S. 320

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NOVITATES ZOOLOGICAE.

VOL. XXXV, 1929–30.

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.

VOL. XXXV, 1929–30.

(WITH TEN PLATES.)

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1929–1930

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NOVITATES ZOOLOGICAE

Vol. XXXV. JANUARY 1929. **No. 1.**

DESCRIPTIONS OF NEW SPECIES OF NOCTUIDAE.

BY A. E. WILEMAN, F.E.S., AND R. J. WEST.

THE specimens were collected by A. E. Wileman in Japan, Formosa and the Philippine Islands. All types are in the Wileman Collection. Ridgway has been used as the standard for colours. Colour terms in italics are not Ridgway's. Patagium = collar-tippet. Tegula = wing-base-cover.

SUBFAMILY **AGROTINAE.**

1. **Agrotis tamsi** sp.n.

Female.—Palpus russet mixed with fuscous black, third segment drab. Antenna with paired setae. Head: frons and vertex russet and fuscous black mixed. Thorax with hair-scales of pale drab grey and fuscous, patagium russet anteriorly, warm velvety blackish brown posteriorly, divided by a drab grey line, tegula russet tinged with blackish brown. Abdomen fuscous above and beneath with some drab grey on side, anal tuft warm buff tinged with fuscous. Pectus warm buff tinged with fuscous. Legs: foreleg drab grey outwardly, fuscous inwardly, tarsus tinged with fuscous; mid- and hindlegs fuscous with drab grey marks on tibiae, tibiae spined.——Forewing: a band of warm buff tinged with russet on costa; orbicular pale drab grey tinged with russet, reniform two bars of russet tinged with fuscous, outlined with pale drab grey; a large patch of warm velvety blackish brown in and below cell, fuscous tinged with russet along inner margin; an oblique drab grey fascia from subcosta antemedially to anal vein subbasally; antemedial fascia and claviform faintly marked; postmedial fascia blackish brown and pale drab grey, crenulate (points distad); subterminal area warm buff tinged with fuscous, subterminal fascia wavy, russet, commencing with a blackish brown patch on costa, termen russet; hindwing fuscous.——Underside: forewing drab grey suffused with fuscous, postmedial fascia faintly marked; hindwing drab grey suffused with fuscous, postmedial and subterminal fasciae faintly marked.

Expanse 42 mm. (Tip to tip 40 mm.)

Holotype. Female.—Arizan, Formosa, 7,300 ft., 23.iii.1908.

Nearest ally.—*A. mandarina* Leech (West China).

We have much pleasure in dedicating this species to Mr. W. H. T. Tams, of the Entomological Department, British Museum (Natural History), from whom we have received great assistance in determining and naming new species from Formosa, Japan and the Philippine Islands.

SUBFAMILY **CUCULLIINAE.**

2. **Cosmia citrago** Linn. subsp. **japonago** subsp.n.

Male.—Palpus buff-yellow. Antenna dentate fasciculate. Head: frons and vertex buff-yellow. Thorax, patagium and tegula buff-yellow tinged with orange posteriorly. Abdomen buff-yellow above and beneath, anal tuft buff-yellow tinged with orange. Pectus light buff. Legs buff-yellow.——Forewing buff-yellow irrorated with orange; subbasal fascia wavy, orange; antemedial fascia orange, oblique to subcosta, sharply angled outwardly and oblique to inner margin: orbicular and reniform faintly outlined with orange; an oblique fuscous fascia slightly excurved, from costa medially to inner margin antemedially; postmedial fascia a thin fuscous line excurved to vein 2, then incurved to inner margin; fringe on inner margin and termen fuscous; hindwing cartridge-buff tinged with buff-yellow on veins and inner margin.——Underside: fore- and hind-wings cartridge-buff tinged with buff-yellow.

Expanse 36 mm. (Tip to tip 35 mm.)

Holotype. Male.—Junsai Numa, prov. Oshima, Hokkaidō I. (Yezo), Japan (plains), 13.viii.1903.

The antenna of subspecies *C. citrago citrago* Linnaeus from Europe is bifasciculate, whilst that of subspecies *C. citrago japonago* is biserrate-fasciculate with sessile fascicles of cilia. Mr. W. H. T. Tams has been kind enough to examine the genitalia of the two subspecies and has discovered that they differ. The harpe in *C. citrago citrago* is club-shaped, but that of *C. citrago japonago* is acuminate.

This seems to be the first subspecies of *C. citrago* so far discovered out of Europe, and is quite new to Japan.

SUBFAMILY **ACRONYCTINAE.**

3. **Trachea lucipara** sp.n.

Male.—Palpus upturned, smoothly scaled with fuscous black and russet, tinged with dark perilla purple. Antenna finely ciliated, with paired setae. Head: frons and vertex russet tinged with dark perilla purple. Thorax russet, patagium and tegula russet mixed with fuscous black tinged with dark perilla purple. Abdomen russet tinged with dark perilla purple, with warm buff hair-scales faintly tinged with purple covering the basal segments, venter russet tinged with dark perilla purple, anal tuft light buff tinged with light salmon-orange. Pectus russet tinged with dark perilla purple. Legs: tibiae fuscous black mixed with cartridge buff tinged with dark perilla purple, tarsal segments fuscous black, light salmon-orange at joints.——Forewing hessian brown; subbasal fascia consisting of two wavy fuscous black lines to median fold; antemedial fascia two faintly marked fuscous black excurved lines; claviform faintly marked with fuscous black, orbicular outlined with fuscous black and warm buff, reniform outlined with fuscous black on basal side, and a warm buff patch on distal side; postmedial fascia faintly outlined with fuscous, excurved to vein 4, then slightly incurved to inner margin: three warm buff spots on costa near apex, and a warm buff patch suffused with hessian brown at apex; subterminal fascia sagittate (points basad): cilia a mixture of hessian brown and fuscous; underside light buff suffused with hessian brown on upper half, two fuscous patches, one

on costa near base, the other occupying cell ; postmedial and subterminal fasciae fuscous, and a triangular fuscous patch at the commencement of subterminal near apex, this patch is outlined with light buff and has in it two light buff points on costa.——Hindwing light buff suffused with hessian brown, faint postmedial and subterminal fasciae ; underside light buff tinged with hessian brown on upper half, postmedial and subterminal fasciae fuscous, fuscous spot on discocellulars.

Expanse 36 mm. (Tip to tip 32 mm.)

Holotype. *Male*.—Baguio, subprov. Benguet, Luzon I., Philippines, 5,000 ft., 2.vi.1913.

Nearest ally.—*T. consummata* Wlk. (type from Ceylon).

4. **Trachea securifera** sp.n.

Male.—Palpus wood-brown mixed with fuscous. Antenna ciliated, with paired setae, shaft fuscous, at basal third each segment ringed with wood-brown. Head : frons warm buff with dark perilla purple band just below the bases of antennae, vertex wood-brown. Thorax covered with wood-brown scales tipped with pale olive-buff, patagium natal brown anteriorly, bordered with wood-brown posteriorly, tegula brownish drab. Abdomen brownish drab above and beneath, and clothed with hairs on sides, anal tuft brownish drab. Pectus light buff tinged with purple drab. Legs brownish drab, tarsal segments fuscous, tarsal joints vinaceous buff.——Forewing verona-brown, all fasciae wavy, and outlined with fuscous black, orbicular and claviform incompletely outlined with fuscous black ; reniform bordered by triangular fuscous black patch basad, and pale gull-grey patch distad, extending to costa ; three drab grey spots on costa between postmedial and apex ; pale gull-grey points on veins postmedially, and a sprinkling of pale gull-grey scales on anal vein between antemedial and postmedial fasciae, a fuscous black streak from postmedial to termen between veins 2 and 3, with a brownish drab dot in its centre ; underside light buff tinged with purple, slightly opalescent near inner margin, fuscous postmedial and subterminal fasciae, with light buff between at costa, two light buff spots on costa near apex.—— Hind-wing light buff suffused with fuscous ; underside light buff suffused with purple on upper half, fuscous on discocellulars, and fuscous postmedial and subterminal fasciae.

Expanse 34 mm. (Tip to tip 33 mm.)

Holotype. *Male*.—Haights' Place, Pauai, subprov. Benguet, Luzon I., Philippines, 7,000 ft., 9.xi.1912.

Paratype. *Male*.—Haights' Place, Pauai, subprov. Benguet, Luzon I., 7,000 ft., 8.xi.1912.

Nearest ally.—*T. consummata* Wlk. (type from Ceylon).

5. **Trachea peridela** sp.n.

Female.—Palpus wood-brown mixed with warm sepia. Antenna ciliated, with paired setae. Head : frons warm buff with natal brown just below bases of antennae, vertex warm buff and natal brown mixed. Thorax natal brown tipped with warm buff, patagium natal brown with a line of light buff across the centre, tegula natal brown mixed with a few light buff scales. Abdomen warm

buff tinged with brownish drab, brownish drab dorsal crest, venter brownish drab. Pectus light buff tinged with natal brown; legs brownish drab mixed with warm sepia, tarsi ringed at the joints with vinaceous buff.——Forewing natal brown to warm sepia, subbasal fascia warm buff edged with velvety blackish brown, antemedial fascia wavy, ill-defined warm buff outwardly edged with velvety blackish brown; orbicular outlined with velvety blackish brown, a small pearl grey spot at basal edge; reniform outlined with velvety blackish brown, bordered by pearl-grey patch distally, with smaller spots above and below this patch; claviform outlined with velvety blackish brown; postmedial fascia warm buff edged with velvety blackish brown (the distal edge having some small pearl-grey spots), excurved from veins 5 to 2, slightly incurved to inner margin; a sprinkling of pearl-grey scales on anal vein between antemedial and postmedial fasciae, four velvety blackish brown streaks from postmedial to termen, between veins 2 and 6, through which a broken warm buff subterminal line passes, breaking up the streaks into sagittate marks; underside light buff tinged with vinaceous russet, glossy, a fuscous spot on discocellulars, a straight (except at costa) fuscous postmedial band, and a faintly marked subterminal band.——Hindwing light buff suffused with fuscous; underside light buff, upper third irrorated, outer third suffused, with warm sepia to fuscous, and tinged with vinaceous russet, with a fuscous spot on discocellulars, a wavy fuscous postmedial band, and a diffuse fuscous subterminal band.

Expanse 42 mm. (Tip to tip 39 mm.)

Holotype. *Female*.—Haights' Place, Pauai, subprov. Benguet, Luzon I., Philippines, 7,000 ft., 20.xi.1912.

Paratype. *Female*.—Haights' Place, Pauai, subprov. Benguet, Luzon I., Philippines, 7,000 ft., 12.i.1912.

Nearest ally.—*T. consummata* Wlk. (type from Ceylon).

6. **Trachea discisignata** sp.n.

Male.—Palpus light buff mixed with wood-brown and fuscous. Antenna ciliated, with paired setae. Head: frons and vertex warm buff tinged with wood-brown. Thorax warm buff, patagium warm buff tinged with wood-brown, a fuscous line across the middle, tegula warm buff tinged with wood-brown posteriorly, with a few fuscous black hair-scales at middle. Abdomen warm buff tinged with wood-brown, venter warm buff, anal tuft light ochraceous buff. Pectus warm buff. Legs warm buff tinged with wood-brown, tarsal segments fuscous, joints warm buff.——Forewing warm buff shaded with wood-brown, all fasciae wavy, faintly outlined with fuscous, orbicular finely outlined with fuscous black, reniform outlined with fuscous black, filled with white and fuscous to fuscous black, claviform wide, filled with fuscous and outlined with fuscous black; an oblique fuscous band from costa medially, to termen near tornus, slightly down-curved and broken in middle below cell, cilia warm buff with fuscous interneurally; underside cartridge buff tinged with cinnamon drab, slightly opalescent along inner margin, fuscous on discocellulars, postmedial and subterminal fasciae faintly marked with fuscous, cartridge buff between at costa, faint triangular fuscous patch in which are two cartridge spots on costa at commencement of subterminal.——Hindwing cartridge buff, veins fuscous, fuscous irroration in subterminal area, cilia cartridge buff; underside cartridge buff, wood-brown

on discocellulars, postmedial and subterminal fasciae faintly indicated in wood-brown.

Expanse 38 mm. (Tip to tip 36 mm.)

Holotype. Male.—Haights' Place, Pauai, subprov. Benguet, Luzon I., Philippines, 7,000 ft., 12.i.1912; and three paratypes, all males.

Nearest ally.—*T. consummata* Wlk. (type from Ceylon).

7. **Data rhabdochlaena** sp.n.

Male.—Palpus cartridge-buff, chocolate above. Antenna minutely ciliated, with paired setae, the latter hardly longer than the cilia. Head: frons and vertex covered with a mixture of cartridge-buff and chocolate. Thorax with patagium and tegula, wood-brown mixed with chocolate. Abdomen cinnamon buff, with chocolate dorsal crests on basal segments, venter shell-pink streaked with wood-brown and chocolate, anal tuft wood-brown tinged with chocolate. Pectus cinnamon-buff. Legs wood-brown tinged with chocolate.——Forewing wood-brown overlaid with velvety warm blackish brown to velvety blackish brown, the veins streaked with drab grey; subbasal fascia white, in two outward curves to median fold; antemedial fascia white edged with fuscous black, excurved to vein 1, then sharply curved back to inner margin; postmedial fascia white inwardly edged with fuscous black, wavy, excurved to vein 4, then slightly oblique to inner margin; subterminal a white zigzag line bordered by fuscous black to vein 5, sharply dentate to termen at veins 4 and 3, then wavy to inner margin; orbicular marked by a down-curved white line tinged with shell-pink, the area inside the curve filled with fuscous black, reniform marked by oblique white bars tinged with shell-pink, fuscous between; a white spot in angle formed by veins 4 and 5, with a smaller white spot below, between veins 3 and 4; underside warm buff suffused with wood-brown, postmedial band narrow, fuscous, crenulate; a subterminal line of pale drab-grey dashes.——Hindwing cinnamon-buff, with wide border of army-brown on termen; underside warm buff, bordered along costa and termen with a mixture of wood-brown and shell-pink with chocolate irroration, fuscous on discocellulars, postmedial line crenulate, fuscous.

Expanse 38 mm. (Tip to tip 35 mm.)

Female.—Similar to male.

Expanse 38 mm. (Tip to tip 36 mm.)

Holotype. Male.—Klondyke, subprov. Benguet, Luzon I., Philippines, 800 ft., 7.iv.1912.

Allotype. Female.—Klondyke, subprov. Benguet, Luzon I., Philippines, 800 ft., 8.iv.1912.

Paratype. Two Males.—Klondyke, subprov. Benguet, Luzon I., Philippines, 800 ft., 22.iii and 7.iv.1912.

Nearest ally.—*D. callopistrioides* Moore (India).

8. **Callopistria tytha** sp.n.

Female.—Palpus wood-brown mixed with pale drab-grey. Antenna minutely ciliated, with very short paired setae. Head: frons and vertex chocolate and pale drab-grey mixed, occiput warm buff. Thorax: patagium drab grey anteriorly, chocolate posteriorly, tegula warm buff tinged with wood-brown. Abdomen drab grey, venter pale drab-grey with chocolate irrorations and streaks,

anal tuft warm buff tinged with ochraceous orange. Pectus pale drab-grey. Legs: pale drab-grey, foreleg pale drab-grey streaked with chocolate, tarsi wood-brown.——Forewing basal area chocolate, medial area russet shaded with chocolate, subterminal area chocolate, veins light drab; an oblique pale drab-grey fascia from costa at one-third, to median nervure subbasally; an oblique fascia of two white lines with chocolate between, from costa slightly beyond middle to inner margin at one-third a shorter oblique fascia of two white lines with chocolate between from costa at a third, joining the previous fascia at right angles, on median nervure; orbicular irregular, outlined with white, filled with chocolate; reniform: oblique white bars, between which is a small elongate patch of cameo pink; a faint pale drab-grey postmedial fascia excurved to vein 2, then incurved to inner margin; a narrow subterminal zigzag white fascia from costa to vein 5, then pronounced and oblique to termen at vein 4, incurved to inner margin; a fine white fascia near termen, termen light drab, cilia fuscous; underside drab, drab-grey along costa, subterminal fascia of pale drab-grey dashes, drab-grey on inner margin, a pale drab-grey patch on costa postmedially, and two pale drab-grey points on costa near apex.—— Hindwing upperside drab-grey suffused with fuscous, fringe cartridge buff with a fuscous line running through it; underside pale drab-grey with scattered fuscous scales below costa, a fuscous lunule on discocellulars, fuscous postmedial and subterminal fasciae, marked strongly at costa, the remainder faint.

Expanse 24 mm. (Tip to tip 23 mm.)

Holotype. *Female*.—Klondyke, subprov. Benguet, Luzon I., Philippines, 800 ft., 17.iv.1912.

Nearest ally.—*E. aethiops* Butl. (type from Japan).

9. **Chytonix olethria** sp.n.

Male.—Head and antennae missing (in type). Thorax, patagium and tegula drab mixed with fuscous black. Abdomen drab mixed with fuscous black above and beneath, anal tuft drab. Pectus and legs drab.——Forewing drab, a large patch of fuscous black at base of wing, as far as antemedial on costa, and postmedial on inner margin, the distal edge oblique from costa to median fold, parallel with inner margin to postmedial; a white quadrate spot at intersection of postmedial and median fold; orbicular and reniform lightly outlined with fuscous black; a triangular fuscous black patch on costa at middle, the point touching orbicular: postmedial a thin fuscous black excurved line, subterminal area suffused with fuscous black; underside drab.——Hindwing: upperside fuscous, underside drab.

Expanse 24 mm. (Tip to tip 22 mm.)

Holotype. *Male*.—Samaji, prov. Awa, Shikoku I., Japan, 22.ix.1896.

Nearest ally.—*C. albipuncta* Hmpsn. (China).

10. **Athetis implacata** sp.n.

Female.—Palpus light buff, natal brown outwardly and above. Head: frons and vertex light buff tinged with natal brown. Thorax, patagium and tegula light buff tinged with natal brown. Abdomen natal brown above and below, anal tuft warm buff tinged with natal brown. Pectus light buff tinged with natal brown. Legs: foreleg natal brown, joints of tarsal segments light

buff : other legs light buff tinged with natal brown, tarsal segments natal brown, joints light buff.——Forewing : ground-colour natal brown, basal part of wing up to orbicular suffused with vinaceous buff ; subbasal, antemedial and postmedial fasciae indicated by a sprinkling of bone-brown scales ; orbicular circular, reniform oval, both large, outlined with light buff edged with snuff-brown ; a suffusion of vinaceous buff extending on each side of postmedial fascia ; subterminal fascia a light buff line edged with snuff-brown, slightly excurved ; interneural bone-brown spots on termen. Hindwing light buff tinged with natal brown, fringe light buff with natal brown line through centre.——Underside : forewing light buff tinged with natal brown, postmedial and subterminal fasciae natal brown ; hindwing cartridge-buff irrorated with natal brown on upper half, a natal brown spot on discocellulars, postmedial fascia natal brown.

Expanse 38 mm. (Tip to tip 37 mm.)

Holotype. *Female*.—Arizan, Formosa, 7,500 ft., 23.viii.1908.

Nearest ally.—*A. placata* Leech (China).

11. **Athetis multilinea** sp.n.

Male.—Palpus thickly sealed, second segment fuscous black, distal third pale drab-grey, third segment pale drab-grey mixed with fuscous black. Antenna minutely ciliated. Head : frons and vertex pale drab-grey mixed with fuscous. Thorax, patagium and tegula pale drab-grey mixed with fuscous. Abdomen pale drab-grey tinged with fuscous above and beneath, anal tuft drab-grey tinged with warm buff. Pectus pale drab-grey. Legs : foreleg coxa and femur pale drab-grey, fuscous above, tibia pale drab-grey speckled with fuscous, tarsal segments fuscous, joints pale drab-grey ; other legs pale drab-grey speckled with fuscous, tarsal segments fuscous, joints pale drab-grey.——Forewing : ground-colour pale drab-grey, subbasal fascia fuscous, excurved to median nervure, antemedial fascia wavy, consisting of two fuscous lines separated by ground-colour ; irregularly crenate fuscous medial shade, orbicular indicated by a fuscous dot, reniform a small warm buff patch outlined with fuscous and fuscous black ; postmedial fascia fuscous, crenulate, excurved ; subterminal area suffused with fuscous in which the fascia is indicated by a wavy shade, interneural spots of fuscous black on termen, fringe pale drab-grey suffused with fuscous ; underside drab, mixed with pale drab-grey along costa, a faint fuscous lunule on discocellulars, and faint postmedial fascia.——Hindwing pale drab-grey, tinged with fuscous on termen and inner margin ; underside pale drab-grey, speckled with fuscous below costa, a fuscous spot on discocellulars and fuscous fascia from vein 6.

Expanse 32 mm. (Tip to tip 30 mm.)

Holotype. *Male*.—Baguio, subprov. Benguet, Luzon I., Philippines, 5,000 ft., 28.iii.1912.

Paratypes. *Two Males*.—Baguio, subprov. Benguet, Luzon I., Philippines, 5,000 ft., 9.vii and 16.xii.1912.

Nearest ally.—*A. bremusa* Swinh. (India, Ceylon, Formosa).

12. **Athetis punctirena** sp.n.

Female.—Palpus army-brown. Antenna with paired setae. Head : frons and vertex army-brown. Thorax, patagium and tegula army-brown. Abdomen fuscous, venter light buff tinged with fuscous. Pectus light buff tinged with

fuscous. Legs: foreleg light buff, fuscous above, tarsal segments fuscous, joints light buff; other legs light buff speckled with fuscous, tarsal segments fuscous, joints light buff.——Forewing army-brown, basal half tinged with vinaceous brown; subbasal fascia faintly marked, excurved to median fold; antemedial fascia a narrow slightly excurved fuscous line; orbicular indicated by a fuscous dot, reniform indicated by a broken outline of white dots, and a warm buff spot on distal side; a fuscous shade medially, postmedial fascia a narrow wavy fuscous line; subterminal fascia a wavy fuscous shade, terminal line light buff with white dots on veins, fringe fuscous. Hindwing cartridge buff tinged with fuscous on veins, subterminal area and along inner margin, fringe light buff.——Underside: forewing light buff irrorated with fuscous below costa, remainder tinged with fuscous, fuscous lunule on discocellulars; hindwing cartridge-buff irrorated with fuscous below costa, on postmedial fascia and termen, fuscous lunule on discocellulars.

Expanse 30 mm. (Tip to tip 28 mm.)

Holotype. *Female*.—Rantaizan, Formosa, 7,500 ft., 9.v.1909.

Nearest ally.—*A. placida* Moore (India, Ceylon, Formosa).

13. **Athetis triangulata** sp.n.

Male.—Palpus pale drab-grey, hair-brown outwardly on basal half of second segment. Antenna minutely ciliated, with paired setae. Head: frons and vertex pale drab grey. Thorax drab, patagium and tegula drab-grey tinged with drab. Abdomen drab-grey tinged with fuscous above and beneath, anal tuft pinkish buff. Pectus pale drab-grey. Legs drab-grey. Forewing drab-grey irrorated with fuscous, fuscous spots on costa subbasally and antemedially; fuscous spot at base of cell, orbicular indicated by a fuscous black dot, reniform by a faint warm buff spot preceded by a few fuscous black scales; a faint fuscous medial shade, a postmedial series of fuscous dots; subterminal broken row of fuscous spots, those between veins 4 and 5, 5 and 6, are larger and merged together forming a conspicuous triangular patch (point basad); underside drab-grey.——Hindwing: upperside and underside *whitish*, underside with a fuscous lunule, fuscous irroration at apex.

Expanse 28 mm. (Tip to tip 26 mm.)

Female.—Similar to male.

Expanse 28 mm. (Tip to tip 27 mm.)

Holotype. *Male*.—Palali, subprov. Benguet, Luzon I., Philippines, 2,000 ft., 24.xii.1912.

Allotype. *Female*.—Sapiangao, subprov. Benguet, Luzon I., Philippines 5,500 ft., 15.xii.1912.

Nearest ally.—*A. bimacula* Wlk. (type from Borneo).

14. **Athetis plumbescens** sp.n.

Male.—Palpus deep mouse-grey, a little pale drab-grey beneath and at junction of second and third segments. Antenna serrate fasciculate, with paired setae. Head: frons fuscous and drab-grey mixed, with a warm buff patch on lower half, vertex fuscous and drab-grey mixed. Thorax drab-grey, patagium fuscous and drab-grey mixed. Abdomen hair-brown, venter drab-grey, anal tuft light buff. Pectus light buff. Legs pale drab-grey and fuscous mixed.——

Forewing: ground-colour drab-grey, all fascia faintly marked in fuscous and accentuated with fuscous black, subbasal wavy, apparently not extending beyond median nervure, antemedial wavy, medial shade excurved at median nervure, postmedial erenulate, excurved to vein 2, incurved to inner margin, subterminal wavy with broken line of dots, two spots between veins 4 and 5, 5 and 6, being much larger than the dots; orbicular indicated by a fuscous dot, reniform by a small light buff patch, a few fuscous scales, and a *whitish* dot at upper angle and another at lower angle of cell; underside drab-grey, pale drab-grey and irrorated with fuscous along costa, paler along inner margin, an indistinct lunule on discocellulars, postmedial and subterminal faseiae faintly indicated in fuscous. — Hindwing semi-hyaline pale drab-grey, veins, termen and inner margin tinged with fuscous; underside pale drab-grey with scattered fuscous scales below costa, a faint lunule on discocellulars, subterminal fascia indicated by faint fuscous streaks on veins.

Expanse 37 mm. (Tip to tip 35 mm.)

Holotype. Male.—Haights' Place, Pauai, subprov. Benguet, Luzon I., Philippines, 7,000 ft., 30.xi.1912.

Nearest ally.—*A. bimacula* Wlk. (type from Borneo).

15. **Elydna sparna** sp.n.

Female.—Palpus sepia basally, pale drab-grey at extremity and inwardly. Antenna with paired setae. Head: frons pale drab-grey, tinged with sepia on upper half, vertex pale drab-grey tinged with sepia. Thorax, patagium and tegula drab-grey tinged with sepia. Abdomen drab above, venter pale drab-grey, anal tuft drab. Pectus pale drab-grey. Legs drab-grey mixed with sepia, tarsal segments sepia.——Forewing pale drab-grey suffused with sepia, the sepia predominating in the distal half of wing; orbicular faintly marked by pale drab-grey and sepia spot, reniform indicated by ill-defined broken outline of pale drab-grey, antemedial fascia a pale drab-grey shade, excurved, outwardly edged with sepia; medial shade angled outwardly to upper edge of cell, then excurved to inner margin, a pale drab-grey postmedial fascia, slightly sinuous, inwardly edged with fuscous; fringe pale drab-grey and sepia mixed, with a narrow edge of pale drab-grey; underside light drab, irrorated with sepia below costa, faint sepia lunule on discocellulars, and postmedial fascia.——Hindwing cartridge-buff with veins streaked with light drab; underside cartridge-buff irrorated with scattered sepia scales below costa, sepia lunule on discocellulars, postmedial fascia indicated by sepia marks on veins.

Expanse 24 mm. (Tip to tip 23 mm.)

Holotype. Female.—Klondyke, subprov. Benguet, Luzon I., Philippines, 800 ft., 1.iv.1912.

Nearest ally.—*E. bipuncta* Snell. (India, New Guinea).

16. **Phragmatiphila agrapta** sp.n.

Female.—Palpus pinkish buff, bone-brown above. Antenna minutely ciliated, with paired setae. Head: frons with rounded prominence, pinkish buff and bone-brown mixed, vertex pinkish buff and bone-brown mixed. Thorax pinkish buff, patagium pinkish buff, tegula pinkish buff with a few bone-brown scales. Abdomen drab-grey above and beneath, anal tuft wood-brown. Pectus

pinkish buff. Legs pinkish buff, foreleg, tarsal segments bone brown, joints pinkish buff.——Forewing pinkish buff tinged with wood-brown, lightly irrorated with scattered bone-brown scales in cell; postmedial faintly marked crenulate bone-brown line, excurved to vein 2, then slightly incurved to inner margin, termen bone-brown; underside pinkish buff, glossy, a faint spot on discocellulars and a faint postmedial fascia.——Hindwing: upperside cartridge-buff; underside cartridge-buff, glossy, a faint spot on discocellulars and a very faint postmedial fascia.

Expanse 30 mm. (Tip to tip 28 mm.)

Holotype. *Female*.—Montalban, prov. Rizal, Luzon I., Philippines, 31.i. 1914.

Nearest ally.—*P. grisescens* Hmpsn. (India).

17. **Phragmatiphila hemicelaena** sp.n.

Male.—Palpus fuscous outwardly, pinkish buff inwardly. Antenna ciliated, with paired setae. Head: frons and vertex pinkish buff tinged with wood-brown. Thorax, patagium and tegula pinkish buff tinged with wood-brown posteriorly. Abdomen pinkish buff, some wood-brown dorsally at base, venter pinkish buff tinged with wood-brown. Pectus pinkish buff tinged with wood-brown. Legs avellaneous speckled with fuscous, fuscous on tarsal segments.——Forewing pinkish buff, lightly irrorated with wood-brown along and below costa, and between veins 6 to 12; a cartridge-buff, wedge-shaped patch (apex basad) at base of cell up to a third, where it breaks into three lines, the upper one as far as two-thirds, the middle one a little longer, and the lower one along the median nervure to just beyond lower angle, remainder of cell filled with avellaneous tinged with wood-brown; a pinkish buff patch tinged with avellaneous near its upper edge, from just beyond cell to subterminal fascia, where it turns obliquely to apex; below median nervure fuscous, from base gradually widening and curving upward towards end of vein 7 to termen, the area between this and inner margin pinkish buff tinged with avellaneous; antemedial fascia faintly marked, wavy, fuscous; postmedial fascia fuscous black, crenulate, excurved to vein 3, then slightly incurved to inner margin; a subterminal series of fuscous dashes, from vein 6 to inner margin, towards which they become obsolescent; interneural fuscous black spots on termen; underside pinkish buff suffused with fuscous in cell, and half-way along veins 2 to 5; fuscous lunule on discocellulars, and fuscous postmedial fascia.——Hindwing pinkish buff tinged with fuscous on veins, on which there is a postmedial series of dashes; underside pinkish buff, fuscous spot on discocellulars, and fuscous postmedial fascia most strongly marked from vein 5 to inner margin, with fuscous on termen interneurally from vein 5 to inner margin.

Expanse 35 mm. (Tip to tip 33 mm.)

Female.—Similar to male, but is paler in colouring, and cilia of antennae shorter.

Expanse 42 mm. (Tip to tip 40 mm.)

Holotype. *Male*.—Baguio, subprov. Benguet, Luzon I., Philippines, 5,000 ft., 23.vi.1913.

Allotype. *Female*.—Baguio, subprov. Benguet, Luzon I., Philippines, 5,000 ft., 3.vi.1912.

Paratype. *Male*.—Klondyke, subprov. Benguet, Luzon I., 800 ft., 16.iii.1912.

Nearest ally.—*P. nigropunctata* Wileman (Formosa).

There is one specimen of this species in the Hill Museum, Witley, Surrey, which was taken in Mindanao Island, Philippine Islands.

18. **Sesamia hemisparacta** sp.n.

Male.—Palpus light buff tinged with fuscous outwardly. Antenna pectinated, pectinations ciliated. Head: frons, lower half light buff, upper half light buff tinged with wood-brown, vertex light buff tinged with wood-brown. Thorax light buff, patagium and tegula light buff with avellaneous. Abdomen light buff mixed with hair-brown, venter light buff, anal tuft pinkish buff. Pectus and legs light buff.——Forewing light buff broadly streaked with avellaneous along and below costa, on median nervure, along inner margin and all the veins; sparsely irrorated with fuscous in cell and distal half of wing; with faint traces of a fuscous postmedial fascia parallel with termen: underside light buff, streaked as above, but more faintly.——Hindwing light buff tinged with avellaneous, postmedial fascia indicated by scattered fuscous scales, underside light buff.

Expanse 35 mm. (Tip to tip 33 mm.)

Holotype. *Male*.—Baguio, subprov. Benguet, Luzon I., Philippines, 5,000 ft., 16.vi.1913.

Nearest ally.—*S. punctilinea* Wilem. (Formosa).

Sub-family **ERASTRIINAE.**

19. **Eublemma marmorata** sp.n.

Female.—Palpus cartridge-buff tinged with drab outwardly. Antenna minutely ciliated. Head: frons and vertex cartridge-buff. Thorax: patagium and tegula cartridge-buff tinged with drab. Abdomen cartridge-buff suffused with fuscous, venter cartridge-buff, anal tuft warm buff. Pectus and legs cartridge-buff.——Forewing drab, antemedially a wavy band of cartridge-buff, postmedial fascia cartridge-buff, commencing at costa as a wide band to lower angle of cell, then continuing as three incurved lines to inner margin; subterminal fascia wavy, cartridge-buff, with a series of fuscous black spots on distal edge at irregular intervals; three fuscous black spots on distal third of costa, and a larger one at apex, a few fuscous black scales on discocellulars; at middle of inner margin a fan of hair-scales. Hindwing cartridge-buff, veins and subterminal area tinged with fuscous, fringe cartridge-buff.——Underside: forewing cartridge-buff irrorated with fuscous on upper half, costa and subterminal area tinged with fuscous black; hindwing cartridge buff irrorated with fuscous below costa and on postmedial and subterminal fasciae.

Expanse, 16 mm. (Tip to tip, 15 mm.)

Holotype. *Female*.—Montalban, prov. Rizal, Luzon I., Philippines, 14.i.1914.

Allotype. *Female*.—Palali, subprov. Benguet, Luzon I., Philippines, 2,000 ft., v.1913.

Nearest ally.—*E. trifasciata* Moore (Bengal, India, Borneo).

20. **Eublemma albostriata** sp.n.

Male.—Palpus pinkish buff. Antenna ciliated. Head: frons and vertex hazel. Thorax: patagium and tegula hazel tinged with liver-brown. Abdomen light drab, venter light buff. Pectus light buff. Legs light buff tinged with hazel.——Forewing hazel, antemedial fascia white, oblique to subcosta, where it is sharply angled, continuing obliquely back to inner margin; a white patch from angle of antemedial to costa joining commencement of postmedial fascia, postmedial fascia white, oblique to vein 5, where it is angled, then incurved to inner margin; a white patch irrorated with hazel at the angle of postmedial between veins 5 and 6, reaching subterminal; subterminal fascia zigzag, white, distally bordered with fuscous black as far as vein 5, then faintly fuscous, wavy to inner margin, a white dash from subterminal at vein 6 to apex; hindwing: basal third cartridge buff, distal two-thirds hazel, a slightly waved white postmedial fascia from vein 6 to near tornus, a very faintly marked fuscous subterminal fascia.——Underside: forewing light buff suffused with hazel on upper half; hindwing light buff tinged with hazel.

Expanse 18 mm. (Tip to tip 16 mm.)

Holotype. Male.—Klondyke, subprov. Benguet, Luzon I., Philippines, 800 ft., 13.iii.1912.

Nearest ally.—E. rubra Hmpsn. (India, Malay, Australia).

21. **Cerynea melanocephala** sp.n.

Male.—Palpus fuscous black. Antenna ciliated, with paired setae a little longer than the cilia. Head: frons and vertex fuscous black. Thorax avellaneous, with fuscous black spot on metathorax, patagium and tegula avellaneous. Abdomen avellaneous, with a dorsal series of fuscous black spots, venter pinkish buff, anal tuft avellaneous mixed with fuscous black. Pectus pinkish buff. Legs: foreleg, coxa, femur and tibia pinkish buff with fuscous black above, tarsi pinkish buff, other legs pinkish buff.——Forewing avellaneous, lightly irrorated with fuscous black, costa warm buff, antemedially two fuscous black spots, one on costa, the other in cell; medially three fuscous black spots, one on costa, the other two in cell; postmedial and subterminal fasciae wavy, faintly marked in a slightly paler shade than ground-colour; a fuscous black spot postmedially between veins 5 and 6, another fuscous black spot subterminally between veins 6 and 7; terminal line crenulate, fuscous black, with spot at points. Hindwing avellaneous, distal half cinnamon drab, postmedial fascia wavy, white, from vein 6 to inner margin, bordered proximally with cinnamon-drab, distally with warm buff, with fuscous black at each end; terminal line crenulate, fuscous black, with spots at points, a small fuscous black spot below middle of cell.——Underside: forewing pinkish buff tinged with fuscous black in subterminal area, a fuscous shade along and below basal half of costa, then curving and crossing wing to inner margin, distal edge crenulate; terminal line crenulate, fuscous black, with spots at points; hindwing pinkish buff, subterminal area tinged with fuscous black, fuscous lunule on discocellulars, postmedial fascia wavy, fuscous, terminal line crenulate, fuscous black, with spots at points.

Expanse 22 mm. (Tip to tip 20 mm.)

Holotype. Male.—Montalban, prov. Rizal, Luzon I., Philippines, 19.i.1914.

Nearest ally.—C. omphisalis Wlk. (Borneo).

22. **Oruza sordida** sp.n.

Female.—Palpus cartridge-buff mixed with fuscous. Antenna minutely ciliated, with paired setae. Head: frons and vertex cartridge-buff tinged with fuscous, occiput fuscous. Thorax: patagium and tegula cartridge-buff suffused with fuscous. Abdomen cartridge-buff suffused with fuscous above and beneath. Pectus cartridge-buff.——Forewing cartridge-buff suffused with fuscous, cartridge-buff and fuscous marks alternately on distal half of costa, postmedial and subterminal fasciae wavy, faintly marked, proximal edge fuscous, distal edge cartridge-buff, fringe fuscous. Hindwing cartridge-buff suffused with fuscous.—— Underside: forewing cartridge-buff suffused with fuscous on upper half; hindwing cartridge-buff irrorated with fuscous below costa and on subterminal area, fuscous lunule on discocellulars.

Expanse 21 mm. (Tip to tip 19 mm.)

Holotype. Female.—Manila, prov. Rizal, Luzon I., Philippines (plains), 7.vii.1912.

Nearest ally.—*O. atriapicata* Hmpsn. (Borneo).

23. **Trogatha adusta** sp.n.

Male.—Palpus warm buff tinged with russet. Antenna ciliated. Head: frons light buff tinged with russet, vertex light buff. Thorax: patagium and tegula light buff. Pectus warm buff. Legs: coxae, femora and tibiae warm buff mixed with russet, tarsi fuscous.——Forewing, termen excised from apex to vein 4, oblique to tornus: warm buff tinged with fuscous below costa and subterminal area, irrorated with scattered fuscous black scales, lightly tinged with russet on lower half of cell: antemedial fascia a short, excurved, fuscous streak from costa to subcosta, and four fuscous tinged russet spots; on discocellulars a faint fuscous-tinged patch with a velvety fuscous black spot at each angle of the cell, edged with fuscous proximally and distally: postmedial fascia fuscous, oblique to vein 7, straight to vein 3, then slightly incurved to inner margin; subterminal fascia a broken, wavy row of fuscous spots; termen fuscous with a small patch of russet at veins 5 and 6. Hindwing light buff, basal half lightly tinged with russet and irrorated with fuscous black below cell, postmedial fascia a wavy light buff line; distal half suffused with fuscous, russet subterminally and on termen, a light buff fringe on inner margin.——Underside: forewing warm buff suffused with russet, a suffusion of fuscous along and below costa, a drab-grey lunule outlined with fuscous black on discocellulars, a warm buff patch between the upper angle of cell and postmedial, another smaller patch between lower angle of cell and postmedial; postmedial fascia russet from veins 8 to 5 where it is suffused with drab-grey to inner margin, a warm buff patch near apex, a border of drab-grey at termen. Hindwing warm buff, basal half tinged with russet, distal half suffused with russet, drab-grey lunule outlined with russet on discocellular, postmedial fascia russet, a border of drab-grey from postmedial to apex and along termen to tornus, light buff on inner margin, a light buff fringe on inner margin.

Expanse 23 mm. (Tip to tip 21 mm.)

Holotype. Male.—Manila, prov. Rizal, Luzon I., Philippines (plains), 28.vii.1912.

Nearest ally.—*T. poecilota* Turner (Australia, New Guinea).

24. **Corgatha costalba** sp.n.

Male.—Palpus warm buff inwardly, wood-brown outwardly. Antenna ciliated, shaft wood-brown, white on basal third. Head: frons warm buff, vertex white. Thorax wood-brown, patagium warm buff anteriorly, wood-brown posteriorly, tegula wood-brown. Abdomen wood-brown, venter light buff, anal tuft warm buff. Pectus light buff. Legs: foreleg warm buff tinged with tawny above, other legs light buff.——Forewing wood-brown, three white spots outlined with fuscous black on costa, subbasally, medially and postmedially; hindwing wood-brown.——Underside: fore- and hindwings light buff, lightly tinged with wood-brown, fuscous on discocellulars.

Expanse 18 mm. (Tip to tip 17 mm.)

Holotype. Male.—Montalban, prov. Rizal, Luzon I., Philippines, 24.iii. 1914.

Nearest ally.—*C. pusilla* Swinh. (Siam).

25. **Protarache annulata** sp.n.

Male.—Palpus fuscous, light buff beneath. Antenna serrate-ciliate. Head: frons light buff tinged with fuscous, and a round corneous plate, vertex light buff tinged with fuscous. Thorax: patagium and tegula light buff tinged with fuscous. Abdomen light buff suffused with fuscous above and beneath, anal tuft light buff. Pectus light buff. Legs light buff, mixed with fuscous above, tarsal segments fuscous, joints light buff.——Forewing, pale drab-grey irrorated with buffy brown from base to antemedial; antemedial fascia excurved to median nervure, oblique to inner margin, pale drab-grey edged distally with buffy brown and blackish brown; area between ante- and postmedial fasciae tinged with blackish brown, a large circular patch faintly outlined with blackish brown, the proximal edge forming a prominent streak on the discocellulars; postmedial fascia pale drab-grey excurved to vein 2, laterally to anal vein medially, then incurved to inner margin; subterminal area light buff suffused with buffy brown, and a blackish brown streak bordering the postmedial fascia from vein 8 to 3; terminal line blackish brown, fringe drab grey with a fuscous line through centre; hindwing fuscous.——Underside: forewing fuscous with some light buff on costa near apex, termen fuscous black; hindwing cartridge-buff irrorated with fuscous, termen fuscous black.

Expanse 20 mm. (Tip to tip 18 mm.)

Female.—Antenna ciliated, similar to male in colouring, but markings are more suffused, the outline of large circular patch not complete.

Expanse 24 mm. (Tip to tip 22 mm.)

Holotype. Male.—Klondyke, subprov. Benguet, Luzon I., Philippines, 800 ft., 20.iv.1912.

Allotype. Female.—Klondyke, subprov. Benguet, Luzon I., Philippines, 800 ft., 8.v.1912.

Nearest ally.—*P. eulepida* Hmpsn. (Ceylon).

26. **Trilophonota tegulata** sp.n.

Female.—Palpus fuscous, light buff inwardly. Antenna ciliated. Head: frons and vertex fuscous. Thorax: patagium and tegula fuscous. Abdomen fuscous, venter light buff, anal tuft warm buff. Pectus light buff. Legs light buff tinged with fuscous, tarsal segments fuscous, joints light buff.——Forewing

pale drab-grey dusted over with fuscous, all fasciae wavy, fuscous; a fuscous shade medially, fringe drab-grey tinged with fuscous; orbicular and reniform faintly outlined with fuscous; hindwing fuscous, fuscous black termen, and some fuscous black at tornus, fringe drab-grey tinged with fuscous.——Underside, fore- and hindwings pale drab-grey suffused with fuscous.

Expanse 18 mm. (Tip to tip 17 mm.)

Male.—Similar to female, but paler in colouring.

Expanse 18 mm. (Tip to tip 17 mm.)

Holotype. Female.—Klondyke, subprov. Benguet, Luzon I., Philippines, 800 ft., 8.v.1914.

Allotype. Male.—Baguio, subprov. Benguet, Luzon, 5,000 ft., 30.v.1913.

The female is selected for the holotype, the male being imperfect, as the head is missing.

Nearest ally.—*T. lamia* Swinh. (Burma).

27. **Hyperstrotia variata** sp.n.

Male.—Palpus light buff mixed with fuscous. Antenna ciliated. Head: frons light buff with a band of fuscous just below the bases of antennae, vertex light buff. Thorax: patagium and tegula light buff tinged with warm sepia, tuft of fuscous black on metathorax. Abdomen light buff suffused with fuscous above and beneath, anal tuft warm buff. Pectus light buff tinged with fuscous. Legs: fore- and midlegs light buff suffused with fuscous, tarsal segments fuscous, joints light buff, hindleg light buff lightly tinged with fuscous.——Forewing: light buff patch at base, its distal edge oblique from costa subbasally to median nervure antemedially, here sharply angled, then oblique to inner margin subbasally, at this point a scale-tooth on inner margin; area from this patch to postmedial light buff suffused with warm sepia, in which is the antemedial fascia, wavy, light buff and fuscous black faintly marked, also a light buff dash on anal vein from antemedial; postmedial fascia oblique to inner margin near tornus, light buff at ends, white in middle, from the white part of postmedial there is a white streak to apex: area below this streak light buff tinged with warm sepia, above light buff tinged with warm sepia in streaks; hindwing cartridge-buff.——Underside: forewing cartridge-buff tinged with fuscous; hindwing cartridge-buff irrorated with fuscous below costa, fuscous spot on discocellulars.

Expanse 20 mm. (Tip to tip 19 mm.)

Female.—Similar to male.

Expanse 21 mm. (Tip to tip 20 mm.)

This species appears to be extremely variable: of the nine specimens before us five are typical, the other four not having the white streak at apex; some do not have the dark patch across the middle of wing, some have it only on upper half of wing, in one case the forewing is plain with fuscous black dashes. Paratypes marked thus (*) are typical.

Holotype. Male.—Baguio, subprov. Benguet, Luzon I., Philippines, 5,000 ft., 24.iv.1912.

Allotype. Female.—Baguio, subprov. Benguet, Luzon I., Philippines, 5,000 ft., 28.v.1913.

**Paratype. Male.*—Baguio, subprov. Benguet, Luzon I., Philippines, 5,000 ft., 20.v.1913.

**Paratype. Male.*—Baguio, subprov. Benguet, Luzon I., Philippines, 5,000 ft., 27.iv.1912.

**Paratype. Male.*—Baguio, subprov. Benguet, Luzon I., Philippines, 5,000 ft., 22.iv.1912.

Paratype. Male.—Baguio, subprov. Benguet, Luzon I., Philippines, 5,000 ft., v.1913.

Paratype. Male.—Baguio, subprov. Benguet, Luzon I., Philippines, 5,000 ft., 26.iv.1912.

Paratype. Male.—Baguio, subprov. Benguet, Luzon I., Philippines, 5,000 ft., 2.vi.1913.

Paratype. Female.—Baguio, subprov. Benguet, Luzon I., Philippines, 5,000 ft., 26.v.1912.

Nearest ally.—*H. macroplaga* Hmpsn. (Ceylon).

SUBFAMILY **SARROTHRIPINAE.**

28. **Characoma casuaria** sp.n.

Male.—Palpus: second segment pale drab-grey, basal half fuscous, third segment pale drab-grey speckled with fuscous. Antenna (description impossible as both are missing in the type). Head: frons pale drab-grey, vertex pale drab-grey tinged with blackish brown. Thorax: patagium and tegula pale drab-grey suffused with blackish brown. Abdomen pale drab-grey tinged with fuscous, venter and anal tuft pale drab-grey. Pectus pale drab-grey. Legs: foreleg pale drab-grey tinged with warm sepia above on tibia and on tarsal segments, other legs pale drab-grey.——Forewing: pale drab-grey tinged dark greyish brown, subbasal fascia, fuscous black, wavy to median fold; antemedial fascia consisting of two, wavy, fuscous black lines, bordered by a shading of warm sepia to just below cell; medially a wide band tinged with dark greyish brown, edged with fuscous black, the proximal edge wavy, bordered by pale drab-grey, the distal edge oblique to vein 6, outwardly angled, then inwardly angled, oblique to vein 4, sharply excurved and oblique to vein 2, excurved to inner margin, a shading of warm sepia beyond; subterminal fascia wavy, dark greyish brown, bordered with pale drab-grey, termen fuscous black, fringe pale drab-grey tinged with fuscous. Hindwing pale drab-grey tinged with fuscous on termen, fringe pale drab-grey.——Underside: forewing fuscous, with three pale drab-grey points on costa near apex, fringe pale drab-grey: hindwing pale drab-grey tinged with fuscous below costa and on termen.

Expanse 22 mm. (Tip to tip 21 mm.)

Holotype. Male.—Haight's Place, Pauai, subprov. Benguet, Luzon I. Philippine Is., 7,000 ft., 1.xii.1912.

Nearest ally.—*C. vallata* Meyr. (Australia).

The medial band resembles somewhat the head of a cassowary.

29. **Characoma latifascia** sp.n.

Female.—Palpus pinkish buff tinged with fuscous above. Antenna minutely ciliated, with paired setae. Head: frons and vertex pinkish buff tinged with fuscous. Thorax: patagium and tegula fuscous. Abdomen pinkish buff suffused with fuscous, venter and anal tuft pinkish buff. Pectus light buff.

Legs: foreleg pinkish buff tinged with fuscous, other legs pinkish buff.——Forewing fuscous with a purple tinge; antemedial fascia a fine mars-brown line, oblique to subcosta, slightly incurved to median fold, oblique to inner margin; a triangular pale drab-grey patch on costa, the base of triangle touching the antemedial and the apex touching the postmedial on costa, orbicular a small pale drab-grey spot, reniform indicated by two fuscous black dots; postmedial fascia consisting of two fine mars-brown lines, excurved to vein 2, then slightly incurved to inner margin: a pale drab-grey dash at apex, subterminal fascia a shading of mars-brown. Hindwing cartridge-buff tinged with fuscous.——Underside: fore- and hindwings cartridge-buff tinged with fuscous, glossy.

Expanse 20 mm. (Tip to tip 19 mm.)

Holotype. *Female*.—Klondyke, subprov. Benguet, Luzon I., Philippine Is., 800 ft., 10.iii.1912.

Nearest ally.—*C. vallata* Meyr. (Australia).

30. **Sarrothripus glaucus** sp.n.

Female.—Palpus white, lightly tinged with fuscous. Antenna minutely ciliated, with paired setae. Head: frons cartridge-buff, vertex olive buff. Thorax: patagium olive-buff with a fuscous black line through centre, tegula olive-buff. Abdomen (description impossible as it is missing from the type). Pectus cartridge-buff. Legs: fore- and midlegs cartridge-buff, with olive-buff above, hindleg cartridge-buff.——Forewing: cartridge-buff, suffused with olive-buff, all fasciae and markings fuscous black, subbasal fascia wavy, antemedial fascia consisting of two broken, wavy lines; a patch in distal half of cell; postmedial fascia a broken line, oblique to vein 6, outwardly angled and oblique to vein 2, incurved to inner margin; a small patch on costa beyond postmedial; subterminal fascia a wavy line of dots, interneural spots on termen. Hindwing cartridge-buff, lightly tinged with fuscous in subterminal area and on veins.——Underside: forewing cartridge-buff, tinged with fuscous; hindwing cartridge-buff, tinged with fuscous below costa and on veins.

Expanse 22 mm. (Tip to tip 21 mm.)

Holotype. *Female*.—Klondyke, subprov. Benguet, Luzon I., Philippine Is., 800 ft., 12.iv.1912.

Nearest ally.—*S. indica* Feld. (Ceylon, Singapore, Australia).

31. **Sarrothripus albescens** sp.n.

Male.—Palpus white, with a little fuscous above. Antenna ciliated, with paired setae. Head: frons and vertex white. Thorax: patagium and tegula fuscous. Abdomen fuscous, venter pale drab-grey. Pectus white. Legs: foreleg white with fuscous above, other legs white.——Forewing: white; subbasal fascia fuscous black, wavy, to median nervure; medially a wide fascia outlined with fuscous, bordered distally with a narrow white line, commencing with a triangular, fuscous patch on costa (apex distad), the remainder of fascia lightly tinged with fuscous, the proximal edge wavy, the distal edge inwardly oblique to vein 7, excurved to vein 5, again excurved to vein 2, then incurved to inner margin, where the fascia is half the width it is at costa; area beyond tinged with fuscous, in which is a wavy, white, subterminal fascia, termen fuscous black with interneural points, fringe white. Hindwing white, tinged with fuscous

on termen.——Underside : fore- and hindwings glossy, pale drab-grey tinged with fuscous, fringe pale drab-grey.

Expanse 18 mm. (Tip to tip 17 mm.)

Holotype. *Male*.—Klondyke, subprov. Benguet, Luzon I., Philippine Is., 800 ft., 6.iv.1912.

Nearest ally.—*S. exophila* Meyr. (Australia).

32. **Barasa nigrilineata** sp.n.

