold, along which it runs to join the postmedian, throwing out projections anteriorly and (smaller) posteriorly where it crosses the discocellulars; postmedian from apex to hindmargin near tornus, forming an inward curve throughout its length, very slightly sinuous; a thick brown terminal line; fringe paler (damaged). — *Hindwing* dirty brownish white.

Forewing beneath smoky, hindwing white.

Cape: Bushman Land, 1896 (G. Alston). Type in coll. Brit. Mus.

Distinguishable at a glance by the form of the brown bars, which represent together, when viewed from the apex of the right wing, a rough Greek gamma.

##### 54. *Conchylia irene* sp. nov.

♂, 28–29 mm. Face white, mixed with light brown. Palpus predominantly brown, the tip (more extended above) remaining white. Vertex and antenna white. Collar mixed with brown. Thorax white; abdomen more brownish.

*Forewing* pure white, less glossy than in the type species; markings fuscous, consisting of two very slender bars, slightly darker at their edges; antemedian from  $SM^2$  at nearly 3 mm. from base, strongly oblique and very slightly curved, terminating at cell-fold near end of cell; postmedian from  $SM^2$  close to tornus, straight in the direction of apex, ending just in front of  $SC^5$ , tapering gradually at posterior end and more abruptly at anterior; termen and fringe concolorous. — *Hindwing* whitish brown, with a not sharply defined fleshy brown border about 3 mm. wide, narrowing towards tornus.

Both wings beneath smoky brownish, forewing darkened at costa, the lines indistinctly marked in dark grey.

Foot of Nieuwveld Mountains, 5 miles N.W. of Beaufort West (Mrs. Butt). 4 ♂♂ in coll. Rothschild.

Near *lapsicolumna* Prout (*Ann. Transv. Mus.*, in the press), the lines more slender, not reaching the wing-margins, etc.

55. *Hydrelia unipecten* sp. nov.

♂ ♀, 29–35 mm. Extraordinarily like large specimens of *H. flavicoma* Warr. (*Nor. Zool.* vi. 296, section *Asthenotricha*) and *H. inutilis* Warr. (*ibid.* viii. 299), sometimes hard to distinguish except that the **male antenna bears very long, slender, curved, uniseriate pectinations**, on which account it will constitute a new section of the genus.\* From *flavicoma* the ♂ also differs in lacking the secondary sexual hair-pencil. Such further distinctions as I have been able to discover depend upon small points not brought out in Warren's diagnoses, so that it is necessary to include them here. Face darker fuscous (only so in fuscous-winged aberrations of *flavicoma*, such as are unknown in *unipecten*). Abdomen nearly always with distinct paired dark dorsal spots on the anterior segments. Coloration on an average redder, varying from light fleshy brownish to strong, deep rufescent (in the allies from fleshy brownish to brown and fuscous); discal dots always strong, on an average (especially on the hindwing) larger than in the allies; median area generally (in them very rarely) much narrowed at hindmargin, here as a rule darkened; postmedian line more lunulate-dentate and not (as in *flavicoma*) incurved between the radials; ill-defined, not being followed (as in it) by a fine pale yellowish or whitish line; terminal line stronger (usually obsolescent in *flavicoma* and *inutilis*), markedly thickened between the veins or forming rather conspicuous dots. Hindwing slightly more elongate costally.

Underside rather less pale.

British East Africa: E. slopes of Aberdare Mountains, 7000–8500 ft., February 24–26, 1911, 26 ♂♂, including the type; W. slopes of Mount Kenya, 5000–8500 ft., February 26, 1911, 2 ♂♂; S. and E. slopes of Mount Kenya, 5000–7000 ft., February 8, 1911; all in coll. Brit. Mus., collected by S. A. Neave.

The ♀ must be sluggish or retiring, and the remarkably modified ♂ antenna is probably connected with the matrimonial quest.

56. *Epirrhoë achatina* sp. nov.

♂, 28 mm. Face with loose tuft of projecting scales on lower part. Palpus moderate, stout. Antenna closely lamellate, pubescent. Head and body concolorous with forewing.

*Forewing* normally shaped (or somewhat narrower than in the typical—*alternata* Müll.—European group), glossy; whitish ochreous, slightly irrorated with ferruginous; basal area slightly darkened costally and marked by a red-brown spot at base and three excurved and crenulate red-brown lines, the outermost the thickest and placed at about 2 mm. from base; succeeding area traversed by three crenulate ferruginous lines, the first rudimentary, the third very slender; median area 5–6 mm. wide at costa, 3 mm. at hindmargin, bounded by fine white lines, its edges crenulate, the distal shaped about as in *Xanthorhoë spadicearia* Schiff.; its proximal and distal parts slightly darkened, the former with three approximated brown lines (the middle one the weakest), the latter with four (the third somewhat blurred, inclining to coalesce with the fourth), its central part delicate pinkish,

\* *Nomenia* Pears., *Can. Ent.* xxxvii. 126, has the discocellulars of both wings biangulate; moreover the pectinations are scarcely more than uniseriate **teeth**—more recalling those of *Hydrelia dentatissima* Warr. (*Nor. Zool.* vi. 34). If not, as I believe, a valid genus, it would fall into *Venusia*.

recalling *Lorofidonia explanata* Walk. (*List Lep. Ins.* xxiv. 1190) or *Epirrhoë thermochroa* Hmps. (*Tr. Zool. Soc. Lond.* xix. (2) 129, t. 4, f. 63); discal dot minute; area beyond median band again traversed by ferruginous lines; subterminal line whitish, obsolescent; distal-marginal area somewhat clouded with brown, with a not very strong, oblique whitish streak from apex; terminal line black, slightly interrupted; fringe brownish in proximal half, whitish in distal, ill-defined black spots opposite the veins.—*Hindwing* rather narrow, with costal margin long (about *Ortholitha* shape), termen slightly waved; whitish, sometimes with an ochreous tinge, proximal part somewhat shaded with pale grey, a sinuous dark grey postmedian line, least distinct at costa, oblique outwards from  $M^2$  to hindmargin, which it reaches near tornus; slight beginnings of two proximal lines at hindmargin: some very feeble greyish shading indicating position of subterminal line: a dark terminal line; fringe proximally much paler than on forewing, traces of dark spots and of a dark central dividing-line.

Both wings beneath pinkish, somewhat darker as far as postmedian line, whitish just beyond this, discal dots and postmedian line well expressed, some feeble lines between them, faint traces of grey-reddish lines in distal area; terminal line and fringe marked nearly as above, but weaker.

Basutoland: Pithaneng River Valley, January 29, 1902 (type); Masite, December 8, 1902 (paratype); both in coll. Brit. Mus., collected by R. Crawshay.

#### 57. *Eupithecia* (?) *dryas* sp. nov.

♂ ♀, 27–28 mm. Face green. Palpus fuscous, nearly twice as long as diameter of eye, strong, heavily scaled beneath. Vertex green. Antenna fuscous, in ♂ with even ciliation of not quite the length of diameter of shaft. Collar fuscous. Thorax and abdomen dorsally green, the latter banded or blotched with fuscous; metathorax with small paired crests; abdominal crests slight, consisting of small whitish scale-patches at ends of segments; anal tuft of ♂ fuscous, not large.

*Forewing* with costa slightly arched proximally and distally, straight between, apex round-pointed, termen curved, oblique; green, the colour formed of a rippling of dentate green lines on a whitish green ground, the markings fuscous; basal area somewhat irrorated with fuscous, bounded by an irregular, double, anteriorly outbent line; median fascia indicated by two pairs of dentate lines and accumulated fuscous central irroration, especially from discal mark to fold; breadth of the fascia at costa about 4 mm., at hindmargin nearly 3 mm., its proximal edge rather oblique outwards from costa to cell-fold and rather projecting inwards behind submedian fold, its distal edge rather oblique outwards to before  $R^1$ , with a pair of small teeth separated by  $R^1$  and a second pair (blunter) by  $M^1$ , slightly inbent at  $R^2$ ; cell-mark blackish, rather elongate; a pair of spots proximal to the (obsolete) subterminal line, before and behind  $R^3$ , a row of smaller internenral spots or dashes distally to the same; terminal line marked by elongate spots at vein-ends; fringe pale, spotted with fuscous opposite the veins.—*Hindwing* long for the genus, smooth-scaled, fuscous, with a slightly paler band beyond middle, bounded proximally by a vague dark line.

Both wings beneath similar to hindwing above.

Transkei (Miss F. Barrett), in coll. Rothschild, coll. Brit. Mus. et coll. L. B. Prout; type in the first-named collection.



Similar to *cidariata* Guen. (*Spec. Gén. Léop.* x. 357), but according to the description and figure the median band is so different in shape that it is impossible to unite it therewith, especially as the hindwing also appears to differ.

#### SUBFAMILY GEOMETRINAE

##### *Anoectomychus* gen. nov.

Face with appressed scales. Palpus moderate, second joint with projecting scales above and beneath, third joint moderate, rather slender, conico-cylindrical. Tongue developed. Antenna in ♂ bipectinate, in ♀ nearly simple, minutely ciliated. Pectus slightly hairy. Femora glabrous. Hindtibia in ♂ slightly thickened, in both sexes with all spurs.

*Forewing* with costa arched at base and beyond middle, straighter between, apex moderately sharp, termen smooth, rather oblique, very little curved, tornus well expressed; cell about two-fifths;  $SC^{1-2}$  coincident, anastomosing or connected with C, sometimes anastomosing at a point with  $SC^{3-4}$ ;  $M^1$  from close to end of cell.—*Hindwing* with apex nearly rectangular, termen curved, especially towards middle, faintly waved, tornus prominent; cell open ( $DC^{2-3}$  wanting), C in ♀ approximated to SC near base, in ♂ later (at the forward curve of SC),  $SC^2$  and  $R^1$  in ♂ separating near base, the former making a strong forward curve, the latter straight, in ♀ separating at about one-third, normally formed,  $R^2$  wanting, M in ♂ very near SC,  $M^2$  in ♀ branching off not far before the separation of  $R^3$  from  $M^1$ , in ♂ quite near base.

Type of the genus: *Anoectomychus pudens* (Swinh.) = *Luciaria pudens* Swinh., *Tr. Ent. Soc. Lond.* 1904, p. 504.

No doubt related to *Luciaria* Walk. and *Cassyma* Guen. Similar to *Pigiopsis* Warr. (*Nov. Zool.* vi. 300), but distinguished by the shorter, open cells of the hindwing, the very curious ♂ venation, and other characters.

##### 58. *Pigiopsis scotoides* sp. nov.

♂, 23 mm. Face and palpus very deep ferruginous, the latter with first joint pale. Vertex and antenna purple-grey. Thorax purple-grey above, pale beneath. Forecoxa and inner side of all legs pale violet-grey; legs otherwise more or less strongly infuscated. Abdomen purple-grey, with slight tinge of brown.

*Forewing* with termen less oblique than in *convergens* Warr. (*Nov. Zool.* vi. 301); a fovea present;  $SC^{1-2}$  coincident, free or anastomosing at a point with C; purple-grey (light, almost entirely obscured with dark cloudings); costal margin infuscated to beyond middle, distal part whitish with three long, narrow blackish spots, that nearest apex the shortest; a bright ferruginous spot close behind apex; an ill-defined whitish streak from this spot basewards (between  $SC^3$  and  $R^1$ ), fading out before reaching middle of wing; lines dark brown, with a slight olive tinge, placed about as in *convergens* Warr., but rather thicker, the median not quite so extremely oblique; fringe divided by a brown line, tips paler.—*Hindwing* browner than forewing, proximal part paler, especially between median and post-median lines; a dark brown spot at base continuing the antemedian line of forewing; all the other lines continued, parallel with termen or rather straighter.

Forewing beneath with costal and hindmargin very pale violaceous grey, the rest almost entirely dark-clouded, with the lines only feebly indicated. Hindwing

beneath pale, with weak fuscous irroration; all the lines strongly expressed, those in distal half thick.

Bitye, Ja River, Cameroons, 2000 ft., September—November 1911. Type in coll. Rothschild; a second, not quite so dark, in coll. L. B. Prout.

Smaller and much darker than *convergens* Warr., differing further in subcostal venation and presence of fovea. The coloration recalls *Anoetomychus pudens* Swinh.

#### 59. *Pigiopsis hyposcotia* sp. nov.

♂, 24 mm. Face mostly fuscous. Palpus short, deep ochreous, third joint fuscous. Vertex and antenna blackish fuscous. Collar ochreous. Thorax and abdomen deep ochreous, the latter dorsally infuscated except at base.

*Forewing* with fovea;  $SC^{1-2}$  coincident, free; ochreous, clouded throughout, except at costal margin and middle of costal area, with deeper, more ferruginous ochreous: extreme costal edge black to beyond two-thirds, then with a subtriangular black spot, nearer the apex a second, flatter black mark; between the black edging and  $SC$ , the ochreous ground-colour is dotted with black; no other definite markings, only a paler oblique line from before two-thirds hindmargin, running in direction of apex, very faintly indicated and distally to the same some slight purple-fuscous shading from hindmargin to middle of wing.—*Hindwing* with the same ground-colour, but almost entirely clouded over, excepting the extreme base and an ill-defined line across the middle of the wing, with deep purple-fuscous (almost black); fringe remaining ochreous.

Forewing beneath ochreous, with slight dark mottlings in cell, a distinct discal dot and a slightly curved subterminal band from tornus to near apex, tapering anteriorly. Hindwing slightly paler ochreous, with dark discal dot and terminal band, its proximal part corresponding to the subterminal band of forewing.

Bitye, Ja River, S. Cameroons, April to June 1910, lesser rains (G. L. Bates). Type in coll. Rothschild.

Near the preceding.

#### 60. *Heterostegane monilifera* sp. nov.

♂ ♀, 17–19 mm. Structure of typical *Heterostegane*, the wings perhaps slightly less broad. Head, body and legs concolorous with wings. Abdomen with ill-defined pale dorsal spots.

*Forewing* pale ochreous, coarsely irrorated with ferruginous brown, some of the ferruginous scales finely tipped with dark fuscous; a slight sprinkling of silvery, especially noticeable about the lines; costal edge deeper ochreous, with some fuscous spots; first line ferruginous, sometimes mixed with fuscous, strongly excurved in cell, so as to approach median line; median line dark purple-fuscous, firm, almost or quite straight, from two-fifths costa, crossing  $DC$ , to about middle of hindmargin; postmedian line ferruginous, weak; lunulate inward and with irregular projecting teeth outward on the veins, between which stand roundish pale spots; subterminal line fuscous, moderately thick, formed as in most of the genus; terminal line fuscous, uninterrupted; fringe with fuscous spots opposite the veins.—*Hindwing* the same, without first line.

Underside similar, with the irroration dark purple-fuscous.

Gold Coast: Bibianaha, October 23—November 2, 1911 (H. G. F. Spurrell), type ♂ and a ♀; Coomassie (H. Whiteside), a ♀; all in coll. Brit. Mus. Oubangui—Chari—Tchad, a ♀ in coll. L. B. Prout.

Nearest the dark-marked aberrations of *arbica* Swinh., from India, differing in the fuscous irroration beneath, etc. From *pleninotata* Warr. (*Noct. Zool.* viii. 15), the nearest West African species, it differs in the dark markings and the form of the median and postmedian lines.

61. *Heterostegane circumrubrata* sp. nov.

♂, 22 mm. Head and body concolorous with wings, the face, palpus, antennal shaft and forecoxa mixed with rufous.

*Forewing* without fovea; apex acute; pale ochreous, rather sparsely irrorated with rufous; costal margin, especially from base to near middle, rufous; terminal line rather thick, deep rufous.—*Hindwing* with C anastomosing with SC at scarcely more than a point: concolorous with forewing; terminal line as on forewing.

Forewing beneath suffused with rufous, rather more dusky towards base, paling off towards posterior margin, behind fold entirely pale. Hindwing beneath nearly as above.

Madagascar: Antananarivo. Type in coll. L. B. Prout, received through Le Moults.

62. *Heterostegane incognita* sp. nov.

♀, 22 mm. Face pale straw-colour, with a large ochreous spot on each side. Palpus pale straw-colour, mixed with ochreous. Vertex, thorax and abdomen pale straw-colour, the collar and front of thorax tinged with ochreous.

*Forewing* whitish straw-colour, inconspicuously irrorated with more ochreous scales, the costal edge more ochreous; lines faintly darker, quite inconspicuous; antemedian at about one-fourth, curved; median slightly more distinct, straight, from one-half costa to beyond one-half hindmargin; postmedian at three-fourths, slightly more wavy, parallel with termen except for a very faint proximal curve anteriorly; subterminal straight, midway between postmedian and termen; a faint terminal line.—*Hindwing* with C anastomosing with SC to near middle of cell; costal region slightly paler; antemedian line obsolete; median obsolete at costa; postmedian slightly thickened, markedly wavy, incurved between radials; subterminal almost parallel with termen, slightly approaching it at tornus.

Forewing beneath more suffused proximally and costally, whitish posteriorly and distally, antemedian line obsolete, median scarcely traceable; a **distinct dark cell-spot**, postmedian and subterminal lines slightly smoky, more distinct than above, except at hindmargin. Hindwing beneath mostly whitish, with distinct cell-spot, postmedian and subterminal line.

Madagascar: Antananarivo (Chnlliat). Type in coll. L. B. Prout, received through Le Moults.

An inconspicuous species, superficially recalling *Acidalia*. Much paler than *rectistriga* Prout (*Ann. Transv. Mus.* iii. 213), the lines quite differently placed, the underside with strong cell-spots.

63. *Xenostega irrorata* sp. nov.

♂, 18 mm. Similar to *X. diagramma* Hmps. (*Proc. Zool. Soc. Lond.* 1910, p. 466, t. 39, f. 13) but smaller, the rufous irroration somewhat more dense, especially in distal area of forewing, the postmedian line and the longitudinal line from it to the termen thicker, the postmedian in addition rather straighter, first line

of hindwing **crossing** the cell-dot, not proximal, outer line **running along** termen.  $R^2$  of forewing **connate** with  $R^1$ , not merely approximated as in Hampson's unique type.

Lutoboka (Fort Stanley), Bugalla, Sesse Archipelago, Victoria Nyanza (Dr. G. D. Hale Carpenter, D.M.), larva spun October 1, 1912, moth emerged October 15. Type in coll. Oxford Museum.

Superficially very like *Heterostegane hyriaria* Warr. (Nov. Zool. i. 406) = *irroraria* Leech (Ann. Mag. Nat. Hist. (6) xix. 203).

#### 64. *Zamarada labifera* sp. nov.

♂, 36 mm. Face ochreous brown, more ferruginous above. Palpus ochreous brown, strongly mixed with ferruginous. Vertex and antennal shaft light brown; pectinations long. Body and legs light brown; hindtibia not shortened and thickened.

*Forewing* rather broad; palest translucent green (almost colourless), anterior and posterior margins light brown, with sparse dark dots and strigulae; base somewhat mixed with brown; cell-mark rather large, light brown with a diamond-shaped ferruginous circumscription; postmedian line ferruginous, less slender than in most of the genus, from SC at 6 mm. before apex, the outward curve between  $R^3$  and  $M^2$  not deep; accompanied distally (after a fine line of silvery scaling) by a paler ferruginous band of nearly 2 mm. width, on which stand scattered blackish strigulae; subterminal line thick, deeply dentate, pale, marked with silvery scales but almost interrupted on two blackish blotches, one of which runs from the ferruginous band along  $R^2$  to near termen, the other (much larger) from the band to termen and about from  $M^1$  to hindmargin, interrupted by an oblique mark from tornus; terminal area otherwise light brown, slightly mixed with pale ferruginous; terminal line present opposite the blotches, otherwise reduced to internodal dots; fringe with strong dark internodal spots.—*Hindwing* ample, with termen appreciably crenulate and at  $R^3$  very slightly bent; a fuscous line bounding the base of SC in cell; cell-mark almost as large as on forewing, blackish fuscous with some silvery scales in centre; postmedian line as on forewing; the band distally to it scarcely indicated; subterminal line uninterrupted, no blackish blotches; terminal line reduced to a few dots; fringe without the dark spots.

Both wings beneath with the cell-mark dark fuscous and with a broad dark fuscous band from postmedian line to near termen, on forewing reaching the termen at  $R^2$  and again from fold to tornus.

Bitye, Ja River, Cameroons, 2000 ft., smaller rains, April–May 1907 (G. L. Bates). Type in coll. Rothschild.

#### 65. *Zamarada hemimeres* sp. nov.

♀, 25 mm. Face pale ochreous, the upper half almost entirely covered with red, the lower with some red dots. Palpus pale ochreous. Vertex and base of antenna mostly red. Collar ochreous. Thorax and abdomen ochreous, dorsally mostly covered with red and with some violaceous admixture.

*Forewing* with apex not sharp, termen rounded; pale greenish yellow, hyaline, in posterior part with violaceous reflections; costal margin (to SC) bright golden yellow much mixed with red and slightly with violaceous and silvery scales; discal dot the same; hindmargin more weakly so; postmedian line deep yellow

proximally, mixed with dark red distally, running from three-fifths costa to about middle of hindmargin, moderately excurved between  $R^3$  and  $M^2$ ; distal area reddish, mixed (especially in proximal half) with violaceous, the veins in distal half remaining clearer rufous; a sprinkling of silvery scales, especially in vicinity of postmedian line; a row of large, ill-defined black spots through the middle of this area, separated by the veins; some weak black internodal dots on distal margin.—*Hindwing* similar, without yellow costa and cell-dot; the postmedian line about the middle of the wing.

Underside with costa and cell-spot of forewing duller; both wings with the distal area dull dark purple-fuscons (in the middle blackish), the distal margin itself remaining yellowish.

Nyassaland: Mount Mlanje, February 6, 1913 (S. A. Neave). Type in coll. Brit. Mus.

Distinguished by the broad, black-spotted distal area.

#### 66. *Zamarada vigilans* sp. nov.

♂, 30 mm. Head and palpus ochreous, strongly mixed with purple-brown, the face much more so than the vertex. Antennal shaft ochreous, dotted with fuscons. Thorax and abdomen dorsally dark glossy fuscons. (Hindlegs lost.)

*Forewing* rather broad, but with the termen oblique and anteriorly rather straight, apex moderately sharp; costal margin ochreous, irregularly spotted with fuscons and metallic scales; ground-colour palest iridescent greenish (almost colourless), with violet reflections, especially in front of median vein and in submedian area; basal patch irrorated with olivaceous grey; a very broad median area of dense olive-grey irroration and strigulation in posterior half of wing; a large blackish cell-spot (diameter fully 1.5 mm.), marked on DC with a line of silvery scales; a broad (4 mm.) dark fuscons marginal band, bounded proximally by a nearly straight line and traversed close to this boundary by an interrupted silvery one; subterminal line indicated by some interrupted V-shaped silvery marks; fringe pale at tips.—*Hindwing* with discal dot minute, the rest nearly as on forewing, the broad median shade traversing the whole wing; basal patch very small, edged distally by a narrow fuscons band.

Bibianaha, Gold Coast, 700 ft., January 28, 1912 (H. G. F. Spurrell). 2 ♂♂ in coll. Brit. Mus.

A very distinct species. The only other *Zamarada* known to me with the very large blackish cell-spot is *perlepidata* Walk. (*List Lep. Ind.* xxvi. 1565) = *exquisita* Warr. (*Nov. Zool.* xvi. 115) nov. syn. = *terpsichore* Ob. (*Ét. Lép.* vi. 258, f. 1461) nov. syn., which is white, the borders almost black, margined proximally by a less straight, crenulate line, etc.

#### 67. *Zamarada medianata* sp. nov.

♀, 28 mm. Face and palpus whitish brown, darker spotted. Vertex, thorax and abdomen light brown, base of abdomen dorsally with slight dark admixture.

Wings with the hyaline parts brown-whitish with scattered fuscons dots.—*Forewing* with costal margin very light ochreous brown, strigulated with fuscons, especially at origin of lines, the strigulation at origin of median shade condensed and extending 2 mm. along the costa; hindmargin also tinged with brown; antemedian line fuscons, somewhat interrupted, angled subcostally; cell-spot small,

blackish; a curved median line or shade well beyond it, fuscous but vague anteriorly, light brown and distinct (rather broad) posteriorly; accompanied proximally in the middle of the wing by a patch of strong brown and fuscous irroration which extends nearly to the antemedian line; postmedian line fuscous, but weak and interrupted, from nearly three-fourths costa to two-thirds hindmargin, the distad curve between  $R^3$  and  $M^2$  moderate, not at all abrupt; distal area light brown with a tinge of ochreous and faint traces of pale dentate subterminal line; proximally to the subterminal a rather darker brown spot on costa, proximally and distally to it pairs of wedge-shaped fuscous marks between the radials; termen scarcely dark-dotted except in anterior half; fringe pale, more greyish, scarcely dark-dotted, a whitish line at its base.—*Hindwing* without antemedian line; discal dot minute; median shade obsolete anteriorly, more fuscous posteriorly; postmedian with the outward curve weaker; terminal brown shade more uniform, but with a single fuscous mark on radial fold; terminal dark marks best developed in **posterior** half of wing and especially at end of radial fold.

Underside more feebly marked, distal area (especially of forewing) slightly more mixed with fuscous in anterior half.

Selukwe, S. Rhodesia, July or beginning of August 1914 (F. W. Short). Type in coll. L. B. Prout.

#### 68. *Zamarada amicta* sp. nov.

♂, 22–23 mm. Closely related to the preceding, possibly a ♂ variety of it. Smaller, rather shorter-winged, third joint of palpus marked with blackish, thorax and base of abdomen dorsally blackish.

*Forewing* with base darkened, marginal shade rather brighter brown, postmedian line more sharply expressed anteriorly and posteriorly, marked with minute proximal teeth, very weak in the middle, making a slightly deeper distad bend, terminal shade darkened, especially in proximal part, which is more ferruginous brown, the distal being more purplish brown.—*Hindwing* with median shade shorter, postmedian line as deeply bent as on forewing, terminal shade showing nearly the same distinctions as on forewing.

Underside with the distal border also strengthened, at least the anterior half on both wings, where in the type it forms fuscous patches; termen with stronger dark dots (dashes).

Hala, Maramas Dist., Kavirondo, British East Africa, 4500 ft., June 20, 1911 (S. A. Neave). 2 ♂♂ in coll. Brit. Mus.

#### 69. *Zamarada eroëssa* sp. nov.

♀, 26 mm. Head and palpus white, with a few black spots. Antenna spotted with blackish. Thorax above light violet-grey, beneath white; abdomen the same, but the first four or five segments occupied dorsally by a large black blotch which leaves only small spots of the ground-colour.

*Forewing* whitish, hyaline, with sparse blackish irroration, costal margin tinged with light brown (towards base more violaceous), more heavily dotted and strigulated with black; base pale violet-grey, black mixed; cell-spot black, of moderate size, not ocellated, a vague black spot opposite to it on costa; postmedian line black, slightly lunulate, and with minute, thickened proximal teeth; arising on costa at nearly three-fourths, the distad curve between  $R^3$  and  $M^2$  moderate, a slight

proximal curve behind  $M^2$ ; distal area very pale, delicate violet-grey, in its proximal half mostly covered by a black band or series of thick, proximally confluent, wedge-shaped markings, which are small and weak opposite the projection of postmedian line, strong again posteriorly, touching the postmedian line behind  $M^2$ , but otherwise very narrowly separated from it; terminal dark line fine, interrupted at the veins; fringe brownish white, very feebly dark-spotted opposite the veins.—*Hindwing* similar except at costa, the discal dot smaller.

Underside with base and costa of forewing more weakly marked, cell-spot nearly as above, postmedian line wanting, the area distally thereto much more uniformly infuscated, becoming paler towards termen of hindwing, especially posteriorly.

Selukwe, S. Rhodesia, February 1913 (F. W. Short). Type in coll. L. B. Prout. A very elegant and distinct species.

#### 70. *Zamarada euryscaphes* sp. nov.

♀, 31 mm. Similar to *Z. bathyscaphes* Prout (*Ent.* xlv. 196), from Rhodesia, but larger, the antennal pectinations relatively longer, and showing further the following differences:

*Forewing* with the discal spot larger and blacker, diamond-shaped; red areas duller, the distal not traversed by dentate pale subterminal; distal projection of the ground-colour still deeper and broader, the hinder edge of the anterior red patch not reaching vein  $R^3$  until the termen, the red at termen reduced to a thick line between  $R^3$  and  $M^1$  and a very shallow projection between  $M^1$  and  $M^2$ .—*Hindwing* with corresponding distinctions, though the cell-dot is not as large as on forewing.

Eritrea: Asmara, October 20, 1905 (N. Beccari). Type in coll. Rothschild.

#### 71. *Zamarada ignicosta pyrilampes* subsp. nov.

♂ ♀, 24–26 mm. Ground-colour somewhat less strigulated than in *Z. ignicosta ignicosta* (Prout, *Entom.* xlv. 198), from Rhodesia, distal borders quite different in colour, bright red scales almost entirely suppressing the purple. Thorax also more mixed with bright red above. Costal margin of forewing generally more yellow.

Marimba, Angola, September 30, 1903 (Dr. Ansorge). 3 ♂♂, 2 ♀♀ in coll. Rothschild.

This is the "*Z. pyrocineta* ab. 1" of Hampson (*Proc. Zool. Soc. Lond.* 1910, p. 470), who overlooked the simple ♂ hindleg; in true *pyrocineta* the hindtibia is greatly dilated, with strong hair-tuft, almost as in *melpomene* Ob. (*Ét. Lép.* vi. t. clii. f. 1461) and others.

#### 72. *Scardamia perobliqua* sp. nov.

♂, 23 mm. General effect of coloration as in *metallaria* Guen., abdomen with a chain of four or five metallic dorsal crests. *Forewing* orange, with extremely fine and close reddish (in places purple) transverse strigulation, leaving free clear bright orange bands proximally to the antemedian line, distally to the postmedian and proximally to the terminal; lines purple, mixed with shining silvery; antemedian gently curved and exceedingly oblique, from costa at 3.5 mm. to hindmargin at 5.5 or 6 mm.; postmedian commencing still more oblique, rounded

towards the radials, then straight and nearly parallel with termen, its beginning and ending thus at right angles; terminal line slightly interrupted by the veins; cell-dot quite small.—*Hindwing* without antemedian line; postmedian much straighter than on forewing; terminal inappreciably interrupted; small cell-dot present.

Underside clear yellow, with small dark cell-dots and conspicuous pink borders.

Mombasa, 14 miles N.W. of Rabai, c. 700 (St. A. Rogers). Type in coll. Oxford Mus. A second example, duller (chiefly because worn), from between Luwumbu and Mwailesia Rivers, Upper Luanga River, N.E. Rhodesia, August 7, 1910 (S. A. Neave) in coll. Brit. Mus.

### 73. *Anonychia prolucens* sp. nov.

♀, 35 mm. Head and palpus rufous. Antenna whitish. Thorax and abdomen rufous, the former and parts of the latter darker above.

*Forewing* orange-reddish, rather sparsely irrorated with dark purple-grey and with more or less broad streaks of the same between the veins, that along the fold almost reaching M and M<sup>2</sup>; veins partly marked with whitish; a pure white subbasal streak along SC; lines pure white, finely dark-edged on their obverse sides; antemedian slightly sinuous, from one-third hindmargin nearly to SC, 2 mm. proximally to discal dot; postmedian straight, oblique, from two-thirds hindmargin to SC<sup>3</sup> at 1.5 mm. from termen, then faintly traceable parallel with termen; discal dot minute, black; a row of very small black terminal dots between the veins; fringe concolorous proximally, white at tips.—*Hindwing* paler, more pink, with minute dark grey discal dot and with white postmedian less firm than on forewing, less straight, more strongly angled subcostally, not dark-edged proximally; terminal dots very weak; fringe as on forewing.

Forewing beneath rather paler than above, the markings reproduced, the antemedian indistinct, terminal dots sharper. Hindwing beneath whitish violaceous, with dark irroration; discal dot enlarged; postmedian line dark-edged proximally, curved rather than angled subcostally; terminal dots well expressed.

Ambinanindrano, 50 km. W. of Mohonoro, Madagascar, September 1912 (G. K. Kestell-Cornish), 2 ♀♀ in coll. Rothschild.

Closely related to *A. flexilinea* Warr. (*Noc. Zool.* v. 34), which also inhabits Madagascar, but larger, brighter, more sharply marked and distinguishable at a glance by the straight lines; palpus fully (in *flexilinea* not quite) twice the length of diameter of eye. Pending revision, I follow Warren in the generic reference, but it should be pointed out that in true *Anonychia* (exclusively Oriental) SC<sup>1</sup> and SC<sup>2</sup> arise separate and anastomose, whereas in the African representatives they are long-stalked.

### 74. *Obolcola perconspecta* sp. nov.

♂, 20–21 mm. Closely related to *ferrovabrata* Walk. (*List Lep. Ins.* xxvi. 1670), from the Cape, agreeing in structure, except that C of the hindwing is closely approximated to SC for a rather longer distance, which may prove inconstant in larger material. Rather smaller. Further differs as follows:

*Forewing* less elongate anteriorly, the termen being considerably less oblique; colour less rufous, being coarsely and closely irrorated throughout with dark fuscous;



lines dark fuscous, more sinuous, median in particular much more deeply incurved between M and SM<sup>2</sup>; costal margin darkly spotted almost throughout; a large blackish discal dot.—*Hindwing* slightly darker than in *ferrorubrata*.—Under-surface similarly more infuscated.

Angola: Muyendi River, April 1900 (Penrice). 2 ♂♂ in coll. Rothschild.

This species and *ferrorubrata* will require to be separated from *Obolcola*, in which Warren (MS.) placed the latter; SC<sup>1</sup> of the forewing is free; SC<sup>2</sup> (like the coincident SC<sup>1-2</sup> of *Obolcola*) is connected by a bar with SC<sup>3-4</sup>.

#### 75. *Oxyfidonia pallidisecta* sp. nov.

♂, 26 mm. Head red-brown, narrowly pale at upper extremity of face and across middle of crown; antennal shaft pale. Thorax and abdomen concolorous with wings.

*Forewing* with termen waved, shallowly emarginate between SC<sup>5</sup> and R<sup>3</sup>; fovea strong; light ochreous brown, coarsely and irregularly irrorated (especially in proximal and distal areas) with dark fuscous; veins in distal area broadly pale; lines pale; antemedian from about one-fourth costa, oblique outward, angled in cell, then sinuous to one-fourth hindmargin; cell-mark black, elongate; postmedian line from five-sevenths costa, curved or bent about R<sup>1</sup>, oblique inwards from R<sup>3</sup> to near hindmargin, slightly sinuous, oblique outwards again at hindmargin; subterminal line firm, except where cut by the veins, faintly sinuous, slightly receding from termen about the middle, then running to torus; terminal line dark fuscous, crenulate, rather thick between the veins; fringe pale, with dark spots opposite the veins, especially at apex.—*Hindwing* with termen somewhat crenulate, bent or bluntly angled at R<sup>3</sup>; pattern similar to that of forewing.

Underside pale ochreous brown, with weak darker irroration or dappling; cell-marks distinct; pale subterminal line present; forewing further with three, hindwing with two, indistinct lines or rows of spots, the median of both wings proximal to the cell-mark.

Lolanga, Upper Congo. Type in coll. L. B. Prout.

Much less rufous than *fulvida* Warr. (*Nor. Zool.* xii. 400) and quite differently marked, both wings with the angle at R<sup>3</sup> rather less strong. The fine sharp lines recall *insolita* Warr. (*Nor. Zool.* xii. 39), which must also doubtless be referred to *Oxyfidonia*, though its ♂ is unknown.

#### 76. *Oxyfidonia monoderctes* sp. nov.

♂, 19 mm. Head, body and wings deep fuscous, almost black, slightly relieved here and there with ochreous scales.

*Forewing* with the excision in anterior half of termen deep; SC<sup>1-2</sup> arising beyond SC<sup>5</sup>, as in *Neostega*; costal margin in distal half with two or three small ochreous spots; a large irregularly roundish one distally to the cell, reaching from costa to just across R<sup>2</sup>; fringe slightly spotted with ochreous between the veins, especially in anterior part.—*Hindwing* unmarked.

Underside similar, the ochreous markings rather brighter, both wings with one or two additional dots near the base, the forewing also with a small costal spot proximally to the large spot and with the first spot distally to the same prolonged into a line, which almost reaches R<sup>1</sup> and is succeeded by a dot between R<sup>1</sup> and R<sup>2</sup>.

Bitye, Ja River, Cameroons, 2000 ft., September—November 1911. Type in coll. Rothschild.

A good deal like *Neostega flavigutta* Warr. (*Nor. Zool.* x. 276) except in shape and antennal structure. Whether these should override the noteworthy venational approach to that genus remains somewhat doubtful.

#### 77. *Peridela amica* sp. nov.

♂, 29 mm. Face deep fuscous, narrowly ochreous below. Palps deep fuscous, mixed with ochreous beneath. Vertex and antennal shaft bright ochreous, spotted with fuscous; pectinations very long, recalling *Oxyfodonia* or *Obolcola*. Thorax deep fuscous, mixed with ochreous in front. Legs fuscous, the foreleg darkest but with the femur spotted with ochreous, and both femur and tibia becoming ochreous on outer side; hindtibia not dilated. Abdomen fuscous.

*Forewing* with apex minutely produced, termen bent at  $R^3$ ;  $SC^{1-2}$  stalked, separating opposite base of  $SC^5$ ; fovea present; violet-grey, irrorated with fuscous; costal margin ochreous spotted with fuscous, underlined with ferruginous along  $SC$ ; the other veins tinged in places with ochreous or ferruginous; lines slender, whitish yellow; antemedian vertical from hindmargin beyond one-third, obsolescent anteriorly to  $M$ ; edged proximally with ferruginous; postmedian almost straight, from beyond three-fourths costa to beyond two-thirds hindmargin, edged distally with ferruginous; discal dot small, black; terminal line fine, ochreous; fringe blackish in proximal half, ochreous in distal, with blackish spots opposite the veins. — *Hindwing* subcrenulate anteriorly, a tooth (about rectangular) at  $R^3$ ; concolorous with forewing, except costal margin; antemedian line represented only by a vague ferruginous shade; postmedian as on forewing (much farther from termen in middle, on account of the wing-shape); discal dot, terminal line and fringe as on forewing.

Underside without antemedian line, the ferruginous shading distally to the postmedian weaker but more diffused.

Bitye, Ja River, Cameroons, 2000 ft., September—November 1911. Type in coll. Rothschild.

A closely similar species (or, as I am inclined to believe, a highly remarkable aberration) is also represented by a single ♂ with the same data, unfortunately rather rubbed. Pale ochraceous instead of violet-grey, the fuscous irroration coarser but more irregular, especially on hindwing, where almost clear bands are left between cell-dot and postmedian line and again at termen, while the proximal part of hindwing is heavily marked; antemedian shade of hindwing thickened and darkened, crossing the cell-dot; postmedian line of both wings nearer termen, on forewing slightly excurved behind middle and incurved posteriorly, on hindwing **nearly parallel with termen**, more inbent between radials.

#### 78. *Osteodes procidata eritreënsis* subsp. nov.

*Forewing* above with the dark border strong, rather broader than in most forms of *procidata* Guen. (*Spec. Gén. Léop.* x. 177), very sharply defined proximally, the pale subapical streak widened in its proximal part, so as to occupy more than half the width between  $R^1$  and  $SC^5$ ; a well-marked costal spot (rarely noticeable in the other forms) proximally to the dark border. — *Hindwing* with rather

strongly expressed transverse band from apex to tornus, broadest at apex, the area distally to this band again becoming pale, especially at the veins.

Both wings beneath with the dark band and termen more nearly as on hindwing above, the enlarged subapical patch of the forewing conspicuous; the white ray and veins of the hindwing about as in *procidata procidata* and ab. *turbulentata* Guen.; discal marks strong, generally elongate.

Eritrea: Asmara, 1 ♂, 2 ♀♀, October 17-18, 1905 (N. Beccari). Type in coll. Rothschild.

Although Guenée founded this species on a number of examples from "Abyssinia," it is quite certain that his form was not the same as this; *procidata* is a very variable species, and individual aberrations sometimes nearly approach the Eritrean race, but it is so extreme and so constant as to merit a separate name.

#### 79. *Osteodes warreni* nom. nov.

*Osteodes exumbrata* Warr., *Nov. Zool.* ix, 529 (1902) (nec Walk.)

Mr. Warren (*loc. cit.*) carefully differentiated this species (from the Kikuyu Escarpment) from *procidata* Guen. and *turbulentata* Guen., but misidentified it as *exumbrata* Walk. (*List Lep. Ins.* xxvi. 1860), which was described from Cape Town and is certainly—according to the type at the British Museum—a very worn example of the ordinary South African *Osteodes*, which I regard, until I can get access to Abyssinian material further elucidating Guenée's, as *procidata turbulentata* Guen. (subsp.). *warreni* has the palpus rather longer and less stoutly scaled than in the allied forms, the ground-colour above more pallid (less tinged with ochreous), the band of the underside quite differently formed from that of *procidata eritreensis*, on the forewing slightly curved inwards at costa, on the hindwing placed proximally to the apex and tornus and distinctly outbent or, angled at the radial fold. It also differs from all other forms of *Osteodes* known to me in the markingless hindwing above; but this is said to be found in Guenée's *procidata*, so that it is just possible *warreni* will prove to be a subspecies of *procidata* and *turbulentata* a separate species, with *eritreensis* as subspecies.

#### 80. *Macaria albivia* sp. nov.

♂, 37 mm. Face and palpus brown, mixed with deep fuscous, especially on the upper part of the face and outer side of palpus; frontal tuft developed; palpus about one and a half times as long as diameter of eye. Antennal ciliation not very dense, scarcely as long as diameter of shaft. Head, body and legs brown, more or less mixed with fuscous, especially on the crown and the dorsal surface; hindtibia moderately strongly dilated, the hairs of the pencil partly brown, partly deep fuscous.

*Forewing* with termen not appreciably sinuate, less bowed than in *elcirata* Guen.; SC<sup>1</sup> arising from C, not touching SC<sup>2</sup>; fovea developed; dull white or brown-whitish, densely irrorated (except in band between median shade and post-median) with dark fuscous, the distal area purplish fuscous, much more sparsely and finely irrorated; costal edge more yellowish, fuscous spotted; antemedian line deep fuscous (sometimes indistinct), oblique outwards from one-fifth costa, acutely bent in cell, then slightly sinuous to one-fifth or one-fourth hindmargin; median shade broad, somewhat diffuse, formed of conglomerated fuscous irroration; the whitish band beyond containing some patches of fuscous irroration; cell-mark

elongate, running from median shade into the pale band; postmedian line dark fuscous, fine anteriorly, making a deep curve distad between  $SC^5$  and  $R^2$ , thicker and fairly straight (rather wavy) from radial fold to hindmargin; a pale line distally to the postmedian, interrupted at its bend; a dark costal spot between postmedian and termen, confluent with a second behind  $SC^5$ , this again almost confluent with an oblique dash in the anterior part of the bend of the postmedian; variable dark clouding distally to the thickened part of the postmedian, narrowing about  $M^2$ , then widening to tornus, marked between  $R^2$  and  $M^2$  by three elongate blackish-fuscous spots, the middle one the largest (in the Hlesha example this one alone developed); a conspicuous white submarginal spot between  $SC^5$  and  $R^1$ , some white dots anteriorly to it; terminal line strong, more or less interrupted at the veins, thickening between; fringe with a pale line at base, fuscous spots or clouds at the vein-ends.—*Hindwing* ample, termen gently crenulate, more markedly from  $SC^2$  to  $R^3$ , bent at  $R^3$ ; the markings of forewing continued, except the antemedian; no anterior bend in the postmedian; the dark and white discal markings of the costal region wanting, on the other hand an ill-defined, approximately triangular, pale distal patch developed between  $R^3$  and  $M^2$ , narrowing to a point at termen just beyond the latter vein; discal spot free in the pale band, fairly large but not elongate; fringe whiter than on forewing.

Forewing beneath with the costal margin more broadly yellowish, the veins and a decided tinge in proximal part of wing also yellowish; ground-colour white (as in the palest specimens above), similarly marked to upperside, but with the distal area uniformly fuscous except for the conspicuous white subapical spot. Hindwing beneath whitish, the fuscous irroration or strigulation densest in basal area and along costa, the distal fuscous band broad, but leaving free a vague whitish subapical patch or scattered spots, a triangular whitish terminal patch as above, and another behind the postmedian line from abdominal margin about to  $M^2$ .