Male.—Palpus cartridge-buff mixed with vinaceous on first segment, cartridge-buff with fuscous at base of second and third segments. Antenna minutely ciliated, with paired setae. Head : frons white mixed with vinaceous, a lateral, fuscous black spot, vertex white mixed with vinaceous. Thorax : patagium and tegula white speckled with fuscous. Abdomen fuscous with white at junction of segments, a fuscous and white tuft at base dorsally, venter white. Pectus white. Legs : foreleg, coxa white tinged with vinaceous, femora and tibia white tinged with vinaceous, fuscous above, tarsus fuscous ; midleg white speckled with vinaceous on tibia, fuscous on basal segment of tarsus ; hindleg white, fuscous on tarsus beneath.——Forewing white, a fuscous patch on costa at base, outlined with fuscous black, basal third of wing irrorated with fuscous ; medially a wide fascia tinged with fuscous bordered by a narrow white line, proximal edge outwardly oblique to subcosta, incurved to median fold, incurved to inner margin, distal edge incurved to vein 7, excurved to vein 5, excurved to vein 2, excurved to inner margin, with a fuscous black spot where it crosses vein 2 ; reniform indicated by a very small warm sepia spot ; subterminal area tinged with fuscous in which there is an almost straight, fuscous black fascia, edged with warm sepia, and a small fuscous spot tinged with warm sepia at apex. Hindwing white, slightly opalescent, with fuscous on costa and termen, gradually decreasing in width toward tornus.——Underside : forewing fuscous ; hindwing same as upperside.

Expanse 26 mm. (Tip to tip 24 mm.)

Holotype. *Male*.—Montalban, prov. Rizal, Luzon I., Philippine Is., 21.i.1914.

Nearest ally.—*B. tetragramma* Hmpsn. (Fiji).

33. **Risoba ornata** sp.n.

Male.—Palpus pinkish buff with livid brown outwardly. Antenna fasciculate. Head : frons pinkish buff, a lateral livid brown spot, vertex pinkish buff. Thorax : patagium pinkish buff mixed with tawny, tegula pinkish buff. Abdomen pinkish buff above and beneath, a small tuft at base dorsally tipped with tawny, anal tuft pinkish buff tinged with tawny. Pectus pinkish buff. Legs : foreleg pinkish buff with blackish brown above, tarsal segments blackish brown, pinkish buff at joints, other legs pinkish buff, tarsal segments blackish brown, pinkish buff at joints.——Forewing cartridge-buff, tinged with dark olive-buff along costa, tinged with pinkish cinnamon in and below cell, a bone-brown patch subbasally from costa to subcosta where it is bent outwardly ; medially a shaded bone-brown mark outwardly oblique, from apex to inner margin ; an oblique white streak, wide at commencement, gradually narrowing and becoming tinged with pinkish cinnamon near inner margin ; area beyond olive-buff tinged

with bone-brown near apex, suffused with pinkish cinnamon between veins 3 and 6, below vein 3 tinged with bone-brown, in which is a white patch on inner margin near tornus; postmedial fascia bone-brown, crenulate, incomplete (points distad), a white spot on each point on veins 2 to 6, internecural bone-brown spots on termen. Hindwing light-buff, with a tinge of livid brown in subterminal area, fringe light buff.——Underside: forewing light buff on costa, termen and inner margin, remainder tinged with livid brown; hindwing light buff irrorated with livid brown below costa and on subterminal area.

Expanse 32 mm. (Tip to tip 31 mm.)

Holotype. *Male.*—Sapiangao, subprov. Benguet, Luzon I., Philippine Is., 5,600 ft., 16.xii.1918.

Paratype. *Male.*—Haight's Place, Pauai, subprov. Benguet, Luzon I., Philippine Is., 7,000 ft., 8.xi.1912.

Nearest ally.—*R. basalis* Moore (India, Ceylon, Singapore, Formosa).

Subfamily **WESTERMANNIINAE.**

34. **Aiteta olivana** sp.n.

Male.—Palpus brownish olive, light buff beneath at base. Antenna ciliated, with paired setae. Head: frons and vertex brownish olive. Thorax: patagium and tegula brownish olive. Abdomen fuscous, venter and anal tuft cartridge-buff. Pectus cartridge-buff. Legs light-buff speckled with fuscous above, tarsal segments fuscous above, cartridge-buff at joints.——Forewing: upper half light buff tinged with avellaneous, lower half blackish brown tinged with brownish olive; a large brownish olive, almost semicircular patch, edged with a narrow line of cartridge-buff, occupying the central third of costa, and extending downward to the anal vein, in the centre of patch the reniform is indicated by a blackish brown spot; subterminal area tinged with blackish brown, in which is a fascia of brownish olive, outwardly oblique to vein 6, then wavy to termen. Hindwing cartridge-buff, blackish brown below costa, on subterminal area and on veins.——Underside: forewing fuscous, avellaneous on costa, cartridge-buff at base, tinged with brownish olive in cell, avellaneous near apex; hindwing cartridge-buff, blackish brown below costa, on subterminal area, and on veins.

Expanse 38 mm. (Tip to tip 36 mm.)

Female.—Similar to male, but paler in colouring.

Expanse 38 mm. (Tip to tip 36 mm.)

Holotype. *Male.*—Haight's Place, Pauai, subprov. Benguet, Luzon I., Philippine Is., 7,000 ft., 12.i.1912.

Allotype. *Female.*—Baguio, subprov. Benguet, Luzon I., Philippine Is., 5,000 ft., 10.vi.1913.

Nearest ally.—*A. trigoniphora* Hmpsn. (Assam).

35. **Carea subvia** sp.n.

Male.—Palpus cinnamon-brown, tinged with vinaceous russet. Antenna bifasciculate. Head: frons and vertex cinnamon-brown. Thorax: patagium cinnamon-brown, tegula cinnamon-brown tinged with vinaceous russet. Abdomen vinaceous russet above and beneath, with a patch of fuscous at base dorsally, bordered laterally with cartridge-buff, anal tuft warm buff. Pectus cartridge-

buff tinged with vinaceous russet. Legs : foreleg vinaceous russet, with cartridge-buff above on tibia and tarsus, midleg inwardly cartridge-buff, outwardly vinaceous russet, mixed with fuscous on tibia, hindleg cartridge-buff tinged with vinaceous russet, a long tuft of warm-buff and cartridge-buff hairs from the inside of tibia, just below femur.——Forewing cinnamon-brown with a shading of pale drab-grey medially ; an outwardly oblique cinnamon-brown fascia, bordered by pale drab-grey proximally, from costa antemedially to inner margin medially ; postmedial fascia cinnamon-brown, bordered distally by pale drab-grey, outwardly oblique to vein 6, where it is bent, and only slightly oblique to inner margin ; subterminal fascia a series of fuscous black dots, a shading of fuscous black at apex, fringe fuscous black edged with vinaceous russet. Hindwing vinaceous russet with fuscous hair-scales along inner margin.——Underside : forewing vinaceous russet, a fuscous black patch at apex ; hindwing cartridge-buff, vinaceous russet on upper half, irrorated with fuscous black near apex.

Expanse 40 mm. (Tip to tip 38 mm.)

Female.—Similar to male, but deeper in colouring, the forewing almost a blackish brown.

Expanse 40 mm. (Tip to tip 38 mm.)

Holotype. Male.—Haight's Place, Pauai, subprov. Benguet, Luzon I., Philippine Is., 7,000 ft., 30.vi.1913.

Allotype. Female.—Haight's Place, Pauai, subprov. Benguet, Luzon I., Philippine Is., 7,000 ft., 26.vii.1913.

Paratype. Female.—Haight's Place, Pauai, subprov. Benguet, Luzon I., Philippine Is., 7,000 ft., 27.vii.1913.

Nearest ally.—*C. obvia* Hmpsn. (Philippines).

36. **Carea carissima** sp.n.

Female.—Palpus liver-brown. Antenna minutely biciliated. Head : frons with a smooth corneous plate, bone-brown above, vertex bone-brown. Thorax : patagium bone-brown, tegula pallid vinaceous drab, a patch of warm buff edged with bone-brown and a small tuft of white each side on metathorax. Abdomen pallid vinaceous drab tinged with liver-brown, a white tuft at base dorsally, venter and anal tuft white. Pectus white. Legs white inwardly, liver-brown outwardly, an oblique band of white round centre of tibiae, and at junction with tarsi, all tarsal segments liver-brown, white at joints.——Forewing pallid vinaceous drab ; subbasal fascia a wide shade of vinaceous brown, slightly excurved from costa to median fold ; area below cell, between subbasal and antemedial fasciae vinaceous brown ; antemedial fascia vinaceous brown, bordered by pallid vinaceous drab, incurved to subcosta, incurved to median nervure, excurved to anal vein, excurved to inner margin ; orbicular a blackish brown spot, reniform a blackish brown lunule, surrounded by a tinge of warm buff ; area from antemedial to just beyond postmedial fasciae vinaceous brown ; postmedial fascia blackish brown, bordered distally by pale drab-grey the same width as fascia, straight to subcosta, excurved to vein 5, incurved to vein 4, two small incurves to vein 2, angled and longitudinal, again angled and outwardly oblique to inner margin ; subterminal area pallid vinaceous drab, subterminal fascia blackish brown, in two short excurves, then straight to tornus, bordered proximally with white, termen blackish brown. Hindwing : cartridge-buff tinged with liver-brown near apex, on veins and termen.——Underside : fore-

wing white tinged with liver-brown, two white patches on costa ; hindwing white irrorated with liver-brown below costa on basal half, termen liver-brown.

Expanse 32 mm. (Tip to tip 30 mm.)

Holotype. *Female*.—Kolambugan, subprov. Lanao, Mindanao I., Philippine Is. (plains), 21.vi.1914.

Nearest ally.—*C. albopurpurea* Hmpsn. (Assam).

37. **Orthocraspis rectitermen** sp.n.

Female.—Palpus cartridge-buff mixed with fuscous. Antenna minutely biciliated, with paired setae. Head : frons and vertex light buff, with a fuscous black tuft projecting forward between the bases of antennae. Thorax : patagium and tegula light buff, with a few fuscous black specks. Abdomen light buff, venter cartridge-buff. Pectus cartridge-buff. Legs : foreleg cartridge-buff with fuscous above and outwardly, other legs cartridge-buff.——Forewing : light buff tinged with fuscous, with a few scattered fuscous black specks ; three light buff longitudinal stripes, occupying the width of the wing, the upper one, from costa just before middle, slightly down-curved to near termen ; the middle one, from costa at base, not curved as much as the upper one, to near middle of termen ; the lower one straight from base to near tornus. Hindwing cartridge-buff, tinged fuscous along termen and inner margin.——Underside : forewing cartridge-buff, with a fuscous streak below costa, and a fuscous spot on discocellulars, another near apex ; hindwing cartridge-buff, irrorated with fuscous, a fuscous spot on discocellulars, another near apex.

Expanse 34 mm. (Tip to tip 32 mm.)

The paratype is larger and has, in addition to other markings, a prominent fuscous-black spot on discocellulars of fore wing.

Expanse 36 mm. (Tip to tip 35 mm.)

Holotype. *Female*.—Baguio, subprov. Benguet, Luzon I., Philippine Is., 5,000 ft., 18.iii.1912.

Paratype. *Female*.—Baguio, subprov. Benguet, Luzon I., Philippine Is., 5,000 ft., 3.xi.1912.

Nearest ally.—*O. acypera* Hmpsn. (Bali, Philippines).

Subfamily **CATOCALINAE.**

38. **Anophiodes pulchrilinea** sp.n.

Female.—Palpus mars-brown, fuscous at base of second segment Antenna minutely ciliated, with paired setae. Head : frons and vertex mars-brown. Thorax : patagium blackish brown edged with mars-brown, tegula blackish brown mixed with mars-brown. Abdomen light buff, lightly tinged with fuscous above and beneath, anal tuft warm buff. Pectus fuscous. Legs : foreleg fuscous, tibia mars-brown, other legs fuscous, all tarsal segments blackish brown, light buff at joints.——Forewing : mars-brown, overlaid with blackish-brown, subbasal fascia blackish brown, bordered with russet, wavy to median fold ; antemedial fascia blackish brown, bordered with russet, outwardly oblique to subcosta, inwardly oblique to median nervure, excurved to anal vein, again excurved to inner margin ; orbicular indicated by a blackish brown spot surrounded by russet, reniform stigma russet, surrounded by a narrow blackish brown line,

outlined with light buff, two blackish brown rings below reniform, the one between median nervure and vein 2, the other between vein 2 and anal vein; postmedial fascia consisting of two blackish brown lines, in a large excurve to anal vein, then excurved to inner margin, where there is a speck of white: subterminal fascia light buff bordered proximally by a band of russet, which commences below apex, crosses fascia at vein 7, touching fascia to just below vein 2, where it separates and is slightly curved inwards; a longitudinal streak of russet from reniform to subterminal fascia, two patches of russet and light buff on termen, the one near apex, the other between veins 3 and 4. Hindwing white, tinged with fuscous at base and on inner margin, fuscous on subterminal area, a white patch in centre, white on termen near apex and near tornus.——Underside: forewing white, suffused with fuscous, a band of white across the middle of wing edged with fuscous proximally, a cartridge-buff subterminal fascia and two patches of cartridge-buff on termen; hindwing: basal half white, tinged with fuscous below costa, distal half fuscous, white in centre, and on termen near apex and tornus.

Expanse 44. (Tip to tip 42 mm.)

Holotype. *Female*.—Haight's Place, Pauai, subprov. Benguet, Luzon I., Philippine Is., 7,000 ft., 1.xii.1912.

Paratypes. *Female*.—Haight's Place, Pauai, subprov. Benguet, Luzon I., Philippine Is., 7,000 ft., 29.xi. and 8.xii.1912.

Nearest ally.—*A. meeki* Beth.-Baker (New Guinea).

SUBFAMILY **DIPHTHERINAE.**

39. **Elydnodes ornata** sp.n.

Male.—Palpus light-buff, with blackish brown above. Antenna bifasciculate. Head: frons and vertex light buff. Thorax: patagium and tegula light buff, tinged with sepia. Abdomen light-buff above and beneath. Pectus light buff. Legs: foreleg light buff, tinged with dark greyish olive, other legs light buff, with hairs on tibiae tinged with dark greyish olive.——Forewing: cartridge-buff at base, subbasal fascia blackish brown, proximal edge straight, sharply defined, distal edge suffused into ground-colour, from the upper half a streak to costa antemedially, from the lower half a wide shade of dark greyish olive on inner margin to about one half; antemedial fascia a narrow blackish brown line, bordered proximally by cartridge-buff, distally by a suffusion of greyish olive and dark greyish olive, inwardly oblique from subcosta to median nervure, angled and outwardly oblique to inner margin; orbicular sepia stigma outlined with cartridge-buff and blackish brown, reniform a sepia lunule outlined proximally with cartridge-buff and blackish brown touching orbicular, distally by light buff; medially a blackish brown shade; from apex an oblique line to inner margin at about a third, the first half a clearly defined division between two colours, the second half a fuscous shade, above this line a long cartridge-buff patch from reniform to apex, the upper edge suffused with greyish olive, below this line the postmedial fascia commences, a blackish brown, crenulate, excurved line (points distad), joining antemedial fascia on inner margin; at commencement of postmedial fascia two sepia dashes tinged with blackish brown to near termen bordered distally with light buff; a suffusion of sepia on termen just below apex, cartridge-buff on veins 3 to 6. Hindwing light-buff suffused with

warm buff, tinged with fuscous in subterminal area.——Underside: forewing light buff, a blackish brown patch in distal half of cell, surrounded by a tinge of sepia, postmedial fascia faintly marked, termen tinged with sepia, with white points at ends of veins; hindwing light buff, a blackish brown patch on discocellulars, postmedial fascia blackish brown faintly marked.

Expanse 36 mm. (Tip to tip 34 mm.)

Holotype. *Male*.—Klondyke, subprov. Benguet, Luzon I., Philippine Is., 800 ft., 17.iv.1912.

Paratype. *Male*.—Klondyke, subprov. Benguet, Luzon I., Philippine Is., 800 ft., 6.iv.1912.

Nearest ally.—*E. variegata* Leech (China).

Subfamily **PHYTOMETRINAE.**

40. **Phytometra luzonensis** sp.n.

Female.—Palpus light buff tinged with warm sepia. Antenna minutely ciliated, with paired setae. Head: frons and vertex light buff tinged with warm sepia, with a small white tuft at base of each antenna, occiput light buff. Thorax: patagium warm sepia, with a band of blackish brown across centre, narrowly edged with white posteriorly, tegula warm sepia. Abdomen warm sepia, with a fuscous tuft at base dorsally, venter light buff mixed with warm sepia. Pectus warm buff. Legs clothed with blackish brown scales and hair-scales tipped with white, tarsal segments fuscous, white at joints.——Forewing warm sepia tinged with blackish brown, which in certain lights has a metallic bronze sheen; subbasal fascia a wavy, *brassy-metallic* line, antemedial fascia consisting of two wavy, *brassy-metallic* lines; below distal half of cell two silver spots with a *brassy-metallic* edge, the proximal one nearly U-shaped, the distal one circular; a suffusion of blackish brown beyond cell; postmedially a wavy sepia shade followed by a long white patch reaching from costa to vein 3, in which is a wavy, warm sepia line nearest the proximal edge; subterminal fascia wavy, blackish brown defined by white, which, between veins 5 and 6, forms a wedge of white in fascia; terminal line sepia, interneural blackish-brown spots on termen, fringe white and blackish brown mixed. Hindwing fuscous.——Underside: fore- and hindwings cartridge-buff tinged with fuscous on basal half, suffused with fuscous on distal half.

Expanse 36 mm. (Tip to tip 34 mm.)

Holotype. *Female*.—Haight's Place, Pauai, subprov. Benguet, Luzon I., Philippine Is., 7,000 ft., 25.vi.1913.

Nearest ally.—*P. chalcytes* Esper (Europe, Asia, Australia, Polynesia).

Subfamily **OPHIDERINAE.**[1]

41. **Belciana bicolor** sp.n.

Male.—Palpus fuscous. Antenna minutely ciliated. Head: frons upper half mytho-green, lower half fuscous, vertex fuscous, occiput whitish. Thorax: patagium fuscous, edged with mytho-green posteriorly, tegula mytho-green, fuscous anteriorly. Abdomen cartridge-buff tinged with fuscous above and beneath, a patch of mytho-green at base dorsally, anal tuft fuscous. Pectus

[1] Formerly *Noctuinae*.

cartridge-buff. Legs cartridge-buff tinged with fuscous, mytho-green on fore-tibia, tarsal segments fuscous, cartridge-buff at joints.——Forewing whitish, overlaid with mytho-green, subbasally a fuscous patch on costa, narrowing and angled at median nervure, inwardly oblique to anal vein ; antemedial fascia a wavy fuscous line ; medially, on costa a triangular fuscous patch, the point just below subcosta, from which is a fascia, excurved to vein 2, excurved to anal vein, excurved to inner margin ; postmedial fascia fuscous, wavy to vein 3, inwardly oblique to vein 2, slightly excurved to inner margin ; a large fuscous patch at apex, and a small one at tornus, interneural fuscous spots on termen. Hindwing cartridge-buff tinged with fuscous at base, suffused with fuscous on distal half.——Underside : forewing cartridge-buff tinged with fuscous on upper half, postmedial fascia fuscous, ill-defined, subterminal area suffused with fuscous ; hindwing cartridge-buff tinged with fuscous, postmedial and subterminal fasciae fuscous, fuscous lunule on discocellulars.

Expanse 34 mm. (Tip to tip 33 mm.)

Female.—Similar to male.

Expanse 43 mm. (Tip to tip 41 mm.)

Holotype. Male.—Kolambugan, subprov. Lanao, Mindanao I., Philippine Is. (plains), 25.v.1914.

Allotype. Female.—Kolambugan, subprov. Lanao, Mindanao I., Philippine Is. (plains), 29.v.1914.

Nearest ally.—*B. biformis* Wlk. (Singapore, Borneo).

42. **Catephia philippinensis** sp.n.

Female.—Palpus fuscous-black, cartridge-buff below and at joints. Antenna minutely ciliated, with paired setae. Head : frons and vertex cartridge-buff tinged with fuscous, a fuscous band below the bases of antennae. Thorax : patagium and tegula cartridge-buff tinged with fuscous, a large tuft of fuscous on metathorax. Abdomen fuscous with dorsal crests, venter light buff, anal tuft light buff tinged with fuscous. Pectus light-buff. Legs : fore- and mid-legs light buff mixed with fuscous, tarsal segments fuscous black, light buff at joints ; hindleg light buff, tarsal segments fuscous black, light buff at joints.—— Forewing fuscous, subbasal fascia blackish brown, wavy to anal vein ; antemedial fascia blackish brown, wavy, ill-defined ; orbicular a small light buff spot outlined with blackish brown ; reniform a white oblique stigma tinged with fuscous on proximal edge, a suffusion of white, forming a band from costa medially, down-curved, passing reniform, to termen at veins 3 and 4 ; postmedial fascia an ill-defined, excurved, crenulate, blackish brown line ; subterminal fascia a cartridge-buff, wavy line, a small white spot near tornus, interneural blackish brown spots on termen. Hindwing : basal half white, distal half fuscous, white on fringe just below apex and near tornus.——Underside : forewing, basal third white tinged with fuscous, a white band across centre, distal third fuscous, white on termen ; hindwing similar.

Expanse 26 mm. (Tip to tip 25 mm.)

Holotype. Female.—Klondyke, subprov. Benguet, Luzon I., Philippine Is., 800 ft., 11.iii.1912.

Paratypes. Females.—Klondyke, subprov. Benguet, Luzon I., Philippine Is., 800 ft., 15. and 22.iii.1912.

Nearest ally.—*C. sciachroa* Hmpsn. (Ceylon, Philippines).

This species appears to be variable, the area below the cell, between the ante- and postmedial fasciae in one instance, is much darker than in the others, forming a blackish brown patch.

Neogabara gen. nov.

Proboscis fully developed ; palpus obliquely upturned, the second segment not reaching vertex of head, thickly scaled and dilated at extremity, third segment short and thickly scaled ; frons smooth ; eye large, round ; antenna of female ciliated, with paired setae ; thorax clothed almost entirely with scales and without crests ; the tibiae smoothly scaled ; abdomen with a dorsal crest at base only. Forewing with the termen evenly curved and not crenulate ; a series of scale-teeth on inner margin ; vein 3 from near angle of cell ; 4, 5 from angle ; 6 from upper angle ; 9 from 10 anastomosing with 8 to form the areole ; 7 from beyond the areole ; 11 from cell. Hindwing with the cell two-thirds the length of wing ; veins 3, 4 from angle ; 5 fully developed from well above angle ; 6, 7 shortly stalked ; 8 anastomosing with the cell near base only.

Genotype : Neogabara plagiola sp.n.

Having found it impossible to fit this species into any of the existing genera, we have erected the genus *Neogabara*. It is closely allied to *Paragabara* Hmpsn., which, however, has the palpus reaching the vertex of head, the forefemora of male with a tuft of curved hair at extremity, the midtibia dilated with a fold containing a tuft of long hair, veins 3 and 5 of forewing near angle of cell, 6 and 7 of hindwing from upper angle.

43. **Neogabara plagiola** sp.n.

Female.—Palpus cartridge-buff inwardly, wood-brown outwardly. Antenna minutely ciliated, with paired setae. Head : frons and vertex wood-brown. Thorax : patagium and tegula wood-brown. Abdomen wood-brown, venter cartridge-buff. Pectus cartridge-buff. Legs cartridge-buff, wood-brown outwardly, fuscous on tarsal segments.——Forewing wood-brown irrorated with blackish brown and dark purple-drab, giving the wing a purple sheen in certain lights ; antemedial fascia russet, slightly wavy, with a white spot on proximal edge below median nervure ; postmedial fascia a russet line edged distally with blackish brown, slightly excurved to vein 6, oblique to inner margin, with two white spots on distal edge, a small one above vein 2, a larger, triangular one, below vein 2 ; termen russet with interneural blackish brown spots. Hindwing fuscous.——Underside : fore- and hindwings cartridge-buff tinged with fuscous.

Expanse 26 mm. (Tip to tip 24 mm.)

Holotype. Female.—Kolambugan, subprov. Lanao, Mindanao I., Philippine Is. (plains), 21.vi.1914.

44. **Oglasa incurvata** sp.n.

Female.—Palpus fuscous, drab-grey at tip. Antenna minutely ciliated. Head : frons drab-grey and bone-brown mixed, vertex drab-grey speckled with bone-brown. Thorax : patagium drab-grey speckled with bone-brown, edged inwardly with bone-brown forming a median line, tegula drab-grey. Abdomen drab-grey tinged with fuscous above and beneath. Pectus drab-grey. Legs drab-grey tinged with fuscous.——Forewing drab-grey irrorated with bone-

brown, antemedial fascia a fine bone-brown line, commencing with a small patch on costa, incurved to subcosta, excurved to anal vein, excurved to inner margin ; medially on costa a triangular bone-brown patch, the point touching an elongate blackish brown patch in distal half of cell, from the distal edge of triangular patch, a fine bone-brown line, excurved round the distal end of blackish brown patch, then incurved to inner margin ; postmedial fascia a fine bone-brown line, outwardly oblique to vein 6, angled and inwardly oblique to vein 5, excurved to vein 2, incurved to inner margin ; beyond postmedial on costa, a semicircular bone-brown patch, with three drab-grey points on costa, a small bone-brown spot near costa, a suffusion of fuscous in subterminal area, interneural bone-brown spots on termen. Hindwing drab-grey, suffused with fuscous.——Underside : forewing drab-grey, suffused with fuscous, with drab-grey on costa near apex, antemedial and postmedial fasciae faintly marked ; hindwing drab-grey, irrorated with fuscous below costa and on subterminal area, antemedial and postmedial fasciae faintly marked.

Expanse 26 mm. (Tip to tip 25 mm.)

Holotype. *Female*.—Klondyke, subprov. Benguet, Luzon I., Philippine Is., 800 ft., 16.v.1912.

Nearest ally.—*O. captata* Butl. (India).

45. **Oglasa contigua** sp.n.

Female.—Palpus cartridge-buff, fuscous black on second segment outwardly and above. Antenna minutely ciliated, with paired setae. Head : frons and vertex cartridge-buff. Thorax : patagium and tegula light buff tinged with pale ochraceous buff. Abdomen pale ochraceous buff above and beneath, anal tuft warm buff. Pectus cartridge-buff. Legs : fore and midlegs cartridge-buff, with fuscous on tibiae outwardly, hindleg cartridge-buff, tinged with pale ochraceous buff, all tarsal segments fuscous, cartridge-buff at joints. ——Forewing : pale ochraceous buff, two small fuscous black spots on costa, one at base, the other antemedially ; two triangular fuscous black patches on costa, with the apex produced and bent outwardly, one medially, the other subterminally ; a patch of fuscous and fuscous black on the middle third of inner margin followed by white, the upper edge being just above the anal vein ; reniform faintly outlined with fuscous and defined by cartridge-buff ; from the apex of subterminal patch on costa, a wavy fascia of fuscous bordered by white ; interneural spots of fuscous preceded by white on termen. Hindwing cartridge-buff tinged with fuscous near apex.——Underside : forewing cartridge-buff, tinged with fuscous ; hindwing cartridge-buff, irrorated with fuscous below costa and at apex.

Expanse 31 mm. (Tip to tip 30 mm.)

Holotype. *Female*.—Montalban, prov. Rizal, Luzon I., Philippine Is., 14.iv.1914.

Nearest ally.—*O. separata* Wlk. (India).

46. **Plecoptera costinotata** sp.n.

Female.—Palpus pinkish buff. Antenna minutely ciliated, with paired setae. Head : frons and vertex pinkish buff, tinged with ochraceous orange. Thorax : patagium pinkish buff, tinged with ochraceous orange, tegula pinkish-

buff. Abdomen light buff above and beneath, anal tuft pinkish buff. Pectus light-buff. Legs pinkish buff.——Forewing pinkish buff, a fuscous patch in cell at distal end, with a fuscous suffusion above reaching to costa, increasing to twice the width of patch at costa, the suffusion more strongly marked on the edges. Hindwing cartridge-buff, postmedial fascia a fine, faintly marked, fuscous line; a faint fuscous border subterminally.——Underside: forewing light buff, a faint fuscous spot on discocellulars, and a fuscous fascia subterminally from vein 6 to near tornus; hindwing light buff, a faint fuscous spot on discocellulars, a faintly marked postmedial fascia.

Expanse 26 mm. (Tip to tip 25 mm.)

Holotype. Female.——Klondyke, subprov, Benguet, Luzon I., Philippine Is., 1,300 ft., 23.xii.1911.

Nearest ally.—P. flava Brem. (China, Assam, India).

NOTES ON NORTH AMERICAN FLEAS.

By DR. KARL JORDAN.

(With Plates I and II.)

THE types of the species of fleas described by Baker being nearly all in the United States National Museum at Washington, D.C., I went in 1927 to that institute for the purpose of comparing the types and making drawings of such detail as is necessary for the recognition of the species. The following notes and descriptions embody some of the results of that visit.

1. **Ceratophyllus pseudarctomys** Baker (1904).

C. pseudarctomys Baker, *Proc. U.S. Nat. Mus.* xxvii. pp. 387, 399, tab. 24, figs. 1–7 (1904) (New Port, Herkimer Co., N.Y., ♂♂♀ off *Arctomys monax*).

C. acasti Rothschild, *Nov. Zool.* xii. p. 168, tab. 7, figs. 19, 20 (1905) ("Quesnel, B.C.", ♀ off *Sciuropterus sabrinus*).

The single ♀ from which *C. acasti* was described agrees with that sex of *C. pseudarctomys*. The locality of *C. acasti* was said to be Quesnel; but as all our other specimens from British Columbia belong to the next species, while those from Alberta and New York State are *C. pseudarctomys*, there is every reason to suspect an error in locality. The normal hosts of *C. pseudarctomys* seem to be Flying Squirrels.

2. **Ceratophyllus vesperalis** spec. nov. (Pl. I, figs. 1, 2).

Close to *C. pseudarctomys*, but easily distinguished by the tail-ends:

♂. On sternite VII the dense bunch of long bristles found in *C. pseudarctomys* is represented in the new species by a much smaller number of bristles, the segment bearing on each side about 8 to 10 ventral and subventral bristles. Sternite VIII claviform, with some long bristles at the apex. The projection of the clasper which bears the two long acetabular bristles quite short (fig. 1). Exopodite F almost straight, with the anterior and posterior sides nearly parallel from the lower spiniform bristle to the apex; lower spiniform straight, longer than F is broad, above it a short, pointed, spiniform, and at apex a large, almost sabre-shaped spiniform which ends with a thin point. Segments I and II of hind tarsus with some very long and thin apical bristles.

♀. Dorsal portion of apical margin of sternite VII (figs. 2, *a*, *b*) produced as a rounded lobe of variable dimensions, the lobe projecting beyond the rest of the margin. Spermatheca longer than in *C. pseudarctomys*.

Hab. British Columbia: Okanagan and Okanagan Landing, off *Sciuropterus alpinus*; a series collected by J. A. Munro.

3. **Ceratophyllus leucopus** Baker (1904).

+. *C. leucopus* Baker, l.c. pp. 387, 401 (1904) (Peterborough, N.Y., 1 ♀ off *Peromyscus leucopus*).

♂♀. *C. aeger* Rothschild, l.c. xii. p. 166, no. 10, tab. 6, figs. 5, 7, 9 (1905) (Red Deer, Alberta, ♂♂♀♀ on *Peromyscus arcticus* and *Evotomys saturatus*); Jord., ibid. xxxiv. p. 179 (1928) (*C. aeger* = *C. leucopus*).

Identified from the types of *C. leucopus* and *C. aeger*.

Near *C. wickhami* Baker (1895). In both sexes the first segment of the

maxillary palpus is a little longer than the second, and the proboscis does not reach to the apex of the forecoxa.

Sternite VIII of ♂ distally smooth, gradually pointed and curved upwards, without the apical filamentiferous flap which is present in all the allied species. Common and of wide distribution, from Alberta and Arizona eastward to the Atlantic, probably everywhere in the Middle and Eastern States, on *Peromyscus leucopus*, its normal host.

4. **Ceratophyllus labiatus** Baker (1904).

♀. *C. labiatus* Baker, l.c. pp. 387, 402, tab. 19, figs. 6–9 (1904) (Moscow, Idaho, 1 ♀ on *Lynx canadensis*).

I was not able to identify this flea from the original description and figures. Some of the details given pointed to the neighbourhood of *C. wickhami*, where Baker placed it, but the statement that there were two rows of bristles on the pronotum was against such a position in the genus. I was inclined to assume that Baker made a mistake in assigning two rows to the pronotum, and the type-specimen at Washington shows indeed the pronotum pushed so far into the head that the subapical row of bristles of the head looks as if it belonged to the thorax. The pronotum bears only one row, as in the allied species.

Baker lays some stress on the presence of spiniform bristles on tergite VIII. He says that "the lower lateral portion of the eighth segment bears a number of normal bristles and also about seven short, stout, dark-coloured bristles which are almost spines, in this latter respect differing widely from any nearly related species." The spiniform bristles thus described are placed on the inner surface of the segment, there being 4 on one side of the body and 5 on the other. Such bristles are present in all species of *Ceratophyllus*, and they will be found to be as variable in *C. labiatus* as they are elsewhere.

The relationship of *C. labiatus* is with *C. caedens* Jord. (1925) on the one hand, and *C. nepos* Roths. (1905) on the other. The lobes of sternite VII are nearly as long as in *C. nepos*, and the lower lobe bears a brownish ridge on the inside as in *C. caedens caedens*. As only a single ♀ of *C. labiatus* is known, it is advisable to assume for the present that it represents a species distinct from the others of the *wickhami*-group.

4. **Ceratophyllus caedens durus** subsp. nov. (fig. 3, *a–g*).

Differs particularly in the ♀. Whereas in *C. caedens caedens* Jord. (1925), described from Alberta specimens, sternite VII of the ♀ is divided into a short upper lobe and a broader and somewhat longer lower one, the latter bearing a conspicuous longitudinal, curved ridge on the inner side, the segment is devoid of this ridge in *C. c. durus* and varies from being entire to being divided into two long lobes as illustrated by figs. 3*a–g* (fig. 3*c* from type of *durus*).

In the ♂ the exopodite usually bears 4 spiniforms, rarely 5 on one exopodite and 4 on the other; in *C. c. caedens* there are usually 5 spiniforms, rarely 4 on both exopodites and equally rarely 4 on one and 5 on the other.

Hab. British Columbia: type (♀) from Okanagan, 16.ii.1917, on *Putorius arizonensis*; Blücher Hall, viii.1910, on *Sciurus richardsoni*; Mara Lake, xi.1902, on *Sciurus hudsonius*; Kelowna, viii.1919, on *Mustela*; and from some other localities in British Columbia; all collected by Messrs. Brooks,

Frazer, Gregson, Garrett and Tate. All our British Columbian specimens belong here, and all our numerous Albertan examples are *C. c. caedens*.

5. **Ceratophyllus sexdentatus** Baker (1904).

All the various fleas which I unite here as subspecies of *C. sexdentatus* differ from *C. wickhami* Baker (1895), *C. leucopus* Baker (1904), *C. nepos* Roths. (1905), *C. labiatus* Baker (1904), *C. caedens* Jord. (1925) and *C. latens* Jord. (1925) in the end-segment of the proboscis being shorter than the two preceding segments together, in the median bristle of the occiput being reduced in size and not accompanied by a small bristle (which, in the allied species, is placed obliquely above it), in the hindcoxa bearing 1 to 3 bristles on the inner surface towards the apex, and in the spiniforms of the exopodite being drawn out into a shorter point than in the ♂♂ of the allied species. Normal host: *Neotoma*, but often found on Carnivora preying on *Neotoma*.

(*a*) **C. sexdentatus sexdentatus** Baker (1904).

C. sexdentatus Baker, l.c. xxvii. pp. 387, 403, tab. 24, figs. 8–14 (1904) (Boulder Creek, Cal., on *Neotoma*).

In the ♂ the proximal angle of the anterior lobe of sternite IX is strongly rounded, and the apex of this sternite rotundate-truncate. The exopodite bears from 5 to 7 spiniforms.

In the ♀ sternite VII divided by a deep sinus into a long and narrow upper lobe and a broader lower one, the latter being triangular in lateral aspect.

Hab. Coast Range of California; on *Neotoma*.

(*b*) **C. sexdentatus nevadensis** subsp. nov. (Pl. I, fig. 4).

The ♂ close to *C. s. agilis*, the ♀ not constantly different from *C. s. sexdentatus*.

♂. Anterior lobe of sternite IX ventrally straight, longer than in *C. s. sexdentatus*, the spiniform placed beyond the middle of this lobe and the distal bristle at the curve of the distal margin; the apical lobe of sternite IX nearly evenly rounded at the apex, not rotundate-truncate. Exopodite with 5 spiniforms, sometimes four on one side.

♀. Sinus of sternite VII deep, as a rule extending nearer to the row of bristles than in *C. s. sexdentatus*; upper lobe narrow, sometimes widened at apex.

Hab. California: Pine City, Mono Co., vii. 1922, 3 ♂♂ and 5 ♀♀ on *Mustela arizonensis*, collected by A. B. Howell.

(*c*) **C. sexdentatus agilis** Roths. (1905).

C. agilis Rothschild, *Nov. Zool.* xii. p. 167, no. 11, tab. 7, figs. 16–18 (1905) (Alberta; Brit. Columbia).

♂. Anterior lobe of sternite IX as in *C. s. nevadensis*, but the spiniform more or less median, and the distal bristle at some distance from the curve of the margin. Exopodite with 5 to 7 spiniforms.

♀. Sinus of sternite VII very variable, but rarely as deep as in the two previous subspecies, the lobes variable in width and length, both present in all our specimens.

Hab. British Columbia and Alberta, probably also farther south, on *Neotoma*, accidentally on *Sciurus*, *Ochotona* and *Putorius*. The type-specimen from Banff, off *Neotoma cinerea*.

(*d*) **C. sexdentatus schisintus** subsp. nov. (Pl. I, fig. 5).

Apparently differs in the ♀ only: the upper lobe of sternite VII broad and short, the lower one absent or quite short. Exopodite of ♂ with 5 or 6 spiniforms.

Hab. Arizona, a series off *Neotoma*, collected by O. C. Duffner; type ♀.

(*e*) **C. sexdentatus pennsylvanicus** Jord. (1928).

Cf. *Nov. Zool.* xxxiv. p. 184, no. 8, text-figs. 8, 9 (1928) (Rolling Rock, Pa., and Potomac, Va.).

Hab. Pennsylvania, Maryland, Virginia, on *Neotoma pennsylvanica*.

6. **Ceratophyllus petiolatus** Baker (1904).

♂. *C. petiolatus* Baker, l.c. pp. 388, 415, tab. 18, figs. 8–11 (1904) (Moscow, Idaho, 1 ♂ off *Lynx canadensis*; not fig. 7, which belongs to *C. idahoensis*).

♂. Sternite VIII differs from that segment of all other species. It is about three times as long as broad, apically rounded (in lateral aspect) and here membraneous, this apical portion being densely studded with minute spicules which point downward; proximally of this membraneous area there is a bristle on each side.

♀. Sternite VII of the ♂ dimorphic; it is either strongly rounded and broad, or is reduced in width from above, the dorsal margin, in the latter case, being almost parallel with the ventral margin, and the apex truncate-subsinuate.

Hab. Idaho and British Columbia; on *Thomomys* and accidentally on *Lynx canadensis*.

7. **Ceratophyllus arizonensis** Baker (1898).

♂. *Pulex arizonensis* Baker, *Journ. N. York Ent. Soc.* vi. p. 55 (1898) (Tucson, Arizona, 1 ♂ off "Silvery Mouse").

♀. *Ceratophyllus proximus* Baker, *Proc. U.S. Nat. Mus.* xxvii. pp. 388, 412, tab. 19, figs. 1–5 (1904) (Palm Springs, "S. Calif." error).

♂. *Ceratophyllus arizonensis* Baker, ibid. pp. 388, 415, tab. 23, fig. 6, tab. 24, figs. 8–12 (1904) (Tucson, on *Neotoma albigula*).

The two names refer to the sexes of the same species. Types compared in U. S. Nat. Mus.

8. **Ceratophyllus arizonensis littoris** subsp. nov. (Pl. I, fig. 6).

♀. Like *C. a. arizonensis*, but the ventral, widened, area of tergite VIII with 21 bristles on one side and 20 on the other, instead of from 14 to 16 as in *C. a. arizonensis*. Sternite VII essentially as in *C. a. arizonensis*, its upper angle a little more turned up, but this difference probably not constant.

Hab. California: S. Diego, 1 ♀ off *Citellus turdicaudatus*, 12.iii.1914, collected by F. Stevens.

9. **Ceratophyllus montanus** Baker (1895).

Pulex montanus Baker, *Canad. Entom.* xxvii. p. 132 (1895) (Colorado, on *Sciurus aberti*).

♂♀. *Ceratophyllus acutus* Baker, *Invertebrata Pacifica*, i. p. 40 (1904) (Stanford University, on *Spermophilus*).

When describing *C. acutus*, Baker compared it with *C. arizonensis* Baker (1898) and *C. idahoensis* Baker (1904), instead of *C. montanus*. The species is widely distributed in the West and individually very variable.

10. **Ceratophyllus labis** J. & R. (1922) (Pl. I, fig. 7).

♂. *C. labis* Jordan & Roths., *Ectoparasites*, i. p. 275. no. 7. text-fig. 267 (1922) (♂, nec ♀; Calgary, off *Putorius* "*longicaudatus*").

The ♀ described by us as that sex of *C. labis* belongs to the new species here following. In the true ♀ of *C. labis* sternite VII is truncate and bears a small, variable, sinus below the upper angle, the chitin being incrassate around the base of the sinus; the segment recalls that of *C. arizonensis*, but in that species the bursa copulatrix is short and upright, whereas in *C. labis* it is long, with the apex curved down. There is, moreover, in *C. labis* and allies (*C. hirsutus*, *C. bruneri*, *C. tuberculatus*, all Baker 1905) at the base of the blind duct of the bursa a sclerification which somewhat resembles the figure 3.

11. **Ceratophyllus rupestris** spec. nov. (Pl. I, figs. 8, 9).

♀. *C. labis* Jord. & Roths., l.c. p. 275. no. 7. text-fig. 268 (1922) (nec ♂; Calgary, from *Putorius* "*longicaudatus*").

Similar to *C. arctomys* Baker (1905), smaller, the bristles on the whole less numerous, the lowest bristle of the posterior row of the abdominal tergite II posterior to the stigma, not directly below it.

♂. Process P. of clasper broader than in *C. arctomys*, the exopodite F broader in upper half, more evenly rounded on the anterior side, the notch of the anterior margin farther upwards than in *C. arctomys*.

♀. Sternite VII slightly and almost evenly incurved, the upper angle often much less rounded than in our figure. Spermatheca much smaller than in *C. arctomys*.

Hab. Alberta: Calgary (type), a large series off *Putorius longicauda* and *Spermophilus richardsoni*, collected by Messrs. G. F. Dippie and C. Garnett; also from Blackfalls, off *Thomomys* and *Canis* (A. D. Gregson), and Dorothy, off *Thomomys* (W. G. Hodgson). *Spermophilus* probably the true host. *C. arctomys* also occurs in Alberta, on *Marmota*.

12. **Ceratophyllus idahoensis** Baker (1904).

♂♀. *C. idahoensis* Baker, *Proc. U.S. Nat. Mus.* xxvii. pp. 388, 413, tab. 18, figs. 1–7 (1904) (Moscow, Idaho, on *Citellus columbianus*; figs. "1–6" laps. cal.).

♂♀. *C. poecantis* Rothschild, *Nov. Zool.* xii. p. 155. no. 2. tab. 8, figs. 22, 23 (1905) (Alberta, British Columbia and Arizona, off *Tamias*, *Spermophilus*, *Sciurus*, *Putorius* and *Marmota*; "Pl. VII" laps. cal.).

Some statements in Baker's description misled N. C. Rothschild to create a synonym. The frontal tubercle is said to be absent in *C. idahoensis*, which is erroneous, and it is stated of the abdomen that the first two tergites bear small apical teeth, while in reality tergites I to IV, sometimes even I to V bear such teeth.

13. **Ceratophyllus ignotus ignotus** Baker (1895).

♀. *Pulex ignotus* Baker, *Canad. Entom.* xxvii. pp. 110, 112 (1895) (Ames, Iowa, host not given).

♂. *Typhlopsylla americana* Baker, l.c. pp. 189, 199 (1895) (partim; Ames, Iowa, on *Geomys bursarius*).

In the N. C. Rothschild collection there is from the Baker collection a ♂ which bears the note on Baker's label: "This was the type of *P. ignotus*." The statement is erroneous, the species having been described by Baker from 2 ♀♀. I have examined these two specimens in the U.S. Nat. Mus.; both slides bear

the remark: "This was the type of *P. ignotus*." One of them I have selected as type and labelled it as such, the second specimen, the paratype, has been transferred to Tring. As regards *Typhlopsylla americana*, the above-mentioned ♂ in coll. N. C. R. was selected by us as type in *Ectoparasites*, i, p. 55 (1915). There is in the U.S. Nat. Mus. a second Iowa ♂, likewise labelled type by Baker. This specimen is in good order; its clasper and exopodite are nearly the same as in *C. ignotus franciscanus* Roths. (1910) and the eighth abdominal sternite agrees with our figure in *Ectoparasites*, text-fig. 57. The seventh sternite of the ♀ is deeply incurved, not truncate. These details will be figured in the Monograph. A ♀ in the coll. of the Agricultural Dept. at Cornell is named *americana* by Baker and also labelled type by him; it came Ames, Iowa, off *Geomys bursarius*, ix. 88.

14. **Ceratophyllus fasciatus** Bosc (1801).

Pulex fasciatus Bosc, *Bull. Soc. Philom.* iii. 44, p. 156 (1801) (*Myoxus nitela*).

♀. *Ceratophyllus californicus* Baker, *Proc. U.S. Nat. Mus.* xxvii. pp. 387, 395, tab. 17. figs. 5–8 (1904) (Mountain View, Calif., 1 ♀ on *Microtus californicus*).

♂. *Ceratophyllus oculatus* Baker, l.c. pp. 387, 396, tab. 19. figs. 10–14 (1904) (Washington, D.C., 1 ♂ on *Putorius vison*).

♀. *Ceratophyllus canadensis* Baker, l.c. pp. 388, 407. tab. 20. figs. 1–4 (1904) (Ottawa, Canada, 1 ♀, host not known).

The types of the three Bakerian names are in U.S. Nat. Mus., where I have compared them. The specimens undoubtedly belong to *C. fasciatus*.

15. **Ceratophyllus asio** Baker (1904) (Pl. I, figs. 10, 11).

♀. *C. asio* Baker, l.c. xxvii. pp. 388, 406 (1904) (Wellesley, Mass., 1 ♀ on *Megascops asio*).

This is a mouse-flea. Besides the type there is a second specimen in the U.S. Nat. Mus., also a ♀, and the collection of the Entomological Department of Cornell University contains a ♂ and several ♀♀ obtained on a field-mouse at Ithaca.

The species is allied to *C. querini* Roths. (1905), *C. walkeri* Roths. (1903), *C. acerbus* Jord. (1925), etc. We figure the exopodite of ♂ and the outline of VII. st. of ♀.

16. **Ceratophyllus megacolpus** spec. nov. (Pl. I, fig. 12).

♀. Similar to *C. asio* Baker (1904), but VII.st. so deeply sinuate that the row of long bristles is nearer the apex of the sinus than in *C. asio*. Pronotum as in *C. asio* with two rows of bristles. Bursa copulatrix with a long glandular continuation from which emanates the duct of the spermatheca.

Hab. British Columbia: Okanagan Landing, 1 ♀ off *Microtus drummondi*, ix. 1912 (E. A. Chapin), in U.S. Nat. Mus.

17. **Ceratophyllus immitis** spec. nov. (Pl. I, fig. 13).

♀. Nearest to *C. acerbus* Jord. (1925); the end-segment of the proboscis as in that species a little longer than the end-segment of the maxillary palpus. Sinus of VII.st. much shallower, the lower lobe hardly at all projecting. Below the stigma of VIII.t. 5 to 8 bristles, of which 3 are long; farther down 21 to 24. Duct of spermatheca for the greater part rather strongly chitinised and therefore conspicuous, being similar to the duct of *S. abantis* Roths. (1905)

and *S. querini* Roths. (1905). In all these species as well as No. 14 and a number of others, the stigma-cavity of VIII.t. is very large.

Hab. Canada: lat. 48045, vi.1846, from Lemming, probably *Dicrostonyx hudsonius*.

18. **Ceratophyllus eumolpi cyrturus** subsp. nov. (Pl. 1, fig. 14).

♂♀. As in *C. e. eumolpi* Roths. (1905), segments I and II of the ♂-midtarsus with long thin bristles and the exopodite with three blunt spiniforms, of which the upper two are short, the lowest long; in ♀ the bursa copulatrix broad and spirally rolled up.

♂. Process P of clasper and exopodite broader than in *C. e. eumolpi*, the second spiniform much nearer to the long one than to the short subapical spiniform; apical margin of exopodite much less slanting. Apex of ventral arm of IX.st. (fig. 12) produced into a long nose, which is curved down.

♀. The lobe of VII.st less rounded than in *C. e. eumolpi*, its lower angle usually distinct; spermatheca longer.

Hab. Arizona: Paradise, 1 ♂ and 5 ♀♀ off *Mephitis*, x.1913 (O. C. Duffner).

19. **Ceratophyllus ciliatus** Baker (1904).

The exopodite of this species is long, apically dilated posticad and bears on this apical projection two short obtuse spiniforms; the ventral arm of IX.st has no membraneous apical flap. Head of spermatheca almost globular, much shorter than the tail. VII.st. of ♀ deeply sinuate, incrassate around the apex of the sinus. The surface ridges of the basal abdominal sternite of the ♀ are much more strongly curved backwards in the middle of the segment than in any other allied species.

Three subspecies are known to me:

(*a*) **C. ciliatus ciliatus** Baker (1904).

♂♀. *C. ciliatus* Baker, *Proc. U.S. Nat. Mus.* xxvii. pp. 387, 397, tab. 16, fig. 1–6 (1904) (Mountain View, Calif., on Chipmunk).

I have seen only the pair from which the species was described by Baker. In the ♂ process P of the clasper is broader than in the other two subspecies, and the apex of the exopodite less dilated posticad. In this ♂ the lower subapical spiniform of the left exopodite is prolonged, being about thrice as long as the upper spiniform, and its extreme tip is bent down, forming a short hook; the spiniforms of the right exopodite are normal.

The upper lobe of VII.st. of the ♀ is evenly rounded and broad, but less broad than the lower lobe, which is truncate with the upper angle rounded off; the sinus a narrow sharp incision.

Hab. California: Mountain View, Santa Cruz Co., on *Eutamias townsendi*; one pair in U.S. Nat. Mus., type ♂, paratype ♀, by my selection.

(*b*) **C. ciliatus protinus** subsp. nov. (Pl. I, figs. 15, 16).

♂. The process P of the clasper narrower than in *C. e. ciliatus*, and the apex of the exopodite, though variable, always strongly dilated posticad.

♀. Upper lobe of VII.st. more or less triangular and pointed.

Hab. British Columbia: a series from various places, type from Sumas, off *Eutamias townsendi*, collected by Allan Brooks; occurs also on *Sciurus hudsonius*.

(*c*) **C. c. mononis** subsp. nov. (Pl. I, figs. 17, 18).

♂. Process P of clasper shorter and narrower than in both previous subspecies; exopodite as much widened at apex as in *C. c. protinus*, but the angle of the anterior margin lower down, being placed below the middle.

♀. Upper lobe of VII.st. very much broader than the lower lobe, its apex rounded and the oblique lower margin once feebly incurved; the lower lobe subtriangular in lateral aspect, its dorsal margin rounded.

Hab. California: Pine City, Mono Co., 1 ♂ and 2 ♀♀ off *Mustela arizonensis* and *Eutamias frater*, vii.1922 (A. B. Howell).

20. **Ceratophyllus vison** Baker (1904).

♂♀. *C. vison* Baker, l.c. pp. 388, 408 (1904) (Peterborough, N.Y., on *Putorius vison*).

♂♀. *C. lucidus* Baker, l.c. pp. 388, 410, tab. 20, figs. 5–9 (1904) (Pagosa Park, Colorado, on *Sciurus fremonti*).

Baker mentions, in his keys and descriptions, certain differences between *C. vison* and *C. lucidus*; but an examination of the types and a series of paratypes proves the differences partly to be unreliable and partly to be due to errors of observation. We have the species also from Alberta and British Columbia.

21. **Ceratophyllus wagneri** Baker (1904).

A most interesting object for the study of geographical variation. In some of the various subspecies the ♀♀ exhibit greater differences than do the ♂♂. The spermatheca is unique in its long subcylindrical head being narrower than the tail, the organ recalling a snake or certain Sipunculid worms, such as *Aspidosiphora* and *Phascolosoma*. The species is restricted to the west of the Continent, not being known farther east than New Mexico, Wyoming and Alberta.

(*a*) **C. wagneri wagneri** Baker (1905).

♂. *C. wagneri* Baker, l.c. pp. 387, 405, tab. 15, figs. 3–7 (1905) (Moscow, Idaho, 2 ♂♂ on *Peromyscus leucopus* and *Mus musculus*).

The specimens from British Columbia, Idaho and Wyoming belong to one subspecies. The spermatheca is vermiform, the apex of its head not being swollen. The duct of the bursa copulatrix is distinctly sclerified for a considerable distance; this conspicuous portion of the duct, which resembles a capital S, is about as long as the swollen tail of the spermatheca, being longer than the non-sclerified lower portion of the duct of the bursa. VII.st. of ♀ often with small sinus.