Bitye, Ja River, Cameroons, 2000 ft., November 1907—March 1908 (dry season). Type in coll. L. B. Prout, with a second from the same locality. Bibianaha, Gold Coast, 70 miles N.W. of Dimkwa, 700 ft., October 12, 1910 (H. G. F. Spurrell); Hlesha, S. Nigeria (L. E. H. Mumfrey); both in coll. Brit. Mus.

Similar to *ostentosaria* Möschl. (*Abh. Senckenb. Ges.* xv. 94) = *siennata* Warr., (*Nov. Zool.* vii. 95), but without the sienna bands, with the pale central band more conspicuous, etc. From *fuscataria* Möschl. (*Abh. Senck. Ges.* xv. 94; ? = *feraliata* Guen., sine loc; = *commista* Warr., *Nov. Zool.* iv. 106) it differs in being much more sharply marked, median shade much thicker, postmedian line of forewing more deeply bent subcostally, cell-spots and white subapical spot larger.

### 81. *Macaria percnoptera* sp. nov.

♂, 37 mm. Face mixed ochreous-grey and dark fuscous, frontal tuft developed. Palpus moderate, stout, third joint quite small; dark fuscous, first and part of second joint pale beneath and at extremities. Antennal joints not projecting, ciliation even, not as long as diameter of shaft. Thorax and abdomen above fuscous, beneath (with legs) pale, with dark irroration. Hindtibia dilated, with hair-pencil.

*Forewing* with fovea developed;  $SC^1$  out of C, closely approaching  $SC^2$ , connected by a minute, slender bar; apex not very sharp, termen slightly waved, oblique, especially in its posterior half; the entire surface covered with dark purple-fuscous clouding and striation, leaving only slight traces of the whitish ground-

colour; extreme costal edge in places black, in places ochreous with black dots; markings deep fuscous, little darker than the rest of the wing; antemedian line bent in the cell; median shade bent round (but touching) the moderately large blackish cell-dot; postmedian line moderately strongly bent subcostally, closely followed distally by an obscure dark band (not bent subcostally), which is mixed with ferruginous anteriorly, is weak between the radials, contains a patch of ochreous scales between  $R^3$  and  $M^1$ , widens posteriorly and is distally bounded by a very indistinct, somewhat glaucescent, crenulate line; fringe concolorous, with a slender pale line at base.—*Hindwing* with inner margin relatively long, costa rather short, apex almost rounded off, termen subcrenulate, strongly bent in middle, but with the tooth at  $R^3$  not very strongly produced; concolorous with forewing; median shade fairly distinct, forming a baseward curve in cell, thus proximal to the strong black discal dot; postmedian line crossing middle of wing, crenulate, faint, accompanied by a fine, faint glaucescent line; the ochreous mark beyond longer and narrower than on forewing, extending from  $R^2$  to  $M^1$ , placed proximally to, rather than on, the vague dark band; the glaucescent subterminal line from  $R^3$  to tornus rather thick and distinct; a faint pale terminal patch about the medians; fringe here somewhat pale, with dark spots at vein-ends.

Forewing beneath in basal part shaded with ochreous anteriorly, spotted and dotted with fuscous; proximal half otherwise strongly striated with bluish white except on the fuscous median band and a large blackish cell-dot; the boundary of this area is slightly oblique, nearly straight, but faintly curved outwards at costal and hindmargin; distal area almost uniformly dark fuscous, with faintest indications of pale subterminal line. Hindwing beneath bluish white, with dark dots and strigulae, large cell-dot, broad median shade as above, curved subterminal band from costa to inner margin near tornus, a fuscous area distally to this band, parting from it before  $R^3$  and ending midway between  $R^3$  and  $M^1$ , only a fainter bar running from it (parallel with the subterminal band) to termen near tornus.

Bitye, Ja River, Cameroons. Type in coll. L. B. Prout; a second example, rather rubbed, in coll. W. F. H. Rosenberg, the latter showing on the hindwing a sinuous postmedian line beneath in addition to the median and subterminal dark bands.

The underside and some of the shadings of the upper recall *M. subcretata* Warr. (*Nor. Zool.* xii. 37), but I do not think *perenoptera* can possibly be a giant form of that species, which occurs also in the locality; termen of forewing more oblique, less convex, upper surface with less strong dark bands, under surface with less white than in ♂ *subcretata*, etc. Larger even than *fasciataria* Möschl., which is rather less varied above with whitish and ochreous, has the median line of the hindwing **crossing** or passing almost **distally** to the cell-spot, more white at base of fringes (especially beneath), a pale apical mark and a small white subapical spot on forewing beneath.

## 82. *Macaria semialbida* sp. nov.

♀, 25–26 mm. Similar to a small *acstinaria* Hb., abdomen more slender, forewing rather narrower, hindwing rather less crenulate, but projecting rather more strongly at  $R^3$ , ground-colour white, antemedian line slightly more oblique, postmedian of both wings more thickened in middle, that of hindwing rather farther from cell-spot, triangular blackish mark proximally to subterminal line on both wings rather large and conspicuous, under-surface sharply marked.

British East Africa : Taveta, December 29, 1905 (K. St. A. Rogers) ; between Voi and Ndumu, June 4, 1897 (C. S. Betton) ; both in coll. Brit. Mus., the former the type.

83. *Macaria natalensis coronoleucas* subsp. nov.

♀, 26 mm. Slightly smaller than *natalensis natalensis* Warr. (*Noc. Zool.* xi. 479), forewing above and beneath with a white apical patch between  $SC^1$  and  $SC^5$ , nearly twice as long as broad, and a smaller one behind it, submarginal, between  $SC^5$  and  $R^1$  ; terminal line rather weak and interrupted, the black marks before and behind  $R^3$  not very strong. Both wings rather more strongly angled at  $R^3$ , the lines of forewing slightly more oblique at costa, postmedian sometimes more incurved between  $M^2$  and  $SM^2$ . Hindwing beneath more mixed with white.

Madagascar : Ambinanindrano, 50 km. W. of Mahanoro, November 1911 (G. K. Kestell-Cornish). Type in coll. Rothschild, coloured like the most ochreous *natalensis natalensis*. A greyer ♀ in coll. Brit. Mus. from Ankafana, Betsileo (Rev. Deans Cowan). Perhaps a separate species.

84. *Macaria orthostates* sp. nov.

♂, 28 mm. Face fuscous. Head, body and legs for the most part concolorous with wings. Palpus about one-and-a-half times as long as diameter of eye. Antennal ciliation almost as long as diameter of shaft.

*Forewing* not very broad, apex round-pointed, termen almost inappreciably concave in anterior and convex in posterior half ;  $SC^1$  wanting ; fovea not strong ; pale violet-grey, with sparse fuscous irroration ; lines deep fuscous ; antemedian oblique, from one-fifth costa to scarcely beyond one-fifth hindmargin, somewhat sinuous, diffuse anteriorly ; median line moderately thick, from before one-half costa, somewhat diffuse anteriorly and a little excurved so as to reach the cell-spot, straighter posteriorly, falling about vertically on hindmargin at scarcely beyond two-fifths ; cell-spot strong, black ; postmedian line strong, almost as thick as median, very slightly excurved, from beyond two-thirds costa to before two-thirds hindmargin ; a black mark, as thick as the postmedian, starting on the same between  $R^3$  and  $M^1$  and running distad as far as the subterminal ; subterminal line whitish grey, of medium thickness, nearly parallel with termen, slightly indented between radials ; termen with slight oblique-edged fuscous cloud ending in a point near the apex, which remains of the ground-colour ; fringe weakly dark-chequered. — *Hindwing* with termen waved, an appreciable but not conspicuous prominence at  $R^3$  ; pale violet-grey with slight fuscous irroration ; the median line very indistinct, straightish, the postmedian rather more distinct, very slightly curved, both much finer than on forewing ; discal dot small ; subterminal line weakly indicated ; no distal dark clouding ; terminal dots and fringe as on forewing.

Forewing beneath much suffused with ferruginous brown, leaving comparatively free the bands between the lines and an interrupted whitish subterminal ; lines represented by diffuse shades, the antemedian and median broader than above ; cell-spot present. Hindwing somewhat paler than forewing, the rust-brown suffusion chiefly expressed on the median shade and a band extending from the postmedian to the subterminal ; cell-spot obsolete.

Madagascar : Antananarivo (ex coll. Chulliat). Type in coll. L. B. Prout.

Less brown than *obliquilineata* Warr. (*Noc. Zool.* vi. 307), median shade less

oblique, **proximal** to the cell-spot, postmedian less straight, hindwing with termen less bent in middle, much more weakly marked, etc. Very distinct from all species known to me; intermediate between *Macaria* and *Discauma* (= *Tephropsis*).

#### 85. *Macaria majestica tropica* subsp. nov.

On an average rather smaller than name-typical *majestica* Warr. (*Nor. Zool.* viii. 213), ground-colour of rather a warmer tone, darker-shaded distally and usually with some blackish spots or dots distally to the postmedian line, one before  $R^1$  of the forewing constant. Underside with a ferruginous-brown band accompanying the postmedian line distally, projecting short distal rays on the veins, forewing in addition with a dark patch connecting this band with the dark terminal mark round the sinus ( $SC^5 R^3$ ).

Gambaga, Gold Coast (Dr. Bury), a long series in coll. Rothschild, including type. Zungeru, S. Nigeria, a series in coll. Brit. Mus. Fort Crampel, French Congo, in coll. L. B. Prout.

*M. majestica majestica* was described from Angola, but occurs in virtually the same form (perhaps on an average somewhat lighter) in Rhodesia and British East Africa. On the other hand a form from Mt. Mlanje, Nyassaland (S. A. Neave), in coll. Brit. Mus., is intermediate, having the under-surface of *majestica tropica* but without the distal dark markings of the upper, and will probably prove to represent a third race.

#### 86. *Macaria fuscorufa* sp. nov.

♂ ♀, 32–36 mm. Face red-brown, upper extremity black; a small, pointed cone of projecting scales at lower extremity, above black, beneath ochreous. Palpus ochreous, the second joint mixed with red-brown on upper and outer sides. Crown red-brown, a pale ochreous fillet between antennae. Antennal shaft ochreous, somewhat dotted with rufous; ciliation in ♂ fully as long as diameter of shaft. Thorax and abdomen red-brown above, ochreous beneath. Hindtibia in ♂ dilated, with hair-pencil.

*Forewing* not very broad, termen in ♂ scarcely, in ♀ markedly excised between apex and  $R^3$ ; fovea in ♂ present;  $SC^1$  arising from C, sometimes anastomosing with  $SC^2$ ; ochreous, densely irrorated, or sometimes covered (almost as in *perfusaria* Walk.) with rufous; proximal area more or less irrorated with dark purple-grey, the curved antemedian line scarcely traceable; median shade purple-grey, ill-defined, bent round an ill-defined dark cell-mark, then slightly oblique and nearly straight to hindmargin just before middle; postmedian line sometimes firmer, deep brown, rather thick or consisting of two confluent lines; arising at about two-thirds costa, strongly outbent, then slightly sinuate inwards; distal area strongly suffused with dark purple-grey; terminal line weak.—*Hindwing* relatively ample, termen somewhat crenulate, rather more so in ♀, a moderate bend at  $R^3$ ; coloured like forewing, the median and postmedian lines continued, the former nearly straight except for a slight proximal bend round the small discal dot, the postmedian gently curved, reaching inner-margin at two-thirds.

Both wings beneath pale ochreous to the postmedian line, with rather coarse but (especially on the hindwing) sparse fuscous dots and strigulae; median shade rather broader and much stronger than above; postmedian line on forewing only slightly curved anteriorly; distal area mostly rufous; with strong purple-grey

clouding; forewing with a small pale subapical spot; hindwing partly pale at termen, especially between  $R^3$  and  $M^1$ .

Mlanje, Nyassaland, March—April 1913 (S. A. Neave), in coll. Rothschild et coll. Brit. Mus. Type in coll. Rothschild, March 15.

Examples with the postmedian line obsolete present altogether a very blurred and indefinite appearance.

### 87. *Boarmia cyrtogramma* sp. nov.

♂, 43 mm. Face light brown, mixed with dark fuscous. Palpus rather long, mostly dark fuscous. Vertex and antennal shaft light brown, irrorated with fuscous; pectinations long. Thorax concolorous with forewing, abdomen with hindwing, a narrow pale ochreous belt at base of abdomen. Hindtibia dilated, with hair-pencil.

*Forewing* moderately broad, termen almost smooth, faintly sinuous;  $SC^{1-2}$  coincident, free; fovea well developed; pale ochreous brown, with sparse fuscous irroration, posteriorly rather deeper ochreous; costal edge marked in places with fuscous, especially proximally; a purplish fuscous antemedian line from hindmargin just beyond the fovea, strongly oblique outwards to  $SC$ , then bending to reach costa at one-third, also with a slight projection in front of  $SM^2$ ; the beginning of a very oblique median line at two-sevenths hindmargin; a moderate discal dot; postmedian dark fuscous, rather fine, from costa 3 mm. before apex, very strongly curved, so as to run proximad from  $R^1$  to the base of  $R^3$  and along  $DC^4$ , then less clearly defined, nearly vertical to  $SM^2$  and curving outwards to nearly two-thirds hindmargin; almost the entire area distally to this line purple-fuscous of varying intensity, somewhat dusted with ferruginous, especially on the veins and as a proximal suffusion between the radials; only the apex (obliquely edged posteriorly) and an oval spot from before  $R^3$  to behind  $M^1$  remaining of the ground-colour; a subapical fuscous spot in the pale apical patch; slight indications of an interrupted whitish subterminal line.—*Hindwing* with termen scarcely at all crenulate, only a little more noticeably so between the radials; purplish fuscous, at the extreme base concolorous with forewing, this shade bounded by a straight subbasal line in continuation of the median of forewing; discal dot present; some ferruginous dusting on veins (except  $C$ ), between discal dot and postmedian line and to some extent towards inner margin; postmedian line from nearly three-fourths costa, deeply incurved between  $C$  and  $SC^2$ , slightly so between  $SC^2$  and  $R^1$ , then obsolete except as dots on the veins; slight indications of a whitish, interrupted subterminal line, accompanied proximally by some faint dark interneural spots.

Under-surface with the markings similar but more blurred; forewing posteriorly with more fuscous suffusion; hindwing with less fuscous suffusion except towards termen, thus concolorous with forewing above.

Bitye, Ja River, Cameroons, 2000 ft., January—March 1907, dry (G. L. Bates). Type in coll. Rothschild.

Evidently related to the species described by Warren as *Hyposidra smithi* (*Nor. Zool.* xi. 480), but with different subcostal venation, smoother termen, much more curved postmedian line, more variegated colouring, etc. Generic position doubtful, as the scaling is scarcely so hairy as in true *Boarmia* and the aspect different; in any case no *Hyposidra*. Perhaps a new genus in the *Geolyces*—*Miantochora* group.



88. *Boarmia barretti* sp. nov.

♂, 38 mm. Face not at all protuberant; concolorous with wings. Palpus shortish; fuscous, except at tip. Tongue slender. Antenna with the pectinations long, darkly coloured. Vertex, thorax, and abdomen concolorous with wings, the breast fuscous, the abdomen dorsally narrowly dark at the ends of the segments. Femora and tibiae fuscous, light spotted; tarsi light, fuscous spotted; hindtibia not dilated.

*Forewing* not very broad, termen scarcely subcrenulate, rather strongly oblique; fovea slight;  $SC^{1-2}$  coincident, not anastomosing with  $C'$ ; light greyish brown with a slight olive tint, clearer brown along hindmargin and along the veins distally; costal, median, apical, and distal areas with fuscous strigulation; lines black; antemedian from a vertical costal spot at nearly one-third, acutely angled outwards in cell, then oblique inwards, straight to fold, curving more strongly basewards from here to hindmargin; median obsolescent, suggested by stronger dark shading near the postmedian; postmedian from a vague costal spot at beyond two-thirds, inbent at  $SC^3$ , acutely angled at  $R^1$ , parallel with termen to  $R^3$ , then forming a long but very shallow inward curve, reaching hindmargin little beyond middle; distal area with a white spot between  $R^3$  and  $M^1$ ; terminal line fine, black, forming a series of very shallow lunules, meeting in internervular black dots; fringe weakly mottled with fuscous.—*Hindwing* with termen moderately crenulate; costal region pale, the rest concolorous with forewing; a blackish spot at base; traces of antemedian line in inner-marginal part; an elongate discal mark; postmedian fine at costa, otherwise thick and black; accompanied distally by a band of fuscous shading, then by a clear pale band, this again by a narrow brown shade proximally to the almost obsolete subterminal line; terminal line and fringe as on forewing.

Underside paler, with the principal markings reproduced, forewing with discal spot more apparent than above.

Tauskei (Miss F. Barrett). Type in coll. L. B. Prout; a second in coll. Brit. Mus.

Recalls *rufiplaga* Warr., *Nor. Zool.* ix. 524 (*Catascia*), but smaller, rather narrower winged, more olive; antemedian line of hindwing far proximal to cell-mark, postmedian of forewing differently formed, etc. Perhaps still nearer *contemptaria* Walk. (*List Lep. Ins.* xxi. 367), costa of forewing less arched, termen of hindwing less deeply crenulate, colour less brown, discal marks not ocellated.

89. *Boarmia complacita* sp. nov.

♀, 28 mm. Face and palpus ochreous brown dotted with blackish; palpus with rather long-projecting scales beneath. Tongue developed. Head and body concolorous with wings, the abdomen above slightly darkened at the ends of the segments. Foreleg darkened, with pale spots at the ends of the joints.

*Forewing* with costa almost straight, apex rather pronounced, termen oblique, little convex, gently crenulate;  $SC^{1-2}$  coincident; violet-whitish, somewhat shaded with brown and tolerably strongly irrorated with fuscous; lines black, not very slender; antemedian from costa at 3.5 mm. to hindmargin at 2 mm., rather strongly curved; postmedian from just beyond two-thirds costa (here not strong) somewhat oblique inward, suddenly bent outward before reaching  $R^1$ , here angled and from this point strong, formed as in *barretti*, the posterior curve rather deep;

median shade weaker, starting midway between the lines, strongly excurved, from  $R^2$  slender, parallel with (and near) the postmedian, the intervening space from  $M^2$  to hindmargin infuscated; subterminal only expressed by a white spot between  $R^3$  and  $M^1$  and narrowly crossing the former, accompanied proximally and anteriorly by some dark shading; terminal line black, somewhat interrupted, strongly thickened (anteriorly forming definite black dots) between the veins; fringe somewhat irrorated or chequered, especially in distal part, and traversed by a dark dividing-line.—*Hindwing* with termen rather strongly crenulate; median shade thick, nearly straight, continuing the median and postmedian of forewing; postmedian starting midway between this and apex and running almost parallel with termen; the white subterminal spot obsolete.

Underside strongly irrorated, costal margin of forewing alternately pale and dark; all the lines reproduced, though mostly less sharp than above; both wings with a cell-spot and with the distal area somewhat darkened, containing conspicuous white spot corresponding to that of forewing above.

Foot of Nieuwveld Mountains, 5 miles N.W. of Beaufort West (Mrs. Butt).

Probably near "*Omphalucha* (?) "*rufinubes* Warr. (Nov. Zool. xii. 398), agreeing in structure; of both the ♂ is unknown.

#### 90. *Boarmia intrusilinea* sp. nov.

♂, 42 mm. Face with tolerably appressed scales; red-brown. Palpus rather short and stout; ochreous, 1st and 2nd joint marked with red-brown on outer side. Vertex and antennal shaft pale ochreous; pectinations darker, very long, decreasing very suddenly from about middle, a rather long distal part nearly simple. Thorax pale ochreous, with dark transverse bands anteriorly and posteriorly; abdomen pale ochreous, dorsally shaded (especially on 2nd-3rd and 6th-7th segments) with red-brown and with very narrow dark fuscous transverse marks at the ends of the segments. Legs ochreous, more or less irrorated and banded with fuscous; hindtibia dilated, with hair-pencil.

*Forewing* with termen scarcely crenulate; fovea developed;  $SC^{1-2}$  coincident; pale ochreous brown, with irregular darker, slightly more olivaceous brown irroration; lines fine, fuscous, starting from small blackish costal spots; antemedian from one-fourth costa, strongly excurved in anterior half, then oblique inwards to before one-fourth hindmargin, accompanied proximally in posterior half by a dark shade; median line from middle of costa, still more strongly excurved anteriorly, but here almost obsolete, incurved behind cell, slightly outbent about submedian fold; a vague costal spot just proximally to three-fourths; postmedian from midway between this and apex, finely denticulate on veins, slightly oblique outwards, somewhat incurved about  $R^1$ , forming a long shallow inward curve between  $R^2$  and fold, here angled, then strongly oblique to middle of hindmargin; a slight grey line close distally and parallel to the postmedian; subterminal line dentate, indistinct and interrupted, with some slight dark shading proximally, a tinge of pinkish in the ground-colour at the interruption behind  $R^3$ ; discal mark slender, slightly elongate; an oblique dark line from apex, crossing the postmedian and continuing in front of  $R^1$  to the median line, on which it ends slightly thickened; a crenulate marginal line, only touching the termen at the vein-ends.—*Hindwing* with termen crenulate; concolorous with forewing, first line from inner margin before one-third, straightish; discal mark slightly lunulate; postmedian denticulate, slightly sinuous,

from two-thirds inner margin to apex ; subterminal line nearly as on forewing, with a stronger dark proximal shade at inner margin and crossed by an oblique dark line which runs from termen at  $SC^2$  to  $R^1$  near postmedian line ; a crenulate terminal line.

Underside paler, the lines scarcely traceable ; both wings with the discal mark ; forewing also with three dark costal spots, minute costal strigulae and very faint brownish terminal suffusion between  $SC^2$  and  $R^2$ .

Lagos. Type in coll. Rothschild.

#### 91. *Boarmia sabinei* sp. nov.

♀, 48 mm. Face blackish fuscous. Palpi shortish, concolorous with face. Vertex, thorax and abdomen concolorous with wings, the abdomen dorsally in places rather heavily irrorated, tending to form broad belts.

Wings shaped nearly as in *punctinalis* Scop. (= *consortaria* F.), the hindwing scarcely so elongate costally and with the terminal crenulation even slighter. — *Forewing* with  $SC^{1-2}$  coincident, connected by slender bar with C ; pale violet-grey, with moderately strong fuscous irroration or minute strigulation, resulting in a tone rather lighter and less glossy than *Cleora rhomboidaria perfumaria* Newm. ; antemedian line scarcely discernible, apparently placed and formed nearly as in *C. rhomboidaria*, a dark dot at its origin on costa ; median line strong, from midcosta, very slightly oblique outwards to behind  $R^2$ , then angled and running almost straight to four-ninths hindmargin ; a long-oval discal ocellus placed in the angle of this line ; postmedian from two-thirds costa, very slightly incurved at first, straighter from  $R^1$  to  $R^2$ , then bent proximally, approaching and proceeding near to the median, almost as in *rhomboidaria* ; this line marked on all the veins with minute dark distal teeth, blackened and thickened on  $R^3$ , where there is an additional slight tooth proximally ; subterminal line lunulate-dentate, only indicated by sparser brown irroration and by some slight brown shades which accompany it proximally at costa, proximally and distally between the radials and very feebly in the posterior part ; terminal line thickened between the veins, very slender and tending to obsolescence in their vicinity ; fringe grey, faintly spotted with brownish opposite the veins. — *Hindwing* with a thick dark line continuing the median of forewing and running straight to inner-margin at about two-fifths ; an oval or slightly lunular discal ocellus ; a sinuous, minutely denticulate postmedian, obsolescent at costa, formed analogously to that of forewing but well distal to the cell-mark ; subterminal line as on forewing ; terminal slightly stronger.

Under-surface whitish, with very feeble dark irroration, proximal half of costal area more strongly marked ; both wings with large black cell-mark, median and postmedian lines faintly traceable, a dark distal border, that of forewing widest (about 4 mm.) and darkest apically, feeble in posterior half, that of hindwing more uniform, only becoming evanescent close to tornus.

Victoria Falls, Rhodesia, May 12, 1911 (L. A. Sabine). Type in coll. L. B. Prout. N'Gami Country (F. D. Lugard), a ♂ in coll. Brit. Mus., rather browner and sharper marked, fovea well developed, hindtibia with hair-pencil. Zungeru, Nigeria (G. B. Simpson), a small worn ♂ in coll. Brit. Mus., apparently more infuscated, rather recalling *Chogada funesta* Warr. (*Nor. Zool.* xii. 398).

In the last-mentioned example,  $SC^{1-2}$  of forewing anastomoses strongly with C.

92. *Boarmia cataimena* sp. nov.

♂, 44 mm. Very similar to the preceding, differing as follows:

Hindtibia not dilated.—*Forewing* with  $SC^{1-2}$  long-stalked, the stalk connected by short bars with C and with  $SC^{3-4}$ ; fovea rather smaller; ground-colour less violet-grey, more inclining to ochreous, the costal margin and veins strongly tinged with ochreous; fuscons irroration strong; median and postmedian lines more proximally placed, the latter almost touching the posterior angle of cell, a black mark filling the space at the origin of veins  $R^3-M^1$ ; an ill-defined whitish terminal patch between  $R^3$  and  $M^2$ .—*Hindwing* with corresponding distinctions, except costa.

Underside with the dark marginal markings restricted to small subapical patches on costa and on termen between  $SC^5$  and  $R^2$ , a quadrate apical spot of 2 mm. diameter remaining white.

Durban, February 1907 (G. F. Leigh). Type in coll. Rothschild.

93. *Boarmia bipandata* sp. nov.

♂, 47 mm. Face with tolerably appressed scales. Palpus rather short, fuscous. Antennal pectinations long, shortening rather suddenly, apical two-fifths almost simple. Head and body concolorous with wings. (Hindlegs lost, tibia presumably not dilated, as the abdominal spine is wanting.)

Wings shaped nearly as in *Cleora repandata* L., the hindwing still more weakly crenulate.—*Forewing* with fovea;  $SC^{1-2}$  long-stalked, connected by short bar with C; reddish grey-brown, with fine, sparse blackish irroration; dark costal spots at commencement of the lines, first at one-fourth, rather oblique outwards, median at before one-half, postmedian at two-thirds, rather oblique inwards; first line somewhat excurved in cell, incurved between M and  $SM^2$ , then extremely oblique baseward and thickened; median forming a deep angle distally to the oval, open cell-mark, then dentate, meeting postmedian in a roundish black spot at hind-margin; postmedian formed as in *C. repandata* L., but with deeper outward bend anteriorly, a rather marked thickening about  $R^3$ ; subterminal line rather deeply lunulate-dentate, chiefly indicated by dark filling-in proximally; termen with elongate dark spots between the veins.—*Hindwing* with dentate median line continued (antemedian); oval discal ocellus strong; postmedian strongly bent outward distally to cell-mark, then fairly straight to inner margin, marked with black teeth on the veins; subterminal and terminal as on forewing.

Underside paler, the discal ocelli almost entirely dark, postmedian line weakly reproduced, subterminal dark shading indicated, on forewing almost confined to costal end, here rather strong; forewing with a paler quadrate apical patch, bounded by the subterminal shade and a slight dark shade between  $SC^5$  and  $R^1$ .

Near Baringa, Lulongo River, Congo, lat. 0, long. 21° E. (Rev. E. Cartwright). Type in coll. L. B. Prout.

Very similar to *contortilinea* Warr. (*Nor. Zool.* iv, 245), the type of the new genus *Zeuctoboarmia* (infra), but with the forewing more elongate,  $SC^{1-2}$  arising well back from cell and not coincident throughout.

*Zeuctoboarmia* gen. nov.

Face not protuberant, with appressed scales. Palpus rather short, moderately stout. Tongue present. Antenna in ♂ bipectinate with long branches, which do

not reach its apex ; in ♀ (as far as known) also bipectinate, with shorter branches. Peetns hairy. Femora glabrous. Hindtibia in ♂ sometimes dilated, with hair-pencil ; all spurs present.

*Forewing* with termen smooth ; cell rather less than one-half ;  $SC^{1-2}$  coincident, from stalk of  $SC^{3-5}$ , anastomosing or connected by short bar with C,  $SC^2$  commonly connected by short bar with  $SC^{3-4}$  ; radials normal ;  $M^1$  separate.—*Hindwing* with termen waved or subcrenulate ; cell rather less than one-half ; C and  $SC^2$  normal ;  $R^2$  wanting ;  $M^1$  separate.

Type of the genus : *Zeuctoboarmia contortilinea* (Warr.) = *Alvis contortilinea* Warr., *Nov. Zool.* iv. 245.

Here belong, in addition to the species about to be described, the following : *simplex* Warr., *Nov. Zool.* v. 247 ; *pectinata* Warr., *op. cit.* iv. 97 ; *smithi* Warr., *op. cit.* ix. 519 ; possibly also *comoraria* Ob., *Ét. Lép.* vii. 292, f. 1715, unknown to me. A specialised development of *Boarmia*, apparently confined to tropical Africa.

#### 94. *Zeuctoboarmia translata* sp. nov.

♂, 42–50 mm. Face dark brown, lower one-third ochreous whitish. Palpus rather short, with very short terminal joint ; ochreous whitish, 2nd–3rd joint dark brown on outer side. Antennal shaft spotted with brown ; pectinations very long, rather weak and slender, curled, a very short apical part simple. Thorax and abdomen concolorous with wings. Hindtibia not dilated.

*Forewing* rather broad, termen oblique, curved, slightly wavel ; fovea rather small ; colour and markings nearly as in *Z. smithi* Warr., but less ochraceous, the irroration somewhat denser and darker, postmedian line with longer teeth distally, terminal spots more elongate.—*Hindwing* ample, termen convex, moderately crenulate ; marked as in *smithi*, with corresponding modifications to those of forewing, the discal lunule more heavily dark-margined.

Underside dirty whitish, with dark discal spot and terminal dashes ; forewing with costa more ochreous, dark-spotted, also with some dark dusting in anterior part (especially in cell), a weak postmedian line in anterior part, and a dark costal spot near the apex.

Nairobi to Mount Kenia ; type in coll. Rothschild. Nairobi Forest, Kikuyu, 5400 ft., April 5, 1900 (R. Crawshay), in coll. Brit. Mus. Rau, Nandi Country, February 23, 1899 (Dr. Ansorge), in coll. Rothschild.

Very near *smithi* Warr., from the Congo, venation the same ( $SC^{1-2}$  connected with C, sometimes also with  $SC^{3-4}$ ), palpus rather less short, pectinations still longer, wings rather broader.

#### 95. *Cleora cnephaea* sp. nov.

♂, 42–50 mm. Build robust. Face with appressed scales ; blackish fuscous. Palpus moderate, rather stout, closely scaled, third joint quite small, deflexed ; fuscous, darkest above and on outer side. Antenna with long pectinations, a short apical portion nearly simple, ciliated. Vertex and thorax concolorous with wings, tegulae blackened ; abdomen dorsally blackened, first segment and anal tuft remaining ochreous. Hindtibia dilated, with hair-pencil.

*Forewing* not very broad, termen not crenulate ; fovea present ;  $SC^{1-2}$  from cell, stalked for about one-half their length ; ochreous with a tinge of reddish, irrorated with dark purple-fuscous, almost entirely clouded over therewith in the posterior

part; in the type specimen there is no sharp demarcation to the clouded area, in a paratype it occupies about the posterior half of the wing from base to median line, broadens a little between this and postmedian, again distally to the postmedian and still again distally to the subterminal, running to termen near apex; blackish costal spots at the beginnings of the three lines; antemedian strongly oblique from SC to hindmargin near base; median and postmedian sharply bent outwards behind SC, then dentate, the median about parallel with termen, the postmedian more oblique and sinuous, approaching it at hindmargin; cell-mark inconspicuous, proximal to the median line; subterminal line ochreous, lunulate-dentate, not conspicuous (in dark specimens mostly covered by the fuscous clouding); termen and fringe fuscous, interrupted by the ground-colour at vein-ends.—*Hindwing* not very broad, termen moderately crenulate; concolorous with forewing, mostly, though confusedly, with a pale band remaining proximally to the crenulate postmedian line, also (especially in type) a pale subterminal, thickened at hindmargin.

Underside similar, the fuscous parts less deep (more shadowy).

Vivet, S. Nigeria, May 1906 (C. G. Dudgeon), type in coll. Brit. Mus. Paratypes, merely labelled Nigeria, in coll. Rothschild.

Except in shape, very similar to another Nigerian insect which I take to be the ♂ of "*Therapis*" (? *Geolyces*) *sordida* Warr., *Nor. Zool.* xii. 40.

#### 96. *Cleora spuria* sp. nov.

♂, 40 mm. Face with somewhat projecting scales in lower part. Palpus short, rough-scaled below. Tongue short. Antenna scarcely one-half as long as forewing, with very long pectinations to about the 27th joint (little beyond one-half), apical part nearly simple. Pectus strongly hairy. Femora and tibiae hairy. Abdomen beneath slightly hairy. Head and body tawny brown mixed with rust-red, base of abdomen with some whitish admixture above. Antennal pectinations black.

*Forewing* fairly broad, costa slightly sinuous, termen rather strongly oblique, slightly curved about  $R^3$ , straighter anteriorly; fovea well developed;  $SC^1$  and  $SC^2$  free; dirty white with rather sparse fuscous irroration; basal area as far as antemedian line, costal to SC and apical to across  $R^1$  suffused with tawny and rusted; veins also reddened, at least distally; lines fuscous, not very strong; antemedian from one-fourth costa to rather beyond one-fourth hindmargin, very slightly curved, preceded on the rufous area by a vague, still less oblique, dark band; cell-mark black, elongate, slender, angulated; median shade from costa opposite cell-mark, oblique outward, rather thick, sharply bent behind  $R^1$ , then incurved, becoming fine and indistinct and near postmedian; postmedian from nearly two-thirds costa, slightly sinuous to  $R^2$ , here bent, then incurved, reaching hindmargin at about three-eighths; some vague fuscous shading distally to this line about the radials and  $M^1$ , more or less extended to termen about  $R^2$ ; subterminal white line ill-defined, irregularly crenulate and sinuous, interrupted from behind  $R^2$  to  $M^1$  by a large white subterminal spot; a terminal line of rather thick black dashes.—*Hindwing* with inner margin long, costa relatively short, termen weakly sub-crenulate; without the rufous cloudings, except on and contiguous to the veins distally; antemedian line wanting; a sinuous line at one-third, thickened in cell and not reaching either margin; the rest corresponding to forewing, the subterminal white patch less conspicuous.

Underside ochreous whitish, almost markingless, the forewing becoming more

ochreous anteriorly, the submarginal spot rather whiter than the rest, very slight dark suffusion about the radials; terminal line weak, brownish, not black, on hindwing obsolete.

Ilesha, S. Nigeria (Capt. Humfrey). Type in coll. Rothschild.

No doubt near *divisaria* Walk. (*List Lep. Ins.* xxi. 366), but the very differently shaped wings, non-stalking of  $SC^1$  and  $SC^2$  of forewing, much less oblique first line, black discal mark and rufous costal shades are distinctive. The two should perhaps form a new genus, on account of the hairy tibiae, short palpus, etc., which suggest some affinity with the *Biston* group; similar tibiae are found in *Miantochora gumpfenbergi* Möschl., but are very exceptional in the *Geometridae*.

#### 97. *Cleora proximaria albescens* subsp. nov.

Considerably whiter than name-typical *proximaria* Walk. (*List Lep. Ins.* xxi. 365), from S. Africa, lacking the grey cloudings which give to the latter its characteristic aspect. On an average smaller.

British East Africa, only a few examples seen, but these constant. Mgana, September 4, 1896 (type); Mombasa, October 1906 (Dr. Ansorge); in coll. Rothschild.

#### 98. *Cleora indigna* sp. nov.

♂, 26 mm. Face broad, scarcely rough-scaled, grey, tinged with ochreous and dotted with fuscous. Palpus very short and slender. Tongue developed. Antenna pectinate with moderate branches. Head, body and legs concolorous with wings. Hindtibiae not dilated.

Wings shaped nearly as in *Ectropis delosaria* Walk. (*List Lep. Ins.* xxvi. 1541) = *crassa* Warr. (*Noc. Zool.* vi. 395), only with the termen of forewing slightly more oblique.—*Forewing* with fovea well developed;  $SC^{1-2}$  very shortly stalked; dirty whitish, tinged (especially about the veins and margins) with ochreous brown and rather strongly (though not quite evenly) irrorated with fuscous; basal area somewhat clouded with fuscous; lines blackish; antemedian from before one-third costa, curved and strongly oblique, rather thick, reaching hindmargin near base; postmedian slender, crenulate, strongest at the vein-teeth, recalling that of *Ectropis delosaria* but vertical from costa, curved about the radials and with the proximal curve behind  $M^2$  very shallow; discal mark long and thick, a vague dark median shade bending closely round it distally and then running from its posterior extremity to hindmargin, parallel with postmedian line; subterminal almost obsolete, its position indicated by a slight brownish shade proximally; terminal line thickened between the veins.—*Hindwing* similar, without first line, cell-mark smaller, the median shade touching its proximal side.

Under-surface paler, costal edge of forewing somewhat ochreous, dark-strigulated; markings weak, almost confined to cell-mark and postmedian; both wings with rather stronger dark dusting proximally to the postmedian than distally.

Cambo Caquenje, Bihé, Angola, November 3, 1904 (Dr. Ausorge). Type in coll. Rothschild.

#### 99. *Hemerophila dnophera* sp. nov.

♂, 34 mm. Rather larger than *H. aborta* Warr. (*Noc. Zool.* v. 247), from Uganda, palpus longer (about  $1\frac{1}{2}$ ), antennal pectinations slightly shorter (barely four times as long as diameter of shaft); very much darker, the warm brown

ground-colour both above and beneath being strongly suffused almost throughout with deep fuscous, on the forewing above with a few spots at costa, and an ill-defined patch in distal area from the radials to near tornus, on the hindwing above with the beginning at inner-margin of a narrow band between median and postmedian lines remaining less suffused.

*Forewing* marked nearly as in *aborta*, the lines deeper black, both thickened at costa; postmedian rather less oblique, its acute angle in front of  $R^3$  not approaching so near the termen; median shade vague, but connected with postmedian line by some black shading in middle of wing; cell-spot perhaps less enlarged.—*Hindwing* with median shade and postmedian line almost as in *aborta* but blacker, rather near together.—Underside with postmedian line rather sharper than in *aborta*.

Bitye, Ja River, Cameroons, 2000 ft., September–November 1911. Type in coll. Rothschild.

The venation, if constant, affords a further distinction: in *H. aborta*  $SC^1$  arises from the cell, well away from  $SC^2$ ; in *dnophera* it is shortly stalked with  $SC^2$ ; in both it anastomoses with C. They agree in having the forewing more shortened and rounded than in typical *Hemerophila*; *H. serrataria* Walk. (*List Lep. Ins.* xxi. 412: = *denticulata* Warr., *Nor. Zool.* xi. 473 = *curta* Warr., *op. cit.* xvi. 119), from Natal, has a rather similarly shaped ♂, but has  $SC^1-2$  coincident, generally well separated from C.

#### 100. *Hemerophila rotifera* sp. nov.

♀, 35 mm. Head grey-brown with some darker irroration. Palpus rather short. Antenna with single bristles almost as long as diameter of shaft. Thorax and abdomen grey mixed with brown.

*Forewing* rather broad, apex almost rectangular, termen crenulate, obliquely curved in posterior part;  $SC^1$  anastomosing slightly with C,  $SC^2$  free; proximal and distal areas brown, slightly mixed with grey and clouded with deep fuscous; central area grey, with slight and sparse brown irroration (stronger costally); lines fine, brown; antemedian from about two-fifths costa to one-fourth hindmargin, sinuous, strongly oblique inwards in posterior half; postmedian angled inwards subcostally, acutely bent outwards before  $R^1$  (the tip of the projection obsolescent), oblique inwards and somewhat sinuous to three-fifths hindmargin; a round brown cell-spot fully 1 mm. in diameter; a very ill-defined median shade traversing the grey area between cell-spot and postmedian, less angled outwards than the latter; dark clouding in terminal area weaker distally than proximally, but without sharp demarcation; terminal line interrupted, expanded into spots between the veins.—*Hindwing* with termen strongly crenulate; mostly brown, somewhat greyer near base, a grey, slightly brown-irrorated patch distally to subterminal line from tornus to middle; discal spot small, not sharp; a feeble, nearly straight, rather thick postmedian line from three-fifths hindmargin, bent near costa but becoming almost obsolete; subterminal pale line somewhat crenulate, almost obsolete, curved from tornus to radial fold, where it again approaches termen; a narrow dark band proximally to the subterminal, obsolete towards costa; interrupted terminal line and spots strong anteriorly, weak posteriorly.

Both wings beneath duller and more uniform, with fuscous irroration and vague fuscous subterminal band; forewing with rather large, hindwing with slightly smaller cell-spot.



Masindi, June 1897 (Dr. Ansorge). Type in coll. Rothschild.  
The coloration rather recalls *H. emaria* Brein.

101. *Hemerophila contenta* sp. nov.

♂, 39 mm. Face pale ochreous brown, mixed, especially in middle, with red-brown. Palpus of moderate length, pale ochreous brown, mixed on upper and outer sides with red-brown. Tongue short. Vertex, thorax and abdomen concolorous with wings. Antennal pectinations long, ceasing rather abruptly at about three-fourths. Abdomen rather long.

*Forewing* rather narrow, termen waved, not crenulate, rather strongly oblique in posterior part;  $SC^{1-2}$  short-stalked,  $SC^2$  connected by bar with  $SC^{3-4}$ ; dirty whitish, irrorated with ochreous brown and marked with red-brown, tending in places to dark fuscous; some indefinite suffusion at base; first line sinuous, very oblique from one-fourth hindmargin in the direction of cell-spot, ceasing about at M, nowhere well distinguishable from a dark shade which accompanies it proximally and which is merged at M into some dark clouding posteriorly to the cell-spot; cell-spot moderate; median line from five-ninths costa, irregularly lunulate, not sharply defined, oblique outwards to behind  $R^1$ , oblique inwards from  $R^2$  to middle of hindmargin, accompanied proximally (except from fold to hindmargin) by dark shading; postmedian line obsolete anteriorly, except as an elongate spot along costa; developed from  $R^1$ , parallel with termen to  $R^3$ , then more oblique, throughout minutely dentate inwards on the veins, at hindmargin accompanied distally by a large dark spot; termen between apex and  $R^3$  with some dark shading nearly as in *H. abruptaria* Thnb., but continued across the postmedian line so as to join the shading behind cell-spot; some weaker dark shading between  $R^3$  and hindmargin, forming distal boundary to the obsolescent, lunulate whitish subterminal line; termen with somewhat triangular (posteriorly more elongate) fuscous spots between the veins: fringe dark-spotted opposite the veins.—*Hindwing* with termen waved, not toothed at  $SC^2$ , crenulate between  $SC^2$  and  $R^3$ , then rather straight; median line continued, accompanied distally by a narrow dark shade, which reaches the moderate cell-spot; postmedian from costa near apex nearly straight (very slightly sinuous) to beyond two-thirds inner margin; subterminal broad but very ill-defined, followed distally by a slightly curved dark line from termen near  $SC^2$  to inner margin close to tornns, and this again by a dark terminal shade.—Underside with the markings reproduced, not very sharply defined.

Ganyoro, Ivory Coast, May 2-7, 1903 (Pemberton). Type in coll. Rothschild. Also in coll. Rothschild a ♂ from Bitye, Ja River, Cameroons, 2000 ft., September—November 1911, more uniformly greyish, forewing with the postmedian line double and the subterminal rather better expressed by dark edgings. Not inconceivably a ♂ form of *penumbra* Warr. (*Nov. Zool.* xii. 395), notwithstanding the extraordinarily different shape, shorter stalking of  $SC^{1-2}$ , etc.

102. *Nychiodes tyttha* sp. nov.

♂, 23 mm.; ♀, 28 mm. Antennal pectinations in both sexes relatively somewhat longer than in the type species. Head and body concolorous with wings, face a little more infuscated, abdomen slightly dark-belted at the ends of the segments.

*Forewing* with termen entire;  $SC^{1-2}$  coincident, sometimes (the ♀ paratype)

anastomosing at a point with  $SC^{3-4}$ ; pale ochreous brown, closely irrorated with red-brown and more sparsely and irregularly with fuscous; base of costa spotted with dark fuscous; lines blackish; antemedian from before one-third costa, strongly excurved in cell, less curved (nearly parallel with termen) from  $M$  to  $SM^2$ , then oblique basewards; preceded by a reddish brown shade, at least posteriorly; median shade ill-defined, from a costal spot between the lines, lunulate-dentate, in posterior half nearer to postmedian than to antemedian; postmedian thickened into spots or dashes on the veins; from towards three-fourths costa, oblique inwards at origin, excurved from  $SC^5$ , strongly incurved from  $R^2$  to  $M^1$ , then nearly vertical to hindmargin; accompanied distally by red-brown shading, especially in posterior half; a red-brown shade between the radials, reaching termen; terminal line black, thickened between and more or less interrupted at the veins.—*Hindwing* with termen much less deeply crenulate than in the type; concolorous with forewing, rather more mixed with fuscous from base to the weakly defined median shade than beyond; a postmedian line formed almost as in *Synopsisia sociara* Hbn., but rather slighter; an ill-defined red-brown subterminal shade; terminal line as on forewing.

Under-surface dull whitish ochreous, the forewing more or less strongly irrorated or clouded as far as the postmedian line, the distal area and the whole of hindwing with only very slight irroration; discal dots present—at least on hindwing; postmedian line represented by vein-dots or small dashes; terminal line much weaker than above.

Eritrea: Carai, November 21, 1905 (N. Beccari). Type ♂ and a more weakly marked ♀ in coll. Rothschild; the latter with the lines of the forewing less deeply curved.

Differs from both the Palaearctic species in its much smaller size, brighter colour, etc.; and slightly in the venation.

### 103. *Ectropis anisa* sp. nov.

♂, 34 mm. Face with appressed scales. Palpus rather short. Antennal ciliation about as long as diameter of shaft. Head, body and legs whitish ochreous-brown; foreleg with femur and tibia infuscated on inner side, tarsus more slightly so, with pale spots. Hindtibia not dilated.

*Forewing* with termen rather strongly bowed, not crenulate,  $SC^{1-2}$  coincident, arising from stalk of  $SC^{3-5}$ , anastomosing strongly with  $C$ ; white, tinged with pale ochreous-brownish, with rather sparse irroration; lines brownish, crenulate; a pair of antemedian rather near base, rather oblique outward from costa, angled behind  $SC$ ; median line weak, arising on costa opposite the discal spot, very strongly oblique outward anteriorly, angled about  $R^1$ , thence parallel with and not very far from the postmedian; postmedian double, somewhat bent about  $R^1$ , thence parallel with termen, at a distance of about 4 mm.; subterminal line marked with dark internodal spots, interrupted between  $R^3$  and  $M^1$ , the spots between the radials and behind  $M^1$  the largest; discal spot large, round, blackish, cut by a pale, somewhat bracket-shaped mark on  $Dc^1$ ; termen with large black dots between the veins.—*Hindwing* with termen only very feebly subcrenulate, a scarcely appreciably stronger tooth at  $R^3$ ; white, on the inner-margin with curved beginnings of postmedian and subterminal line; the latter sometimes interruptedly traceable throughout; terminal dots present, strongest posteriorly.

Underside dirty white, almost markingless.

Ran, Nandi Country, February 1899 (Dr. Ansorge), 6 ♂♂ in coll. Rothschild, including the type. Daro Forest, Toro, Uganda, 4000-4500 ft., October 29, 1911 (S. A. Neave), a well-marked example in coll. Brit. Mus.

Recognisable at a glance by the poorly marked hindwing.

#### 104. *Gnophos rubricimixta* sp. nov.

♂ ♀, 24-27 mm. Face rounded, not appreciably protuberant; fuscous. Palpus rather short, pointed, with tolerably appressed scales; fuscous. Crown somewhat paler, with some reddish admixture. Antennal shaft mixed fuscous and rufous; in ♂ with moderate pectinations, not reaching tip; in ♀ subserrate. Thorax and abdomen concolorous with wings; the abdomen with dark dorsal belts occupying the greater part. Hindtibia in ♂ scarcely dilated; tarsus long.

*Forewing* elongate, with termen almost smooth, curved, strongly oblique; SC<sup>1</sup> anastomosing with C, SC<sup>2</sup> from stalk of SC<sup>3</sup>, anastomosing with SC<sup>1</sup> and with SC<sup>3-4</sup>; blackish fuscous, very strongly irrorated with orange red, the scaling with a peculiar longitudinal arrangement, very noticeable with the lens; a rather large, feebly ocellated blackish cell-spot; lines blackish, very indistinct except as costal spots, rather approximated, chiefly discernible through a slight diminution of the red irroration in the median area and accentuation of the same at each edge thereof (especially the distal); postmedian line strongly excurved round the cell-spot and incurved in submedian area; termen with very ill-defined row of spots or interrupted line.—*Hindwing* with termen rather strongly crenulate, slightly prominent in posterior part; coloured like forewing, the proximal half (except extreme base) predominantly blackish, distal half more irrorated, especially a narrow postmedian band bounding the proximal area and in places almost clear orange-red; discal dot small and inconspicuous, or even obsolete.

Underside uniform glossy pale grey, with very slight rufescent tinge.

Cape Colony: Deelfontein, February-March 1902 (Colonel Sloggett), type ♂ and a ♀ in coll. Brit. Mus.; foot of Nienwveld Mountains, 5 miles N.W. of Beaufort West (Mrs. Butt), a worn ♀ in coll. Rothschild.

#### 105. *Gnophos delagardei* sp. nov.

♂, 28 mm. Face and palpus as in the preceding. Vertex pale ochreous grey. Antenna ochreous, rather strongly lamellate. Thorax and abdomen pale ochreous grey, the latter dorsally indistinctly darkened, except at extremity of segments. Hindtibia slender.

*Forewing* with termen faintly waved, posteriorly curved, moderately oblique; SC<sup>1</sup> connected by bar with C, SC<sup>2</sup> from cell, anastomosing shortly with SC<sup>1</sup> and with SC<sup>3</sup>; pale ochreous grey with slight darker suffusions and with sparse fuscous irroration; costal edge with dark strigulation; lines fuscous, not very sharp, slightly thickened at costa; antemedian from one-third costa, strongly bicurved outward, on M and on SM<sup>2</sup> dentate inward; feeble indications of one or two lines proximally to this; postmedian from costa just before two-thirds, oblique outward, strongly angled on R<sup>1</sup>, dentate outward on the succeeding veins, incurved between M<sup>1</sup> and SM<sup>2</sup>; a large discal annulus; subterminal pale line indicated by some vague dark proximal shading; termen with blackish internodal dots.—*Hindwing* with termen crenulate, the deepest sinus between the radials; as forewing, but without antemedian line.

Under-surface more glossy, almost markingless, the postmedian line feebly traceable.

Cape Colony: Simon's Town, October 1904 (P. de la Garde). Type in coll. Brit. Mus.

Facies curiously Palaearctic, suggesting a diminutive pale *obscurata* Schiff. with the angled postmedian line of *ambigua* Dup. or *variegata* Dup.

#### 106. *Elophos barbarica* sp. nov.

♂, 32 mm. Best comparable with *E. caelibaria spurcaria* Lah., with the most heavily irrorated, most weakly marked examples of which it shares the scaling and general effect, except for its smaller size and differently shaped hindwing. Face rather less protuberant, dark fuscous. Palpus dark fuscous. Antenna rather short, the pectinations stouter and even shorter than in *caelibaria*, equally clavate. Thorax and abdomen concolorous with wings.

*Forewing* with termen slightly less oblique than in *caelibaria*, DC more incurved (cell-spot at just one-half wing-length), SC<sup>1</sup> free, SC<sup>2</sup> anastomosing rather strongly with SC<sup>3+4</sup>; costal edge finely yellowish, the ground-colour otherwise fleshy, not yellowish; lines extremely indistinct, except at the veins, the costal spots at their origin not large; antemedian more curved anteriorly than in *caelibaria*; a median shade indicated by a costal mark opposite the cell-spot; postmedian much nearer the termen than in any Palaearctic species, arising at costa 4 mm. from apex; cell-spot smaller than in most *caelibaria*, roundish; no terminal line.—*Hindwing* with termen strongly convex, especially in posterior part; cell rather short; postmedian line midway between cell-spot and termen.

Underside with cell-spots and faint traces of postmedian line.

Foot of Nieuwveld Mountains, 5 miles N.W. of Beaufort West (Mrs. Butt). Type and a second, very worn, example in coll. Rothschild.

The genus *Gnophos* Tr. (sens. lat.), as is well known on biological grounds, is heterogeneous and in need of revision. I use *Elophos* Bdv. (with type *operaria* Hbn.) for the small group with smooth wing-margins, shortly pectinate ♂ antenna and apterous or semiapterous ♀. The few Aethiopian species of "*Gnophos*" yet described have been referred to *Catascia* (wing-margins crenulate); but in part, at least, do not belong to the group at all. *barbarica* shows superficially an aspect which seems rather prevalent in South Africa, appearing in the five or six species described as *Dyscia* (= *Scodiona*), in "*Idiotephra*" *simplex* Warr. (*Ann. S. Afr. Mus.* x. 490)\* and even in *Ectropis delosaria* Walk.; the antennal structure will distinguish it at a glance.

#### 107. *Buzura potaenia* sp. nov.

♂, 67 mm. Face rather rough-scaled; whitish above, dark fuscous in middle, fading off below. Vertex and antennal shaft whitish; pectinations long, dark. Thorax and abdomen whitish, mixed with fuscous except front of thorax; abdomen not very robust. Legs whitish; foreleg dark fuscous above except at extremities of joints; hindtibia not bilated, but furnished on upperside proximally with a tuft of projecting scales.

\* I am at a loss to imagine how this species can have been compared with *I. curvivena* Warr., to which I cannot see the remotest resemblance. It should be added that the ♂ antenna in *simplex* bears slender, well-ciliated pectinations, two pairs to each joint.

*Forewing* with  $SC^{1-2}$  long-stalked; dirty whitish, irregularly irrorated with very fine dark dots and strigulae and weakly stained in places with ferruginous brown, especially at base, in a large patch between postmedian and subterminal lines from hindmargin about to  $R^3$ , and a smaller, slighter patch anteriorly to the same; lines fuscous, mostly weak and interrupted except at costa, where they form conspicuous dark spots, the median the broadest; first line at one-fifth, angulated step-wise, obsolescent at the first two inward bends (in cell and before submedian fold); median shade nearly obsolete in cell, where it curves strongly proximad, mostly well developed from M to hindmargin, bending inward to submedian fold, then outward; postmedian from two-thirds costa, oblique outward, broken basewards behind  $SC^3$ , obsolete from  $R^1$  to fold except as blackish dots (minute dashes) on the veins, slightly more oblique than termen; oblique outwards from fold to  $SM^2$ , then curving inwards, in this part of its course accompanied distally by a second, parallel line; subterminal line dirty white, dentate, not sharp, accompanied proximally from costa to  $SC^5$  by a dark spot, its dark shading otherwise very slight; discal mark very weak, crescentic, white, feebly dark-edged; terminal line broken into small dashes.—*Hindwing* with the brown stains still less noticeable, the median line continued as a zigzag antemedian, postmedian little beyond the cell, formed nearly as on forewing; subterminal little dentate anteriorly; no dark costal spots, on the other hand one at inner margin proximal to the subterminal line.

Forewing beneath with rather large, round dark cell-spot, small median costal spot, beginning of postmedian line, very large subterminal spot and faint subterminal shading between radials. Hindwing beneath with median and postmedian costal spots.

Bitye, Ja River, Cameroons. Type in coll. L. B. Prout.

Much larger than *analipлага* Warr. (*Nov. Zool.* iv. 244), rather less robust, browner, pectination still longer and more slender, hindwing less shortened anteriorly, etc.

### **Nothofidonia** gen. nov.

Akin to *Nothabraxas* Warr. (*Nov. Zool.* iv. 88), but with the eye smaller, face and palpus strongly hairy, hindtibia with terminal spurs only.\* ♀ apterous.

Type of the genus: *Nothofidonia bicolor* sp. nov.

Here belongs also the closely related *ansorgei* Warr. (*Nov. Zool.* viii. 16, as *Fidonia*), of which only the ♂ is yet known.

### 108. **Nothofidonia bicolor** sp. nov.

*Nothabraxas bicolor* Warr. MS.

♂, 37-40 mm. Face yellow, upper part black. Palpus black. Vertex and antenna black. Thorax black, mixed (less so on pectus) with yellow; abdomen with more yellow.

*Forewing* yellowish white, pretty uniformly marked with copious coarse black dots, in places confluent into short transverse streaks; fringe yellow, irregularly cut with black chequering.—*Hindwing* ochreous yellow, more sparingly dotted, fringe also with fewer black marks.

Underside similar, but with both wings yellow.

\* Warren, in erecting *Nothabraxas*, says, "Hindtibia with a pair of spurs," but both pairs are developed in that genus.

British East Africa: Kikuyu Escarpment, 6500—9000 ft., March 1901 (W. Doherty), type in coll. Rothschild; Nakutu, May 8, 1911 (H. A. Bodeker), 2 ♂♂ in coll. Brit. Mus.

109. *Nothofidonia bicolor irregularis* subsp. nov.

♂. Differs from name-typical *N. bicolor*, as described above, in having the black markings much more irregularly distributed, especially on the hindwing.

*Forewing* sometimes purer white; more or less entirely clear areas in the region of M and the proximal part of M<sup>1</sup> and between SC<sup>5</sup> and R<sup>1</sup> towards termen; the black more or less condensed about SC and anterior part of cell and especially in apical region, where one or two solid black patches are sometimes formed. — *Hindwing* black at extreme base and usually for a considerable distance between SM<sup>2</sup> and SM<sup>3</sup>, also densely black-spotted along distal margin for a width of about 3 mm.; a few dots and spots at costa and sometimes one or two on M and in cell; otherwise clear yellow.

♀ with the wings reduced to minute black vestiges. Coloration nearly as in ♂, abdomen mainly black, with narrow yellow belts and yellow anal end.

Nyassaland: Mlanje Plateau, 6500 ft., November 10–11, 1913 (S. A. Neave), a good series of both sexes in coll. Brit. Mus. The males were flying in abundance, the females were found by searching the grass.

Variable and often asymmetrical, but the general tendencies constant.

110. *Nothabraxas anamesa* sp. nov.

♂ ♀, 43–47 mm. Face yellow. Palpus whitish grey at base, becoming black (variable in extent of the colours). Vertex mostly yellow. Antennal shaft whitish grey, spotted with black. Thorax above and abdomen mostly yellow, the abdomen with black spots, more or less confluent into belts. Legs whitish grey, spotted with black.

*Forewing* with termen strongly oblique; whitish, with a slight tinge of ochreous and with two broad, but not strong, streaks of dull ochreous suffusion, one along the cell and radial area, becoming faint and cleft distally, the other along the fold; a still fainter suffusion between the median veins, the surface irregularly covered with large but rarely confluent black dots; fringe with only a few black dots. — *Hindwing* without the ochreous suffusions, the black dots wanting or sparse in proximal part, well developed in distal (variable). Both wings beneath similar, the suffusions duller and slighter.

Usanga district, German East Africa, 3500—4500 ft., November 30 and December 4, 1910 (S. A. Neave), 3 ♂♂, 1 ♀ in coll. Brit. Mus.

Perhaps nearest *castus* Warr. (*Nov. Zool.* xi. 471), which has the antennal pectinations, as well as shaft, black-spotted, the wings rather less strong and more glossy, whiter, with fine strigulae instead of coarse dots. The longitudinal shades rather recall (except in colour) *roseovittata* Butl. (*Proc. Zool. Soc. Lond.* 1895, p. 741).

111. *Rhodophthitus myriostictus* sp. nov.

♂ ♀, 48–60 mm. Head bright ochreous. Palpus quite short; ochreous, second joint black on outer side. Antenna black, with extreme base ochreous; ♂ with pectinations very short (scarcely as long as diameter of shaft), ending in fascicles of

cilia; ♀ serrate. Thorax pale ochreous, mixed with bright ochreous and with a few dark grey dots above. Fore and middle legs mostly infuscated, hindfemur and tibia ochreous, hindtarsus fuscous-spotted; hindtibia in ♂ strongly dilated, with hair-pencil, spurs very short. Abdomen pale ochreous, with a narrow blackish belt above at the end of each segment, a few of them slightly continued ventrally; anal tuft well developed, bright ochreous.

*Forewing* elongate, costa gently curved;  $SC^{1-2}$  stalked to about opposite origin of  $SC^3$ ; dirty white, with a slight yellowish tinge, unevenly marked throughout with olive-fuscous dots, mostly rather coarse, here and there somewhat confluent; a cell-spot of the same colour.—*Hindwing* rounded; similar, but with the dots rather sparser except in distal region; one of the dots occupies middle of  $DC^1$ .

Underside the same.

Ilesha, S. Nigeria (Capt. Humfrey), 3 ♂♂, 1 ♀ in coll. Rothschild.

Similar to the preceding except in structure, more rounded wings and whiter colour. Like most of the African genera of *Geometrinae*, *Rhodophthitus* is in need of revision. The only species with similar antennal structure which has been referred to it is *tricoloraria* Mab. (*Ann. Soc. Ent. Fr.* 1890, p. 50) = *imperialis* Bastelb. (*Intern. Ent. Zeit.* i. 109), a large, handsome, broad-winged species with slightly different venation. These two species have less hairy clothing than *castus* Warr., etc., which I refer to *Nothabraxas*.

#### 112. *Callioratis apicisecta* sp. nov.

♂, 70 mm. Face ochraceous rufous, becoming paler below. Crown and antenna black. Thorax and abdomen ochraceous rufous, a narrow black band down middle of thorax, extending on to base of abdomen. Legs black, the coxae, femora and tibiae whitened on outer side.

*Forewing* ochraceous rufous, becoming redder at hindmargin and paler towards costal margin and apex; markings black; a small patch at base; a narrow, oblique, tapering fascia from one-fourth costa (here 3 mm. wide) to across fold, its distal edge touching the origin of  $M^2$ ; a spot on  $SM^2$  as continuation of this fascia; a broader but shorter fascia (also tapering) from midcosta, along  $DC^{2-3}$ , to just across  $DC^4$ ; a third fascia before three-fourths, slightly curved, 4 mm. wide at costa, tapering little, furcate on  $R^3$ , one branch very short, ending on  $R^3$  near termen, the other longer, confluent with the black border at  $M^1$  and again at  $M^2$ , tapering to a point behind fold; a small black apical patch, continuous as a very narrow distal border, succeeded at tornus by a black spot on  $SM^2$  (anteriorly pointed); fringe black.—*Hindwing* concolorous, with slightly deeper discal spot, narrow black border (a little wider at apex) and a narrow black band from nearly three-fourths costa to mid-termen, thickening where it joins the distal border.

Underside the same.

Kojokaji, Lado Enclave, May 6, 1912. Type in coll. Rothschild.

All the black parts are tinged or shot with glossy deep blue.

#### 113. *Mimaletis reducta* sp. nov.

♂ ♀, 34–40 mm. Very similar to *humilis* Warr. (*Nov. Zool.* i. 378), differing as follows:

Antennal pectinations shorter in the ♀. Smaller, but with the wings relatively a trifle broader; less bright reddish, the black border of forewing broader at costa, its edge being more oblique; no white at apex; first white spot relatively shorter,

not pointed behind, second smaller (scarcely larger than third); border of hindwing narrower, the white spots smaller (only four or five present, the first—between  $SC^2$  and  $R^1$ —sometimes obsolete above, always minute).

Uganda: Semliki Valley, Bnamba Forest, 2300—2800 ft., November 4, 1911, type ♂; Unyoro, Budongo Forest, 3400 ft., December 13–14, 1911, 3 ♀♀. All in coll. Brit. Mus., collected by S. A. Neave.

#### 114. *Ereunetea orientalis* sp. nov.

♂, 28–30 mm. Face and palpus orange, the latter tipped with black. Head purplish, mixed with orange. Thorax purplish. Abdomen orange, with purplish lateral stripe; anal tuft partly fuscous.

*Forewing* bright orange to beyond one-half, black distally, the black area reaching at least as far as the cell, at times to the origin of  $SC^{1-2}$ ; costal edge black, a purplish fuscous suffusion between this and  $SC$ .—*Hindwing* with the black border narrowing off posteriorly, only reaching the fold; a black cell-spot.

Forewing beneath with the costal and distal areas mostly dull purple, only a restricted black band (angled outwards and broadening towards tornus) separating the orange-yellow from the purple. Hindwing dull purple, with black cell-spot, orange-yellow from the inner margin to the fold.

Mombasa: Rabai, type and 3 other ♂♂, March 15, 1912 (S. A. Neave), in coll. Brit. Mus. One from the same district, May 27, 1911 (St. A. Rogers), in coll. Oxford Mus.

Probably an eastern race of *fulgida* Warr. (*Nor. Zool.* vi. 303), which is generally rather more reddish, lacks the costal suffusion of forewing, and has the border of hindwing extended to  $SM^2$ . Both species (or races) vary in the breadth and shape of the black borders.

#### 115. *Ereunetea nesiotis* sp. nov.

♀, 33 mm. Face and underside of palpus ochreous. Crown of head rosy. Antennal shaft fuscous. Thorax above orange-ochreous, beneath rosy; patagia and tegulae mixed with rosy. Legs mostly greyish. Abdomen above orange-ochreous, on side partly rosy, beneath more greyish.

*Forewing* relatively rather long; orange, the extreme costal edge blackish, a rosy tinge between  $C^1$  and  $SC$  near base; a large blackish cell-mark, fully 1 mm. in width and extending the entire length of  $DC^{2-3}$  and on to the base of  $R^2-M^1$ ; a dark grey, slightly purple-tinged distal border, extending at least 5 mm. at costa, narrowing to a point at tornus, its proximal edge bent in middle, somewhat ragged in anterior half, some dark irroration extending into the orange ground.—*Hindwing* with a discal dot and an extremely narrow dark distal border, becoming a mere thread from  $M^1$  and disappearing about at the fold.

Forewing beneath orange, the cell-mark as above, the border dull rufescent, the costal margin broadly (to  $SC$ ) of the same tone. Hindwing beneath almost wholly dull rufescent, only orange at inner margin; a black cell-spot.

Pemba Island (E. Morland). Type in coll. Rothschild.

#### 116. *Ereunetea horitropha* sp. nov.

♀, 38 mm. Near the preceding, larger, the wings slightly narrower still, head and palpus orange, the latter with the third joint black, crown of head



scarcely reddened, shaft of antenna darker, patagia and tegulae not mixed with red, legs darkened.

*Forewing* orange; cell-mark large, but not extending beyond hinder angle of cell; distal border at costa more extended (6.5 mm.), in the type almost immediately narrowed, though still wider than in *nesiotes*, in a second example touching the cell-mark.—*Hindwing* with the dark border confined to anterior half and consisting only of minute dots (type) or larger, confluent spots (paratype).

Forewing beneath with the purplish border more or less broadly edged proximally with blackish from the cell-mark almost to tornus. Hindwing scarcely less orange than forewing.

Nyassaland: Mount Mlanje, January 20 (type) and February 15, 1911 (S. A. Neave) in coll. Brit. Mus.

Not impossibly a local race of the preceding.

#### 117. *Geodena venata* sp. nov.

♀, 40 mm. Head somewhat damaged, apparently black, palpus black. Antenna black, pectinations of moderate length. Collar orange. Thorax partly black. Tegula dirty white. Abdomen white dorsally, at least in anterior part (partly discoloured), mostly orange ventrally.

Wings dirty white, the veins strong, darkened with grey. *Forewing* with base narrowly blackish, costal area blackish, the entire distal area dull black, excepting an irregularly quadrate white spot, with a diameter of about 2 mm., placed between (and just crossing)  $SC^5$  and  $R^1$  at a distance of 5–7 mm. from apex; proximal boundary of the black area commencing at C about the middle of the wing, oblique outward to just behind  $M^1$  near its origin, here pointed, again (though less sharply) on  $M^2$ , then again oblique outward, reaching termen near tornus.—*Hindwing* with base narrowly blackish, a moderately large blackish cell-spot and a not very broad black border, averaging about 3 mm. in breadth from apex to radial fold, here angled and becoming narrower, widening again somewhat from  $M^1$  to beyond submedian fold, then abruptly very narrow. Fringe black.

Underside the same.

Near (half a mile east of) Oni camp, 70 miles east of Lagos (W. A. Lamborn), pupa found freely exposed on leaf in forest, February 1, 1912, emerged February 6, 3 p.m. Type in coll. Oxford Mus.

Rather distinct in facies, on account of the darkened veins and the large discal spot of the hindwing. The shape of the black border of the forewing is perhaps nearest that of *sphingifacies* Hmps. (*Ann. Mag. Nat. Hist.* (8) v. 454). This group of the genus is characterised by the shape of the cell of the forewing, which is much longer posteriorly than anteriorly,  $DC^2$  curving and becoming extremely oblique,  $R^2$ ,  $R^3$ , and  $M^1$  all arising near together from the posterior arm.

#### 118. *Terina rogersi* sp. nov.

♀, 36 mm. Face black, crossed below the middle by a white band (or two large, more or less confluent white spots) and with a slight admixture of metallic blue scales, especially in the lower part. Palpus black, with a white band at end of first joint. Head and body black with some white spots, dorsal, lateral, and ventral rows equally conspicuous. Legs black, femora whitish on underside.

*Forewing* bright golden yellow; extreme base black, with a white spot, a

broad black band (about 3–5 mm.) from just proximally to midcosta to tornus, its proximal edge irregularly indented, in the middle very slightly excavated, its distal edge slightly oblique outwards at costa and at tornal end, and very slightly indented on  $R^1$ ,  $R^3$ , and  $M^1$ ; apex rather broadly and termen narrowly black; fringe black.—*Hindwing* red-orange, from fold to inner margin concolorous with forewing; a black border from costa near apex, broad at first, narrowed from  $R^3$  to behind  $M^1$ , then forming a rather large (2 mm.) tornal blotch, with dentate anterior edge; inner margin narrowly black in distal half.

Under-surface the same, but both wings orange, only the costal margin of the forewing slightly yellower.

British East Africa: 15 miles W. of Fort Hall, Kikuyu Co., Weithaga, about 6000 ft. elevation, February 24, 1909 (K. St. A. Rogers), type in coll. Oxford Mus.; Mount Kenya, N. slopes, 4500–5000 ft., February 13, 1911, 1 ♂, S. and E. slope, 5000–7000 ft., February 11–12, 1911, 4 ♀♀ (S. A. Neave), all in coll. Brit. Mus.

#### 119. *Terina fulvibasis* sp. nov.

♀, 38 mm. Face white, with blackish mark below base of antenna. Palpus black above, white beneath. Vertex black, with a white spot between antennae. Antenna black, extreme base beneath white. Thorax above grey (mixed black and white), beneath dirty white. Legs darkened on upperside. Abdomen dirty white.

*Forewing* with costa gently arched, apex rather rounded, termen not very long, rather oblique, curved in anterior part, tornus rather rounded; white, with costal edge at base and vein SC blackened, the space between fulvous; a broad black border, its proximal edge arising from the black costa at about 4 mm. from base, at first extremely oblique, not crossing SC till 7 mm. from base, then obliquely curved to a point behind  $M^2$  within 4 mm. of termen, finally oblique inwards to three-fifths hindmargin; slight proximal projections from this border along M and  $M^2$ ; fringe black.—*Hindwing* with costa long, apex and anterior part of termen rounded; white, with a black apical patch from costa to across  $R^1$ , at its widest about 3 mm.; fringe blackened along most of this patch.

*Forewing* beneath nearly as above, the fulvous basal patch suffusedly extended, SC not blackened.—*Hindwing* beneath also with fulvous basal suffusion; the black apical patch not produced.

Bitye, Ja River, Cameroons, April–June 1910, lesser rains (G. L. Bates). Type in coll. Rothschild.

Related to *doleris* Plötz (*Stett. Ent. Zeit.* xli. 82) = *acera* Swinh. (*Tr. Ent. Soc. Lond.* 1904, p. 149), but very distinct. It is quite exceptional in this group to find any part of the black borders of the upperside not reproduced beneath.

#### 120. *Terina meliorata* sp. nov.

♀, 38 mm. Face dark grey, whitish at edges. Palpus light grey with third joint dark. Vertex and antenna blackish. Collar and patagia mixed with grey. Thorax and abdomen yellowish white.

Wings shaped as in *octogesa* Druce.—*Forewing* yellowish white, slightly yellower proximally than distally, costal edge narrowly black; a bright orange anterior patch at base, extending about 5 mm. along costa and bounded posteriorly by SC, but with some slighter orange shading also in base of cell; apical black patch about 10 mm. long at costa, its proximal edge forming alternate shallow

concavities and convexities (the latter at origin of  $M^1$  and near end of  $M^2$ ), and finally running very narrowly along hindmargin for a very short distance beyond tornus; the contained spot of the ground-colour moderately large.—*Hindwing* uniform yellowish white, with a continuous black distal border from costa near apex to tornus, 1.5 mm. broad at first, broadening a little at apex and again between  $M^1$  and the fold, narrow and sinuous-edged between, and suddenly exceedingly narrow behind fold.

Under-surface the same.

Lake Azingo, Gaboon, December 1907 (Dr. Ansorge). Type in coll. Rothschild.

Druce treated the ♂ of this (from the Congo) as the ♂ of his *octogesa*; it may possibly be a striking aberration or geographical form of that species, but both forms certainly occur in both sexes, and they demand provisional separation.

As ab. *insulata* ab. nov. I describe a ♀ form in which the black apical patch of the forewing is obsolete proximally to the spot of the ground-colour, with the exception of an isolated round discal spot. Two examples from Bitye, Ja River, Cameroons, in coll. Rothschild.

### 121. *Terina circumcincta* sp. nov.

♂ ♀, 34–40 mm. Akin to *doleris* Plötz, of which it may prove a local race. On an average smaller, and differing markedly as follows:

Thorax and abdomen black dorsally.

*Forewing* with the black apical portion less obliquely edged proximally, consequently crossing  $M^2$  much nearer to its origin.—*Hindwing* with the black apical patch somewhat broader and **continuing as a moderate** (circ. 2 mm.) **border** round entire distal margin and more narrowly along inner margin to about halfway.

Nyassaland: Mount Mlanje, November 20, 1912 (type ♂), and several other examples, November 15–23, 1912, and February 4, 1913 (S. A. Neave); Mlanje, Boma, 2400 ft., April 26, 1910, a pair (S. A. Neave). All in coll. Brit. Mus.

*T. doleris* is common from the Gold Coast to the Cameroons and in Uganda, and is everywhere very constant.

Warren (*Nor. Zool.* xvi. 116) proposed sinking *Terina*—in which he was evidently correct in merging *Amnemopsyche*, *Hylemera* and *Agirpa*—to the following genus. I consider the latter as provisionally distinct on account of its more robust build, more hairy clothing (rough face, etc.), and other details.

### 122. *Pitthea cyanomeris* sp. nov.

♂, 37–43 mm. Face white, with narrow oblique black bars from base of antennae, almost meeting below. Palpus black, mixed with orange at base. Vertex and antenna black. Postorbital rim white. Collar orange mixed with red. Thorax and abdomen above dark grey with slight bluish admixture; pectus mixed with orange; abdominal cavity narrowly edged with orange; an orange ventral band, narrowing posteriorly, anal extremity not orange.

Wings shaped almost as in *fumula* Drury.—*Forewing* black, less deep proximally, where there is a slight admixture of bluish; a large white patch on hindmargin from near base to about three-fifths; anteriorly somewhat rounded, reaching SC; an oblique distal fascia from SC to  $M^1$  or just beyond.—*Hindwing*

with an extended white patch occupying a great part of the wing, leaving a grey area, very strongly mixed with bright blue, along inner margin, a black distal border and apical region; this white patch is broad at costa (about 5 mm.), still broader at first in cell, somewhat rounded and narrowed off distally, ending about 2 mm. from termen.

Both wings beneath with the same white patches, base mixed with orange, the black of forewing anteriorly and of both wings apically mixed with brown, the blue of hindwing reduced to a very feeble, dull suffusion.

Uganda: S.E. Budda, Tero Forest, 3800 ft., September 29-30, 1911 (S. A. Neave). Type in coll. Brit. Mus.

Intermediate between *trifasciata* Dewitz and *famula* Drury.

### 123. *Pitthea neavei* sp. nov.

♂ ♀, 37-43 mm. Face white, the upper part with a black tuft on each side. Palpus black. Head and antenna black, postorbital rim with a white dot. Thorax black, mixed with orange beneath. Abdomen black, venter orange.

*Forewing* black, with very slight bluish gloss; two oblique bands as in *continua* Walk. but of a light orange colour, not yellow, the postmedian very pale and washed-out, but becoming deep orange at each end, slightly variable in length but never quite reaching the wing-margins.—*Hindwing* black, with a single band of a bright orange-red to vermilion colour, broad at costa (occupying middle one-third or more), narrowing somewhat posteriorly, its hinder end rounded, from  $R^3$  to behind  $M^1$ , never quite reaching the distal margin.

Forewing beneath nearly as above, the antemedian band sometimes widened. Hindwing beneath with the red band more orange, its distal boundary as above, but proximally extended to the base and posteriorly (*i.e.* towards inner margin) to the fold, except in distal one-fourth, where the black ground-colour encroaches so as to reduce the band to the same width as on upperside.

Nyassaland: Mount Mlanje, November 1912, February and May 1913 (S. A. Neave), 6 in coll. Brit. Mus.

### *Hylemeridia* gen. nov.

Head rather small. Face smooth, rounded. Palpus shortish, with moderately appressed scales; third joint small. Tongue slender. Antenna short, in both sexes bipectinate nearly to apex, with very long branches. Thorax and abdomen slender, glabrous. Hindtibia not dilated; all spurs developed. Forewing rather broad, costa slightly arched, apex rather rounded, termen little curved; fovea present in ♂; cell slightly over one-half;  $SC^{1-2}$  coincident, rather remote from C, usually stalked with  $SC^{3-5}$ ,  $M^1$  rather remote from  $R^3$ . Hindwing with apex rounded, termen convex, inner margin rather long; cell about one-half, narrowing at end; C approximated to SC rather shortly near base,  $SC^2$  well separate from  $R^1$ ,  $R^2$  wanting,  $M^1$  rather remote from  $R^3$ .

Type of the genus: *Hylemeridia eury melanotes* sp. nov.

Differs from *Terina* in shape, but especially in venation. As I have not seen the types of *eurema* Plötz (*Stett. Ent. Zeit.* xli. 83) and its synonym (*vide* Warr. MS.) *de xitheu* Druce, I make *eury melanotes* the type, though I consider the accepted determinations correct and the relationship very close.

124. *Hylemeridia majuscula* sp. nov.

♀, 36 mm. Exceedingly like *eurema* Plötz, from Gold Coast and Cameroons, but larger.

*Forewing* with broader black border; in *eurema*, against a wing expanse of 15 mm., this measures at its broadest (apex to median vein) 4.5 to 5 mm.; in *majuscula*, against an expanse of 17 mm., it measures 7 to 7.5 mm. Apical fringe in both these species white.—*Hindwing* also with the apical spot broader.

Oni, Lagos (W. A. Lamborn), 2 ♀♀ in coll. Oxford Mus. The type was captured flying at 4 p.m. on October 14, 1910 (near the end of the wet season), in forest half a mile from Oni.

Antennal pectinations very long but very slender. In one example,  $SC^{1-2}$  arises from the cell, though near  $SC^{3-5}$ , in the other from the base of the stalk; in the other species of the genus, so far as I have observed, the stalking is constant.

125. *Hylemeridia eury melanotes* sp. nov.

♂ ♀, 27–32 mm. Near *eurema* Plötz, legs less darkened, hindwing slightly more elongate costally.

*Forewing* with the black border very much broader, at costa occupying almost three-fifths of the wing, its proximal edge slightly sinuous, running somewhat obliquely in the direction of tornus as far as the fold, then recurved so as to reach hindmargin at 2 or 3 mm. before tornus; costal edge narrowly blackened to base.—*Hindwing* with apical spot triangular, rather larger than in *eurema*, its proximal edge reaching costal margin before the end of C (in *eurema* reaching termen behind C, with an extremely narrow extension along the margin as far as C).

Bitye, Ja River, Cameroons, 2000 ft., January–March 1907 (G. L. Bates), type ♂ in coll. Rothschild; April–May 1913, a ♂ in coll. L. B. Prout; others in coll. Rothschild are merely labelled "Cameroons." Congo Forest, February 6, 1907 (A. F. R. Wollaston), a ♀ in coll. Brit. Mus.

Smaller than the preceding, the black border considerably broader still, its boundary more oblique from costa to fold, so that the white ground-colour appears to project more at the fold.

126. *Hylemeridia nigricosta* sp. nov.

♂, 28–29 mm. Head and antenna black, palpus mostly pale ochreous. Thorax pale ochreous. Abdomen still paler, especially on upperside. Fore and middle legs and hindtarsus partly darkened.

*Forewing* with termen rather more oblique than in *eurema* Plötz, to which it is otherwise nearly akin; white, with extensive black border; this commences in a point at base of costa, widens rapidly so as to bound the cell anteriorly, crosses the cell a little beyond its middle to M just before the origin of  $M^1$ , runs for a short distance nearly parallel with the medians, then again curves or bends, finally forming a border of about 3 mm. breadth along posterior part of termen; fringe black.—*Hindwing* with the black limited to a patch at apex which reaches, or just crosses,  $R^1$ .

Underside the same.

Uganda: Unyoro, Budongo Forest, 3400 ft., December 11, 1911 (type); W. Ankole, 4500–5000 ft., October 12, 1911; both in coll. Brit. Mus., collected by S. A. Neave.

**Crambometra** gen. nov.

Face with slight projecting cone of scales. Palpus rather long, heavily scaled above and beneath, third joint concealed. Antenna in ♂ bipectinate almost to apex, with very long branches. Thorax and abdomen slender, not crested. Pectus hairy. Femora glabrous; hindtibia of ♂ not dilated, all spurs developed. Forewing long and narrow, costa nearly straight, termen short, curved, oblique; cell over one-half, rather narrow:  $SC^1$  free,  $SC^{2-3}$  stalked,  $SC^3$  approaching  $SC^4$  but not anastomosing,  $SC^{4-5}$  stalked from before end of cell, radials normal,  $M^1$  almost connate with  $R^3$ . Hindwing ample, apex moderately rounded, termen very feebly concave between the radials; cell one-half, DC incut; C approximated to cell to beyond one-half,  $SC^2$  separate from  $R^1$ ,  $R^2$  vestigial, from middle of DC,  $M^1$  approximated to  $R^3$ ,  $SM^3$  long, running to distal margin.

Type of the genus: *Crambometra derelicta* sp. nov.

Affinities very obscure, apparently rather a primitive form, perhaps verging on the *Oenochrominae*; as there seem to be traces of  $SM^1$  in the hindwing and the forewing venation is almost unique in the *Geometridae* (if we except *Perusiopsis* Warr. and the problematical *Debos* Swinh.) it may possibly even demand family separation. The narrow forewing and very ample, much folded hindwing point to a probable position of rest at least as much folded as in *Alsophila*, while the colouring indicates some similarity of habit to *Leucania*, the *Crambus* group, etc.

127. **Crambometra derelicta** sp. nov.

♂, 34 mm. Head, body and legs very pale wainscot brown; a fuscous line from upper extremity of face across vertex, collar and front of thorax; some dark shading and spotting on foreleg.

*Forewing* very pale glossy wainscot brown, with sparse but coarse fuscous atoms; a dark discal dot; a very slight suggestion of darkening along the fold from base to about one-third and along the radial fold just proximally and distally to the discal dot (chiefly an optical illusion due to the depth of the folds themselves); fringe long, pale, its proximal half with large blackish dots at the vein-ends.—*Hindwing* glossy white, absolutely unmarked; fringe with weak dark dots.

Forewing beneath with slight smoky suffusion (strongest at base of costa), fading out at about three-fourths, distal region whitish, fringe nearly as above.—Hindwing beneath white, some slight suffusion and irroration in anterior part.

S. Africa: Tongaat, 1900 (H. C. Burnup). Type in coll. L. B. Prout, sent by the Natal Museum, which I understand possesses topotypes.

128. **Hebdomophruda diploschema** sp. nov.

♀, 31–32 mm. Head and palpus grey, mixed with brown; face more brown. Antenna with slender pectinations about twice as long as diameter of shaft. Thorax grey, above mixed with brown. Abdomen grey, mixed with brown and blackish, a rather conspicuous dark dorsal belt on 2nd–3rd segment, an ill-defined dark stripe on side of venter.

Wings very narrow, more so than in *apicata* Warr. (*Nov. Zool.* iv. 101); otherwise similarly shaped and scaled.—*Forewing* with  $SC^2$  connected by very short bar with  $SC^{3-4}$ ,  $SC^5$  present (as doubtless in the ♀ of the other species); anterior part light brown, darkening distally, along costa more or less strongly dark-spotted

(especially proximally); posterior part grey, merging gradually into the brown, tornus and adjacent part of hindmargin slightly hoary,  $SM^2$  brown; a small black discal dot, slightly pale-surrounded; a fine black (towards costa brown) line from scarcely beyond one-third costa, extremely oblique outward almost to cell-dot, then equally oblique inward to behind M, longitudinal outward (almost parallel with fold) for 2.5 mm., then subcrenulate back to costa, parallel with termen; another fine black line from hindmargin near base, very oblique outward, curving after crossing  $SM^2$ , then almost parallel with fold, very acutely angled at 3 mm. from termen, running back obliquely inward to before middle of hindmargin; a narrow grey distal-marginal shade; a fine, slightly interrupted black terminal line; fringe rather long, with a slight dark line in centre, followed distally by a fine pale line. —*Hindwing* with C approximated to SC to near middle of cell,  $SC^{12}$  stalked; pale brown, with slight grey suffusion, the inner-marginal region predominantly grey, somewhat mixed with hoary; discal dot obsolescent; a very fine, somewhat wavel blackish postmedian line from about two-thirds inner margin, nearly parallel with termen to across  $M^2$ , then curved, thence nearly 3 mm. from termen, becoming weaker.

Forewing beneath with the lines and terminal grey shade obsolete. Hindwing beneath more uniformly brownish than above; discal dot rather better expressed; postmedian line present, though not strong.

Foot of Nieuwveld Mountains, 5 miles N.W. of Beaufort West (Mrs. Butt). 2 ♀♀ in coll. Rothschild.

#### 129. *Axiodes tripartita* sp. nov.

♂, 30–35 mm. Head, body and legs grey, somewhat mixed with brown.

*Forewing* with termen pretty regularly and not deeply crenulate; grey with scattered blackish irroration, the median area strongly clouded with brown (least so in the cell), proximal area with some black shading at costa; terminal area with some vague brown shading in its distal half, except at apex and between  $R^2$  and  $M^1$ ; lines strong; antemedian from costa at about one-fourth, oblique outwards to M, then nearly vertical, a small outward tooth at  $SM^2$ , finally somewhat oblique inwards; postmedian from costa at somewhat beyond three-fourths, nearly straight to behind  $R^3$ , then right-angled, running basewards parallel with costa to  $M^1$ , then more curved to  $M^2$ , a small outward lobe between this and  $SM^2$ , reaching hindmargin rather near antemedian line; discal dot strong; fringe spotted with brown at the vein-ends, tips whitish. —*Hindwing* more uniformly shaded with brown; discal dot less strong; a not very strong sinuous postmedian line, vaguely pale-shaded distally; fringe also brownish, with browner spots at vein-ends, tips white.

Forewing beneath almost uniform brown-grey, costal edge more ochreous, spotted with fuscous. Hindwing beneath grey, with strong, coarser brown irroration. Fringes nearly as above.

Anushaw, Cape Colony (Miss F. Barrett). Type in coll. Rothschild; topotype in coll. Brit. Mus.

#### 130. *Axiodes inaequalis* sp. nov.

♂, 30 mm. Face and palpus grey, mixed with red-brown. Head and thorax grey, somewhat mixed with brown, a brown line across patagia. Abdomen grey, mixed with brown.