Hab. British Columbia; Idaho; Wyoming; Western Montana; on *Peromyscus*, accidentally on other mice.

(*b*) **C. wagneri systaltus** subsp. nov. (Pl. II, fig. 19).

♂. Exopodite somewhat narrower than in the previous subspecies, and its anterior margin more incurved.

♀. Duct of bursa copulatrix much shorter than in *C. w. wagneri*, the sclerified portion of it about as long as the tail of the spermatheca is broad. Head of spermatheca vermiform as in the previous subspecies.

Hab. Alberta: Blackfalls, on mouse (probably *Peromyscus*), type (A. D. Gregson); Red Deer, on *Peromyscus arctieus*, v.1901 (F. G. Dippie); a series.

(*c*) **C. wagneri ophidius** subsp. nov. (Pl. II, fig. 20).

♂. Exopodite on the whole broader than in the two previous subspecies, and reaching well above process P of the clasper.

♀. Apex of head of spermatheca swollen, the organ recalling a snake. The sclerified portion of the bursa copulatrix about as long as in *C. w. wagneri*.

Hab. California, coast district: S. Francisco, type (Carroll Fox); San Mateo (M. B. Mitzmain); a series from *Putorius xanthogenys* (probably accidental host).

22. **Ceratophyllus thambus** spec. nov. (Pl. II, fig. 21).

♂. Closely allied to *C. wagneri* Baker (1904), but the levers of the genital armature not rolled up in a spiral, being very much shorter than in *C. wagneri*, the longest lever only forming half a convolution, and the lamina of the penis being without a long wire-like lever. Sternite VIII about half as long as in *C. wagneri*, without apical membraneous flap. Process P of clasper much longer and extending a little above the exopodite. The latter less dilated below middle and gradually rounded-oblique at apex on posterior side, gradually narrowing, forming a sharp apical angle on anterior side; three spiniforms as in *C. wagneri*, but the lowest longer and thinner than in *C. wagneri*, and the other two ending with a very thin point. Distal lobe of ventral arm of IX.st. pointed, with the apex curved upwards, not downwards (fig. 21). Apex of paramere obtuse, thumb-like, its ventral apical margin being rounded and its dorsal apical margin slightly incurved.

Hab. Alberta: Red Deer (A. D. Gregson), 1 ♂ off *Lynx*; the true host probably a mouse.

23. **Ceratophyllus bitterootensis** Dunn & Parker (1923).

♂. *C. bitterootensis* Dunn & Parker, *Public Health Reports*, xxxviii, p. 2771 (Reprint p. 11) (1923) (W. of Darby, Montana, on *Neotoma*).

♂♀. *C. isus* Jordan, *Nov. Zool.* xxxii, p. 110, no. 34, text-figs. 39, 40 (1925) (Red Deer R., Canad. Rocky Mts., on *Mus*).

The description of *C. bitterootensis* was taken from 2 ♂♂, one of which, the paratype, I have had an opportunity to compare with *C. isus*, with which it agrees.

24. **Ceratophyllus penicilliger** Grube (1852).

Two ♂♂ obtained by A. H. Twitchell at Flat, Alaska, on *Microtus* in March 1925, are the first Nearctic specimens I have seen of this widely distributed Palaearctic species. The specimens are badly preserved, having been treated with too strong a dose of KOH, but the characteristic genital armature renders the identification certain. The better specimen in U.S. Nat. Mus., the second at Tring.

25. **Ceratophyllus stejnegeri** spec. nov. (Pl. II, figs. 22, 23).

♂♀. Related to *C. araucanus* J. & R. (1920) from Chile. The proboscis shorter, the pronotum with a comb of 40 spines (♂) or 36 (♀), which are narrower than in *C. araucanus*; the small bristles on meso- and metanotum and on the first abdominal tergite more numerous, there being two complete rows in front of the postmedian row of long ones, besides some additional dorsal bristles.

♂. Process P of clasper broad and apically round; three acetabular bristles. Exopodite straight from near base, subconical, with two stout pointed spiniforms at lower angle and another below middle, all three somewhat longer than the

exopodite is broad in middle. Ventral arm of IX. st. with a rounded proximal lobe, which bears a marginal row of 6 or 7 rather strong pale bristles and on the distal portion of inner side a stouter submarginal one; apical lobe of ventral arm gradually dilated, the apex dorsally and distally rounded, ventrally incurved, the ventral apical angle somewhat projecting downward. Sternite VIII narrow, without long bristles or spiniforms, but on each side with an irregular row of minute hairs; at apex of sternite VIII a large flap directed obliquely distad, the proximal portion of its anterior margin smooth and rather strongly chitinised, the rest of the flap being membraneous and bearing numerous filaments.

♀. Upper and lower antepygidial bristles about as long as the bristles of the posterior row of tergite VII; sternite VII sinuate below upper margin, the upper lobe short, sharply pointed, the lower lobe broad and long. Head of spermatheca little longer than broad, almost globular (dorsally split across in the only ♀ seen), similar to that of *C. araucanus*, as is also the bursa copulatrix. Anal sternite longer, and its ventral margin straighter than in *C. araucanus*, with a larger number of small short bristles.

Hab. Bering I., Commander Is., 1882–3 (L. Stejneger), one pair, host not mentioned; in U.S. Nat. Mus. Named in honour of the collector. This northern bird-flea is a most interesting discovery, as the affinities of the species are with species known from Chile, Argentina and Brazil.

26. **Ceratophyllus celsus apricus** subsp. nov. (Pl. 11, fig. 24).

♂. Process P of clasper subacuminate, not truncate, the posterior margin of the clasper between the acetabular bristles and base of P distinctly convex; (left exopodite with three long bristles, right clasper with two); vertical arm of sternite IX more strongly dilated below middle, but its apical nose shorter, than in *C. c. celsus* Jord. (1926). Sternite VIII with a sharply pointed apical transparent process which points upwards (the position of this projection proves that in the type of *C. c. celsus* both the right and left projections are accidentally twisted at the base and in consequence of this twist directed distad instead of upward); a bunch of 6 apical bristles as in *C. c. celsus*, but 2 of them slightly shorter and a little more spiniform than the others (all broken away in the paratype).

♀. Apparently not different from *C. c. celsus*.

Hab. Cuba: Soledad, in nests of *Petrochelidon fulva*, collected by J. Bequaert; 2 pairs, more or less strongly damaged, type (♂) and paratype (♀) in U.S. Nat. Mus., the second pair in coll. N.C.R.

27. **Ceratophyllus niger inflexus** subsp. nov. (Pl. 11, fig. 25).

♀. Only two specimens known. Both have the apical margin of sternite VII incurved above middle.

Hab. Colorado: Custer Co. (T. D. A. Cockerell), no host mentioned, 1 ♀, type, in U.S. Nat. Mus.; Colorado Springs, 1 ♀ on *Eutamias*, xi.1909 (E. R. Warren), in coll. N. C. R.

Dactylopsylla gen. nov.

♂♀. Similar to the *ignotus*-group of *Ceratophyllus*, but more specialised. Eye vestigial. Hindtibia with about 20 dorsal bristles. Hindtarsal segment V shorter than III.

♂. Exopodite very long and slender, curved backwards at apex. Proximal setiferous lobe of sternite IX separated by a broad sinus from the distal lobe,

no hinge between the two lobes, ventral angle of distal lobe hook-shaped, not rounded. Dorsal portion of outer sheath of penis modified into a long, narrow, finger-like process which is curved down and is not pointed, and the lateral portion of the sheath ending with a sharp hook directed down and placed above a sinus of the sheath.

♀. Below eye a long marginal bristles, in addition to the usual eye-row of three. Stylet at least thrice as long as broad. Head of spermatheca longer than broad, orifice subventral or ventral.

Genotype: *Odontopsylla bluei* Fox (1909).

28. **Dactylopsylla comis** spec. nov. (Pl. II, fig. 26).

♀. Apical margin of sternite VII rounded, not produced into a narrow triangular lateral lobe as in *D. bluei*.

On mesopleura 13 or 14 long bristles and anteriorly nearly 30 small ones. On metanotum about 33 bristles in front of the postmedian row, on the two sides together. Bristles on abdominal tergites also more numerous than in *D. bluei*: tergites II 38, 33; III 39, 35; VI 27, 29; VII, 24, 24; on the two sides together. On sternite II 22 on the right side and 24 on the left (long and short), on sternite VII 54 on both sides together. Anterior coxa with more than 80 bristles. On outside of hindtibia 23 or 24 lateral ones. The longest apical bristle of hindtarsal segment II reaches to apex of IV, not beyond it. Sternite VII broadly rounded. Stylet more than four times as long as broad. Head of spermatheca shorter than in *D. bluei*.

Hab. British Columbia: Okanagan Landing, 1 ♀ off *Thomomys fuscus*, collected by J. A. Muro.

29. **Phalacropsylla arachis** spec. nov. (Pl. II, fig. 27).

♂♀. Proboscis reaching to two-thirds of forecoxa. Abdomen without apical spines. Pygidium not convex behind. Hindcoxa with one row of short, but rather stout, spiniforms. Hindtarsal segment III shorter than V, and IV at most one-third longer than broad. Chaetotaxy essentially as in *Ph. cummingi*, but the bristles of the hindleg on the whole a little shorter.

♂. Genital armature similar to that of *Ph. cummingi* Fox (1926), but the bristles of sternite VIII more distal; clasper with fewer bristles; exopodite narrower, without any bristles in lower two-fifths; apex of sternite IX more pointed and the two spiniforms nearer the point.

♀. Apical margin of sternite VII slanting, somewhat undulate, with a shallow bay at some distance above the ventral angle, which is rounded off; apex of tergite VIII pointed. Head of spermatheca as broad anteriorly as posteriorly, but thinner in middle. Ventral margin of anal sternite subangulate.

Hab. Arizona: McCleary's Ranch, 30 miles S.E. of Tueson, 30.i.1921 (V. Bailey), on *Dipodomys spectabilis*, 1 ♂ and 4 ♀♀, and 1 ♀ on *D. merriami* ex coll. Chapin in U.S. Nat. Mus. (2 ♀♀ transferred to the N. C. R. collection); type ♂.

30. **Phalacropsylla shannoni** spec. nov. (Pl. II, figs. 28, 29).

♂♀. Agrees with *Ph. arachis* in the shortness of the proboscis, the absence of apical spines from the abdominal tergites, the flatness of the pygidium and the row of spiniforms on the inside of the hindcoxa; but segments II of midtarsus and III of hindtarsus a little longer than V, and IV of hindtarsus nearly twice

as long as broad. Bristles of hindtibia and hindtarsus very long. Only 2 antepygidial bristles, one long, the other nearly as stout, but only one-fourth as long.

♂. Sternite VIII with a curved subapical row of bristles nearly parallel to the rounded apical margin. Clasper almost gradually narrowed into a conical process, with two very long and numerous shorter bristles. Exopodite nearly as in *Ph. cummingi* Fox (1926), but somewhat shorter, with the bristles in lower half more numerous. Sternite IX quite different: ventral arm divided into four processes (two on each side), the outer process of each side is without bristles and recalls a hoe; the inner process also is widened downward at the apex; its upper angle slightly acute, bearing a pale bristle, below which, at the vertical apical margin, a small, pale, curved spiniform; the ventral nose of the inner process rounded, bearing a short, stout, obtuse spiniform at the apex and proximally to this two short stout bristles.

♀. Apical margin of sternite VII nearly vertical, its upper angle rounded and slightly projecting. Apex of tergite VIII rounded off. Head of spermatheca inverted pyriform, broadest towards tail. Ventral margin of sternite X straight, the bristles thinner than in *Ph. cummingi*.

Hab. Washington: Ritzville, vi.1920, on fieldmice (R. C. Shannon), 3 ♂♂ and 1 ♀, type ♂ in U.S. Nat. Mus., one paratype ♂ transferred to coll. N. C. R.; Lind, viii.1920, off fieldmouse (R. C. Shannon), 3 ♂♂,1 ♀; from same place, off *Perognathus*, and "Big-eared mice," x.1920 (M. C. Lane), a small series in coll. of Ent. Department, Cornell, Ithaca.

31. **Nycteridopsylla chapini** spec. nov. (Pl. II, figs. 30, 31).

♂♀. The apical spines of abdominal tergites I and II as short as those of the metathoracic comb, and there are at most 5 spines in these combs, whereas the pronotal comb contains from 29 to 32 spines. Segment II of maxillary palpus twice, in ♂ less than twice, the length of segment I. The four subdorsal bristles on the frons of the ♀ very stout, almost spiniform, much stouter than any bristles of the abdomen; in ♂ 3 bristles, which are not enlarged, being about as thick as the lateral bristles placed below the row of three. The bristles of the occiput as stout in ♀ as the subdorsal ones of the frons, in ♂ on the whole slightly stouter than the bristles of the pronotum.

♂. Clasper almost equally divided by a broad apical sinus into a dorsal and a ventral process, the ventral process bearing a long stout bristle. The exopodite similarly forked, but the processes longer than those of the clasper, the dorsal one narrow, subcylindrical, truncate, and the ventral process, which is the longer of the two, slightly widened towards apex and bearing a marginal, apical row of 5 or 6 long bristles, besides a few small marginal and lateral ones. The distal lobe of sternite IX very long, curved upwards from close to its origin, widest in middle, rounded at apex, nearly five times as long as broad (the length measured in a straight line).

♀. Apical margin of sternite VII rounded, without a distinct lateral sinus; the segment bears a row of 9 bristles, in front of which there are 7 small bristles, on the two sides together. Stylet slender, as long as the third hindtarsal segment.

Length (approximately), ♂ 1·7 mm., ♀ 2·6 mm.; hindfemur ♂ 0·38, ♀ 0·43 mm.

Hab. Maryland: Glen Echo, on *Eptesicus fuscus*, iii.1916 (R. O. Shannon), 2 pairs ex coll. E. A. Chapin, in whose honour the interesting species is named; one pair transferred to coll. N. C. R.; type ♂ in U.S. Nat. Mus.

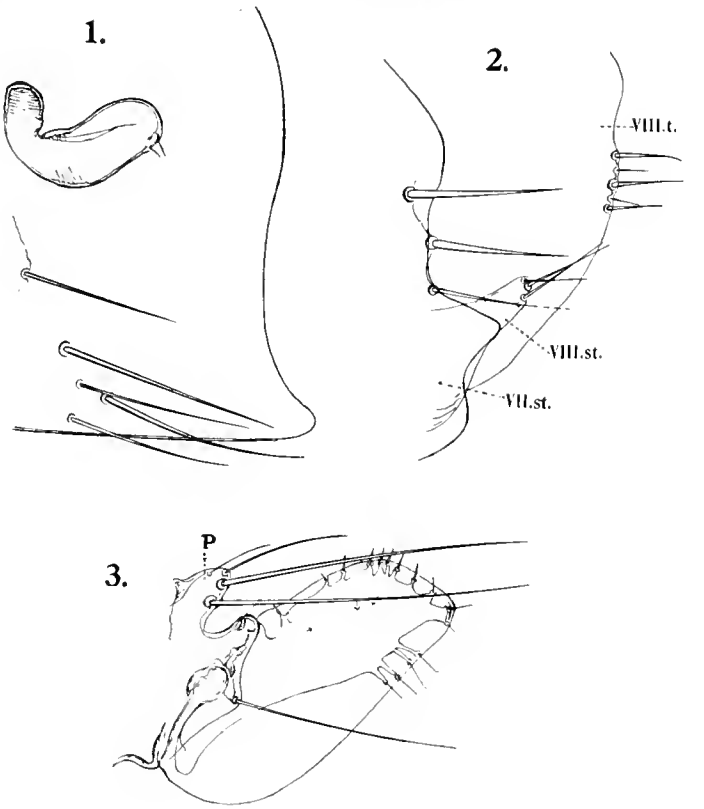
SOME OLD-WORLD SIPHONAPTERA.

By DR. KARL JORDAN.

(With 3 text-figures.)

1. **Rhadinopsylla jaonis** spec. nov. (text-fig. 1).

♀. Near to *Rh. dahurica* J. & R. (1920), but the labial palpi secondarily divided into more than the usual number of segments, the divisions not quite complete, the one palpus consisting of 8, the other of 7 segments. Frontal tubercle small, nearer to the oral angle than in *Rh. dahurica*. Four genal spines, of which



the upper one is the shortest. Apical margin of VII.st. strongly slanting, slightly incurved, the segment being longest close to the ventral margin ; there is neither a lateral sinus nor a lateral incrassation, both of which are present in *Rh. dahurica*. Head of spermathea less claviform than in *Rh. dahurica*, its tail as in that species, not being caved in on the posterior side ; the head of spermatheca longitudinally split for some distance, which may account to some extent for its dorsal surface being less incurved than in *Rh. dahurica*.

Length (approximately) 2·1 mm.——Hindfemur: 0·31 mm.

Hab. China: Wu-Yasi, Shansi, on *Scaptochirus gilliesi*, one badly preserved ♀ in U.S. Nat. Mus.

2. **Palaeopsylla remota** spec. nov. (text-fig. 2).

♀. Dark portion of short upper genal spine narrower than in the other species of this genus, second spine broader, third pointed as in *P. minor* Dale (1878). Head similar in proportions to that of *P. sorecis* Dale (1878). Proboscis nearly reaching to apex of forecoxa. Pronotum short, with 15 spines in the comb, the spines long and narrow, the longest as long as hindtarsal segment II. Abdominal sternite VII with a broad upper lobe and a triangular subventral lower one, the latter projecting more than the former (fig. 2). On the ventral portion of tergite VIII a vertical row of three bristles about halfway to apex; apical margin with shallow sinus, and below it with a row of three bristles, between which there are two small bristles, on one side of body an additional marginal bristle above the row. Sternite VIII (which is much broader in *P. sorecis* than in *P. minor* and *P. kohauti* Dampf (1910)) longer than in *P. sorecis*; the bristles at its apex long, whereas in all the other species these bristles are minute.

Long. 2·3 mm.

Hab. China: Chungking, on Mole (W. R. Brown), 1 ♀; at Tring.

3. **Ctenophthalmus russulae ducis** subsp. nov. (text-fig. 3).

♂. Process P^1 of clasper longer than in *Ct. r. russulae* J. & R. (1912) from Algeria, its long bristles farther away from the bottom of the sinus. Sternite VIII. only with three long bristles in the posterior row.

Hab. Sardinia: Assuni, 1 ♂ off *Sorex* spec. (Dr. A. H. Krausse); at Tring.

TYPES OF BIRDS IN THE TRING MUSEUM.

BY ERNST HARTERT, PH.D.

D. Gregory M. Mathews' Types of Australian Birds.[1]

DROMICEIIDAE.

1. **Dromiceius novaehollandiae woodwardi** Math. = *Dromiceius novaeholl. woodwardi.*

Dromiceius novaehollandiae woodwardi Mathews, *Nov. Zool.* xviii, p. 175 (1912—Strelley River, N.W. Australia).

Type: ♂ Strelley River, 4.ix.1901. J. W. Tunney coll. No. R. 232.

2. **Dromiceius novaehollandiae rothschildi** Math. = *Dromiceius novaehollandiae rothschildi.*

Dromiceius novaehollandiae rothschildi Mathews, *Nov. Zool.* xviii, p. 175 (1912—Gracefield, S.W. Australia).

Type: ♂ Gracefield, Kojonup district, S.W. Australia, 22.ix.1912. J. W. Tunney coll.

While *D. n. woodwardi* is a lighter bird, *D. n. rothschildi* seems to be a darker form.

SPHENISCIDAE.

(?) 3. **Aptenodytes patagonica halli** Math. = *Aptenodytes patagonica halli* (? ?).

Aptenodytes patagonica halli Mathews, *B. Australia*, i, p. 272 (1911—Macquarie Islands).

Type: " ♂ ad., Maequarie Islands, British Antaretic Exp., 1907."

I doubt if it will be possible to distinguish several forms of King Penguins. The extent of the bluish-grey colour on the inside of the flippers varies a great deal individually, and so, it seems to me, does the colour of the upperside. I do not understand the description of the " inside of the tarsus," which is supposed to be white in *A. p. halli* and *longirostris* (Kerguelen and Crozet Is.), but " blue all round, forming a collar " in *A. p. patagonica* from South Georgia and Falkland Islands. The tarsi of our 2 Falkland and South Georgia specimens are as in the series from the Maequaries, and this is the same in the British Museum.

4. **Eudyptula minor iredalei** Math. = *Eudyptula minor iredalei.*

Eudyptula minor iredalei Mathews, *B. Australia*, i, p. 286 (1911—Chatham Islands).

Type: An adult specimen from the New Zealand seas, bought from a New Zealand dealer, possibly from the Chatham Islands.

The Chatham Islands specimens have as a rule a larger, stronger bill than those from New Zealand. The bill of the type is stronger than in most New Zealand specimens, but not so strong as in the biggest Chatham Is. examples, and it would have been better to select as type a skin with a more pronounced big bill, and with a certain locality.

[1] For former lists of types see NOVITATES ZOOLOGICAE, vols. 1918, 1919, 1920, 1922, 1924, 1925, 1926, 1927, 1928.

† 5. **Eudyptula minor woodwardi** Math. = *Eudyptula minor noraehollandiae.*

Eudyptula minor woodwardi Mathews, *Nov. Zool.* xviii, p. 199 (1912—"West Australia").

Type: ♂ Sandy Hook Island, south-east coast of West Australia, 15.xi.1904. Caught on nest on young, by J. Tunney. No. 7090 (239 of Mathews).

Mathews was, I believe, the first recent author who pointed out the striking difference of the Australian form, which has white rectrices, mostly with blue-black shaft-streaks towards bases of feathers, sometimes without. In his *Birds of Australia*, i, p. 285 (1912) he gave a good review of the forms of *Eudyptula minor*, as follows:

Eudyptula minor minor Forst., New Zealand.

Eudyptula minor albosignata Finsch, "Akaroa, New Zealand."

Eudyptula minor iredalei Math., Chatham Islands.

Eudyptula minor noraehollandiae Steph., Australia.

In 1912 (just after this was published) he spoiled his good work by describing *E. minor woodwardi*, saying that it was "grey-blue" above, which all *Eudyptula* are, and that the "flipper is grey and not blue"; this, however, is due to the flippers being covered with dirt.

On the other hand, in 1927, in the *Syst. Av. Australasian.*, p. 12, he more logically recognized *E. albosignata* as a species, while unfortunately still retaining *woodwardi*.

MEGAPODIIDAE.

† 6. **Megapodius duperreyi melvillensis** Math. = *Megapodius reinwardt tumulus.*

Megapodius duperreyi melvillensis Mathews, *Austral Avian Record*, i, p. 26 (1912—Melville Island).

Type: ♂ in partially worn plumage, Melville Island, 1.xii.1911. J. R. Rogers coll. No. 2555.

Already placed as synonym by Mathews 1927, and there can be no doubt that this is correct. On the other hand, it seems to me certain that the specimens from Cape York and North Queensland (Cairns) are on the crown of the head and on the back more rufous, somewhat brighter and lighter than in *M. r. tumulus*. They are smaller. This form should be separated as another good subspecies. Mathews does not separate it, but suggests (*B. Austr.* i, p. 37) that it might be separated as

Megapodius reinwardt assimilis Masters.

It is, however, very doubtful if the name *assimilis* can be adopted for these birds, as *assimilis* was described from skins from Dungeness and Bet Islands in the Torres Straits, nearer to New Guinea than to Australia. Masters, *Proc. Linn. Soc. N.S. Wales*, i, p. 59, 1876, says that this bird is found on "many of the low-lying islands in Torres Straits." A skin from Cairncross Island in the British Museum has the upperside much redder than any other.

Mathews places *assimilis*, in 1927, as a synonym of *tumulus*, but gives as distribution of the latter only "Northern Territory and North Queensland," while *assimilis* was named from an island in the Torres Straits. These latter islands have unfortunately been neglected recently, Mathews never sent collectors there, and in this case and others does not mention them in the distribution of species and subspecies.

† 7. **Leipoa ocellata rosinae** Math. = *Leipoa ocellata* (*ocellata*).

Leipoa ocellata rosinae Mathews, *Nov. Zool.* xviii, p. 177 (1912—" South Australia, Victoria, New South Wales ").

Type : " South Australia, Dec. 1875," no exact locality.

It seems to me that there is no constant difference between eastern and western specimens, neither in the Mathews collection nor in the British Museum.

† 8. **Alectura lathami robinsoni** Math. = *Alectura lathami lathami*.

Alectura lathami robinsoni Mathews, *Nov. Zool.* xviii, p. 177 (1912—" Mid Queensland ").

Type : ♂ Mt. Sapphire, Cairns, Northern Queensland, 16.x.1899. E. Olive coll.

Already recognized as synonym by Mathews, 1927.

TURNICIDAE.

9. **Turnix maculosa pseutes** Math. = *Turnix maculosa pseutes*.

Turnix maculosa pseutes Mathews, *Nov. Zool.* xviii, p. 180 (1912—" North West Australia ").

Types : " ♂♀ " Parry's Creek, East Kimberley, N.W. Australia, 15.xii.1908, 26.i.1909. J. P. Rogers coll.—both, however, are females ; the supposed male was left unsexed (queried) by Rogers, but Mathews thought it was a male.

This form is different from *T. m. maculosa* of New South Wales and Victoria in being darker on the underside, having a distinct, unspotted rufous superciliary line, and in being somewhat smaller ; only in one of the three dozen specimens from New South Wales, said to be from the Botany Swamps, do I find the same unspotted rufous superciliary line.

Though different from *T. m. maculosa* this form is very closely allied to the Timor form *T. m. rufescens*, which, however, in adult females, often has the whole underside deeper rufous still, leaving no white patch on the abdomen (♀ ad. !). Formerly I took the view expressed by Hellmayr in the *Arifauna von Timor*, p. 95, viz. that the variation in these birds was so great that *rufescens* could not be separated. Now, however, with three dozen typical *maculosa* before me, it is evident that a darker island form is easily separable, though only adult females can be recognized at first glance. Of what I call *rufescens* we have at Tring now : 5 from Wetter, 4 from Moa, 1 from Alor,[1] 1 ♀ from Babber, 3 from South Flores,[2] 2 from Timor, 5 from Savu,[3] 1 from Kisser, 3 from Tomia, 1 from Little Key. Of all these localities Mathews only mentions Timor, having apparently only been interested in the type locality.

We also have a female, but possibly not quite adult, from Cape York, which probably served Mathews for his description of *T. maculosa yorki*, which is not different from *rufescens* and *pseutes*.

From the Aroa River in New Guinea we have one female and one young. These were united with *yorki* by Mathews, but if the latter is not different from *rufescens* it would fall under that form.

From Celebes we have only one adult female, and a young bird. This material is insufficient, but the upperside of the adult female is very light, and it seems to be a smaller bird than *maculosa* and its other allies ; it is

[1] Underneath deeper brown than any others, wing-coverts almost uniform rufous, hind-neck very wide chestnut-red.

[2] One with the back blacker than in any others.

[3] All very light above, but one from Queensland is indistinguishable.

therefore possible—judging from our two birds—that Salvadori's *beccarii* is a distinct subspecies.

[There is also an error in the "distribution" of *Turnix powelli* Guill. in Mathews' *Syst. Av.* p. 21. He gives as the locality Gunong Api "north of Wetter Island," while the type was shot on Gunong Api near Sumbawa! The name Gunong Api, meaning fire-mountain, is of course variously applied to active volcanoes in Malay-speaking countries. In the distribution only "Gunong Api" is given, while the species has now been recorded by me from Lombok, Sitonda Island near Sumbawa, Lomblen, Alor and Flores.]

† 10. **Turnix varia stirlingi** Math. = *Turnix varia varia*.

Turnix varia stirlingi Mathews, *Nov. Zool.* xviii, p. 181 (1912—"West Australia").

Type: ♀ ad., Stirling Range, W. Australia, 2.x.1910. L. White coll.

Already made a synonym by Mathews, of *Turnix varia scintillans*, a name which he now uses for the West Australian birds; in the *B. Australia* he made *scintillans* a synonym of *varia*, and later on separated it without any explanation. Gould described *scintillans* from the Houtman's Abrolhos Islands; from there I have not been able to see specimens, but if it is to be the West Australian form I cannot separate it; fresh specimens are finer and brighter than old dusty skins from New South Wales and Victoria, but fresh ones from the latter countries seem to be indistinguishable. When Gould described it, he evidently did not know that the females are larger, and his saying that *scintillans* was not much more than half the size of *varia* was an exaggeration.

† 11. **Turnix varia subminuta** Math. = *Turnix varia varia*.

Turnix varia subminuta Mathews, *Nov. Zool.* xviii, p. 181 (1912—"North Queensland").

Type: ♂ Cooktown, 18.iii.1900. Olive coll. Mathews says: "Differs from *T. v. varia* in its smaller size. Wing 100, in typical birds 107–112 mm." But this is the difference of the sexes, wings of males measuring 100 or less, of females about 107–112 mm.

† 12. **Turnix castanota melvillensis** Math. = *Turnix castanota castanota*.

Turnix castanota melvillensis Mathews, *Austral Av. Rec.* i, p. 27 (1912—Melville Island).

Type: ♀ Cooper's Camp, Apsley Straits, Melville Island, 27.x.1911. J. P. Rogers coll.

Already recognized as synonym by the author.

† 13. **Turnix castanota alligator** Math. = *Turnix castanota castanota*.

Turnix castanota alligator Mathews, *Austral. Avian Record*, i, p. 27 (1912—"West Northern Territory").

Type: ♀ South Alligator River, 28.vi.1903. J. Tunney coll.

Already recognized a synonym by the author.

14. **Turnix castanota magnifica** Math. = *Turnix castanota magnifica*.

Turnix castanota magnifica Mathews, *Nov. Zool.* xviii, p. 181 (1912—"North West Australia").

Type: North-West Kimberley, 18.vii.1901.

Cf. Nov. Zool. xxxiv. 1927, p. 25.

(? †) 15. **Turnix velox vinotincta** Math. = *Turnix velox vinotincta* (?).

Turnix velox vinotincta Mathews, *Nov. Zool.* xviii, p. 182 (1912—" Interior North West Australia, Mungi ").

Type: ♀ ad., Mungi Rockhole, 8 miles S.E. of Mount Alexander, West Kimberley, N.W. Australia. 19.vi.1911. J. P. Rogers coll.

It is possible that the western form is separable from the typical one from South Australia, Victoria and N.S. Wales to Queensland, but the material in the Mathews collection from these countries is so poor, and the variability in the series from North-West Australia (from the same localities) so great, that it was very bold and hazardous to separate this form, and final judgment cannot be passed at present from the material at hand.

† 16. **Turnix velox picturata** Math. = *Turnix velox* (?) *vinotincta*.

Turnix velox picturata Mathews, *Nov. Zool.* xviii, p. 182 (1912—" North West Australia, Derby ").

Type: ♀ Derby, 18.ii.1902.

Mathews, *B. Austr.* i, admitted no subspecies of *T. velox*, but some months afterwards (Nov. Zool. xviii, p. 182) he separated *velox leucogaster* of North without any explanation whatever, and separated *velox vinotincta* and *picturata* with quite short diagnosis and without saying what material he had. In 1927 he placed *vinotincta* as a synonym of *velox leucogaster*, while keeping *picturata* separate. I can only repeat that I cannot decide about the subspecies, but *picturata* and *vinotincta* from Derby and West Kimberley should geographically be the same, and not the former the same as the Davenport Creek bird (West Queensland), if that is different.

† 17. **Colcloughia melanogaster goweri** Math. = *Turnix melanogaster*.

Colcloughia melanogaster goweri Mathews, *Austral Avian Rec.* iii, p. 53 (1916—Gowrie, Queensland).

Type: ♀ ad., Gowrie Scrub, December 1889, no original label.

Mathews has recognized his error and placed " *goweri* " as a synonym, p. 23, *Syst. Av. Australasianarum*.

18. **Turnix pyrrothorax berneyi** Math. = *Turnix pyrrhothorax berneyi*.

Turnix pyrrothorax berneyi Mathews, *Nov. Zool.* xviii, p. 182 (1912—" North West Australia ").

Type: ♀ Parry's Creek, East Kimberley, N.W. Austr., 4.ii.1909. J. P. Rogers coll.

† 19. **Austroturnix pyrrothorax intermedia** Math. = *Turnix pyrrhothorax berneyi*.

Austroturnix pyrrothorax intermedia Mathews, *Austral Avian Record*, iii, p. 53 (1916—" Wyangarie, Queensland ").

Type: ♀ Wyangarie, Flinders River, Northern Queensland, north of the Dividing Range, April 1908. F. Berney coll.

This specimen, though a bad skin, belongs clearly to the darker form, *berneyi*, inhabiting N.W. Australia and Northern Territory, which is a good subspecies.

† 20. **Pedionomus torquatus goulburni** Math. = *Pidionomus torquatus*.

Pedionomus torquatus goulburni Mathews, *Austral Avian Rec.* iii, p. 53 (1916—" Goulburne, New South Wales ").

Type: ♀ Goulburn plains, no date.

Error already recognized by Mathews, *Syst. Av. Austral.* p. 25.

PHASIANIDAE.

† 21. **Coturnix pectoralis praetermissa** Math. = *Coturnix pectoralis.*

Coturnix pectoralis praetermissa Mathews, *Nov. Zool.* xviii, p. 178 (January 1912—" West Australia").

Type : ♀ Broome Hill, South-West Australia, 28.xi.1908. Tom Carter coll.

When Mathews described this bird in 1911 he had no others from that locality, and did not notice that it was a soiled bird, possibly from the ashes from a bush fire. Later on he received a series of females and young from Carter, from the same locality, and a fine adult from " Wilson's Inlet," S.W. Australia, which are clean and do not differ from *C. pectoralis* from other parts of Australia. Unfortunately these were not thought of when Mathews wrote the *Syst. Avium Austral.*, where on p. 18 *praetermissa* is still admitted.

(Three skins from the Gawler Ranges in South Australia are very sandy reddish, but in varying degrees, and I think they are soiled by some reddish earth, and that therefore they do not constitute a different subspecies as it would seem at first glance.)

† 22. **Coturnix australis melvillensis** Math. = *Synoicus ypsilophorus cervinus.*

Coturnix australis melvillensis Mathews, *Austral Av. Rec.* i, p. 26 (1912—Melville Island).

Type : ♂ Cooper's Camp, Apsley Straits, Melville Island, 6.x.1911. No. 2128, J. P. Rogers coll.

Already placed as synonym by the author in *Syst. Av. Austr.* Mathews now adopts the name *ypsilophorus*, which is older than *australis.*

† 23. **Coturnix australis rogersi** Math. = *Synoicus ypsilophorus cervinus.*

Coturnix australis rogersi Mathews, *Nov. Zool.* xviii, p. 179 (1912—" North West Australia, Parry's Creek ").

Type : ♀ Parry's Creek, East Kimberley, N.W. Australia, 10.xi.1908. No. 322, J. P. Rogers coll.

† 24. **Coturnix australis mungi** Math. = *Synoicus ypsilophorus cervinus.*

Coturnix australis mungi Mathews, *Nov. Zool.* xviii, p. 179 (1912—" North West Australia, Mungi ").

Type : ♂ Mungi Rock Hole, 8 miles S.E. of Mt. Alexander, West Kimberley, N.W. Australia, 2.vii.1911. No. 1854 of P. Rogers coll.

Already synonymized by Mathews, 1927.

25. **Coturnix australis queenslandicus** Math. = *Synoicus ypsilophorus queenslandicus.*

Coturnix australis queenslandicus Mathews, *Austral Avian Rec.* i, p. 26 (1912—" Cape York, North Queensland ").

Type : ♀ Cape York, 30.viii.1911. No. 1894, J. P. Rogers coll.

This seems to be a more reddish form.

† 26. **Excalfactoria chinensis cairnsae** Math. = *Excalfactoria chinensis australis.*

Excalfactoria chinensis cairnsae Mathews, *Austral Avian Rec.* i, p. 83 (1912—" North Queensland ").

Type : ♂ Cairns, North Queensland, October 1911. Schrader coll. Already placed as synonym by Mathews 1927. I agree.

† 27. **Excalfactoria chinensis victoriae** Math. = *Excalfactoria chinensis australis.*

Excalfactoria chinensis victoriae Mathews, *Nov. Zool.* xviii, p. 179 (1912—"Victoria, South Australia ?").

Type : ♂ Koo Wee Rup, Victoria, December 1892.

The supposed differences do not hold good.

28. **Excalfactoria chinensis colletti** Math. = *Excalfactoria chinensis colletti.*

Excalfactoria chinensis colletti Mathews, *Austral Avian Rec.* i, p. 73 (1912—"Northern Territory").

Type : ♂ Glencoe, Northern Territory, 28.ii.1895. Dahl coll.

This form—judging from our small series of two males and one female, collected at Glencoe and the Adelaide River by Dahl—seems to be separable, the males being on the upperside somewhat pale, the female on the other hand nearly as dark as *lepida*, and somewhat small.

(In the *Systema Av. Austral.* 1927, Mathews says of *E. c. lineata* that it inhabits the "Philippines to New Guinea and Marianne Islands." This seems to require correction ; the New Guinea specimens that I have seen, a male from the Kumusi River, a female from Boboli, China Straits, S.E. New Guinea, are different from *lineata* and obviously are *lepida*. In NOV. ZOOL. 1898, p. 49, I quoted *E. chinensis lepida* from Flores, but omitted to say that the male has more chestnut-red on the wing than any other specimen I have seen ; it may possibly be another subspecies, but this can only be made certain by more material. On the Marianne Islands it must have been introduced.)

CORVIDAE.

The Australian *Corvi* have recently enjoyed (or suffered ?) a great deal of attention. Mathews has treated them in various different ways in his somewhat hurried lists, and finally in his *Birds of Australia*, in the two last parts, which appeared early in 1927.

Stresemann has reviewed them in 1914 in *Verh. Orn. Ges. Bayern*, xii. and Meinertzhagen in NOV. ZOOL. xxxiii, 1926.

After comparing our wonderful series of Australian *Corvi*, I was formerly, in 1921 to 1923, inclined to agree with Stresemann, who considered all *Corvi* of a somewhat similar appearance from Australia to Japan, Manchuria, and India, as forms of *coronoides*, recognizing four subspecies in Australia : *coronoides*, *perplexus*, *bennetti*, and *cecilae*.

Meinertzhagen severely criticized Mathews' changing divisions, and accepted only two subspecies in Australia, i.e. *coronoides* and *bennetti*. I am sorry to say that, after spreading out on the long tables in the Tring Museum the 200 Australian *Corvi*, and comparing them, not a few specimens at the time, but series with series, I have been obliged to alter my opinion considerably. First of all it is certainly an error to consider the forms with the large raven-like hackles on the throat and the dark brownish bases to the feathers of the neck and breast, and the forms with smaller throat feathers and snow-white bases to the feathers of breast and neck, as subspecies of one another. In fact *coronoides* differs from *bennetti* and *cecilae* as much as a European Raven (*corax*) and a Carrion Crow (*corone*) ; the hackles of *coronoides* are at least twice as large as those of *cecilae* and *bennetti*, and there are no intermediates, neither in the hackles nor in the colour of the feather-bases. In fact Sharpe, *Cat. B. Brit. Mus.* iii, placed *coronoides* in the

genus *Corvus*, *bennetti*, sub nomine *australis*, into *Corone*. Though I, of course, most strongly disagree with this genus-splitting, there was some sense in it, in so far as the two groups are very different, and there is also some sense in the popular Australian distinction of *coronoides* as "Raven" and *bennetti* as "Crows."

It is true that the distribution of the "Raven" and the "Crows" seems to be exclusive, but this is not absolutely the case, as both occur in the Gawler Range in South Australia, and, as mentioned by Meinertzhagen, one "Raven" was shot at Normanton in Queensland, where only "Crows" are otherwise known; Meinertzhagen says it "would be unreasonable to allow one bird out of over 220 to influence a general deduction based on such a large series." I cannot so lightly do away with this "puzzling" specimen, as Normanton is rather far away from the known habitat of "*coronoides*," and I would first want to know if there is not a population of this bird at Normanton. In life all black Ravens and Crows must look much alike, it is therefore possible that many *coronoides* occurred, though only one was shot at Normanton. Moreover, geographical separation alone cannot decide about two forms being species or subspecies, for they must agree in their main features to be regarded as the latter. I do *not* find that there are intermediates between the two species!

Now with regard to the two forms with white feather-bases. Though I cannot accept any subspecies, there are in my mind obviously two species. Several good observers, especially Tom Carter, also Robert Kemp, have definitely stated that a large and a small "Crow" are found in the same places, and we have some from the same localities and dates: from N.W. Australia (collected by Tom Carter), from Normanton in Queensland (collected by R. Kemp), from Cape York and from Central Australia. The two forms differ only in size, but adults do not overlap, though there is a considerable individual variation. The small bird is everywhere much rarer, according to a number of statements in the field; notes about different calls lack precision, but a larger and a smaller form usually have different notes in other birds, the same might therefore be expected in these. A good deal of attention has been given to the colour of the iris, but field ornithologists in Australia have formerly overlooked the fact that old birds of all *Corvi* in Australia have as a rule a white iris, while the iris is brown in young birds—though it seems that the brown iris is also sometimes found in adults, at least of *coronoides*.

Of the authors mentioned who wrote recently about the species of the Crows and Ravens of Australia, Mathews therefore came nearest the truth—or let us say the only logical conclusion I could arrive at. I agree with him that there are apparently three different species: *coronoides*, *cecilae*, and *bennetti*; on the other hand, I cannot accept any of his subspecies of either of them.

Though the species with brown feather-bases is quite distinct from those with white feather-bases, it must be made clear that *young* birds of *cecilae* do not have snow-white bases, but have them pale grey or brownish grey! This is proved by specimens from Normanton in Queensland, most strikingly in No. 4565, shot by Kemp 20.v.1914. Of *bennetti* we have no birds young enough to show this change.

Stresemann also separated *cecilae* and *bennetti*, but as subspecies—with the caution that further researches in a wild state might possibly alter his conclusion. Mathews wrongly accused him of thinking that "Moolah" was near Cape York, while he distinctly said that it was in western New South Wales.

Unfortunately, the separation into species of the Australian *Corvi* affects the nomenclature of many other forms, and the large structure of Stresemann and Meinertzhagen—largely followed by myself, Baker, and others—having several weak points, invited attacks, and falls at the first assault.

The separation into a species with white feather-bases and another with grey bases is more or less tenable, not only in Australia, but all over the range of all forms of "*coronoides*" admitted by Stresemann, Meinertzhagen, and Baker.

Snow-white bases are found in *cecilae* and *bennetti*. Of these two *cecilae* is similar to many other geographical forms, in fact *latirostris* from Timorlaut is only separable from *cecilae* by its wider bill, at the base! *C. bennetti* is a form of smaller dimensions, which developed apparently, not from a geographical subspecies (like so many other species have undoubtedly done), but from other reasons unknown at present, and we must use for it a binomial appellation.

Into the group of *latirostris* fall naturally *macrorhynchus*, *orru*, *insularis*, *philippinus*, and *macrorhynchus*: *macrorhynchus* being the oldest name, they all become subspecies of the latter.

These birds agree not only in the pure white feather-bases but have glossy under-surfaces, and the hind-neck is not strikingly different from the rest of the upper surface, in fact in most cases equally glossy, and the feathers of the hind-neck are practically of the same structure.

On the other hand, the more northern group of forms, inhabiting the Japanese and Chinese islands, China, and India, all agree in having the feather-bases brown-grey to whitish-grey, not snow-white, the most northern and high mountain forms having generally the darkest bases. Also the continental birds have generally an almost glossless underside, and the feathers of the hindneck are less glossy and somewhat less compact at the edges.

Typical for this group are *japonensis*, *mandschuricus* (synonymized with *japonensis* by Meinertzhagen), *hassi* (synonymized with *colonorum* by Meinertzhagen), *hainanus*, *connectens*. To this group might be connected also *intermedius* (in which the bases are usually whitish grey to light grey, often also white, though not of the snowy whiteness of the *macrorhynchus* group), *levaillantii*, *culminatus* (not separated from *levaillantii* by Stresemann). *Levaillantii* being the oldest name, this becomes the specific name of the group.

The Ceylon form differs in my opinion more strikingly than most of the others. It is the smallest form, and is more glossy on the underside and nape. The bases of the nape-feathers are grey or whitish grey, but never pure white. Stresemann and Meinertzhagen keep the Ceylon form (*anthracinus* Mad. 1911, *madaraszi* Stres. 1916) quite distinct, while Baker unites the Deccan and Ceylon form as *culminatus*.

I would thus tentatively acknowledge:

Corvus macrorhynchos macrorhynchos Wagl.

Corvus macrorhynchos Wagler, *Syst. Av.*, Corvus sp. 3 (1827—Java, type in München Museum).

Southern part of Malay Peninsula, Sumatra, Java, Kangean Is., Bali, Lombok, Sumbawa, Flores, Lomblen, Alor, Wetter, Kisser, Sumba, Timor, and Savu.[1]

[1] Since this was written Rensch separated the Flores form as "*Corvus coronoides inoptatus*," *Orn. Monatsber.* 1928, p. 7, because neck, back, and rectrices were blue-green, against "violet" in the Java-form. If this is correct the birds from all the Lesser Sunda Islands from Lombok eastwards will probably be *inoptatus*.

Corvus macrorhynchus philippinus Bp.

Corvus philippinus Bonaparte, *Compt. Rend. Acad. Paris*, xxxvii, p. 830 (1853—Philippines, doubtless Luzon).

Philippine Is., including Sulu Is.

Corvus macrorhynchos mengtszensis La Touche.

Corvus coronoides mengtszensis La Touche, *Bull. B.O. Club*, xliii, p. 80 (1922—Mengtsz).

Yunnan, S.W. China, perhaps exclusive of the highest mountains in the north.

Corvus macrorhynchus orru Bp.

Corvus orru Bonaparte, *Consp. Gen. Av.* i, p. 385 (1850—New Guinea, terra typica Lobo Bay, ex Sal. Müller MS.).

New Guinea, Western Papuan Is., west to northern Moluccas and Obi, east to D'Entrecasteaux and Louisiade Is.

Corvus macrorhynchos insularis Heinr.

Corvus insularis Heinroth, *Journ. f. Orn.* 1903, p. 69 (New Britain).

New Britain, Witu Is., New Ireland, New Hanover, Rooke Island. (A wonderful series now at Tring, collected by Albert F. Eichhorn.)

Corvus macrorhynchos cecilae Math.

Corvus coronoides cecilae Mathews, *Nov. Zool.* xviii, p. 442 (1912—N.W. Australia, terra typica Broome Bay).

Tropical Australia, generally (North Queensland, Northern Territory, N.W. Australia), West Australia, south at least as far as Dirk Hartog Island.

Corvus macrorhynchus latirostris Mey.

Corvus latirostris A. B. Meyer, *Zeitschr. ges. Orn.* i, p. 199 (1884—Timorlaut).

Timorlaut or Tenimber Is. and Babber.

Corvus bennetti North.

Corvus bennetti North, *Victorian Naturalist*, xvii, p. 170 (1901—Moolah in western N.S. Wales).

South and West Australia, apparently through Central Australia to northern and north-western N.S. Wales, Queensland to Cape York. Rarer than *cecilae* and in many places in the same area.

Corvus validus Bp.

Corvus validus Bonaparte, *Consp. Gen. Av.* i, p. 385 (1850—Ceram and Halmahera. Ex Temminck MS. in Leyden Museum. Cf. Meinertzhagen, *Nov. Zool.* xxxiii, 1926, p. 70).

Halmahera, Batjan, Obi, and Morty Islands.

This long-billed Raven, with pure white feather-bases, is rather puzzling. In spite of its greyish (not glossy black) underside, it might be united—and should have been united, as long as the birds with dull and glossy undersides were united—with the *macrorhynchus* group, if it was not that *C. m. orru* occurred on the same islands! The bill is not so very strikingly different from some *connectens*, though usually much longer.

Corvus levaillantii japonensis Bp.

Corvus japonensis Bonaparte, *Consp. Gen. Av.* i, p. 386 (1850—Japan. Stresemann "accepted" Yesso as typical locality, but in former times nearly all Japanese birds came from Hondo or Kiusiu Island, therefore Hondo should be fixed as terra typica !).

From Sachalin (teste Lönnberg) and Southern Kurile Is. (if locality on label correct !), over Japanese Islands to Tanega and Yaku. From Yesso an enormous example in Tring Museum with wing 385, but others from there only 348, 330 mm. !

? ! Corvus levaillantii mandschuricus But.

Corvus macrorhynchus mandschuricus Buturlin, *Mess. Orn.* iv, 1, p. 40 (1913—Ussuriland).

Supposed to be the representative of *japonensis* in E. Amurland, Ussuriland, Corea, but differences doubtful. Not recognized by Meinertzhagen, and probably not separable.

Corvus levaillantii hassi Rchw.

Corvus hassi Reichenow, *Orn. Monatsber.* 1907, p. 51 (Tsingtau).

S. Manchuria, Chihli, Shantung, south to the Tsinling Mts. in Shensi. Not recognized by Meinertzhagen, but seems recognizable.

Corvus levaillantii colonorum Swinh.

Corvus colonorum Swinhoe, *Ibis*, 1864, p. 427 (N.E. Formosa).

Formosa to the Lower Yangtse Valley.

Corvus levaillantii hainanus Stres.

Corvus coronoides hainanus Stresemann, *Verh. Orn. Ges. Bayern*, xii, p. 286 (1916—Hainan).

Hainan.

Corvus levaillantii connectens Stres.

Corvus coronoides connectens Stresemann, *Verh. Orn. Ges. Bayern*, xii, p. 281 (1916—Myiako- and Okinawa-shima, Riu Kiu group, south of Japan).

Only known to me from these two islands.

Corvus levaillantii intermedius Adams.

Corvus intermedius Adams, *Proc. Zool. Soc. London*, 1859, p. 121 (Kashmir, Dagshai, Simla).

Himalayas from Chinese Turkestan and Kashmir to Bhutan, and possibly to S.E. Tibet and Sifan. Kleinschmidt described from the latter places a *Corvus macrorhynchos tibetosinensis* from two skins only ! From his comparing it with *mandschuricus* and *japonensis* we must conclude that it belongs to the *levaillantii* group. More material is required to confirm this form.

Corvus levaillantii levaillantii Less.

Corvus Levaillantii Lesson, *Traité d'Orn.* p. 328 (December 1830—Bengale).

India south of the Himalayas east of the Sutlej valley and south to the Deccan, and to Madras and Nilgiri hills.

Corvus levaillantii andamanensis Beavan.

Corvus andamanensis Beavan, *Ibis*, 1866, p. 420 (Andamans); id. *Ibis* 1867, p. 328 (Andamans).

Assam, Burma, N. and W. Siam, south to Malay Peninsula and Penang.

Corvus coronoides coronoides Vig. & Horsf.

Corvus coronoides Vigors & Horsfield, *Trans. Linn. Soc. London*, xv, p. 261 (1827—Australia ! Substituted locality New South Wales).

" Generally south of a line running from lat. 30 south in New South Wales " through southern Australia to about N. of Perth. In N.S. Wales more or less coastal. One shot in Queensland. (Tasmania—or closely allied form.)

The following types are in the Mathews collection :

† 29. Corvus marianae Mathews = *Corvus coronoides coronoides.*

Corvus marianae Mathews, *Emu*, x, p. 326 (1911—" Replaces *C. australis* Gould, preoccupied ") ; *Nov Zool.* xviii, p. 443 (1912—Gosford, N.S. Wales).

Type (as quoted in 1912) : Ad., Gosford, N.S. Wales, Sept. 1892. No. 7084, Mathews coll. Originally this specimen was not sexed, but someone put subsequently " ♂ " on the label.

† 30. Corvus marianae mellori Math. = *Corvus coronoides coronoides.*

Corvus marianae mellori Mathews, *Nov. Zool.* xviii, p. 443 (1912—Angas Plains, South Australia. In the original diagnosis the range was given as Victoria, South Australia, S.W. Australia, but No. 5724 is quoted as the type, so that the type locality is that of No. 5724).

Type : " ♂ " (?), Angas Plain, 31.xii.1901. Ex. coll. Edwin Ashby.

† 31. Corvus coronoides perplexus Math. = *Corvus coronoides coronoides.*

Corvus coronoides perplexus Mathews, *Nov. Zool.* xviii, p. 442 (1912—" S.W. Australia, type Perth "),

Type : " Perth, West Australia." No. 3721.

Though Stresemann in his review of the forms of *Corvus coronoides*, in *Verh. Orn. Ges. Bayern*, xii, p. 277 (May 1916), recognized *perplexus* as a distinct subspecies, with *halmaturinus* and ? *tasmanicus* as synonyms, I must agree with Meinertzhagen that *perplexus* cannot be separated. I cannot agree that it is correct to say *perplexus* is on an average smaller ; the measurements of Stresemann and Meinertzhagen (NOV. ZOOL. 1926) do not show this, and I object to judging by average measurements in such a small series ; moreover, an average is spoilt if in either of the series occurs a giant, a dwarf, or in error of measuring. Thus the measure 380 mm. for a specimen without exact locality and data in the British Museum stands quite alone, and only very few of Stresemann's "*perplexus*" are smaller than the smallest "*coronoides.*" The Kangaroo Island form is no longer recognized by Mathews himself, while I have not seen enough skins from Tasmania to form an opinion.