*Forewing* shaped as in the preceding species; grey, with dark dots and longitudinal striation, the ground-colour, except in the narrow distal and hindmarginal area, almost entirely obscured by rust-brown cloudings, only remaining clearer in cell, in a streak behind  $SC^3$  and more slightly about the origin of the medians; a fine dark line from costa within 1 mm. of apex, waved and slightly more oblique than termen to behind  $M^2$  (here 1.5 mm. from termen), then very strongly bent, running parallel with hindmargin to middle of wing, where it crosses  $SM^2$  and runs obliquely to hindmargin at about one-third; veins in distal area somewhat brown, especially  $SM^2$ ; a fine brown terminal line; a pale line at base of fringe.—*Hindwing* grey, slightly tinged with brown; an ill-defined, anteriorly obsolete postmedian line rather near termen.—Both wings beneath grey, irrorated with brown, especially in anterior half.

Deelfontein, Cape Colony, August 24, 1902 (Colonel Sloggett). Type in coll. Brit. Mus.

### 131. *Drepanogynis incogitata* sp. nov.

♂ ♀, 26–28 mm. Face ochreous grey, dotted with reddish fulvous. Palpus more reddish. Head and body concolorous with wings, a more reddish-fulvous band across front of thorax. Wings shaped nearly as in *admiranda* Warr. (*Nor. Zool.* xii. 406) but with the costal margin of forewing normal, lacking the slight sinuosity of that species.

*Forewing* pale ochreous grey, in the ♂ slightly clouded with yellowish, in the ♀ strongly irrorated (or strigulated) with fulvous; lines in ♂ brown with an olivaceous tinge, in ♀ reddish fulvous; first from costa at 4 or 5 mm. to hindmargin at 2 mm., acutely bent at  $SC$ ; postmedian from costa close to apex, oblique to beyond middle of hindmargin, very slightly curved in posterior part; accompanied distally by a slight pale violaceous tinge; distally to this line a blackish-fuscous mark from apex to  $R^1$  and some similar, rather variable internodal spots between  $R^1$  and  $M^1$ , and again faintly at hindmargin; discal dot obsolete; terminal line fine, coloured as the others.—*Hindwing* concolorous; postmedian and terminal lines reproduced, the postmedian slightly curved anteriorly, reaching costa a little before apex; discal dot sometimes (♂) indicated.

*Underside* coarsely strigulated with fuscous, lines in both sexes fuscous, sometimes thickened, both wings with slight fuscous discal mark; ♂ somewhat more yellowish than above.

Cubal River, Angola, February and April 1899 (Peurice), type ♂ and paratype ♀, both in coll. Rothschild.

Near *admiranda* Warr. but smaller, the line of hindwing much nearer termen, etc.

### *Euexia* gen. nov.

Face rounded, rather prominent, densely scaled. Eye hairy. Palpus rather short, second joint with moderately appressed scales, third joint very small. Tongue obsolete. Antenna of ♂ bipectinate to apex. Pectus and femora densely hairy. Hindtibia of ♂ not dilated; all spurs present. Abdomen robust with a pair of anal tufts, though less long than those of *Thenopa*.

Forewing with apex very minutely produced, termen curved at radials, strongly oblique posteriorly; cell one-half,  $DC$  strongly incurved;  $SC^{1-2}$  coincident, well free



from C, connected by a short bar with SC<sup>3</sup> beyond SC<sup>4</sup>, SC<sup>3-4</sup> very long-stalked, SC<sup>5</sup> wanting, R<sup>1</sup> long-stalked with SC<sup>3-4</sup>, R<sup>2</sup> from close to apex of cell, M<sup>1</sup> well or widely separate from R<sup>3</sup>. Hindwing with angles moderate, termen rounded, scarcely waved; DC curved or strongly inbent, C approximated to cell to beyond one-half, SC<sup>2</sup> just separate, R<sup>2</sup> wanting, M<sup>1</sup> separate.

Type of the genus: *Euxia percnopus* sp. nov.

Belongs to the *Plegapteryx* group; the only other genus thereof with C of the forewing free is *Vaëna* Walk. (= *Lysopteryx* Bryk.), which is certainly related to *Euxia*, but differs so essentially in shape, besides its flatter face and more oblique DC of forewing, that a new genus is called for.

### 132. *Euxia percnopus* sp. nov.

♂, 36-40 mm. Face red (in dark examples mixed with black). Palpus deep fulvous mixed with red (terminal joint sometimes with black). Vertex and antennal shaft white, strongly mixed with purplish and sometimes with reddish, inner edge of antennal shaft remaining white proximally. Thorax, abdomen, femora and tibiae concolorous with wings; tarsi dark purple-fuscons.

*Forewing* variable in colour, in the type bright deep fulvous, strongly mixed in proximal and distal areas with purplish, in an aberration dull olive-green in the median area, of a more nondescript shade (due to the admixture of the olive with purplish) in the proximal and distal; cell-dot small, black; lines fine, separating the colour areas; antemedian at nearly one-third, with angles outward near both margins and an outward curve in middle; postmedian from four-fifths costa, very oblique outwards, strongly recurved at SC<sup>4</sup>, then nearly straight to two-thirds hindmargin; a whitish costal mark distally to postmedian; a pale spot at apex; fringe concolorous with median area.—*Hindwing* with the median area greatly narrowed, sometimes further constricted on fold, typically light green, sometimes scarcely differentiated in colour; sometimes faint traces of a narrow dark shade distally to the postmedian.

Underside bright fulvons, with sparse but coarse purplish irroration, distal area of forewing strongly, of hindwing more mixed with purplish; lines dull dark purplish, the antemedian placed much nearer the base than above, obsolete at costa; forewing with the apical spot white.

Congella, Durban, January 1905, December 30, 1904, December 22, 1908 (G. F. Leigh), type and two darker in coll. Rothschild. White River, Transvaal, December 9, 1909 (A. T. Cooke), a ♂ in coll. Brit. Mus., intermediate in colour. Mambora, German East Africa (Dr. Baxter), a ♂ in coll. Rothschild quite agreeing with type.

### 133. *Sphingomima viriosa* sp. nov.

♂, 44 mm. Face strongly protuberant, sloping. Palpus about one-and-a-half times diameter of eye, not relatively very stout. Antennal pectinations long. Face, palpus, thorax and abdomen concolorous with wings. Vertex and antennal shaft pinkish white, marked with darker reddish. Legs marked with purple-fuscons, the tarsi almost wholly of this colour.

*Forewing* with the excision in termen less deep than in *S. cinereomarginata* Holl. (*Ent. News* iv. 175); R<sup>1</sup> only very shortly stalked with SC<sup>3-4</sup>; warm, bright brown with a tinge of olivaceous, posterior half of distal area more mixed with

violaceous scales; proximal area, and median area as far as a vague, straight median shade which crosses the discal dot, slightly darker than distal area; discal dot round, black, not minute; two fine dark lines; antemedian very sinuous, from one-third costa to beyond two-fifths hindmargin, the deepest sinus being inwards between fold and  $M^1$ ; postmedian oblique, from nearly two-thirds hindmargin, nearly straight till after crossing  $R^1$ , then gently recurved to costal margin; fringe paler proximally than distally.—*Hindwing* with termen more convex than in the other species, waved, slightly bent at  $R^3$ ; C anastomosing shortly with SC; postmedian line of forewing continued across centre, becoming rather indistinct and diffuse, and passing distally to the hyaline, black-edged cell-mark, which is rather small and narrow, but with slight distal tooth at radial fold and proximal one behind it in cell.

Underside yellower, especially the hindwing, both wings with olive-brown strigulations and cloudings; costal and hind-margins of forewing in part paler; discal marks and postmedian line present; forewing in addition with an elongate whitish subterminal patch from before  $R^1$  to near  $R^3$ , hindwing with a dark subapical patch at termen from near C to  $R^1$ .

Njoro, British East Africa (A. J. Cholmley). Type in coll. Brit. Mus.

#### 134. *Psilocladia loxostigma* sp. nov.

♂, 29 mm. Face fuscous, becoming grey above. Palpus fuscous, rather paler beneath. Vertex and antenna grey. Thorax grey, with a brown band across front. Foreleg grey, on upper and outer sides brown. Abdomen grey, dorsally mixed with brown.

*Forewing* grey, irrorated with brown and with a few dark fuscous scales, costal area to middle and entire distal area predominantly brown; a fine antemedian line from beyond one-fourth costa, vertical to hindmargin, slightly sinuate inward behind M; a very oblique fuscous cell-mark; median shade obsolete except at hindmargin, where it forms a vague brown spot near the antemedian; postmedian forming a straight line of small brown, fuscous-centred vein-spots from two-thirds costa to beyond two-thirds hindmargin; a white subapical dot between SC<sup>5</sup> and  $R^1$ ; fringe brown, with dark spots.—*Hindwing* similarly coloured; without antemedian line; median shade complete, but thin and not sharp; a small black discal dot; postmedian, terminal area and fringe nearly as on forewing, without subapical dot.

Underside similar, forewing without first line, its discal mark thick and black, median shade rather better developed.

Nola, French Congo. Type in coll. L. B. Prout.

Considerably broader winged than the type species, termen of both wings sinuate in anterior half; the antennae are damaged, but appear to have been dentate or subpectinate, with fascicles of cilia—in this respect a transition between *Psilocladia* and *Xenimbia*.

#### 135. *Xenimbia angusta* sp. nov.

♀, 31–32 mm. Related to *conformis* Warr. (*Nor. Zool.* v. 39), antenna with similar short pectinations, both wings slightly narrower, forewing with termen smoother, hindmargin not appreciably concave. Head and body concolorous with wings.

*Forewing* whitish ochreous, almost entirely covered with purple-fuscons irrorations and cloudings, the ground-colour only noticeable in places, as in basal area, distally to the postmedian line and especially in a spot or patch between median and postmedian behind middle of wing; lines rather well expressed; antemedian from one-third costa, oblique outward, acutely angled behind  $SC$ , then almost parallel with termen; postmedian from two-thirds costa or rather less, acutely angled behind  $R^1$ , then slightly more oblique inwards than antemedian; median shade thicker, touching postmedian on hindmargin, less oblique, vanishing about at  $R^1$ , just distally to  $DC$ ; a subterminal line or shade about parallel with postmedian but more or less incomplete, chiefly expressed as a thick, oblique costal spot, three spots (sometimes confluent) between  $SC^2$  and  $R^3$  and a cloudy shade between  $M^2$  and hindmargin; discal dot scarcely noticeable; termen with an interrupted dark line.—*Hindwing* similar, the antemedian and subterminal lines nearly obsolete, a narrow blackish distal border.

Under-surface with the markings reproduced, rather thick and indefinite, a more ochreous band between postmedian and subterminal, especially in anterior part of both wings (less extended on hindwing); both wings sometimes with dark shading proximally to the subterminal, at least in posterior part; hindwing without the dark border.

British East Africa: N. Kavirondo, Maramas dist., Ilala, 4500 ft., June 20, 1911 (S. A. Neave). Type in coll. Brit. Mus. Two rather worn specimens in coll. Rothschild, one from Masindi, June 1897, the other from Labonga, Unyoro, July 6, 1897, both collected by Dr. Anson, not differentiated by Mr. Warren from *X. conformis*.

### 136. *Xenimpia chalepa* sp. nov.

♀, 30 mm. Palpus rather long. Antenna minutely subserrate, with single bristles at the end of the serrations. Head, body, and legs light ochreous brown, irrorated with dark purple-fuscons.

*Forewing* with termen somewhat dentate, rather shallowly emarginate between  $SC^2$  and  $R^3$ , strongly oblique from  $R^3$  to tornus, tornal lobe rather more triangular (less rounded) than in *erosa* Warr. ♀; basal and costal areas and a band between postmedian and subterminal lines light ochreous brown irrorated with purple-fuscons, the band becoming posteriorly more rufous and more fuscons-clouded; the rest of the wing clouded with dull purple-fuscons so as to leave only slight remnants (chiefly along the veins distally and along the lines posteriorly) of the ochraceous ground-colour; lines purple-fuscons; antemedian from nearly one-third costa, rather sharply angulated subcostally, then straight and very oblique to one-fourth hindmargin; postmedian from about middle of costa, oblique outward, very acutely angled at  $R^1$ , then oblique inward fairly straight to middle of hindmargin; subterminal indicated by slight whitish dots, with blackish-fuscons edging or clouding proximally.—*Hindwing* with apex cut away as in *erosa*, termen dentate, but scarcely excised between  $SC^2$  and  $R^3$ , no special projection at the latter; similarly coloured to forewing, the fuscons cloudings more restricted, appearing chiefly at the two lines (which are less angulated than on forewing) and narrowly along termen; a blackish terminal line; a thick pale line on base of fringe.

Underside with the markings somewhat similar, but more variegated; forewing with an additional (but ill-defined, non-angulate) median line, followed by an

ill-defined pale streak, both wings with the band between postmedian and subterminal bright ochreous, strongly mixed with bright ferruginous, and with a pale violet-grey band distally to the subterminal, that of the hindwing reaching the termen; hindwing without black terminal line or light line at base of fringe.

Bitye, Ja River, Cameroons. Type in coll. L. B. Prout.

137. *Xenimpia repudiosa* sp. nov.

♂, 26 mm. Face red-brown. Palpus pale ochreous, deep red-brown above and on outer side, third joint spotted with red-brown. Vertex and antennal shaft pale ochreous, the latter dark-spotted. Thorax and abdomen pale ochreous, strongly irrorated with red-brown.

*Forewing* with termen only feebly sinuate in anterior half;  $SC^{1-2}$  long-stalked; pale ochreous, irrorated with red-brown, especially proximally, apically, tornally, and along costa; markings deep purple-fuscons, almost black, consisting of some irroration at base, a thick straight line a little proximally to middle of wing, arising from a costal spot; a slightly sinuous postmedian row of large vein-dots, arising also from a costal spot, and a large, amorphous tornal blotch; a vague band of less deep purple-fuscons proximally to the antemedian line; a round pale spot near termen, placed between  $SC^5$  and  $R^1$ ; a terminal line of thick blackish internervul dashes; fringe bisected by a weak red-brown line and with strong blackish spots opposite the veins.—*Hindwing* with apex truncate but not or scarcely emarginate, termen scarcely sinuate in anterior half, slightly prominent at  $R^3-M^1$ ; antemedian line and band, tornal blotch and submarginal pale spot wanting; on the other hand with blackish-fuscons subapical spot.

Underside similarly marked, the antemedian line diffuse and not sharp, the fuscons shade proximally to it strong except at costa and continued as a line on hindwing.

♀ 30 mm. Antenna subserrate.

*Forewing* more clouded with light purple-fuscons, especially distally to postmedian line, leaving a large round pale spot between  $R^2$  and  $M^2$ .—*Hindwing* with termen rather more scalloped; more uniformly suffused with light purple-fuscons, especially in distal half.

Bitye, Ja River, Cameroons, type ♂ and others in coll. L. B. Prout; both sexes in coll. Rothschild. A worn ♂, three days from Fort Beni, Congo Free State, May 7, 1899 (Dr. Ansorge), in coll. Rothschild.

Not a typical *Xenimpia*, the palpus and foreleg showing less long projecting scaling and a fovea being present. A ♂ in coll. W. F. H. Rosenberg is a sport in venation,  $SC^5$  being obsolete on left forewing and its distal end obsolete on right.

138. *Hypochrosis euphyes* sp. nov.

♀, 60 mm. Face and palpus reddish orange. Vertex and antennal shaft pale; pectinations longish. Occiput red-orange. Thorax above olive-green, beneath ochreous. Legs ochreous, mixed (especially foreleg) with red-orange. Abdomen ochreous, tinged with olive dorsally.

*Forewing* ample, with apex somewhat falcate;  $SC^2$  arising from stalk of  $SC^{3-5}$ , anastomosing with  $SC^4$ , which (as usual) arises from  $C^1$ ; glossy olive-green, mixed (except at base and on the lines) with shining blue-grey scales; lines thick, indicated by absence of blue-grey admixture; antemedian at nearly two-

fifths, straight; postmedian at about 6 mm. from termen, forming a very slight inward curve; vague indications of a subterminal (especially as a strong inward curve between  $R^2$  and tornus) and of olive distal border.—*Hindwing* shaped nearly as in *H. banakaria* Plötz (*Stett. Ent. Zeit.* xli. 302; = *tortuosa* Warr., *Nor. Zool.* iv. 258), rather more produced tornally; concolorous with forewing, but even more vaguely marked (except the antemedian, which reaches inner margin beyond middle), costal margin pale.

Both wings beneath reddish orange, the forewing somewhat shaded in and behind the cell, and in a streak from cell to apex with blue-grey.

Bitye, Ja River, Cameroons, 2000 ft., lesser rains, April–May 1907 (G. L. Bates). Type in coll. Rothschild.

Probably related to the *banakaria* group, but much larger and aberrant in the stalking of  $SC^2$  of forewing.

### **Dysnymphus** gen. nov.

Face with appressed scales. Palpus very short. Tongue short. Antenna in both sexes bipectinate, with long branches, last few segments nearly simple (as in *Osicerda*). Pectus slightly hairy. Femora glabrous. Hindtibia with all spurs. Abdomen rather robust; in ♂ more or less tufted beneath. Forewing with costa arched; termen with a deep, rounded excision between  $SC^5$  and  $R^3$ , very strongly oblique posteriorly; cell long (about three-fifths),  $DC^1$  extremely long, oblique;  $SC^1$  arising from C,  $SC^2$  from stalk of  $SC^{3-5}$ , anastomosing slightly with  $SC^1$ ,  $SC^{3-5}$  very long-stalked,  $R^2$  from middle of DC,  $M^1$  well separate. Hindwing with termen oblique to  $SC^2$ , straight from  $SC^2$  to  $R^3$ , somewhat bent behind  $R^3$ ; in ♂ folded at inner margin, forming a kind of hair-fringed pocket beneath; cell over one-half,  $DC^1$  very long,  $DC^{2-3}$  inbent, becoming strongly oblique; C approximated to SC rather shortly near base,  $R^2$  wanting,  $M^1$  widely separate from  $R^3$ .

Type of the genus: *Dysnymphus monostigma* sp. nov.

No doubt a very specialised development of *Osicerda* Walk. (= *Prionia* Guén., nec Hb.). Here evidently belongs *Drepana* (?) *bioculata* Holl. (*Ent. News*, iv. 177).

### 139. **Dysnymphus monostigma** sp. nov.

♂, 27 mm. Head and thorax olivaceous; abdomen whitish with an olivaceous tinge, dorsally mixed with pink.

*Forewing* unicolorous dirty olivaceous, with a black spot on fold opposite the origin of  $M^2$ ; fringe rather paler.—*Hindwing* white.

Forewing beneath dirty whitish, becoming olivaceous costally and distally. Hindwing beneath whitish.

Bitye, Ja River, Cameroons, 2000 ft., September–November 1911. Type in coll. Rothschild.

### 140. **Eurythecodes prolixa** sp. nov.

♀, 34 mm. Palpus about as long as diameter of eye. Tongue slight. Antennal pectinations rather long. Head, body, and legs concolorous with wings.

*Forewing* very broad, termen shaped about as in *Epigynopteryx flaredinaria* Guén.; pale grey, the median area weakly irrorated with olivaceous brown, the basal and distal areas olivaceous, shaded with pinkish brown; lines dark olivaceous

brown; antemedian rather thick but not distinct, arising at one-third costa, bent outward at M, then vertical to hindmargin at fully two-fifths; the pale median area consequently narrow in its posterior half; discal dot very small; postmedian line from costa 3 mm. before apex, acutely angled behind  $SC^5$ , then oblique inwards, more strongly incurved from  $R^2$  to  $SM^2$ ; a bright rust-brown shade distally to this line in its posterior part, reaching nearly to tornus at hindmargin, but narrowing almost to a point about  $R^2$  (here ill-defined), and with a very shallow distal excavation between the medians; fringe concolorous.—*Hindwing* with termen very feebly crenulate, the tooth at  $R^3$  scarcely appreciably stronger than the others; proximal area concolorous with median area of forewing or very slightly more irrorated (whiter costally); a minute discal dot; postmedian line about as in *Epigynopteryx flaredinaria*; distal area strongly irrorated with pinkish brown, the rust-brown shade slight and narrow.

Under-surface similarly but rather more weakly marked, the pale areas more irrorated, the discal dots more sharply black.

Madagascar: Antananarivo (coll. Chulliat), type in coll. L. B. Prout, received through Le Mout; Ambinanindrano, 50 km. W. of Mahanoro, October 1911 (G. K. Kestell-Cornish), a slightly worn, less variegated example in coll. Rothschild (dark shade distally to postmedian almost obsolete).

#### **Acrostatheus** gen. nov.

Face with appressed scales. Palpus rather short, shortly rough-scaled, third joint small but distinct. Antenna in ♂ bipectinate with rather long branches. Peetus strongly hairy. Femora hairy. Hindtibia in ♂ scarcely dilated, all spurs developed. Forewing broad, costa arched, apex subfalcate (especially in ♀), termen smooth, nearly straight, tornus squared;  $SC^1$  out of C, well free from  $SC^2$ ,  $SC^2$  from cell, sometimes connected with  $SC^{2-4}$ ,  $M^1$  separate from  $R^3$ . Hindwing ample, apex fairly prominent, termen bent or angled at  $R^3$ , almost straight before and behind, tornus pronounced; cell less than one-half,  $DC^1$  curved, becoming strongly oblique; C normal,  $SC^2$  separate from  $R^1$ ,  $R^2$  wanting,  $M^1$  separate from  $R^3$ .

Type of the genus: *Acrostatheus apicitincta* sp. nov.

Here belongs also "*Aeschropteryx*" *atomaria* Warr. (*Nor. Zool.* viii. 216).

#### **141. Acrostatheus apicitincta** sp. nov.

♂, 54–56 mm. Face red-brown. Palpus red-brown, paler beneath. Antenna red-brown, the shaft whitish ochreous proximally. Vertex whitish ochreous. Thorax and abdomen concolorous with wings.

*Forewing* very pale ochreous, without dark irroration, only in the distal area with indistinct ochreous or brownish strigulae; first line faint (sometimes obsolete), bent outward in cell and sharply angled outward at fold; discal dot minute; postmedian line brown, from hindmargin at nearly three-fifths, oblique and slightly curved (or nearly straight) to  $SC^5$  near termen, here acutely bent, running inwards to a red-brown costal spot 5–6 mm. from apex; a rather less sharply defined brown line distally to the postmedian, at 1 mm. distance, disappearing at  $SC^5$ , the space between postmedian line and apex being here almost entirely suffused with red-brown, with a slight admixture of blackish scales; fringe browned in anterior half.—*Hindwing* with the double postmedian line continued, except at costal margin, its proximal element crossing the base of  $SC^2$  and  $R^1$  and cutting the

projecting hinder corner of the cell, reaching inner margin about the middle; distal strigulation even weaker than on forewings.

Underside with the same markings, but fainter.

Old Calabar (S. D. Crompton), type; Gold Coast: between coast and Kumasi (C. H. McDowall), Bibianaha, 70 miles N.W. of Dimkwa, 700 ft., November 17, 1910 (H. G. F. Spurrell); all in coll. Brit. Mus.

## ADDENDA

The following should have been placed under the *Oenochrominae*:

### 142. *Conolophia melanothrix* sp. nov.

♂ ♀, 56-62 mm. Face black. Palpus with first joint whitish ochreous, the rest black. Vertex and front of thorax above brown, rest of body paler.

*Forewing* with apex minutely produced, termen more oblique than in the allies; whitish ochreous or whitish brown, irrorated with blackish grey; costal margin somewhat darkened; antemedian line almost entirely obsolete, a distinct dark dot sometimes remaining on  $SM^2$ ; cell-dot small, sometimes obsolete; postmedian line blackish, shaded at edges with ferruginous, from costa close to apex, oblique to hindmargin little beyond middle, at costa somewhat thickened, accompanied by slight, dark apical shading; a row of terminal dark dots; distal part of fringe darkened from apex about to  $M^2$ .—*Hindwing* with termen bent at  $R^3$ ; the ♂ sexual tuft on inner margin well developed, black; coloration as on forewing, only the costal area whiter; postmedian line continued as antemedian, but obsolete anteriorly to  $Sc^2$ ; a row of ill-defined blackish-grey spots sometimes developed in distal area, parallel with termen; terminal dots as on forewing; fringe all light.

Underside similar, the line without ferruginous shade, costal area of hindwing not pale, the costal margin itself, on the contrary, rather heavily dark-spotted.

Uganda: S.E. Budda, Tero Forest, 3800 ft., September 29-30, 1911 (S. A. Neave), type and two others in coll. Brit. Mus. Congo Free State: 2-18 days from Fort Beni, May 6-22, 1899 (Dr. Ansorge), 2 ♂♂, 4 ♀♀ in coll. Rothschild. British East Africa: S. Kakumega Forest, Yala River, 4800-5300 ft., May 25-26, 1911 (S. A. Neave), 2 ♀♀ in coll. Brit. Mus.

Very distinct in its large size, elongate forewing, bent hindwing, black sexual cone, incomplete line of hindwing, etc. As in all the genus, a frequent aberration occurs (six out of the eleven known examples), with a large black outer spot between  $M^2$  and  $SM^2$  of the forewing.

To No. 112:

Belongs to Section II. of *Callioratis* (Hampson, *Ann. S. Afr. Mus.* iii, 417), but  $Sc^3$  of the forewing has migrated, being stalked with  $Sc^2$  instead of with  $Sc^4$ .

DATES OF PUBLICATION OF THE SECTIONS OF THE  
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1	May 1910	xx. 1-156	1-18
2	October 1910	157-296	18A-32
3	January 1911	297-449	33-46
4	April 1911	1-170	47-61
5	June 1911	171-378	62-79
6	November 1911	379-540	80-93
7	February 1912	1-194	94-108
8	April 1912	195-412	109-122
9	July 1912	413-609	123-135
10	December 1912	1-188	136-155
11	June 1913	189-404	156-174
12	November 1913	405-692	175-178

Egg plates (20) A to W at end of  
vol. iv., except Plate E (Cuckoo),  
vol. ii. p. 494.

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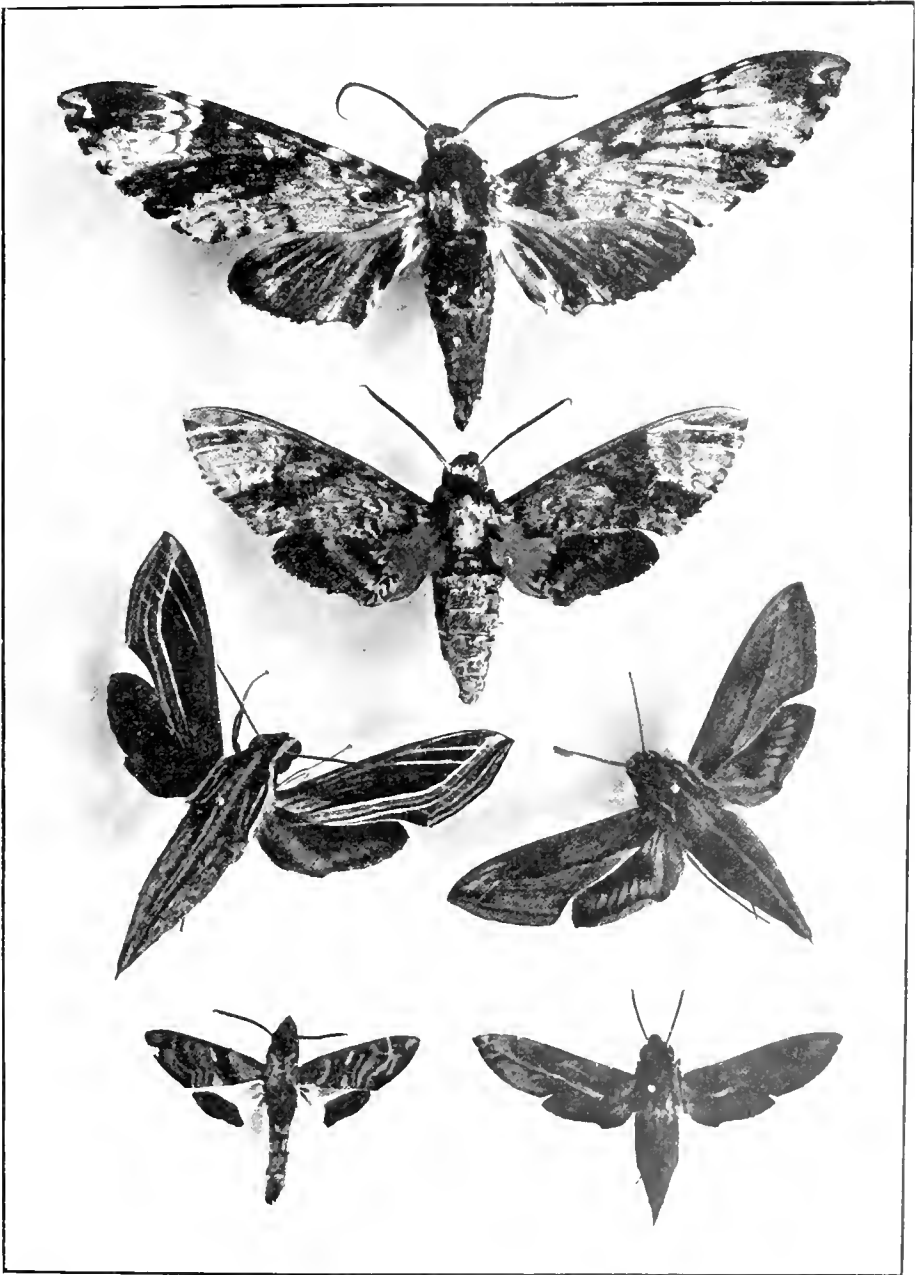


FIG. 1.—*Poliana leucomelas*  
.. 2.—*Coelonia brevis*,  
.. 3.—*Hippotion commatum*.

FIG. 4.—*Hippotion aurum gloriosana*,  
.. 5.—*Macroglossum lapidum*,  
.. 6.—*Thereatra orpheus scotinus*.





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## ON THE LEPIDOPTERA IN THE TRING MUSEUM SENT BY MR. A. S. MEEK FROM THE ADMIRALTY ISLANDS, DAMPIER, AND VULCAN ISLANDS.

By LORD ROTHSCHILD, F.R.S., Ph.D.

(Continued from p. 208.)

### LEMONIIDAE

#### Libythaeinae

#### 104. *Libythea geoffroyi geoffroyi* God.

*Libythea geoffroyi* Godart, *Enc. Méth.* ix. Suppl. p. 813 (1823) (Java).

I have been unable from the material in the Tring Museum to decide which forms are local races and which are individual aberrations, so I treat here the specimens from Vulcan Island under the head of the typical form.

4 ♂♂, 1 ♀ brown form, 4 ♀♀ blue form, Vulcan Island.

### LYCAENIDAE

#### 105. *Malais meeki* sp. nov.

♂. *Above.* Entirely sooty brown-black.

*Below.* Forewing deep umber brown, irrorated with mouse-grey, inner margin broadly mouse-grey, terminal area broadly chocolate-brown. Hindwing similar, but with three discal transverse bands of somewhat indistinct brown-black spots.

♀. *Above.* Paler sooty brown-black; basal two-thirds of forewing between subcostal nervure and vein 1 white dusted with brown-black at base.

*Below.* Similar to ♂ but much paler.

Length of forewing: ♂ 14 mm., ♀ 12 mm.

Expanse: ♂ 31 mm., ♀ 26.5 mm.

1 ♂, 4 ♀♀, Dampier Island.

#### 106. *Lycaena boetica* (Linn.)

*Papilio boeticus* Linnaeus, *Syst. Nat.* Ed. xii. l. 2. p. 789. No. 226 (1767) (Barbaria).

This widespread species varies much in size. 1 ♀ from Vulcan is almost entirely silvery blue above.

3 ♂♂, 6 ♀♀, Vulcan Island; 3 ♀♀, Dampier Island.

107. *Everes pulchra* sp. nov.

♂. *Above.* Antennae black ringed with white, club black tipped with white; head, thorax and abdomen black-brown washed with blue and with long whitish hairs. Forewing purple blue, broad terminal border sooty black. Hindwing purple blue, costal and terminal borders broadly sooty black, the latter with obsolete greyish white rings and a white line; a black terminal patch with a broad reddish orange patch above it between veins 2 and 3 and veins 3 and 4.

*Below.* Silver grey; on forewing a discocellular stigma, a transverse post-discal band of streaks between veins 1 and 6, and a double subterminal band of coalescent spots darker grey; on hindwing similar to above, but in addition two post-basal spots, a black postmedian spot above vein 7 and a similar dot in middle of abdominal area, and a very large submarginal patch of fiery orange enclosing two black and metallic green ocelli.

♀. *Above.* Similar in marking, but forewing sooty black-brown, basal three-quarters below median fold lavender-grey. Hindwing as in ♂, but blue replaced by lavender-grey.

*Below* as in ♂.

Length of forewing: ♂ ♀, 10 mm.

Expanse: 22.5 mm.

3 ♂♂, 5 ♀♀, Vulcan Island; 2 ♂♂, 1 ♀, Dampier Island (Type ♂ Dampier).

108. *Lycaenopsis insulicola* sp. nov.

♂. *Above.* Sooty brown-black. Antennae black ringed with white; forewing with an oblique median white patch between veins 1 and 4; hindwing has a median white patch between costa and just beyond vein 6.

*Below.* Forewing white, a number of black-brown spots along basal two-thirds of costa, an antemedian spot followed by a streak on median nervure cinnamon-brown, a postmedian band of irregular streaks cinnamon-brown; terminal area broadly cinnamon-brown, a submarginal zigzag line and a marginal hair-line white. Hindwing white, an antemedian and a postmedian large spot above vein 7 black, three smaller subbasal black spots below median nervure, a submedian narrow line and a postmedian irregular chain of spots cinnamon-brown; terminal area as on forewing but broader, and a black patch below vein 2.

♀. *Above.* Differs from ♂ in the white oblique patch being smaller on forewing, and absent on hindwing.

*Below.* The cinnamon-brown is replaced by cinnamon-grey, and the terminal dark areas of both wings are broader.

Length of forewing: ♂ 11 mm., ♀ 12 mm.

Expanse: ♂ 24 mm., ♀ 26 mm.

1 ♂, 1 ♀, Dampier Island; 2 ♀♀, Vulcan Island. (Type ♂).

109. *Lycaenopsis vulcanica* sp. nov.

♂. *Above.* Antennae black ringed with white, tip of club buff; head, thorax, and abdomen black, thorax and abdomen clothed with lavender hairs. Forewing violet blue, costa and terminal area sooty black. Hindwing violet blue, terminal



area broadly sooty black, the portion between tornus and vein 4 broken up into spots.

*Below.* Whity grey; forewing a discocellular streak, a postmedian band of streaks, a postdiscal band of confluent half-moons, and a subterminal row of spots cinnamon-brown; hindwing with three black antemedian spots, a median black spot above vein 7 and two broken discal bands of cinnamon-brown streaks; a postdiscal band of confluent half-moons cinnamon-brown; a submarginal row of seven large spots, the four nearest tornus black, the rest cinnamon-brown.

Length of forewing: 12 mm.

Expanse: 26 mm.

1 ♂, Vulcan Island.

#### 110. *Eupsychellus dionysius* (Boisd.)

*Lycæna dionysius* Boisdual, *Voy. Astrol. Lép.* p. 82. No. 11 (1832) (New Guinea).

1 ♀, Manus, Admiralty Islands; 4 ♂♂, 4 ♀♀, Vulcan Island; 4 ♂♂, 4 ♀♀, Dampier Island.

#### 111. *Castalius evena* (Hew.)

*Lycæna evena* Hewitson, *Exot. Butt.* v. t. 1. ff. 2, 3 (1876) (New Guinea).

8 ♂♂, Dampier Island.

#### 112. *Zizera gaika* (Trim.)

*Lycæna gaika* Trimen, *Trans. Entom. Soc. Lond.* (3) I. p. 403 (1862) (South Africa).

8 ♂♂, Manus, Admiralty Islands.

#### 113. *Zizera labradus* (God.)

*Polyommatus labradus* Godart, *Enc. Méth.* ix. p. 680. No. 197 (1823) (Australia).

This species varies enormously in size.

Length of forewing: ♂ 10–15 mm., ♀ 9–14 mm.

6 ♂♂, 3 ♀♀, Dampier Island; 2 ♂♂, 5 ♀♀, Vulcan Island; 7 ♂♂, Manus, Admiralty Islands.

#### 114. *Zizera dampierensis* sp. nov.

♂. In size and shape nearest to *gaika* Trim., but still smaller.

*Above.* Differs at first sight by the much broader brown-black terminal area, which occupies two-fifths of the whole wing. Hindwing also has wider brown-black margins.

*Below.* Differs in the brownish grey, **not** silvery whitish grey, ground colour, in the much larger and deeper-coloured spots, and in the distinct postdiscal and subterminal bands of both wings.

♀. Similar, but whole upper surface brown-black, the basal two-thirds more or less suffused with lavender-grey.

Length of forewing : ♂ 7 mm., ♀ 9 mm.

Expanse : ♂ 16 mm., ♀ 20 mm.

6 ♂♂, 2 ♀♀, Dampier Island; 1 ♂, 1 ♀, Vulcan Island. (Type ♂ Dampier).

#### 115. *Zizera lulu* (Math.)

*Lycaena lulu* Mathew, *Trans. Entom. Soc. Lond.* 1889, p. 312 (Tongatabu).

4 ♂♂, Vulcan Island.

#### 116. *Lycaenesthes violacea* Butl.

*Lycaenesthes violacea* Butler, *Ann. Mag. Nat. Hist.* (7) iv, p. 343 (1899) (Louisiades).

7 ♂♂, 1 ♀, Dampier Island; 4 ♂♂, 4 ♀♀, Vulcan Island.

#### 117. *Lycaenesthes rufimargo* sp. nov.

♂. *Above.* Very similar to *violacea* Butl., but has somewhat broader and much more distinct black margins to the wings.

*Below.* Much paler than *violacea*; on the forewing the darker white-edged bands are much shorter, straighter, and wider apart, not reaching beyond vein 4, while there is a third shorter antemedian band reaching to median vein; a black patch on submedian line at vein 2 is also absent in *violacea*. Hindwing differs conspicuously in having a submarginal band of coalescent triangular rufous orange spots, and the large spot between veins 1 and 2 is orange outwardly and black inwardly, while in *violacea* these colours are reversed.

Length of forewing : 16 mm.

Expanse : 35 mm.

1 ♂, Vulcan Island.

#### 118. *Syntarucus manusi* sp. nov.

♂. *Above.* Violet-blue with a leaden gloss; fore- and hindwings with an even sooty-black margin; a minute tail and a submarginal black dot between veins 1 and 2 on hindwing.

*Below.* Forewing wood-grey; two incurved oblique white subbasal bands reaching from inner margin to subcostal nervure, where they join in a point, the outer one enclosing a wood-grey band, an inwardly turned oblique median band from vein 2 to costa and a similar postmedian one from vein 4 to subcostal white with central wood-grey band; between these two bands, and joined to the inner one, is a round white patch between veins 3 and 4 with grey centre; a broad white submarginal band with a narrower central wood-grey band within it and a marginal row of wood-grey spots. Hindwing white; six subbasal patches of wood-grey, an antemedian curved band of wood-grey expanding from the centre to the costa and the abdominal margin; a broken median band from costa to vein 4, a postmedian broad band from abdominal margin to vein 6, a subterminal tessellated band, and a marginal row of dots and hairline wood-grey, an orange, green and black ocellus on each side of vein 2 at termen.

Length of forewing : 11 mm.

Expanse : 24 mm.

1 ♂, Manus, Admiralty Islands.

#### 119. *Jamides saemias* Druce

*Jamides saemias* Druce, *P. Z. S.* 1891, p. 367, pl. xxxii. ff. 4, 5 (Alu).

3 ♂♂, 2 ♀♀, Manus, Admiralty Islands.

#### 120. *Jamides timon* Gr. Smith

*Jamides timon* Grose Smith, *Nor. Zool.* ii. p. 510, No. 271 (1895) (New Britain).

7 ♂♂, 5 ♀♀, Dampier Island; 1 ♂, 3 ♀♀, Vulcan Island.

#### 121. *Jamides uniformis* sp. nov.

♂. *Above.* Deep dull violet with a hairline margin of black.

*Below.* Slate-grey with the only slightly darker bands strongly defined by white edges, ocellus above tail large.

♀. *Above.* Basal three-quarters of forewing below subcostal nervure bright blue, rest of wing sooty black. Hindwing: basal three-quarters bright blue, outer quarter sooty black with central crenulate pale blue band.

*Below.* Similar to ♂.

Length of forewing : ♂ 10 mm., ♀ 11 mm.

Expanse : ♂ 22 mm., ♀ 25 mm.

1 ♂, 1 ♀, Manus, Admiralty Islands.

#### 122. *Catachrysops lithargyria* (Moore)

*Lampides lithargyria* Moore, *Ann. Mag. Nat. Hist.* (4) xx. p. 340 (1877) (Ceylon).

4 ♂♂, 1 ♀, Dampier Island; 3 ♂♂, 1 ♀, Vulcan Island.

#### 123. *Catachrysops strabo* (Fabr.)

*Papilio strabo* Fabricius, *Entom. System.* iii. pt. i. p. 287, No. 101 (1793) (India Orient.).

3 ♂♂, 2 ♀♀, Dampier Island; 1 ♂, 1 ♀, Vulcan Island.

#### 124. *Euchrysops cnejus* (Fabr.)

*Hesperia cnejus* Fabricius, *Entom. System. Supplem.* p. 430, Nos. 100, 101 (1798) (India Orient.).

This species varies greatly in size, and also in size of ocelli above tail.

Length of forewing : ♂ 12-17 mm., ♀ 13-17 mm.

Expanse : ♂ 26-37 mm., ♀ 28-37 mm.

11 ♂♂, 4 ♀♀, Dampier Island; 5 ♂♂, 2 ♀♀, Vulcan Island.

#### 125. *Lampides batjanensis* (Röber)

*Plebejus suelleni* var. *batjanensis* Rober, *Iris* i. p. 54, t. iv, f. 10 (1886) (Batchian).

5 ♂♂, 3 ♀♀, Dampier Island.

126. **Lampides celeno** (Cram.)

*Papilio celeno* Cramer, *Pap. Ezot.* i. pt. iii. p. 51. t. 31. ff. C. D (1775) (Surinam!).

4 ♂♂, 4 ♀♀, Vulcan Island; 5 ♂♂, 2 ♀♀, Dampier Island.

127. **Nacaduba berenice** (Herr.-Schaeff.)

*Lycaena berenice* Herrich-Schaeffer, *Stett. Entom. Zeit.* 1869. p. 74. No. 331 (Rockhampton).

1 ♂, Manus, Admiralty Islands; 2 ♂♂, 8 ♀♀, Dampier Island; 7 ♂♂, 2 ♀♀, Vulcan Island.

128. **Nacaduba meiranganus** (Röber)

*Plebejus meiranganus* Röber, *Iris* i. p. 65. t. v. ff. 23 and 25 (1886) (Aru).

3 ♂♂, 1 ♀, Manus, Admiralty Islands; 1 ♂, 1 ♀, Dampier Island; 1 ♂, Vulcan Island.

129. **Nacaduba ancyra** (Feld.)

*Lycaena ancyra* Felder, *Sitzb. Akad. Wiss. Wien, Math. Nat. Cl.* xl. p. 457. No. 36 (1860) (Amboina).

2 ♂♂, 2 ♀♀, Vulcan Island; 2 ♂♂, 2 ♀♀, Dampier Island.

130. **Nacaduba korene** Druce

*Nacaduba korene* Druce, *P.Z.S.* 1891. p. 361. pl. xxxi. f. 8 (Guadalcanar).

1 ♂, Vulcan Island; 2 ♀♀, Manus, Admiralty Islands.

131. **Nacaduba dubiosa** (Semper)

*Lampides dubiosa* Semper, *Journal Mus. Godeffroy* xiv. p. 159 (1879) (Cooktown).

1 ♂, Vulcan Island.

132. **Nacaduba nora** (Feld.)

*Lycaena nora* Felder, *Sitzb. Akad. Wiss. Wien, Math. Nat. Cl.* xl. p. 458. No. 37 (1860) (Amboina).

1 ♂, 2 ♀♀, Manus, Admiralty Islands; 3 ♀♀, Vulcan Island.

133. **Nacaduba subvariegata** sp. nov.

♂. *Above.* Antennae black very faintly ringed with white; head sooty black-brown; thorax and abdomen brown-black, clothed with whitish blue hairs. Forewing grey-blue; costal area, termen, and large apical area sooty black. Hindwing grey-blue, a subterminal sooty brown somewhat faint band, two tornal black ocelli; margin narrowly black. Fringes of both wings chequered white and black.

*Below.* Dark sooty brown; forewing, two antemedian white bands, a large darker discocellular band with lighter central streak, a broad darker postmedian band outlined with white; outer quarter of wing white, apical spot and two broken

irregular submarginal lines sooty brown. Hindwing sooty brown with a number of irregular darker bands outlined partially with white; outer quarter of wing white with irregular broken grey band and two brilliant ocelli.

Length of forewing: 14 mm.

Expanse: 31 mm.

1 ♂, Vulcan Island.

#### 134. *Nacaduba hermus* (Feld.)

*Lycaena hermus* Felder, *Sitzb. Akad. Wiss. Wien, Math. Nat. Cl.* xl. p. 457. No. 33 (1860) (Amboina).

1 ♂, Manus, Admiralty Islands.

#### 135. *Nacaduba saturator* sp. nov.

♂. *Above.* Antennae black ringed with white; head, thorax, and abdomen sooty black clothed with whitish blue hairs. Wings deep purple washed with brown, costa and terminal margins sooty black.

*Below.* Forewing brownish wood-grey; a short band in cell, one at apex of cell, and a transverse postmedian band to vein 1 darker and outlined in whitish; two dark grey subterminal bands. Hindwing brownish wood-grey with numerous irregular darker bands outlined in white; a large ocellus between veins 1 and 2.

Length of forewing: 10.5 mm.

Expanse: 23 mm.

1 ♂, Dampier Island.

#### 136. *Candalides parvifascia* sp. nov.

♂. *Above.* Differs from *dubitata* Gr. Sm. in its broader, rounder wings and much narrower black margin.

*Below.* Purer grey, **not** grey-brown.

♀. *Above.* Sooty brown-black; a large patch of pale blue on basal two-thirds of forewing between vein 1 and middle of cell. On hindwing there is a subbasal patch of pale blue occupying three-quarters of cell.

*Below.* Similar to ♂.

Length of forewing: ♂ 17 mm., ♀ 16 mm.

Expanse: ♂ 37 mm., ♀ 35 mm.

1 ♂, 1 ♀, Vulcan Island; 1 ♂, 1 ♀, Dampier Island. (Type ♂ Vulcan).

#### 137. *Candalides zadne* (Gr. Smith)

*Holochila zadne* Grose Smith, *Nor. Zool.* v. p. 107 (1898) (Mailu).

4 ♂♂, 4 ♀♀, Vulcan Island; 1 ♂, 6 ♀♀, Dampier Island.

#### 138. *Candalides moira* (Gr. Smith)

*Holochila moira* Grose Smith, *Rhop. Exot.* iii. *Oriental Lycaenidae* p. 14. No. xxii. Pl. xviii, ff. 9, 10, 11 (1899) (Ferguson Island).

1 ♂, Vulcan Island; 1 ♂, 2 ♀♀, Dampier Island.

139. **Epimastidia dampierensis** sp. nov.

Closely allied to *inops* Feld.

♂. *Above*. Differs in the purer and much brighter blue, **not** so much suffused with violet, and in the wider black margins; on the hindwings between veins 2 and 3 and 3 and 4 the black margin projects into the blue in a cone-shaped excrescence, a character not or hardly perceivable in *inops*.

*Below*. The dark outer and marginal portions of both wings are broader and much more sharply defined, of a blackish slate-colour, while in the type of *inops* these dark portions are dirty chocolate brown: this may however be due to age and fading. The inner of the two submarginal rows of spots on forewing is very broad, entirely coalescent, and deep black. On the hindwing this inner band consists of a wide coalescent row of large black arrowhead-like marks, while the outer consists of rounded spots edged with blue; the white bands are very much narrower and fainter.

♀. *Above*. Entirely sooty black; on the forewing the base is suffused with blue and a discal white patch reaches from vein 5 to vein 1. On hindwing basal third obliquely white suffused at base with grey and metallic blue.

Length of forewing: ♂ 17–21 mm., ♀ 17–19 mm.

Expanse: ♂ 37–45 mm., ♀ 37–41 mm.

5 ♂♂, 3 ♀♀, Dampier Island.

140. **Thysonotis epicoritus** (Boisd.)

*Damis epicoritus* Boisdual, *Voy. Astr. Lép.* p. 67 (1832) (New Guinea).

1 ♂, 1 ♀, Vulcan Island; 1 ♀, Dampier Island.

141. **Thysonotis hymetus manusi** subsp. nov.

♂. Differs from *hymetus hymetus* Feld. in the much broader black margins to the wings.

♀. Differs from *h. hymetus* by the large metallic blue area in the basal third of both wings above.

4 ♂♂, 2 ♀♀, Manus, Admiralty Islands.

142. **Thysonotis hamilcar** Gr. Smith

*Thysonotis hamilcar* Grose Smith, *Ann. Mag. Nat. Hist.* (6) xiv, p. 25 (1894) (New Britain).

2 ♂♂, 7 ♀♀, Manus, Admiralty Islands.

143. **Thysonotis hanno** Gr. Smith

*Thysonotis hanno* Grose Smith, *Ann. Mag. Nat. Hist.* (6) xiv, p. 25 (1894) (New Britain).

4 ♂♂, 3 ♀♀, Dampier Island; ? 4 ♂♂, 4 ♀♀, Vulcan Island.

144. **Thysonotis dispar latifascia** subsp. nov.

♂. *Above*. Differs from *d. dispar* Gr. Smith in the much wider white band on hindwing.

♀. *Above*. Differs from *d. dispar* in the much wider and whiter band in both wings.

*Below*. Both sexes show no differences beyond wider white areas.

This form varies enormously in size.

Length of forewing: ♂ 13-21 mm., ♀ 13-20 mm.

Expanse: ♂ 29-46 mm., ♀ 29-44 mm.

8 ♂♂, 8 ♀♀, Manus, Admiralty Islands.

#### 145. *Virochala affinis* sp. nov.

♀. *Above*. Differs from *perse* Hew. in the less defined black patch below subcostal in basal half of forewing and the larger white patch beyond.

*Below*. Differs in the ground colour being dirty white with the bands cinnamon-grey edged with white.

Length of forewing: 23 mm.

Expanse: 50 mm.

1 ♀, Dampier Island.

#### 146. *Hypochlorosis ancharia tenebrosa* subsp. nov.

♂. Differs from *a. ancharia* Hew. in its much deeper colour, purple **not** sky blue.

♀. *Above* and *below* darker.

6 ♂♂, 3 ♀♀, Dampier Island.

#### 147. *Hypochlorosis danisoides* (Nicév.)

*Hypolycaena danisoides* De Nicéville, *Journ. As. Soc. Beng.* lxxvi. 2. p. 558, No. 13, pl. iii. fig. 21 (1897) (Key).

1 ♀, Dampier Island.

#### 148. *Deudorix woodfordi* Druce

*Deudorix woodfordi* Druce, *P.Z.S.* 1891. p. 371. pl. xxxii. ff. 13, 14 (Guadalcanar).

2 ♂♂, Vulcan Island; 1 ♂, Dampier Island.

#### 149. *Hypolycaena phorbas* (Fabr.)

*Hesperia phorbas* Fabricius, *Entom. System.* iii. 1. p. 277. No. 68 (1793) (India Orient.).

4 ♂♂, 4 ♀♀, Vulcan Island; 6 ♂♂, 1 ♀, Dampier Island.

#### 150. *Prosotas caliginosa* Druce

*Prosotas caliginosa* Druce, *P.Z.S.* 1891. p. 366. pl. xxxi. f. 15 (Alu).

1 ♀, Dampier Island.

151. *Miletus theophanes* (Gr. Smith)*Hypochrysops theophanes* Grose Smith, *Nor. Zool.* i. p. 550. No. 188 (1894) (Humboldt Bay).

1 ♂, Vulcan Island.

152. *Miletus heros* (Gr. Smith)*Hypochrysops heros* Grose Smith, *Nor. Zool.* i. p. 550. No. 189 (1894) (Humboldt Bay).

3 ♂♂, 5 ♀♀, Dampier Island.

153. *Miletus dryope* (Gr. Smith)*Hypochrysops dryope* Grose Smith, *Rhopal. Exot.* ii. *Oriental Lycaenidae* p. 15. pl. iii. ff. 1. 2. (1895) (Constantinshafen).

4 ♂♂, 4 ♀♀, Vulcan Island.

154. *Miletus chrysargyra* (Gr. Smith)*Hypochrysops chrysargyra* Grose Smith, *Rhopal. Exot.* ii. *Oriental Lycaenidae* p. 16. pl. iii. ff. 4. 5 (1895) (New Guinea).

2 ♀♀, Vulcan Island.

155. *Liphyra brassolis robusta* (Feld.)*Sterosis robusta* Felder, *Reise Nor. Lep.* ii. p. 219. No. 237. t. 27. ff. 10. 11 (1865) (Halmheira).

This extraordinary insect is very variable both individually and locally. It has been divided into four subspecies, viz. :

*brassolis brassolis* Westw., N. India, Malacca, etc.*b. robusta* Feld., Moluccas, etc.*b. major* Rothsch., Queensland, and*b. abbreviata* Strand, Sumatra.

In addition to these four forms of *L. brassolis*, Herr Em. Strand has described as a distinct species *Liphyra castnia* from German and Dutch New Guinea. This form at first sight looks very different from *brassolis*, being above entirely black, with an oblique postmedian orange band on forewing from costa to vein 2. However, if he examines a large series, the student is at once struck by the enormous variability in this insect, which owes its extreme rarity in collections to its parasitic habits in the nests of tree ants.

The Tring Museum possesses the following specimens :

1 ♀, Malacca (coll. Biggs fig. by Distant).

1 ♂, Penang Hill (coll. Adams).

1 ♀, Perak (bought Doncaster).

1 ♀, Borneo (Micholitz coll.)

1 ♂, Halmheira (Waterstradt).

1 ♀, Dodinga, Halmheira (Lorquin) (Type of *robusta* Feld.)

1 ♀, Rossell Island, Louisiade Islands (Feb. 1898, A. S. Meek).

1 ♂, British New Guinea (Dr. Heath).

1 ♂, Humboldt Bay (Sept., Oct. 1892, W. Doherty).



- 1 ♂, Bongainville, Solomon Islands (April 1904, A. S. Meek).  
 1 ♀, Rendova, Solomon Islands (Feb. 1904, A. S. Meek).  
 1 ♀, Cedar Bay, Cooktown (Meek) (Type of *b. major* Rothsch.)  
 1 ♀, North Queensland.  
 7 ♂♂, 7 ♀♀; 1 cripple, 3 pupa cases, 1 larva, 1 larval skin and series of eggs (Townsville, Queensland, F. P. Dodd. Bred 1901).

Of these the Bongainville ♂ is almost black—i.e., where in Strand's *castnia* the orange band is situated, there is only a very small orange spot, and on the hindwing and basal quarter of forewing are only some faint splashes of deep rufous. The British New Guinea ♂ has rather more rufous marks, while the Humboldt Bay and Halmaheira ♂♂ have basal third of both wings orange. The Rendova ♀ is identical with, though slightly larger than, the type of *robusta* Feld.; while the Rossell Island ♀ is indistinguishable from some of the bred Queensland specimens. The Perak ♀ is similar to the Bornean ♀.

From this evidence I am forced, for the present, to consider that only three races can be separated, and that *castnia* Strand is only a melanistic aberration of *b. robusta*; the forms would thus be as follows:

- L. brassolis brassolis* Westw., India, Malacca and Sunda Islands.  
*L. brassolis robusta* Feld. Moluccas, N. Guinea and Solomon's Island.  
*L. brassolis major* Rothsch., Queensland and adjacent islands.

- 1 ♂, Vulcan Island.

#### 156. *Arhopala helius* (Cram.)

*Papilio helius* Cramer, *Pap. Erot.* iii. pt. xvii. p. 15. pl. cci. ff. F & G (1779) (Surinam!).

- 8 ♂♂, 2 ♀♀, Manns, Admiralty Islands; 5 ♂♂, 3 ♀♀, Dampier Island;  
 2 ♀♀, Vulcan Island.

#### 157. *Arhopala aexone* (Hew.)

*Amblypollia aexone* Hewitson, *Illustr. Diurn. Lep.* p. 5. No. 15. pl. iii. ff. 20, 24 (1863) (Waigion).

- 1 ♂, Vulcan Island.

#### 158. *Arhopala periander* Gr. Smith

*Arhopala periander* Grose Smith, *Nov. Zool.* i. p. 582. No. 263 (1894) (Jobie).

I cannot agree with Mr. Bethune-Baker that this is the same species as *philander* Feld. That insect has no saturated purple gloss on the underside, being of a particularly soft woolly appearance; while the present insect, on the underside, looks as if saturated with a satiny purple grease. As, however, the type of *periander* has unaccountably vanished, I cannot with absolute certainty declare the Jobie insect and these two Dampier Island ones to be identical.

- 2 ♂♂, Dampier Island.

#### 159. *Arhopala meander* Boisdu.

*Arhopala meander* Boisduval, *Voy. Astrol. Léop.* p. 76. (1832) (Arn).

- 5 ♂♂, 3 ♀♀, Dampier Island; 4 ♂♂, 4 ♀♀, Vulcan Island.

## GRYPOCERA

## HESPERIIDÆ

## Hesperiinae

160. *Casyapa naevifera* Mab.

*Casyapa naevifera* Mabille, *Le Naturaliste* p. 77 (1888) (New Guinea).

3 ♂♂, 2 ♀♀, Dampier Island; 4 ♂♂, 1 ♀, Vulcan Island.

161. *Celaenorrhinus trimaculatus* sp. nov.

♀. Antennae dark brown, basal half of club above dirty buff; head pale wood-grey; thorax dark brownish grey; abdomen deep brown.

*Above.* Wings deep umber brown, basal area clothed with greyish hairs; on forewing a large white patch in cell, a larger one placed obliquely below it, and a dot below vein 2 also white; a white oblong oblique spot half way between cell and apex.

*Below.* Forewing similar, but with a large mauve-grey subterminal patch between apex and vein 3. Hindwing, costal and abdominal quarters deep brown; median half, basal two-thirds mauve-grey with a broad postmedian rusty brown band and two spots of same colour nearer base; outer third deep brown clouded with mauve-grey.

Length of forewing: about 23 mm.

1 ♀, Dampier Island.

162. *Tagiades sivoa* Swinh.

*Tagiades sivoa* Swinhoe, *Ann. Mag. Nat. Hist.* (7) xiv. p. 419. No. 5 (1904) (Humboldt Bay).

1 ♂, 1 ♀, Vulcan Island; 3 ♂♂, 1 ♀, Dampier Island.

163. *Tagiades suffusus* sp. nov.

♂. Very close to *sivoa* Swinh., but—

*Above.* White on hindwing almost obliterated, except on abdominal area.

*Below.* Differs in the white area of hindwing being much reduced in size.

Length of forewing: 19 mm.

Expanse: 42 mm.

1 ♂, Vulcan Island.

164. *Tagiades kowaia* Ploetz

*Tagiades kowaia* Ploetz, *Berl. Entom. Zeitsch.* xxix. p. 231. No. 30 (1885) (New Guinea).

3 ♂♂, 2 ♀♀, Vulcan Island; 3 ♂♂, 1 ♀, Dampier Island.

165. *Tagiades inconspicua* sp. nov.

♂. *Above.* Antennae black, curved hook deep rufous; head, thorax, and abdomen sooty black-brown. Forewing sooty black-brown, a white semivitreous

spot in cell, two similar ones one on each side of vein 8 and one above vein 6 ; two smaller ones on each side of vein 5. Hindwing sooty black-brown ; outer fifth of wing from abdominal margin to below vein 4 white.

*Below.* Thorax and abdomen greyish white. Forewing as above, but with two pale greyish spots below vein 2. Hindwing above vein 6 sooty black-brown ; below vein 6 greyish white, a black dot on each side of vein 4.

Length of forewing : 25 mm.

Expanse : 55 mm.

2 ♂♂, Manus, Admiralty Islands.

### Ismeninae

#### 166. *Hasora hurama* (Butl.)

*Ismaene hurama* Butler, *Trans. Entom. Soc. Lond.* p. 498, 1870 (North Australia).

1 ♂, Vulcan Island ; 4 ♂♂, 1 ♀, Manus, Admiralty Islands.

#### 167. *Hasora dampierensis* sp. nov.

♂. Allied to *hurama* Butl., but much larger.

*Above.* Antennae black ; head and thorax bronze green ; abdomen deep chocolate black-brown. Fore- and hindwing velvety chocolate black-brown ; basal third clothed with bronze-green hairs.

*Below.* Similar to *hurama*, but white band on hindwing narrower and much more oblique.

Length of forewing : 27 mm.

Expanse : 63 mm.

1 ♂, Dampier Island.

#### 168. *Hasora haslia* Swinh.

*Hasora haslia* Swinhoe, *Ann. Mag. Nat. Hist.* (7). iii. p. 197, No. 11 (1899) (Brisbane).

1 ♂, Dampier Island.

### Pamphilinae

#### 169. *Parnara hasaroides* Elwes & Edw.

*Parnara hasaroides* Elwes & Edwards, *Trans. Zool. Soc. Lond.* xiv. p. 284. pl. xxi. f. 11 (1897) (Batchian, Halmaheira).

4 ♂♂, Manus, Admiralty Islands.

#### 170. *Parnara parvimacula* sp. nov.

♂. Differs from *mathias* Fabr. above in all the spots on forewing having disappeared except the one above vein 3 and the three above veins 6, 7 and 8, which are reduced to minute dots. On hindwing below there is a single dot below vein 6.

♀. Differs from *mathias* in the absence on forewing above of spots on each side of median fold within the postmedian line of spots, and in having, like the ♂, only one spot on hindwing below.

Length of forewing : ♂ 15 mm. : ♀ 14-19 mm.

Expanse : ♂ 35 mm. ; ♀ 33-43 mm.

9 ♀ ♀, Manns, Admiralty Islands ; 2 ♂ ♂, 5 ♀ ♀, Dampier Island ; 5 ♀ ♀, Vulcan Island. (Type ♂ Dampier.)

#### 171. *Parnara lyelli* sp. nov.

*Parnara mathias* Waterhouse & Lyell (nec Fabr.), *Bull. Austr.* p. 212. No. 314. ff. 711-713 (1914) (Australia).

♂. Antennae brownish rufous ; head, thorax and abdomen brownish olive.

*Above.* Forewing brownish olive, rather darker in centre of disc ; a white median dot below subcostal and one smaller and less distinct in cell ; a curved post-median band of whitish spots, those above veins 6, 8, 9 and 10 being very small, and the ones on each side of vein 3 larger ; sexual streak equally black and white obliquely from vein 2 to vein 4. Hindwing brownish olive, costal area deep brown.

*Below.* Uniform satiny wood-brown ; a large patch of dark brown scales occupying half the disc of forewing and spots as above ; on hindwing a white dot above veins 3, 4, 5 and 6.

♀. *Above.* Differs on forewing by having two white spots above vein 1, and one each above veins 2 and 3, while all spots are much larger.

*Below.* Has a subbasal white spot on hindwing in addition to the four post-discal ones.

Length of forewing : ♂ 20 mm., ♀ 21 mm.

Expanse : ♂ 46 mm., ♀ 48 mm.

*P. mathias* Fabr. is much smaller and = *agaa* Moore. Queensland examples in British Museum agree with mine from Dampier and Vulcan.

1 ♂, 1 ♀, Dampier Island ; 1 ♀, Vulcan Island. (Type ♂ Dampier).

#### 172. *Baoris laraca* (Swinh.)

*Caltois laraca* Swinhoe, *Ann. Mag. Nat. Hist.* (7) xx. p. 434 (1907) (Woodlark).

2 ♂ ♂, Dampier Island ; 4 ♂ ♂, 2 ♀ ♀, Vulcan Island.

#### 173. *Padraona tanus* (Ploetz)

*Apaustus tanus* Ploetz, *Berl. Entom. Zeitschr.* xxix. p. 228 (1885) (New Guinea).

1 ♂, 1 ♀, Vulcan Island.

#### 174. *Padraona ardea* sp. nov.

♂ ♀. *Above.* Differ from *tanus* Ploetz in the larger subapical yellow spot on forewing and absence of basal streak on hindwing.

*Below.* All bands are broader. Size the same.

2 ♂ ♂, 1 ♀, Dampier Island ; 1 ♀, Vulcan Island. (Type ♂ Dampier).

#### 175. *Padraona flavoguttata* (Ploetz)

*Hesperia flavoguttata* Ploetz, *Stett. Entom. Zeit.* xlv. p. 231. pl. 696 (1883) (Manilla?).

1 ♂, 4 ♀ ♀, Vulcan Island ; 4 ♂ ♂, Dampier Island.

176. *Ocybadistes marnas* (Feld.)

*Pamphila marnas* Felder, *Sitzb. Akad. Wiss. Wien, Math. Nat. Cl.* xl. p.462. No. 53 (1860) (Amboina).

This insect is very variable in size and extent of the orange markings. Vulcan and Dampier have a number of much larger individuals than any from Manus, though many of the others are as small as any from the latter place. There is, moreover, only one damaged ♀ from Manus.

10 ♂♂, 3 ♀♀, Dampier Island; 7 ♂♂, 1 ♀, Manus, Admiralty Islands; 3 ♂♂, Vulcan Island.

177. *Telicota megathymoides* sp. nov.

The ♀ resembles the American genus *megathymus*.

♂. *Above.* Antennae black with very faint indications of orange rings; head, frons orange mixed with olive and with black transverse bars, vertex olive mixed with orange hairs; thorax and first two abdominal segments deep brown densely clothed with orange olivaceous hairs, rest of abdomen deep brown ringed with orange. Forewing blackish chocolate-brown, basal third of costal area, cell and basal third below median vein orange streaked with brown, and with nervures brown; basal half below vein 1, three large postmedian patches above veins 1, 2, 3, and five smaller spots between vein 4 and costa orange. Fringe from apex to vein 3 deep brown, orange from vein 3 to tornus. Hindwing blackish chocolate-brown, basal and abdominal areas clothed with orange hairs; an oblique postmedian band from vein 1 to vein 6 orange; fringe orange.

*Below.* Antennae black, with segmental wings and basal half of club orange; head and palpi golden buff; pectus orange; abdomen ringed dark brown and orange. Forewing sooty black, costal and cellular area, and apical third dull orange, bands and spots as above bright orange. Hindwing dull orange with dark brown nervures, a spot in cell and postmedian band brighter orange, edged with dark brown.

♀. *Above.* Similar, but with less orange in cell and basal third of forewing above.

*Below.* Dull orange of forewing much suffused with rufous. Hindwing has dull orange replaced by purplish rusty rufous.

Length of forewing: ♂ 21 mm., ♀ 24 mm.

Expanse: ♂ 48 mm., ♀ 55 mm.

3 ♂♂, 4 ♀♀, Vulcan Island; 3 ♂♂, Dampier Island (Type ♂ Vulcan).

178. *Telicota moseleyi* (Butl.)

*Pamphila moseleyi* Butler, *Ann. Mag. Nat. Hist.* (5) xiii, p. 198, No. 50 (1884) (Ké Dukan).

♀. *Above.* Differs from *megathymoides* on forewing in the orange-yellow of cell and the wide yellow costal area which reaches almost to the upper spots of postmedian band and in all spots and bands being paler and wider. On hindwing the basal area is clothed with yellow hairs and the postmedian band is much paler and wider.

*Below.* Much paler dull orange and golden yellow, and the bands are wider and a sooty patch above tornus of hindwing.

♂. Similar to ♀ but smaller, and with a very strongly marked sexual brand on forewing.

Length of forewing: ♀ 16-22 mm., ♂ 14-19 mm.

Expanse: ♀ 38-51 mm., ♂ 32-43 mm.

3 ♂♂, 2 ♀♀, Dampier Island; 7 ♂♂, Vulcan Island.

179. **Telicota augias** (Johans.)

*Papilio augias* Johansson, *Amoen. Acad.* vi. p. 410. No. 80 (1763) (Java, China).

1 ♂, 1 ♀, Vulcan Island; 1 ♂, Dampier Island.

180. **Telicota silativa** (Swinh.)

*Podraona silativa* Swinhoe, *Ann. Mag. Nat. Hist.* (7) xvi. p. 617 (1905) (Humboldt Bay).

2 ♂♂, 3 ♀♀, Dampier Island; 3 ♂♂, 1 ♀, Vulcan Island.

181. **Telicota aruana** (Ploetz)

*Hesperia aruana* Ploetz, *Stett. Entom. Zeit.* xlvii. p. 103 (1886) (Aru).

1 ♂, 1 ♀, Vulcan Island.

182. **Mimas melie** Nicév.

*Mimas melie* De Nicéville, *Journ. Bomb. Nat. Hist. Soc.* ix. p. 394, pl. 2. f. 55 (1895) (Humboldt Bay).

5 ♂♂, 1 ♀, Dampier Island; 5 ♂♂, 1 ♀, Vulcan Island.

183. **Notocrypta wokana** (Ploetz)

*Phisionura wokana* Ploetz, *Berl. Entom. Zeitschr.* xxix. p. 225. No. 4 (1885) (Aru).

5 ♂♂, 3 ♀♀, Vulcan Island; 2 ♂♂, 4 ♀♀, Dampier Island.

(To be continued.)

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## THE GIANT LAND TORTOISES OF THE GALAPAGOS ISLANDS IN THE TRING MUSEUM.

By LORD ROTHSCHILD, F.R.S., PH.D.

(Plates XXI.—XXXII.)

DR. VAN DENBURGH'S monograph on these tortoises, in the *Proceedings of the California Academy of Sciences*, vol. ii, 1914, is so exhaustive that in enumerating the series in the Tring Museum it would be only reiteration to write long descriptive accounts. Therefore I am contenting myself with giving the measurements of each specimen and a few notes to supplement Dr. Van Denburgh's work. The measurements given are in inches and decimals, and are those employed by Dr. Van Denburgh; viz. the "straight length," taken between two uprights at the nuchal notch and the end of the supracaudal plate respectively; the "straight width," taken between uprights on each side between the second and third costal plates; the "length over curve," taken with a tape measure from nuchal notch over centre of vertebral scutes to end of supracaudal plate; the "width over curve," taken with a tape measure from bend of marginals above centre of plastral bridge over third vertebral scute to opposite bend of marginals; "width between second and third marginals"; the "straight width" between verticals placed at the suture between second and third marginal plates on each side of nuchal notch; the "middle height," being vertical distance between table or board and the centre of third vertebral plate, taken with a sliding square and a spirit level; the "front height" is taken at nuchal notch in the same manner; the "height to marginals" is from the table to lower edge of marginals taken with a pair of compasses; and the "length of plastron" is measured straight from fore to hind notch with a tape measure. In addition to the tortoises mentioned in this enumeration, the Tring Museum possesses alive one *Testudo ephippium*, collected by Captain Noyes; one *Testudo galapagoensis* which was procured on the Sandwich Islands, and one *Testudo ? nigrita* also from the Sandwich Islands. These latter are said to have been taken there by Captain Meek, of the *Boston Eagle*, about 1812. The Tring Museum also possesses the casts of the Scarborough *Testudo galapagoensis*, and casts of the ♂ types and ♀♀ of *Testudo hoodensis* and *Testudo chathamensis*, of the ♂ type and ♀ of *Testudo darwini*, and ♂ type *Testudo phantastica*, and of a ♂ identified as *Testudo wallacei*; and of a ♀ *Testudo ?* from Cowley Mountain; the originals of these latter being in the museum of the California Academy of Sciences. The cast of the type specimen of *Testudo nigrita* is also at Tring, the original being in the Royal College of Surgeons Hunterian Museum. The collection contains in all 138 dead and 3 living specimens of 11 species or races out of the 14 known from entire specimens; the Barrington race is known only from a few bones.

### *Testudo abingdonii* Günth.

(Plates XXI., XXII.)

*Testudo abingdonii* Günther, *Proc. Zool. Soc. Lond.* 1877, p. 66 (Abingdon Island).

The ♂ and ♀ were obtained on Abingdon Island by R. H. Beck in the first half of 1901.

The ♂ is a very old individual, with front three pairs of marginal plates much worn and chipped.

The ♀, which is the only ♀ known, is a much younger animal, though fully

adult. It shows traces of growth between the scutes, but this must not be taken as a sign of immaturity, as my very large ♂ *Testudo darwini*, which is at least a hundred years old, was growing between the scutes to the day of his death. This ♀ can at once be distinguished from ♀♀ of *ephippium* by the much more compressed front third of carapace and the more strongly everted second and third pairs of marginals. From my ♀ of *Testudo becki* it differs much, as that, unlike the ♀ of *becki* in the California Academy of Sciences' Museum, is of the broader, more dome-shaped type of which there is one ♂ at Tring and one at San Francisco.

### *Testudo becki* Rothschild.

*Testudo becki* Rothschild, *Nov. Zool.* viii, p. 372 (1901) (Cape Berkeley).

The type was taken by R. H. Beck early in 1901 at Cape Berkeley, North Albemarle, and, though large, is a fairly young individual.

The four other ♂♂ and the ♀ were taken at Banks Bay, North Albemarle, early in 1902 by Beck. The fifth ♂ obtained on that occasion is now in the Peabody Museum, Salem, Mass.

The ♀ is the least saddle-backed of any of the fourteen known specimens of this race, and resembles much *T. galapagoensis*. The five ♂♂ in the Tring Museum are mounted, but the ♀ is not.

### *Testudo ephippium* Günth.

*Testudo ephippium* Günther, *Trans. Roy. Soc. Lond.* clxv, p. 271, pls. 34, 35 f. b, 37 f. c, 38 f. c, 39 f. c, 42 f. b, 44 f. b, 45 f. b. (1875) (?).

Of the twenty-six specimens in the Tring Museum, Nos. 92 and 96 were collected by Dr. Baur, and the rest by the Webster-Harris expedition, the Leland Stanford (Heller and Snodgrass) expedition, the Johnson-Green expedition, the Captain Noyes second expedition, and by Mr. R. H. Beck. Of the twenty-nine original ones got by the Webster-Harris expedition, two are in the British Museum, two in the Vienna Museum, and several were exchanged with other museums and institutions. Of the eight collected by Dr. Baur, four only came to the Tring Museum, and of these two are now in the British Museum. The small 23-inch ♂, which is still living, was one of the four collected by Captain Noyes in 1900, and therefore has lived fifteen years in England—a record, I believe, for any Giant Tortoise.

Nos. 11 to 23 are unmounted, the rest mounted. One ♂ is mounted on plaster carapace, and the skeleton mounted complete.

### *Testudo galapagoensis* Baur

(Plates XXIII.—XXVIII.)

*Testudo galapagoensis* Baur, *Amer. Nat.* xxiii, p. 1044 (1889 [1890]) (Charles Island).

The two specimens in the Tring Museum were formerly the property of the Peabody Museum, Salem, Mass., and were lent to me for study. They were deposited in the British Museum, and were in the care of Charles Barlow, mason. Owing to his long illness and death, together with the retirement of Dr. Günther, they got mislaid, and could not be found when the Peabody Museum Trustees requested their return. I replaced them by mounted specimens of *Testudo becki* ♂, and *T. microphyes* ♂. Subsequently, on going through some old packing-cases, Barlow's son found the two tortoises. No. 39 is a complete carapace of an old ♂; No. 40 has the plastron and portions of the plastral-bridges wanting. The large living



tortoise, which I have provisionally identified as of this race, was taken to the Sandwich Islands by Captain Meek of the *Boston Eagle* about 1812.

Dr. Van Denburgh has identified this race with *Testudo elephantopus* of Harlan (for reasons cf. *Proc. Cal. Acad. Sci.*, ser. 4, vol. ii., pt. i., p. 247 [1914]); his reasons, however, do not quite convince me, and I prefer, as the **type** of Harlan's *elephantopus* no longer exists, to call this form *Testudo galapagoensis* Baur, which is a name certainly given to the Charles Island race, and place *elephantopus* under it with a ? Both the late Dr. Günther and I were agreed that the type of *Testudo nigra* Quoy & Gaimard was much too young to be certain as to which species it belonged to, and Dr. Van Denburgh, agreeing with our decision, quotes it here with a ?. Now, however, slightly more light is thrown on the question by my large living ♂. This was brought, as stated above, to the Sandwich Islands by Captain Meek in 1812, and Messrs. Quoy & Gaimard state that the type of their *Testudo nigra* was presented to M. de Freycinet by Captain Meek while the *Uranie* and *Physicien* were in the Sandwich Islands. Now one is at once tempted to say that "if they both came from Captain Meek, they must have come from one place, and as the large living one is a Charles Island Tortoise, the type of *nigra* is one too." But unfortunately there were until May 1915 five Galapagos tortoises on the Sandwich Islands, all said to have been brought there by Captain Meek. In May 1915, through the good offices of Mr. Thomas Gerrard, the large ♂ above cited was presented to the Tring Museum by the ex-Queen of the Sandwich Islands, and one of the ♀♀ by Messrs. G. N. & A. S. Wilcox. Now this ♀ is certainly not a saddle-backed tortoise, and can only have come from Indefatigable Island, or Central or South Albemarle. It is certainly not quite so strongly dome-shelled as two of my three adult ♀♀ of the Indefatigable race, but it agrees fairly well with the third; so for the present, as it is not possible to take correct measurements of living tortoises, I think it safest to treat it as an example of *Testudo nigruta*. Thus, if Captain Meek really brought **all** five of these tortoises to the Hawaiian Islands, they represent at least two if not three races; and so we get no further in our search for indirect evidence as to the identity of *Testudo nigra*.

### **Testudo darwini** Van Denb.

*Testudo darwini* Van Denburgh, *Proc. Cal. Acad. Sci.* (4) i. p. 4 (1907) (James Island).

The large ♂ was one of a number of tortoises turned down on "Rotumah" or Madison Island, Marquesas Islands, by Captain David Porter in 1813, when he went there from the Galapagos Islands in the U.S.A. frigate *Essex*. It remained there till the second half of the nineteenth century, when it was brought to Tonga. It was presented by King George of Tonga to Mr. Alexander Macdonald, who brought it to Sydney in 1866, and deposited it in the Hospital grounds at Gladesville, where it lived till 1896, when it was procured for the Tring Museum by Mr. Ogilvie of the Alliance Marine Insurance Company, and brought to London. It died in Regent's Park in July 1898, and has been mounted, the skin and scutes on a cast carapace, and the bones and bony carapace as a complete skeleton. Mr. Waite (*Rec. Austr. Mus.* iii. p. 97), who calls it *T. nigruta*, states that it was brought, according to Captain Howard of the schooner *Ida*, to Rotumah by an "American whaler" from the Galapagos, but this is evidently an error for "American frigate." The skull is enormously thick and heavy, and almost all sutures are completely ankylosed. It measures 8.5 inches from the front edge above nasal opening to the end of the occipital spine, and weighs 13 ounces; while the

skull of a *Testudo vicina* from Old Cobos Settlement (No. 61), measuring 8.25 inches from front edge above nasal opening to end of occipital spine, only weighs 9 ounces.

The ♀ was exchanged with the California Academy of Sciences, and is the No. 8105 of Dr. Van Denburgh's monograph.

### ***Testudo chathamensis* Van Denb.**

(Plates XXIX., xxx.)

*Testudo chathamensis* Van Denburgh, *Proc. Cal. Acad. Sci.*, (4) i. p. 4 (1907) (Chatham Island).

The ♀ (?) was purchased, along with the type of *Testudo wallacei* Rothsch., at the dispersal of Mr. Wallace's museum at Distington, Cumberland. It was bought in Callao Bay off a whaler by Mr. Wallace in 1833, together with two very young *T. nigrita* (see infra). It consists of a complete carapace with scutes, and some bones of three legs and the neck. The male, a stuffed specimen, was received in exchange from the Florence Museum for a 40-inch *Testudo vicina*. It was obtained in March 1884 on Chatham Island, during the voyage of the Italian vessel *Fetta Pisani*, and bears the Florence Museum Register No. M 2454, Coll. 25. 1896. One costal scute is missing.

### ***Testudo microphyes* Günth.**

*Testudo microphyes* Günther, *Trans. Roy. Soc. Lond.* clxv. p. 275, pls. 36, 37 f. B, 38 f. B, 39 f. B, (1875) (Tagus Cove). (Type ♀, locality unknown) (♂♂ ♀♀ Tagus Cove, Com. Cookson).

Of the six specimens in the Tring Museum, No. 48 was procured by R. H. Beck early in 1901, and Nos. 49 and 50 in 1902, together with a third ♂ now in the Peabody Museum, Salem, Mass. The two Nos. 51 and 52 were obtained between Vilamil and Cape Rose on the Johnson-Green expedition. All five are mounted. The ♀ was brought alive to London by R. H. Beck.

The two Cape Rose specimens are mounted on plaster carapaces and the skeletons mounted complete.

### ***Testudo güntheri* Baur.**

*Testudo güntheri* Baur, *Amer. Nat.* xxii. p. 1044 (1889 [1890]) (Type. ? Locality. Oxford Museum) (Vilamil Mountain).

All the twenty-three specimens of this species, except No. 126, were obtained by R. H. Beck on Vilamil Mountain early in 1902. Nos. 30-35 inclusive are unmounted, the rest are mounted. No. 126 is from La Tortuga, and is at first sight as much saddle-backed as any *T. becki*; but the first pair of marginal scutes are not modified, as in all the saddle-backed races, but remain thin, and being large, project as in *nigrita*. I therefore do not separate it from *güntheri* at present. Seeing, however, that the Cape Rose tortoises are inseparable from *Testudo microphyes* of Tagus Cove, I expect we shall have to add this to *T. becki* eventually; but I do not do so now owing to the different first pair of marginals. Nos. 99 and 98 are also abnormal, being less in width over curve than in length, but are apparently true *güntheri* and **not** *vicina*.

### ***Testudo vicina* Günth.**

*Testudo vicina* Günther, *Trans. Roy. Soc. Lond.* clxv. p. 277, pls. 35 f. A, 40 f. B, 41 fs. A and C, 45 fs. C and D. (1875.) (Type origin ?) (Iguana Cove.)

Nos. 37, 38, and 63-89 are unmounted, the rest mounted. Nos. 111, 128, and 60 were collected by Dr. Baur, and Nos. 61 and 106 at Old Cobos Settlement by

the Johnson-Green expedition. The rest were got by the Webster Harris, Leland Stanford, and Captain Noyes second expedition, and by R. H. Beck. Three ♂♂ and one ♀ are mounted on plaster carapaces, and the skeletons mounted complete. There are fifty-eight specimens of this race in the Tring Museum.

### *Testudo* species ?

**Nos. 91 and 138** are two saddle-backed tortoises of uncertain origin, though both collected by R. H. Beck. **No. 138** is indistinguishable from *ephippium*, and was got in the first half of 1902 and is labelled in Beck's handwriting "South Albemarle." **No. 91** is a saddle-backed tortoise with strongly everted marginals; it was collected by R. H. Beck, and labelled by him "**Indefatigable Island**, Feb. 16th, 1901." It has a very depressed carapace and much resembles *Testudo chathamensis*.

### *Testudo wallacei* Rothschild.

(Plates XXXI., XXXII.)

*Testudo wallacei* Rothschild, *Nov. Zool.* ix. p. 619 (1902.) (Type Distington Museum. Locality ?)

The type specimen consists of a complete carapace with scutes, and was purchased when Mr. Wallace's museum at Distington, Cumberland, was dispersed, together with a small ♀ ? *Testudo chathamensis*, two very small *Testudo nigrita*, a specimen of the extinct *Nesotor productus*, the also extinct *Carpophaga spadicea*, and other rarities. This carapace was bought by Mr. Wallace at the sale of the famous Bullock Museum. The scutes are absolutely smooth, with no trace of striation, and the shape is much more oblong than any specimen I have yet seen of Galapagos tortoises. There is a specimen in San Francisco obtained on Jervis Island by Beck and Slevin which Dr. Van Denburgh refers to this species. Until the cast of this Jervis ♂ is ready for comparison, I feel unwilling to express a definite opinion; but from the monograph it is clear that while being larger (more than four inches longer in a straight line), this Jervis Island specimen has the scutes strongly and deeply striated.

### *Testudo nigrita* Dum. & Bibr.

*Testudo nigrita* Dumeril & Bibron, *Erpét. Génér.* ii. p. 89 (1835). (Type Hunterian Museum. Locality ?).

*Testudo porteri* Rothschild, *Nov. Zool.* x. p. 119 (1903) (Indefatigable Island).

Dr. Van Denburgh (cf. *Proc. Cal. Acad. Sci.* ser. 4, vol. ii, pt. i. pp. 249-51) gives reasons—and good reasons—for making use of my name of *porteri* for the Indefatigable tortoise, and only quoting *nigrita* under it with a query.

I, however, in this case, am in favour of using the older name, as I think it can be proved to belong to this race.

The type of Dumeril & Bibron's description is the specimen in the Hunterian Museum. This consists of a complete carapace with scutes. I have carefully compared it with the Indefatigable Tortoise brought home by Mr. Gerrard from San Francisco, and, although the latter is slightly larger, the two agree in every character most exactly.

I therefore reluctantly feel obliged to sink my own name *porteri* as a synonym and reinstate *nigrita* Dum. & Bibr. for the tortoise of Indefatigable Island. The type of *nigrita* is certainly a ♀. Nos. 103 and 104 were bought in 1833 from a whaling boat in Callao Bay by Mr. Wallace, of Distington, at the dispersal of whose museum I obtained them.

TESTUDO ABINGDONII Günth.

Number.	Sex.	Straight.		Over Curve.		Width 2nd and 3rd marginals.		Height.			Height to marginals.	Per cent.	Plastron.	Per cent.
		Length.	Width.	Length.	Per cent.	Length.	Per cent.	Middle.	Per cent.	Front.				
1	♂	33.5	21.5	36	107%	35.4	106%	15.4	46%	15.1	45%	3	25	75%
27	♀	20	13.75	22.5	113%	22	110%	9.8	49%	8.8	44%	1.65	15.25	76%

TESTUDO BECKI Rothsch.