I therefore treat without hesitation *perplexus mellori* and *halmaturinus* as synonyms of *coronoides*, leaving *tasmanicus* doubtful, as was done by Stresemann, l.c.

(In measuring Ravens it is important to consider the sexes, as the females are *as a rule* smaller (shorter wings and chiefly smaller bills).)

† 32. Corvus marianae halmaturinus Math. = *Corvus coronoides coronoides.*

Corvus marianae halmaturinus Mathews, *Nov. Zool.* xviii, p. 443 (1912—Kangaroo Island).

Type : ♂ juv. ! Middle R., Kangaroo Island, 20.x.1905, ex coll. Edwin Ashby. No. 3725. Wing-feathers not fully grown.

(?) 33. **Corvus marianae tasmanicus** Math. = *Corvus marianae tasmanicus* (?).

Corvus marianae tasmanicus Mathews, *Nov. Zool.* xviii, p. 443 (1912—Tasmania).

Type : Ad. (obviously ♂), Tasmania, 1876. Ex coll. Walter Chamberlain. No. 3719 of the Mathews coll.

This specimen is very large, but another " ♂ " from Hobart, Tasmania, 6.iv.1914, is much smaller. I would require more material to decide whether I should keep this form as a separate subspecies from *coronoides*.

34. **Corvus coronoides cecilae** Math. = *Corvus macrorhynchus cecilae*.

Corvus coronoides cecilae Mathews, *Nov. Zool.* xviii, p. 442 (1912—" North West Australia ").

Type : ♂ Napier, Broome Bay, N.W. Australia, 30.vii.1910. G. F. Hill coll.

† 35. **Corvus bennetti queenslandicus** Math. = *Corvus macrorhynchus cecilae*.

Corvus bennetti queenslandicus Mathews, *Nov. Zool.* xviii, p. 443 (1912—" Queensland ").

Type : ♂ jun., Coomooboolaroo, Dawson R., Queensland, 27.xi.1909. Henry Barnard coll. No. 4724 of Mathews coll.

† 36. **Corvus cecilae marngli** Math. = *Corvus bennetti*.

Corvus cecilae marngli Mathews, *Austral. Av. Rec.* i, p. 52 (1912—" Marngle Creek, West Kimberley, West Australia ").

Type : ♂ ad., Marngle Creek, 1.vi.1911. J. C. Rogers coll.

† 37. **Corvus bennetti bonhoti** Math. = *Corvus bennetti*.

Corvus bennetti bonhoti Mathews, *Nov. Zool.* xviii, p. 442 (1912—" West Australia ").

Type : " ♀ " Yaudan garra, Murchison, West Australia. G. T. Tunney coll. No. 5176 Mathews coll.

† 38. **Corcorax melanorhamphos subniger** Math. = *Corcorax melanorhamphos*.

Corcorax melanorhamphos subniger Mathews, *Nov. Zool.* xviii, p. 446 (1912—" Victoria ").

Type : ♀ ad., Ringwood, Victoria, 25.iii.1910. No. 54. " *C. m. subniger* " is not now admitted as different by Mathews, nor can I distinguish it.

† 39. **Corcorax melanorhamphos whiteae** Math. = *Corcorax melanorhamphos*.

Corcorax melanorhamphos whiteae Mathews, *Nov. Zool.* xviii, p. 446 (1912—" Eyre's Peninsula, South Australia ").

Type : ♀ W. coast near Lake Greenly, Eyre's Peninsula, 29.viii.1911. No. 58.

The bill of this specimen is very short, but it is closely approached by several other females. There are, however, no other specimens from the same locality, though several from the Gawler Ranges, just to the north. I have no doubt that there is only one form of *C. melanorhamphos*; in any case no theory should have been built on that one skin.

PARADISAEIDAE.

† 40. **Ptilonorhynchus violaceus dulciae** Math. = *Ptilonorhynchus violaceus violaceus.*

Ptilonorhynchus violaceus dulciae Mathews, *Nov. Zool.* xviii, p. 438 (1912—" South Queensland, North New South Wales ").

Type : ♂ ad., bought from the dealer Boneard, labelled " Cockerell, Queensland."

There is no certainty about the locality of this specimen ; Mathews in 1912 thought the northern birds were smaller, but the wing of the type does *not* measure 166, but 172 mm., and specimens from New South Wales are equally large, but not larger.

The only recognizable subspecies is *P. violaceus minor* Campbell from the Bellenden Ker range, which is considerably smaller. Mathews now only admits the latter.

† 41. **Scenopocetes dentirostris minor** Math. = *Scenopocetes dentirostris.*

Scenopocetes dentirostris minor Mathews, *Austral Avian Rec.* ii, p. 132 (1915—" Johnstone River, Queensland ").

Type : " ♂ " Johnstone River, 23.vi.1900. E. Olive coll.

The description of this supposed subspecies is laconically : " Differs from *S. d. dentirostris* in being smaller." Measurements are not given The specimen marked as " type " is small, its wing measuring 140 mm., but it is juvenile, as shown by narrow rufous edges to the upper wing-coverts, and the tips of wings and tail are worn. Moreover, there are three other specimens, from the Johnstone River, also collected in June by E. Olive. Their wings measure 147 (♀), 146 (♀), 149 (♂). Other specimens have wings of 144–152 mm., and Mathews gives the wing as 150 mm.

† 42. **Ailuroedus melanotus fairfaxi** Math. = *Ailuroedus melanotis maculosus.*

Ailuroedus melanotus fairfaxi Mathews, *Austral Avian Record*, ii, p. 132 (1915—" Bellenden Ker, Queensland ").

Type : ♂ Bellenden Ker, 16.xi.1899.

The only difference said to exist in the diagnosis is " general lighter coloration, especially noticeable in the under-surface." A series from Bellenden Ker, however, does not look paler. In the great work on the Birds of Australia Mathews only says that two subspecies can be admitted, but does not state the supposed differences. Though correctly quoting *melanotis* he afterwards spells the name throughout *melanotus.*

† 43. **Ailuroedus crassirostris blaauwi** Math. = *Ailur. crassir. crassirostris.*

Ailuroedus crassirostris blaauwi Mathews, *Nov. Zool.* xviii, p. 439 (1912—Richmond River, N.S. Wales).

Type : ♀ ad., Rous, Richmond River, October 1905, Schrader coll.

44. **Chlamydera nuchalis melvillensis** Math. = *Chlamydera nuchalis melvillensis.*

Chlamydera nuchalis melvillensis Mathews, *Austral Avian Rec.* i, p. 52 (1912—" Melville Island, Northern Territory "); *B. Austr.* xii, pp. 349, 350.

Type : ♂ (not in full plumage), Coopers Camp, Apsley Straits, Melville Islands, 11.xi.1911. P. Rogers coll. No. 2172.

45. **Chlamydera nuchalis oweni** Math. = *Chlamydera nuchalis oweni*.

Chlamydera nuchalis oweni Mathews, *Nov. Zool.* xviii, p. 440 (1912—" North-West Australia, Northern Territory "); *B. Austr.* xii, pp. 341, 350.

Type : ♂ ad., Point Torment, King Sound, West Kimberley, N.W. Australia, 14.iii.1911. J. P. Rogers coll. No. 1407.

Formerly it was supposed that the type of *C. nuchalis* had come from North-West Australia, and consequently Gould separated as *C. orientalis* the eastern form from North Queensland. This contention was upset by Mathews " by examination of the coloured figure (i.e. of *C. nuchalis*) and comparison with specimens." Reasons are not given by Matthews. The original figure is, however, so crude, that no conslusions can be drawn from it, but the description of the crown as having " a shining or satiny lustre " may be taken as applying to the form from North Queensland, as in that form only are the tips of the feathers somewhat shining and very obvious. This is best accepted, so as not to upset again the latest adopted nomenclature, though it may be somewhat arbitrary.

We have then the following forms :

1. *C. nuchalis nuchalis* (Jard. & Selby) from North Queensland. This subspecies is the smallest and slightly darker, and has conspicuous light tips to the feathers of the crown.

2. *C. nuchalis melvillensis* Math. from Melville Island and adjacent parts of " Northern Territory." This form is intermediate in size, wings of fully plumaged adult males measuring 173–175 mm., once 180 (Melville Island), and once 185, specimens from Point Keats to Burrundie (along the Daly River valley) somewhat merging towards *oweni*, having wings of 183–186 (once) About the distribution of this form and *oweni*, Mathews changed his mind. At first it was described from " Melville Island, Northern Territory," meaning obviously Melville Island, belonging to " Northern Territory " ; then he named *oweni* from N.W. Australia and Northern Territory, but in his latest list (*B. Austr.* xii, p. 350) he restricts *oweni* to N.W. Australia (which seems to be correct), and *melvillensis* to the Northern Territory, meaning of course including Melville Island.

3. *C. nuchalis oweni* Math. " N.W. Australia," that is to say, the " Kimberley Division," just west of the habitat of *melvillensis*.

There is no difference in coloration, but the wings are longer, measuring (fully plumaged adult males) 186–193 mm.

† 46. **Chlamydera maculata clelandi** Math. = *Chlamydera maculata maculata*.

Chlamydera maculata clelandi Mathews, *Nov. Zool.* xviii, p. 439 (1912—" Range : South Australia ").

Type : An unsexed specimen labelled by Mathews " *Chlamydera maculata* South Australia ? Dr. Clelland." Evidently the exact locality of this specimen is not known, but it was supposed to come from " South Australia," and even this was at first doubtful. It was obtained from some Dr. Clelland, after whom it was presumably named, dropping one of his *l's*. It is said to " differ from *C. m. maculata* in its smaller bill, which is light-coloured, its paler nuchal crest and its redder abdomen." The fact, however, is that the outer covering of the upper bill is gone, which accounts for the smaller size and light colour, a fact obvious at a glance, the upper bill being shorter than the lower. After soaking the bill of one of our other skins in water for a day I produced a similar example. The

nuchal crest is partially discoloured, the skin being old and dirty, which also accounts for the different colour of the abdomen. The specimen is figured in vol. xii, pl. 584 of the *B. of Australia* (lower figure), where a cleaner specimen would have been selected with more advantage.

† 47. **Chlamydera maculata sedani** Math. = *Chlamydera maculata maculata*.

Chlamydera maculata sedani Mathews, *Austr. Av. Record*, ii, p. 78 (1913—"Gloncurry River, Queensland").

Type: ♀ Sedan, Clonenrry (not Gloncurry!) River in N.W. Queensland (Burke), 25.ii.1910. Name of collector not given on label. In full moult. This specimen is supposed to be figured in *B. Australia*, presumably vol. xii, pl. 585, upper figure, but the figure seems to be of a finer specimen not in moult.

(Mathews, *B. Austr.* xii, admitted not less than 8 subspecies. From the material available I can only admit two, i.e. *C. maculata maculata* and *C. maculata guttata*. We do not have at Tring the type of *C. maculata nova*, but one of the females of this supposed subspecies shot by Tom Carter, 6.viii.1916, near the N.W. Cape in N.W. Australia, from where the type of *guttata* came. It is in my opinion just a fine, freshly moulted *guttata*. The figure of this "*nova*," *Ibis*, 1920, pl. xiv, is rather too foxy, perhaps as a result of the printing process.)

† 48. **Chlamydera maculata subguttata** Math. = *Chlamydera maculata guttata*.

Chlamydera maculata subguttata Mathews, *Nov. Zool.* xviii, p. 440 (1912—"Mid Westralia").

Type: ♂ East Murchison, 1.xi.1909. F. L. Whitlock coll. Described as being paler than *guttata*, which I cannot see, and the head is not "grey," though it appeared to be so when covered with plaster of Paris.

† 49. **Chlamydera maculata macdonaldi** Math. = *Chlamydera maculata guttata*.

Chlamydera maculata macdonaldi (sic!) Mathews, *Austral Avian Record*, ii, p. 78 (1913—"Macdonald Ranges, Central Australia").

Type: Adult, MacDonnell (not "Macdonald") Range, Central Australia. Bad specimen, bill half decayed, therefore appearing small.

† 50. **Sericulus chrysocephalus rothschildi** Math. = *S. chrysocephalus*.

Sericulus chrysocephalus rothschildi Mathews, *Nov. Zool.* xviii, p. 441 (1912—Blackall Range, South Queensland).

Type: ♂ ad., Blackall Range, 28.ix.1903. Ex coll. Edwin Ashby.

† 51. **Prionodura newtoniana fairfaxi** Math. = *Prionodura newtoniana*.

Prionodura newtoniana fairfaxi Mathews, *Austral Av. Rec.* ii, No. 7, p. 133 (1915—Bartle Frere Mts., N. Queensland).

Type: ♂ ad. Bartle Frere, 14.viii.1909.

Mathews, though no longer admitting his name *fairfaxi*, still recognized (September 1926) two subspecies, *P. n. newtoniana* and *P. n. mestoni* (de Vis), the latter from the Bellenden Ker, but these two forms are not separable.

† 52. **Craspedophora magnifica claudia** Math. = *Ptiloris magnifica alberti.*

Craspedophora magnifica claudia Mathews, *Austr. Av. Record*, iii, p. 72 (1917—Claudie River, North Queensland).

Type : ♂ ad., Claudie River, 8.x.1913 (No. 36 of some collection).

Full length of wing, 181 mm.

I still accept the name *alberti*, and the reasons will be explained elsewhere.

† 53. **Phonygammus yorki** Math. = *Phonygammus kerandrenii gouldi.*

Phonygammus yorki Mathews, *Bull. B.O. Club*, xlv, p. 17 (1924—" Black Gin Creek, Cape York ").

Type : ♂ Black Jin Creek (spelt thus by Kemp), Cape York, 23.xii.1912. Robin Kemp coll.

This is a specimen with an exceptional large purple patch on the back and some purple on the wings. It is a variety of *P. k. gouldi*, which was also described from Cape York. *P. k. gouldi* is a very distinct subspecies.

AILUROEDUS BUCCOIDES AND ITS SUBSPECIES.

By LORD ROTHSCHILD and ERNST HARTERT.

UNTIL 1891 all *Ail. buccoides* were united under the name *buccoides*. In 1891 A. B. Meyer separated *Ai. geislerorum*, based on specimens from the Astrolabe Bay and from Huongulf. With these we have hitherto united the birds from British New Guinea south of Huongulf, viz. from Aicora, Collingwood Bay, and the Hydrographer Mountains, west of Dyke Acland Bay.

The birds from Astrolabe Bay, however, are not like those from the Huongulf region, which agree exactly with those from Aicora, Collingwood Bay, and the Hydrographer Mts. We therefore restrict the terra typica of *geislerorum* to the Astrolabe Bay region.

The other form from north of the Huongulf and south to Collingwood and Hydrographer Mts. has the crown lighter than in *geislerorum*, more reddish, say, a somewhat tawny clay colour, instead of the darker, somewhat liver-brown crown of *geislerorum*. Other constant characters do not seem to exist. We name this south-eastern subspecies :

Ailuroedus buccoides molestus, subsp. nov.

Type : ♂ ad., Haidana, Collingwood Bay, 17.iv.1907. A. S. Meek coll. No. 2858.

We can thus distinguish :

Ailuroedus buccoides buccoides (Temm.).

Foot of Snow Mountain Range, Alkmaar, Sahang, Noord River to Lobo Bay.

Ai. buccoides oorti R. & H.

This form is probably restricted to Waigiu, but may occur also in the Berau Peninsula and neighbourhood ?

Ai. buccoides geislerorum A. B. Meyer.

North coast of New Guinea from Astrolabe Bay to Takar and Mamberano River.

Ai. buccoides molestus R. & H., antea.

From the Huongulf in the Mandated Territory to Collingwood Bay and Hydrographer Mts.

ON *OXYAMBULYX SUBSTRIGILIS* AND SOME ALLIED SPHINGIDAE.

By DR. KARL JORDAN.

(With Plate III.)

THE various Indo-Malayasian forms of *Oxyambulyx* R. & J. (1903) which have a large black basal patch on the upperside of the hindwing were treated by us in the Revision of the Sphingidae (1903) as subspecies of *O. substrigilis* Westw. (1848), at that time only one form being known to us to occur in each locality. Twenty years later, in *Entom. Mitteil.* xii. p. 51 (1923), I said that three distinct species with black base to the hindwing instead of one were found on the Sunda Islands. This statement requires amplification, and the nomenclature used correction inasmuch as I referred the name *O. pryeri* Dist. (1887) to the wrong species, although in the Revision the species described by Distant had been correctly identified.

The specimens from the Philippine Islands, which are remarkably different from the Sundanese and Malayan ones in the ♂-genital armature, stand apart, and as we shall soon have additional specimens for comparison, I abstain from dealing with them in the present paper.

The numerous specimens of this group of *Oxyambulyx* obtained by Messrs. Pratt on Sumatra (some of which have generously been placed at my disposal by my friend Dr. B. Preston Clark) render it certain that there are four different species on Sumatra and the Malay Peninsula—and presumably also on Borneo, whence we have so far only three.

1. **Oxyambulyx pryeri** Dist. (1878).

A large species, corresponding to *O. staudingeri* Roths. (1894) from the Philippines. The type-specimen of *O. pryeri*, which came from Sandakan, North Borneo, seems to have disappeared. According to the description it was certainly a ♀, though the sex was not stated by the author of the name. Having compared the tail-ends of several ♂♂ from each of the islands of Borneo, Sumatra and Java, I confess to have failed in finding any fairly constant differences between the specimens from these places. I therefore must regard the names *eteocles* Huwe (1895, Java) and *sumatranus* Roths. (1920, Sumatra) as synonyms of *O. pryeri*.

♂. Sternite VII is produced into a median lobe which is about as long as it is apically broad ; its apical margin (fig. 4) is turned upward (= inward), and each angle produced into a conical projection which is directed more or less upwards. The ventral process of the harpe tapers towards the end, the apex being very much narrower than in *O. substrigilis*, almost pointed ; the dorsal, sharply pointed, process of the harpe is strongly curved and nearly as long as the ventral process. The dorsal longitudinal rib of the penis-sheath ends with a process which, though very variable in length individually, is always longer than in any of the other species here dealt with, and is always curved more or less dorsad, i.e. away from the mouth of the sheath ; the inner sclerite of the sheath is drawn

out into a long, rod-like, process, which is non-serrate (fig. 10, dorsal aspect, fig. 11, lateral aspect, taken from two specimens, both from Java).

Hab. Malay Peninsula ; Borneo ; Sumatra ; Java.

2. **Oxyambulyx clavata** spec. nov.

Oxyambulyx pryeri Jordan (nec Distant, err. determinationis), *Ent. Mitteil.* xii. p. 51 (1923).

We know only ♂♂. In colour not distinguishable with certainty from the next species. On the whole smaller than *O. pryeri*. The median lobe of sternite VII individually variable in width, similar to that of *O. pryeri*, but the apical margin not turned inward, and the projecting angles turned sidewards and remaining more or less on a level with the median portion of the apical lobe (fig. 5, Sarawak ; fig. 6, Kina Balu, type). The median rib of the penis-sheath (fig. 12) projects beyond both lateral serrate ridges ; its apex is swollen and then narrowed into a point which is directed dorsad-laterad. The inner sclerite (fig. 13, from type) of the sheath appears in two forms as figured, the denticulate ridge of this sclerite being dorsal ; the difference in width is partly due to the sclerite as shown in fig. 14 being flattened ; further material must be examined before this apparent dimorphism can be looked upon as established. The ventral process of the harpe (fig. 3) is gradually narrowed to a point, nearly as in *O. pryeri* ; the subventral, irregularly dentate, ridge on the proximal half of the harpe is variable in height, as it is in *O. pryeri*.

Hab. Borneo : Kina Balu, type ; Sarawak ; Limbang River.——Sumatra (in coll. Preston Clark).——Malay Peninsula.

3. **Oxyambulyx substrigilis** Westw. (1848).

In this species the median lobe of sternite VII of ♂ is quite short, with the apical margin turned dorsad (= inward) ; the angles of the lobe are usually drawn out into a short projection each (as in fig. 8), which is directed dorsad. The ventral process of the harpe (fig. 1) is broad, spatulate, its apex being more strongly rounded dorsally than ventrally, so that it projects somewhat ventrad. The midrib of the penis-sheath is very little longer than the serrate right-side ridge [1] ; the apical portion of this ridge lies close along the midrib, and both are curved ventrad-laterad ; the left dentate ridge is widened apically and is either shorter or longer than the midrib. The inner sclerite of the sheath is without serration ; its apex is bifurcate as in fig. 16, with the right projection sharply pointed and strongly chitinised, the left projection being short and obtuse, sometimes barely indicated.

(*a*) **O. substrigilis brooksi** Clark (1923).

The left dentate ridge of the penis-sheath projects beyond the apex of the midrib (the ridge is often elbowed, its apical portion then lying more or less horizontally across the opening of the sheath). Figs. 7, 8, both taken from Sumatran specimens, represent extremes in the development of sternite VII. Fig. 1 gives a view of the harpe taken from vertically above the broad ventral process.

Hab. Sumatra, Borneo and Malay Peninsula.

[1] " Right "-side in figure, the apex of the sheath turned away from the eye.

4. **Oxyambulyx tattina** Jord. (1919).

At the time when I described this *Oxyambulyx* we had no other species from Sumatra with a blackish basal patch on the hindwing, and I therefore regarded *tattina* as representing *O. substrigilis* on the island. The discovery on Sumatra of *O. substrigilis brooksi* by Messrs. Pratt, who also obtained a series of both sexes of *O. tattina*, leaves no doubt that we have in *O. tattina* a fourth Malay-Sundanese species, which occurs side by side with *O. substrigilis brooksi*, *O. clavata* and *O. pryeri*.

In colour both sexes are recognisable by the forewing being strongly washed with raw umber from the tornus forward to vein R^3 and along distal margin; the species further differs from the previous ones in the subbasal, olive-black, rounded posterior spot of the forewing being either small or replaced by a greyish spot (similar in colour to the pale portions of the disc of the wing), in the outer area of the forewing beneath being so deep tawny that the submarginal line, which borders the grey marginal band, is hardly visible (except in a worn specimen, in which the dark markings are more prominent than in fresh specimens).

Sternite VII has the median lobe very broad and very short, the apical margin of the lobe is not distinctly incrassate, and the angles are not produced (fig. 9). The ventral process of the harpe (fig. 2) is nearly as in *O. substrigilis*, but the apex is dorsally as well as ventrally subangulate, being more symmetrical than in *O. substrigilis*. The midrib of the penis-sheath (fig. 17) is nearly as in *O. substrigilis*, but longer than both dentate ridges, and the right-side dentate ridge is separated from the midrib by a broad interspace; the internal sclerite, fig. 18, is flat, obtuse and on one side minutely denticulate.

Hab. Sumatra, and in coll. Preston Clark one worn ♂ from the Malay Peninsula.

Opistoclanis gen. nov.

Near *Clanis*, but the tibiae without spines.

The pattern of the forewing of the only known species consists in the main of bands which run from the costal margin obliquely back and outwards, being costally nearer the base than posteriorly. This peculiar design, as well as the red colouring of the hindwing and of the underside, recalls the African genus *Libyoclanis*, from which *Opistoclanis* differs, however, in the tibiae being non-spinose and in the cross-veins of the hindwing being much more oblique and consequently the lower cell-angle much more acute.

Genotype: *Clanis hawkeri* Joicey & Talbot (1921), from French Indo-China.

NEW SPECIES AND SUB-SPECIES OF GEOMETRIDAE.

By LOUIS B. PROUT.

Subfam. **STERRHINAE.**

1. **Anisodes (Perixera) pictimaculis** sp.n.

♂♀, 28 mm. Face brown above, whitish below. Palpus with third joint in ♂ rather long, in ♀ longer, almost as long as diameter of eye; pale, marked on upperside with dull red. Head, body and legs concolorous with wings, a red line on occiput, the foreleg reddened on upper- and innerside. Hindfemur with the ♂ sexual tufting predominantly dark purple-red.

Forewing not broad, apex moderate, termen waved; areole small, far proximal to end of cell; whitish, with irregular fleshy suffusions and scattered, somewhat darker irroration; cell-spot small, but more than a point, orange-buff (or perhaps 14*d* in Ridgway's scheme, *Color Standards*, pl. iii); antemedian line weak, indicated by vein-dots; median shade rather weak, fleshy, anteriorly far beyond the cell-spot, with outward angles at R^1 and R^3 and inbent between them, behind R^3 strongly oblique inward, slightly incurved and sinuous, reaching hindmargin about middle; postmedian formed of conspicuous vein-dots, deep fleshy, touched with black, the dot on R^3 markedly displaced proximally (2·5 or 3 mm. from termen), the rest of the series describing a gentle curve, the dot at R^3 nearest to the termen; subterminal shades rather indefinite; terminal dots rather sharp, deep fleshy touched with black.——*Hindwing* with termen rather strongly crenulate; concolorous with forewing and similarly marked, the cell-spot slightly larger, of the same bright colour, the median shade nearer beyond it.

Underside whitish, the forewing with an ample pink shade occupying the cell and extending in front of it (to costa), outside it (to position of median shade) and a little behind it; both wings with zigzag pink postmedian line (finer and weaker on hindwing), which is anteriorly faintly double or at least forms two elongate spots at costa; terminal dots small and pink, on hindwing ill-developed.

Java: Pengalengan, Preanger, type ♂ in coll. Tring Mus. Also known to me, chiefly in the ♀ sex, from Ceylon, the Malay Peninsula and Borneo.

The colours are almost those of *A. flavispila* (Warr., Nov. Zool. iii. 312), which is a larger, broad-winged species, with the cell-spot orange-buff on the hindwing only, there larger.

Subfam. **LARENTIINAE.**

2. **Orthonama dicymanta** sp.n.

♂♀, 22–26 mm. Palpus at least as heavily scaled as in *vinosata* Prout (1910).

Forewing shaped nearly as in the ♂ of *vinosata* Prout or of *corteza* Dogn. (1896), the distal margin being straightish and rather strongly oblique; apex, in the ♂, slightly more acute still than in the species cited; general coloration approximately as in the reddest-banded forms of *olivacea* Warr. (1900) = *cincta* Schaus (1901), but considerably more uniform, the more orange-brown proximal

area and costal streak not very sharply differentiated, a narrow distal border whitish mixed; sub-basal, antemedian and postmedian lines very weak, not edged with white, except perhaps at costal margin; two extremely slender, deeply lunulate-dentate whitish subterminal lines, very conspicuous under the lens (similar to the single line of *oliracea* but with profounder teeth, directed proximad on the veins), parallel except anteriorly, where the proximal one curves slightly inward; terminal black line slender, broken into short dashes which are separated by, and very narrowly bordered with, white scaling; fringe as in *oliracea*.—*Hindwing* a little broader than in most of the group, the sinuosities of the termen extremely weak; both sexes broadly whitish costally and apically, much as in the ♂ of *oliracea*; posterior part nearly as in *oliracea*, but a little more blurred.

Underside, especially in the ♀, more reddish and weakly marked than in *oliracea*.

E. Ecuador: Baeza, March 1915, a pair in coll. Tring Mus., type. Colombia: Pacho, E. Cordillera, 2,200 m. (A. H. Fassl), 1 ♂ in coll. Joicey.

3. **Erebochlora orbisticta cacotrocha** subsp.n.

♂, 62 mm. Nearest to *O. subtermaculata* Dogn. (1911, Cerro de Pasco dist.: Huancabamba and Oxapampa) in size[1] and markings. Distinguished from both the hitherto known races by the reduction of the whitish costal patch of the hindwing, which occupies much less than one-third of the wing-length, its greatest length being 6·5 mm. (in *O. subtermaculata* 8 to 10 mm.), and is moreover irregularly rotund instead of regularly oval, its contour indented at several points, especially at R^2, R^3 and M^1 distally. The pale markings of *O. subtermaculata* on forewing beneath present, but narrowed.

S.E. Peru: Oconeque, Carabaya, 7,000 ft., dry season, July 1904 (G. Ockenden), type in coll. Tring Museum, February 1905, paratype in coll. Joicey.

4. **Eudule pyristacta** sp.n.

♂, 22 mm. Head and thorax black, patagia and tegulae marked with orange. (Abdomen lost.) Legs dark, marked with whitish.

Forewing broad, about as in *E. phlaearia* (Stgr., 1894, *Polyomma*), to which it is probably related; opaque, bright deep rufous, with black markings; short basal streaks at both margins; antemedian, median and postmedian rows of rather large spots, confluent and somewhat oblique outward anteriorly, well separate posteriorly, the isolated antemedian and median ones of submedian area (between M and SM^2) about as far from termen as those in cell, the first two postmedian (in cellules 3 and 2) elongate, especially the second, reaching almost to the base of their respective cellules and ending about as near the termen as the last of the confluent ones and the small one in cellule 1*b*, which touches the distal end of a narrow, somewhat interrupted hind-marginal streak; terminal band much narrower than that of *phlaearia*, at apex about 2 mm., enclosing a spot of the ground-colour, mostly about 1 mm., cut nearly to the termen by broad projections of the ground-colour on the veins; fringe black, in part slightly greyer.—*Hindwing* concolorous, the black border narrow and fairly regular, but broadening along distal part of costa and joining the postmedian; a black spot at base; a longitudinal streak occupying most of cell; a second along fold,

[1] Dognin's measurements are always from tip to tip in a well-set specimen.

reaching the postmedian ; a narrow one along abdominal margin ; postmedian, as far as M^2 analogous to that of forewing, its constituents rather narrower.

Underside slightly more orange, with the same markings.

Peru : Oxapampa, type in coll. Tring Mus.

5. **Psaliodes vernifera** sp.n.

♂♀, 17–19 mm. Head green, the palpus with a broad, tapering red-brown stripe on outerside. Thorax above predominantly green, abdomen (except at base) deep vinaceous grey ; body beneath, with coxae and femora, mottled with these two colours and whitish ; abdomen without pencils.

Forewing with apex minutely produced, termen sinuous, suberenulate, strongly oblique ; areole double ; glossy green (lime green of Ridgway), the markings deep vinaceous grey and pure white, their edging finely red-brown ; basal patch irregular, chiefly costal ; antemedian band slender, wavy-margined, a little broadened at ends, very strongly excurved in cell ; median band mostly narrow, especially in ♂, at costa broadened and enclosing some green dots, between the radials throwing out a strong projection distally (which in the ♀ reaches the outer white lunule), just outside DC (which is close to its proximal edge) enclosing a green spot ; ill-defined apical and tornal spots, the former enclosing some green sealing, the white markings indicate the boundaries of the true median area (as shown in the *picta* and *miniata* groups and many other *Psaliodes*) and are placed and formed nearly as in *electa* Schaus (1912), or—in the more distal position of the outer radial lunule—in *fuscata* Warr. (1904) = *cupreipennis* Dogn. (1914), the antemedian ones rather broad and well isolated, the postmedian ones shallowly lunulate, their slender dark edgings confined to the median area ; terminal line fine, developing on the teeth at vein-ends into blackish spots which extend on to the green fringe.——*Hindwing* with termen sinuous and suberenulate ; DC^3 vertical or slightly oblique *inward*, R^3 scarcely behind middle ; whitish at base, otherwise suffused with pale vinaceous drab ; a minute dark cell-dot and a faint pale crenulate postmedian line ; terminal line browner ; fringe pale yellowish green.

Forewing beneath reproducing the pattern of upperside but much more blurred. Hindwing green, partly suffused with reddish brown and with a postmedian band of that tone and a fainter (more vinaceous grey) terminal one ; cell-dot blackish.

Jamaica : Newcastle, a pair, the type ♂ dated September 1893 ; also a ♀ without more exact location. All in coll. Tring Mus.

Mr. Warren labelled the ♂ "*detractata* Walk.," the ♀♀ "? *effrenata* Walk." ; I cannot find that it has ever been named.

6. **Collix praetenta** sp.n.

♂♀, 32–40 mm. Larger and rather paler than *ghosha* Walk. (*List Lep. Ins.* xxiv. 1249), antenna of ♂ less laterally compressed. Wings with the wood-brown ground-colour slightly tinged with fawn or purplish and with the dark irroration extremely fine, the darkest specimens extremely similar on the upperside to average *hypospilata* Guen. (1858).

Forewing sharply marked ; cell-spot large and nearly round (as in *hypospilata*); costal spots at origin of lines always more or less large, notably the distal post-

median.——*Hindwing* with little to distinguish it from the allies; the subterminal line less interrupted, generally lunalate-dentate rather than broken into short dashes, never punctiform.

Underside intermediate between those of *ghosha* and *hypospilata*, almost exactly as in the African *foraminata* Guen., the strong longitudinal streaking of *ghosha* faintly or scarcely indicated, the postmedian and subterminal lines or bands both macular, with the spots large and subconfluent, the postmedian series not so elongate as in *ghosha*.

Assam, E. Pegu, the Malay Peninsula and Formosa, the type ♂ from Cherrapunji, February 1894, in coll. Tring Mus.

Mr. Warren generally determined this as *hypospilata*, on one occasion as *foraminata*. I have remarked on it in *Journ. Bomb. Nat. Hist. Soc.* xxxi. 313, no. 103.

7. Collix leuciota sp.n.

♂♀, 36–40 mm. Nearest to *praetenta* (*supra*) but darker and much more weakly marked, with a gloss that somewhat recalls that of *stellata* Warr. (*Nov. Zool.* i. 679), though less pronounced.

Forewing with cell-spot generally a little less rounded than in *praetenta*, with a slight and narrow projection on its anterior side; markings not noticeably strengthened at costa.——*Hindwing* differing chiefly from those of *praetenta*, *ghosha* and *hypospilata* in that the cell-dot, instead of being very faintly and narrowly *surrounded* with whitish, has some snow-white scaling at its *outer and posterior edges only*.

Underside pale, with the postmedian line almost as in *hypospilata*, i.e. continuous and not broad, the subterminal, as in *praetenta*, macular, subconfluent and blackish, very different from that of *hypospilata*, in which it is deeper black, with its component spots or dots well separated.

Sikkim: the type ♀ from Darjiling (Pilcher) in coll. Tring Mus.; a pair ex coll. Elwes in the same collection; also a ♂ from Gunong Ijau, Malay Peninsula (coll. Tring Mus.) and a worn one "Perak, 2,000–2,500 [feet], W. Doherty" (coll. Joicey).

As the ♂ from Elwes has lost its locality label, though it will certainly be from Sikkim, and the Malayan examples may represent a separable race, I have chosen as type the ♀ with the most exact data.

8. Collix rufidorsata sp.n.

♂♀, 28–32 mm. Size of large *ghosha* Walk. Antenna of ♂ lamellate with long teeth beneath. Abdomen in both sexes with orange-brown subdorsal streak scarcely so bright as that of the *stellata* group (*stellata* Warr. 1894, *griseipalpis* Wileman 1916, *rufipalpis* Hmpsn. 1907, *purpurilita* Prout 1925), but longer, in addition with a similar tinge on the mediodorsal ridge, the intervening stripe blackish, generally more or less macular.

Upperside coloured and marked nearly as in *praetenta* Prout (*supra*), though with the cell-spot scarcely so large and round. Underside with the longitudinal streaks on M and its branches and on SM^2 almost as strongly developed as in *ghosha*.

W. Java: 1892, type ♂, Sukabumi, 2,000 ft., 1893 (H. Fruhstorfer), allotype ♀, both in coll. Tring Mus. Assam; Sarawak; Sula Islands; New Guinea,

coastal regions; probably some separable races, but mostly single specimens. The species was formerly confounded with *ghosha*, but Warren furnished it with the manuscript name which I have adopted.

9. **Collix rufidorsata promulgata** subsp.n.

♂♀, 25–32 mm. Darker and more tinged above with reddish or purplish than in the name-typical form (*supra*), in aspect somewhat less banded, on account of the more equal expression of the lines, in particular the good development of the punctiform one which bisects the pale postmedian band; basal region of forewing anteriorly nearly always well reddened.

Manus, Admiralty Islands, September–October 1913 (Meek's Expedition), 4 ♂♂, 3 ♀♀ in coll. Tring Mus. Similar forms are distributed in the Bismarck Archipelago.

10. **Collix stenoplia** sp.n.

♂♀, 38–40 mm. Palpus elongate, bright ochreous. Antenna in ♂ pectinate to near apex, the branches moderate (3 or 4). Head and body concolorous with wings, or the body somewhat paler beneath; abdomen on first three segments with a bright ochreous lateral stripe (near the lower edge of the dark dorsal area). Midtibia of ♂ not dilated. Abdomen of ♂ rather long.

Forewing brown, with strong purple-drab reflections; cell-mark large, finely white bounded, its proximal edge indented near the anterior, narrower end; dark lines rather thick, but very weak, normal for the genus; subterminal white, punctiform.——*Hindwing* concolorous, rather more noticeably white-dotted on the veins, especially at the postmedian line; cell-dot white; subterminal dots as on forewing.

Underside weakly marked for a *Collix*, without longitudinal dark streaks; cell-spot of forewing smaller than above, of hindwing here similar to that of forewing; postmedian and subterminal bands present, the postmedian not macular, nearly as in *hypospilata* Guen. or with a slightly stronger and more regular outward curve, the subterminal still weaker, but continuous, not definitely macular, with a slight suggestion of pale interneural spots or lunules at its outer side.

Selangor: Bukit Kutu, 3,450 ft., at light, 13 and 14 April 1926 (H. M. Pendlebury), type ♂ in coll. Brit. Mus., presented by the Federated Malay States Museums, allotype ♀ in their collection.

Forms a new section of the genus by the ♂ characters, otherwise very similar to *rufipalpis* Hmpsn., rather smaller, purpler, postmedian of both wings rather less bulged.

11. **Sauris septa** sp.n.

♂♀, 26–30 mm. Structure group of *proboscidaria* Walk. 1862 (*Holorista* Warr.). Palpus not quite so long as in that species, the concavity on upperside of antenna at about one-third slightly more noticeable. Hindtibia of ♂ with fringing of hair on underside triangular as in *proboscidaria*, but rather stronger, continuing to end.

Forewing superficially like that of *abnormis* Moore (1888) rather than *proboscidaria*, the purple-grey distal border being strong, the olive-fuscous line which bounds it proximally complete and preceded proximally by a second, more macular line of the same fuscous colour from R^1 to near tornus; ground-colour

grape-green, generally a little duller (more suggesting deep grape-green) proximally to the postmedian band than distally; sub-basal line slender; antemedian rather more oblique than in *proboscidaria*, less zigzag, its indentation at fold shallow instead of V-shaped; the triple postmedian less equally developed than in *proboscidaria*; the other lines only indicated in slightly deepened grape-green; cell-dot obsolete.——*Hindwing* and underside nearly as in *proboscidaria*, the hindwing beneath with rather more copious specialized scaling in posterior half.

New Ireland, November–December 1923 (A. F. Eichhorn), 5 ♂♂, 1 ♀, in coll. Tring Mus. The ♀, but for its more complete postmedian band, might easily be confused with that of *S. abnormis nitidula* Warr. (1899), which has been received from the Bismarcks.

12. **Hydrelia candace** sp.n.

♂♀, 26–29 mm. Near to *H. argyridia* (Butl. 1894), especially to the ♀, even the freshest ♂♂ being considerably less dark than the ♂ of *argyridia*.

Forewing in both sexes at least as broad as in the ♀ of *argyridia*, perhaps slightly broader, the apex minutely produced, the termen, except near apex, rather markedly convex; median band (as also in *argyridia*) variably shaped distally, but in general with much less pronounced lobe or prong at R^2–M^1, the white band beyond it always narrow; humulate or submacular whitish subterminal line always developed (as only in occasional ♀ aberrations of *argyridia*).——*Hindwing* with the median band broader and less sharply angulated than that of *argyridia*, generally less conspicuous, the ground-colour being less pure white; white bands beyond narrower than in *argyridia* (generally twice as narrow), distal area broader, with suggestion of two macular subterminal pale lines, the proximal the stronger; this wing altogether more reminiscent of some pale forms of *inutilis* Warr. (1901) than of *argyridia*.

Abyssinia: Adis Abeba, June and July 1926 (Gajdacs), 9 ♂♂, 1 ♀, in coll. Tring Mus., the ♀ and some of the ♂♂ very worn. A ♀, equally worn, was taken at the same place by O. Neumann on March 22, 1925, and is also in Mus. Tring.

SUBFAM. **GEOMETRINAE.**

13. **Ischnopterix choritis** sp.n.

♂, 49 mm. Near *fabiana* Stoll (*Uitl. Kapell.* iv. 227, t. cccxcvii, f. H), perhaps a race. Wings slightly less narrow.——*Forewing* with termen more strongly convex; the whitish parts more mixed with green, hence less outstanding; median band appreciably more proximal than in the specimen of *fabiana* before me (in which latter it touches the cell-mark), at fold markedly indented, a black mark which accompanies it proximally forming a pronounced V.——*Hindwing* with the median line more sinuous than in *fabiana*.

S.E. Peru: Rio Huacamayo, Carabaya, 3,100 feet, June 1904 (G. Ockenden), type in coll. Tring Mus.

Stoll's figure of *fabiana* is rather crude, much too broad-winged, not green enough, nor with the reddish shade proximally to the posterior half of the subterminal sufficiently brought out, but with the rest of the markings pretty correct, except that the costal white mark which adjoins the pale apical patch is in reality acutely angled outward in front of SC^5. That species seems rare; the Tring Museum has a single ♂ from St. Jean de Maroni.

14. **Ischnopterix ochroprosthia** sp.n.

♂. 42–48 mm. Frons with the prominence long, a blackish stripe down the sloping upperside, the rest pale. Palpus rather under 2, heavily scaled, mostly pale. Vertex blackish except at sides. Antenna not extremely long. Body very pale wood-colour, copiously mixed with fuscous above, producing a somewhat olivaceous tone, the first few segments of abdomen warmer brown; abdomen extremely long and slender, about as in *chryses* Druce (1892). Legs, especially the foreleg, dark mixed; hindtibia not extremely dilated, the hair-pencil present.

Forewing long and narrow, slightly more so than in *chryses*; retinaculum somewhat enlarged; stalk of SC^{2-3} well separated from C; predominant colour a blend of dark purple-grey and red-brown; a broad (circ. 1·5 mm.) costal streak cream-buff, only dark-dotted at costal edge, finely underlined with black; a narrower and less well defined streak of the same colour from termen at R^3, running proximad and slightly forward for a length of 4 or 5 mm.; a still less well defined, quadrate pale patch from about middle of hindmargin to beyond $\frac{4}{5}$, separated from an incomplete pale subterminal by a narrow band of the red-brown colour; cell-mark black, slightly elongate; a very narrow black mark from base of costal streak to hindmargin at $\frac{1}{4}$ or $\frac{1}{5}$; faint indications of dark median shade and zigzag line beyond it, but proximal to the cell-mark; termen with blackish lunules; fringe pale-mixed.——*Hindwing* rather pale, with fleshy suffusion, about as in the ♀ of *rostellaria* Feld. or both sexes of *callistrepta* Prout (1928); cell-spot dark grey, moderately large; postmedian line slightly darkened on the veins, between R^2 and fold incurved, behind the fold faint; a faint, dusky, macular subterminal band; terminal lunules constricted in middle, slightly suggesting paired dots.

Forewing beneath less contrasted, the pale parts nearly as above, the rest less dark; cell-spot and terminal markings fairly strong. Hindwing more ivory-yellow than above, only fleshy mixed about the subterminal band; moderate grey irroration; cell-spot strong, blackish, other markings slight.

Iguassu, Parana, 2 ♂♂, the type dated October 26, 1921; both in coll. Tring Mus.; also a damaged ♂ from Buenavista, E. Bolivia, July–October 1906 (J. Steinbach), in the same collection.

105. **Biston regalis pelidna** subsp.n.

♂. 63 mm. Black lines thinner than in *r. regalis* Moore (1888) from N. India, the brown band proximally to the antemedian narrow, the median shade broad and strong (rather dark grey), more distally placed, postmedian line of forewing also rather distal, terminal area of both wings more clouded with brown, the white midterminal spot wanting.

W. Java: Mt. Gedé, 4,000 ft., 1896 (H. Fruhstorfer), type in coll. Tring Mus.

16. **Epimecis amianta** sp.n.

♂. 56–64 mm. Very near *subalbida* Warr. (1900), both in appearance and structure. Termen of hindwing less deeply crenulate. Ground-colour clearer white, the dark irroration much less dense.——*Forewing* with antemedian line rather more distal, close to the base of M^2, much straighter except for the anterior angulations; cell-mark generally more elongate; postmedian thicker, distinct throughout, less oblique anteriorly, scarcely oblique between the radials, with a

supplementary tooth on R^2, rather less oblique inward behind R^3; subterminal less regular, the lunule behind R^3 developed into an oval white spot, that behind M^1 with a sharper blackish spot proximally.——*Hindwing* with median shade less incurved anteriorly than in *subalbida*, postmedian thicker, subterminal lunules shallower.——Underside with borders as in *subalbida*, the lines showing the same distinctions as above.

Amazons: Calama, Rio Madeira, below Rio Machados, August–October 1907 (W. Hoffmanns), type; Fonte Boa, May 1906 (S. M. Klages), a small ♂ taken together with *subalbida*. British Guiana: Potaro, February 1908 (S. M. Klages), 1 ♂. All in coll. Tring Mus. Also known to me from Matto Grosso and Bolivia.

17. **Cleora alienaria fumipennis** subsp.n.

"*Boarmia acaciaria* Bdv. form *carnaria* Guen." Hmpsn. in *Monogr. Christmas Island*, p. 70 (1900). *Chogada fumipennis* Warr. MS. in coll. Tring Mus.

♂♀, 30–38 mm. Smaller than *a. alienaria* Walk. (= *gelidaria* Walk.). Antenna of ♂ pectinated appreciably further. Hindtibia of ♂ almost 7 mm. long, tarsus less than 3 mm.——*Forewing* rather more pointed than in *a. alienaria*, the white parts always with a definite suffusion of yellow or brown, the dark markings heavy.——*Hindwing* with the white cell-dot generally rounded, without the posterior extension; pale band between postmedian and subterminal generally strongly developed.——Underside suffused with glossy brown, postmedian line rather strong, on hindwing sharply angled in middle; dark borders heavy.

Christmas Island: Ross Hill; Murray Hill; Flying-Fish Cove; N. part of Island; E. coast; type from Ross Hill in coll. Brit. Mus.

18. **Cleora pendleburyi** sp.n.

♂, 46–50 mm. Closely similar to *determinata* Walk. (1860), with which I formerly confused it. On an average less large. Abundantly distinct in the genitalia: valve broader in centre, the armature (including the harpe of Pierce) quite different, the strong spine (which is common to both) much more strongly curved, etc., the whole structure indicating a possible race of *illustraria* Walk. (1862), though *pendleburyi* is longer-winged, less sharply marked, with abdominal belt weaker, underside more blurred.

Forewing with the markings appreciably less heavy and coarse than those of *determinata*, more recalling *fraterna* Moore (1888); cell-mark narrowed, nearly as in the latter, without such a large proximal projection or accessory spot as in *determinata*; median line generally weak or obsolete; brown band outside the postmedian less developed or narrower.——*Hindwing* with similar toning down of the markings, the band outside the postmedian narrowed and not spotted with blackish.

Underside with the dark borders less extremely broad and heavy than in *determinata*, particularly on the hindwing, where in *determinata* it absorbs and obliterates the postmedian line and commonly even the cell-spot, whereas in *pendleburyi* it begins to pale before reaching the postmedian, which stands out thick and strong in an appreciably more blackish brown.

Selangor: Bukit Kutu, circ. 3,500 ft., a good series; the type, taken at light, April 16, 1926 (H. M. Pendlebury) presented to the British Museum. Also from Kedah Peak, 3,200 ft. and Gunong Angsi, Negri Sembilan, 2,000–2,700 ft. (Raffles

Museum). Except on Kedah Peak it was accompanied by *determinata*. Perak, Borneo and S.W. Sumatra also yield this species; from the slopes of Korintji the Pratt brothers sent a fine series.

The ♀ apparently differs from that of *determinata* in similar ways as regards reduction of cell-spot on forewing above and of both borders beneath, but, curiously, the median line is well developed in *pendleburgi*, nearly obsolete in *determinata*.

19. **Cleora illustraria aequivoca** subsp.n.

♂♀, 42–48 mm. Structure of *illustraria* Walk. (1862) and *anestiaria* Swinh. (1915) including the genitalia, so that it is safe to assume that all three are races of a single species. Very distinct in showing the dusky coloration of *injectaria* Walk. (1860), only in one ♀ with some white admixture remaining in the basal and median areas, the incomplete line between postmedian and subterminal and small apical and midterminal spots beneath, besides the base of abdomen above. ——*Forewing* dark greyish brown, with a slaty tinge and with some black irroration; the brown bands which bound the median area indicated, with some ochreous scaling on the veins.—*Hindwing* similarly darkened, proximal area scarcely paler than median, cell-dot small or subobsolete, its black circumscription strong.——Underside also darkened, especially in the ♂.

Vulcan Island, November 1913–January 1914 (Meek's Expedition), 2 ♂♂, 2 ♀♀ in coll. Tring Mus. (types), further examples in the Oberthür and Joicey collections.

Other races of *illustraria*, closely similar to *i. anestiaria*, but apparently separable, occur on New Ireland and New Britain, but I have seen too few examples to be able to differentiate them with confidence; the New Guinea race *anestiaria* is very variable, but regularly more sharply variegated than the nametypical *illustraria* of Queensland.

20. **Cleora injectaria dobboënsis** subsp.n.

♂, 44–46 mm. Rather larger and fuller-winged than the ♂♂ of the other races. Abdomen and median area of both wings above and beneath a good deal marked with white or whitish, as in some ♂ examples of the small, narrow, blackish Rossel Island race *rittata* Warr. (1899); cell-marks with the black circumscription strong; median line not very black, the streak which in many of the forms runs from it to or towards midtermen not developed; postmedian of forewing as strongly dentate posteriorly as in *i. rittata*.

Aru Islands: Dobbo, March 1897 (Doherty), 3 ♂♂ in coll. Tring Mus.

C. injectaria Walk. (1860) = *compactaria* Walk (1862) is one of the most widely distributed species of the group; a melanic race from Engano has been named *fuliginosa* Warr. (1894); some interesting island forms are—as with *illustraria*—still insufficiently known.

21. **Cleora munditibia** sp.n.

♂♀, 40–44 mm. Very similar to *nausori* B.-Bak. (1905). Hindtibia in both sexes pale, without the smoky mottlings which are always conspicuous on its outerside in that species. Colouring less tinged with ochreous than in *nausori*; the white cell-marks, especially on forewing, more diffuse, less clearly expressed, without such sharp blackish dashes distally; the lines not accompanied by

conspicuous band-like shades.—*Forewing* with antemedian more strongly excurved in cell, postmedian generally more inbent in front of the outward bend at R^1; subterminal with similar proximal dark maculation at the radials, but with the distal maculation at the same position weaker, not (as in *nausori*) spreading forward to SC^5.——Underside with less cloudings than in *nausori* but—at least on hindwing—with more definite demarcation between the dusky submarginal shading and the nearly clear marginal band.

Fiji: Obalau I. (R. Baxendale), 4 ♂♂, 5 ♀♀ in coll. Brit. Mus., ex coll. Bethune-Baker, including ♂ type and ♀ allotype; Nasoua, 1 ♂, 1 ♀, from the same source; Viti Levu (Woodford), 3 ♂♂ in coll. Joicey; Ba River (Woodford), 1 ♂ in coll. Tring Mus.; Labasa, dwarfed ♀♀ bred from larvae found feeding on leaves of *Mucuna aterrima* Holland (W. Greenwood).

Bethune-Baker (*Proc. Zool. Soc. Lond.* 1905, p. 94) mentions this species as an ab., "uniformly paler," of *vitiensis* B.-Bak., but the genitalia are of a quite different type and that species has the underside much more as in the *illustraria* group, besides several other differences. The valve of *munditibia* is furnished with short curved proximal spines instead of a single long spine as in *nausori*.

Zeuctocleora gen.n.

Face slightly rounded, with appressed scales. Palpus rather short; second joint with close, compact scaling, third joint short, concealed. Tongue short. Antenna in ♂ pectinate, in ♀ subpectinate, in both sexes with apical part merely ciliated. Pectus slightly hairy. Femora not hairy. Hindtibia in ♂ dilated, with hair-pencil; abdominal spine vestigial or wanting. Frenulum fully developed.——*Forewing* in ♂ rather narrow, in ♀ broader, termen oblique, gently curved, scarcely waved; fovea in ♂ large; cell half; SC^2 free or anastomosing slightly with C, SC^2 from stalk of SC^{3-5}, R^2 slightly before middle of DC, M^1 well separate.——*Hindwing* with costa slightly elongate, termen moderately rounded, waved, scarcely crenulate; cell nearly half, DC slender; C curving, appressed to cell—commonly even anastomosing—towards middle, then rapidly diverging, R^1 separate, R^2 wanting, M^1 separate.

Type of the genus: *Zeuctocleora una* sp.n.

Probably a development of the *proëmia* group of *Cleora*, but distinct in the stalking of SC^2 of the forewing, the peculiar curve of C of the hindwing, etc.

22. **Zeuctocleora una** sp.n.