5	♂	35.25	23.25	38.25	109%	37.5	106%	13.75	39%	15.75	45%	16.5	47%	23	7%	74%
6	♂	33	25.5	40	121%	37.5	114%	16.25	49%	17.5	53%	13.2	40%	3.9	12%	29.5
4	♂	32	24.5	36.75	115%	36.5	114%	13	41%	16.625	52%	15	47%	3	9%	24
2	♂ (Type)	31.25	21.5	40.75	130%	36	115%	16.25	49%	16.3	52%	14.4	46%	3.45	11%	25.25
3	♂	31	23.75	39	126%	36	116%	14.5	47%	16.05	52%	11.8	38%	3.55	11%	27.5
28	♀	28.5	21.25	32	112%	34	119%	14.5	51%	13.5	47%	12	42%	2.4	8%	20
																70%

TESTUDO EHRPPRUM Günth. (♂♂)

94	♂♂	30.25	21	33.25	110%	31	102%	14.25	47%	14.9	49%	13.7	45%	3.3	11%	24.75	82%
9		29	20.75	35	121%	34	117%	13	45%	15	52%	11.1	38%	2.8	10%	25.85	87%
26		28.75	19.25	32.25	112%	32	111%	12.5	44%	14	49%	13.1	46%	3.2	11%	22.5	78%
96		28.75	20.75	32.5	113%	32.5	113%	12.75	44%	14.4	50%	15.45	54%	2.8	10%	23.5	82%
93		28.5	20.25	34	119%	34.5	121%	14	49%	14.8	52%	15.6	55%	3.05	10%	24	84%
8		27	20	36	133%	34	126%	14.5	54%	15.25	56%	10.8	40%	3.1	11%	26	96%
25		26.75	19.5	31.75	119%	31.5	118%	12.5	47%	13.85	52%	12.1	45%	2.9	11%	22.5	84%
24		26.5	20.5	31.5	119%	32.5	123%	13.6	51%	14.1	53%	12.6	48%	3	11%	22.75	86%
11		26.5	20.5	32.5	123%	32	121%	12.85	48%	13.75	52%	14.15	53%	3	11%	23.25	88%
95		26.25	19.75	30.75	117%	30.5	116%	12.5	48%	13.7	52%	14.1	54%	2.8	11%	23	88%
12		25.5	18.5	30.25	118%	29.25	115%	13.5	53%	12	47%	12.9	51%	2.4	9%	23	90%
7		24.75	19.5	32	129%	32	129%	11	44%	14	56%	11.05	45%	2.7	11%	23.5	95%
97		24.75	18.75	29.75	120%	29.75	120%	13.5	55%	13	53%	12	48%	2.4	10%	21	85%
14		24.75	18.5	30	121%	28	113%	12.5	51%	11.85	48%	12.35	50%	2.9	12%	20.75	84%
13		24.2	18.85	28.75	119%	29.25	121%	13.5	56%	12	50%	12.1	50%	2.5	10%	20.5	85%
15		24	17.5	27.5	115%	27	113%	11.25	47%	11.25	47%	11.3	47%	2.35	10%	20.25	84%
92		21.25	15.25	24.75	117%	23	108%	9.75	44%	9.5	43%	9.5	43%	2.45	12%	17.75	83%

# TESTUDO EPIPIPIUM Günth. (♀♀)

21	15	71%	24.25	115%	24.75	118%	10.75	51%	10.4	50%	9	43%	2.1	10%	17.5	83%
16	13.85	66%	24.5	117%	25.5	121%	9.125	43%	10.35	49%	11.25	54%	1.4	7%	18	86%
18	14.75	71%	23	111%	24	116%	9.5	46%	10.175	49%	10.1	49%	1.65	8%	18	87%
10	16.5	80%	25.75	126%	25	122%	10.5	52%	10.45	52%	8.5	41%	2.4	12%	19.5	95%
20	20	74%	23	115%	23.5	118%	10.25	51%	9.9	50%	9	45%	2.3	12%	16.75	84%
20	14.75	74%	23	115%	23	118%	8.75	45%	9.5	49%	9	47%	1.8	9%	16	83%
17	14.5	75%	22.75	118%	23	119%	8.75	45%	8.7	49%	8.4	47%	1.7	10%	16.5	93%
19	13.5	76%	20.75	111%	21.5	121%	8.2	46%	8.15	49%	6.7	40%	2.1	13%	14.5	87%
23	13.4	80%	19.5	117%	19.35	116%	8.5	51%	8.15	49%	6.7	40%	2.1	13%	14.5	87%
22	11.75	78%	18.5	123%	18.75	125%	7.25	48%	7.3	49%	6.05	40%	1.6	11%	13.25	85%

## TESTUDO GALAPAGOENSIS Bair.

39	26.75	78%	40.5	118%	41	120%	19.5	57%	15.95	47%	14.45	42%	1.7	5%	26.5	77%
40	16.5	73%	25.5	112%	26	114%	10.5	46%	—	—	—	—	—	—	—	—

## TESTUDO DARWINI Van Denb.

62	34.5	71%	56.5	116%	62	127%	22	45%	25.7	53%	23	47%	3.8	8%	36	74%
8105	18.5	72%	30.75	119%	29.5	114%	14.5	56%	13	50%	11.25	44%	2	8%	21.5	83%

(California Academy)

## TESTUDO CHATHAMENSIS Van Denb.

41	13.5	76%	21	119%	22	124%	9.25	52%	7.95	45%	6.7	32%	1.3	7%	14.75	83%
90	10.35	78%	17.75	134%	16	121%	6.5	49%	6.9	52%	4.3	32%	1.4	11%	11.75	89%

## TESTUDO MICROPHYES Günth. (Specimens from Tagus Core)

50	27.25	70%	46.25	119%	45.5	117%	20.75	53%	18.4	47%	14.9	38%	2.6	7%	28.5	73%
48	28	74%	44	117%	44.25	117%	17.5	46%	17.3	46%	15.35	41%	2.7	7%	28	74%
49	25.75	69%	44.75	119%	43	115%	19	53%	17.45	47%	14.9	40%	2.95	8%	26.5	71%
117	19.75	79%	31.5	126%	31	124%	14	56%	13.25	53%	9.15	37%	2.3	9%	21	84%

## TESTUDO MICROPHYES Günth. (Specimens from neighbourhood of Cape Rose)

52	28.5	75%	46	120%	43.5	113%	19.75	52%	17.8	47%	16.25	42%	3.3	9%	30.5	80%
51	25.75	72%	44.25	123%	43	119%	19.5	54%	18.3	51%	15.3	43%	2.7	8%	26	75%

TESTUDO GÜNTHERI Baur.

Number.	Sex.	Straight.		Over Curve.			Width 2nd and 3rd marginals.		Height.			Height to marginals.	Per cent.	Plastron. Per cent.		
		Length.	Width.	Length.	Per cent.	Width.	Per cent.	Middle.	Per cent.	Front.	Per cent.					
116	♂ ♂	47.25	36.5	77%	55.75	118%	55.75	118%	25.75	19.6	41%	16.3	34%	3.2	33.5	71%
98		46.25	32.25	70%	54.5	118%	54	117%	23	20.95	45%	17.3	37%	2.9	34	74%
30		45.5	36	80%	53	118%	55.5	122%	26	21.8	48%	16.5	36%	3.9	33	73%
102		45.5	35.75	79%	54	119%	56	123%	27.5	19.35	43%	16.55	36%	2.45	33	73%
101		44	35.5	80%	53	120%	54.25	128%	24	19.85	45%	17.4	39%	2.25	30.5	69%
57		43.5	34.5	80%	53	122%	56	129%	24.25	21.1	48%	16.4	38%	2.5	33.5	77%
56		41.5	31.5	76%	47.5	114%	51	123%	23	21.1	51%	16.95	41%	2.4	31.5	76%
31		40.25	30	75%	50	124%	50	124%	20.75	19.6	49%	17.7	44%	2.7	30	75%
137		40	30	75%	46	115%	49	122%	20.75	18.9	47%	16.3	41%	2.7	29.5	74%
55		38.75	30.5	79%	46.75	121%	50.5	130%	23.75	19.4	50%	16.4	42%	3.1	28.5	74%
129		37	28.5	77%	43	116%	43	116%	20.75	16.95	46%	15.5	42%	2.5	26.5	72%
126		33.5	27	81%	37	110%	40.25	120%	17.25	15.6	47%	16.1	48%	3.5	25.5	76%
127		30	23.75	79%	35.5	118%	37	123%	16	14.9	50%	13.9	46%	2	24	80%
35		23.25	18.25	78%	29	125%	30	129%	12.5	12.3	53%	8.3	36%	2.1	19.75	85%
131		32	26.5	83%	38	119%	41.5	130%	16.75	16.5	52%	13.5	42%	2.4	25.75	80%
124		28.25	24	85%	34.75	123%	38.5	136%	14.5	14.75	52%	10.6	38%	1.8	23.4	83%
119		26.5	20.5	77%	31.25	118%	32	121%	13.75	12.25	46%	8.75	33%	1.4	19	72%
32	♀ ♀	27.5	22.25	81%	33	120%	36	131%	15.75	13.8	50%	10.2	37%	1.9	22	80%
122		24.75	20	88%	29.75	120%	32.25	130%	12.5	12.5	51%	9.1	37%	2	19	77%
123		24.5	18.75	77%	28.5	116%	32.25	132%	11.25	11.5	47%	9.9	40%	1.8	18.5	75%
33		20.5	17.25	84%	27	132%	27.5	134%	12	11.5	57%	8.25	40%	2.5	18.25	89%
34	♂	18.5	16.25	88%	23.25	126%	25	135%	11.75	10.1	55%	7.5	41%	2	16	86%
99		40.75	30.75	75%	49	120%	45	110%	19.25	18.3	45%	16	39%	2.9	27.5	67%

# TESTUDO VICINA Günth. (♂♂)

Number.	Sex.	Straight.		Over Curve.		Width 2nd and 3rd marginals.		Height.			Height to marginals.	Per cent.	Per Plastron. cent.			
		Length.	Width.	Length.	Per cent.	Per cent.	Width.	Middle.	Per cent.	Front.				Per cent.		
61	♂♂	46	38	83%	59	128%	60.5	132%	23.8	52%	21.2	40%	3.4	7%	35	76%
60		44.75	33.75	75%	54	121%	56	124%	22.8	51%	16.8	38%	2.7	6%	33.5	75%
53		43.75	33.5	77%	52	119%	56	128%	20.75	47%	19.3	44%	3.45	8%	31	71%
58		42.5	32.25	76%	53	125%	55	129%	22.5	53%	17.1	40%	4	9%	31.75	86%
135		41.25	31.75	77%	52.25	127%	53.5	130%	22.5	52%	16.2	38%	3	7%	32	78%
100		38.75	29.5	76%	49.25	127%	49	126%	21.5	55%	16.3	42%	2.85	7%	29	75%
136		38.5	29.75	77%	46.75	121%	49	127%	22.5	60%	16.1	42%	3	8%	29	75%
37		36.5	28.75	79%	43	118%	46	126%	21	58%	15.5	42%	2.55	6%	28	77%
38		36.5	28.25	75%	42	115%	46.5	127%	21.25	58%	15.7	43%	3.4	9%	27	74%
59		36	32	89%	46.5	129%	53	147%	20	56%	18.2	51%	3.6	10%	30	83%
125		29.75	25.75	87%	37	124%	40.75	137%	16.75	56%	13.1	44%	3.3	11%	24.25	82%
63		29.75	22.5	76%	35.25	118%	38.5	129%	15.25	51%	12	40%	2.1	7%	19.5	66%
72		26.25	22.5	86%	34	130%	34	130%	16.25	62%	13.3	51%	10.4	9%	23	87%
73		25.75	22	85%	32	124%	31.5	122%	14.75	57%	14.2	55%	9.8	11%	22.25	86%
76		24.75	21.25	86%	32	129%	32.75	132%	14	57%	13.3	54%	9.55	9%	21.25	86%
114		20.5	17.25	84%	25.75	126%	25.25	123%	11.15	54%	10.65	52%	7.2	14%	18	88%
109		20	15.75	79%	25.75	129%	25.75	129%	9.5	47%	10.85	54%	7.15	10%	17	85%
113		15.25	11.75	77%	18.75	123%	18.25	120%	7.25	48%	7.7	50%	4.9	7%	13	85%
110		15	12	80%	19.75	132%	19	127%	7.5	50%	7.7	51%	5.5	9%	12	80%
89		10.5	9.65	92%	15.5	148%	16.5	157%	6.75	64%	6.45	61%	3.45	9%	9.5	90%
105		7.5	6.35	85%	9.75	130%	9.75	130%	3.75	50%	3.65	49%	2.7	9%	6.5	87%
106		5.75	5.15	89%	7.5	130%	7.5	130%	3.25	57%	3.15	55%	2.1	10%	5	87%

TESTUDO VICINA Günth. (♀ ♀)

Number.	Sex	Straight.		Over Curve.			Width 2nd and 3rd marginals.			Height.			Height to marginals.	Per cent.	Plastron. cent.
		Length.	Width.	Per cent.	Length.	Per cent.	Width.	Per cent.	Width	Middle.	Front.	Per cent.			
132	♀ ♀	30.5	25.5	84%	37.5	123%	42	138%	17.5	18.4	12	60%	2.4	8%	25
128		30	24.75	82%	38.5	128%	39	130%	15.85	17.15	11.3	57%	2.65	9%	24.75
134		27.25	23	84%	36.5	134%	38.75	142%	15.75	16.4	11.75	60%	2.7	10%	21.5
133		27.25	23.5	86%	35	128%	39	143%	15.75	16.1	11	59%	2.7	10%	23
66		26.75	21	79%	31.5	118%	33.5	125%	13.25	12.55	9.2	43%	1.7	6%	20.25
130		26.5	22.25	84%	34	128%	35	132%	16.25	15.1	10.75	57%	2.45	9%	23
65		26	20.25	78%	33.25	128%	33	127%	14	13.5	9.8	52%	2.3	9%	22
64		26	20	77%	32.5	125%	32.5	125%	13	13.6	8.8	52%	2.3	9%	22
118		25.5	21	82%	31.85	125%	32	125%	13.5	13.3	9.5	53%	2.5	10%	20.5
67		25.5	19.5	76%	30.75	121%	32.75	128%	12.75	13.3	10.2	52%	2.65	10%	21.5
74		25.25	20.5	81%	31.5	125%	33	131%	13.25	13.6	9.5	54%	1.7	7%	21
78		24.85	20	80%	29.75	120%	30.5	123%	10.75	13.3	9.7	54%	2.45	10%	20
75		24	19.75	82%	31	129%	32.25	131%	13.25	13.4	9.7	56%	2.1	8%	20
69		24	19.75	82%	30.5	127%	31.75	132%	13.25	13.5	9.4	54%	2.3	10%	20.25
120		23.75	19.75	83%	30.5	128%	32	135%	13	12.9	9.1	58%	3.6	15%	19.75
70		23	19.75	86%	29.5	128%	30.5	133%	13	13.7	8.5	51%	1.7	7%	21
68		23	18.5	80%	27.75	121%	28.5	124%	12.25	11.8	9.3	50%	2.4	10%	19
77		22.75	19	84%	30	132%	30.5	134%	12	11.6	9.9	53%	2.15	9%	19.5
71		22.5	18.25	81%	28.5	129%	30	134%	11.1	11.7	8.6	52%	1.9	8%	18
121		22.5	18.5	82%	29	129%	30.25	134%	12.25	12.75	9.1	57%	1.9	8%	19.25
81		22.5	15.5	69%	28.5	127%	30	133%	12.5	12.45	8.65	55%	2.3	10%	18.75
80		22	18.5	84%	28.5	130%	29	132%	11.25	11.9	8.1	54%	1.9	9%	19
79		21.85	17.25	79%	26.75	122%	27	134%	10.65	11.25	7.6	51%	2	9%	18
54		20	16.5	82%	24.5	120%	24	120%	9	10.8	6.5	46%	1.65	8%	15.75
115		19.75	16	81%	24.75	125%	25	127%	10.25	10.2	6.4	51%	1.4	7%	16
111		18.5	14.25	77%	22.5	121%	22.75	123%	9	9.6	7	52%	1.7	9%	15
112		16.5	13	79%	20	121%	20.25	123%	7.75	8.5	5.9	51%	1.4	8%	13.5



TESTUDO VICINA (Günth. (♀ ♀ continued)

86	16.25	13.65	84%	21.25	131%	21.5	133%	8.5	52%	8.6	53%	5.7	35%	1.45	9%	14	86%
87	16.25	13.5	83%	21.25	131%	20.5	126%	9	55%	8.3	51%	5.3	33%	1.4	9%	14	86%
82	15.25	12	79%	18.5	121%	19	125%	7.25	48%	7.8	51%	4.9	32%	1.4	9%	12.5	82%
88	15.15	12	79%	19.5	129%	18.75	124%	7.6	50%	7.6	50%	5.3	35%	1.35	9%	12.5	92.6
107	13.25	12.25	83%	19.25	131%	19.75	134%	7.5	51%	8.25	56%	5.8	39%	1.2	8%	13.25	90%
83	14.25	11.25	82%	18.5	132%	18.5	132%	7.25	50%	7.5	52%	4.75	33%	1.3	9%	11.75	82%
85	14.25	11.75	82%	18.5	130%	19.25	135%	7.35	52%	7.5	53%	4.65	33%	1.1	8%	12.5	88%
84	13.95	12.5	90%	18	129%	18	129%	7.25	52%	7.4	53%	5	36%	1	7%	12.25	88%
108	9	7.5	83%	11.5	128%	11	122%	4.75	53%	7	52%	3.45	38%	0.8	9%	7.75	86%

TESTUDO NIGRITA Dum. & Bibr.

45	43.25	34	79%	59	136%	61	141%	30	69%	24.8	57%	17.4	40%	3.4	8%	32	74%
44	36.5	31	85%	50.5	138%	55	151%	22	60%	22.75	62%	13	36%	3.4	9%	31.75	87%
46	30.5	25	82%	40	131%	43	141%	18	59%	18.4	60%	11.95	39%	3.4	11%	25	82%
36	29.75	25.75	86%	37.75	137%	41.5	139%	16	54%	17.8	60%	12.8	43%	2.9	10%	24	81%
47	29	24.25	81%	39	134%	43	148%	15.5	43%	18	62%	11.7	40%	2.2	8%	25.5	88%
43	28.25	21.75	77%	34.5	129%	38.25	135%	15.25	54%	15.1	53%	10.35	37%	2.4	8%	22.5	80%
29	16	12.75	80%	21	131%	19.5	122%	8	50%	8.2	51%	5.7	36%	1.7	11%	13.75	86%
103	11.5	9	78%	14.25	124%	14	122%	5.25	46%	6	52%	3.9	34%	1	9%	9.75	85%
104	9.25	7.75	84%	12	129%	12.25	132%	4.5	49%	5.2	56%	3.2	35%	0.7	8%	8.25	89%

TESTUDO WALLACEI Rothschild.

42	31.25	23.5	75%	39.5	126%	37.5	120%	16.25	52%	15.65	50%	12.5	40%	2.4	8%	24.25	78%
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TESTUDO SPECIES?

91	20.25	15.75	78%	24.75	122%	24	119%	9.25	46%	9.8	48%	9	44%	1.7	8%	17.5	87%
138	21	15.5	74%	24.75	118%	25.5	121%	10.5	50%	10.85	52%	10.5	50%	2	10%	18	86%

# COMPARATIVE LENGTHS AND PERCENTAGES OF TRING AND SAN FRANCISCO SERIES

Number of examples.	Straight lengths from largest to smallest.	Straight width. Percentages.	Length over curve. Percentages.	Width over curve. Percentages.	Width between 2nd and 3rd marginals. Percentages.	Middle height. Percentages.	Front height. Percentages.	Height to marginals. Percentages.	Plastron. Percentages.
<i>Testudo abingdonii</i>									
TRING									
1 ♂	33.5	64%	107%	106%	37%	45%	45%	9%	75%
1 ♀	20	69%	113%	110%	29%	49%	44%	8%	76%
SAN FRANCISCO									
4 ♂ ♂	36-29.3	68-72%	115-119%	105-116%	36-38%	47-51%	46-50%	8-10%	81-82%
<i>Testudo becki</i>									
TRING									
5 ♂ ♂	35.25-31	66-77%	109-130%	106-116%	39-49%	45-53%	38-47%	7-12%	70-89%
1 ♀	28.5	75%	112%	119%	51%	47%	42%	8%	70%
SAN FRANCISCO									
6 ♂ ♂	41-18.1	69-81%	118-127%	110-120%	40-53%	46-53%	35-49%	5-12%	73-88%
1 ♀	21.75	76%	114%	111%	54%	49%	44%	9%	84%
<i>Testudo ephippium</i>									
TRING									
17 ♂ ♂	30-25-21-25	67-79%	110-133%	102-129%	44-56%	43-56%	43-55%	9-12%	78-96%
9 ♀ ♀	21-15	66-80%	111-120%	116-125%	43-52%	49-52%	43-54%	7-13%	83-95%

*Testudo ephippium*

SAN FRANCISCO											
25 ♂♂	29.5-23.25	66-75%	109-122%	100-120%	39-59%	42-51%	10-51%	8-11%	75-85%		
61 ♀♀	27-18.4	67-79%	110-122%	100-129%	41-56%	39-51%	39-48%	7-12%	78-87%		

*Testudo galapagensis*

		TRING							
2 ♂♂	34.25-22.75	73-78%	112-118%	114-120%	46-57%	—-17%	—-42%	—-5%	—-77%

*Testudo darwini*

		TRING							
1 ♂	48.5	71%	116%	127%	45%	53%	17%	8%	74%
SAN FRANCISCO									
3 ♂♂	40.25-21	73-79%	125-129%	119-125%	48-55%	54-56%	32-45%	7-11%	76-86%
2 ♀♀	30-25.75	72-77%	119-126%	114-129%	56-58%	50-54%	42-44%	8-9%	83-85%

*Testudo chathamensis*

		TRING							
1 ♂	17.75	76%	140%	124%	52%	45%	32%	7%	83%
1 ♀	13.25	78%	134%	121%	49%	52%	32%	11%	89%
SAN FRANCISCO									
3 ♂♂	35.25-25.25	69-76%	112-117%	108-118%	53%	40-47%	34-36%	4-6%	75-79%
1 ♀	22.5	75%	125%	115%	46%	51%	27%	6%	81%

COMPARATIVE LENGTHS AND PERCENTAGES OF TRING AND SAN FRANCISCO SERIES

Number of examples.	Straight lengths from largest to smallest.	Straight width. Percentages.	Length over curve. Percentages.	Width over curve. Percentages.	Width between 2nd and 3rd marginals. Percentages.	Middle height. Percentages.	Front height. Percentages.	Height to marginals. Percentages.	Plastron Percentages.
<i>Testudo microphyes</i>									
TRING									
<i>Tagus Core Specimens</i>									
3 ♂♂ 1 ♀	39-37.5 25	69-74% 79%	117-119% 126%	115-117% 124%	46-53% 56%	46-47% 53%	38-41% 37%	7-8% 9%	71-74% 84%
<i>Cape Rose Specimens</i>									
2 ♂♂	38-25-36	72-75%	130-123%	113-119%	52-54%	47-51%	42-43%	8-9%	75-80%
SAN FRANCISCO									
<i>Tagus Core Specimens</i>									
13 ♂♂ 1 ♀	40.5-14.75 13-25	63-84% 83%	114-126% 131%	107-123% 130%	46-56% —	42-49% 55%	29-40% 30%	3-7% —	67-86% 91%
<i>Cape Rose Specimens</i>									
4 ♂♂ 1 ♀	38-29.2 25	69-75% 75%	114-122% 123%	110-119% 127%	54-57% 54%	43-48% 51%	35-43% 37%	6-7% 7%	68-77% 80%
<i>Testudo güntheri</i>									
TRING									
{ 12 ♂♂ 3 ♂♂ 8 ♀♀ (abnormal) }									
47-25-23.25 46-25-33.5 32-18.5									
75-81% 70-81% 77-88%									
110-125% 110-120% 118-132%									
116-130% 110-120% 130-136%									
51-61% 47-51% 46-64%									
41-53% 45-47% 46-57%									
34-48% 37-48% 33-42%									
5-10% 6-10% 5-11%									
69-85% 67-76% 72-89%									
SAN FRANCISCO									
5 ♂♂ 36 ♀♀									
40-24.5 28.8-23.7									
73-83% 70-88%									
116-121% 114-128%									
123-128% 122-136%									
53-61% 46-61%									
46-50% 46-55%									
31-41% 31-42%									
3-6% 3-9%									
70-80% 70-87%									

*Testudo vicina*

TRING

22 ♂♂ 36 ♀♀ 1 ♀	46-57.5 30.5-9	75-92% 69-86%	115-148% 118-134%	120-157% 120-143%	47-64% 42-61%	49-61% 43-60%	32-51% 32-43%	6-14% 6-15%	66-90% 76-92%
	43-24 31.2-21.25 3.3	73-87% 75-84% 85%	115-131% 124-134% 117%	116-138% 123-149% 117%	44-59% 48-58% —	49-58% 51-59% 48%	32-43% 31-40% —	6-10% 7-10% —	66-85% 71-87% 85%

SAN FRANCISCO

*Testudo nigrita*

TRING

4 ♂♂ 5 ♀♀ 1 ♀	43-25-29.75 29-9-25	79-86% 77-84%	127-138% 122-134%	139-151% 122-145%	54-69% 43-54%	57-62% 51-62%	36-43% 34-40%	8-11% 8-11%	74-87% 80-89%
	41-4-23.6 35.8-8.5	75-90% 82-89%	126-141% 125-138%	125-146% 122-146%	55-71% 53-60%	55-61% 54-63%	30-38% 26-40%	7-11% 8-13%	77-92% 80-93%

SAN FRANCISCO

*Testudo wallacei*

TRING

1 ♂	31-25	75%	126%	120%	52%	50%	40%	8%	78%
	36-2	79%	134%	129%	54%	54%	37%	8%	81%

SAN FRANCISCO, Jarvis Island

*Testudo species? TRING*

2 ♀♀	21-20-25	74-78%	118-122%	119-121%	46-50%	48-52%	44-50%	8-10%	86-87%
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ON THE GIGANTIC LAND TORTOISES OF THE SEYCHELLES  
AND ALDABRA-MADAGASCAR GROUP WITH SOME  
NOTES ON CERTAIN FORMS OF THE MASCARENE  
GROUP.

By LORD ROTHSCHILD, F.R.S., PH.D.

(Plates XXXIII.—LXXVI.)

INTRODUCTION

WHEN Dr. Günther wrote his great work on the *Gigantic Land Tortoises in the Collection of the British Museum* he was able to divide the species or races into three well-characterised sections, which, in spite of certain doubts raised by the subsequently described *Testudo sumeirei* Sanz., will, I believe, be perfectly maintainable. These three groups were diagnosed as follows :

Nuchal plate present ; third cervical vertebra biconvex ; gular double.

**Aldabra races**

Nuchal plate absent ; fourth cervical vertebra biconvex ; gular double.

**Galapagos races**

Nuchal plate absent ; fourth cervical vertebra biconvex ; gular single.

**Mascarene races**

At that time Dr. Günther was able to distinguish amongst the available material 4 **Aldabra races**, 6 **Galapagos races**, and 5 **Mascarene races** ; 15 in all. Owing to the great interest shown in these creatures and the exhaustive investigations of many students subsequent to the issue of his book, a considerable number of species or races have been added to our knowledge, and while one species has had to be sunk another has been re-established, so that now we know 7 well-established and 2 doubtful races of Günther's **Aldabra Group**, 13 well-defined and 2 doubtful races of the **Galapagos Group**, and 8 well-established and 2 doubtful races of the **Mascarene Group**. As later researches have demonstrated that Günther's **Aldabra Group** was originally spread over Madagascar, the Seychelles and most of the islands between and around, in addition to Aldabra itself, I am calling this group here and for the future the **SEYCHELLES AND ALDABRA-MADAGASCAR GROUP**. As they now stand the groups work out as follows :

**Seychelles and Aldabra-Madagascar Group.**

<i>Testudo elephantina</i> Dum. and Bibr.	. . . . .	North Aldabra
<i>Testudo daudinii</i> Dum. and Bibr.	. . . . .	South Aldabra
<i>Testudo gigantea</i> Schweigg.	. . . . .	} Various islands of the Seychelles
<i>Testudo gouffei</i> Rothsch.	. . . . .	
<i>Testudo sumeirei</i> Sanz.	. . . . .	
<i>Testudo grandidieri</i> Vaill.	. . . . .	
<i>Testudo abrupta</i> Grandid.	. . . . .	Madagascar
<i>Testudo species</i>	. . . . .	?
<i>Testudo species</i>	. . . . .	?

## Galapagos Group

<i>Testudo abingdonii</i> Günth.	. . . . .	Abingdon Island
<i>Testudo phantastica</i> Van Denb.	. . . . .	Narborough Island
<i>Testudo ephippium</i> Günth.	. . . . .	Duncan Island
<i>Testudo becki</i> Rothsch.	. . . . .	North Albemarle
<i>Testudo hoodensis</i> Van Denb.	. . . . .	Hood Island
<i>Testudo galapagoensis</i> Baur	. . . . .	Charles Island
<i>Testudo chathamensis</i> Van Denb.	. . . . .	Chatham Island
<i>Testudo darwini</i> Van Denb.	. . . . .	James Island
<i>Testudo microphyes</i> Günth.	. . . . .	Central Albemarle
<i>Testudo güntheri</i> Baur	. . . . .	S.E. Albemarle
<i>Testudo vicina</i> Günth.	. . . . .	South Albemarle
<i>Testudo wallacei</i> Rothsch.	. . . . .	Jervis Island
<i>Testudo nigrita</i> Dum. and Bibr.	. . . . .	Indefatigable Island
<i>Testudo species</i>	. . . . .	Cowley Mountain
<i>Testudo species</i>	. . . . .	Barrington Island

## Mascarene Group

<i>Testudo indica</i> Schneid.	. . . . .	Réunion
<i>Testudo rosmaeri</i> Schoepff	. . . . .	Rodriguez
<i>Testudo peltastes</i> Dum. and Bibr.	. . . . .	
<i>Testudo commersoni</i> Vaill.	. . . . .	Mauritius
<i>Testudo inepta</i> Günth.	. . . . .	
<i>Testudo triserrata</i> Günth.	. . . . .	
<i>Testudo sauzei</i> Gadow	. . . . .	
<i>Testudo leptocnemis</i> Günth.	. . . . .	<i>T. africana</i> = <i>grati</i> may be from Réunion, but it is doubtful
<i>Testudo africana</i> Schweigg. = <i>grati</i> Dum. and Bibr.	. . . . .	
<i>Testudo gadowi</i> Van Denb.	. . . . .	
<i>Testudo microtympaum</i> Boul.	. . . . .	?

Of the doubtful forms, the two of the Seychelles and Aldabra-Madagascar group are quoted, the one on a large adult specimen in the Liverpool Museum, two at Calcutta, one in Ceylon, and one at Tring, the other on a young one at Tring respectively. The former are most likely semi-domesticated hybrids of *T. sumeirei* × *T. elephantina*, and the latter of *T. sumeirei* × *T. gigantea*. With regard to Galapagos doubtful forms, of the Cowley Mountain race only one old ♀ is known, distinguished from ♀ *T. nigrita* by its greater "Middle Height." Of the Barrington race only a few bones are known. Of the two doubtful Mascarene forms *T. leptocnemis* is founded by Günther on some extremely slender bones with no associated carapace; it may be and probably is identical with one of the other Mauritius forms described from the carapace. *T. africana* Schweigg. = *grati* Dum and Bibr. is founded on a carapace with scutes in the Paris Museum of unknown origin, and may or may not be a Mauritian tortoise—more probably a Réunion one.

In the present article the Seychelles and Aldabra-Madagascar forms are more fully dealt with, and I have only added a few notes on Mascarene species. This latter group I hope to deal with more thoroughly later on. I may, however, mention here now that Dr. Gadow's ideas about the type of *T. sumeirei* are not correct, partly owing to an error of M. Sauzier. The latter believed the origin

of this creature to be unknown, whereas full documentary evidence exists. If Dr. Gadow had had all the available photographs, especially that of the creature tilted up on end, he would have seen that the gular is not forked, and that it is more or less identical with that of the Aldabra races. The plastrons with forked gulars from the "Mare au Songe" (*T. gadowi* Van Denb.) belong to tortoises of an older type more closely related to the fossil *T. (Colossochelys) atlas* Falc. of the Siwalik Hills (see Plates LXXV.-VI.). I have taken the measurements given in the tables exactly as in the previous article on "The Galapagos Tortoises in the Tring Museum, etc.," with one exception: viz., owing to the absence of a perceptible bend in the lateral marginal plates, I have taken the "Width over Curve" from the lower edge of the lateral marginals on one side over the vertebral line to the lower edge of the lateral marginals on the opposite side.

### EARLY HISTORY

The early history of the **Seychelles and Aldabra-Madagascar Land Tortoises** is not nearly as full nor so easy to unravel as that of the **Galapagos Islands Group** of these creatures. In many of the early seventeenth-century accounts the early voyagers do not discriminate between the tortoises of the Mascarene Islands and those of the other islands; while the very full accounts given by Leguat, Dubois (le Sieur D. B.), Commerson, l'Abbé Pingré and others refer almost exclusively to the tortoises of the Mascarene Islands. The following extracts are taken from Theodore Sanzier's "**Les Tortues de terre gigantesques des Mascareignes et de certaines autres Iles de la Mer des Indes.**"

In a book published in 1833 by Baron d'Unienville, entitled *Statistique des Seychelles et ses dépendances, etc., etc.*, we read: "At Mahé the land and sea tortoises as well as the 'Carrets' (a sort of sea tortoise yielding the tortoiseshell), which were so exceedingly numerous when the islands were discovered, are already scarce, and soon will be as rare as on Mauritius."

And again, "When they took possession of the island of La Digue in 1771 it was full of birds and Land Tortoises."

In 1815 James Horsburgh in a work on this region says: "On the Island of La Providence many land tortoises and land crabs are found with abundance of water," and again: "At the 'Îles Africaines' one finds abundance of land tortoises" (*Instructions on the Navigation of the Mozambique Channel and the islands and dangers in the North and N. East of Madagascar*, by James Horsburgh).

A long time before Horsburgh d'Après de Mannevillette (*Instructions sur la navigation des Indes Orientales*, 1775) testified to the abundance of Land Tortoises on the Ile de la Providence.

In a "**Mémoire sur les Seychelles**" addressed to the Minister M. de Vergennes, dated Port Louis, May 1, 1775, and signed Brayer du Barré, it is related that the "Man of War, *le Mascarin*, in September 1770, on its way to Malabar, called at the Seychelles and exchanged for some chickens with the Governor, M. de Launay, a number of Land Tortoises." Also "that the *l'Heure du Berger*, and the *l'Etoile du Matin*, sent to explore the archipelagos to the N.E. of Madagascar in December 1770, under the command of MM. de Rolan et d'Hercé, called at the Seychelles, and took on board Land Tortoises (Vol. 8, *Records of the Islands of France and Bourbon*) L'Abbé Rochon, a member of the Academy of Sciences, who in 1769 was charged with the mission of charting the islands to the N.E. of Mauritius, sojourned a



mouth at the 'Seychelles et îles adjacentes,' which at that time were solely inhabited by monstrous crocodiles and land and sea tortoises" (*Voyage à Madagascar et aux Indes Orientales*, 1791).

In the public library at Caen is a large collection of manuscripts bequeathed to his native town by General Decaen, who was the last French governor of Mauritius. In Vol. 106, containing documents relating to the Seychelles, are contained, inter alia, eight memoirs on this archipelago by Monsieur Malavois, who carried out an official inspection during the years 1786 and 1787. Among these eight documents is one entitled "Description et notice sur l'Archipel des Seychelles." 1e 1<sup>er</sup> Mai 1786, (Signé) Malavois.

This is of the highest interest, for the author describes each island in detail, and enumerates its resources and what products can be drawn from it. On several of the large number of islands the tortoises had already been exterminated. After visiting each island of the archipelago our author severally records the presence on the islands and islets either in large numbers or in greatly reduced numbers of the tortoises, or else the total absence of these creatures. Having first stated, "When the Seychelles Islands were first discovered, no other quadrupeds were found except the still existing amphibians, namely the Land and Sea Tortoises and the Caimans. On Seychelle Island (= Mahé) a few non-poisonous or hardly dangerous snakes, some centipedes and scorpions are found; green frogs and toads are very rare; but bats of the large sort are very abundant,"—our author proceeds to give a detailed list of the islands, of which the following had tortoises on them:—

"On **Ile Sainte-Anne** there are some 200 Land Tortoises, but 3000 could well live there. Its shores are much frequented by Sea turtle.

"**Ile Moyenne** has a diameter of about 200 'toises,' and absolutely no fresh water. There are a very great number of Land Tortoises.

"**Ile aux Cerfs** is the most suitable island to serve as depot for all the tortoises which could be collected in the archipelago.

"**Ile Thérèse.** On this island tortoises are no longer found.

"**Ile de la Conception.** Formerly a prodigious number of tortoises were found here, but now only a few still remain and these mostly small and thin.

"**Ile Silhouette.** This island still holds a few Land Tortoises.

"**Ile du Nord.** In spite of it having been burnt some years ago, Land Tortoises are still found here, and those the finest in the archipelago.

"**Ile aux Récifs.** Formerly the Land Tortoises were present on this island in great numbers, but private vessels have carried them off, so that but few remain.

"**Ile aux Frégates.** A few fine Land Tortoises are still shipped from here.

"**Ile Praslin.** This island is covered with native cocoanut palms, which grow at a great elevation above the low ground. This tree, besides on **Praslin**, is only found on the islands of **Curieuse**, **Sainte-Pierre**, and **Ronde**. Land Tortoises were formerly excessively common, until the crews of the trading vessels, which called there for cargoes of these creatures, took to burning the scrub to find them. At present only a very few still exist in certain little frequented parts of the interior.

"**Ile Aride.** A few Land Tortoises still occur here.

"**Ile Félicité.** On the slopes of the high mountain, Land Tortoises are found.

"**Les Sœurs.** These two islands are covered with dense scrub, in which a few Land Tortoises occur.

"**Ile Marianne** is only an elevated rock covered with scrub and lacking water during a large portion of the year. A few small Land Tortoises are found.

"**Ile de la Digue.** This is the island on which a prodigious number—perhaps most of all—of Land Tortoises are found.

"**Ile aux Vaches Marines.** There are on this island a considerable number of tortoises."

Captain Laplace, during a voyage round the world, made a long stay in the Seychelles in 1830, and after saying how astonished he was at the large size of the Sea Turtle, many having a shell 4 feet long by  $3\frac{1}{2}$  wide, he proceeds to say : "The Land Tortoises are very common in the **archipelago**; they are smaller and rounder than the Turtles. Large numbers are shipped to the neighbouring colonies." (*Voyage autour du Monde sur la corvette La Favorite*, 1834.)

Truth to tell, even as late as this epoch, the importation into Mauritius of Land Tortoises was still enormous. Here is a list of vessels recorded in the *Gazette de Maurice* as discharging at Port Louis in 1826 :—

"8th January, '**Le Pêcheur**,' having left the Ile de Providence December 10th, 1825. **800 Tortoises.**

"28th May, the same ship, having left the Seychelles May 3rd. **800 Tortoises.**

"10th June, '**Le Chériby**,' out from Saint Brandon June 7th. **15 Tortoises.**

"6th December, '**Le Jeune Ferdinand**,' out from the Seychelles November 12th. **1600 Tortoises."**

Here we have over 3200 Land Tortoises sent to Mauritius in 1826, 2400 from the Seychelles and 800 from the Ile de la Providence.

Monsieur L. de Grandpré, who landed at the Seychelles in 1790, remarks : "It is important to mention how greatly these islands abound in Land Tortoises. How can they have got here?" (*Voyage dans l'Inde et au Bengal par L. de Grandpré*, 1801).

In a work entitled *Les Iles de l'Afrique*, Paris 1848, Monsieur Eugène de Frobergville summarises the case as follows :

"In **Rodriguez** since end of last century the Land Tortoises have become scarce" (p. 70).

"On **Galega Island** in 1785 only a very small number of Land Tortoises were found" (p. 83).

"Formerly on **Mahé** the number of Land Tortoises was gigantic, but now they are confined to the most inaccessible mountain gorges" (p. 92).

"When Lieutenant Oger took possession of **Silhouette** he reports that this island abounded in Land and Sea Tortoises more than any other of the group" (p. 98).

"In 1771 the **Ile de Digue** was full of crocodiles and Land Tortoises. One crocodile Oger measured was 13 feet long and 8 feet round the belly" (p. 99).

"When Lazare Picault took possession of the **Seychelles** in 1744 (9th November), he found on the larger islands of the group large quantities of Land and Sea Tortoises and Crocodiles of various sizes" (p. 103).

"**The Amirante Isles** are only inhabited during a part of the year by people from the Seychelles and Mauritius collecting Land and Sea Tortoises" (p. 110).

"On the **Alphonse Islands** Land Tortoises are extremely abundant" (p. 111).

"On the **African Isles** many Land Tortoises are found" (p. 111).

"The **Ile de la Providence** abounds in Land and Sea Tortoises" (p. 112).

"Picault, when he discovered the Isle of Astove, 27th October, 1742, saw there large quantities of very large Land Tortoises" (p. 114).

All these different excerpts from Sauzier and others prove :

(1) That in the first half of the eighteenth century Giant Land Tortoises abounded on Mauritius, Réunion, and Rodriguez.

(2) That down to the year 1800 they also were extremely abundant on the Seychelles and all the other small islands of the Indian Ocean.

(3) That they disappeared from the Seychelles and the other islands except Aldabra after 1830.

(4) That in Réunion about 1750, in Mauritius in 1780, and in Rodriguez in 1800, they had become extremely rare; and that they disappeared entirely from these islands before 1840.

(5) That there are in existence on Mauritius, Réunion, and the Seychelles a certain number of Giant Tortoises in a state of semi-domesticity, most of which undoubtedly came from Aldabra, but others equally certainly did not, and it is now impossible to tell which island originally was their home. In addition there are a number hatched in this state of semi-domesticity which are the produce of parents of different origin.

(6) That at the present time there exist only on South Aldabra a few *Testudo doudinii* in a wild state; on all the other islands the Giant Tortoises have been exterminated.

(7) That the following are the islands in the Indian Ocean which we know held Giant Tortoises in the seventeenth and eighteenth centuries.

#### A. Seychelles and Aldabra-Madagascar Group of Tortoises:

*Madagascar* (fide Cauche), *Aldabra*, *Farquhar Island* or *Juan de Nova*, *Atoree*, *La Providence*, *Iles Africaines*, *Alphonse*, *Amirante Islands*, *Galega*, *Cosmoledo Island*, *Glorioso Island*, *Assumption*, the *Chagos Archipelago*, the *Comoro Islands*, and the following of the *Seychelles Archipelago*, *Mahé*, *Sainte Anne*, *Mogenne*, *Ile aux Cerfs*, *La Conception*, *Silhouette*, *Ile du Nord*, *Ile aux Récifs*, *Ile aux Frigates*, *Praslin*, *Aride*, *Félicité*, *Les Sœurs*, *Marianne*, *La Digue*, and the *Ile aux Vaches Marines*.

#### B. Mascarene Group of Tortoises:

*Mauritius*, *Réunion* or *Bourbon*, and *Rodriguez*.

It has been shown by our collections that each of the Galapagos Islands had a distinct race of Giant Land Tortoise, and the largest, **Albemarle Island**, four. One would then be inclined to take it for granted that the above thirty-three or more islands—among which Réunion and Rodriguez are said to have had three each, Mauritius at least four, while Aldabra had two if not three—had at least one separate race each.

But the aforementioned Monsieur de Grandpré, after his query of "How can they have got there?" proceeds to relate that undoubtedly they could swim as much as from one to three leagues, for individuals captured on **Praslin**, and after having a circle cut in their shell with a "graver," put in an enclosure, had escaped and were recaptured on the **Ile aux Cerfs**; and others similarly caught on the **Ile aux Cerfs** and similarly marked, had escaped and were retaken on **Mahé**. This fact of their power of swimming at least three leagues makes it possible that within the one **Seychelles** group of islands several islands might have had one species common to the several.

In 1877, when writing his great work, Dr. Günther stated that there was

no actual proof of there having been a tortoise indigenous to the Seychelles, and that all the people best acquainted with the islands declared that all the semi-domestic tortoises then there had come from Aldabra. The foregoing extracts, due to the careful investigations of Messrs. Sanzier, Fauvel, and Professor Vaillant in the "Grandes Archives" of the Admiralty in Paris and other French repositories of manuscripts, however, show that not only were there several indigenous species on the Seychelles down at least to 1826, but that most likely several of the semi-domestic tortoises there and on Mauritius and Réunion had originated in the Seychelles. The following extract really belongs among the previous ones, but is given here as it was discovered later.

In the Journal of the Ship *Le Charles*, on her voyage leaving Mauritius in 1742 and returning there in 1743, Captain Jean Grossin writes that after charting the islands of **Cargados (Cardonat)** and **Agalela** or **Galega**, he dropped anchor at "**Jean de Nove**" or **Farquhar Island** on October 29, 1742. On the 30th he disembarked and found numbers of Land Tortoises, the smallest of which were larger than the largest of Rodriguez Island; some being such that six men could not carry them, nor could they be got into the boats. They were rounder than those of **Rodriguez**, and produced a cry like a calf. They were also more tender and better flavoured than those of **Rodriguez**.

As regards those of **Aldabra** itself, the brothers Rodatz state that they found the tortoises still numerous during their visit in the first half of the nineteenth century, but they kept mostly to the thick scrub. There were on the islands, at the time of their visit, several brick-walled enclosures in which the tortoises were collected for export to Mauritius, Madagascar, and elsewhere. In one they saw 200 and in another 300 tortoises.

Kersten mentions that a Hamburg merchant informed him that as late as 1847 a hundred men—the crew of two ships—collected and carried off 1200 tortoises from Aldabra, and among these were still numbers of veritable giants, of a weight from 800 to 900 lb. each. A great and probably permanent hindrance to any really exhaustive and critical elucidation of the races of this group is that for about 150 years large numbers of these tortoises have been kept in a semi-domesticated condition on Mauritius, Réunion, and the Seychelles. As they have been brought there from many different islands, and in the case of the Seychelles down at least to 1826, there survived original native tortoises: these creatures have interbred freely, and many of the surviving individuals are undoubtedly hybrids and mongrels between many races.

With the exception of the seven or eight brought by Dr. Voeltzkow from South Aldabra, of which two are at Tring and four in Frankfurt, no tortoise of this group in any Museum can with certainty be proved to have been caught wild, all or nearly all having been shipped to Europe from the Seychelles and Mauritius. Therefore, as—with the exception of the negligible quantity still living in South Aldabra of *T. daudlinii*—the tortoises have been exterminated on all the islands where they occurred in a wild state, a Monograph similar to the one published by Dr. John van Denburgh on the Galapagos Tortoises has become an impossibility.

#### Systematic Account.

Ten names have been given to tortoises belonging to the **Seychelles and Aldabra-Madagascar Group**; but the reason so little was done in the study and classification of Giant Tortoises till it was almost too late was owing to their all

having been lumped together under the title of *Testudo indica* for three-quarters of a century. The ten names are as follows :

- |          |                            |                    |           |  |
|----------|----------------------------|--------------------|-----------|--|
| 1. 1814  | <i>Testudo gigantea</i>    | Schweigger         | . . . . . | No locality                              |
| 2. 1835  | <i>Testudo elephantina</i> | Dumeril and Bibron | . . . . . | { Anjouan, Comoro and<br>Aldabra Islands |
| 3. 1835  | <i>Testudo daudini</i>     | Dumeril and Bibron | . . . . . | East Indies                              |
| 4. 1877  | <i>Testudo ponderosa</i>   | Günther            | . . . . . | No locality                              |
| 5. 1877  | <i>Testudo hololissa</i>   | Günther            | . . . . . | No locality                              |
| 6. 1892  | <i>Testudo sumeirei</i>    | Sanzier            | . . . . . | Réunion or Mauritius                     |
| 7. 1906  | <i>Testudo gouffii</i>     | Rothschild         | . . . . . | Thérèse Island                           |
| 8. 1868  | <i>Testudo abrupta</i>     | Grandidier         | . . . . . | Madagascar                               |
| 9. 1868  | <i>Emys gigantea</i>       | Grandidier         | . . . . . | Madagascar                               |
| 10. 1885 | <i>Testudo grandidieri</i> | Vaillant           | . . . . . | Madagascar                               |

Of these last three, Nos. 8, 9, were proposed in 1868 by the late M. Alfred Grandidier for two species of semi-fossil tortoises collected by him at Ambonlitsate and Etséré respectively. No. 10 was a name given to the larger species from Etséré in 1885 by Professor Vaillant after a more critical study of these remains, when he found that M. Grandidier's *Emys gigantea* was a true *Testudo*, and as *gigantea* was preoccupied in the latter genus, it required a new name.

Of the remaining seven names three were proposed for specimens undoubtedly brought alive from the Seychelles, and stated somewhat lightly by their former owners to have been imported to the Seychelles from Aldabra.

One was applied to a living specimen in Mauritius known to have been taken there in 1766 from the Seychelles, and almost certainly a native of one of that group of islands or a neighbouring one. Of the remaining three, the author of one gives no locality, one is stated to have come from the "East Indies," and the third is stated to belong to a race found on the "Islands in the Mozambique Channel, Anjouan, Comoro, and Aldabra."

### 1. *Testudo gigantea* Schweigg.

This name was applied by its author (*Prodr.* p. 58 (1814) (*Arch. Königsb.* vol. i. pp. 327 and 362)), to a large tortoise which was perfectly smooth, had an undivided supracaudal, and had a nuchal plate. The description agrees exactly with Günther's *T. hololissa*, except that the latter has a divided supracaudal scute. As we find a divided caudal scute to be of accidental occurrence in *T. elephantina* and *T. daudini*, I do not think it possible, with our present knowledge, to retain *gigantea* and *hololissa* separate, their only character of difference being one known to occur accidentally in other species. Of course, had not these tortoises disappeared in a wild state, it is quite possible that we should have found that while one island of a group of islands produced nothing but tortoises with divided supracaudal plates, a neighbouring island might yield such only as had undivided ones. As a rule ♀♀ *gigantea* are much more dome-shaped than the ♂♂, but the very old male (No. 139) is proportionately as high and dome-shaped as any ♀.

### 2. *Testudo elephantina* Dum. and Bibr.

This name was applied by its authors to the seven or eight tortoises presented to the Paris Muséum by Messrs. Mathieu and Dussumier, obtained from Mauritius, Bourbon, and Anjouan. The type is a specimen the carapace of which measures

45.6 inches in length in a straight line, and was sent by M. Mathien from Mauritius. It is a brown-scuted specimen with no embossed scutes, though all the vertebral ones are raised above the rest. The authors also state that specimens occur with large conical bosses to the scutes. As native country they give "All the islands in the Mozambique Channel, such as Anjouan, Aldabra, and the Comoros."

### 3. *Testudo daudinii* Dum. and Bibr.

This name was given to a long narrow tortoise whose vertical middle height is about half the length with no nail to the end of the tail. The type specimen has a carapace measuring 39.8 inches in a straight line, while a second specimen in the British Museum measures 34.5 inches in a straight line, and has a middle height of less than half the length. Dr. Günther has identified with this a young ♂ in the Liverpool Museum, but I am not quite sure that all the proportions agree. I have associated with this species the wild South Aldabra tortoises and the very large ♂ brought to Mauritius from Egmont Island, Chagos Islands, by Mr. Antelme, from whom I purchased it. If it should appear that the breadth of these tortoises is much too great to allow of this, I leave it to others to give a name to the South Aldabra Tortoise. But as the British Museum specimen is a quite distorted individual and the type is also probably abnormally narrow, I personally consider that the South Aldabra Tortoise is *daudinii*.

### 4. *Testudo ponderosa* Günth.

Dr. Günther applied this name to an adult ♀ tortoise without locality which lived for some time in the Zoological Society's Gardens. The author laid particular stress on the skull differences and the thickness of the carapace. Mr. Boulenger, in his *Catalogue of Chelonians*, 1889, puts it as a synonym of *elephantina* without comment.

I feel sure it is a hybrid of *T. elephantina* × *T. gigantea*.

### 5. *Testudo hololissa* Günth.

This name was given by Günther in his large work to two male carapaces in the Royal College of Surgeons Museum, and he associated with them a ♀ then living in the Zoological Gardens. The larger specimen is the type, and not, as Boulenger states in his 1889 *Catalogue*, the ♀ now in the British Museum. As the only apparent difference between this and *T. gigantea* is the divided supracaudal, I feel it is impossible to keep it up as a separate race, so it must be treated as a synonym of *T. gigantea*.

### 6. *Testudo sumeirei* Sauz.

This name was applied by its author to the large living tortoise which was in the Artillery Barracks at Port Louis, Mauritius, when the English took possession in 1810; and which, though quite blind, is, I believe, still living. Monsieur Sauzier declared that its history was unknown, and that it probably originated on Mauritius or else had come from Réunion. There are, however, records extant which show that it was one of six or seven large tortoises brought to Mauritius from the Seychelles by the Chevalier Marion de Fresne in 1766. They were undoubtedly indigenous to the Seychelles or neighbouring islands, and **not** of Aldabra. A second specimen of this lot is in the Tring Museum; it was brought alive from Mauritius. There was a third and perhaps others alive in Mauritius in 1906. One of the original lot was also brought alive to the Zoological

Society's Gardens in 1833, but unfortunately, since its death, all traces of it have vanished. It is also said that the Giant Tortoise which was on St. Helena during Napoleon I.'s captivity on that island was one of these tortoises. This, however, must remain uncertain; for there are at present two living tortoises on St. Helena, and the carapace brought from there to the British Museum as that of the tortoise of Napoleon's time is first of all not **certainly** the carapace of that beast, which may still be alive, and secondly is not *T. sumeirei*. This species is characterised by its flat-topped carapace, absence of a nuchal plate, and double gular; while the carapace in question is a narrow, dome-shaped carapace with very large nuchal plate.

#### 7. *Testudo gouffii* Rothsch.

I described under this name a gigantic ♂ tortoise (*Nor. Zool.* xiii. pp. 753-4, 1906). It was procured for me alive by Messrs. Gouffé and James, and it had lived for a great number of years on Thérèse Island, St. Anne's Channel, Seychelles. It is a very old animal, conspicuous by the very deeply cut striations and horn-yellow colour of the scutes of the carapace, and the very prominent and strongly projecting scutes of the head and forelegs. It has a very large nuchal plate, and strongly crenulated and everted marginal scutes between hind limbs and supracaudal. It may be a last remnant of the indigenous Thérèse Island race, or else, what I think more likely, came from Juan de Novo or Farguhar Island.

#### 8. *Testudo abrupta* Grandid.

This name was applied by the late Monsieur Alfred Grandidier to the smaller of the two semi-fossil tortoises obtained by him. It was found at Amboulitsate, and is very strongly dome-shaped, and the declivity to the nuchal plate and the supracaudal respectively is very sharp, while the shell is very thin, as were also apparently the scutes in life.

#### 9 and 10. *Emys gigantea* Grandid. = *Testudo grandidieri* Vaill.

Monsieur Grandidier placed his larger species found at Etséré in the genus *Emys* because of the very depressed and flat carapace, and therefore naturally called it *gigantea*, as no fossil or recent *Emys* could approach it for size. However, Professor Vaillant (*Compt. Rend.* 1885, Part I. pp. 874-5) has shown that in spite of the extraordinarily depressed carapace it is a true *Testudo* and near *elephantina*. He renamed it, therefore, *Testudo grandidieri*, as *gigantea* was preoccupied in *Testudo*.

#### Description

We now come to the question of diagnosing the differences of the races: and here begins a troublesome task, because, as I have before stated, of the specimens of the first five of the seven races of these tortoises which, I think, can be easily recognised (except certain specimens from South Allabra), none are definitely known to have been caught wild, and on the Seychelles and Mauritius numerous hybrids have been produced. Another circumstance is puzzling, though I believe if we knew the definite habitat of each specimen it would be quite explicable: namely, in both *Testudo gigantea* Schweigger and *Testudo elephantina* Dum. and Bibr., we find long and narrow specimens and short and broad specimens: *i.e.*, we have long and narrow as well as short and broad individuals, with perfectly smooth scutes and also with strongly striated scutes, and this evidently quite irrespective of age. We also find that as a rule the short and broad individuals

of both races in the ♂♂ show much more pronounced bosses or pyramids of the scutes than the long and narrow ones; ♀♀ of the smooth-scuted form, however, never show any trace of the scutes being embossed. It would probably be found that the long and narrow tortoises are all hybrids or descendants of hybrids between *Testudo daudinii* and either *gigantea* or *elephantina* as the scutes are smooth or striated. As, however, we can now never trace the exact origin of the tortoises under consideration, I am reluctantly forced to include under *gigantea* all smooth-scuted individuals whether they be short or long, and all the specimens with striated scutes under *elephantina*. A character noticeable and conspicuous in very old and large tortoises of this group is that the plastral bridge becomes enormously swollen and pushed out, so that it projects far beyond the lower edge of the marginals and is totally unlike anything found in large Galapagos tortoises. It is, however, only in extremely old specimens that it becomes conspicuous, for the very large ♂ in the British Museum (figured here on Pls. XLIX. and L.), though of the largest dimensions, shows hardly any signs of this development. Among the Seychelles and Aldabra-Madagascar tortoises no such definite saddle-shaped carapaces occur as in the other two groups, but the type specimen in Paris and the large adult ♂ of *daudinii* in the British Museum have the marginals much everted and the front of the carapace considerably raised, so that we can without impropriety say that *daudinii* represents the saddle-backed races of the "Seychelles and Aldabra-Madagascar group" *abingdonii*, *becki*, *ephippium* and *phantasticus* of the "Galapagos group," and the saddle-backed *Testudo roosei* from Rodriguez of the "Mascarene group."

Dr. Van Denburgh was able, thanks to possessing numerous specimens with exact data, to determine four categories of variation:

1. Variation with age.
2. Variation with sex.
3. Variation with distribution.
4. Individual variation.

In consequence of there being only a negligible quantity of Indian Ocean material with any kind of data, and while fully conscious of having before my eyes all these four classes of differences, I can only definitely deal with three—viz. Nos. 1, 2, and 4. I will take them seriatim:

### 1. Variation with Age

As in the Galapagos group of races, the very young tortoises are all more or less of the same shape: being more strongly dome-shaped than in most of the adults. One outstanding feature is the enormously deep incised divisions between the scutes in the young ones from  $\frac{1}{3}$  to  $\frac{2}{3}$  grown, so that in many specimens each scute appears resting on a high platform. This is **not** or **very rarely** found in the Galapagos group. Another difference is that from a very early if not the earliest age the young of *T. gigantea* have the scutes absolutely smooth. We have no very young individuals of either *T. microphyes* or *T. guntheri*, the two smooth-scuted Galapagos dome-shaped races; but the youngest we have show stray striations. As before mentioned, extremely old ♂♂ of the group we are dealing with have an extraordinary development of the plastral bridge not seen in younger ♂♂ or in any ♀♀. Very old individuals of both sexes show an inclination, often very strong, for the supracaudal to curve round towards and even under the posterior end of the plastron.



## 2. Variation with Sex

In the smooth-scented *T. gigantea* the ♀ is always much more strongly dome-shaped than the ♂, and never shows any signs of the scutes being embossed. In the striate-scented *T. elephantina* the ♀ is not conspicuously more dome-shaped than the higher shelled ♂♂, but it often exhibits scutes as highly embossed as any ♂. In *daudinii* only one considerably dome-shaped and in *gouffii* no ♀♀ are known: while in *sumeirei*, if the specimen I have of a half-grown ♀ is really *sumeirei* and **not** a hybrid, this sex is proportionally even more dome-shaped than in *gigantea*, thus indicating a representative development in this group to *chathamensis* among the Galapagos races. Like all the "Giant Tortoises," the ♂♂ attain a much larger size than the ♀♀.

## 4. Individual Variation

Here we are faced by a very awkward situation, due entirely to the interbreeding of the various races on the Seychelles and Mauritius, thus making it necessary to include under one name a number of individuals which show differences as great as, and often greater than, those between such Galapagan races as *T. nigrita* and *T. abingdonii*. If we took the extremes, such as the very old ♂ in the Tring Museum which was brought back from the Seychelles by Dr. Braner (see Plates LIII., LIV.), and the large ♂ from Cerf Island in the British Museum (see Plates XLIX., L.), no one would believe them other than very distinct species: for Dr. Braner's ♂ is long and comparatively narrow, has a considerably depressed carapace, and the scutes show little or no signs of a boss—*i.e.*, the edges of the scutes are very little lower than the centre. The Cerf Island ♂, on the other hand, is short, very broad and very high, the carapace not depressed at all, and the scutes enormously embossed, the centre of the scutes being often 4–5 inches higher than the edges. Unfortunately we do not know the exact habitat of these extremes, but we do know that a large number of intermediate specimens between the extremes represent interbreeding in all sorts of degrees between at least four species or races. The colour is also very variable, running from pale-horn brown to deep black. The ♀♀ and young are mostly dark slate-grey or brownish black, very seldom indeed being pale horn-brown. Although, as proved by the above-mentioned large ♂ from Cerf Island, the adult ♂♂ of *elephantina* do occasionally become very pale horn-brown, we generally find that the large ♂♂ of a decided pale brown colour are nearly always entirely smooth-scented, and therefore must be included under *gigantea*. The brown colour appears, however, to be found in long and narrow and short and broad specimens promiscuously, but seems less frequent among those with embossed than those with flat scutes, although the Cerf Island ♂ in the British Museum is one of, if not the most embossed specimens known. I have a much older ♂ at Tring, also brought from Cerf Island; this individual is entirely black, deeply striated, and has strongly embossed scutes (see Plates LI. and LII.); but, although being very aged, while the British Museum specimen was about eighty years old only, it is much smaller. As examples of the short and long forms of *T. gigantea*, see Plates LIX., LX. and LXI., LXII. In none of the races of the group under discussion do we find the yellow jaws and throat, as found in certain Galapagos races.

## Key to the Species

- |    |   |   |                            |
|----|---|---|----------------------------|
| 1. | { | Marginals strongly everted . . . . .  | <i>T. daudinii</i>         |
|    | { | Marginals feebly or not at all everted . . . . .  | 2.                         |
| 2. | { | Carapace flat in vertebral region . . . . .   | 3.                         |
|    | { | Carapace not flat in vertebral region . . . . .   | 6.                         |
| 3. | { | Nuchal plate absent, shell not depressed . . . . .  | 4.                         |
|    | { | Nuchal plate present . . . . .  | 5.                         |
| 4. | { | Shell strongly declivous in front only, narrower . . . . .  | <i>T. sumirei</i>          |
|    | { | Shell strongly declivous all round, broader . . . . .   | <i>T. species</i> , p. 436 |
| 5. | { | Shell strongly depressed . . . . .  | <i>T. grandidieri</i>      |
|    | { | Shell not depressed . . . . .   | <i>T. species</i> , p. 436 |
| 6. | { | Shell abruptly declivous, costals vertical . . . . .  | <i>T. abrupta</i>          |
|    | { | Shell not abruptly declivous . . . . .  | 7.                         |
| 7. | { | Scutes on head and legs strongly projecting, scutes of carapace }<br>deeply striated . . . . .          | <i>T. goniffii</i>         |
|    | { | Scutes on head and legs not projecting, scutes of carapace not, or }<br>less deeply, striated . . . . . | 8.                         |
| 8. | { | Scutes of carapace absolutely smooth . . . . .  | <i>T. gigantea</i>         |
|    | { | Scutes of carapace distinctly striated . . . . .  | <i>T. elephantina</i>      |

## DESCRIPTION OF THE RACES

As these tortoises vary so much individually, it would be useless to give long or detailed lists of characters and descriptions; I am of opinion that the diagnoses and the photographs will convey a better idea of the important features.

To aid the student still further I have given a reproduction (Pl. xxxiii.) of a chart of the Aldabra Islands, to show the generally accepted theory that originally *T. daudinii* inhabited the large South Aldabra Island, *T. gigantea* the smaller North-West Aldabra Island, and *T. elephantina* the large North Aldabra Island: which theory, however, I doubt. There are also three Plates showing the skulls of the various groups: viz. Pl. xxxiv., Nos. 3, 4, and Pl. xxxv., *Testudo grandidieri* ♀ and *Testudo elephantina* ♂, to illustrate the form of a skull peculiar to the Seychelles and Madagascar-Aldabra group: Pl. xxxvi., *Testudo darwini* ♂, to illustrate that of the Galapagos group; and Pl. xxxiv., Nos. 1, 2. *Testudo rosmaeri* ♂, to illustrate that of the Mascarene group.

**Testudo gigantea** Schweigg.

(Plates LXI-LXIV.)

*Testudo gigantea* Schweigger, *Prodr.* p. 58 (*Arch. Königsb.* pp. 327 and 362) (1814); Dum. and Bibr. *Erpét. Gén.* ii. p. 120 (1835); Hubrecht, *Notes Legl. Mus.* iii. p. 43 (1881).  
*Testudo hololissa* Günther, *Gig. Land-Tort.* p. 39, pl. vii. (1877).

*Type specimens*.—The type of **T. hololissa** Günth. is No. 1021 in the Royal College of Surgeons Museum. The type of Schweigger's **T. gigantea** is not specially indicated, and I believe it must have been entirely lost.

*Distribution*.—Dr. Günther gave Aldabra as the locality for his **hololissa**; trusting to the statements, reported to him, that the inhabitants of the Seychelles asserted that they never had known of indigenous tortoises and all their semi-domestic ones originated in Aldabra. Thanks to the careful investigations of Monsieur Theodore Sanzier, we now know that even as late as 1826 numerous islands of the Seychelles group still contained indigenous races of Giant Land Tortoises, and that the type came from one of these Seychelles Islands.

*Material*.—Including both specimens with double and nudivided snpracaudal scutes, the Tring Museum has 3 ♂♂ and 7 ♀♀ entire; the Royal College of Surgeons' the carapaces of 2 ♂♂ (1 adult, the Type, 1921, and 1, No. 1020, half grown); and the British Museum 1 carapace of an adult ♂, and an adult ♀ stuffed which is **wrongly catalogued** by Boulenger as the **type** of **hololissa** Günth.

*Diagnosis*.—Nuchal plate normally present; gulars paired; third cervical vertebra biconvex; front of carapace declivous, much lower than middle: height at nuchal plate more than 31% of straight length (32–40%); difference between percentages of heights at third vertebral and nuchal plate 20%; carapace strongly dome-shaped and oval, very wide anteriorly, width at junction of second and third marginals more than 40% (44–58%); front and hind marginals not everted and not produced; length over curve not more than 140% (129–140%), generally less than width over curve; vertical height to marginals medium, very constant, 5–7%; size large, adult ♂♂ 36–46.5 inches; plastron medium, greatest percentage 88%; plates entirely smooth. Scutes of head and forelegs smooth, flat and level with surface of skin.

*General Remarks*.—The **Type** of Dr. Günther's description is **undoubtedly** the adult ♂ No. 1921 in the Hunterian Museum and **not**, as Mr. Boulenger records, the adult ♀ now in the British Museum, which latter, when the description of *hololissa* was published in 1877, was still living in the Zoological Gardens, London. The history of this specimen was, that it was being taken as a present to the Governor of Mauritius (Isle of France) on board the French corvette *Gobe-Mouches*, in December 1898, when this vessel was captured by H.M.S. *Nereida*, Captain Corbett, on December 18, and taken to the Cape of Good Hope. It was sent to England by Admiral Bertie, who at that time commanded at the Cape, and it lived at Petworth, the country seat of the Earl of Egremont, from August 1899 to April 1910. Its weight was 207 lb. Through the investigations of Monsieur Sauzier we now know that this specimen was really an indigenous Seychelles Tortoise; but of course we do not know from which one of the numerous islands it had come. The very large male (46.5 inches, No. 139) in the Tring Museum is an exceedingly old animal—at least 300 years; it weighed when alive 593 lb. I obtained it through the late Mr. Carl Hagenbeck.

No. 176 is remarkable for having no nuchal plate.

Nos. 149 and 143 are evidently hybrids with *T. daudinii*, for while showing all the general characters of *T. gigantea* they are very long and narrow and much depressed, the "middle height" being **less** than **half** the "straight length," as in *daudinii*. Although neither have the marginals everted, as in *T. daudinii*, in No. 143 the first and second pairs are bent up and almost project horizontally. No. 143 is figured on Plates LIX. and LX., under the heading of *T. gigantea*.

Nos. 141, 160, 162, 163, 170, 171, and 181 are, in my opinion, all hybrids between *T. gigantea* and *T. elephantina*. Of No. 141 we know the parents, the father being the large ♂ (49-inch) *elephantina* in the British Museum (figured Pls. XLIX., L.), and the mother the ♀ *gigantea* imported alive along with it from the Seychelles (*Ile aux Cerfs*). They vary much, but all show a condition of concentric striation on portions of the scutes more or less intermediate between the entirely smooth scutes of *gigantea* and the strongly striated scutes of *elephantina*. All its ten specimens of *gigantea* and eight of the hybrids were received alive from the Seychelles.

The ♀♀ of *gigantea* are nearly always much more dome-shaped than the ♂♂.

The little tortoise No. 141 was given to me in spirit by the late Dr. Albert Günther, who had kept it alive for several years; it had come over with its parents. All its measurements were taken with a large pair of compasses.

***Testudo elephantina* Dum. and Bibr.**

(Plates XLIX.—LII. and LV., LVI.)

*Testudo elephantina* (part.) Dumeril and Bibron, *Erpét. Gén.* ii. p. 119 (1835). (Islands of Mozambique Channel.)

*Testudo elephantina* Günther, *Gig. Land-Tort.* p. 21, pls. I.—IV., VIII.—XVII., XIX. (1877); *Peter's Reise u. Mossamb.* iii. p. 3, pl. III. f. B. (1882).

*Testudo indica* (part.) Gray, *Syn. Rept.* p. 9 (1831); *Cat. Tort.* p. 5 (1844); *Shield Rept.* i. p. 6, pl. XXXV. f. 1 (1855); *Suppl. Shield Rept.* p. 5 (1870).

*Testudo ponderosa* Günther, *Gig. Land-Tort.* p. 35, pls. VI., VIII., IX., XIII., and XVIII. (1877) (♀ Hybrid *T. gigantea* × *T. elephantina*).

*Type specimens.*—The type was not marked by Messrs. Dumeril and Bibron, but is evidently the very large specimen in the Paris Museum sent from the Ile de France (Mauritius) by M. Mathien. The type of *ponderosa* is a ♀ skeleton with no history in the British Museum; it had been bought alive by Dr. Günther.

*Distribution.*—It is supposed that *T. elephantina* inhabited the Northern Island, Aldabra Islands; but all the specimens in the various Museums have been received from the Seychelles, Mauritius, or elsewhere alive, and not a single specimen is known to have been collected in a wild state on Aldabra and brought to Europe direct.

*Material.*—Of presumably pure *T. elephantina* there are in the Tring Museum 11 ♂♂ and 9 ♀♀, of which No. 169 was purchased stuffed, and the rest all received alive from the Seychelles or Mauritius. This is the commonest of the Indian Ocean tortoises in museums, and I have examined many in Paris, Vienna, and elsewhere; but there is no specimen at all approaching the large 49-inch ♂ in the British Museum, either in size or sharpness of the specific characters.

*Diagnosis.*—Nuchal plate normally present; gulars paired; third cervical vertebra biconvex; front of carapace strongly declivous, much lower than middle; height at nuchal plate more than 25% of straight length (28–39%); difference between percentages of heights at third vertebral and nuchal plate more than 20% (22%); carapace strongly dome-shaped and oblong, very wide anteriorly; centre of scutes often very strongly raised and embossed; width at junction of second and third marginals more than 47% (48–60%); front and hind marginals not—or very feebly—everted, and not produced; length over curve not more than 140% (128–140%); generally equal to or slightly less than width over curve; in about 30% of the individuals it distinctly exceeds the width over curve; vertical height to marginals very variable, 3–9%; size large adult ♂♂ 35–49 inches; plastron long, greatest percentage 92%; plates distinctly striated. Scutes of head and forelegs flat and level with surface of skin.

*General Remarks.*—The description given by Messrs. Dumeril and Bibron was made from some seven or eight specimens sent from Bourbon, Mauritius, and Anjouan by Messrs. Mathien and Dasselmier; but as they give full measurements of the one sent by Monsieur Mathien, and moreover lay stress on it as being an extra large specimen, while dismissing the rest simply in the words: “et les six ou sept autres que nous possédons,” it is evident that that is the type. Otherwise the name could not stand, as among these seven or eight are one or two *gigantea*

and one *daudinii*. The Tring Museum, unfortunately, possesses no very large typical ♂ of this species, and I fear it is now too late to get one from the Seychelles, for almost all the really large individuals still there are hybrids or apparent hybrids. In fact, outside the Paris Museum, I consider the only really fine ♂ is the one in the British Museum.

No. 142 is a hybrid between *daudinii* and *elephantina*, for while the scutes are distinctly striated, the carapace is long and narrow, and the "middle height" is **less** than **half** the straight length. This tortoise is one of the pair brought alive from the Seychelles by Dr. Braner and deposited in the Hamburg Zoological Gardens in 1896. I purchased them both from him on the understanding that they should remain in Hamburg till they died. This specimen died in 1906. In the periodical *Zoologischer Garten*, vol. 36, p. 354 (1896) Dr. Bolau gives the following dimensions for the larger ♂; **Straight Length** 125 cm. = 50 inches; **Length over Curve** 157 cm. = 62·8 inches; **Greatest Breadth at hinder part of Carapace** 81 cm. = 32·4 inches; and **Height of Carapace from floor when not moving** 58 cm. = 23·2 inches. When lettering the plates (before writing this article) I simply took these measurements, and this accounts for the words **50 inch** on Plates LIII and LIV. I cannot understand the wide discrepancy of  $4\frac{1}{2}$  inches, even when it is taken into account that Dr. Bolau's measurements were effected during life; for, unlike my large *daudinii*, the marginals are not produced, and so there could only be from  $\frac{1}{2}$  to  $\frac{3}{4}$  of an inch difference between the nuchal plate and the front edge of the first marginal, even if we suspect the straight length to have been taken from front of first marginal. The ♀ is, I believe, still alive.

### **Testudo daudinii** Dum. and Bibr.

(Plates XLI.—XLVIII.)

*Testudo daudinii* Dumeril and Bibron, *Erpét. Gén.* ii, p. 123 (1835) (East Indies); Günther, *Gig. Land-Tort.* p. 33 pls. iv., v. (1871); Sauzier, *La Nature*, 45, pp. 273-275 (1895); Id., *Compt. Rend.* 1895 part 2, p. 430; Bolau, *Zool. Gart.* 36, pp. 353, 354 (1896); Rothsch. *Nor. Zool.* iii, p. 90 (1896); Id., *Nor. Zool.* iv, pp. 407, 408, pl. XIII. (1907).

*Type specimens.*—The type specimen is a complete skeleton in the Museum of Comparative Anatomy in Paris, and the scutes of the same individual mounted on a wire frame in the Musée d'Histoire Naturelle in the same grounds.

*Distribution.*—If, as I am convinced, the wild tortoises on South Aldabra are identical with *daudinii*, this species or race is the only one of the Indian Ocean races still in existence in a wild state. There appear to be a few hundreds still in dense scrub on the South Island.

To prevent future misunderstandings, I may draw attention here to the fact that some of the semi-domestic tortoises from the Seychelles have been turned down on the "North and West Islands" of Aldabra.

*Material.*—Besides the type, in Paris there are at least two other specimens which I, personally, consider to be *daudinii*. The British Museum possesses an adult ♂ (see Pls. XLI., XLII.) which was presented by Lord Derby. There is a half-grown ♂ in the Liverpool Museum (see Pls. XLIII. and XLIV.) of which a cast is at Tring; I have at Tring also a ♂ and ♀ collected by Dr. Voeltzkow on Aldabra, and the gigantic ♂ from Egmont Island, Chagos Archipelago, bought from Mr. Leopold Antelme.

*Diagnosis.*—Nuchal plate present; gulars paired; third cervical vertebra biconvex; front of carapace normally not declivous (but large ♂ has first

vertebral sharply declivous) not much lower than middle; height at nuchal plate more than 33% (35–36%) of straight length; difference between percentages of heights at third vertebral and nuchal plate more than 12% (15–18%); carapace hardly at all dome-shaped, more saddle-backed, long and narrow, very broad anteriorly, width between second and third marginals more than 55% (56–65%); front and hind marginals much everted and very strongly produced, forming a deeply imbricated margin; length over curve much less than 140% (126–128%); height to marginals variable, 4–9%; size very large, adult ♂♂ 35.25 to 52.25 inches; plastron very long, greatest percentage 90%; plates entirely smooth or, when half grown, very faintly striated; scutes on head and forelegs flat and level with surface of skin.

*General Remarks.*—This tortoise has a very great though melancholy interest above the rest of the **Seychelles and Aldabra-Madagascar** group in being the only one of which a few individuals still linger in a wild state. The few still living in South Island, Aldabra, owe their existence to the fact that there never has been a permanent settlement on Aldabra, and more especially to the dense scrub and mangrove fringe on the island. For difficulties of present search and field notes see Dr. A. Voeltzkow in *Zoologischer Garten*, vol. 37, p. 30 (1896).

Nos. 147 and 148 are the adult pair collected by Dr. Voeltzkow, of which the ♀ (the only **recorded** ♀) is an extremely old animal. This ♀ at first sight appears not to belong to *daudinii*, as the vertical “middle height” is **more** than **half** the “straight length.” It must, however, be remembered that this is the only ♀ of which the measurements are recorded, and that in both *elephantina* and *gigantea* ♀♀ are much more dome-shaped and show an average greater “middle height” than ♂♂. The gigantic ♂, No. 184, which I purchased from Monsieur Antelme, was known on the Chagos Archipelago many years previously to the definite colonisation of the Egmont Islands, in or about 1800–5, by Monsieur Victor Duperrel. It lived with a female (which died in 1894) on the Ile aux Lubines, and was brought to Mauritius by Mr. Antelme in May 1895. I purchased it (♂) in 1897, and it lived in the London Zoological Gardens till 1899, when it died of old age. I am figuring the Nos. 148 and 184, the ♂ in the British Museum, and the half-grown ♂ from Liverpool, on Pls. xli.—xlviii. The discrepancy between the actual straight length and that given in *Novitates Zoologicae*, 1897 (p. 408), is due from that measurement having been taken while alive and from front of first marginal suture. The lettering on the Plates xlv. and xlvi. (56 inches) is due to an error.

### **Testudo goufféi** Rothschild.

(Plates LXV., LXVI.)

*Testudo goufféi* Rothschild, *Noe. Zool.* xiii, pp. 753, 754 (1906) (Thérèse Island).

*Type specimens.*—The type was obtained for the Tring Museum by Messrs. Gouffé and James, after the first of whom it is named. It was living on Thérèse Island, St. Anne's Channel, Seychelles Archipelago; but although I am convinced that it came either from the Seychelles Archipelago or Farquhar Island, I now doubt if it originated on Thérèse Island itself, as that was one of the few islands where the tortoises had been exterminated long before 1760.

*Distribution.*—This tortoise was indigenous either to one of the Seychelles or the surrounding islands. It certainly did not come from Aldabra, as the projecting scutes on head and forelegs, the very sharp and deep striation, and



TESTUDO ABINGDONI GÜNTHER.

FEMALE. (No. 27)

(TRING MUSEUM)







TESTUDO ABINGDONI GÜNTHER.

FEMALE. (No 27)





TESTUDO GALAPAGOENSIS BAUR.

(No. 39)





TESTUDO GALAPAGOENSIS BATH.  
(No. 39)





TESTUDO GALAPAGOENSIS BAUR.  
(SCARBOROUGH MUSEUM)







TESTUDO GALAPAGOENSIS BAUR.  
(SCARBOROUGH MUSEUM)





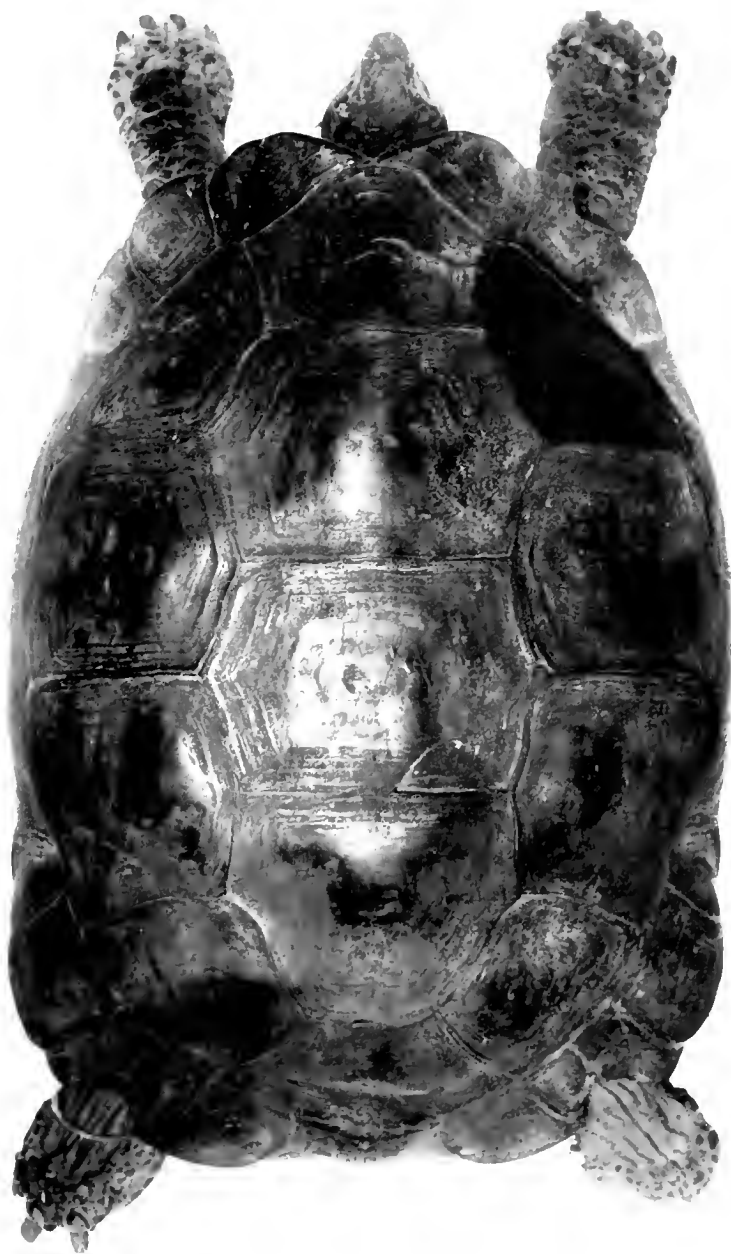
TESTUDO GALAPAGOENSIS BAUR.  
(No. 40)





TESTUDO GALAPAGOENSIS BAUR.  
(No. 40)





TESTUDO CHATHAMENSIS VAN DENB.

(No. 41)

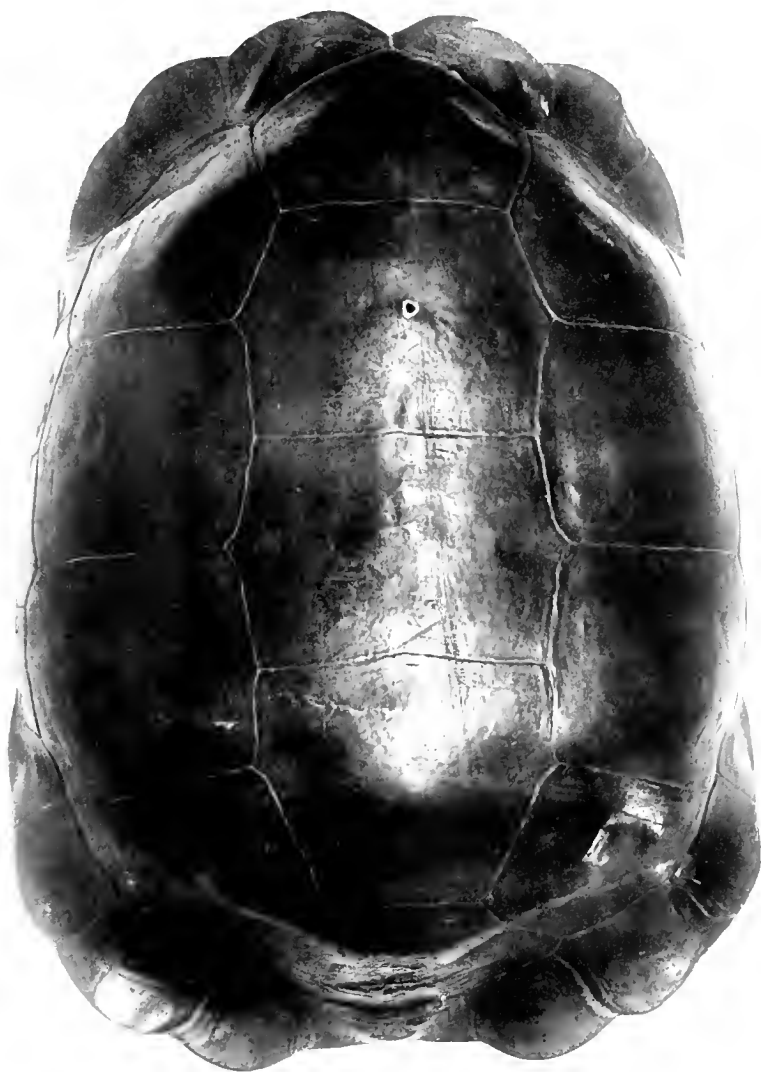






TESTUDO CHATHAMENSIS VAN DENB.  
(No. 41)





TESTUDO WALLACEI ROTHSC.

(No. 42)





TESTUDO WALLACEI ROTHSC.

(No. 42)



INDIAN OCEAN ISLANDS OFF THE NORTH COAST OF MADAGASCAR



ALDABRA.  
(ADMIRALTY CHART, NO. 71B, PUBLISHED 1879)







1



4



3



2

1, 2 TESTUDO VOSMAERI SCHÖEPPF (BRITISH MUSEUM)

3, 4 TESTUDO MADAGASCARIENSIS VAILLANT ♀ (BRITISH MUSEUM)



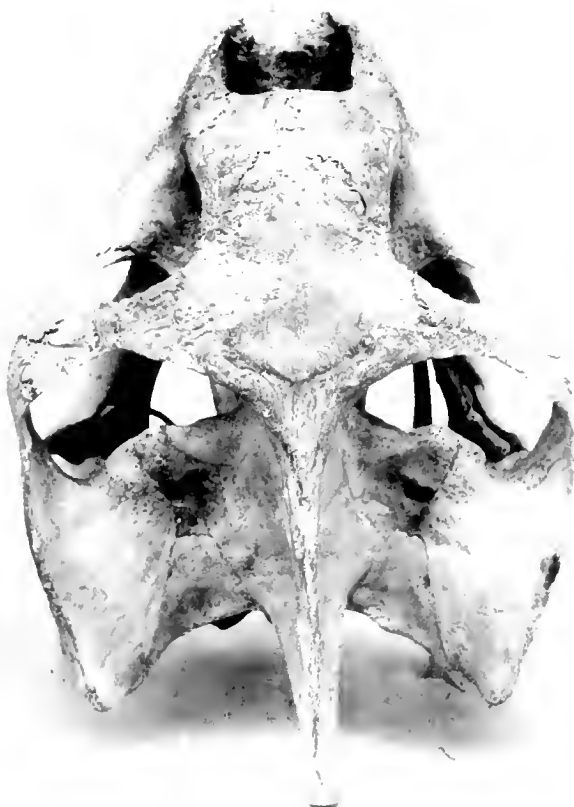


TESTUDO ELEPHANTINA DUM. & BIER.

4 9 INCH MALE

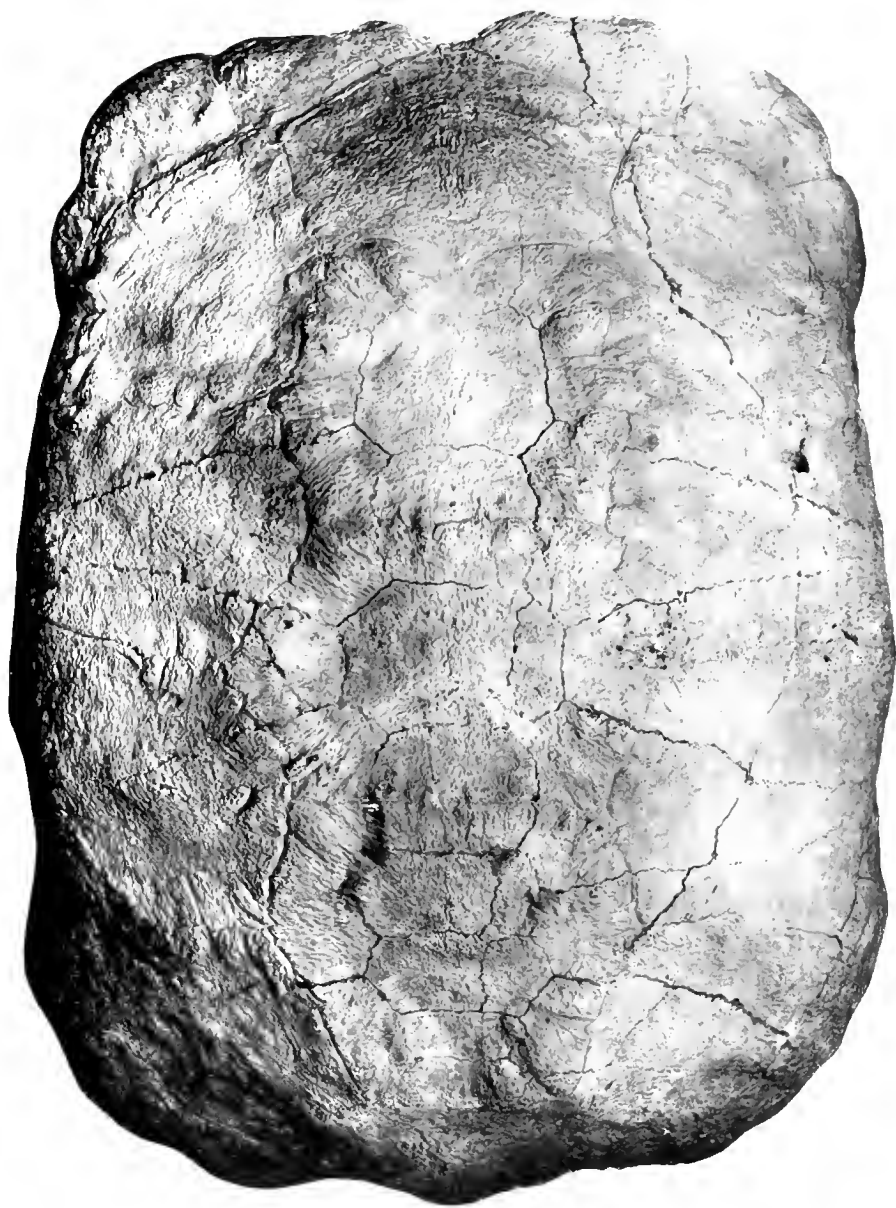
(BRITISH MUSEUM)





TESTUDO DARWINI VAN DENB. ♂  
(TRING MUSEUM)





TESTUDO GRANDIDIERI VAILLANT.