♂, 25–28 mm.; ♀, 29–31 mm. Face blackish, narrowly pale below; palpus black. Head and body brown, much clouded with black. Legs, especially the foreleg, black mixed, leaving the ends of the tibial and tarsal joints conspicuously pale.

Forewing bright brown, mottled of two or three shades (more yellowish, reddish and purplish) and irrorated with black, in a few ♂♂ and most ♀♀ heavily clouded with black, in which case the costal area generally remains conspicuously less blackened; cell-dot indistinct; lines black, rarely very distinct throughout; antemedian acutely angled outward in cell, accentuated on M (just proximal to M^2), excurved between this and SM^2; median thickened at costa, considerably nearer to post- than to antemedian, zigzag, rather variable, sometimes blurred; postmedian nearly parallel with termen in anterior half, then slightly incurved,

with a slight tooth outward at SM^2; deeper black marks on this line at R^1, R^2 and M^1, pointing inward, developed in the ♂; a fine pale distal edging to the line noticeable, at least at costa; subterminal line weak to nearly obsolete, but always developing a whitish spot (variable in size) at and behind R^3, often succeeded by a pale mark along R^3 to termen; terminal line crenulate, enclosing small whitish vein-dots; fringe marked with blackish opposite the veins.——*Hindwing* with a straightish median shade and a minutely crenulate postmedian line, the latter angled at R^3 and slightly sinuate inward between M^2 and SM^2, the two somewhat convergent posteriorly; a fine pale distal edging to the postmedian; subterminal chiefly indicated by a dusky proximal shade, no enlarged pale spot at R^3; terminal line and fringe as on forewing.

Underside pale, with strong dark-grey irroration and clouding; costal margins more buff, on forewing with fine blackish strigulae; no distinct markings, the postmedian generally indicated, at least costally; fringe spotted opposite the veins.

N.E. Madagascar: Diego Suarez, February–September 1917; Sakaramy, February 1917 (G. Melou), a long series in coll. Tring Mus.

23. **Catoria tamsi** sp.n.

♂, 45 mm. Head and body concolorous with wings, the face and upperside of palpus blackish, abdomen with some dark subdorsal spots. Hindtibial dilation not extreme.

Forewing with the long stalk of SC^{3-5} generally arising from the stalk of SC^{3-5} near its base (as in normal *sublavaria* Guen.) and anastomosing with C; white with rather strong brown irroration, nearest in effect to strongly dusted *camelaria* Guen., but a little darker, the irroration having a slightly more olive-tinged setting; markings as in *camelaria*, slightly heavier than in any but extreme aberrations of that species; costal spot at commencement of postmedian line subquadrate, about 1 mm. in diameter, succeeded by a second slightly less broad, rather nearer to it than to the subterminal.——*Hindwing* with markings similarly heavier than in normal *camelaria*, the median line somewhat thickened in the cell, the outer postmedian, thick between SC^2 and R^3; cell-mark long-oval, filled in with black, as in rare aberrations of *camelaria*.

Underside almost exactly as in rather strongly suffused examples of *sublavaria* Guen.; forewing with two subquadrate dark costal postmedian spots, corresponding to those of upperside; terminal white spot behind R^3 smaller than white apical patch.

Perak: Batang Padang, Jor Camp, 1,800 ft., May 31, 1923 (H. M. Pendlebury), type in coll. Brit. Mus., presented by the Federated Malay States Museum; Mt. Tahan (Waterstradt), a ♂ in coll. Tring Mus. Sumatra: Lebong Tandai (C. J. Brooks), a ♂ in coll. Joicey, with stalk of SC^{3-5} arising from the cell.

I am indebted to Mr. W. H. T. Tams for kindly investigating, on British Museum material, the ♂ genitalia of the representatives of the principal *Catoria* forms belonging to the present group, including a Singapore specimen of the new species. The results are very interesting, as the shape and especially the armature of the valves show very wide differences as between species and species. *C. olivescens* Moore (which Hampson, *Faun. Ind., Moths* iii. 370, made a "form" of *sublavaria*, though he has never been followed in this) is so similar in structure

to *camelaria* that Mr. Tams would regard it as a race thereof in spite of the wide superficial divergence; *sublavaria* Guen., *hemiprosopa* Turn. (with subspecies *affinis* Prout) and the new species are all totally different from *camelaria* and from one another.

24. **Diplurodes inundata** sp.n.

♂♀, 28–30 mm. Face white, mixed with brown. Palpus with second joint very broadly scaled, third joint very small; predominantly brown. Vertex whitish. Antenna of ♂ with the ciliation over 2. Thorax and abdomen whitish, mixed—especially above—with brown or fuscous; lateral tufts of ♂ moderately strong. Hindtibia of ♂ not dilated.

Forewing broad, apex appreciably more rounded than in the nearest allies (*decursaria* Walk. 1862, *restita* Warr. 1896, etc.); fovea strong; median area white, with little irroration; cell-mark black, narrow, a little elongate; proximal and distal areas pale quaker-drab or mouse-grey, clouded with brown; lines blackish; antemedian from costa just beyond 3 mm., excurved, but with a slight inward sinus behind; postmedian arising about 5 mm. from apex, slightly intensified at costa and on veins, with moderate projections outward behind R^3 and behind M^1 (slightly variable); a brown median line, arising from a blacker costal spot near the cell-mark, oblique outward from R^1, describing an irregular outward sinus, slightly angled inward between bases of R^3 and M^1, a second sinus touching the postmedian at M^2; markings of distal area much as in *indentata* Warr. (1897) or weakly marked *restita*, but with longitudinal blackish clouding between R^3 and M^1 from postmedian to subterminal rather strongly developed, pale mid-terminal patch indicated.——*Hindwing* much as in *decursaria*, but without such sharply blackish shading proximally to the subterminal.

Underside distinctive, especially in the ♂, the dark borders being exceptionally broad; in the ♂ they nearly reach the cell-mark and do not enclose pale terminal spots or band, only narrowing and weakening towards abdominal margin of hindwing, and the space between cell-mark and border on the forewing is more or less suffused (in all the allies clear whitish), in the ♀ it is only slightly less extreme; median line on forewing and antemedian line or band on hindwing also present.

Penang (loc. typ.), April, May, June and November (Curtis), 3 ♂♂ and 1 ♀ in coll. Tring Mus.; Singapore, 4 ♂♂ in coll. Brit. Mus.; Selangor: Bukit Kutu (H. M. Pendlebury), 1 ♂ and 1 ♀ in coll. Federated Malay States Museum; Negri Sembilan: Gunong Angsi, in coll. Raffles Mus. & coll. L. B. Prout; S.W. Sumatra: Barisan Range (Pratt brothers), 2 ♂♂, Lebong Tandai, 1 ♀ in coll. Joicey.

25. **Diplurodes semijubata** sp.n.

♂, 29–33 mm. Antennal ciliation at least twice as long as broadest diameter of shaft. Abdomen with the lateral pencils well developed, fuscescent.

Larger than *fimbripedata* Warr. (Nov. Zool. vii. 113), hindtibia simple, midtibia very strongly fringed, the fringe short at distal end, steadily lengthening to become very long at proximal end.——*Forewing* with DC similarly formed but less extreme; markings stronger and more variegated, a strong dark shade proximal to the subterminal nearly always conspicuous; apex pale; a mid-terminal pale patch as in *exprimata* Walk. (*List Lep. Ins.* xxiii. 764) or usually connected with a tornal one.——*Hindwing* with abdominal flap nearly as in

fimbripedata, termen more regularly shaped; median shade very rarely suffusing with postmedian, the rather large black cell-dot being usually placed on an almost white area; subterminal shading and midterminal pale patch as on forewing.—— Underside with the outer dark band not reaching termen, but well developed on both wings.

Malay Peninsula: Bukit Kutu, Selangor, 2,500 ft. (H. M. Pendlebury), the type at light, April 13, 1926, presented to the British Museum, other examples in different collections from the type locality and from Gunong Angsi, Kedah Peak, Taiping, etc.

26. **Synegia (Eugnesia) liparampyx** sp.n.

♂, 33–34 mm.; ♀, 33–38 mm. Head orange, tip of palpus yellow; vertex predominantly bright yellow. Body above orange, clouded with purple-grey, collar-tippets and second segment of abdomen purple-grey; beneath paler. Antenna of ♂ simple, not serrate as in *albibasis* Warr. (1906).

Wings orange, nearly as in *fulvata* Warr. (1906) but with a pale yellow admixture, especially in the median area of the forewing behind the cell-dot, and with grey cloudings recalling those of *commaculata* Warr. (1907) and *correspondens* ab. *concurrens* Warr. (1897) though not quite so solid.——*Forewing* with transverse shades formed nearly as in *fulvata*, the lines themselves, however, somewhat more blackened; a pale spot outside the postmedian between SC^5 and R^3; a rather pale apical spot, bounded behind by an oblique dark dash.——*Hindwing* with the antemedian shade indistinct, the macular subterminal rather strong, followed towards termen by a second, irregular series.

Underside paler, with similar markings.

Dutch New Guinea: Mt. Goliath, 5,000–7,000 ft., February 1911 (A. S. Meek), 2 ♂♂, 2 ♀♀, in coll. Tring Mus.

The larger ♀ is of a brighter red, with the dark cloudings intensified and extended, occupying nearly the whole distal area except for the radial and apical spots of the forewing, which are both mixed with reddish. A rather extreme ♀ of this aberration, from Mt. Kumpi, Weyland Mountains, 6,000 ft., November–December 1920, is in the Joicey collection. The aberration may be distinguished as **intensicolor** ab. n.

27. **Synegia (Syntaracta) echmatica** sp.n.

♂, 34–37 mm. In structure similar to *albibasis* Warr. (1906), which it perhaps represents in the Snow Mountains. Abdomen with the same snow-white spot on second tergite, the succeeding tergites with elongate pale-yellow spots, much as in *camptogrammaria* Guen. Colouring about as in *nigrellata* Warr. (1906), but with the orange irroration rather stronger and coarser, the lines a little stronger, less strongly grey-mixed.——*Forewing* with costal edge dark, rather closely spotted with black; cell-dot sharp, not minute; lines widely (5–7 mm.) apart, the accompanying shades rather narrow, postmedian almost direct, finely lunulate-dentate, a conspicuous narrow, very pale yellow band outside it; subterminal about as in *albibasis*, but strongly darkened; terminal line black, interrupted; fringe sharply spotted.——*Hindwing* with antemedian only strong behind the cell; postmedian more distally placed and rather more bent in the middle than in *albibasis*, with blackish spots at the outward angles at radial fold and submedian

interspace; longitudinal shade not broad, a little curved and oblique, starting close to the postmedian at M^1 and ending at termen about R^1; termen and fringe as on forewing.——Underside rather paler, the markings greyer.

Snow Mountains, Dutch New Guinea: Upper Setekwa River, 2,000–3,000 ft., September 1910 (A. S. Meek), type; Utakwa River, 3,000 ft., January 1913 (A. F. R. Wollaston); both in coll. Tring Mus. The second specimen must evidently be the one recorded by Rothschild (*Lep. Br. Orn. Un. Exp.* p. 81) as "*Syntaracta clathrata* Warr.," but is quite different in colour from any form of that variable species, has non-pectinate ♂ antenna and is smaller, with several minor distinctions.

28. **Nadagara cryptospila** sp.n.

♀, 39 mm. Head and body pale purplish grey, the head and thorax more or less mixed with cinnamon, the palpus with some dark irroration.

Forewing rather more elongate than in the genotype, the termen rather strongly oblique, scarcely curved, not appreciably waved anteriorly; pale purplish grey, with a vinaceous tinge and with a slight irroration of cinnamon, which becomes strong enough proximally to the postmedian to produce a proximally ill-defined band of that colour; a few scattered dark scales; lines very weak; antemedian a little thickened at an outward angle near costa, otherwise scarcely traceable; postmedian very fine, slightly pale-edged distally, especially at the veins, at first 3 mm. from termen, about R^1 curving to become slightly more oblique than termen, running almost straight to $\frac{3}{5}$ hindmargin; some slight clouding outside the postmedian, developing two dark spots between R^1 and SC^5 and a weaker, more cinnamon one behind R^3; fringe concolorous.——*Hindwing* rather elongate costally, apex nearly square, termen almost smooth, very gently rounded; postmedian line continued, little beyond middle of wing, strongest anteriorly, bent close to costa, otherwise almost straight; no other distinct markings.

Underside similarly or rather more brightly coloured, the dark irroration rather stronger; both wings with large black, faintly pale-pupilled cell-dot; forewing in anterior part with a faint line indicating the position of the subterminal maculation of upperside, in posterior part with weak indication of the postmedian line; hindwing with a fairly strong postmedian, curved parallel with and about 4 mm. distant from the termen, black-dotted on the veins.

Federated Malay States: Pahang, "Cameron's Highlands," Tanah Ratu, 4,800 ft., October 26, 1923 (H. M. Pendlebury). Type in coll. Brit. Mus., presented by the Federated Malay States Museum.

A damaged pair from Gunong Ijau, Perak, in coll. Tring Mus., the ♂ with only three wings, show that sex to have the hindtibia dilated, with hair-pencil. In that specimen the cinnamon—or even an almost brighter—colour suffuses nearly the whole of the upperside, while the Perak ♀ is intermediate in colouring and has the line rather strongly expressed; both, but notably the ♀, have the cell-marks above rather less weak than in the type.

I have published a survey of this genus in *Insects of Samoa*, iii. (3), 164–7. In the key (pp. 164–5) *cryptospila* can be separated at No. 9 by having the antemedian line obsolescent posteriorly and the cell-dots enlarged beneath. In colouring it is nearer to *juventinaria* Guen., but it is much longer winged, with the postmedian fully as oblique as in *epopsioneura* Prout.

29. **Luxiaria submonstrata celebensis** subsp.n.

♂♀. 34–37 mm. Forewing of ♂ shorter anteriorly and relatively broader than in *s. submonstrata* Walk. (1861), termen appreciably less concave. Hindwing with termen not extremely scalloped. SC^2 in the only known ♂ separate (in *s. submonstrata* commonly connate). The pale parts appreciably whiter, particularly in the ♂ beneath; the distal white markings on the ♀ underside extended.

Celebes: Ramboekers, Tondano (Weigall), type ♂ and 2 ♀♀; Bonthain, 5,000–7,000 ft., August 1896 (Doherty), 1 ♀; all in coll. Tring Mus.

As *subrasata* is represented in New Guinea by the still more extreme-shaped and darker *inferna* (Warr., 1903, described as *Euippe*), it is possible that all three should be regarded as separate species.

30. **Luxiaria despicata** sp.n.

♂, 28–37 mm. Antenna simple. Hindtibia moderately dilated, the hair-pencil pale.

Wings formed as in the species which passes as *acutaria* Snell. (*vide* Nov. Zool. xxxii. 63 [1]); considerably smaller; colour light drab or drab grey rather than brown (i.e. coloured like rather weakly-marked *submonstrata*), the greyer band outside the postmedian present or (almost) wanting; cell-mark not or scarcely ocellated; postmedian punctiform, even less curved than in the species named; markings otherwise similar.——*Hindwing* with cell-dot very small, but sharply expressed; postmedian as on forewing.

Underside pale or whitish, with the lines slender, often weak, only exceptionally with a well-developed band outside the postmedian.

♀ similar to the banded ♂♂, or to a washed-out ♀ of *submonstrata*.

Khasis, not uncommon in various collections, the type from Cherrapunji, November 1893, in coll. Tring Mus. Rarer in Sikkim.

Like most of the group, this little species has suffered from misidentifications. Warren called in *hypaphanes* Hmpsn. or *turpisaria* Walk.; in Swinhoe's collection it stood as *submonstrata*.

[1] Snellen's type, from N. Sumatra, which should be in the collection of the Natura Artis Magistra, is unfortunately mislaid, as I am informed by Mr. J. B. Corporaal, who kindly made search for it on my behalf. In Snellen's own collection various species of the group were mixed.

A FURTHER NOTE ON THE GENUS *LAMPRIBIS*.

By DAVID BANNERMAN, M.A., F.R.S.E.

Plates IV and V.

IN the *American Museum Novitates*, No. 84, 1923, pp. 1–9, Dr. J. P. Chapin returns to the vexed question of the Olive Ibis of Du Bus and its representatives on the African mainland and the islands of the Gulf of Guinea.

In previous reviews[1] of the genus *Lampribis* I had expressed the opinion that Du Bus's "*Ibis olivacea*" (type locality unknown) had been obtained on the West African coast rather than in one of the islands; moreover, I had formed the opinion (from literature) that the type-specimen, mounted in the Brussels Museum, probably came from Lower Guinea: thus I sank Reichenow's *Lampribis cupreipennis*, described from Bipindi in Cameroon, into the synonymy of *Lampribis olivacea olivacea*. At the time of writing I had only seen a young bird from Efulen in Cameroon and the fine representative in the island of Principe which I named *Lampribis rothschildi*.

Following this statement Dr. Chapin, of the American Museum of Natural History, took the opportunity when in Brussels of examining Du Bus's type in the Royal Museum of Natural History, and after taking measurements of that specimen, and comparing it with the description and measurements of *Lampribis splendida* Salvadori, expressed the opinion that they would prove to be one and the same bird, although he never had an opportunity of comparing the one with the other. Dr. Chapin gives additional reasons for believing that Du Bus's type came from Upper rather than Lower Guinea—reasons which must undoubtedly be taken into account. Having set out his conjectures commendably clearly, he states, "A comparison of Büttikofer's specimen" [*L. splendida* Salvad.] "with the type of *olivacea* in Brussels and specimens of *cupreipennis* in London, Tervueren, and Berlin, is to be hoped for."

As these specimens are of great value—not to be measured in pounds sterling—and moreover were widely scattered in the principal museums of Europe, the accomplishment of Dr. Chapin's wish presented exceptional difficulties.

A comparison of the "types" became still more imperative when the *Systema Avium Ethiopicarum* was published in 1924, for in that important publication the author had accepted the views of the present writer published previous to the appearance of Dr. Chapin's paper.

Thanks to the kind offices of Dr. Percy Lowe and the far-sighted policy of Dr. Van Straelen of Brussels, Dr. Van Oort of Leyden, Dr. Stresemann of Berlin, and Dr. Gestro of Genoa, the types of *Lampribis olivacea*, *Lampribis splendida*, *L. cupreipennis*, and *L. rothschildi* have been most generously forwarded by their respective custodians to the British Museum, while Lord Rothschild has been good enough to send me the only example[2] (a fine (?) male) of *Lampribis akleyorum* in Europe, the unique opportunity is given, therefore, of comparing these types with one another.

[1] Bull. B.O.C., 1919, pp. 5–7 and Ibis 1921, pp. 108–110.

[2] Since writing the above another example of this rare Ibis from Mount Kenya has been sent to the British Museum.

Unfortunately M. Berlioz of the Paris Museum could not comply with our request to send to London the type of *Lampribis bocagei*, but thanks to Dr. Frade of the Lisbon Museum we have examined two specimens of this race described from Saõ Thomé, which were forwarded from Lisbon for the purpose.

This contribution is not intended to supercede Dr. Chapin's more exhaustive paper but merely to support the main conclusions at which he arrived, for until all the types were compared we were working on supposition alone.

In his review Dr. Chapin treated *L. o. cupreipennis* as a subspecies of *L. olivacea olivacea*, but he kept *akleyorum* from Kenya and both the island birds, *rothschildi* and *bocagei*, as distinct species. It seems to the writer that all these birds are best treated as *sub*species of *L. olivacea*, and as such I shall consider them in future.

A comparative examination of Du Bus's type of *L. olivacea* with Salvadori's *L. splendida* proves that, as Chapin surmised, *splendida* must be considered a synonym of *olivacea*; allowing for wear and fading in a specimen described in 1838 (!)—which is still in a wonderful state of preservation—there is no difference between them which cannot be ascribed to the causes mentioned. The bare skin of the face in *L. splendida* certainly covers a larger area than in the type of *L. olivacea*, but this may be owing to the skin being stretched in the former specimen and rather drawn in the latter.

In the all-important measurements the two specimens agree very closely—much more closely than would appear from Dr. Chapin's comparative table of measurements on p. 9, where he gives the length of the culmen of *L. splendida* from rear of nostril as about 100 (on Salvadori's authority apparently), whereas it is in reality when measured exactly 95 mm., within one millimetre of the length of the culmen in *L. olivacea*.

In the measurements which I have taken of the four type-specimens before me I find that I differ very little from Dr. Chapin's own measurements, but I do differ in an infinitesimal degree, so that I append herewith the measurements I have arrived at myself. In the type of *L. olivacea*, for instance, I find that my measurements of the wing, tail, and tarsus are in each case 1 mm. longer than those given by Dr. Chapin, though we get the same measurements for the culmen. My measurements are appended :—

—	Wing.	Tail.	Culmen from nostril.	Bill from feathers.	Tarsus.	Type in.
L. o. olivacea (type)	334	147	96	—	68	Brussels (mounted)
L. splendida (type)	330 (broken at tip)	150	95	—	73	Leiden
L. cupreipennis (type)	312	133	83	—	58	Berlin
L. rothschildi (type)	328 (damaged)	132 (worn)	95	—	70	Genoa
L. bocagei	259	103	—	82	51·5	Paris (mounted)
	(*imm*) ♀ 237	105	69	74	50	Lisbon
	♂ 251	99	circa 75	circa 85 (broken)	54	Lisbon
L. akleyorum	♂ 355	154	—	125	73	Trung
	♂ 368	159	—	124	66	British Museum

As regards the range of the various forms, it certainly appears probable, taking everything into consideration that Du Bus's type—the mounted specimen

in the Brussels Museum—came from Liberia. Salvadori's *splendida* obtained by Büttikofer in Liberia consequently becomes a synonym of the former species.

L. olivacea olivacea therefore becomes the name for the Olive Ibis inhabiting Upper Guinea and *L. cupreipennis* Reichenow for that inhabiting Lower Guinea, as Dr. Chapin suggested as the most probable solution.

Comparing the type of *splendida* (which must now be called *olivacea olivacea*) with *cupreipennis*, both adults (though ♂ and ♀ respectively) in beautiful fresh plumage, we find that *splendida* has the upper parts more brownish-olive which in *cupreipennis* are of an oily bottle-green (or a dark olive without any brown).

The metallic gloss on the lesser wing coverts is definitely more copper-coloured in *splendida*, decidedly greener in *cupreipennis*.

The rump, upper tail-coverts, and rectrices are principally green in *splendida*, principally blue in *cupreipennis*.

On the undersurface *splendida* is lighter and browner in colour—*cupreipennis* darker with the brown lower chest and belly strongly glossed with dark olive.

In size the bill is noticeably longer in *splendida* than in *cupreipennis* and the amount of bare skin on the forehead is greater.

The dimensions of the two types and the type of *L. olivacea olivacea* can be best seen by referring to the comparative table on p. 79.

Thanks to the generosity of Lord Rothschild, who has most kindly invited me to publish these notes in his journal, the heads of all the known races of *Lampribis olivacea* are now beautifully figured by Mr. Grönvold, for although certain sketches appeared with Dr. Chapin's article neither Lord Rothschild nor myself considered them satisfactory.

I cannot close this article without expressing my very deep appreciation of the manner in which those responsible for the care of these valuable specimens responded to Dr. Lowe's request to send them to the British Museum. In no other way could this question have been settled with any degree of finality, for it will be many years before the types of *L. olivacea*, *L. splendida*, *L. cupreipennis*, and *L. rothschildi* can be examined under the same roof.

The writer is more particularly gratified as it has enabled him to deal with these Ibises in his forthcoming work on the Birds of West Africa in a manner which could not have been otherwise accomplished.

Distribution of the Genus Lampribis.[1]

Lampribis olivacea olivacea (Du Bus).

Synonym *Lampribis splendidus* Salvad.

Range: Liberia and perhaps the adjacent "Coast of Guinea."

Lampribis olivacea cupreipennis (Reichw.).

Range: Cameroon and Gaboon, extending eastwards across the Belgian Congo.

Lampribis olivacea rothschildi Bannerman.

Range: Principe (or Prince's Island), Gulf of Guinea.

[1] Space does not admit here of entering into the detailed distribution or the life-histories, in so far as they are known, of these rare Ibises. The subject will be dealt with at length by the present author in his forthcoming volumes on the Birds of Western Africa, vol. i.

Lampribis olivacea bocagei Chapin.

Range : Saõ Thomé (or St. Thomas Island), Gulf of Guinea.

Lampribis olivacea akleyorum (Chapman).

Range : Southern slopes of Mount Kenya, 6000–1200 ft.,[1] Kenya Colony.

(Said to have been observed in the Aberdare Mountains 9000 ft. and on Mt. Elgon 8000–10,000 ft. These last require verification.)

Lampribis rara Rothsch., Hart., and Kleinschm.

Range : Liberia to Angola, extending eastwards across the Belgian Congo to Avakubi and Bomakandi.

Note by Lord Rothschild.

When Messrs. E. Hartert, O. Kleinschmidt, and I, in Nov. Zool. vol. iv, pp. 376, 377, applied the new name of *Lampribis rara* to Ussher's Denkera bird figured by Elliot, P.Z.S., 1877, pl. 51, we merely stated that it was quite different from *Lampribis olivacea* Du Bus and made no further remarks. I cannot, however, refrain from expressing astonishment that two such eminent ornithologists as D. G. Elliot and R. Bowdler Sharpe could have for a single moment conceived that the Denkera birds with the orange-buff variegated undersides could be the same as the bird figured with a plain grey breast as "*Ibis olivacea*" by Du Bus. If they had said they were the young birds it would have been quite excusable, but as they treated the one most distinct as the adult it can only be explained by thinking that they considered the plate made from the original type as wholly unreliable and misleading. I have added the figure of *L. rara* to those of the five subspecies of *L. olivacea* to illustrate fully the genus *Lampribis*. This figure will at once show how different *L. rara*, with its heavily spotted underside and wedge-shaped crest, is from the second and genotypical species *Lampribis olivacea* Du Bus. I can only conclude by saying that although we have now received a considerable increase in recorded specimens of this genus, it still remains one of the rarest of genera in the museums of the world.

[1] According to Mr. Akeley.

ON THE TYPE OF *LARUS AFFINIS* REINHARDT.

BY THE REV. F. C. R. JOURDAIN, M.A., H.F.A.O.U., H.M.O.S. FRANCE AND GERMANY, ETC.

Plate VI.

IN 1853 Dr. J. Reinhardt published a paper on the Birds of Greenland in the *Vidensk. Meddel. Naturhist. Foren. Kjöbnhavn*, in which (p. 78) he described a Gull in winter plumage obtained at Nanortalik in 1851 as possibly a new species, under the name of *Larus affinis*. Further notes by the same writer will be found in the "List of the Birds hitherto observed in Greenland," in the *Ibis*, 1861, p. 17. In separating this straggler from *Larus argentatus* the main characters relied on by Reinhardt were the darker colour of the mantle, which he describes as "many shades darker" and the smaller size.

In 1878 Howard Saunders published his paper, "On the Larinae or Gulls," in the *P.Z.S.*, pp. 155–212, and upheld Reinhardt's new species, of which he examined the type in the Royal Museum at Copenhagen. He identified it with the breeding Gulls from the Petchora Delta brought back by Seebohm and Harvie-Brown; but it is interesting to note that while Hartert and Dwight are agreed in regarding the Petchora birds as a race of *Larus fuscus* (*L. f. taimyrensis* But.), Saunders (*t.c.*, p. 172) says "The present species is in fact a Herring Gull, which passes the whole of the year in a brilliant atmosphere."

It will be noticed that Saunders, like Reinhardt, regarded the type of *L. affinis* as belonging to the *argentatus* group, though he also points out that it is rather closely connected with *L. fuscus* "(although quite distinct) in the length of its foot as compared with that of the tarsus, it having a proportionately smaller foot than either *L. argentatus*, *L. cachinnans* or *L. occidentalis*, but larger than *L. fuscus*."

When writing on the Gaviae in vol. xxv of the *Catalogue of the Birds in the Brit. Mus.* in 1896, he seems to have modified his views on this point and in the Key (p. 172) and also on p. 255 clearly admits that the nearest ally of *L. affinis* (= *taimyrensis*) is *L. fuscus*.

In 1898 Herr H. Winge (*Meddelelser om Grønland*, xxi. pp. 176–8) pointed out that Reinhardt's bird was smaller than the normal Siberian breeding bird, which like his predecessors he regarded as a dark race of *L. argentatus*, but in spite of this discrepancy he referred both to the same form.

In 1913 Mr. T. Iredale obtained the loan of the type from the Copenhagen Museum, and at once recognized its distinctness from *L. f. taimyrensis*. After a close examination, in which he was assisted by Mr. W. R. O. Grant, he came to the conclusion that it was a specimen of the pale-backed British race of *Larus fuscus*, which had recently been separated by Dr. P. Lowe under the name of *L. fuscus britannicus*. The type-specimen, which was set up in 1851 was exhibited in its case at a meeting of the Brit. Ornith. Club on March 19, 1913, and Mr. Iredale subsequently published in *Brit. Birds*, vi, pp. 360–364, a paper dealing with the question, pointing out that Lowe's name of *britannicus* must give way to Reinhardt's *affinis* for the British race of *L. fuscus*.

Herr Winge, however, dissented from this on the ground that the type of *affinis* lacked the long slender tarsus and short toe of *fuscus*, but in spite of this Iredale's conclusions have been generally adopted and the name *affinis* applied generally to the British Lesser Black-backed Gull. At the International Ornith. Congress at Copenhagen in 1926 the question was re-opened, when Dr. Wesenburg Lund and Mr. E. Lehn Schiøler exhibited the type to the members of the Congress on May 27, and expressed their conviction that the bird was *L. argentatus* and not *L. fuscus*. The specimen was, of course, in its case, and could not be handled or measured, but as most of the measurements were already known this was less essential. The most striking points of difference between the two species are the colour of the mantle and feet. In *argentatus* the mantle is very pale-blue grey ; in *fuscus* it varies from slate-grey in the British race to slaty black in Scandinavian birds : while the feet are yellow in *fuscus* and flesh-coloured in *argentatus*. In most other respects they agree closely and measurements overlap, but the bill of *argentatus* is heavier and deeper, the tarsus of *fuscus* is more slender and the middle toe shorter, while there are also differences in the colouring of the primaries.

In the present case it is not possible to ascertain the original colour of the feet. The colour of the mantle is that of *L. argentatus*, but the specimen is over seventy years old, and though not exposed to direct sunlight has been set up and shown in a gallery of the museum for many years. Reinhardt described the mantle as " many shades darker " than that of *argentatus*, which is certainly not the case at present. Iredale's photograph (1913) also shows a strikingly pale mantle, but in his article he does not refer to this point and presumably regards it as the result of fading.

The Copenhagen bird seems to have stouter, clumsier-looking feet, and a more massive bill than *L. fuscus*. This latter characteristic is very conspicuous in Iredale's photograph, but is explained as being the result of the bird's head being slightly turned towards the photographer. Reinhardt measured the tarsus and middle toe with claw as 56, 56 mm., Winge more recently gave them as 59, 57 mm. from the stuffed bird. The small tarsus suggests a female, but might apply to either species : the middle toe is, however, long for *fuscus* and strongly suggests *argentatus*. There is no allusion to the colouring of the primaries in Iredale's paper.

Even with the advantage of fresh skins with notes on the coloration of the soft parts, it has been shown that the older writers regarded *taimyrensis* as a Herring Gull, while modern workers class it as a form of *fuscus* : *atlantis* is treated by Dwight as a subspecies of *fuscus*, yet Hartert places it under *argentatus*, while *cachinnans* is by some held to be merely a race of *argentatus*, while others treat it as a distinct species. It is therefore not surprising that there should be differences of opinion with regard to a seventy-year-old skin, lacking data as to the colour of the soft parts and presumably faded. To all appearance it is only a rather small but otherwise normal, Herring Gull (*L. argentatus*), but in order to put the identification beyond doubt Dr. Hartert has communicated with Mr. R. Hørring of the University Museum at Copenhagen, who has made a close inspection of the primaries and very kindly supplied carefully drawn diagrams, showing the distribution of colour. Unfortunately Nos. 1 to 3 are unmoulted juvenile feathers, but there can hardly be any doubt from the conspicuous white tips and grey bases of 4 and 5 that the bird belongs to the *argentatus* group. This can best be

appreciated from a study of Mr. Hørring's diagrams, but taken in conjunction with the heavy bill, stout tarsi and long middle toe, as well as the pale mantle, these characters support the general consensus of those present at the Congress that *Larus affinis* Reinhardt must be relegated to the synonymy of *L. argentatus*.

The question now arises as to what is the proper name for the British race of *Larus fuscus*. A. E. Brehm (*Naturhist. Zeitung*, Neue Folge, iii, 1857, p. 483) described a winter bird from Malaga under the name of *Larus graellsii*. His description, as pointed out by Lowe, is in some respects defective, as he describes it as "multo major, rostro multo crassiori et colore valde clariori." The type, however, is still in existence in the Brehm collection at Tring Museum. It was shot at Malaga, 21.x.1856, and Dr. Hartert states that it is undoubtedly of the British race. Dr. Lowe's statement in *British Birds*, vi, p. 3, that "the type, too, is missing" was evidently made under a misapprehension, and as Brehm's name has over fifty years' priority over Lowe's name of *britannicus* (*Brit. Birds*, vi, p. 2, 1912), it will have to be adopted in future.

While expressing my thanks to Dr. Hartert and Mr. Hørring for their assistance, I should like to express my regret that Mr. Schiøler has been prevented by illness from dealing with this subject, on which no one is better qualified to write.

NOTE.—On referring to Dr. Dwight's *Laridae of the World*, I find that an unfortunate series of misprints renders the figures of the primaries of *L. fuscus* almost useless. On p. 215 *affinis* is said to be illustrated by fig. 140, and Lowe's type by fig. 141; *taimyrensis* by fig. 141 and 142, but fig. 141 is again said to represent *britannicus* and 142 *antelius* (= *taimyrensis*).

On the plate (p. 360), figs. 141–142 are marked *affinis*, and 140 as *taimyrensis*! Dr. Hartert informs me that he finds that there is more variation in the wing pattern and colour of the primaries than most authors realize.

F. C. R. J.

ON SOME ORIENTAL *SPHINGIDAE*.

By DR. KARL JORDAN.

(With five text-figures.)

1. **Oxyambulyx sericeipennis** Butl. (1875).

THERE are two subspecies in India, one inhabiting the North-West and the other the North and North-East. We had no specimens from North-West India when we wrote the account of the species in the *Revision*.

a. O. s. sericeipennis Butl. (1875).

O. sericeipennis Butler, *Proc. Zool. Soc. Lond.* p. 252. no. 34 (1875) (Massuri); Roths. & Jord. *Revision of Sphingidae*, p. 195. no. 156 (1903) (partim; Randakheit).

Major F. B. Scott has bred a small series of this subspecies.

Hab. N.W. India.

b. O. s. sericeipennis agana subsp. nov.

O. sericeipennis Butl., Roths. & Jord., *l.c.* tab. 9. fig. 2 ♂, tab. 22. fig. 27, tab. 23. fig. 9, tab. 30. fig 9, tab. 31. fig. 16 (1903) (partim; Sikkim, Khasia and Jaintia Hills, and Tenasserim).

♂♀. On the whole larger than the N.W. Indian subspecies, but many specimens in the series bred by Major F. B. Scott at Shillong small (underfed ?). The underside of both wings paler yellow than in *O. s. sericeipennis*, less brick-red, particularly in the outer half.——Process (uncus) of anal tergite narrower, its apical portion as seen from the side wider vertically; the dentate ridge of the harpe of the clasper somewhat longer.

Hab. Sikkim (type figured on tab. 9 of the *Revision*); Assam; Tenasserim.

2. **Marumba gaschkewitschi fortis** subsp. nov.

♂♀. Forewing as long as in *M. g. irata* Joicey & Kaye (1917), to which this subspecies is nearest in its colouring as well as geographically; dentition of terminal margin more prominent; on upperside the interspace between the two outer antemedian lines and that between the two inner discal lines filled in with brown, thus two transverse bands being formed which are more conspicuous and deeper in tone than in any specimen we have of other subspecies of *M. gaschkewitschi*; terminal area deep brown, extending in costal two-fifths of wing to the outermost discal line; subtornal blackish brown double spot large.—— Hindwing as in *M. g. complacens* distally much shaded with brown, anal mark large.

On underside the brown disal line of the forewing distinct from costa to below middle, separating a narrow grey band from the grey discal area, the disc proximally of this line washed with brown, more so in ♂ than in ♀.——On the hindwing the interspace between the two proximal median lines filled in with brown, this band crossing the tip of the cell; the brown line placed beyond this band very distinct; terminal area nearly as in *M. g. complacens*, contrasting strongly with the greyish discal band, the discal line which forms the boundary

of the dark terminal area diffuse.——The colouring of the underside on the whole brighter in the ♀ than in the ♂.

Length of forewing : ♂ 48 mm., ♀ 54 mm.

Hab. Yunnan, a pair in the Tring Museum.

3. **Rhodoprasia callantha** sp. nov.

A beautiful species recently bred by Major F. B. Scott.

♂♀. Whereas in *Rh. floralis* Butl. (1877), the only other known species of the genus, the foretibia bears a long thorn or claw at the apex, there is no such armature in the new species. This difference might be considered to be of generic value ; but the new species agrees otherwise so well with *Rh. floralis* that the original diagnosis of *Rhodoprasina* R. & J. (1903) should be modified rather than that a new genus be erected for the reception of *Rh. callantha*.—— Body and wings deeper-coloured than in *Rh. floralis*, forewing less dentate, on underside the middle line more proximal.

♂. Antenna thinner than in *Rh. floralis*, the segments less deeply constricted. Body above olive-green, somewhat brighter below, particularly on the abdomen, which has a yellowish tint. Tibiae and tarsi more or less blackish, shaded with grey on the upperside ; foretibia without terminal claw ; hindtibia with a minute anteapical spur and a pair of short apical ones.

Wings, upperside : Forewing olive-green, partly shaded with white, which gives it a sage-green appearance in certain lights ; hindmargin a little more deeply sinuate than in *Rh. floralis* and more convex proximally of the sinus, tornal lobe broader, terminal margin more convex in lower half and here hardly at all dentate ; three olive-green transverse lines nearly as in *Rh. floralis* ; the first straight, shaded with white on outside, the second slightly convex, the third, which crosses R^3 halfway between cell and distal margin, more strongly convex in anterior third and here more distal than in *Rh. floralis* ; between second and third lines a narrow band consisting of two rather faint olive-green lines which costally are curved basad ; beyond this band a diffuse white costal spot ; terminal area a little paler green, shaded with white, the proximal margin of this terminal border dentate, the grey shading projecting at R^2 to near the discal line ; hindmargin red at base.——Hindwing carmine, costal area down to R^1 and anal area dull olive-green, the former more sharply defined than in *Rh. floralis* ; the red area extending to termen between R^1 and R^3, but washed with olive-green at the termen.

Underside paler green than upper, with a distinct yellowish green tint ; forewing as in *Rh. floralis* with a large carmine patch from near base to just beyond apex of cell ; a discal line slightly S-shaped, bounded with white costally on the proximal side, the white scaling also forming a diffuse costal spot proximally of the white line, but connected with it ; between this line and the termen a diffuse dark olive-green dentate line corresponding to the distal boundary of the olive-green area of the upperside.——Hindwing : costal margin slightly, but distinctly concave from near base, convex at three-fourths where the distal transverse line reaches the costal margin ; three lines as in *Rh. floralis*, but the second line placed much nearer to the first than to the third, proximally of second and third lines conspicuous white shading along the lines, third line convex anteriorly, concave posteriorly (the line straight or nearly so in *Rh. floralis*) ; a lighter green terminal band very irregular, widest below costal angle

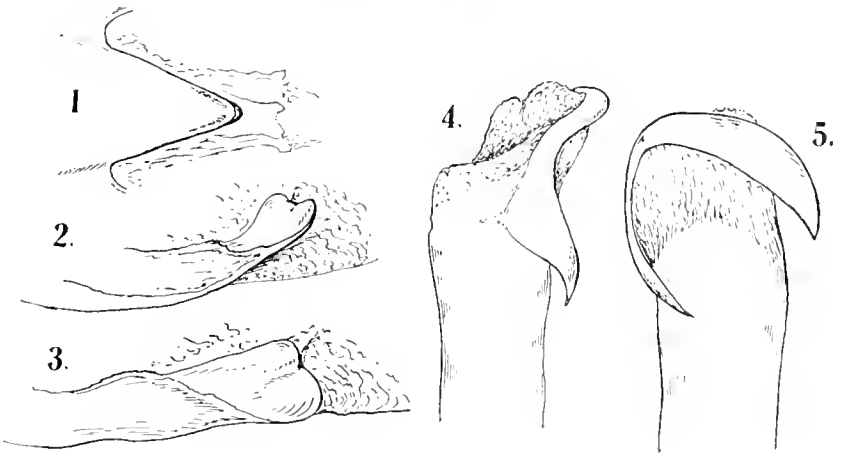
(about 5 mm. broad at R^2), fading away at anal angle, anteriorly within this border diffuse olive-green spots close to termen.

♀. The olive-green colour of the ♂ replaced on the upperside by greenish tawny-olive, on the underside by brighter tawny-olive; in a crippled ♀ the colouring somewhat greener. The white shading on the upperside rather more extended than in the ♂.——On the underside a blackish dot close to apex of forewing corresponds to an olive-green minute dot of the ♂; centre of base of hindwing pale green; on both wings blackish and grey diffuse submarginal scaling which, on forewing, forms an irregular triangular patch from anal angle forward, and on hindwing an irregular band which is nearly interrupted before middle.

Genitalia. ♂: tenth tergite longer than in *Rh. floralis*,[1] particularly the narrowed apical portion, at apex a minute median incision, no division into two prongs; margin of tenth sternite faintly incurved in middle. Harpe of clasper as in *Rh. floralis* but the neck of which the pair of prongs are the continuation a little shorter, the prongs slightly variable in lengths, either the proximal prong the longer or the distal one. Penis-sheath with a large, conical, slightly compressed, horizontal tooth.——♀: Around orifice a moderately raised halfring which is open posteriorly, the segment membranous in front of the halfring and at the sides, and wrinkled.

Length of forewing: ♂ 41 mm., ♀ 46 mm.

Hab. Shillong, Assam, bred by Major F. B. Scott in August, October, and November, 1 ♂ and 2 ♀♀, and a pair of cripples.



4. **Gurelca masuriensis** Butl. (1875).

The Indian specimens of *Gurelca* with the terminal band of the hindwing tapering anally were treated by us in the *Revision* as belonging to one species only. Major F. B. Scott, however, has lately obtained specimens of this type from two remarkably different larvae (which he will describe and figure), and on examining the specimens bred by him we find that (1) they represent two

[1] We have now two ♂♂ (and one ♀) of *Rh. floralis*; in one of them the tenth tergite is comparatively short and broad and is forked as figured in the *Revision* (tab. 25, figs. 1 and 24); in the other it is longer and narrower, and the division into two prongs is only indicated by an incision.

species, and (2) that one of them is the true *G. masuriensis*, of which there are no specimens in the Tring Museum. The synonymy as given in the *Revision* must be amended as follows :

Gurelca himachala himachala Butl. (1875).

Lophura himachala Butler, *Proc. Zool. Soc. Lond.* p. 621. no. 1 (1875) (N.E. Himalayas).
Lophura erebina Butler, *l.c.* no. 3 (1875) (N.W. India).
Gurelca masuriensis masuriensis Butl., R. & J., *Revision of Sphingidae*, p. 589. no. 525a. tab. 49. fig. 32, tab. 55. fig. 40 (1903) (partim ; Darjiling ; Buxa, Bhutan ; Khasia Hills ; Cherrapunji).

A second subspecies is *G. himachala sangaica* Butl. (1875) from China. Formosa, Korea, and Japan.

Gurelca masuriensis Butl. (1875).

Lophura masuriensis Butler, *l.c.* p. 244. no. 16. tab. 36. fig. 3 (1875) (Masuri)
G. masuriensis masuriensis Butl., R. & J., *l.c.* p. 589. no 525a (1903) (partim ; Masuri).

This species is greyer than *G. himachala*, the anal lobe of the forewing is shorter, the hindmargin of the wing not being quite so deeply excised as in *G. himachala* ; the black terminal band of the hindwing is anteriorly broader and here not sharply defined, the blackish brown colouring invading the disc ; the yellow area paler, particularly on the underside.

Type (in B.M.) not dissected. In the two ♂♂ bred by Major F. B. Scott the anal tergite more compressed than in *G. himachala*, the sternite (text-fig. 1) less broad and more gradually narrowed to a point. Harpe (text-figs. 2, 3) spatulate, concave on the upperside, with the apical margin incised on emarginate above middle, proximally of the apical dilated portion a low obliquely transverse ridge. The apical armature of the penis-sheath (text-figs. 4, 5) consists of a prominent, non-dentate ridge which ends at both sides with a sharp hook pointing frontad.

FURTHER RECORDS OF NORTH-AMERICAN BIRD-FLEAS, WITH A LIST OF THE NEARCTIC BIRDS FROM WHICH FLEAS ARE KNOWN.

By DR. KARL JORDAN.

In comparison with the large number of species of land and sea birds which breed in the United States and Canada the records of the fleas occurring on them and in their nests are very scanty. Any addition to our knowledge of the distribution of the species of fleas among the North American birds, therefore, is most welcome. In Nov. Zool. xxxiv, p. 182 (1928) I had occasion to express my gratitude to Mrs. K. C. Harding, of Brooklyne, Boston, Mass., for her assistance in collecting bird-fleas. Mrs. Harding has continued her examination of birds' nests and has again been successful in breeding fleas from nests taken after the fledglings had left. Although no new species were found, Mrs. K. C. Harding, in obtaining fleas in nests of several birds from which these Ectoparasites were not known, has established new host records. Moreover, no bird-fleas were previously known from New Hampshire.

A. Bird-Fleas Collected by Mrs. K. C. Harding at Holderness, N.H., in June 1928.

1. **Seiurus aurocapillus** L. (1788); Ovenbird.

Ceratophyllus diffinis Jord. (1925), a series.

2. **Dumetella carolinensis carolinensis** L. (1758); Catbird.

A series of the same flea.

3. **Hylocichla fuscescens fuscescens** Stephens (1817); Wilson's Thrush.

The same flea.

4. **Planesticus migratorius migratorius** L. (1766); Robin.

The same flea.

5. **Sialia sialis sialis** L. (1758); Bluebird.

The same species in numbers.

B. Bird-Fleas Collected by Mrs. K. C. Harding at Cohasset, Boston, Mass., in July 1928.

6. **Troglodytes aëdon aëdon** Vieillot (1807 or 09 ?); House Wren.

Likewise a series of *Ceratophyllus diffinis* Jord. (1925), which is evidently a species occurring on many hosts.

C. Mrs. K. C. Harding forwarded, in addition, the following Bird-Fleas:

Ceratophyllus idius J. & R. (1920), collected by Mr. A. W. Higgins at Rock, Mass., from the nest of **Sialia sialis sialis,** in July 1928; also by Mr. L. W.

Smith at Babson Park, Mass., from the nest of **Iridoprocne bicolor** Vieillot (1807 or 1808) in July 1928; and by L. Fletcher at Cohasset, Mass., from the nest of **Sialia sialis sialis**.

Ceratophyllus gallinae Schrank (1803), collected by Messrs. L. W. and T. D. Smith at Babson Park, Mass., in nests of **Sialia sialis sialis** in June and July 1928.

I append here a list of the North American birds of which fleas are known, hoping to induce thereby one or the other biologist interested in birds to pay greater attention to these Ectoparasites than has hitherto been the case. Nesting boxes afford a very good opportunity for collecting bird-fleas.——The names of the birds are taken from the third edition of the *Check-List of North American Birds* (New York, 1910).

1. **Colymbus holboelli** Reinh. (1853);[1] Holboell's Grebe.

Ceratophyllus diffinis Jord. (1925): Okanagan Falls, B.C., April 1913 (C. Garrett).

2. **Spatula clypeata** L. (1758): Shoveller.

It is uncertain as to whether the fleas were obtained from this bird or from **Steganopus tricolor**; *Ceratophyllus garei* Roths. (1902): mouth of Bear R., Utah (A. Wetmore).

3. **Oidemia deglandi** Bonap. (1850); White-winged Scoter.

Ceratophyllus garei Roths. (1902): Edmonton, Alta (A. Hine).

4. **Steganopus tricolor** Vieillot (1819); Wilson's Phalarope.

Cf. No. 2. *Ceratophyllus garei* Roths. (1902): mouth of Bear R., Utah (A. Wetmore).

5. **Gallus domesticus** L. (1758); Domestic Fowl.

Ceratophyllus gallinae Schrank (1803): Barker, N.Y. (E. P. Felt); and Perry, N.Y.; Eliot, Maine, August 1923 (P. R. Lowry).

Ceratophyllus niger niger Fox (1908): San Francisco (Carroll Fox); Blue Wake, Cal. (A. H. Krausse); Bridgeport, Cal. (F. C. Bishopp); Tacoma, Wash. (F. C. Bishopp); Essington, B.C. (J. H. Keen).

Echidnophaga gallinaceus Westw. (1875): Southern States, northward to New York State and Missouri, an Old World species.

6. **Meleagris gallopavo** L. (1758); Turkey.

Echidnophaga gallinaceus Westw. (1875): Southern States.

Ceratophyllus niger niger Fox (1908): Alberta (A. D. Gregson).

7. **Sphyrapicus ruber ruber** Gmel. (1788); Red-breasted Sapsucker.

Ceratophyllus gallinulae perpinnatus Baker (1904): Queen Charlotte I., May 1920 (J. A. Munro).

[1] C. griseigena holboelli.

8. **Cyanocitta stelleri carlottae** Osgood (1901); Queen Charlotte Jay.

Ceratophyllus gallinulae perpinnatus Baker (1904): Masset, Queen Charlotte I., June 1920 (1920).

9. **Passer domesticus** L. (1758); English Sparrow.

Ceratophyllus gallinae Schrank (1803): Mount Kisko, N.Y., June 1927 (K. Jordan).

10. **Melospiza melodia caurina** Ridgw. (1899); Song Sparrow.

Ceratophyllus gallinulae perpinnatus Baker (1904): Masset, Queen Charlotte I., June 1920 (J. A. Munro).

11. **Iridoprocne bicolor** Vieillot (1807 or 1808); Tree Swallow.

Ceratophyllus idius J. & R. (1920): Okanagan Landing, B.C., July 1913 (J. A. Munro); also Babson Park, Mass., July 1928 (L. W. Smith).

Ceratophyllus gallinae Schrank (1803): Babson Park, Mass., July 1927 (L. W. Smith).

12. **Riparia riparia** L. (1758); Bank Swallow.

Ceratophyllus riparius J. & R. (1920): Rosslyn, Va., June 1916 (F. C. Bishopp); Ithaca, N.Y., July 1921 (R. C. Shannon); Bay View, Milwaukee, May 1911 (R. A. Muttkowski): Okanagan Falls, B.C., April 1913 (C. Garrett).

Ceratophyllus celsus Jord. (1926): Okanagan Falls, B.C., April 1913 (C. Garrett.

13. **Lanivireo solitarius cassini** Xantus (1858); Cassin's Vireo.

Ceratophyllus gallinulae perpinnatus Baker (1904): Sweet Spring I., B.C., August 1928 (K. Racey).

14. **Vermivora celata lutescens** Ridgw. (1872); Lutescent Warbler.

Ceratophyllus gallinulae perpinnatus Baker (1904): Masset, Queen Charlotte I., June 1920 (J. A. Munro).

15. **Seiurus aurocapillus** L. (1766); Ovenbird.

Ceratophyllus diffinis Jord. (1925): Holderness, N.H., June 1928 (Mrs. K. C. Harding).

16. **Dumetella carolinensis carolinensis** L. (1766); Catbird.

Ceratophyllus diffinis Jord. (1925): Cohasset, Mass., August 1927, and Holderness, N.H., June 1928 (Mrs. K. C. Harding).

17. **Thryomanes bewicki** Audub. (1827); Bewick's Wren.

Ceratophyllus gallinulae perpinnatus Baker (1904): Sumes, B.C., April 1905 (A. Brooks).

The host possibly misidentified for **Troglodytes aëdon parkmani** Audub. (1839).

18. **Troglodytes aëdon aëdon** Vieillot (1807 or 1808); House Wren.

Ceratophyllus idius J. & R. (1920): Cohasset, Mass., July and August 1927 (Mrs. K. C. Harding and K. Jordan).

Ceratophyllus diffinis Jord. (1925): Cohasset, Mass., July 1928 (Mrs. K. C. Harding).

19. **Telmatodytes palustris** Wilson (1810); Marsh Wren.

Ceratophyllus garei Roths. (1902): Shoal Lake, Manitoba, May 1917 (Gordon Hewitt).

20. **Hyolocichla mustellina** Gmel. (1788); Wood Thrush.

Ceratophyllus diffinis Jord. (1925): Colpoys Bay, Ontario (A. B. Klugh).

21. **Hylocichla fuscescens fuscescens** Stephens (1817); Veery.

Ceratophyllus diffinis Jord. (1925): Holderness, N.H., June 1928 (Mrs. K. C. Harding).

22. **Hylochichla ustulata ustulata** Nuttall (1840); Russet-backed Thrush.

Ceratophyllus gallinulae perpinnatus Baker (1904): Masset, Queen Charlotte I., June 1920 (J. A. Munro).