MALE

(BRITISH MUSEUM)







TESTUDO GRANDIDIERI VAILLANT.

MALE  
(BRITISH MUSEUM)





TESTUDO SUMEIREI SAUZ.

MALE

(TRING MUSEUM)





TESTUDO SIMEIREI SAUZ.

MALE

(TRING MUSEUM)

LESLIE L. MUSEUM, MUSEUM, 1904





TESTUDO DAUDINII DUM. & BIBR.

MALE

(BRITISH MUSEUM)







TESTUDO DAUDINII DUM. & BIER.

MALE

BRITISH MUSEUM





TESTUDO DAUDINII DUM. & BIBR.

HALF GROWN MALE

(LIVERPOOL MUSEUM)



PLATE XLV.

**Testudo daudinii.**

Read "52.25 inches," and *not* "56 inches in straight length."





TESTUDO DAUDINII DUM. & RIBR.

56 INCHES IN STRAIGHT LENGTH

MALE





PLATE XLVI.

**Testudo daudinii.**

Read "52.25 inches," and *not* "56 inches in straight length."





TESTUDO DAUDINII DUM. & BIBR.

56 INCHES IN STRAIGHT LENGTH

MALE





TESTUDO DAUDINII DUM. & BIER.

FEMALE

CAPTURED WHILE ON SOUTH ISLAND, MARIANA





TESTUDO DAUDINII DUM. & BIER.  
CAPTURED WILD ON SOUTH ISLAND, ALDABRA







TESTUDO ELEPHANTINA DUM. & BIER.

49 INCH MALE

(BRITISH MUSEUM)





TESTUDO ELEPHANTINA DUM. & BIER.

49 INCH MALE  
(BRITISH MUSEUM)





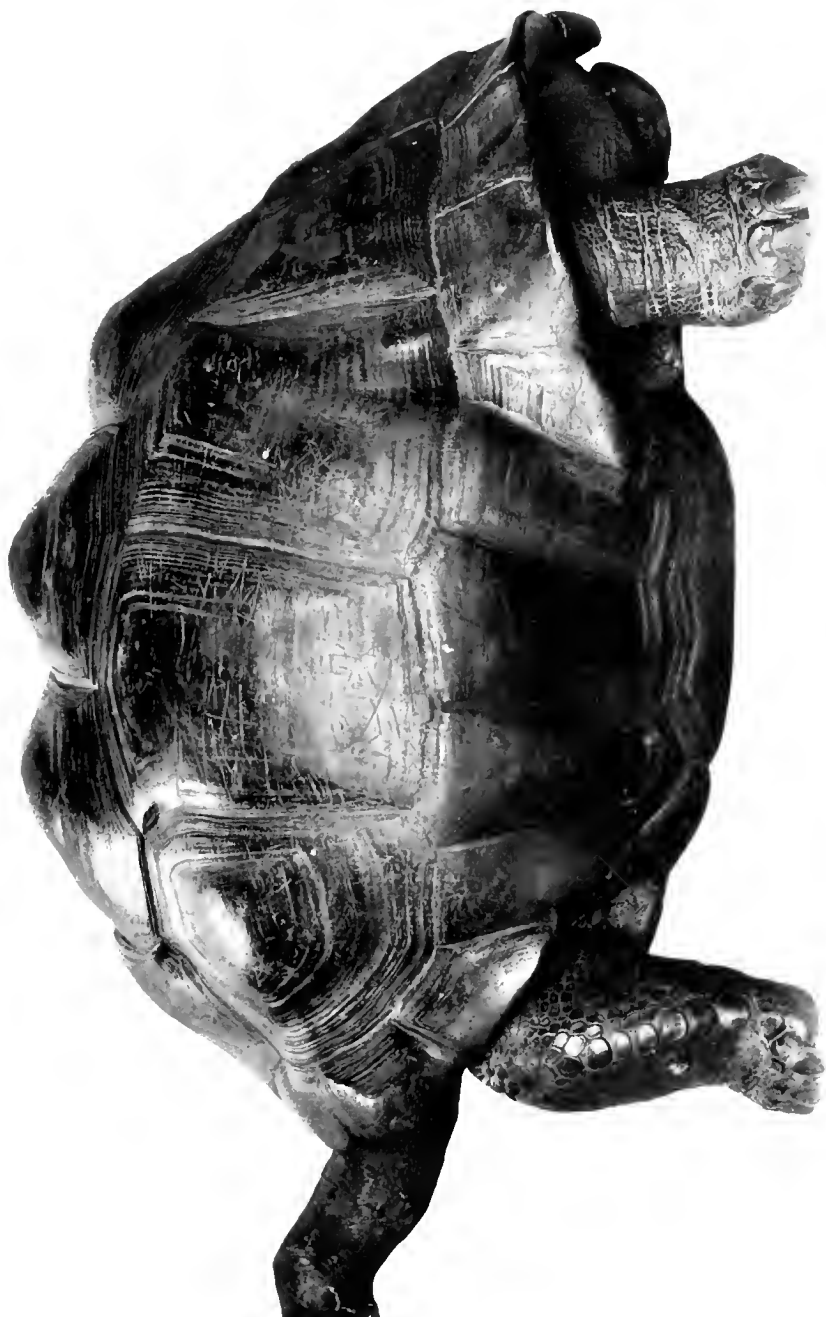
TESTUDO ELEPHANTINA DUM. & BIBR.

CERF ISLAND, SEYCHELLES

MALE

(TONG. MUSTANG)





TESTUDO ELEPHANTINA DUM. & BIRR.

CERF ISLAND, SEYCHELLES

MALE

(TRING MUSEUM)





PLATE LIII.

Read "**Testudo daudinii** × **Testudo elephantina** 45·5-inch male," and *not*  
"**Testudo elephantina** 50-inch male."





TESTUDO ELEPHANTINA DUM. & BIBR.

50 INCH MALE BROUGHT TO HAMBURG BY PROFESSOR BRAUER

(TRING MUSEUM)



PLATE LIV.

Read "**Testudo daudinii** × **Testudo elephantina** 45-inch male," and *not*  
"**Testudo elephantina** 50-inch male."





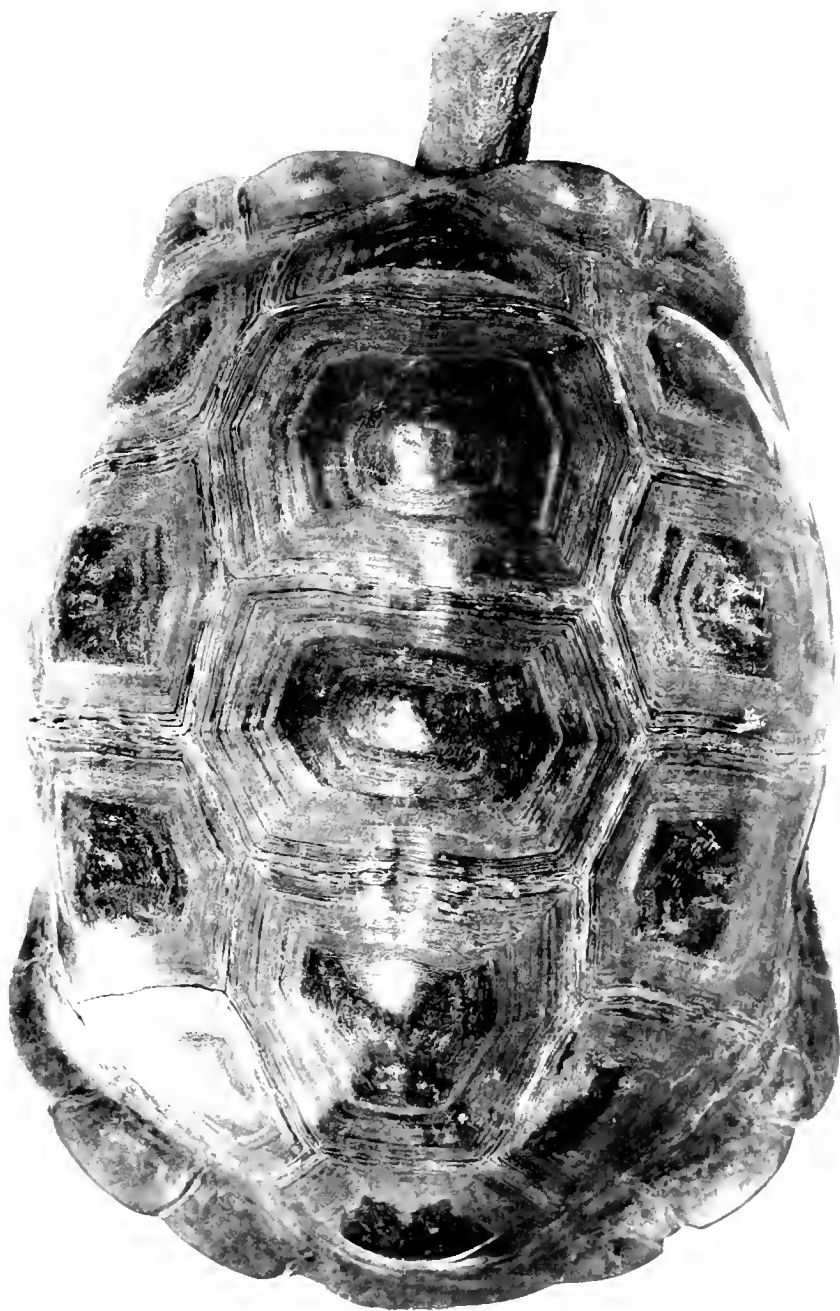
TESTUDO ELEPHANTINA DUM. & BIBR.

50 INCH MALE BROUGHT TO HAMBURG BY PROFESSOR BRAUER

(TRING MUSEUM)



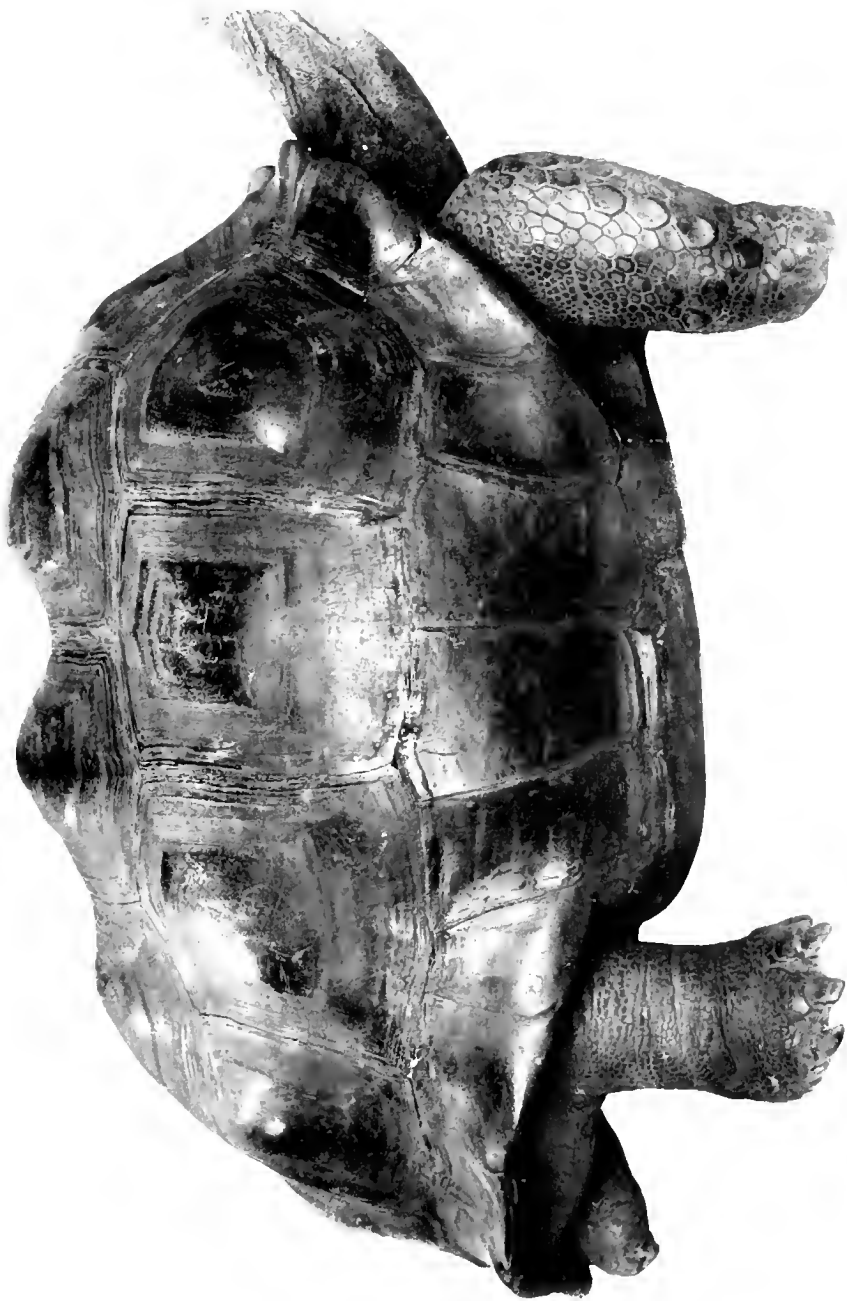




TESTUDO ELEPHANTINA DUM. & BIER.

MALE





TESTUDO ELEPHANTINA DUM. & BIERR.

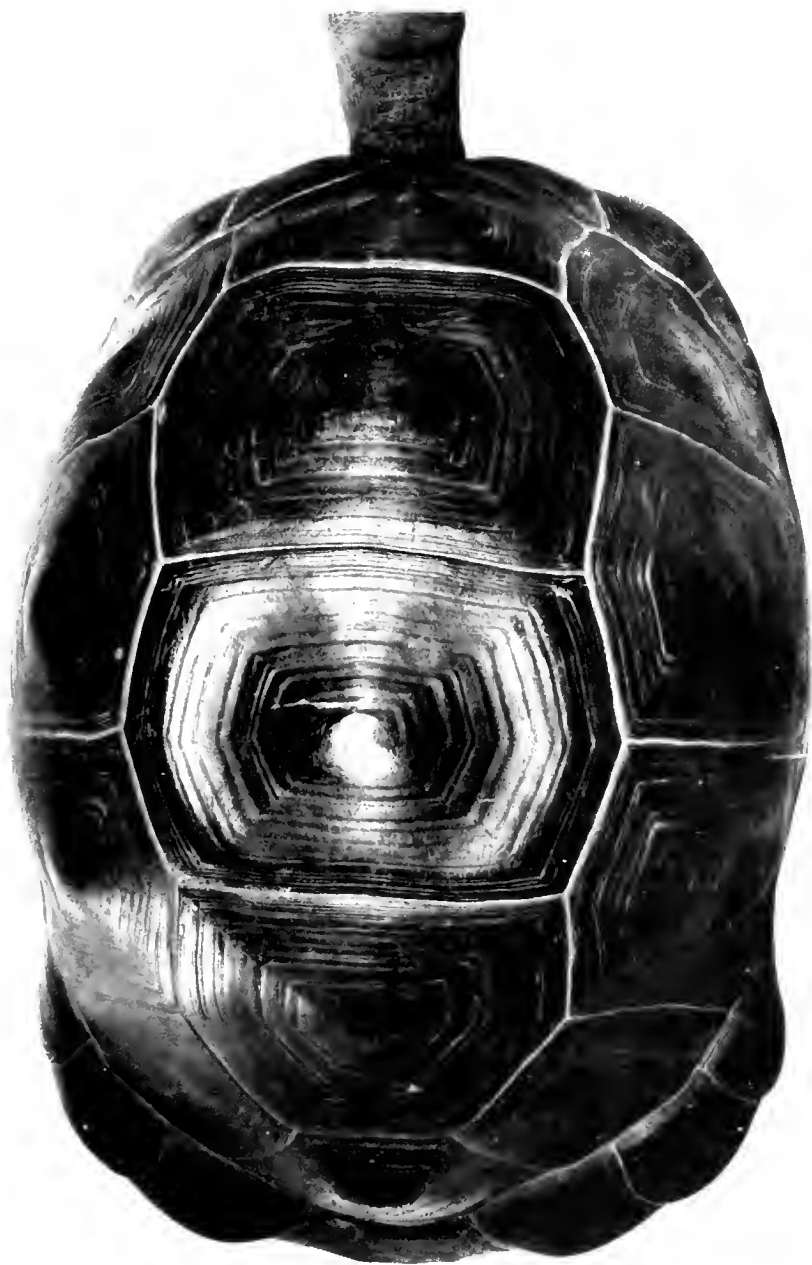
MALE  
(TIDING MUSEUM)



PLATE LVII.

Read "**Testudo species ?**" *not* "**Testudo elephantina.**"





TESTUDO ELEPHANTINA DUM. & BIBR.

FEMALE

(TOWN HUSTON)





PLATE LVIII.

Read "**Testudo species ?**" *not* "**Testudo elephantina.**"





TESTUDO ELEPHANTINA DUM. & BIER.  
FEMALE  
(TRING MUSEUM)



PLATE LIX.

Read "**Testudo daudinii** × **Testudo gigantea**," *not* "**Testudo gigantea**."





TESTUDO GIGANTEA SCHWEIG.

MALE

(TRING MUSEUM)





PLATE LX.

Read "**Testudo daudinii** × **Testudo gigantea**," *not* "**Testudo gigantea**."





TESTUDO GIGANTEA SCHWEIG.  
MALE

(ITALIA, ALCANTARA)

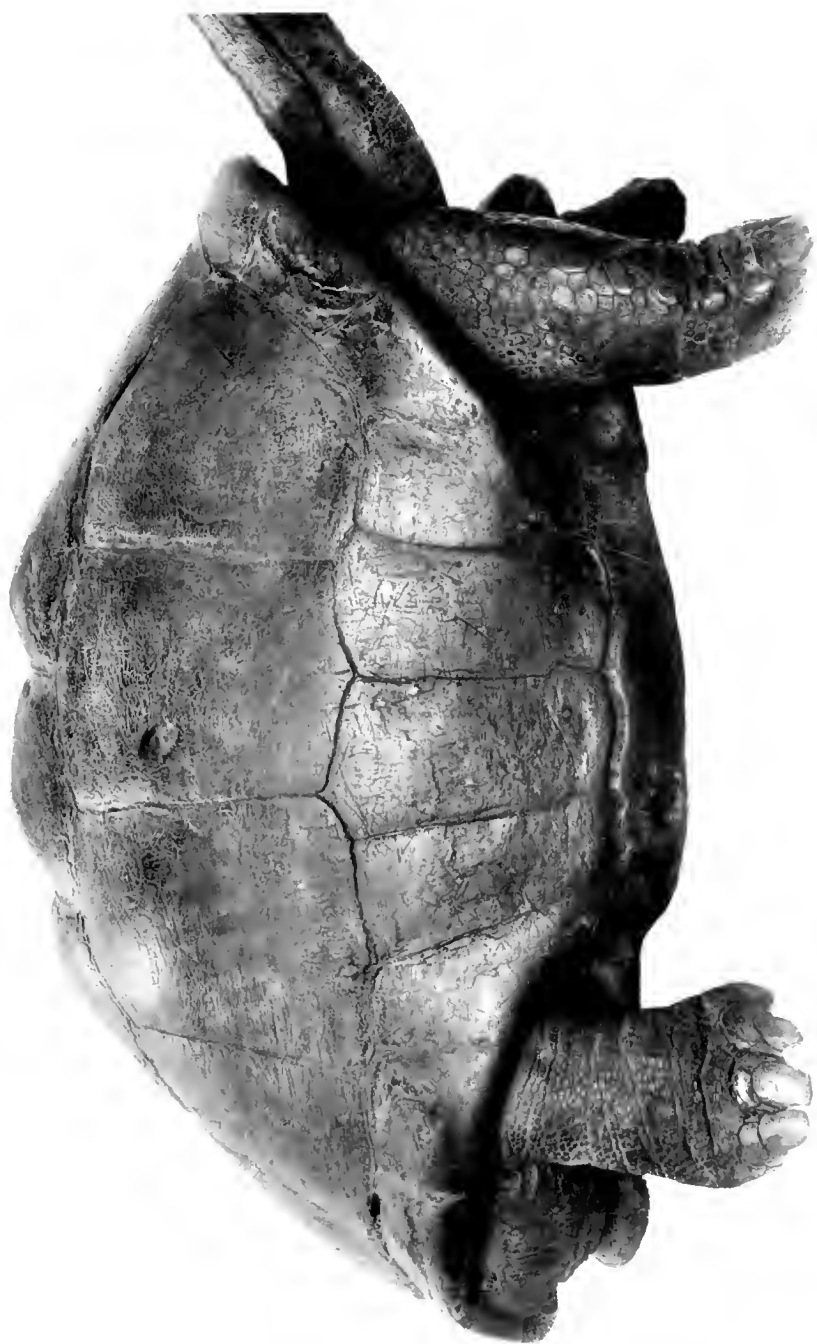




TESTUDO GIGANTEA SCHWEIG.

VERY OLD MALE





TESTUDO GIGANTEA SCHWEIG.

VERY OLD MALE

ITALICUS MUSEUM







TESTUDO GIGANTEA SCHWEIG.

FEMALE





TESTUDO GIGANTEA SCHWEIG.

FEMALE

(TRING MUSEUM)





TESTUDO GOUFFÉI ROTHSC.

THÉRÈSE ISLAND, SEYCHELLES

MALE. TYPE





TESTUDO GOUFFÉI ROTHCHILD.  
THÉRÈSE ISLAND, SEYCHELLES  
MALE. TYPE  
(TRING MUSEUM)







TESTUDO SPEC. P  
(TRING MUSEUM)





TESTUDO SPEC. P.  
(TRING MUSEUM)





TESTUDO SPEC. P  
(LIVERPOOL MUSEUM)





TESTUDO SPEC. P  
(LIVERPOOL MUSEUM)







TESTUDO PELTASTES DUM. & BIER.  
(BRITISH MUSEUM)





TESTUDO PELTASTES DUN. & RIBB.  
(BRITISH MUSEUM)





TESTUDO INEPTA GÜNTH.

(No. 43)





TESTUDO INEPTA GÜNTH.







FRONT PORTION OF PLASTRON OF TESTUDO GADOWI VAN DENR.

SHEWING FORKED GULAR

(TRING MUSEUM)





TESTUDO (COLOSSOCHELYS) ATLAS FAULKNER.

GULAR PROCESSES OF PLASTRON  
(BRITISH MUSEUM. TYPE)



horn-yellow colour of the scutes show it to be quite different from *elephantina* or *daudinii*. Its great size makes me almost certain that it came from Farquhar Island, as the tortoises there were famed for their size.

*Material*.—Only the type is known: this is mounted in the Tring Museum, the scutes and skin on a cast carapace, and the skeleton entire.

*Diagnosis*.—Nuchal plate present; gulars paired; third cervical biconvex; front of carapace not sharply declivous in front, lower than the middle; height at nuchal plate more than 35% of "straight length" (38%); difference between percentages of heights at third vertebral and nuchal plate, 15%; carapace dome-shaped, oval, very wide anteriorly, width at juncture of second and third marginals more than 50% (57%); front marginals somewhat everted, projecting horizontally, hind marginals strongly everted, both produced: length over curve less than 135% (133%); length over curve 4% more than width over curve; height to marginals, medium 7%; size, large, 45.5 inches; scutes of carapace pale horn-yellow; scutes of head and forelegs strongly raised and projecting well away from skin (during life resembling those of *T. calcarata*, but not hard or horny, so have become smaller and less prominent on dried skin); plates extremely deeply striated.

*General Remarks*.—This tortoise is highly interesting as indicating a possibility that the Indian Ocean Giant Tortoises had a continental African origin, i.e. a common ancestor together with the present-day *calcarata*, possibly the fossil *Testudo ammon* Andrews from the Fayoum. The discrepancy of four inches in the measurements here given, and those given on p 754 of *Novitates Zoologicae*, xiii. (1906), is due to the length measurements being taken, in the latter case, to front edge of post-marginal, and breadth over curve to lower edge of plastral bridge.

### ***Testudo sumeirei* Sanz.**

(Plates xxxix., xl.)

*Testudo sumeirei* Sanzier, *La Nature*, 39, pp. 395-398 (1892); Rothschild, *Nor. Zool.* vi, pp. 359, 360 (1899); Gadow, *Trans. Zool. Soc. Lond.* xiii. p. 318 (1893).

*Type specimens*.—The type is the old blind ♂ still living in the Artillery Barracks, Port Louis, Mauritius. There is one adult ♂ in the Tring Museum, sent from Mauritius by Monsieur Leopold Antelme, and one other besides the type is still on Mauritius. A large ♂ sent to the Zoological Society in 1833, by Sir Charles Colville, has disappeared, and a second one, received a few years later, also appears to have been lost.

*Distribution*.—These five tortoises, known in Mauritius as the Marian Tortoises, were brought from the Seychelles to Mauritius in 1766 by the Chevalier Marion de Fresne. As Monsieur Sanzier distinctly proves that indigenous tortoises existed in the Seychelles down to as late as 1826, it is almost certain that *Testudo sumeirei* was indigenous on one of the islands of the Seychelles Archipelago.

*Material*.—At present there appears to be only the single ♂ in the Tring Museum available for study.

*Diagnosis*.—Nuchal plate absent; gulars paired; third cervical vertebra biconvex; front of carapace declivous, much lower than middle; height at nuchal plate more than 30% (34%) of "straight length"; difference between percentages of heights at nuchal plate and third vertebral, 66%; carapace entirely flat in vertebral region, long, oval, sharply declivous only in front, very wide anteriorly, width at juncture of second and third marginals more than 50% (51%); front and hind marginals not everted and not produced; length over curve 131%; height

to marginals small,  $3\frac{1}{2}\%$ ; size, large, 37.5-40 inches (living type given as 40 inches in straight line): plastron medium  $75\%$ ; plates smooth.

*General Remarks.*—There is not much to be said about this tortoise, as the recorded individuals are very few in number, and all at the time of recording in captivity. It appears probable that they came from one of the islands of the Seychelles, where the tortoises had been quite early almost exterminated, otherwise the Chevalier Marion de Fresne would not have taken them to Mauritius as gifts, to where down to 1826 large numbers of tortoises were shipped as food from the Seychelles.

#### **Testudo species?**

(Plates LXVII., LXVIII.)

*Specimen.*—The only known specimen is the young ♂ at Tring, No. 183.

*Distribution.*—Nothing is known as to the habitat of this tortoise. It was said by Hagenbeck to have been taken in German East Africa, but this is most unlikely.

*Diagnosis.*—No nuchal plate; gulars paired; front of carapace declivous, much lower than middle; height at nuchal more than  $33\%$  of "straight length" ( $35\%$ ); difference between heights at third vertebral and nuchal plate  $20\%$ ; carapace entirely flat on vertebral region, sharply declivous all round, short and wide, very wide anteriorly; width at junction of second and third marginals much more than  $50\%$  ( $54\%$ ); front and hind marginals not everted and not produced; length over curve  $136\%$ ; height to marginals large,  $7\%$ ; plates smooth.

*General Remarks.*—Unless brought from the islands and escaped, it is most unlikely that a "gigantic Land-Tortoise" should be captured on the mainland of Africa. This is probably a hybrid between *gigantea* and *sumeirei*.

#### **Testudo species?**

(Plates LVII., LVIII. (lettered as *elephantina*) and LXIX., LXX.)

*Specimens.*—I place here two specimens, first a large ♂ marked Liverpool Derby Museum on Table of measurement, p. 440, belonging to the Liverpool Museum, and a ♀ No. 173 in the Tring Museum. The very different percentages of "middle height," straight width, and width over curve are accounted for by the more dome-shaped carapace in the case of ♀♀.

*Distribution.*—The origin of the Liverpool Museum specimen is quite unknown; No. 173 was imported alive from the Seychelles.

*Material.*—In addition to the two mentioned above I have seen two specimens of this form, the property of the Calcutta Museum; and the large tortoise for so many years kept alive in Ceylon was also of this form.

*Diagnosis.*—Nuchal plate present or absent; gulars paired; third cervical vertebra biconvex; front of carapace somewhat declivous, lower than middle, height at nuchal plate in ♂ less than  $30\%$  ( $24\%$ ), in ♀ more than  $30\%$  ( $35\%$ ) of straight length; difference between percentages of heights at third vertebral and nuchal plate in ♂  $24\%$ , in ♀  $25\%$ ; carapace flat in vertebral region, depressed in ♂, very deep in ♀, very wide anteriorly, width at junction of second and third marginals more than  $53\%$  (♂  $57\%$ , ♀  $54\%$ ); front marginals not everted, hind ones projecting somewhat outwards and upwards; length over curve, ♂  $125\%$ , ♀  $142\%$ ; height to marginals medium,  $6-7\%$ ; size medium,  $32.65-40.25$  inches; plastron moderately long,  $75-85\%$ ; plates with moderate striation; scutes on head and forelegs flat and level with skin.

*General Remarks.*—These tortoises stand somewhat in between *sumeirei* and *elephantina*; the 3 ♂♂ I have seen and the old Ceylon specimen have all nuchal plates, while the ♀, No. 173, has no nuchal plate. Whether they are hybrids or not I am unable to decide; but, beyond the ♀, No. 173, which, as before stated, came from the Seychelles alive, the origin of the other four is absolutely unknown.

***Testudo grandidieri* Vaill.**

(Plates XXXVII., XXXVIII.)

*Emys gigantea* Milne-Edwards, ex Grandidier in lit., *Compt. Rend.* 1868, Part 2, p. 1167.

*Testudo grandidieri* Vaillant, *Compt. Rend.* 1885, Part 1, pp. 874-77; Boulenger, *Trans. Zool. Soc. Lond.* xiii. pp. 395-11, pls. XXXIX.-XLI. (1893).

*Type specimens.*—Two almost complete carapaces, remains of four others, and a few bones in the Paris Museum collected in 1868 at Etséré by the late Alfred Grandidier; one almost complete skeleton and carapace of a ♀; two complete carapaces and a few bones of ♂♂ in the British Museum, collected by Last at or near Nossi Bey; two complete carapaces and some bones of ♂♂ in the Tring Museum, collected by Last in same place; and a complete carapace in the Museum of the California Academy of Sciences, also collected by Last.

*Distribution.*—Northern Madagascar; only known in semi-fossil condition.

*Material.*—Only the eight carapaces and the bones and pieces mentioned above are on record.

*Diagnosis.*—Nuchal plate present; gulars paired; third cervical vertebra biconvex: front of carapace not at all declivous in front, little lower than the middle; height at nuchal plate more than 33% (34-35%) of "straight length"; difference between the percentages of heights at third vertebral and nuchal plate more than 9% (10-13%); carapace very depressed, flat on vertebral region, very thick, orbicular, extremely wide anteriorly, width at junction of second and third marginals more than 58% (59-61%); front and hind marginals not everted, produced, very thick, length over curve not more than 128% (127-128%); vertical height to marginals fairly large, 7-8%; length of plastron medium, greatest percentage 87% (no plates or skin); size large, 36.75-48.4 inches.

*General Remarks.*—These tortoises are remarkable, in that, while having the flat vertebral region of *T. sumeirei*, they have the most depressed shell of any Giant Land-Tortoise. They are found intermixed with the bones of *Hippopotamus*, *Aepyornis*, and *Crocodilus robustus*, but only the last named survives in a living state on Madagascar.

***Testudo abrupta* Vaill.**

*Testudo abrupta* Milne-Edwards, ex Grandidier in lit., *Compt. Rend.* 1868, Part 2, p. 1167. (Nom. nud.)

*Testudo abrupta* Vaillant, *Compt. Rend.* 1885, Part 1, pp. 874-77.

*Type specimens.*—An imperfect carapace and some bones collected in 1868 at Amboulitsaté by the late Alfred Grandidier, in the Paris Museum.

*Distribution.*—Central Madagascar; only known in a semi-fossil state.

*Material.*—Only the above-mentioned carapace and bones are on record.

*Diagnosis.*—Nuchal plate (?); gulars paired; front of carapace strongly declivous, much lower than middle; carapace strongly dome-shaped, almost semi-circular, costals flat and vertical; carapace abruptly declivous all round; front and hind marginals not everted and not produced; general shape like *Testudo radiata*.

*General Remarks.*—Shows ancestral affinity to *radiata*.

# TESTUDO GIGANTEA Schweigg.

Number.	Sex.	Straight.		Over curve.		Width and height marginals.		Height.		Height to marginals.	Per cent.	Plastron. cent.
		Length.	Width.	Length.	Width.	Length.	Per cent.	Per cent.	Front.			
139	♂	16.5	30	60	129.0	59.75	129.0%	25.5	58.0%	24.65	53.0%	35.25
179		32	21.85	42	131.0	44	137.0%	16.5	52.0%	17.1	53.0%	25.5
176		27.75	21.25	37.25	134.0	41	148.0%	13.25	41.0%	15.85	57.0%	23.25
149		34	24	45.25	133.0	45.5	131.0%	18.5	54.0%	18.5	51.0%	26.25
156	♀	31.25	22.25	41.25	132.0	42.25	135.0%	17.75	57.0%	16.9	54.0%	27
174		31	23.25	43	139.0	43.5	140.0%	17.25	50.0%	17.3	56.0%	26
182		29.75	20.75	39.25	132.0	40.5	136.0%	14.75	49.0%	16.25	55.0%	25
155		29.75	20.25	39	131.0	39.5	133.0%	17.25	58.0%	15.5	52.0%	24.75
180		26	18.5	36.5	140.0	36	138.0%	15	58.0%	14.9	57.0%	21
175		23.5	16.75	32	136.0%	33.5	143.0%	12	53.0%	14.2	60.0%	20.75
												88.0%

## TESTUDO DAUDINII × TESTUDO GIGANTEA

143	♂	43.25	27.5	69.5	140.0%	52.25	121.0%	24.5	57.0%	21.4	49.0%	33.5	77.0%
140	♂	40.5	26.5	53.5	132.0%	48	119.0%	22.25	55.0%	19.8	49.0%	32.25	80.0%

## TESTUDO ELEPHANTINA × TESTUDO GIGANTEA

171	♂	34	24.85	45.5	134.0	49	141.0%	19.75	58.0%	21.5	63.0%	27.5	81.0%
181		31	23.75	43.5	140.0	45	145.0%	15.5	50.0%	18.8	61.0%	24.5	79.0%
160		31	21.75	43	139.0	44.25	143.0%	17	55.0%	18.4	59.0%	26	84.0%
170		30	22	39	130.0	40.5	135.0%	15.5	52.0%	16.8	56.0%	22	73.0%
163	♀	28	21	39.75	142.0	42.75	153.0%	15.75	56.0%	17.15	61.0%	24.5	87.0%
141		5.8	4.8	6.25	108.0%	6.25	108.0%	2.5	4.0%	2.8	48.0%	4.25	73.0%
162		29.25	20.5	38.75	132.0%	41.6	142.0%	15.5	53.0%	17	58.0%	24	82.0%



TESTUDO ELEPHANTINA Dum. & Bibr.

	♂ ♂										♀ ♀									
	169	172	177	178	184	185	186	187	188	189	190	191	192	193	194	195	196	197	198	199
40-5	26-25	65%	52	128%	49-25	122%	20-5	51%	20-4	50%	12-35	30%	2-8	7%	29	72%				
39-5	28	71%	55-25	140%	55-5	141%	22	55%	23-5	59%	13-7	35%	2-4	6%	31	78%				
38	28-25	74%	52	137%	54	142%	21-5	57%	20-3	53%	14-2	37%	1-3	3%	31	82%				
36-75	25-25	69%	49	133%	46	125%	19-75	54%	18-7	51%	11-9	32%	1-8	5%	28-75	78%				
36	28	78%	50-5	140%	51-5	143%	20-75	58%	21-45	60%	12-6	35%	2-7	7%	32-5	90%				
35-5	24	68%	48	135%	46-25	130%	19-5	55%	19-7	55%	11-9	34%	2-5	7%	29	76%				
32-75	24	73%	45-75	140%	47-75	146%	17-25	53%	19-7	55%	12	36%	2-3	6%	27-75	85%				
32-25	23-75	74%	45-5	141%	45-75	142%	18	56%	18-3	57%	10-8	33%	1-6	5%	26	81%				
28-75	19-75	69%	39-75	138%	40	139%	16-25	57%	17-325	60%	10-125	35%	2-05	7%	23-5	82%				
22-25	16-5	74%	30	135%	32	144%	12-25	55%	13-4	60%	8-5	38%	1-6	7%	20	90%				
15	10-5	70%	19-25	128%	19	127%	9	60%	8-2	55%	4-95	33%	1-4	9%	13	87%				
30-5	22	72%	41-25	135%	42-25	139%	15	49%	17-5	57%	10-2	33%	1-7	6%	25-25	83%				
30	22	73%	39	130%	40-5	139%	16-5	55%	16-8	56%	9-6	32%	1-55	5%	24-25	81%				
21-25	16	75%	29	136%	31-4	148%	11	52%	12-9	61%	7-6	36%	1-3	6%	18-5	87%				
21-25	16-5	78%	29	136%	30-5	144%	11-75	55%	12-1	57%	7-55	36%	1-6	8%	18-5	87%				
21	16-25	77%	28	133%	30-5	145%	11-25	54%	11-2	53%	7-4	35%	1-1	5%	20	95%				
19-75	13	66%	25-75	130%	25-75	130%	9-5	48%	10-4	53%	6-6	33%	1-3	7%	16-5	84%				
19-5	14-5	74%	25-35	130%	26-25	135%	9-75	50%	11-4	58%	7-15	37%	1-7	9%	18	92%				
19-25	13-25	69%	25	130%	24-25	120%	9-5	49%	10-1	53%	5-4	28%	1-4	7%	17-5	91%				
16	11-5	72%	20-75	130%	21	131%	8-75	55%	9-3	58%	6-2	39%	1-3	8%	14-75	92%				

TESTUDO DAUDINII X TESTUDO ELEPHANTINA

142	♂	45-5	30-25	66%	61	134%	54-25	119%	26-75	59%	22-35	49%	19-65	43%	3-2	7%	31-5	76%
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TESTUDO DAUDINII Dum. & Bibr.

184	♂	52-25	36-75	70%	66	126%	61	117%	34	65%	26	50%	19	36%	4-7	9%	47	90%
147	♂	35-25	23-5	67%	45	128%	44-5	126%	19-75	56%	17-6	50%	12-45	35%	2-2	6%	27	77%
148	♀	33-25	22	66%	42	126%	41-25	133%	20	60%	18-1	51%	12-2	37%	1-2	4%	25-5	77%

TESTUDO GOURÉI Rothsch.

Number.	Sex.	Straight.		Over curve.			Width 2nd and 3rd marginals.	Height.			Height to marginals.	Per cent.	Plastron.	Per cent.		
		Length.	Width.	Per cent.	Length.	Width.		Per cent.	Per cent.	Middle.					Front.	Per cent.
114	♂	45.5	32.75	72.0%	60.5	133.0%	58.75	129%	24.2	53%	17.3	38%	3.1	7%	36	79%

TESTUDO SUMERETI Sauz.

145	♂	37.5	26	69%	49.1	131%	49	131%	19.25	51%	12.9	34%	3.2	9%	28	75%
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TESTUDO SPECIES?

183	♂	14.75	11.25	76%	20	136.0%	21	142%	8	54.0%	8.15	55.0%	5.1	35.0%	1	7.0%	12.5	85%
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TESTUDO SPECIES?

Liverpool Derby Museum 173	♂	40.25	28	70%	50.25	125%	50.5	125%	23.1	57%	19.15	48%	9.8	24%	2.5	6%	30	75%
	♀	32.5	23.75	73%	46	142.0%	8	148.0%	17.65	54%	19.65	60.0%	11.7	36%	1.7	5%	27.75	85%

TESTUDO GRANDIERI Vail.

1a	♂	41.75	30.5	73%	53	127.0%	52.5	126%	24.75	59%	18.35	44%	14.2	34%	3.5	8%	33	80%
2a	♂	36.75	29.25	80%	47	128.0%	49	133%	22.5	61%	17.65	48%	12.95	35%	2.7	7%	32	87%

## SOME NOTES ON MASCARENE TORTOISES.

**Testudo peltastes** Dum. & Bibr.

(Plate LXXI., LXXII.)

Dr. Günther and Mr. Boulenger have treated this as the young of *Testudo cosmaeri*, which, however, I consider is erroneous. Already Leguat in his narrative of Rodriguez states there were three species of Tortoise on Rodriguez, and since the discovery of a complete ♂ mounted of *T. cosmaeri*, it became easier to compare the type of *peltastes* (a carapace with scutes) with typical *cosmaeri*. Professor Vaillant has done so, and finds that *peltastes* is quite distinct. I have also examined the **so-called young** carapaces of *cosmaeri* in the British Museum, and find they are completely adult with the sutures entirely ancylosed. The carapace of *peltastes* is dome-shaped and not constricted in the anterior third, while the carapace of *cosmaeri* is constricted in the anterior third and saddle-backed.

**Testudo commersoni** Vaill.

This tortoise was described by Vaillant from one of many very accurate drawings accompanying Commerson's Journal, and is the third species from Rodriguez.

**Testudo indica** Schoepf.

Professor Vaillant, after carefully tracing the history of the type of this species (a carapace with scutes), has ascertained that it came from the island of Bourbon (Réunion).

**Testudo gadowi** Van Denb.

(Plate LXXV.)

Dr. Gadow proposed the name of *güntheri* for certain front halves of plastra from Mauritius with forked gulars, but the name being preoccupied, Dr. Van Denburgh renamed the species *gadowi*. Dr. Gadow was of opinion that these plastra proved that Dr. Günther's classification into three groups of the gigantic Land-Tortoises broke down, for while the latter diagnosed the Mascarene forms as having a single gular, these plastra from the Mare aux Songes proved that a form occurred on Mauritius with a double gular and fourth cervical vertebra biconvex, as in the Galapagos forms. If Plate LXXV. is consulted, which shows one of these plastra belonging to the Tring Museum, it will be seen that the forked gular is very similar to that of the colossal 10-foot-long fossil *Colossochelys atlas* of the Siwalik Hills (Plate LXXVI.). This shows that these plastra belong to a tortoise of a much older epoch allied to the Siwalik species. Although they were found in the Mare aux Songes, they must have worked up through the mud from an older geological stratum, and therefore do not affect the problems connected with our three groups of gigantic Land-Tortoises at all.

**Testudo inepta** Günth.

(Plates LXXIII, LXXIV.)

The Tring Museum possesses a carapace without plastron, and five or six skulls of *inepta*; the skulls are very long and narrow. The carapace measures: "straight" length, 21.79 inches; width, 12.6; "over curve" length, 24.5; width, 26; width between second and third marginals, 10. The fourth vertebral is strongly embossed "*bombé*."

---

ERRATA IN PLATES.

Plates LIX., LX., should read **T. daudinii** × **T. gigantea**, NOT *T. gigantea*.

Plates LIII., LIV., should read **T. daudinii** × **T. elephantina** 45.5-inch male, NOT *T. elephantina* 50-inch male.

Plates XLV., XLVI., should read **52.25 inches**, NOT 56 inches in straight length.

Plates LVII., LVIII., should read **Testudo species ?** NOT *Testudo elephantina*.

---



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# LEPIDOPTERA

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