23. **Planesticus migratorius migratorius** L. (1766); Robin.

Ceratophyllus diffinis Jord. (1925): Holderness, N.H., June 1928 (Mrs. K. C. Harding).

24. **Planesticus migratorius propinquus** Ridgw. (1877); Western Robin.

Ceratophyllus niger Fox (1908): Okanagan Landing, B.C., June 1917 (J. A. Munro).

25. **Sialia sialis sialis** L. (1758); Bluebird.

Ceratophyllus gallinae Schrank (1803): Babson Park, Mass., July 1927 and June and July 1928 (L. W. and T. D. Smith).

Ceratophyllus idius J. & R. (1920): Rock, Mass., July 1927 (A. W. Higgins); Cohasset, Mass. (L. Fletcher).

Ceratophyllus diffinis Jord. (1925): Holderness, N.H., June 1928 (Mrs. K. C. Harding).

26. "**Goose,**" not identified.

Ceratophyllus garei Roths. (1902): Edmonton, Alta (A. Hine).

Accidental occurrence of bird-fleas on mammals:

Ceratophyllus niger niger Fox (1908): San Francisco, on **Homo** (collected by Carroll Fox).

Ceratophyllus niger inflexus Jord. (1929): Colorado Springs, Colo., on **Eutamias,** xi.1909 (E. R. Warren).

Accidental occurrence of mammal-fleas on birds:

Ceratophyllus asio Baker (1904): Wellesley, Mass., on **Otus asio asio** L. (1758) (A. P. Morse).

Ceratophyllus gallinae Schrank (1803): Adirondack Lodge, Essex Co., N.Y., ix.1928, on **Tamias striatus** L. (1758) (K. Jordan).

PURCHASED

EXPLANATION OF PLATES I AND II

PLATE I.

Fig. 1. *Ceratophyllus vesperalis* ♂ . . . . . p. 28
,, 2a, b ,, ,, ♀♀ . . . . . .
,, 3, a–g ,, *caedens durus* ♀♀ . . . . . p. 29
,, 4. ,, *sexdentatus nevadensis* ♂ . . . . . p. 30
,, 5. ,, ,, *schisintus* ♀ . . . . . p. 31
,, 6. ,, *arizonensis littoris* ♀ . . . . . p. 31
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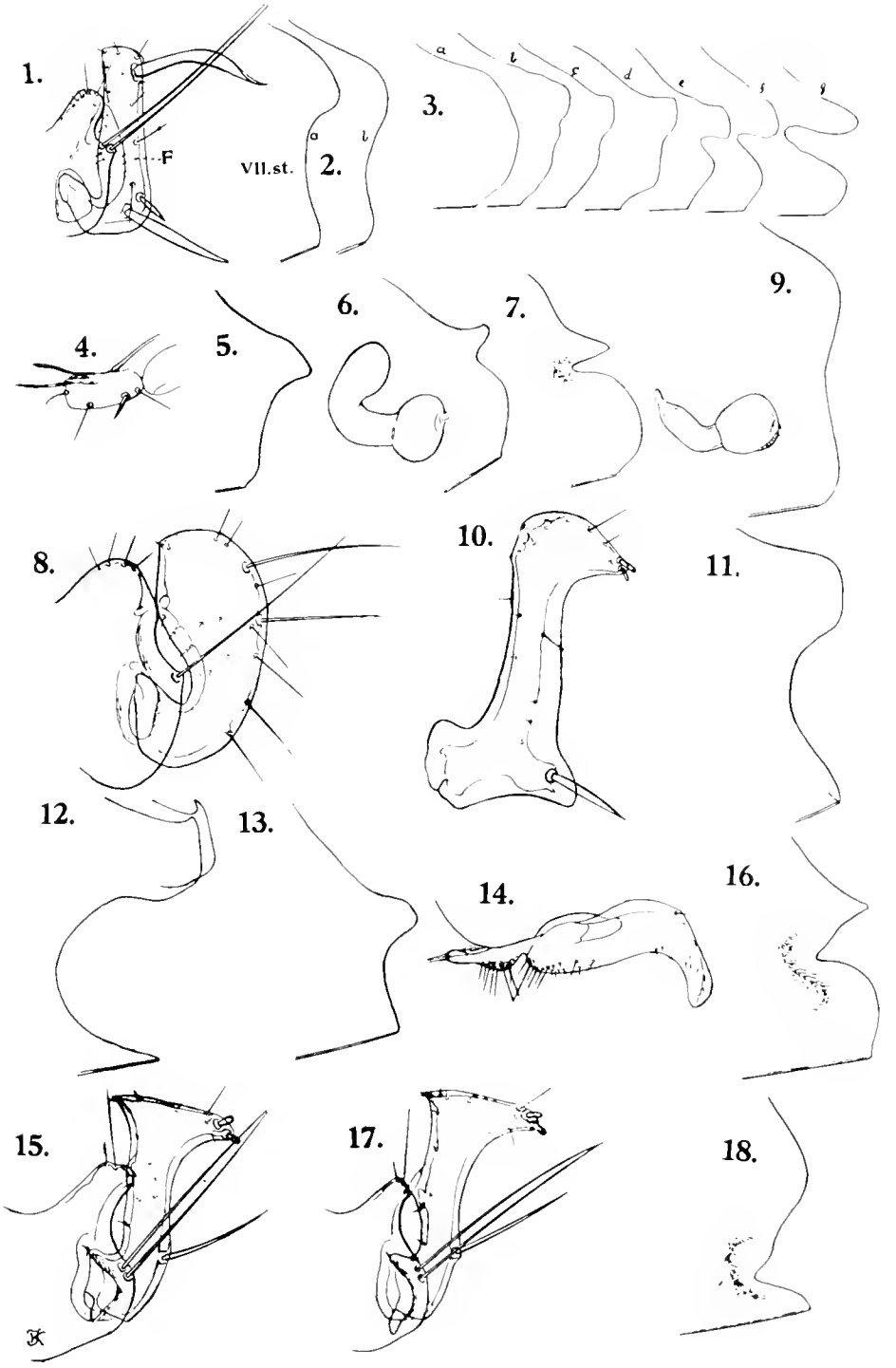

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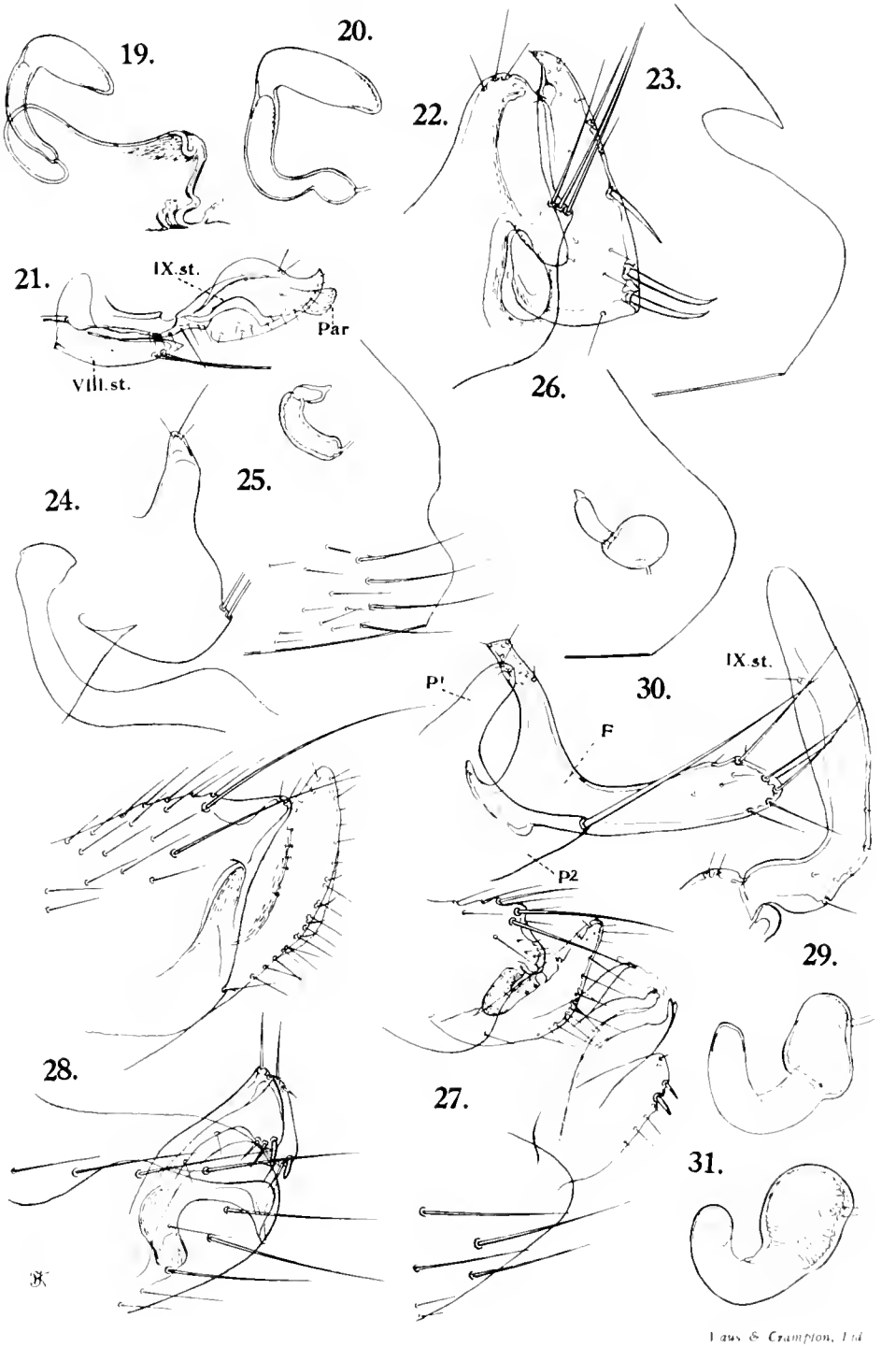

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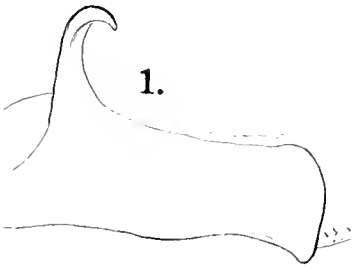
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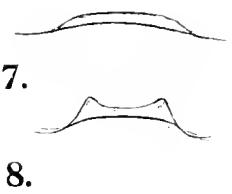
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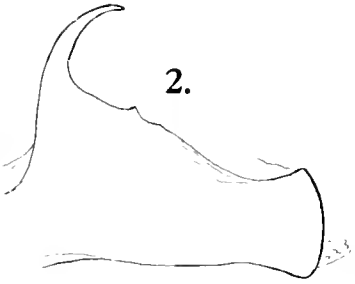
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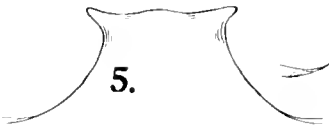
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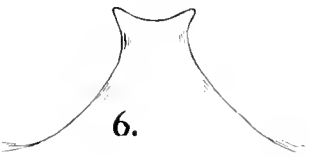
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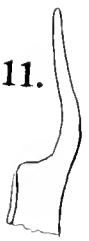
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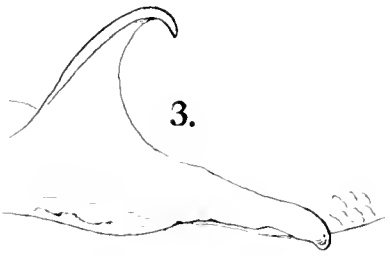
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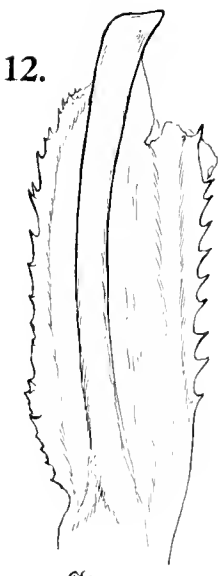
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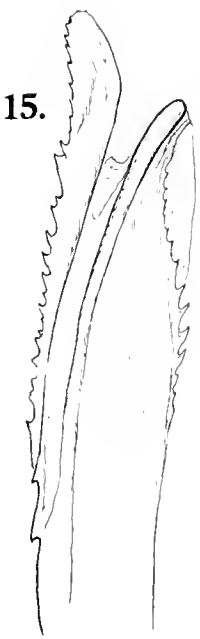
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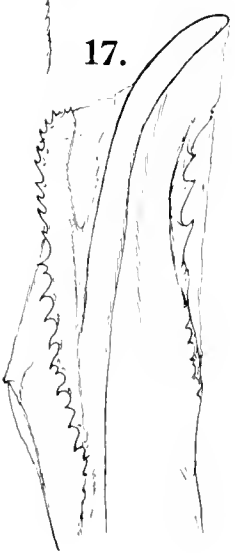
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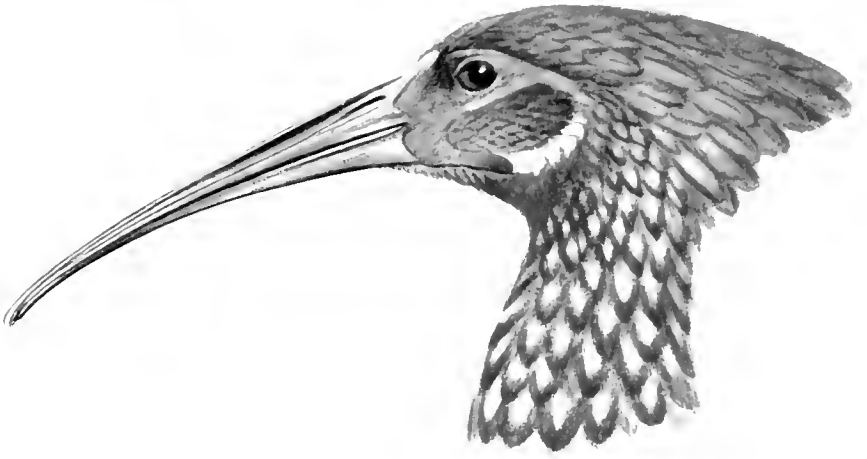
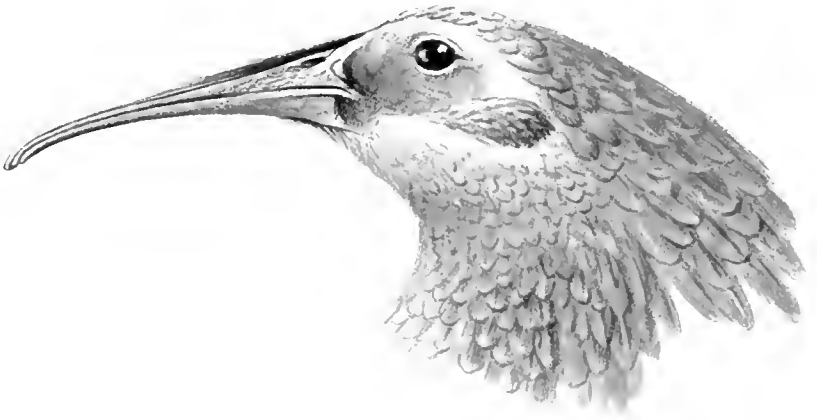


Lampribis rara Rothsch. Hart. & Kleinschm. (British Museum.)



Lampribis olivacea cupreipennis Rchw. (Type, Berlin Museum.)

Lampribis olivacea olivacea (Dubus). (Type, Brussels Museum.)

FIRST EIGHT PRIMARIES OF THE TYPE OF *FARUS AFFINIS* BHDT., NANORTALIK, GREENLAND.

R. Herring.]

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

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NOVITATES ZOOLOGICAE

Vol. XXXV. SEPTEMBER 1929. No. 2.

ON VARIOUS FORMS OF THE GENUS *TYTO*.

By ERNST HARTERT.

TYTO ALBA AND ITS SUBSPECIES.

THE examination of a Barn-Owl, the first recorded from the Solomon Archipelago, which had been collected by R. H. Beck on Vella Lavella Island, 11 Nov. 1927, when he was leader of the first Whitney South Sea Expedition, led me to revise the Barn-Owls, a genus of birds which contains some of the most beautiful birds, and of which I have been always particularly fond.

When Sharpe monographed this group in vol. ii of the Cat. B. Brit. Mus. (1875), he did much the same as we do now, as regards species, distinguishing specifically "*Strix flammea* and allies," *Strix novae-hollandiae*, *tenebricosa*, *capensis*, and *candida*, but he declared all the various names given to subspecies of "*flammea*" to be, in his opinion, *synonyms*, while he separated the closely allied *castanops* as a subspecies of *novae-hollandiae*. This was not consistent or logical, as many of the subspecies of "*flammea*," which he treated as synonyms, are much more different from the first-named, European, form, than *castanops* is from *novae-hollandiae*.

Sharpe's volumes of the Catalogue of Birds are immortal, and generally the best of that famous series, but it must not be forgotten that the idea of subspecies was then very vague, and the following quotation will show how little material was expected at the time. Sharpe wrote in 1875, i.e. over half a century ago: "It is seldom that an opportunity is afforded to the ornithologist of examining such a fine series of birds as has been permitted to use in the case of the Barn-Owls; and it would be difficult to find a more comprehensive collection that at present exists in the British Museum." Yet he had only 116 specimens from all over the world of what he called *Strix flammea*, while the Museum now contains many many more, and there are now before me in the Tring Museum no less than 435 skins. Moreover, when Sharpe wrote that, there were vast regions of the world unexplored, and especially many of the Indo-Malayan and Australian Islands were only touched or entirely unexplored.

While some forms are fairly widely spread, others are more local, and insular forms are often very well marked.

I can now distinguish the following subspecies:

Tyto alba alba (Scop.).

Strix alba Scopoli, Annus I, *Hist. Nat.* i, p. 21 (1769—" Ex Foro Juli " = Friaul).

The above name must be used for the continental Mediterranean Barn-Owl, which has the underside as a rule white, with a few blackish or brown-grey spots on the sides of the body, which are nearly always present, though often very small. Underside rarely suffused with brownish yellow. The tail is pale yellowish brown or pale brownish yellow, with the usual cross-bars, sometimes wider, sometimes very narrow. The upperside is of course lighter than in the usual dark specimens of *Tyto alba guttata* from Central Europe, but does not differ from the typical British ones or from Spanish ones. It seems that specimens with pure white underside, without any spots, are rare, but possibly more frequent than we know in Greece. Wings, 281–296, once 310; metatarsus, 56–63 mm.

This form inhabits Italy, north to southern slopes of the Alps, Sicily, apparently also Greece (rare!), Corfu, Crete, and Cyprus, and in the west apparently through the Balearic Isles and Spain, westernmost France to the Channel Islands to British Isles and Ireland. In France brown and white forms occur, but the ones with white underside are more common than in Germany, but in westernmost and southernmost France the white underside is *apparently* commoner than in eastern and northern France. Cf. notes in *Vög. pal. Fauna*, pp. 1030 and 1033–1034.

Kleinschmidt separates the Barn-Owls of the Rhine-valley as *T. a. rhenana*,[1] not because he can distinguish any specimens from either the Central European ones, or from the Mediterranean form, but because there is a greater percentage of underside white specimens than in other parts of Germany, and more brown ones than in Southern Europe. This is quite true, of course, but the conclusion that they must therefore have a special name is, in my opinion, not correct. We cannot explain every phenomenon by our clumsy nomenclature. Nomenclature must be able, and its object is, to distinguish by names forms which can be distinguished, but not forms which are not distinguishable, though a certain proportion of specimens differ. And it is not possible to say how many differ, as we generally can only compare an infinitesimal proportion of the actual population. To talk of an " average " (" Durchschnitts ") size or coloration, when only a few or a dozen specimens have been examined, is doubtless a great mistake!

I consider *Tyto alba kleinschmidti* Jordans[2] an undoubted synonym of *T. alba alba*. The author has been kind enough to send me six beautiful skins which he collected in Mallorca. He described the form in 1924 from nine specimens. He explains (what we all know) that many specimens (" grosses Material ") are necessary to see the " Variationsbreiten "—but he did *not* have large series, but only nine specimens! Judging from these nine specimens he talks of the normal type (" Mittelwert "), which, however, he could hardly know. He knew well the great variability of Barn-Owls, but did not take the consequences into account. Jordans says that such heavily spotted undersides as are common in Spain are not found in Mallorca. He could not know this, as he had only nine; moreover, that heavily spotted underside is not, apparently, usual in Spain, as I have not seen one that was heavier spotted than the most spotted

[1] *Strix flammea rhenana* Kleinschmidt, Berajah, *Strix Flammea*, p. 20.

[2] *Tyto alba kleinschmidti* Jordans, *Journ. f. Orn.* 1924, p. 409 (Balearic Isles, type in Jordans' collection from Mallorca).

Mallorcan. He says that such dark uppersides are not found in Mallorca, but the darker Mallorcans are quite as dark as the darker Spaniards. Jordan says that the upperside is much heavier spotted in Mallorca than in Spain—this is not the case in comparison to our Spanish examples. I cannot at all see that the "Variationskurve" is different, but even if it was, that could not suffice in the genus *Tyto*, where often, when one has a good series, other specimens turn up which are strikingly different, as for example in a fine series of South-Sea Barn-Owls (*T. alba lulu*), which has usually a white underside, specimens with brown breast and abdomen occur. Similar "irregularities" are found among the other species, *Tyto longimembris* (*candida* auct.).

Dr. von Jordans also shot an abnormal specimen with a white upperside. It is obviously an aberration and as such can have no importance at all for the discussion of the subspecies. The reasoning of Jordans was the same as that of the late Carlo von Erlanger, when he described "*Phyllosc opus sibilatrix flavescens*" and made an obviously aberrant luteism or albinism the type. I don't see that the suggestion is justified that this is an extreme of the subspecies, as the supposed differences are *not* exaggerated—on the contrary, the great amount of grey which Jordans mentions, and which is present in some of his specimens, is quite absent.

Kleinschmidt [1] separates the British Barn-Owl under the name "*Strix hostilis*." He compared at the time 6 British specimens with 10 from Siena and Ravenna "and with many *S. ernesti* from Sardinia." He says that they differ by showing a length of tarsus ranging between lower extremes. No measurements given.—It is true that I too found lower extremes, but by far the majority do not range under the majority of Spanish and Italian specimens. I quite agree that variable forms are most interesting, but do not take the consequence that populations of which only a minor percentage can be distinguished should receive names. My view is that of older ornithologists, but to call it antiquated is a presumption. It is surely not antiquated because half a dozen or more recent ornithologists have named such forms!

The few Barn-Owls I have been able to see from Cyprus are rather uniform, with light upperside, underside white with a few blackish spots, one without the latter. Wings 290–305 mm. They seem to be the same as Palestine and *presumably* Asia Minor birds, which I have not compared. It is for me impossible to say how they vary, and I see no reason to separate them from *T. a. alba*.

Tyto alba ernesti (Kleinschm.).

Strix ernesti Kleinschmidt, *Orn. Monatsber.* 1901, p. 168 (Sardinia).

"*Strix Flammea ernesti*" Kleinschmidt "Berajah," *Strix Flammea*," p. 20, and instructive photos of underside of series on pl. vi (1906).

Tyto alba ernesti Hartert, *Vög. pal. Fauna*, p. 1036 (1913).

This island form is recognizable. Its characters are perhaps most comprehensively described in the *Vög. pal. Fauna*, where measurements are also given. The whiter tail and the great amount of white or whitish colour on the wings are characteristic. The tail is not rarely white or whitish without bars, more often with narrow cross-bars, the underside is very often pure white without any spots, and if they occur they are very small. It is true that absolutely similar specimens occur in England, but they are very rare. As is the case in

[1] *Strix hostilis* Kleinschmidt, *Falco*, xi. p. 18 (1915—England),

other species, the form from Sardinia and Corsica is well recognizable, while the surrounding Mediterranean countries and the Balearic Isles have not developed a practically separable form.

Sardinia and Corsica.

(Females are often darker than males; there is in underneath white specimens often a light but bright buffish band across the breast. In British specimens all such specimens that were sexed by me or in my presence were females, in pairs the males were uniform white, the females had the buffish band. This is the rule in Barn-Owls; even in Javan *javanica* the males are whiter, females browner underneath. Some few specimens in collections which do not confirm this rule are probably wrongly sexed!)

This owl is one of the most beautiful of all birds!

Tyto alba schmitzi (Hart.).

Strix flammea schmitzi Hartert, *Nov. Zool.* 1900, p. 534 (Madeira).

Madeira.

Tyto alba gracilirostris (Hart.).

Strix flammea gracilirostris Hartert, *Bull. B.O. Club*, xvi, p. 31 (1905—Fuertaventura and Lanzarote)

Eastern Canaries: Fuertaventura and Lanzarote.

Tyto alba pusilla subsp. ?

About the North-African Barn-Owls, I mean those from Africa Minor and Egypt (I know nothing of the occurrence in Cyrenaica and have not seen any from Tripolitania), I have written all I knew in *Vög. pal. Fauna*, p. 1035. Though I have now more specimens, I can say nothing more about them. Many specimens are indistinguishable from S.W. European ones, but specimens with more heavily spotted undersides are more frequent, though they occur with unspotted undersurface. The tarsi are often thinner feathered, and sometimes longer. The wings range longer, but the majority of specimens are not larger. I measure, however, a number of specimens with wings of 300 and exceptionally to 310 mm. I never measured even 300 in British ones, but Kleinschmidt, measuring 6 specimens, mentions a British wing of 308 mm., but among the many measured by Witherby and myself is not one with such a long wing.

If anyone wishes to attach a special name to Barn-Owls from Egypt (and Africa Minor) I am afraid he must call it *Tyto alba pusilla*. This name is misleading and stupid, when compared with *T. a. alba*, but it was given [1] from comparison with the much larger Indian Barn-Owl, which at the time was supposed to be the same as "European" Barn-Owls. The name was given to a bird without locality, but in *Ibis*, 1866, p. 250, it was added that it came from Egypt. Before the author knew this he gave another name, *parva*, for the same reason, to a still smaller bird from Egypt. Five years after C. L. Brehm gave the name *splendens* [3] to specimens from N.E. Africa and the Rhine, and in 1885 he mixed up with this also Sennaar examples, and said he received also one from Strassburg.

[1] *Strix pusilla* Blyth, *Journ. As. Soc. Bengal*, xviii, p. 801 (1850—From a specimen with unknown locality, but *Ibis*, 1866, p. 250, declared to be from Egypt!).

[2] *Strix parva* Blyth, *l.c.*, p. 801 (Egypt).

[3] *Strix splendens* Brehm, *Vogelfang* (partim!), p. 40 (1855).

Tyto alba guttata (Brehm).

Strix guttata Brehm, *Handb. Naturg. Vög. Deutschl.* p. 107 (1831—Rügen, in winter in Germany).

From South Sweden and Denmark throughout Central Europe to Rhineland, where it begins to merge into *alba*, a process which continues through France, also the Alps, Austria, Hungary, Bohemia, to Bulgaria and Roumania.

This form is very variable. Specimens with quite white underside, like *alba*, occur exceptionally in most parts of its range, but they become more numerous on the Rhine and in Eastern France, also apparently in the Alps. In Great Britain this form is an occasional and rare visitor.

Tyto alba affinis (Blyth).

? Strix Poënsis Fraser, *Proc. Zool. Soc. London*, pt. x. 1842, p. 189 (1843—Island of Fernando Po. Specimens from Fernando Po could not be examined).

Strix maculata nec Vieillot, Brehm, *Vogelfang*, p. 40 (1855—Nordost-Afrika); *Naumannia*, 1858, p. 220 ("Sennaar." In the collection are now only examples labelled Chartum, which are the types). See *Nov. Zool.* xxv, p. 41, 1918.

Strix affinis Blyth, *Ibis*, 1862, p. 388 (Cape of Good Hope).

Distinguishable from *T. alba alba* by having stronger toes, and generally longer and often thinner feathered tarsi. The underside is usually pale rusty-yellow, rarer browner, often more whitish, but not as a rule snow-white, the jugulum and sides remaining rusty brownish. Snow-white examples are very rare, and even then there are dark brown spots, sometimes almost black and more or less angular, frequently arrow-shaped and cross-lines on the sides and abdomen. Upperside with fairly large black and white spots, ground-colour with much grey. Wings (20) 286–305, tarsi 63–70 mm.

This form inhabits tropical Africa from Southern Nubia and Khartum to Senegambia and South Africa.

Tyto alba hypermetra Grote.

Tyto alba hypermetra Grote, *Orn. Monatsber.* 1928, p. 79 (Madagascar).

Madagascar and Comoro Islands.

In *Vög. pal. Fauna*, p. 1038, I pointed out the specimens from Madagascar and the Comoros agreed in coloration with *T. a. affinis*, but were larger: wings 300–320 mm. Grote found this confirmed by specimens in the Berlin Museum, and I have also received further specimens, which confirm my statement of 1913. In consequence of this Grote named the larger form, for which no name was available.

Tyto alba detorta Hart.

Tyto alba detorta Hartert, *Bull. Brit. Orn. Club*, xxxi. p. 38 (Santiago, Cape Verde Islands).

This is a darker form, like darkest *guttata*, but with larger spots on the upperside, rectrices strongly barred. This is the "*Strix insularis*" of older authors, but the name *insularis* was given to specimens from St. Vincent in the West Indies, and not from the Cape Verde Islands!

Tyto alba erlangeri Scl.

Tyto alba erlangeri W. Sclater, *Bull. Brit. Orn. Club*, xlii, p. 24 (1921—Lahej in South Arabia).

South Arabia: Aden, Lahej, Muscat, and "apparently extending to Mesopotamia and Palestine," if the latter is true, it would only be South Palestine, not the whole; more Palestine material is however desirable!

Sclater found my remarks, *Vög. pal. Fauna*, p. 1038, confirmed.

Tyto alba thomensis (Hartl.).

Strix thomensis Hartlaub, *Rev. et Mag. Zool.* 1852, p. 3 (Sao Thomé Island in the Gulf of Guinea).

Only known from this island.

Very dark form. Upperside dark grey, almost blackish, the black and white spots very conspicuous. Face very brown. Underside of the known specimens almost golden brown, sometimes with very large black and white, sometimes with much smaller spots. Wings of three specimens in the Tring Museum, collected by A. Moequerys in 1901, only 250–260 mm. Feet powerful.

Tyto alba stertens subsp. nov.

Strix indica Blyth, nec Gmelin!

The Indian *Tyto* is a real "Barn-Owl," one hears it snorting (hence *stertens*) round buildings and ruins, in gardens, etc. It has generally been called *javanica* (if not "*Strix flammea*"), but differs rather from specimens from Java, Kangean, and Lombok, specimens in Tring, the British and Berlin Museums having been compared. The upperside in the Indian form is lighter, paler grey, and the black and white spots are usually smaller, the brownish parts yellower. The underside is white or very pale brownish yellow, in parts or throughout, the spots nearly always present and smaller, if the underside is brown it is less deep than in typical *javanica*. Dimensions similar.

Type: ♂ ad., caught on nest in the roof of the Forest Offices, Silchar, Cachar, November 1895, by E. C. Stuart Baker.

There is not enough material from Ceylon to prove that Ceylonese specimens are smaller than continental Indian ones, though some of ours are very short-winged. Legge also says they have the same dimensions.

Tyto alba subsp.?

Specimens from French Indo-China (Tonkin, ex Alan Owston, and Delacour's in the British Museum) are more like Javanese than like Indian ones, but richer on the upperside than the former, the spotting on the underside often very heavy. More material, however, is required to prove that they have sufficient constancy for a special name.

Tyto alba javanica (Gm.).

Strix javanica Gmelin, *Syst. Nat.* i. p. 295 (1788—Java). See remarks under *T. a. stertens*.

I have seen specimens from Java, Kangean and Lombok (Rensch coll.) only, but the form must be wider spread.

Tyto alba de-roepstorffi (Hume).

Strix De-Roepstorffi Hume, *Stray-Feathers*, iii. p. 390 (1875—South Andamans).

This dark form—the darkest are all island birds: *thomensis* from Sao Thomé, *detorta* from the Cape Verde Islands, *punctatissima* from the Galápagos, *nigrescens* from Dominica—is extremely rare, for it seems that only two specimens have ever been recorded: the type, obtained by De Roepstorff, and an adult male shot by A. L. Butler at Port Blair, South Andamans. This is marked on the label: "Iris brown. Bill whitish. Feet whitish. Length 13½, wing 10⅛, tail 4 5/16, tarsus 2¼. Bill (gape to tip of upper

mandible $1\frac{3}{4}$, expanse 36. Port Blair, January 1898.—A. L. B." The spots on the dull chocolate upperside with reddish brown, not white and black spots. The usually light ochre portions are replaced by rich rufous. The underside in our specimen is much lighter than in the type, ochre with dark brown spots, not deep brownish rufous! Belly in our specimen white.

Tyto alba kuehni subsp. nov.

In coloration like *T. a. delicatula* but larger, wings considerably longer, toes much more powerful. Wing: ♂ 297, unsexed 288, ♂ 300 mm.

Three specimens collected on Kisser in May and June 1901 by Heinrich Kühn. The subspecies is named in memory of this excellent collector.

There is also a ♂ shot at Atapupu, Timor, by Alfred Everett 17.viii.1897, with a wing of 293 mm. which fully resembles the Kisser examples.

The Indian Barn-Owls, called *T. a. javanica*, resemble this form, but they are usually much more ochraceous on the upperside and have mostly larger black and white spots, also the underside is as a rule tinged with buff on ochraceous, a character hardly ever seen in *T. a. delicatula* and its closest allies.

Type of *T. alba kuehni*: ♂ ad. Kisser, 11.v.1901, No. 4103, Heinrich Kühn leg.

Probably this form is much wider spread, and may occur on Flores, Sumbawa, etc., but series from other localities are wanting.

Tyto alba everetti subsp. nov.

A series of 9 Barn-Owls from the little island of Savu west of Timor, between Timor and Sumba, are in colour inseparable from *T. alba kuehni*, but differ in being smaller! The wings that are measurable (others too much in moult) measure: ♂ 247, 253, ♀ 265, 283. The males moult, but have nearly completed their moult. Bills and feet much smaller than in *kuehni*.

Type: ♂ Savu, August 1896. Alfred Everett leg.

Named after the collector, another of the fine collectors of bygone days, when not only new subspecies, but fine new species could be discovered in numbers.

Tyto alba sororcula (Scl.).

Strix sororcula Sclater, *Proc. Zool. Soc. London*, 1883, p. 52 (Timorlaut Islands).

A small form with wing 227 mm., reminding one of the small forms from the Galápagos and other islands.

Timorlaut or Tenimber Islands.

Tyto alba sumbaënsis (Hart.).

Strix flammea sumbaensis Hartert, *Nov. Zool.* iv. p. 270 (1897—Sumba Island).

Only known from Sumba or Sandalwood Islands. This as well as *meeki* are characterized by their very pale, almost whitish, tails.

Tyto alba meeki (R. & H.).

Strix flammea meeki Rothschild and Hartert, *Nov. Zool.* 1907, p. 446 (Collingwood Bay, S.E. New Guinea).

We have specimens from Collingwood Bay, Dampier and Vulcan Islands.

Tyto alba delicatula (Gould).

Strix delicatulus Gould, *Proc. Zool. Soc. London* 1836, p. 140 (1837—New South Wales).

Australia generally. *T. alba alexandrae* Mathews 1912 is a synonym and admitted as such by the author.

Tyto alba lulu (Peale).

Strix lulu Peale, *U.S. Expl. Exp.* p. 74 (1848—Upolu, Samoa, "also one from Fiji Is." "Lulu" is the native name at Upolu, Samoa).

Samoa, Tonga, Society Islands, perhaps also Fiji Islands.

The Barn-Owls from the South Sea Islands are comparatively little known and generally recorded as *Tyto alba delicatula* (terra typica, New South Wales), or *Tyto alba lulu* (terra typica Upolu, Samoa).

They are indeed so similar to the Australian *delicatula* that they cannot be separated without measuring. They are however smaller. While Australians have wings generally from 280–290, sometimes to 292 and 293, rarely under 280, i.e. 278, 276, 275, eight Samoan skins, mostly collected by R. H. Beck, have wings from 273–278, once 279; these are then true *T. a. lulu*. To this form *seem* also to belong specimens from Tonga (one: 273), Nine (two: 268, 273), New Caledonia (two: 265, 273), New Hebrides (two: 265, 280), Sta. Cruz (two: 275, 270).

Probably the form from the Fiji Islands (Viti) is smaller, as three specimens have wings of 265, 265, 265 mm., 1 sexed ♂, 1 ♀, and 1 doubtful. Considering, however, that on Nine, New Hebrides, and New Caledonia there are differences from 5 to 15 mm., this can only be surmised at present.

That no importance can be attached to colour alone, unless its width of variation is known, is beautifully illustrated in two specimens from Vanikoro (Santa Cruz), one of which has the upperside much richer, and the underside a rich brownish ochre, while that of the other specimen from the same locality is white with only a slight buffy tinge. Similar variations are of course well known in Central Europe, while in South and West Europe the specimens are nearly always white underneath, with a buffy wash in the females only. Among all the examples from Australia I have seen there is not one with a brownish ochre underside.

An adult male from Nissan Island, east of South New Ireland, shot by Eichhorn 11.ix.1924, has a wing of 289 mm. and cannot be distinguished from Australian *delicatula*. One from Vella Lavella in the American Museum (R. H. Beck coll.) has a wing of 279 and must also be called *delicatula*.

A single male from Kalao south of Celebes cannot be discussed without more material from these regions.

Brasil[1] states that *Tyto alba lulu* occurs on New Caledonia, while on Lifu another subspecies occurs which he calls *T. a. lifuensis*, which is to be distinguished by a spotless white underside; this is, however, a character not to be relied on; I have seen one from Samoa with a spotless white underside, and in many subspecies that varies individually. It would also be very peculiar if *lulu* spread as far as New Caledonia, and in between were another form. I, therefore, think that *lifuensis* is not separable.

[1] *Rev. Française d'Orn.* iv. p. 202 (1915).

Tyto alba guatemalae (Ridgw.).

Strix flammea var. *guatemalae* Ridgway, *Bull. Essex Inst.* v. p. 200 (1873—"Panama to Guatemala").
Tyto perlata guatemalae Ridgway, *Bull. U.S. Nat. Mus.* no. 50, vi. p. 610 (1914—Nicaragua is here given as the type locality).

Central America from Guatemala to Panama, and perhaps farther spread.

Tyto alba pratincola (Bp.).

Strix pratincola Bonaparte, *Geogr. & Comp. List*, p. 7 (1838—based on Audubon, *Orn. Biog.* ii. p. 403, pl. 171, where specimens from the south-eastern U.S.A. are described).

United States and Mexico—said to go to Nicaragua in winter!

Tyto alba furcata (Temm.).

Strix furcata Temminck, *Pl. Col.* 432, livr. 73 (1838—Cuba).

Remarkable by the white area on the secondaries, which, however, is not constant, and the white tail, either barred or unbarred.

Cuba with Isle of Pines and Jamaica.

Tyto alba tuidara (Gray).

Strix tuidara Gray, in Griffith ed. Cuvier, *Anim. Kingd.* 6, p. 75 (1829—Brazil).
Strix perlata nec Vieillot 1817, Lichtenstein, *Verz. Doubl. Berlin*, p. 59 (1823—Brazil).

From Argentina throughout Brazil.

Cory suggested that Patagonian specimens may be smaller?

Tyto alba contempta (Hart.).

Strix flammea contempta Hartert, *Nov. Zool.* v. p. 500 (1898—Cayambe, 9,223 feet, N.W. Ecuador).
Strix stictica Madarász, *Ann. Mus. Hung.* ii. p. 115 (1901—Description of one female in the Hungarian Museum, from Merida, 1,630 m.)

Ecuador, Colombia, and Venezuela.

Very variable in coloration of upper- and underside.

Tyto alba lucayana Riley.

Tyto perlata lucayanus Riley, *Proc. Biol. Soc. Washington*, p. 153 (1913—New Providence Island, Bahamas).

Bahamas.

I have not examined specimens from the Bahamas!

Tyto alba bargei (Hart.).

Strix flammea bargei Hartert, *Bull. Brit. Orn. Club*, iii. p. xiii (1892—Curaçao).

Only known from one locality, the rock with the fortifications on Curaçao.

Tyto alba glaucops (Kaup).

Strix glaucops Kaup, in Jardine's *Contr. Orn.* 1852, p. 118 ("Jamaica," errore, only found on Haiti or San Domingo).

San Domingo or Haiti Island.

We have beautiful specimens, collected by Kaempfer.

Tyto alba insularis (Pelzeln).

Strix insularis Pelzeln, *Journ. f. Orn.* 1872, p. 23 (St. Vincent).

Lesser Antilles: St. Vincent, Grenada, Carriacou, Union and Bequia Islands.

(*Hybris nigrescens noctivirdus* Barbour, *Proc. Biol. Soc. Washington*, xxiv. p. 57, 1912, Grenada, is a synonym!)

Tyto alba nigrescens (Lavr.).

Strix flammea var. *nigrescens* Lawrence, *Proc. U.S. Nat. Mus.* i. p. 64 (1878—Dominica).

Only known with certainty from Dominica in the West Indies, and very much like *nigrescens*, only larger.

Tyto alba punctatissima (Gray).

Strix punctatissima Gray, in *Zool. of the Voyage of the Beagle, Birds*, p. 34, pl. iv (1841—James I., Galápagos).

Only known from the Galápagos Islands.

Tyto rosenbergi (Celebes), *cayeli* (Buru), *inexpectata* (North Celebes), *manusi* (Admiralty Is.), and *aurantia* (New Britain), seem not to be subspecies of *alba*, and seem to belong to *Tyto novae-hollandiae*, an Australian species. I hope to be able to review the subspecies of *T. novae-hollandiae* before long.

Quite different from *T. alba*, the "Barn-Owls," are the long-legged "Grass-Owls," which live and nest on the ground.

There is one species in Southern Africa, *Tyto capensis* (Smith), of which *cabrae* Dubois, from the Congo, and perhaps also *damarensis* Rob., seem to be synonyms.

Another species inhabits India to the Philippines and Australia, *T. longimembris*, *candida* auctorum.

TYTO LONGIMEMBRIS AND ITS SUBSPECIES.

The "Grass-Owls" of the Eastern Continent and Islands down to Australia were known as "*Strix candida*" Tick., but in 1912 Mathews discovered that unfortunately that name was anticipated by *Strix candida* of Latham, who used it for a "Snowy Owl." Therefore the specific name became *Tyto longimembris*. Mathews then called the Australian form *Tyto longimembris walleri*, thus suggesting that it differed from the Indian birds, but he did not enlighten us about the differences. In a recent anonymous list of Owls the same is done. This separation into two subspecies is correct, but there are more than two forms. I think at least the following should be recognized:

Tyto longimembris longimembris (Jerd.).

Strix longimembris Jerdon, *Madras Journ. Lit. Sci.* x. p. 86 (1839—Neilgherries, Southern India).

Upperside dark rich brown, a sort of chocolate-brown, the bases of the feathers orange-buff and showing through in many places, on the wings large light patches, each feather with a small white spot near the tip. Tails white or with a tinge of brownish yellow, and with very dark brown bars and some mottling

near the tip. Underside white, generally suffused with buff on breast and flanks. One specimen is underneath rich yellowish brown.

India generally in suitable places from Dehra Dun to East Assam and south to Nellore, the Carnatic, Neilgherries, etc.

Tyto longimembris walleri (Diggles).

Strix walleri Diggles, *Ornith. Austr.* pt. vii. (1866—Queenlsand, Brisbane).

Tyto longimembris georgiae Mathews, *Austral. Avian Rec.* i. p. 75 (1912—Victoria River, Northern Territory. The type shows that this supposed subspecies is not separable, and Mathews himself admits this in 1927, *Syst. Av.* p. 281).

Australian specimens differ from Indian ones in being darker on the upperside, more blackish, more or less mottled with whitish, and in having larger white spots near the tips of the feathers, and there are less light bases of the feathers showing through, especially on the wings, also the tails are as a rule much darker, light brown! The underside as a rule much more brownish.

One skin from Palm Island (Queensland) is almost like Indian birds. In the plate (273) in Mathews' *B. of Australia*, vol. v., the feet are wrongly coloured yellow.

This subspecies is spread over large parts of Australia; Mathews mentions Northern Territory, Queensland, New South Wales, and Victoria, the latter, however, not any longer in 1927, p. 281. We also have a ♀ collected by Kühn on Kalidupa, Tukang Besri Island (S.E. of Celebes).

Tyto longimembris papuensis subsp. nov.

This form differs at a glance from both *T. l. longimembris* and *walleri*, by its upperside being more uniform, duller and paler, with only some very small, tiny white spots near the tips of the feathers. The tails are yellowish or brownish, with the usual dark cross-bars. Underside white to brownish yellow with small dark brown spots.

New Guinea, so far only known from the eastern parts: ♂ ♀ Owgarra, Angabunga River, 27.xi.1904 and 29.1.1905, collected by Meek and Eichhorn. 1 (unsexed) from the mountains west of the Huon Gulf, collected by Herr Keysser.

Type of *Tyto longimembris papuensis*: ♀ ad. Owgarra, Angabunga River, British New Guinea, not less than 6,000 feet alt., 27.xi.1904. A. S. Meek coll., No. A 1888 (A. F. Eichhorn praep.), in the Tring Museum.

Tyto longimembris subsp. nov. ?

1. Hartlaub, *Proc. Zool. Soc. London*, 1879, p. 295, named a Grass-Owl as *Strix oustaleti*, from a pair collected in the island of Viti Levu, Fiji Islands. He described it as different, having compared it with various Barn-Owls and *Strix novae-hollandiae* apparently in ignorance of *T. longimembris*. The types, if possible, must be compared, in order to say whether this is a separable subspecies or the same as one of the other forms.

2. R. Swinhoe, *Ibis* 1866, pp. 396 and 397, described a Grass-Owl under the name of *Strix pithecops*, which is not like the Chinese form but looks like the Indian subspecies, and it will be necessary to examine more, in order to see if it differs, as one would expect from the different locality. A specimen from Taihaisa, Formosa, 1.vi.1909, bought from the late O. E. Janson in London, probably

collected by Mr. Wileman, is like Indian specimens, but the ground-colour of the upperside is darker, more blackish. Specimens in the British Museum did not seem to differ from Indian ones.

3. Specimens from the Philippines in Tring and London do not seem to differ from Australian ones! In view of the Kalidupa example the question may be raised, if the Australian form could not extend over Celebes to the Philippines? A series from the latter islands must be examined. A Luzon specimen was described as *Strix amauronota* by Cabanis, *Journ. f. Orn.*, 1872, p. 316, but it was only compared with "*Strix flammea*," apparently in ignorance of *longimembris*.

Tyto longimembris chinensis subsp. nov.

Upperside chiefly buffish ochraceous, the feathers being dark chocolate-brown with wide bases and edges being buffy ochraceous, and near the tip is a small buff to whitish spot. The tail is a bit lighter, almost orange-buff, with the usual blackish cross-bars. Underside paler, ochraceous-buff with a few tiny dark brown spots. Facial disk like the ground-colour of the upperside. We have a skin, with wing 340 mm., shot at Suey Kow, in South-eastern China, in December 1889 by C. B. Rickett, and there are two like it in the British Museum from Foochow. This extraordinary coloration seems to be the usual one in South China, while it is not, as a rule, found elsewhere, except that there is one from Raipur in India like it, if the label has not been exchanged?

Type in Tring Museum, Suey Kow, C. B. Rickett coll.

It will be seen from the foregoing treatise, that material of Grass-Owls is wanting from many parts: from Indo-China, from Celebes, and probably the species may occur on the Sunda Islands, the Moluccas, and on some other islands than the Fiji Islands in the South Sea.

DESCRIPTIONS OF NEW SPECIES OF JAPANESE, FORMOSAN, AND PHILIPPINE GEOMETRIDAE.

By R. J. WEST.

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THE descriptions in this paper are based on material in the collection of the late A. E. Wileman, which has recently been presented to the British Museum (Natural History) by Mrs. Wileman in memory of her husband.

Subfamily GEOMETRINAE

Microniodes opalescens sp.n.

♂: *Palpus* ochraceous-buff. *Antenna* bipectinate. *Head:* frons and vertex white, a wide band of burnt sienna below bases of antennae, occiput white tinged with burnt sienna. *Thorax:* patagium white, tinged with burnt sienna anteriorly; tegula white. *Abdomen* white above and beneath. *Pectus* white. *Legs* white tinged with drab. *Forewing* white, slightly opalescent, drab irrorated with hair-brown on costa, a drab spot on discocellulars; an inwardly oblique, drab, wavy line, from cell at vein 2, to inner margin subbasally; an inwardly oblique, drab line, diffusely edged distally, from apex to inner margin medially; subterminally a series of drab dots, one on each vein; termen drab. *Hindwing* white, slightly opalescent; medially an inwardly oblique, drab line diffusely edge distally, in continuation of line from apex on forewing; postmedially an inwardly oblique, drab line; subterminally a series of interneural drab dots; termen drab, angled at vein 4. *Underside:* fore- and hindwings white, slightly opalescent, drab on costa of forewing.

Expanse 43 mm. (*tip to tip* 40 mm.).

♀: Similar to ♂, but antenna ciliate, with paired setae.

Expanse 46 mm. (*tip to tip* 42 mm.).

Holotype ♂: 1.xii.1912; *allotype* ♀: 2.xii.1912; *paratype* ♀: 2.i.1913; Philippine Is., Luzon I., subprov. Benguet, Pauai, Haight's Place, 7,000 ft.

Nearest ally: *M. ocernaria* Swinh. (Assam).

Microniodes minor sp.n.

♂: *Palpus* light buff. *Antenna* finely bipectinate. *Head:* frons and vertex warm buff. *Thorax:* patagium and tegula white. Abdomen white above and beneath, with a narrow amber-yellow band at base dorsally. *Pectus* light buff. *Legs* light buff. *Forewing* opalescent sparsely irrorated with chestnut-brown, amber-yellow on costa, an amber-yellow spot on median nervure at vein 2, another on anal vein subbasally; postmedially an amber-yellow, inwardly oblique, broken line, from vein 6 to inner margin medially; subterminally an amber-yellow, broken line from vein 6 to inner margin, beyond this a series of chestnut-brown dots on veins, termen amber-yellow. *Hindwing* opalescent, sparsely irrorated with chestnut-brown; medially an amber-yellow, inwardly oblique line, in continuation of postmedial line on forewing; sub-

terminally an amber-yellow, broken line, in continuation of subterminal line of forewing; beyond, a series of chestnut-brown dots on veins, termen amber-yellow, angled at vein 4. *Underside:* forewing opalescent, amber-yellow on costa and termen; hindwing opalescent, termen amber-yellow.

Expanse 26 mm. (*tip to tip* 23 mm.).

Holotype ♂: Philippine Is., Luzon I., subprov. Benguet, Klondyke, 800 ft., 29.iv.1912.

Nearest ally: *M. ocernaria* Swinh. (Assam), which is, however, considerably larger.

Plutodes pulcherrima sp.n.

♀: *Palpus* light buff. *Antenna* bipectinate. *Head:* frons warm buff, vertex cartridge-buff. *Thorax:* patagium primrose yellow, tegula cinnamon-buff. *Abdomen* cinnamon-buff, venter light buff. *Pectus* light buff. *Legs* light buff tinged with cinnamon-buff. *Forewing* cinnamon-buff, primrose-yellow along costa; medially a primrose-yellow band edged with blackish brown and metallic scales; subterminal fascia a fuscous, wavy line; termen with blackish brown and metallic scales, fringe primrose-yellow. *Hindwing* cinnamon-buff; medially a primrose-yellow band edged with blackish brown and metallic scales, forming a continuation of medial band on forewing; subterminal fascia a fuscous, wavy line; termen with blackish brown and metallic scales, angled at vein 4, fringe primrose-yellow. *Underside:* fore- and hindwings light buff tinged with cinnamon-buff, markings showing through from upperside.

Expanse 32 mm. (*tip to tip* 28 mm.).

Holotype ♀: Philippine Is., Luzon I., subprov. Benguet, Klondyke, 800 ft., i.iv.1912.

Nearest ally: *P. exiquinota* Hmpsn. (Ceylon).

Cassyma arcuata sp.n.

♀: *Palpus* warm buff mixed with hazel. *Antenna* minutely ciliate. *Head:* frons warm buff, vertex warm buff mixed with hazel. *Thorax:* patagium fuscous, tegula warm buff mixed with hazel. *Abdomen* warm buff mixed with hazel, venter warm buff. *Pectus* warm buff. *Legs:* foreleg warm buff tinged with fuscous above, other legs warm buff. *Forewing* warm buff densely irrorated with hazel, warm blackish brown on costa; medially a warm blackish brown line, slightly incurved to median nervure, where there is a small point, then straight to inner margin; postmedially an ill-defined line; subterminally a warm blackish brown line, incurved to vein 5, where there is a short bar to termen, incurved to vein 2, then straight to tornus. *Hindwing* warm buff densely irrorated with hazel; medially a warm blackish brown line, forming a continuation of medial line of forewing; subterminally a warm blackish brown line, forming a continuation of subterminal line of forewing; excurved to vein 5, incurved to tornus. *Underside:* fore- and hindwings, warm buff, markings the same as on upperside, but wider and more sharply defined.

Expanse 28 mm. (*tip to tip* 25 mm.).

Holotype ♀: 28.xii.1912; *paratype* ♀: 26.xii.1912. Philippine Is., Luzon I., subprov. Benguet, Palali, 2,000 ft.; *paratype* ♀: Luzon I., prov. Rizal, Montalban, 24.iii.1914.

Nearest ally: *C. subtessellata* Wlk. (India).

Cassyma retessellata sp.n.

♂: *Palpus* warm buff. *Antenna* ciliate. *Head:* frons warm buff, with a band of chestnut below bases of antennae, vertex warm buff mixed with chestnut. *Thorax:* patagium warm buff mixed with chestnut, tegula warm buff mixed with chestnut with a band of chestnut posteriorly. *Abdomen* warm buff mixed with chestnut, venter light buff. *Pectus* light buff. *Legs* warm buff. *Forewing* warm buff irrorated with chestnut, a short longitudinal streak of chestnut at base; antemedially a fine chestnut line, outwardly oblique, touching medial line in cell, then inwardly oblique to inner margin; medially a thicker chestnut line, incurved to lower angle of cell, sharply angled and incurved to inner margin; postmedially a fine chestnut line, oblique to vein 6, incurved to vein 3, incurved to inner margin; subterminally a thick chestnut line, incurved to vein 5, incurved to vein 2, incurved to inner margin; termen warm blackish brown, with warm blackish brown patch at vein 5 and at tornus. *Hindwing* concolorous with forewing, the lines forming continuations of lines on forewing; subbasal line inwardly oblique, medial line incurved to upper angle of cell, incurved to vein 2, incurved to inner margin; postmedial line wavy, subterminal line, incurved to vein 5, inwardly oblique to vein 4, outwardly oblique to tornus, termen blackish brown. *Underside:* forewing warm buff irrorated with warm blackish brown, medial and subterminal lines similar to those on upperside, warm blackish brown; hindwing light buff, medial and subterminal lines similar to those on upperside, warm blackish brown.

Expanse 22 mm. (*tip to tip* 20 mm.).

♀: Similar to male, but antenna minutely ciliate.

Expanse 22 mm. (*tip to tip* 20 mm.).

Holotype ♂: 22.vi.1914; *allotype* ♀: 21.vi.1914. Philippine Is., Mindanao I., subprov. Lanao, Kolambugan (plains); *paratype* ♂: Philippine Is., Luzon I., subprov. Benguet, Klondyke, 800 ft., 23.iii.1912.

Nearest ally: *C. insulata* Warr. (Ké Island).

Parasynegia defixaria sp.n.

♂: *Palpus* warm buff, a patch of wood-brown on second segment. *Antenna* bipectinate, ciliate on apical sixth. *Head:* frons warm buff, with a band of chestnut across middle, vertex light buff, a small chestnut tuft projecting forward. *Thorax:* patagium wood-brown, tegula light buff. *Abdomen* warm buff suffused with wood-brown, irrorated with ochraceous-orange, venter light buff. *Pectus* light buff. *Legs:* foreleg light buff, wood-brown on coxa; other legs light buff. *Forewing* warm buff densely irrorated with ochraceous-orange, and sparsely with fuscous-black, wood-brown on costa irrorated with fuscous-black; a fuscous-black cell spot; postmedial fascia wood-brown, crenulate, incurved to vein 6, inwardly oblique to inner margin; subterminal fascia broken into diffuse fuscous-black spots, in a suffusion of wood-brown; a fuscous-black spot at apex, and interneural fuscous-black spots on termen. *Hindwing* concolorous with forewing; postmedial fascia fuscous, excurved; subterminal fascia broken into diffuse fuscous-black spots. *Underside:* forewing light buff lightly irrorated with fuscous-black; a fuscous-black cell spot; postmedial fascia fuscous; subterminal fascia fuscous-black as on upperside.

Expanse 32 mm. (*tip to tip* 29 mm.).

Holotype ♂: Philippine Is., Luzon I., subprov. Benguet, Palali, 2,000 ft., 24.xii.1912.

Nearest ally: *P. infixaria* Wlk. (India, Assam).

Syntaracta saturata sp.n.

♀: *Palpus* ochraceous-orange, fuscous on base of second and third segments. *Antenna* minutely ciliate, with paired setae. *Head:* frons and vertex ochraceous-orange. *Thorax:* patagium ochraceous-orange, a border of ochre-red and fuscous posteriorly, tegula ochraceous-orange suffused with ochre-red. *Abdomen* light buff suffused with ochre-red, a few scattered specks of fuscous-black, venter light buff. *Pectus* light buff. *Legs* light buff, fuscous on tibia of foreleg. *Forewing* ochraceous-orange overlaid with ochre-red, irrorated with fuscous-black, costa light buff suffused with ochre-red; two fuscous-black spots at base, one on costa, the other on inner margin; the area between the antemedial and postmedial fasciae a little more densely irrorated, giving the appearance of a band across the wing, in which is a fuscous-black cell spot; antemedial fascia fuscous, excurved, crenulate (points basad), a fuscous-black spot on each point; postmedial fascia fuscous, inwardly oblique, crenulate (points distad), a fuscous-black spot on each point; subterminal fascia fuscous, ill-defined, wavy; interneural fuscous-black spots on termen. *Hindwing* concolorous with forewing, fasciae forming continuations of those on forewing. *Underside:* fore- and hindwings light buff irrorated with fuscous-black, fasciae the same as on upperside.

Expanse 40 mm. (*tip to tip* 38 mm.).

Holotype ♀: 5.xii.1912; *paratype* ♀: 30.xi.1912. Philippine Is., Luzon I., subprov. Benguet, Pauai, Haight's Place, 7,000 ft.

Nearest ally: *S. camptogrammaria* Guen. (Assam, Borneo).

Syntaracta assimilis sp.n.

♀: *Palpus* pinkish buff tinged with ochre-red. *Antenna* minutely ciliate *Head:* frons pinkish buff tinged with ochre-red, ochre-red border on lower edge, vertex pinkish buff tinged with ochre-red. *Thorax:* patagium pinkish buff, a transverse dividing line of ochre-red, fuscous posteriorly, tegula pinkish buff tinged with ochre-red. *Abdomen* sepia, with a pinkish buff patch on each segment, venter light buff. *Pectus* light buff. *Legs* light buff. *Forewing* pinkish buff irrorated with ochraceous-tawny, more densely between the antemedial and postmedial fasciae, suggesting a wide band across the wing, in which is a fuscous-black cell spot; costa sepia with a slight purple tinge, irrorated with fuscous; antemedial fascia sepia, inwardly oblique, crenulate (points basad); postmedial fascia sepia, inwardly oblique, crenulate (points distad); subterminal fascia sepia, crenulate, wavy; a fuscous-black spot on termen at end of each vein. *Hindwing* concolorous with forewing, fasciae forming continuations of those on forewing. *Underside:* fore- and hindwings light buff, fasciae same as on upperside.

Expanse 42 mm. (*tip to tip* 40 mm.).

Holotype ♀: 28.vi.1913; *paratypes:* 3 ♀♀, 24.vi., 20.vii.1913, 17.xi.1912, Philippine Is., Luzon I., subprov. Benguet, Pauai, Haight's Place, 7,000 ft.

Nearest ally: *S. hadassa* Butl. (China, Japan).

Syntaracta tertia sp.n.

♂: *Palpus* light buff suffused with buckthorn-brown. *Antenna* minutely ciliate, with paired setae. *Head:* frons and vertex light buff suffused with buckthorn-brown. *Thorax:* patagium light buff suffused with buckthorn-brown, tegula light buff. *Abdomen* light buff above and beneath, a buckthorn-brown V-shaped mark on each segment dorsally. *Pectus* light buff. *Legs* light buff. *Forewing* irrorated with buckthorn-brown, on costa with wood-brown; cell spot bone-brown surrounded with buckthorn-brown; postmedial fascia buckthorn-brown, inwardly oblique, wavy, with a streak to termen between veins 2 and 3; subterminal fascia buckthorn-brown parallel to postmedial with a short streak to termen between veins 6 and 7. *Hindwing* concolorous with forewing, bone-brown cell spot surrounded with buckthorn-brown, postmedial and subterminal fasciae forming continuations of those on forewing. *Underside:* fore- and hindwings light buff, markings showing through from upperside.

Expanse 36 mm. (*tip to tip* 33 mm.).

Holotype ♀: Formosa, Suisha, 19.vii.1908.

Nearest ally.—*S. secunda* Swinh. (Sumatra).

Syntaracta nigritibiata sp.n.

♀: *Palpus:* first and second segments light buff, fuscous-black at joints, third segment fuscous-black. *Antenna* minutely ciliate, with paired setae. *Head:* frons warm buff, with a chocolate spot laterally, vertex warm buff. *Thorax:* patagium warm buff, with a patch of fuscous-black posteriorly, tegular, warm buff, a patch of fuscous-black near posterior end, two fuscous-black spots on metathorax. *Abdomen* warm buff, a series of fuscous-black spots in pairs, widely separated at base, gradually becoming closer and almost touching on anal segment, venter light buff. *Pectus* light buff. *Legs:* foreleg light buff, fuscous-black at joints of tibia; midleg light buff, fuscous-black at upper joint of tibia; hindleg light buff. *Forewing* warm buff irrorated with Natal brown, with fuscous-black on costa; cell spot fuscous-black; antemedial fascia Natal brown, excurved, crenulate (points basad), a fuscous-black spot on each point; postmedial fascia Natal brown, inwardly oblique, crenulate (points distad), a fuscous-black spot on each point; subterminal fascia Natal brown, crenulate, ill-defined, broken; fuscous-black spots on veins at termen. *Hindwing* concolorous with forewing, cell spot fuscous-black, fasciae forming continuations of fasciae on forewing, fuscous-black spots on veins at termen. *Underside:* fore- and hindwings light buff, markings showing through from upperside.

Expanse 35 mm. (*tip to tip* 32 mm.).

Holotype ♀: Philippine Is., Luzon I., subprov. Benguet, Pauai, Haight's Place, 7,000 ft., 8.xi.1912.

Nearest ally: *S. nigrellata* Warr. (New Guinea).

Aplochlora similis sp.n.

♀: *Palpus* wood-brown. *Antenna* ciliate. *Head:* frons and vertex wood-brown. *Thorax:* patagium and tegula mignonette green. *Abdomen* mignonette green above and beneath. *Pectus* light buff. *Legs* light buff. *Forewing* mignonette green; a few scattered spots of wood-brown and fuscous-black; a fuscous-black cell spot surrounded with wood-brown; a broken, wood-brown line

from apex, running inwardly for a short distance, bent and turned downward to below vein 7. *Hindwing* concolorous with forewing, cell spot and other spots similar, angled at vein 4. *Underside :* fore- and hindwings pyrite yellow.

Expanse 32 mm. (*tip to tip* 30 mm.).

Holotype ♀: Philippine Is., Luzon I., subprov. Benguet, Baguio, 5,000 ft., 20.iv.1912.

Nearest ally : *A. viriluca* Wlk. (Ceylon).

Heterolocha polymorpha sp.n.

♂: *Palpus* yellow-ochre suffused with russet. *Antenna* pectinate. *Head :* frons and vertex dark purple drab. *Thorax :* patagium and tegula russet. *Abdomen* yellow-ochre, lightly suffused with russet above and beneath, a russet stripe laterally. *Pectus* yellow-ochre. *Legs* yellow-ochre suffused with russet. *Forewing* yellow-ochre suffused with russet, and tinged with dark purple-drab before antemedial, and beyond postmedial fasciæ ; antemedial fascia dark-purple-drab, wavy, outwardly oblique to middle of cell, angled, then inwardly oblique to inner margin ; a cartridge-buff cell spot edged with dark purple-drab ; postmedial fascia dark purple-drab, inwardly oblique from costa near apex to vein 2, where it is slightly incurved, then straight to inner margin. *Hindwing* yellow-ochre suffused with russet on lower half, tinged with dark purple-drab basally and beyond postmedial fascia; a faint purple-drab cell spot ; postmedial fascia dark purple-drab, excurved to vein 6, then straight to inner margin. *Underside :* forewing yellow-ochre irrorated with purple-drab, more densely on basal half ; fasciae and cell spot as on upperside ; hindwing yellow-ochre irrorated with purple-drab, more densely on basal half ; fascia and cell spot as on upperside.

Expanse 34 mm. (*tip to tip* 31 mm.).

♀: Similar to male, but having antenna ciliate ; in colouring, the yellow ochre is more predominant and the markings more sharply defined.

Expanse 34 mm. (*tip to tip* 31 mm.).

Holotype ♂: 27.vi.1913 ; *allotype* ♀: 3.xii.1912 ; *paratype* ♂: 3.xii.1912. Philippine Is., Luzon I., subprov. Benguet, Panai, Haight's Place, 7,000 ft.

Nearest ally : *H. marginata* Wileman (Formosa).

This species appears to be variable, both in depth of colouring and strength of markings.

Luxiaria hapala sp.n.

♂: *Palpus* warm buff mixed with army brown. *Antenna* fasciculate. *Head :* frons army brown, vertex light buff lightly tinged with army brown. *Thorax :* patagium and tegula light buff lightly tinged with army brown. *Abdomen* light buff irrorated with bone-brown above and beneath, a series of bone-brown spots dorsally. *Pectus* light buff. *Legs :* foreleg, coxa warm buff ; femur, tibia and tarsus light buff suffused with army brown above ; other legs warm buff. *Forewing* light buff suffused with army brown, basal half irrorated with bone-brown, the distal edge of suffusion being an oblique line from apex to inner margin medially ; a short, oblique, bone-brown streak, from median nervure medially to inner margin subbasally ; another, faintly marked streak, from vein 2 postmedially, to inner margin antemedially ; an oblique, wavy, bone-brown line from vein 7 subterminally, to inner margin medially, bordered by light buff proximally, by a Natal brown shade distally ; area beyond this

line Natal brown with a short, oblique, bone-brown streak near tornus. *Hindwing* basal half light buff irrorated with army brown, distal half Natal brown; medially an inwardly oblique, army brown line; postmedially an inwardly oblique, bone-brown line, bordered by a Natal brown shade distally. *Underside:* forewing warm buff irrorated with Natal brown; a Natal brown cell spot; the irrorations forming a line postmedially; hindwing light buff tinged with warm buff and irrorated with Natal brown below costa and on subterminal area; subterminal line Natal brown.

Expanse 42 mm. (*tip to tip* 40 mm.).

♀: Similar to male, but antenna minutely ciliate.

Expanse 42 mm. (*tip to tip* 40 mm.).

Holotype ♂: Philippine Is., Luzon I., subprov. Benguet, Pauai, Haight's Place, 7,000 ft., 2.xii.1912; *allotype* ♀: subprov. Benguet, Baguio, 5000 ft., iii.1913; *paratype* ♂: subprov. Benguet, Sapiangao, 5,800 ft., 17.xii.1912; *paratype* ♀: Luzon I., prov. Rizal, Manila (plains), 19.vii.1912.

Nearest ally: *L. amasa* Butl. (Japan).

Acadra nebulosa sp.n.

♂: Palpus warm buff mixed with Natal brown. *Antenna* fasciculate. *Head:* frons warm buff, a band of Natal brown connecting the bases of antennae; vertex warm buff with a band of Natal brown. *Thorax:* patagium warm buff bordered with Natal brown posteriorly; tegula light buff with a Natal brown bar near posterior end; two bone-brown spots on metathorax. *Abdomen* light buff irrorated with Natal brown above and beneath; a Natal brown patch on each segment dorsally; and a series of bone-brown spots laterally. *Peetus* light buff. *Legs* light buff mottled with Natal brown outwardly. *Forewing* light buff tinged with Saccardo's umber, sparsely irrorated with bone-brown; antemedial fascia indicated by a few bone-brown spots; medially a Natal brown, outwardly oblique dash on costa; subterminally a Natal brown, outwardly oblique streak, terminating in a bone-brown spot, two bone-brown patches on costa at apex; from below apex a patch of Saccardo's umber, proximal edge inwardly oblique to vein 4, incurved to vein 2, outwardly oblique to tornus; in this patch is a subterminal series of bone-brown spots. *Hindwing* light buff tinged with Saccardo's umber, irrorated with bone brown; a bone-brown cell spot; a Natal brown, medial fascia from vein 2 to inner margin; postmedial fascia consisting of two Natal brown lines, with a large bone-brown patch covering them between veins 2 and 4, excurved above the patch, incurved below; subterminal fascia Natal brown, straight to vein 6, angled, then inwardly oblique to inner margin, a suffusion of Saccardo's umber subterminally as far as vein 4, where termen is angled. *Underside:* forewing basal two-thirds light buff irrorated with Natal brown, warm buff on costa; a bone-brown cell spot; medial fascia Natal brown, wavy; distal third of wing natal brown suffused with bone-brown subterminally, with an oblique light buff patch at apex; hindwing basal two-thirds light buff irrorated with Natal brown; a bone-brown cell spot; medial fascia Natal brown, wavy; distal third of wing Natal brown suffused with bone-brown subterminally; a patch of light buff on termen from vein 4 to tornus, and on inner margin.

Expanse 38 mm. (*tip to tip* 34 mm.).

Holotype ♂: Philippine Is., Luzon I., subprov. Benguet, Baguio, 5,000 ft. 18–24.iii.1912.

Nearest ally: *A. acutaria* Wlk. (India, Assam).

Macaria compsa sp.n.

♂: *Palpus* cream-buff mixed with warm sepia. *Antenna* ciliate. *Head:* frons and vertex cream-buff. *Thorax:* patagium and tegula hair-brown. *Abdomen* cream-buff lightly suffused with hair-brown. *Pectus* cream-buff. Legs cream-buff speckled with warm sepia. *Forewing*, basal two-thirds pinkish buff irrorated with hair-brown; distal third benzo-brown; benzo-brown along costa; a small warm sepia cell spot; medially a fine, faintly marked, warm sepia, wavy line; postmedial line warm sepia, slightly excurved; a warm sepia spot just beyond between veins 3 and 4; termen warm sepia. *Hindwing* concolorous with forewing, medial and postmedial lines forming continuations of those on forewing; a small warm sepia cell spot; a warm sepia spot just beyond postmedial line between veins 3 and 4; termen warm sepia, crenulate, angled at vein 4. *Underside:* fore- and hindwings cream-buff irrorated with warm sepia; markings similar to upperside, but distal third bistre with patch of cream-buff irrorated with warm sepia.

Expanse 27 mm. (*tip to tip* 25 mm.).

Holotype ♂: Philippine Is., Luzon I., subprov. Benguet, Klondyke, 800 ft., 2.iii.1912.

Nearest ally: *M. luteiceps* Warr. (Celebes).

Macaria oxa sp.n.

♀: *Palpus* deep chrome. *Antenna* minutely ciliate. *Head:* frons and vertex deep chrome. *Thorax:* patagium and tegula deep chrome. *Abdomen* deep chrome; venter warm buff with a lateral deep chrome stripe. *Pectus* deep chrome. *Legs* deep chrome, tarsi fuscous. *Forewing* deep chrome sparsely irrorated with bone-brown; a small fuscous-black patch on costa subbasally; postmedial line bone-brown, commencing with a fuscous-black patch on costa, bordered distally by a fuscous shade, slightly excurved; subterminally a bone-brown spot between veins 3 and 4. *Hindwing* concolorous with forewing, medial line forming continuation of that on forewing. *Underside:* fore- and hindwings similar to upperside in colour and marking.

Expanse 24 mm. (*tip to tip* 21 mm.).

Holotype ♀: Philippine Is., Luzon I., subprov. Benguet, Klondyke, 1,300 ft., 19.xii.1911.

Nearest ally: *M. luteiceps* Warr. (Celebes).

Macaria psilotes sp.n.

♀: *Palpus* cartridge-buff, wood-brown above. *Antenna* minutely ciliate. *Head:* frons wood-brown, vertex cartridge-buff. *Thorax:* patagium cartridge-buff, bordered by wood-brown posteriorly; tegula cartridge-buff. *Abdomen* cartridge-buff above and beneath, a double row of fuscous spots dorsally. *Pectus* cartridge-buff. *Legs* cartridge-buff, wood-brown outwardly. *Forewing* cartridge buff lightly suffused with wood-brown and irrorated with fuscous; subbasally a fine wood-brown line, excurved to median nervure, slightly excurved to inner

margin; cell spot fuscous; medially a faintly marked, fine, wood-brown line, outwardly oblique to vein 6, sharply angled, then inwardly oblique and wavy to inner margin; postmedially a fine, wood-brown line, outwardly oblique to vein 6, sharply angled, then inwardly oblique and waved to inner margin; termen between veins 4 and 7 fuscous and excised. *Hindwing* concolorous with forewing, cell spot fuscous; lines forming continuations of those on forewing; termen crenulate, angled at vein 4. *Underside:* fore- and hindwings with basal half white irrorated with wood-brown; distal half wood-brown with a cartridge-buff patch on termen from vein 4 to tornus on both wings.

Expanse 36 mm. (*tip to tip* 32 mm.).

Holotype ♀: Philippine Is., Mindanao I., subprov. Lanao, Kolambugan (plains), 17.iv.1914.

Nearest ally: *M. intersectaria* Leech (India, Assam, China, Japan).

Iridoplecta ochrias sp.n.

♀: *Palpus* white mixed with bistre. *Antenna* ciliate. *Head:* frons and vertex white mixed with bistre. *Thorax:* patagium and tegula white mixed with bistre. *Abdomen* white mixed with bistre, venter white. *Pectus* white. *Legs* white, tinged with bistre outwardly. *Forewing* white; basally a patch of bistre irroration; medially a wavy line of bistre irroration; subterminally a fascia of bistre, broken, excurved, and wavy; interneural bistre spots on termen. *Hindwing* concolorous with forewing, medial line and subterminal fascia forming continuations of those on forewing. *Underside:* fore- and hindwings white; a faint bistre line on forewing medially.

Expanse 28 mm. (*tip to tip* 25 mm.).

Holotype ♀: 23.iv.1912; *paratype* ♀: 23.v.1912. Philippine Is., Luzon I., subprov. Benguet, Baguio, 5,000 ft.; *paratype* ♀: 18.iii.1912, subprov. Benguet, Klondyke, 800 ft.

Nearest ally: *I. ferrifera* Moore (India, Burma).

Lithina catapasta sp.n.

♂: *Palpus* warm buff mixed with russet. *Antenna* bipectinate. *Head:* frons warm buff mixed with russet; vertex warm buff. *Thorax:* patagium and tegula hair-brown. *Abdomen* cartridge-buff irrorated with drab above and beneath. *Pectus* cartridge-buff. *Legs* light buff, drab outwardly. *Forewing* cartridge-buff densely irrorated with drab; cell spot drab; postmedial line drab, slightly excurved to vein 3, then straight to inner margin; interneural drab spots on termen. *Hindwing* concolorous with forewing; cell spot drab; postmedial line forming continuation of line on forewing, excurved, wavy. *Underside:* fore- and hindwings cartridge-buff irrorated with drab.

Expanse 30 mm. (*tip to tip* 27 mm.).

Holotype ♂: Philippine Is., Luzon I., subprov. Benguet, Sapiangao, 5,800 ft., 15.xii.1912.

Nearest ally: *L. catalaunaria* Guen.

Sabaria elegans sp.n.

♂: *Palpus* ochraceous-orange. *Antenna* bipectinate. *Head:* frons pinkish buff, lightly suffused with warm sepia; vertex pinkish buff, a warm sepia spot posteriorly. *Thorax:* patagium pinkish buff, with a warm sepia spot; tegula

pinkish buff, a warm sepia spot posteriorly. *Abdomen* pinkish buff irrorated with warm sepia, venter ochraceous-buff. *Pectus* ochraceous-buff. *Legs* ochraceous-buff, warm sepia on tarsi. *Forewing* pinkish buff striated with warm sepia; a warm sepia spot at base; antemedially a broken, warm sepia fascia, consisting of a spot on costa, followed by two spots, inwardly oblique; cell spot warm sepia; postmedially a warm sepia spot on costa, followed by a warm sepia fascia, obliquely incurved from vein 5 to inner margin; three burnt umber patches on termen, one just below apex, another between veins 4 and 6, the third at tornus. *Hindwing* ochraceous-buff; cell spot warm sepia; pinkish buff irrorated with warm sepia on inner margin, gradually widening to tornus, with a short warm sepia streak postmedially. *Underside:* forewing ochraceous-buff; cell spot warm sepia; a fine warm sepia streak from vein 7 to vein 5; hind-wing ochraceous-buff; cell spot warm sepia; a series of warm sepia spots postmedially.

Expanse 26 mm. (*tip to tip* 24 mm.).

Holotype ♂: 12.i.1914; *paratype* ♂: 27.i.1914, Philippine Is., Luzon I., prov. Rizal, Montalban.

Nearest ally: *S. lithosiaria* Wlk.

Hypochrocis prouti sp.n.

♂: *Palpus:* white at base, second and third segments fuscous. *Antenna* bipectinate for two-thirds, apical third setose. *Head:* frons white suffused with fuscous; vertex white tinged with fuscous. *Thorax:* patagium and tegula white, fuscous anteriorly. *Abdomen* white, a fuscous band on each segment, anal segment fuscous, venter white. *Pectus* white. *Legs* white, suffused with fuscous. *Forewing* fuscous; medially a white, elongate, oval patch, lying obliquely across the wing; subterminally a smaller white patch between veins 4 and 6; fringe white tinged with fuscous. *Hindwing* white; bordered with fuscous along costa and termen to near tornus; a short fuscous streak near tornus; fringe white. *Underside:* forewing fuscous; medially a white, elongate patch; white on costa, apical and subterminal areas; hind-wing white; a group of five fuscous spots, forming a broken U-shaped mark, the top touching costa; a fuscous spot on anal vein antemedially; an oblique fuscous streak near tornus.

Expanse 26 mm. (*tip to tip* 25 mm.).

♀: Similar to male.

Expanse 32 mm. (*tip to tip* 30 mm.).

Holotype ♂: 19.iv.1912; *allotype* ♀: 30.iii.1912, Philippine Is., Luzon I., subprov. Benguet, Baguio, 5,000 ft.

Nearest ally: *H. albodecorata* Swinh. (Borneo).

This species is dedicated to Mr. Louis B. Prout, F.E.S., in recognition of the great assistance he has given me in determining the Philippine and Formosan Geometridae.

Hypochrocis zoota sp.n.

♂: *Palpus:* capucine yellow at base; second segment suffused with mahogany-red; third segment fuscous. *Antenna* bipectinate for five-sixths, apical sixth setose. *Head:* frons mahogany-red; vertex mouse-grey. *Thorax:* patagium and tegula mouse-grey. *Abdomen* mouse-grey, mahogany-red on

basal segments dorsally; venter anterior half capucine yellow, posterior half mouse-grey suffused with mahogany-red. *Pectus* capucine yellow. *Legs:* foreleg coxa capucine yellow; femur capucine yellow, mouse-grey outwardly; tibia and tarsus mouse-grey; other legs coxae and femora capucine yellow; tibiae and tarsi mouse-grey. *Forewing* mouse-grey, sparsely irrorated with fuscous-black; a large patch of bistre suffusion in subterminal area; medially, a wide band edged with fuscous-black, filled with a mixture of mahogany-red and fuscous-black, the proximal edge from costa medially, obliquely excurved to median nervure, angled, along median nervure, angled antemedially, then oblique and way to inner margin subbasally, the distal edge from costa subterminally, excurved to vein 5, along vein 5 for a short distance inwardly, angled, returning toward costa, sharply recurved at base of vein 6, incurved to base of vein 4, straight to below vein 3, inwardly oblique to just below vein 2, angled and longitudinal to a point below base of vein 2, curved and then straight to inner margin medially. *Hindwing* upper half light buff, lower half mouse-grey; a fuscous-black line bordered proximally by mahogany-red, from vein 6, to base of vein 3, incurved to vein 3, outwardly angled, then incurved to inner margin near tornus. *Underside:* forewing basal half capucine yellow, distal half mahogany-red lightly suffused with mouse-grey; hindwing capucine yellow.

Expanse 48 mm. (*tip to tip* 42 mm.).

Holotype ♂: Philippine Is., Mindanao I., subprov. Lanao, Kolambugan (plains), 30.v.1914.

Nearest ally: *H. binexata* Wlk. (Borneo, Penang).

Hypochrocis flagrans sp.n.

♂: *Palpus* capucine yellow suffused with liver-brown; third segment warm blackish brown. *Antenna* bipectinate for five-sixths, apical sixth ciliate. *Head:* frons liver-brown; vertex fawn colour. *Thorax:* patagium fawn colour; tegula fawn colour edged with warm blackish brown posteriorly. *Abdomen* fuscous; a warm blackish brown band basally; a warm blackish brown spot on each of the two basal segments; another on anal segment dorsally; venter capucine yellow. *Pectus* capucine yellow. *Legs:* foreleg, coxa capucine yellow, femur capucine yellow, fuscous outwardly, tibia and tarsus fuscous; other legs fuscous. *Forewing* fawn colour irrorated with fuscous; medially two patches, one on upper half, the other on lower half, suggesting a wide band broken in centre; patch on upper half bordered with warm blackish brown, liver brown just inside border, remainder filled with ground-colour, upper edge along costa, proximal edge from costa medially, inwardly oblique to middle of cell, lower edge downcurved, upcurved, angled, distal edge excurved to vein 7, then straight to costa subterminally; patch on lower half, bordered with warm blackish brown, filled with a mixture of liver-brown and warm blackish brown, proximal edge obliquely excurved from inner margin antemedially, upper edge along median nervure to base of vein 4, distal edge deeply incurved to inner margin subterminally, lower edge along inner margin; a small fuscous patch near apex, and fuscous shading in subterminal area. *Hindwing* upper two-thirds capucine yellow, lower third fawn colour; a short warm blackish brown incurved line edged proximally with liver-brown, from just above vein 2, to inner margin near tornus. *Underside:* forewing basal two-thirds capucine

yellow, distal third suffused with liver-brown; hindwing capucine yellow, tinged with liver-brown along costa and termen, fuscous on inner margin.

Expanse 44 mm. (*tip to tip* 40 mm.).

♀: Similar to male, but pectinations of antenna much shorter.

Expanse 45 mm. (*tip to tip* 41 mm.).

Holotype ♂: 17.v.1914; *allotype* ♀: 25.v.1914; *paratype* ♀: 22.v.1914, Philippine Is., Mindanao I., subprov. Lanao, Kolambugan (plains).

Nearest ally: *H. binexata* Wlk. (Borneo, Penang).

Heteromiza noctuoides sp.n.

♂: *Palpus* wood-brown. *Antenna* minutely ciliate. *Head:* frons and vertex wood-brown. *Thorax:* patagium and tegula wood-brown tinged with Natal brown. *Abdomen* wood-brown, two blackish brown spots on basal segment dorsally; venter pinkish buff; anal tuft cartridge-buff. *Pectus* pinkish buff. *Legs:* fore- and midlegs pinkish buff, wood-brown outwardly; hindleg pinkish buff, tibia enlarged. *Forewing* wood-brown, irrorated with fuscous along costa, tinged with Natal brown for two-thirds; cell spot blackish brown; antemedially an excurved, wavy, deep livid-brown line; postmedially a deep livid-brown line, darker where it crosses the veins, giving the appearance of dots along the line, excurved from costa to vein 7, then inwardly oblique to inner margin medially; subterminal area wood-brown; a deep livid-brown patch near apex; another near tornus. *Hindwing* concolorous with forewing, the medial line forming a continuation of postmedial line on forewing. *Underside:* fore- and hindwings cartridge-buff suffused with wood-brown and irrorated with Natal brown; cell spot fuscous; postmedial line Natal brown and excurved on both wings.

Expanse 37 mm. (*tip to tip* 35 mm.).

♀: Similar to male.

Expanse 40 mm. (*tip to tip* 38 mm.).

Holotype ♂: Philippine Is., Luzon I., subprov. Benguet, Baguio, 5,000 ft., 18.vi.1913; *allotype* ♀: subprov. Benguet, Sapianago, 5,800 ft., 15.xii.1912; *paratypes*, 2♂♂: 9 and 14.xii.1912, subprov. Benguet, Pauai, Haight's Place, 7,000 ft.; *paratype* ♂: 21.xii.1912, Luzon I., prov. Rizal, Manila (plains).

Nearest ally: *H. unilinea* Warr.

Ourapteryx rhabdota sp.n.

♂: *Palpus* cinnamon. *Antenna* minutely ciliate. *Head:* frons cinnamon, vertex ivory-yellow. *Thorax:* patagium and tegula ivory-yellow. *Abdomen* ivory-yellow above and beneath. Pectus ivory-yellow. *Legs:* fore- and midlegs ivory-yellow suffused with cinnamon, speckled with fuscous-black, hindleg ivory-yellow. *Forewing* ivory-yellow; a cinnamon line, outwardly oblique, from costa antemedially to inner margin medially; a short cinnamon streak, outwardly oblique from costa medially to near median nervure; a cinnamon line, slightly incurved, from costa postmedially to inner margin near tornus, fringe cinnamon. *Hindwing* ivory-yellow tinged with cinnamon near tornus; a cinnamon line, outwardly oblique, from base of vein 7 to near tornus; anal vein cinnamon; termen produced to a tail at vein 4; fringe burnt-sienna;

interrupted at vein 5 by an ivory-yellow spot edge with fuscous-black, which continues as a diffuse bar across base of tail to vein 3, with a Brazil red spot at each end; fuscous-black at base of fringe on tail. *Underside:* fore- and hindwings ivory-yellow; fringe cinnamon.

Expanse 54 mm. (*tip to tip* 50 mm.).

♀: Similar to male.

Expanse 56 mm. (*tip to tip* 50 mm.).

Holotype ♂: 24.vii.1913, Philippine Is., Luzon I., subprov. Benguet, Pauai, Haight's Place, 7,000 ft.; *allotype* ♀: 23.v.1912; *paratype* ♂: 23.iv.1912, subprov. Benguet, Baguio, 5,000 ft.

Nearest ally: *O. clara* Butl. (India).

Niphonissa umbrina sp.n.

♂: *Palpus* bistre. *Antenna* bipectinate. *Head:* frons and vertex bistre. *Thorax:* patagium and tegula bistre. *Abdomen* bistre sparsely irrorated with fuscous-black, above and beneath. *Pectus* bistre. *Legs* light buff suffused with bistre. *Forewing* glossy bistre irrorated with fuscous-black; a small drab-grey cell spot; antemedial line fuscous-black, faintly marked, outwardly oblique to median nervure, slightly incurved to an anal vein, then inwardly oblique to inner margin; postmedial line fuscous-black, faintly marked, inwardly oblique and slightly incurved. *Hindwing* light buff suffused with bistre, irrorated with fuscous-black on subterminal area; fuscous cell spot; postmedial line fuscous, inwardly oblique, faintly marked. *Underside:* forewing glossy, light buff suffused with bistre; postmedial line faintly marked; hindwing glossy, light buff densely irrorated with fuscous; cell spot fuscous; postmedial and subterminal lines faintly marked.

Expanse 48 mm. (*tip to tip* 44 mm.).

Holotype ♂: 9.xii.1912; *paratypes* 2 ♂♂: 12.i.1912, 3.xii.1912, Philippine Is., Luzon I., subprov. Benguet, Pauai, Haight's Place, 7,000 ft.

Nearest ally: *N. albiguttulata* Bastelb. (Formosa).

Euchoria pia sp.n.

♂: *Palpus* russet. *Antenna* simple. *Head:* frons and vertex russet. *Thorax:* patagium and tegula russet. *Abdomen:* russet; venter pinkish buff tinged with russet. *Pectus* russet. *Legs:* foreleg pinkish buff, russet above; mid- and hindlegs pinkish buff. *Forewing* russet sparsely irrorated with fuscous; costa edged with cartridge-buff; subbasal line chestnut-brown, wavy; antemedial line chestnut-brown, wavy; postmedially two chestnut-brown lines, inwardly oblique, crenulate. *Hindwing* concolorous with forewing; medially two chestnut-brown lines forming continuations of postmedial lines on forewing. *Underside:* fore- and hindwings tawny-olive irrorated with bone-brown; lightly suffused with bone brown on subterminal area; postmedially two bone-brown lines, faintly marked on both wings.

Expanse 46 mm. (*tip to tip* 42 mm.).

Holotype ♂: Philippine Is., Luzon I., subprov. Benguet, Pauai, Haight's Place, 7,000 ft., 3.xii.1912.

Nearest ally: *E. oenoptila* Prout (New Guinea).

Elphos lutulenta sp.n.

♂: *Palpus* warm sepia. *Antenna* bipectinate for seven-eighths, apical eighth ciliate. *Head:* frons warm sepia; vertex clove-brown. *Thorax:* patagium clove-brown; tegula hair-brown. *Abdomen:* hair-brown; venter light buff, lightly suffused with hair-brown. *Pectus* pinkish buff. *Legs:* foreleg pinkish buff, clove-brown above; tibia with a pencil of hair beneath; mid- and hindlegs pinkish buff; tibia of hindleg thickened by a fold on inner side containing hair. *Forewing* tawny-olive irrorated with clove-brown and overlaid with hair-brown; antemedially a clove-brown, crenulate line (points basad), commencing with a small patch on costa; cell spot elongate, edged with clove-brown; a clove-brown patch on costa just above; postmedially a clove-brown, crenulate line (points distad), commencing with a light buff wedge-shaped dash on costa, excurved to vein 4, then inwardly oblique to inner margin medially; subterminally a series of clove-brown spots; interneural clove-brown spots on termen. *Hindwing* concolorous with forewing; antemedially a clove-brown, inwardly oblique line; a clove-brown cell spot; medially a clove-brown, crenulate line (points distad), excurved; postmedially a hair-brown, excurved band; subterminally a wavy, excurved, clove-brown line, bordered by hair-brown proximally; interneural clove-brown spots on termen. *Underside:* forewing cartridge-buff lightly suffused with fuscous for two-thirds; distal third fuscous; a fuscous cell spot, a cartridge-buff patch irrorated with fuscous beyond cell; another at apex; a small spot on termen between veins 3 and 4, and one at tornus; hindwing concolorous with forewing, five cartridge-buff interneural spots in subterminal area, two above vein 6, three below vein 4.

Expanse 76 mm. (*tip to tip* 68 mm.).

♀: Differs from the male in the following features: *Antenna* simple. *Forewing* white; tawny-olive irrorated with clove-brown at base; between basal patch and antemedial line irrorated with clove-brown; antemedial line clove-brown, crenulate (points basad); beyond, irrorated with clove-brown, densely below median nervure and mixed with tawny-olive suffusion; an outwardly oblique, clove-brown dash from costa in which is a tawny-olive cell spot; beyond cell white sparsely irrorated with clove-brown, the distal edge of this area outwardly oblique; a patch near tornus densely irrorated with clove-brown and suffused with tawny-olive; postmedial line clove-brown, crenulate (points distad), excurved to vein 4, inwardly oblique to inner margin medially, broken where it passes through white area; apical area tawny-olive irrorated with clove-brown, with a white patch at apex; a small sagittate white mark between veins 3 and 4. *Hindwing* white, irrorated with clove-brown; densely irrorated in a suffusion of tawny-olive, antemedially; lines forming continuations of those on forewing, but not completely crossing the wing; the suffusion and irroration of subterminal area forming streaks at termen. *Underside:* forewing white; basal third suffused with fuscous; distal third fuscous, with three white patches, one at apex, a small one between veins 3 and 4, another at tornus; hindwing white; distal third fuscous; two white patches on termen, one at apex, the other between veins 3 and 4.

Expanse 98 mm. (*tip to tip* 83 mm.).

Holotype ♂: Philippine Is., Palawan I., Taytay (plains), 26.v.1913; *allotype*

♀: Philippine Is., Mindanao I., subprov. Lanao, Kolambugan (plains), 22.vi. 1914; *paratype* ♀: Palawan I., La Laguna, 12.v.1913.

Nearest ally: *E. hymenaria* Guen. (India, Ceylon).

Buzura prinodes sp.n.

♂: *Palpus* warm buff, blackish-brown above. *Antenna* bipectinate for two-thirds, apical third ciliate. *Head:* frons warm buff, a triangular blackish brown patch near upper edge; vertex white suffused with warm buff. *Thorax:* patagium white suffused with warm buff; tegula white tinged with warm buff. *Abdomen* white tinged with warm buff above and beneath. *Pectus* warm buff. *Legs* light buff, blackish brown outwardly. *Forewing* white tinged with warm buff irrorated with blackish brown; antemedial line blackish brown, commencing with a spot on costa, wavy to anal vein, then inwardly oblique to inner margin; a blackish brown spot on costa medially; postmedial line blackish brown, commencing with a spot on costa, a downcurved sweep to near termen just below vein 6, two small outward curves to vein 4, inwardly alone vein 4, angled postmedially, waved to vein 2, excurved to anal vein, excurved to inner margin near tornus; a cluster of scales just beyond points of postmedial between veins 4 and 6, a diffused blackish brown patch in angle of postmedial between veins 3 and 4. *Hindwing* white, tinged with warm buff, irrorated with blackish brown; postmedial line blackish brown, wavy, excurved at vein 4, bordered distally by a concentration of irroration. *Underside:* fore- and hindwings white tinged with warm buff, irrorated with wood-brown; a clove-brown cell spot on each wing; postmedial line showing through from upper side.

Expanse 60 mm. (*tip to tip* 55 mm.).

Holotype ♂: 5.ix.1912; *paratype* ♂: 5.x.1912, Philippine Is., Luzon I., prov. Rizal, Manila (plains).

Nearest ally: *B. suppressaria* Guen. (China, India, Ceylon, Assam, Burma).

Boarmia tella sp.n.

♂: *Palpus* bone-brown, white at ends of segments. *Antenna* minutely ciliate, shaft white and bone-brown alternately. *Head:* frons and vertex white, a few bone-brown scales between antennae. *Thorax:* patagium bone-brown; tegula white, a bone-brown bar posteriorly. *Abdomen* white mixed with bone-brown above and beneath, a bone-brown bar at each joint. *Pectus* white. *Legs:* fore- and midlegs, alternate patches of white and bone-brown; hindleg white mottled with bone-brown. *Forewing* white; basally a patch of bone-brown; subbasal line bone-brown; area between subbasal and antemedial line warm sepia; antemedial line a bone-brown, excurved to median nervure, excurved to anal vein; medially a bone-brown, wavy line, widened on discocellulars, and enclosing an elongate white spot; area beyond this line, to just beyond postmedial, suffused with warm sepia to tawny-olive; postmedial line a bone-brown, edged distally by white, wavy, incurved to vein 6, excurved to vein 2, incurved to inner margin; in subterminal area, a patch of bone-brown on costa near apex; just below apex a patch of bone-brown and warm sepia; another patch of bone-brown and warm sepia near tornus; through these patches passes a wavy, white, subterminal line. *Hindwing* white sparsely irrorated with warm sepia for a third, distal edge of irrorated area straight;

area beyond this suffused with warm sepia, to just beyond postmedial; postmedial line bone-brown, edge with white distally, crenulate, excurved to vein 2, incurved to inner margin; beyond this a narrow band of cartridge-buff, followed by a light suffusion of warm sepia and tawny-olive, in which is a wavy, white, subterminal line; interneural bone-brown spots on termen. *Underside:* fore- and hindwings white; fuscous patches on costa; fuscous spot on discocellulars; postmedial line fuscous, with some diffuse fuscous subterminally.

Expanse 42 mm. (*tip to tip* 38 mm.).

♂: Similar to female, but having antenna bifasciculate, it is much worn and paler in colouring.

Expanse 42 mm. (*tip to tip* 38 mm.).

Holotype ♀: 23.vi.1913; *allotype* ♂: 8.iii.1912; *paratypes* 2 ♀♀: 9.iii. and 17.iv.1912, Philippine Is., Luzon I., subprov. Benguet, Baguio, 5,000 ft.

Nearest ally: *B. alienaria* Wlk. (Ceylon).

Boarmia pissoconeta sp.n.

♂: *Palpus* cartridge-buff tinged with fuscous outwardly. *Antenna* with proximal half bipectinate, distal half ciliate. *Head:* frons and vertex cartridge-buff. *Thorax:* patagium and tegula cartridge-buff mixed with fuscous. *Abdomen* light buff; a long tapering fuscous-black patch, almost covering abdomen dorsally; venter and anal tuft light buff. *Pectus* light buff. *Legs* light buff tinged with fuscous; tibiae and tarsi with patches of fuscous and cartridge-buff alternately. *Forewing* cartridge-buff, lightly suffused with fuscous on costa; basal third fuscous to army brown, with a well-marked fovea below median nervure; antemedial line fuscous, almost straight across the wing, forming an edge to basal third; medially a fuscous line, becoming almost obsolescent in centre, excurved to vein 2, obliquely incurved to inner margin; postmedial line fuscous, slightly incurved to below vein 6, excurved to vein 4, excurved to below vein 2, then slightly incurved to inner margin; area beyond fuscous to army brown. *Hindwing* cartridge-buff sparsely irrorated with fuscous, suffused with army brown on distal third; a faint fuscous cell spot; postmedial line fuscous, somewhat broken, inwardly oblique from about vein 6 to inner margin; subterminal line similar and parallel. *Underside:* fore- and hindwings light buff, suffused with warm buff subterminally; with markings corresponding to those on upper side.

Expanse 40 mm. (*tip to tip* 37 mm.).

♀: Similar to male, but antenna simple.

Expanse 40 mm. (*tip to tip* 37 mm.).

Holotype ♂: 1.xii.1912; *allotype* ♀: 30.xi.1912, Philippine Is., Luzon I., subprov. Benguet, Pauai, Haight's Place, 7,000 ft.

Nearest ally: *B. variegata* Moore (India, Assam, Formosa).

Boarmia diadela sp.n.

♂: *Palpus* blackish brown; light buff on third segment. *Antenna* bipectinate for two-thirds, apical third ciliate. *Head:* frons and vertex light buff mixed with army brown. *Thorax:* patagium light buff suffused with army brown; tegula light buff mixed with army brown, blackish brown posteriorly; a tuft of army brown mixed with light buff on metathorax. *Abdomen* basal

two-thirds blackish brown, with a light buff band at base; anal third light buff suffused with fawn colour; venter light buff. *Pectus* light buff. *Legs:* fore- and midlegs with coxae light buff tinged with blackish brown; femora, tibiae and tarsi, with alternate patches of light buff and blackish brown; hindleg light buff with some blackish brown on tibia and tarsus. *Forewing* light buff; basal and distal thirds blackish brown to army brown; antemedial fascia consisting of two blackish brown lines, excurved and wavy; medial fascia commencing as a blackish brown patch from costa to median nervure, then army brown, not so well defined, inwardly oblique to inner margin; postmedial fascia, a somewhat broken, dotted, blackish brown line, straight to vein 5, inwardly oblique and wavy to inner margin; subterminal fascia, a thick blackish brown line, edged with light buff distally, straight to vein 5, inward for a short distance, then angled and straight to inner margin; a light buff patch on termen between veins 3 and 4. *Hindwing* light buff suffused with fuscous basally, suffused with fawn colour on distal third, irrorated with blackish brown below basal half of cell; postmedial fascia, a dotted, blackish brown line, excurved to vein 2, incurved to inner margin; subterminal fascia blackish brown, edged distally with light buff, from vein 4, to near tornus; termen blackish brown, crenulate. *Underside:* forewing warm buff with a fuscous patch on costa basally; another medially; subterminal area fuscous, with a warm buff patch on termen between veins 3 and 4; postmedial fascia a series of fuscous spots; hindwing warm buff; a fuscous cell spot; postmedial fascia a series of fuscous dots; a short fuscous streak near tornus.

Expanse 38 mm. (*tip to tip* 35 mm.).

♀: Similar to male, but antenna ciliate.

Expanse 38 mm. (*tip to tip* 35 mm.).

Holotype ♂: 1.xii.1912; *allotype* ♀: 8.xi.1912; *paratypes* ♂: 10.xi.1912; ♀ 30.xi.1912, Philippine Is., Luzon I., subprov. Benguet, Pauai, Haight's Place, 7,000 ft.

Nearest ally: *B. variegata* Moore (India, Assam, Formosa).

Boarmia eupithecioides sp.n.

♂: *Palpus* cartridge buff mixed with fuscous. *Antenna* bipectinate for two-thirds, apical third ciliate. *Head:* frons cartridge-buff, a lateral fuscous-black spot, another near base of antenna; vertex cartridge-buff mixed with fuscous. *Thorax:* patagium and tegula cartridge-buff mixed with fuscous. *Abdomen* cartridge-buff suffused with fuscous, a cartridge-buff band at base dorsally; venter and anal tuft light buff. *Pectus* light buff. *Legs:* fore- and midlegs light buff, with alternate patches of light buff and fuscous outwardly; hindleg light buff; tibia enlarged by a fold on inner side containing hair. *Forewing* cartridge-buff, densely irrorated with fuscous; a well-marked fovea below basal half of cell, causing the anal vein to be diverted from its normal position; antemedially a fine fuscous line faintly marked, excurved; cell spot fuscous; postmedially a fuscous line, wavy, inwardly oblique; subterminally a wavy, cartridge-buff line. *Hindwing* concolorous with forewing; cell spot fuscous; postmedially a fuscous line, excurved to vein 4, incurved to inner margin; subterminally a short, wavy, cartridge-buff line, from vein 4 to tornus; interneural fuscous spots on termen. *Underside:* forewing cartridge-buff lightly

suffused with fuscous; cell spot fuscous; hindwing cartridge-buff densely irrorated with fuscous; cell spot fuscous.

Expanse 26 mm. (*tip to tip* 25 mm.).

Holotype ♂: 15.xii.1912; *paratype* ♂: 16.xii.1912, Philippine Is., Luzon I., subprov. Benguet, Sapiangao, 5,800 ft.

Nearest ally: *B. nubeculosa* Bastelb. (Formosa).

Cleora lipotera sp.n.

♂: *Palpus* cartridge-buff mixed with fuscous. *Antenna* bipectinate, for two-thirds, apical third ciliate. *Head:* frons and vertex light buff mixed with fuscous; a transverse wood-brown bar between bases of antennae; occiput cartridge-buff. *Thorax:* patagium wood-brown tinged with fuscous; tegula fuscous. *Abdomen* cartridge-buff mixed with fuscous; venter cartridge-buff; anal tuft pinkish buff. *Pectus* light buff. *Legs:* foreleg light buff mixed with fuscous above; other legs light buff. *Forewing* wood-brown irrorated with fuscous; antemedial line fuscous, inwardly oblique; medial line fuscous, excurved to median nervure, excurved to inner margin; a patch of raised scales on discocellulars; postmedial line fuscous, crenulate (points distad), slightly excurved to vein 4, then inwardly oblique to inner margin; below apex a patch of fuscous suffusion. *Hindwing* concolorous with forewing; a wide medial band suffused with fuscous, proximal edge (near which is a small patch of raised scales on discocellulars) inwardly oblique, distal edge crenulate (points distad), excurved to vein 3, incurved to inner margin. *Underside:* forewing cartridge-buff; a fuscous patch on discocellulars; three fuscous spots on costa antemedially, medially, and postmedially; tinged with fuscous in apical area; termen fuscous; hindwing cartridge-buff.

Expanse 38 mm. (*tip to tip* 35 mm.).

♀: *Palpus* benzo-brown mixed with *whitish*. *Antenna* minutely ciliate. *Head:* frons and vertex benzo-brown mixed with *whitish*. *Thorax:* patagium and tegula benzo-brown mixed with *whitish*. *Abdomen* benzo-brown; venter light buff. *Pectus* light buff. *Legs* benzo-brown mixed with *whitish*. *Forewing* benzo-brown finely irrorated with fuscous; with some *whitish* in subterminal area; antemedial line fuscous, inwardly oblique, bordered by a cinnamon-drab shade proximally; medial line fuscous, wavy, slightly excurved; postmedial line fuscous, crenulate (points distad), bordered by a cinnamon-drab shade distally, straight to vein 5, obliquely incurved to inner margin; a fuscous patch on termen below apex; subterminally a *whitish*, wavy line, bordered proximally by fuscous from costa to vein 5; interneural fuscous spots on termen. *Hindwing* concolorous with forewing; medial and postmedial lines forming continuations of those on forewing; some white at tornus. *Underside:* forewing white lightly suffused with fuscous; cell spot fuscous; postmedial line fuscous; fuscous on subterminal area gradually fading toward tornus, with a *whitish* patch at apex, another on termen at vein 3; hindwing white tinged with fuscous; cell spot and subterminal lines fuscous.

Expanse 45 mm. (*tip to tip* 43 mm.).

Holotype ♂: 7.xi.1912; *allotype* ♀: 13.xii.1912; *paratypes* 4♂♂: 7, 8, 11.xi, 5.xii.1912. 1 ♀: 7.xi.1912, Philippine Is., Luzon I., subprov. Benguet, Pauai, Haight's Place, 7,000 ft.

Nearest ally: *C. leucophaea* Butl.

This species appears to vary from a more or less uniform colour to a very pale form with dark markings.

Abraxas semiusta sp.n.

♂: *Palpus* ochraceous-buff, bone-brown on third segment. *Antenna* fasciculate. *Head:* frons and vertex bone-brown; with some white glossy scales between bases of antennae. *Thorax:* patagium ochraceous-buff, white posteriorly; tegula ochraceous-buff, bone-brown mixed with white posteriorly; rest of thorax bone-brown mixed with white. *Abdomen* ochraceous-buff, spotted with bone-brown above and beneath; a Dresden brown band at base dorsally. *Pectus* ochraceous-buff. *Legs* coxae ochraceous-buff, rest of legs fuscous. *Forewing* white; a bone-brown to Dresden brown basal patch, in which are some white glossy scales, distal edge excurved; medially a large light mouse-grey patch on costa, with a white tooth cutting into the proximal edge; below, an elongate, broken, light mouse-grey patch, from median nervure to inner margin; postmedially a light mouse-grey patch on costa, continuing as an irregular border round apex and on termen; from patch on costa, an excurved series of light mouse-grey spots, terminating in a large patch of bone-brown to Dresden brown on inner margin, with white glossy scales in centre. *Hindwing* white; two bone-brown bars basally; medially two light mouse-grey spots, one on costa, the other on inner margin; postmedially a light mouse-grey patch on costa, with a small spot each side; and a large patch on inner margin near tornus, bone-brown to Dresden brown, with white glossy scales in centre; an irregular light mouse-grey border at termen. *Underside:* fore- and hindwings white; markings hair-brown, similar in shape to upperside.

Expanse 42 mm. (*tip to tip* 38 mm.).

Holotype ♂: Philippine Is., Luzon I., subprov. Benguet, Baguio, Trinidad, 4,000 ft., 30.iii.1912.

Nearest ally: *A. intermedia* Warr. (India, Assam, Burma, S. Shan States).

Abraxas cyclobalia sp.n.

♂: *Palpus*, white suffused with sepia. *Antenna* minutely ciliate. *Head:* frons upper half sepia, lower half white, with a wedge-shaped dash at middle extending into upper half; vertex cinnamon-buff with a lateral sepia spot. *Thorax:* patagium, tegula and rest of thorax cinnamon-buff spotted with sepia. *Abdomen* cinnamon-buff spotted with sepia above and beneath, suffused with white at base dorsally. *Pectus* cinnamon-buff. *Legs:* foreleg, coxa cinnamon-buff with a sepia spot, rest of leg suffused with sepia outwardly; midleg, coxa and femur cinnamon-buff, tibia and tarsus suffused with sepia; hindleg, coxa and femur cinnamon-buff, tibia cinnamon-buff with two sepia patches, tarsus sepia. *Forewing* white; sepia on basal half of costa, some sepia spots basally; antemedial fascia sepia, a series of spots joined together, obliquely incurved; medially a round sepia patch in distal end of cell, connected to costa by a short bar; postmedially a series of sepia spots and patches, excurved to vein 2, then inwardly oblique and double to inner margin; subterminally a series of sepia spots and patches; a number of sepia spots merged into one another, forming a wide border round apex; a cluster of sepia spots near tornus. *Hindwing* concolorous with forewing; a spot on inner margin antemedially; medially

a series of spots, obliquely across the wing; postmedially an exeurved series of spots; a series of spots subterminally, and another terminally. *Underside:* fore- and hindwings, similar to upperside.

Expanse 40 mm. (*tip to tip* 37 mm.).

♀: Similar to male.

Expanse 48 mm. (*tip to tip* 43 mm.).

Holotype ♂: xii.1912; *allotype* ♀: 29.iii.1912, Philippine Is., Luzon I., subprov. Benguet, Baguio, Trinidad, 4,800 ft.

Nearest ally: *A. inrasata* Warr. (Brit. N. Borneo).

Abraxas gephyra sp.n.

♀: *Palpus* cinnamon-buff basally, olive-brown apically. *Antenna* minutely ciliate. *Head:* frons cinnamon-buff; vertex bone-brown, surrounded by cinnamon-buff. *Thorax:* patagium bone-brown; tegula bone-brown, cinnamon-buff in middle; rest of thorax cinnamon-buff spotted with bone-brown. *Abdomen* cinnamon-buff spotted with bone-brown above and beneath. *Pectus* cinnamon-buff. *Legs:* foreleg, coxa cinnamon-buff spotted with bone-brown, remainder of leg olive-brown; other legs olive-brown. *Forewing* white; an olive-brown border extending from base, along costa, round apex, and on termen to tornus; in this border at the base are five spots, four white, and one cinnamon-buff; an olive-brown band, from costa subterminally to tornus, crossed by an olive-brown band from costa postmedially, outwardly oblique to base of vein 4, angled, and along vein 4 to termen; two short olive-brown bars, connecting the downward band with termen, one on vein 3, the other on vein 2. *Hindwing* white; a terminal olive-brown band, in which is a series of five white spots. *Underside:* fore- and hindwings, similar to upperside.

Expanse 44 mm. (*tip to tip* 40 mm.).

Holotype ♀: Philippine Is., Luzon I., subprov. Benguet, Baguio, 5,000 ft., 10.iii.1912.

Nearest ally: *A. punctifera* Wlk. (Burma, Timor).

Craspedosis picoides sp.n.

♀: *Palpus* mouse-grey. *Antenna* minutely ciliate. *Head:* frons and vertex mouse-grey. *Thorax:* patagium and tegula mouse-grey. *Abdomen* cinnamon-buff above and beneath, basal segment mouse-grey. *Pectus* cartridge-buff tinged with mouse-grey. *Legs* fuscous. *Forewing* mouse-grey; a fovea below base of cell; postmedially a large white patch lying obliquely across wing, its upper edge parallel to costa, its proximal edge outwardly oblique to below vein 2, angled, and continued outwardly toward tornus, its distal edge outwardly oblique to vein 5, then exeurved to near tornus, where it joins proximal edge forming a blunt point; subterminally a faint pale mouse-grey line. *Hindwing* white, mouse-grey at base; a wide border of mouse-grey subterminally, in which is a faint pale mouse-grey subterminal line. *Underside:* fore- and hindwings similar to upperside.

Expanse 54 mm. (*tip to tip* 50 mm.).

Holotype ♀: Philippine Is., Mindanao I., subprov. Lanao, Kolambugan (plains), 25.v.1914.

Nearest ally: *C. leucosticta* Warr. (Queensland).

Subfamily **LARENTIINAE**

Poecilasthenia prouti sp.n.

♂: *Palpus* wood-brown. *Antenna* minutely ciliate, white on basal half of shaft. *Head:* frons wood-brown; vertex white mixed with glaucous-green. *Thorax:* patagium and tegula, white mixed with glaucous-green. *Abdomen* white mixed with glaucous-green; venter white. *Pectus* white. *Legs:* fore- and midlegs white, wood-brown outwardly; hindleg white. *Forewing* white irrorated with glaucous-green, translucent; antemedially a faintly marked, glaucous-green line, inwardly oblique; postmedially a band of glaucous-green, inwardly oblique, slightly wavy; cell spot glaucous-green; subterminally three fine glaucous-green, wavy lines. *Hindwing* concolorous with forewing; lines and markings forming continuations of those on forewing. *Underside:* fore- and hindwings opalescent, glossy.

Expanse 28 mm. (*tip to tip* 24 mm.).

♀: Similar to male.

Expanse 30 mm. (*tip to tip* 28 mm.).

Holotype ♂: 1.xii.1912; *allotype* ♀: 19.xii.1912; *paratype* ♀: 9.xii.1912, Philippine Is., Luzon I., subprov. Benguet, Pauai, Haight's Place, 7,000 ft.

Nearest ally: *P. thalassina* Meyr. (Australia).

Hastina plumbipicta sp.n.

♀: *Palpus* light buff suffused with ochraceous-orange. *Antenna* ciliate; shaft, light buff ringed with ochraceous-orange. *Head:* frons light buff, a wide band of ochraceous-orange suffusion across middle; vertex light buff. *Thorax:* patagium light buff tinged with ochraceous-orange; tegula light buff with a suffusion of fuscous proximally. *Abdomen* fuscous, light buff mixed with ochraceous-orange on basal segment dorsally; venter light buff. *Pectus* light buff. *Legs:* foreleg light buff, bone-brown above; mid- and hindlegs light buff. *Forewing* baryta-yellow; bone-brown to ochraceous-orange along costa, gradually widening from base forming a triangular patch on basal half of cell; again increasing in width medially, where a wide fascia is thrown off, well-defined to base of vein 3, then ill-defined and broken; a large bone-brown patch suffused with neutral grey, edged with ochraceous-orange in apical area, with three cartridge-buff points on costa; a small bone-brown patch suffused with neutral grey, edged with ochraceous-orange at tornus; termen ochraceous-orange; fringe baryta-yellow. *Hindwing* basal third baryta-yellow, distal two-thirds bone-brown suffused with neutral grey, the dividing line between the two colours, outwardly oblique from costa medially to vein 7, sharply excurved, returning along vein 6 to discocellulars, angled and inwardly oblique to near median nervure, inwardly, parallel with median nervure, angled subbasally, then oblique to inner margin; cell spot blackish brown; medially, some baryta-yellow spots surrounded by ochraceous-orange; subterminal line bone-brown; termen deeply excised between veins 5 and 6. *Underside:* forewing light buff; wood-brown on costa, a bone-brown patch in apical area; a bone-brown spot at tornus; termen baryta-yellow; hindwing basal half light buff, distal half bone-brown, termen light buff.

Expanse 30 mm. (*tip to tip* 27 mm.).

Holotype ♀: Philippine Is., Luzon I., subprov. Benguet, Pauai, Haight's Place, 7,000 ft., 7.xi.1912.

Nearest ally: *H. ornata* Moore (Sikhim).

Sauris nigrilinearia Leech.

♂: *Palpus* dusky brown. *Head:* frons dusky brown; vertex dark olive-buff. *Thorax:* patagium and tegula dark olive-buff. *Abdomen* dark olive-buff; venter cartridge-buff. *Pectus* cartridge-buff. *Legs:* foreleg, coxa and femur dark olive-buff; tibia and tarsus tinged with dusky brown; other legs cartridge-buff tinged with dusky brown. *Forewing* dark olive-buff; subbasal fascia a dusky brown line, outwardly oblique to subcosta, slightly incurved to inner margin; medially a dusky brown patch on costa, from which runs an ill-defined line, dusky brown to olive-citrine, excurved to lower angle of cell, incurved at vein 2, slightly oblique to inner margin; postmedial fascia consisting of two dusky brown to olive-citrine, wavy lines, excurved to vein 2, then straight to inner margin; subterminal fascia a strongly marked dusky brown line, slightly excurved to vein 2, incurved to tornus, bordered distally by a fine dusky brown line; terminal line dusky brown; the space between subterminal and terminal lines, below vein 5, suffused with dusky brown; a dusky brown spot at the end of each vein on termen. *Hindwing* vinaceous-buff; a large fovea on lower half of wing, extending beyond the end of cell. *Underside:* fore- and hindwings wood brown.

Expanse 28 mm. (*tip to tip* 27 mm.).

Neallotype ♂: 5.vii.1895; *paratype* ♂: 4.vii.1895, Japan, Kyushu I., prov. Satsuma, Kagoshima.

Nearest ally: *S. infirma* Swinh. (Pulo Laut, Singapore).

Steirophora dialitha sp.n.

♂: *Palpus* light yellowish olive. *Head:* frons and vertex light yellowish olive. *Thorax:* patagium and tegula light yellowish olive; rest of thorax light yellowish olive with sooty black spots laterally. *Abdomen* light buff suffused with olive-brown above and beneath; olive-ochre on basal and anal segments; anal tuft olive-ochre with two sooty black spots. *Pectus* olive-ochre. *Legs:* fore- and midlegs, coxae light yellowish olive, femora suffused with sooty black, tibiae and tarsi sooty black with light buff patches; hindleg olive-brown, light buff above on tibia, and at joints on tarsus. *Forewing* light yellowish olive; fasciae broken up by light yellowish-olive streaks radiating from base to termen; a sooty black spot at base; subbasal fascia sooty black, excurved, incurved; antemedial fascia sooty black, slightly excurved; postmedial fascia, a wide sooty black band edged with a fine white line, another through middle, passing close to a sooty black cell spot; proximal edge slightly waved; distal edge excurved to vein 5, excurved to vein 3, incurved to inner margin; subterminal fascia sooty black, edged with white distally, slightly excurved to vein 2, incurved to inner margin; sagittate sooty black marks on termen at ends of veins (points distad). *Hindwing* light buff lightly suffused with olive-brown; olive-brown on discocellulars; a faint light buff postmedial line. *Underside:* forewing olive-brown; the white lines showing through from upperside; hindwing similar to upperside.

Expanse 52 mm. (*tip to tip* 50 mm.).

♀: Similar to male.

Expanse 49 mm. (*tip to tip* 45 mm.).

Holotype ♂: Philippine Is., Luzon I., subprov. Benguet, Pauai, Haight's Place, 7,600 ft., 28.vii.1913; *allotype* ♀: subprov. Benguet, Baguio, 5,000 ft., xii.1914.

Nearest ally: *S. punctatissima* Warr. (Bonthain).

Collix elachista sp.n.

♂: *Palpus* light buff mixed with fuscous. *Antenna* minutely ciliate. *Head:* frons fuscous; a wide band of light buff across middle; vertex light buff mixed with fuscous. *Thorax:* patagium and tegula light buff mixed with fuscous. *Abdomen* light buff suffused with fuscous; venter light buff. *Pectus* light buff. *Legs* light buff, fuscous suffusion at joints of tarsus of foreleg. *Forewing* light buff densely irrorated with fuscous; medially a fuscous line, slightly oblique, crossing fuscous cell spot, then obliquely incurved to inner margin; postmedially a eremulate, fuscous line, edged with light buff distally, excurved to vein 2, obliquely incurved to inner margin; subterminally a fascia of sagittate fuscous marks (points basad), edged with light buff distally, excurved to anal vein, straight to inner margin; between veins 3 and 4, a wedge-shaped fuscous patch, base on subterminal fascia, point cutting through postmedial fascia; subterminal area fuscous, in which is a terminal line of light buff spots. *Hindwing* concolorous with forewing; lines and fasciae forming continuations of those on forewing. *Underside:* fore- and hindwings white; veins ochraceous-buff as far as subterminal area, where they are fuscous; a fuscous cell spot; a series of fuscous spots postmedially.

Expanse 24 mm. (*tip to tip* 21 mm.).

♀: similar to male.

Expanse 25 mm. (*tip to tip* 22 mm.).

Holotype ♂: 7.ii.1914; *allotype* ♀: 3.i.1914, Philippine Is., Luzon I., prov. Rizal, Montalban.

Nearest ally: *C. flavovenata* Leech (China).

Euphyia litterata sp.n.

♂: *Palpus* light buff, some bistre outwardly. *Antenna* fasciculate. *Head:* frons and vertex light buff mixed with bistre; a bistre streak from vertex, between antennae, and half-way down frons. *Thorax:* patagium and tegula light buff mixed with bistre. *Abdomen* snuff brown; laterally, a bistre streak; dorsally, a longitudinal light buff line, and two shorter light buff lines crossing it at base; basal segment bistre; venter light buff mixed with snuff brown. *Pectus* light buff. *Legs* bistre, with light buff patches. *Forewing* bistre; divided into patches by cartridge-buff, in which is a suffusion of snuff-brown; the lighter coloured portion forms a grotesquely shaped letter K; basal patch edged with cartridge-buff, outwardly oblique to middle of cell, angled, then straight to below median nervure, angled, and inwardly oblique to inner margin; antemedially three small patches, placed obliquely beyond basal patch, one on costa, another on median nervure, the third and larger patch, in which are two small spots, on anal vein and touching inner margin medially; postmedially a large patch,

the upper edge on costa, the lower edge almost reaching vein 2, proximal edge from costa medially, outwardly oblique, slightly curved to base of vein 3, downcurved, almost touching vein 2, then sharply excurved returning to vein 3; distal edge straight from costa to vein 7, then widely excurved to vein 3, joining proximal edge in an inward point; a triangular patch on costa near apex, the point touching vein 6, divided by a cartridge-buff line; three bistre patches on termen, bordered proximally by cartridge-buff, incurved to vein 3, incurved to vein 2, again incurved to tornus; a fine terminal line of cartridge-buff; and a cartridge-buff patch in fringe between veins 3 and 4. *Hindwing* cartridge-buff lightly suffused with snuff-brown; postmedial line faintly marked; termen bistre. *Underside:* forewing light buff irrorated with bistre; a bistre cell spot; postmedially two bistre lines from costa as far as vein 3, with a suffusion of bistre between them; hindwing light buff irrorated with bistre; cell spot bistre; medial and postmedial lines bistre.

Expanse 46 mm. (*tip to tip* 42 mm.).

Holotype ♂: 1.xii.1912; *paratypes* 3 ♂♂: 1, 2.xii.1912, 17.vii.1913, Philippine Is., Luzon I., subprov. Benguet, Pauai, Haight's Place, 7,000 ft.

Nearest ally: *E. melancholica* Butl. (Formosa, Japan).

Euphyia phrice sp.n.

♂: *Palpus* white mixed with sepia. *Antenna* ciliate. *Head:* frons and vertex white; a wedge-shaped, sepia patch on vertex, the point between antennae. *Thorax:* patagium sepia, edged with white; tegula sepia, rest of thorax white mixed with sepia. *Abdomen* sepia; a cartridge-buff, longitudinal stripe dorsally, with a narrow cartridge-buff band crossing it at base; venter cartridge-buff mixed with sepia. *Pectus* cartridge-buff. *Legs* light buff suffused with sepia. *Forewing* sepia; subbasal fascia a fine, white, wavy line; antemedial fascia a white, excurved, wavy line; an outwardly oblique, white line from costa antemedially to inner margin subterminally; a white line from inner margin antemedially, rising to near median nervure, angled, and running longitudinally to subterminal fascia at vein 2, forming a patch where it crosses the oblique line previously mentioned; subterminal fascia consisting of four white lines, the proximal line straight to vein 2, where it is angled, then slightly oblique to tornus; the two inner lines wavy; the distal line, incurved from apex to vein 3, excurved to vein 2. *Hindwing* white, irrorated with sepia on lower half; postmedial fascia a sepia, crenulate (points basad), excurved line; subterminal area suffused with sepia, in which is a white subterminal line. *Underside:* fore- and hindwings white, glossy; markings showing through from upperside.

Expanse 43 mm. (*tip to tip* 40 mm.).

Holotype ♂: Formosa, Karapin, x.1908.

Nearest ally: *C. rectilinea* Warr.

Euphyia euchora sp.n.

♂: *Palpus* warm sepia. *Antenna* fasciculate. *Head:* frons and vertex warm sepia mixed with light buff. *Thorax:* patagium and tegula warm sepia mixed with light buff. *Abdomen* warm sepia above and beneath, light buff laterally. *Pectus* light buff mixed with warm sepia. *Legs:* coxae and femora

light buff speckled with warm sepia; tibiae and tarsi warm sepia mixed with light buff. *Forewing* cinnamon-brown; warm sepia basally, distal edge light buff, from costa subbasally, obliquely excurved, wavy; a wide warm sepia medial band, edged with light buff; antemedial edge, outwardly oblique from costa to subcosta, wavy to inner margin; postmedial edge slightly waved to below vein 4, inwardly oblique to vein 2, excurved to anal vein, straight to inner margin; a short cartridge-buff, outwardly oblique dash, from costa near apex; below apex on termen, two blackish brown patches; a white spot in a suffusion of warm sepia at tornus. *Hindwing* light buff, lightly suffused with warm sepia; a faintly marked, light buff postmedial line. *Underside:* fore- and hindwings cinnamon-brown; suffused with bone brown on basal two-thirds.

Expanse 46 mm. (*tip to tip* 40 mm.).

♀: Similar to male, but antenna ciliate.

Expanse 40 mm. (*tip to tip* 35 mm.).

Holotype ♂: 26.xi.1912; *paratypes* 4♂♂: 13, 14, 22.xi., 3.xii.1912, Philippine Is., Luzon I., subprov. Benguet, Pauai, Haight's Place, 7,000 ft.; *allotype* ♀: 21.vi.1913, subprov. Benguet, Baguio.

Nearest ally: *E. propinquata* Koll.

Chloroclystis obscura sp.n.

♀: *Palpus* cartridge-buff mixed with fuscous. *Antenna* ciliate. *Head:* frons and vertex cartridge-buff mixed with fuscous. *Thorax:* patagium and tegula cartridge-buff mixed with fuscous. *Abdomen* cartridge-buff suffused with fuscous; venter cartridge-buff. *Pectus* cartridge-buff. *Legs* cartridge-buff, tinged with fuscous outwardly. *Forewing* cartridge-buff suffused with fuscous; antemedial fascia, consisting of two cartridge-buff lines, outwardly oblique to subcosta, inwardly oblique to inner margin; medially a faintly marked, cartridge-buff line, parallel with antemedial fascia; cell spot fuscous; postmedial fascia consisting of two cartridge-buff lines, outwardly oblique to vein 7, incurved to vein 4, inwardly oblique and wavy to inner margin; subterminal area fuscous, in which is a wavy, cartridge-buff line. *Hindwing* concolorous with forewing, lines and markings forming continuations of those on forewing. *Underside:* forewing cartridge-buff tinged with fuscous; cell spot fuscous; subbasal, antemedial, and postmedial lines fuscous; subterminal area suffused with fuscous; hindwing cartridge-buff, cell spot and postmedial line fuscous; subterminal band fuscous.

Expanse 25 mm. (*tip to tip* 22 mm.).

Holotype ♀: 22.v.1900, Japan, Honshu I., prov. Yamato, Yoshino.

Nearest ally: *C. dentatissima* Warr.

Chloroclystis tortuosa sp.n.

♂: *Palpus* pinkish buff. *Antenna* ciliate. *Head:* frons and vertex pinkish buff. *Thorax:* patagium and tegula pinkish buff. *Abdomen* pinkish buff; venter cartridge-buff. *Pectus* cartridge-buff. *Legs:* foreleg pinkish buff, suffused with fuscous above; other legs pinkish buff. *Forewing* basal half cartridge-buff, distal edge commencing with a fuscous spot on costa, obliquely excurved from costa antemedially to inner margin medially; distal half cinnamon-drab medially to fuscous subterminally; postmedial line cartridge-buff,

excurved to vein 5, excurved to anal vein; subterminal line cartridge-buff, wavy. *Hindwing* cartridge-buff; postmedially a series of fuscous dots; termen fuscous; fringe cartridge-buff. *Underside:* forewing glossy; cartridge-buff suffused with cinnamon-drab; fuscous on basal half of costa; cell spot and postmedial line faintly marked; termen fuscous; hindwing glossy, cartridge-buff; cell spot and postmedial line faintly marked.

Expanse 21 mm. (*tip to tip* 18 mm.).

Holotype ♂: 15.xi.1912, Philippine Is., Luzon I., subprov. Benguet, Pauai, Haight's Place, 7,000 ft.

Nearest ally: *C. inaequata* Warr.

Chloroclystis mira sp.n.

♀: *Palpus* light yellowish olive. *Antenna* minutely ciliate. *Head:* frons and vertex light yellowish olive. *Thorax:* patagium light yellowish olive; tegula light yellowish olive with a blackish brown spot. *Abdomen* light yellowish olive, blackish brown on basal and anal segments, and some blackish brown scales at joints between other segments dorsally; venter cartridge-buff, tinged with light yellowish olive. *Pectus* light yellowish olive. *Legs:* foreleg, coxa and femur light yellowish olive with blackish brown above; tibia and tarsus blackish brown, light yellowish olive at joints; midleg light yellowish olive mixed with blackish brown outwardly; hindleg cartridge-buff tinged with light yellowish olive. *Forewing* light yellowish olive to yellowish olive, blackish brown on costa; antemedial fascia a band of cartridge-buff straight across wing, bordered by a suffusion of blackish brown; postmedial fascia a cartridge-buff band, with blackish brown on veins along each edge, straight to vein 7, outwardly angled, then wavy and inwardly oblique to inner margin; a wide suffusion of wood-brown from lower half of antemedial fascia, narrowing to space between veins 4 and 6 at discocellulars, continuing to postmedial fascia and beyond. *Hindwing* cartridge-buff. *Underside:* forewing glossy, cartridge-buff lightly suffused with light yellowish olive, more deeply on costa; fascia marked to median nervure by fuscous irroration; hindwing glossy cartridge-buff lightly suffused with light yellowish olive; fascia marked by fuscous irroration.

Expanse 28 mm. (*tip to tip* 26 mm.).

Holotype ♀: 12.xi.1912; *paratype* ♀: 15.xi.1912, Philippine Is., Luzon I., subprov. Benguet, Pauai, Haight's Place, 7,000 ft.; *paratype* ♀: 3.vi.1912, subprov. Benguet, Baguio, 5,000 ft.

Nearest ally: *C. blanda* Bastelb.

Chloroclystis hypopyrrha sp.n.

♂: *Palpus* cartridge-buff. *Antenna* ciliate. *Head:* frons and vertex cartridge-buff. *Thorax:* patagium cartridge-buff; tegula Lincoln green. *Abdomen* cartridge-buff, warm sepia on two basal segments dorsally; venter cartridge-buff. *Pectus* cartridge-buff. *Legs* cartridge-buff, warm sepia patches on tibia and tarsus of foreleg. *Forewing* Lincoln green; some warm sepia on costa basally; medially a wide, warm sepia band; proximal edge, excurved to median nervure, inwardly oblique to inner margin; distal edge wavy and excurved; subterminal line white, crenulate, passing through three patches of

warm sepia, one on costa, another between veins 4 and 6, the third at tornus; termen warm sepia; fringe Lincoln green mixed with warm sepia. *Hindwing* concolorous with forewing; lines and markings forming continuations of those on forewing. *Underside:* forewing cartridge-buff lightly suffused with warm sepia; cell spot and postmedial fascia warm sepia; subterminal area suffused with warm sepia; hindwing cartridge-buff; cell spot and postmedial fascia warm sepia.

Expanse 22 mm. (*tip to tip* 20 mm.).

♀: Similar to male.

Expanse 24 mm. (*tip to tip* 22 mm.).

Holotype ♂: 20.vi.1901; *allotype* ♀: 16.vii.1901; *paratypes:* 1 ♂ 9.vi, 1 ♂ 3.vii, 2 ♂♂ 1.ix, 1 ♂ 20.x.1899; 1 ♂ 27.v.1900; 1 ♀ 9.ix, 1 ♀ 1.x.1899; 1 ♀ 17.vi, 1 ♀ 19.vi.1901; Japan, Honshu I., prov. Yamato, Yoshino.

Nearest ally: *C. rectangulata* Linn.

Eupithecia dolia sp.n.

♂: *Palpus* Verona brown. *Antenna* minutely ciliate. *Head:* frons white, Verona brown on lower half; vertex white. *Thorax:* patagium and tegula white; rest of thorax with a white Verona brown spot in middle. *Abdomen* Verona brown, basal segment white; venter cartridge-buff. *Pectus* white. *Legs:* Fore- and midlegs cartridge-buff, Verona brown above; hindleg cartridge-buff. *Forewing* Verona brown; white at base below median nervure; subbasal line white, wavy; antemedial line Verona brown defined by white, wavy to median nervure, below, ill-defined and almost obsolescent; cell spot bone-brown in a white patch which reaches costa; postmedially two white lines, the distal one commencing with a patch on costa, excurved and wavy to vein 4, below, ill-defined and almost obsolescent; subterminally a series of bone-brown spots, edged distally with white; a white spot at tornus. *Hindwing* white; partial fasciae of Verona brown, subbasally, medially and postmedially, from median nervure to inner margin. *Underside:* forewing light buff tinged with Verona brown; markings showing through from upperside; hindwing cartridge-buff; antemedial, medial and postmedial fasciae faintly marked; subterminal area tinged with Verona brown.

Expanse 24 mm. (*tip to tip* 23 mm.).

Holotype ♂: 20.xi.1912, Philippine Is., Luzon I., subprov. Benguet, Pauai, Haight's Place, 7,000 ft.

Nearest ally: *E. sinicaria* Leech.

(Colours from Ridgway's *Color Standards and Color Nomenclature*, 1912. Colour terms in italics are not Ridgway's.)

ON THE GEOMETRID GENUS *CATORIA* MOORE.

By LOUIS B. PROUT.

THE genus *Catoria* was erected by Moore in 1887 (*Lep. Ceyl.* iii. 414), under the "family" heading *Boarmiidae*, for two species which were said to have the ♂ forewing "comparatively shorter and broader than in *Cymatophora* [type *roboraria* Schiff.], *Boarmia* [type *consonaria* Hb., see. Moore ex err., *tom. cit.* 412] and *Alcis* [type *repandata* Linn.]; the apex less produced and somewhat rounded; cell shorter, costal vein bifid near its end; first subcostal . . . joined to middle of the costal branch; . . . hindwing short; exterior margin almost even, convex; cell nearly half the length; first subcostal [SC^2] close to end; . . . body short, rather stout; palpi obliquely projected in front, laxly clothed beneath, apex conical; antennae broadly bipectinate to one-third the tip [*sic*], the branches very long and finely ciliated; legs long, more slender than in above genera, spurs long, slender." He selected for its type *Boarmia sublavaria* Guen. (*Spec. Gén. Lép.* ix. 256), which—as is shown by his citations and other works—embraced both the true *sublavaria* and its Ceylon representative; and added (p. 415) *procursaria* Walk. (1860), an outlier with similar venation but with different ♂ antenna and smooth face, probably standing on a somewhat different line of evolution (*Boarmia-Serraca* group).

By later systematists the genus (*sens. str.*) has been forced into *Boarmia* sect. *Alcis* (Hmpsn., *Faun. Ind. Moths*, iii. 270) or divided between *Ectropis* and *Diastictis* (Meyr., *Proc. Linn. Soc. N. Sth. Wales* (2) vi. 333, *E. camelaria* Guen.; *Tr. Ent. Soc. Lond.* 1897, p. 75, *D. sublavaria* Guen.) or between *Ectropis* and *Boarmia* (Turn., *Proc. Linn. Soc. N. Sth. Wales*, xlii. 333, *E. hemiprosopa* Turn. and *camelaria* Guen.; *tom. cit.* 359, *Boarmia viridaria* Pagenst.). Warren alone seems to have been conscious of its perfect homogeneity as regards the Indo-Australian Region; but he erred in the opposite direction by including a Neotropical group which has only a very general and partly superficial resemblance (the group of *Boarmia bipennaria* Guen.).

Apart from the pattern of both upper- and underside, which shows remarkably little deviation throughout, the genus *Catoria* is characterized absolutely by the ♂ antennal structure, to which Meyrick and Turner have called attention (see the references under *Ectropis*, *supra*). The pectinations, which are very long but leave free the apical one-third or two-fifths of the antenna, arise in slender pairs at the extreme ends of each segment and are always in part fused into single stouter pectinations, in part free, in part fused for a longer or shorter distance proximally but separating apically. The face is more or less rough-scaled, generally with a well-defined cone below. The hindtibia of the ♂ is dilated, though not extremely, the ensheathed hair-pencil therefore more or less slender. The fovea is well developed in the ♂. The forewing has $SC^{1,2}$ very long-stalked or (in *hemiprosopa* Turn. and in the ♀♀ of several species) coincident, in the ♂♂ with the stalk connected by a bar (Moore's costal branch) with C or very rarely anastomosing slightly, in the ♀♀ nearly always anastomosing more or less strongly. The hindwing has the termen somewhat crenulate, but more weakly than in the majority of the *Boarmia* group. The coloration is

generally white, grey or green, scarcely ever brown; cell-spots above strongly developed, that of the hindwing often ocellated, beneath enlarged on the forewing, often also on the hindwing, or with the ocellus solidified into a strong black spot; lines of upperside double, excepting the median, and on the hindwing generally the antemedian; proximal postmedian generally and proximal subterminal always macular, the latter strong; underside white or oftener more or less suffused with grey or drab, without lines but nearly always with complete or incomplete subterminal or terminal dark bands, in which white or very pale spots persist at least at apex of forewing and midtermen of both wings.

The ♂ genitalia, as noted in Nov. Zool. xxxv, 75, show very good differential characters, notably in the armature of the valves, though all have the sacculus free and very strong.

In order to make clear the phylogenetic unity of the group, which has spread almost throughout the Indo-Australian Region but is entirely unrepresented elsewhere, it appears highly desirable to treat it as a genus. I believe I have examined all the forms yet known, and as there is little hope of my finding an opportunity to monograph them, I have prepared a general survey and propose to name the undescribed ones except where the material is at present inadequate.

KEY TO THE SPECIES.

1.	Colour green	2
	Colour not green	3
2.	Hindwing with cell-spot ocellated	7. *parra* Butl.
	Hindwing with cell-spot not ocellated	6. *delectaria* Walk.
3.	Shape of ♂ abnormal; underside bright brown	3. *lucidata* Warr.
	Shape of ♂ normal or nearly so; underside white, grey or drab	4
4.	Colour dark brown or dark-mottled, beneath without dark apical or distal band	4. *saturata* Prout.
	Colour not so, beneath with dark apical or distal band	5
5.	Forewing beneath at apex blackish	8. *subalbata* Warr.
	Forewing beneath at apex white or whitish	6
6.	Face sharply half white and half black; forewing with $SC^{1,2}$ coincident	13. *hemiprosopa* Turn.
	Face not so; forewing with $SC^{1,2}$ long-stalked	7
7.	Face wholly black	8
	Face partly white	10
8.	Cell-spot of hindwing large, oblong	9. *tamsi* Prout.
	Cell-spot of hindwing small, round or punctiform	9
9.	Sacculus strongly dentate on innerside; wings beneath dark, with white midterminal spot narrow	11. sp.n. (Ceylon)
	Sacculus with only a few irregular teeth; wings beneath generally less dark, with white more extended	12. *sublavaria* Guen.
10.	Cell-spot of hindwing ocellated	11
	Cell-spot of hindwing not ocellated	12
11.	Underside white or whitish proximally	2. *camelaria* Guen.
	Underside smoky proximally	1. *olivescens* Moore.
12.	Underside predominantly white	10. sp.n. (Timor).
	Underside predominantly drab	5. sp.n. (Choiseul).

1. Catoria olivescens Moore.

This species, readily recognizable by its dusky olive-grey tone, the ocellated cell-mark, and the broadly darkened borders beneath, evidently represents *camelaria* Guen. in the Indian subregion (cf. Nov. Zool. xxxv. 73–4); but a careful comparison of the ♂ genitalia shows a sufficiently wide difference in the sacculus to call for specific separation. In both, the sacculus arm is nearly as long as the valvula and has a prong on the costal side; but whereas in *olivescens* this is placed beyond the middle and the margin of the sacculus between it and the apical prong forms a regularly curved concavity, in *camelaria* it is more proximal and projects more sharply from the arm. Both the species, together with some others to be referred to later, have a process (inward) from the "costal fold" terminating in two (or sometimes on one of the valves three—i.e. asymmetrical) slender spines. The uncus is weak, blunt, with two groups of bristles at extremity, the gnathos weak.

Thus far I have only recognized two races.

(*a*) C. olivescens olivescens Moore.

Catoria olivescens Moore, *Lep. Atk.* 244 (1888) (Darjiling).
"*Boarmia sublavaria* Guen." Butl., *Ill. Het.* vii. 21 (1889) (Dharmsala).

Fairly common in Sikkim, Bhutan and Assam, apparently rare in N.W. India. Also known to me from Perak and Formosa.

(*b*) C. olivescens longistigma Prout.

Catoria olivescens longistigma Prout, *Bull. Hill Mus.* iii. (1) 38 (1929) (Buru).

Distinguished by its whiter admixture above, with elongate cell-mark of hindwing (more as in *tamsi* Prout) and dark, broad-bordered underside.

Buru and Ceram. I now suspect the ♀ "*camelaria*" from Buru (*loc. cit.*) is really the ♀ to this *olivescens* race, although the double element in the fauna of this island renders it by no means impossible that it may provide a meeting-place for the two allies.

2. Catoria camelaria (Guen.).

This is a widely distributed species, its range extending from Timor and perhaps Buru (*vide supra*) to the Loyalty Islands or probably Fiji. It is characterized by the ocellated cell-spot of the hindwing, the pronounced broadening of the black border on the anterior part of the forewing beneath and in most of the forms by the strong contrast between the whiteness of the ground-colour and the sharpness of the dark markings. The face is never wholly black, as in *sublavaria* Guen. and *tamsi* Prout, or half white and half black, as in *hemiprosopa* Turn. Usually it is crossed by a not very sharply defined black band about or above the middle.

In Australia, whence *camelaria* was first described, it seems strongly variable, and this, taken in conjunction with the fact that only scanty and sometimes poor material is yet to hand from some of its other localities, renders it difficult —or indeed impossible—to give an adequate analysis of its geographical variation. The following is the best that I can yet offer.

(*a*) **C. camelaria camelaria** (Guen.).

Boarmia (?) *camelaria* Guen., *Spec. Gén. Lép.* ix. 256 (1858); Oberth., *Et. Lep.* vii. fig. 1660 (1913) (Australia).

Cleora velutinaria Walk., *List Lep. Ins.* xxxv. 1580 (1866) (Moreton Bay [& Swan River, *err. loc.*]).

The variation consists chiefly in the ground-colour, which is sometimes brownish instead of white (resulting in a marked superficial resemblance to *hemiprosopa* Turn.) and in the extent of the dark submarginal bands beneath, which in any case become obsolescent posteriorly on the hindwing but may also disappear from the entire hindwing and even, in extreme cases, be reduced on the forewing to a small subapical patch.

General in Queensland and reaching Newcastle, N.S.W.

(*b*) **C. camelaria timorensis** subsp.n.

♂♀, 39–44 mm. On an average smaller than *C. camelaria* and with relatively shorter forewing, at least in the ♂. Tone brownish. Cell-dot of forewing strong, ocellus of hindwing more perfect than in most *c. camelaria*. Forewing beneath with the cell-spot smaller than in *c. camelaria*, the distal band generally more uniform, with the white apical patch reduced.

Dutch Timor: Oinanissa (loc. typ.), November–December 1891 (W. Doherty), 2 ♂♂, 2 ♀♀. Portuguese Timor; Dili, May 1892 (W. Doherty), 2 ♂♂. All in coll. Tring Mus.

(*c*) **C. camelaria baryconia** Prout.

Catoria camelaria baryconia Prout, *Bull. Hill Mus.* iii. (2) p. ? (in the press) (New Guinea).

A well-differentiated race, represented in the Tring Museum from the Snow Mountains, Sattelberg and Owen Stanley Range. A very similar ♀ from New Ireland cannot be named without further material.

(*d*) **C. camelaria carbonata** Warr.

Catoria camelaria carbonata Warr., *Nov. Zool.* iii. 402 (1896) (Lifu).

In size and shape agreeing with *c. timorensis* but white, on the ♂ upperside less darkly marked than *c. camelaria*, in both sexes beneath with the subapical patch of the forewing strongly blackened, more roundish, not or scarcely continued to the costal margin.

Only the original series of 3 ♂♂, 1 ♀ from the Loyalty Islands yet known to me.

In addition to the forms detailed above, I have recently seen a ♀ from Fiji which I believe to be referable to this species and, according to a hurried note made in Berlin, I suspect that 3 ♀♀ from Palau, in poor condition, recorded by Semper (*Iris*, xviii. 266) as "*Boarmia sublavaria* Guen.," also belong here; his fourth ♀, mentioned as darker, is a *Cleora*.

3. **Catoria lucidata** Warr.

Catoria lucidata Warr. *Nov. Zool.* xii. 15 (1905) (Guizo).

An interesting species, nearly like *camelaria* in structure, but with narrower, more acute forewing, less regularly rounded hindwing, punctiform cell-dot of the latter, browner suffusion above and bright brown underside, inclining towards tawny-olive. In the 5 known ♂♂, the connective bar from C of the

forewing reaches the stalk of $SC^{1,2}$ very little before bifurcation; in the one ♀ the bar is lost in a short anastomosis. The ♂ genitalia have not been mounted, but show the same general scheme as *camelaria*; the long sacculus arm is produced to a sharp spine, but apparently has not the strong lateral prong of the two preceding.

Solomon Islands: Choiseul (2 ♂♂), Vella Lavella (1 ♂), Gnizo (1 ♂), Rendova (1 ♂, 1 ♀).

4. **Catoria saturata** Prout.

Catoria saturata Prout, *Bull. Hill Mus.* iii (1) 39 (1929) (Buru).

This rather broad-winged species is recognizable at once by its deep olive-brown colour, particularly in the ♂, the ♀ being more mottled with white; it further differs from all the other *Catoria* in wanting the subapical or terminal band beneath. The sacculus arm, as in the preceding species, is produced into a slender curved spine; the lateral prong is more distally placed than in them, large, directed backward; the two spines of the costal process are rather strongly elongate.

Confined, so far as known, to Buru and Ceram.

5. **Catoria misticia** sp.n.

♂, 37 mm. Face white, the upper $\frac{1}{3}$ or $\frac{1}{4}$ black-brown, somewhat encroached upon by whitish in the centre. Palpus black, slenderly white beneath. Vertex and antennal shaft white; pectinations (in the type) almost regularly cleft near their tips only, except the inner (left-hand) series of right antenna, which are mostly cleft to base. Thorax and abdomen above dirty whitish, with brown dots; beneath more smoky. Hindtibia somewhat dilated, with slender pencil.

Forewing with costa rather straight, termen bowed, strongly oblique, moderately long; $SC^{1,2}$ very long-stalked, the stalk arising from cell, with the usual connecting bar to C short; pale gull-grey, vaguely dappled with brownish and with scattered darker scales; cell-dot small, sharply blackish, indefinitely encircled with rather deep gull-grey; lines strongly broken into brown vein-spots or short dashes, the three principal arising from black costal dots and somewhat blackened on the veins; postmedian rather strongly excurved in its anterior part, as in the most curved-lined forms of *camelaria* Guen.; its distal duplicating line only showing as weak interneural spots.——*Hindwing* similar, the cell-dot enlarged, round, black, not surrounded with grey.

Underside light drab, mixed with drab-grey or pale drab-grey proximally, darkening distally; both wings with black cell-spot, that of hindwing as above, that of forewing larger; forewing with large apical and very small midterminal spot clear white, hindwing with the terminal white more extended, but broader in cellule 3 than at apex, strongly recalling *delectaria plesia* Swinh.

Solomon Islands: Choiseul, N. side, December 1903 (A. S. Meek), type in coll. Tring Mus., unique.

6. **Catoria delectaria** (Walk.).

Widely distributed and relatively not very variable, yet probably divisible into more races than have yet been differentiated. Unfortunately only Walker's poor type, a ♀, is yet known to me from the Aru Islands; this certainly agrees approximately with the Moluccan and Papuan forms, but any attempt to sort

these further must wait upon the rediscovery of the species in the type locality. The only strikingly distinct race is that from Mefor, here described. I have found also a difference in Swinhoe's *plesia*, from Sumatra, which enables me to quote it as a provisional race. Specimens from Queensland are small, but are closely approached in all respects by those from the Louisiades.

Except in very faded examples, the bright green colour marks out this species very prominently. The only other green one is the following, which, besides being of a greyer green, is longer-winged and has the cell-spot of the hindwing ocellated.

The proximal part of the sacculus is broad and strong, with a lateral prong (somewhat as in *camelaria*) before its narrowing form the "sacculus arm," which is widened at its curved extremity, in some positions suggesting a golf club. The harpe is a 2- or 3-spined process from the costal fold, similar to those of the preceding species. The costal region of the valva has a spined field somewhat similar to that of *sublavaria*, but more elongate. The uncus is short, with a foreshadowing of the dorsal-lateral spines which develop in *sublavaria*.

(*a*) **C. delectaria plesia** (Swinh.).

Ophthalmodes plesia Swinh., *Ann. Mag. Nat. Hist.* (7) xx. 80 (1907) (W. Sumatra).

Swinhoe's unique type ♂ and a fairly similar ♀ from Nias measure 40 mm., have the cell-spots moderately large, the underside not such a dark green-grey as in the other forms and with some midterminal white, which they do not show, in addition to the apical white spot which is common to all.

(*b*) **C. delectaria delectaria** (Walk.).

Ophthalmodes delectaria Walk., *List. Lep. Ins.* xxxv. 1595 (1866) (Aru).
Boarmia viridaria Pagenst., *Jahrb. Nass. Ver. Nat.* xli. 168 (sep. p. 84) (1888) (Amboina).
Selidosema viridis Turn., *Tr. Roy. Soc. S. Austral.* xxx. 133 (1906) (Queensland) (subsp. ?).

Known to me from Celebes (one ♀, probably racially separable), Sula Mangoli (one poor ♀), Halmahera (Pagenstecher, 1897), Buru, Amboina, Dammer Island, Misol, Dutch and British New Guinea, Trobriand Islands, Goodenough, Louisiades, North Queensland, St. Matthias Island (small form), Admiralty, Dampier, New Hanover, New Ireland, Feni Island, New Britain and Nissan Island (Solomons). Probably the Bismarck Archipelago provides some differentiable races.

(*c*) **C. delectaria vernans** subsp.n.

♂♀, 33–43 mm. Upperside of a smooth, even green (light grape green or very slightly bluer), with the irroration and transverse markings reduced, the median line of the forewing obsolete or nearly so. Underside of a less greenish grey than most of the other forms.

Mefor (W. Doherty), 6 ♂♂, 5 ♀♀ in coll. Tring. Mus. Also 1 ♂, 4 ♀♀ in coll. Joicey (Pratt Bros.), besides a couple of the original Doherty series.

7. **Catoria parva** (Butl.).

Ophthalmodes parva Butl., *Ann. Mag. Nat. Hist.* (5) xx. 242 (1887) (Ulaua, Solomons).

This species, incorrectly sunk by Swinhoe (*Cat. Lep. Het. Oxf. Mus.* ii. 294) to *delectaria* Walk., has been sufficiently differentiated in the notes given above. In addition, the ♂ abdomen is distinguished by having a pad of buff-tinged hair

on the 6th–7th sternite. The face has the upper part narrowly or interruptedly blackish, chiefly at the corners.

Generally distributed in the Solomon Islands, apparently with but little variation. The Tring Museum has it from Bougainville, Treasury, Choiseul, Isabel, Tulagi, Florida I., Guadalcanar, Vella Lavella, Guizo, Rendova and New Georgia.

8. **Catoria subalbata** Warr.

Catoria subalbata Warr., *Nov. Zool.* xii. 15 (1905) (E. Sumatra).

Face predominantly pale. Forewing with the stalk of $SC^{1,2}$ just stalked with that of SC^{3-5} (as in Warren's type) or from the cell (as is usual in all the preceding species). Cell-spot of both wings large, fairly equal, not ocellated. Underside white, with a characteristic blackish apical patch which does not, as in normal *Catoria*, contain a white spot at the apex itself. Uncus somewhat as in *camelaria*, but with the bristles more definitely divided into a bunch at either side; sacculus arm a good deal shorter than valvula; harpe with three short stout spines.

Only four specimens, all ♂, are yet known; an old and rather worn example, merely labelled Sumatra, has stood for many years in the British Museum, where it bore—from the early 'nineties until the present year—the manuscript name of *albida* Warr.; two fine specimens were collected by the Pratt brothers in 1921 in the Korintji district, S.W. Sumatra, and are now in the Joicey collection.

9. **Catoria tamsi** Prout.

Catoria tamsi Prout, *Nov. Zool.* xxxv. 73 (1929) (Perak).

No further material of this recently discovered species has yet come to hand. From similar forms of *camelaria* it is best distinguished by the wholly black face and the *sublavaria*-like underside; from *sublavaria* by the strong coarse irroration and the large, long-oval cell-mark of the hindwing; from both by the very different genitalia. Sacculus arm rather long, but very strongly curved, therefore not approaching the end of the valvula; process from costal fold terminating in a group of short broad spikes; uncus with two long horns. The subcostal venation of the forewing varies in the same way as in *subalbata*.

Known from Perak, Singapore and Sumatra.

10. **Catoria cinygma** sp.n.

♂, 40 mm. Similar to a small, weakly marked *sublavaria sublavaria* Guen. Face with the lower part (less than one-half) whitish, shading through brown to blackish above. Uncus long, tapered to a single point, more as in a *Cleora*; valva narrow, with the spinose patch elongate.——*Forewing* rather narrower than in typical *sublavaria*; stalk of SC^2 from the cell, SC^1, by loss of its base, from C; ground-colour whiter, with the shadowy light-brown band outside the postmedian relatively better developed, scarcely interrupted; cell-dot smaller. ——*Hindwing* with similar distinctions.——Underwide white, the hindwing almost unmarked, with a minute black cell-dot, the forewing with a much smaller cell-spot than in *sublavaria*, the dark border subapical only, consisting of a narrow band from costa to SC^5 and a weaker terminal patch between the radials; terminal dots distinct anteriorly, becoming obsolescent.

Dutch Timor: Oinanissa, November–December 1894 (W. Doherty), type in coll. Tring Mus.

The unique type is worn, but easily recognizable.

11. **Catoria halo** sp.n.

♂♀, 40–51 mm. Closely like *sublavaria* Guen.——*Forewing* with the stalk of $SC^{1,2}$ (the coincident $SC^{1,2}$ in the ♀) arising from the cell (in *sublavaria* generally short-stalked or at least connate with that of SC^{3-5}); cell-spot above showing as a larger and generally more conspicuous grey halo round the black dot.—— *Hindwing* with the median line more constantly near the cell-spot than in *sublavaria*, here more or less thickened, sometimes producing together with the spot an impression of the ocellus of *olivescens* Moore.——Underside more decidedly and evenly brownish drab or cinnamon-drab than in any but the most extreme forms of *sublavaria*, with larger black cell-spots (that of forewing well rounded, not oval) and narrower, more wedge-shaped white terminal spot behind R^3.

Ceylon, fairly common, the type from Pundaloya, April 1897 (E. E. Green) in coll. Tring Mus.

Probably the Ceylon representative of *sublavaria*, with which it has always been united. The uncus, which in that species develops two bunches of broad blunt spines (5 or more in each group), here has each bunch fused into a single spine, much lengthened; arm of sacculus differently shaped, strongly dentate on its inner (upper) edge as in no other *Catoria*; "signum" of ♀ very differently formed, considerably larger, with a much deeper central excavation, etc. In order to make more definite the community of origin, Mr. Tams would advocate calling *halo* a subspecies of *sublavaria*, but the morphological differences are pronounced enough to preclude any likelihood of syngamy in the event of their meeting again. On the other hand, a veritable race of *sublavaria* from a much more remote locality (New Guinea) has retained the venation and genitalic structure of the North Indian name-type.

12. **Catoria sublavaria** (Guen.).

This is one of the most widely distributed of all the *Catoria* species, reaching from N. India to the Bismarck Archipelago, although until recently it had been little noticed beyond the confines of British India. Hampson (*Faun. Ind., Moths*, iii. 270) adds only Borneo, Meyrick (*Tr. Ent. Soc. Lond.* 1897, p. 75) Sambawa, Swinhoe (*Cat. Lep. Het. Oxf. Mus.* ii. 293) Singapore, Semper (*Reisen Philipp.* (2) vi. 614) the Philippines. I suspect that Sambawa and the Philippines may yield differentiable races but have only seen one example of each, the Sambawa ♂ rather brown, a Luzon ♀ large, broad-bordered beneath. In any case there is evidently considerable geographical variation and the erection of some new races here seems justified.

Attention has already been drawn to the constancy of the black face and the strong tendency of the two subcostal groups to arise from a common stalk. In the ♀♀ both of this species and the preceding the 1st and 2nd subcostals seem to be invariably coincident instead of long-stalked. The ♂ valva is characterized by the branching of the long, strong sacculus, near its distal end into a broad, bluntly pointed outer arm and a long, somewhat curved, tapering inner spike;

also by the structure of the process from the costal fold, which develops a field of unequal, rather short but strong spines. The uncus is weak, but furnished with dorsal spines (see under *halo*) which suggest a possible affinity with the genus *Serraca* Moore, including the " *Boarmia* " *punctinalis* (Scop.) group, and perhaps *Pseudoboarmia* McDunnough.[1]

(*a*) **C. sublavaria sublavaria** (Guen.).

Boarmia sublavaria Guen., *Spec. Gén. Lép.* ix. 256 (1858); Oberth., *Et. Lép.* vii. fig. 1659 (1913) (" Central India " [? Silhet]) (*subflavaria* ex err., Oberth., *tom. cit.* 661).
Boarmia spilotaria Snell., *Tijd. Ent.* xxiv. 75, t. viii, f. 5, 5a (1881) (Celebes).

The name-typical form, beautifully figured by Culot in Oberthür's *Études*, varies little on the upperside, though some examples are whiter; beneath, the deviation is more pronounced, the drab ground-colour sometimes giving place to an almost clear white. Both extremes are sometimes found in the same locality, *e.g.* in Assam, but there are as yet no data available for judging whether the variation may be individual or seasonal.

C. sublavaria from Burma, Malaya, Borneo, Java and Formosa have not yet been differentiated from the North Indian name-type. Neither does the single Celebes example before me—a ♂ from Oberthür collection—show any tangible distinction, though the name *spilotaria* Snell. is waiting to be revived for it if necessary.

(*b*) **C. sublavaria tenax** subsp.n.

♂, 42 mm. Smaller than name-typical *sublavaria* Guen. Forewing with the stalk of $SC^{1,2}$ from the cell. Both wings above more uniformly suffused with olive-brownish than in *s. sublavaria*. Hindwing with the median line close to the cell-dot, as in *C. halo* Prout (*supra*). Underside as dark as in *halo*, but with nearly the typical maculation of *sublavaria*.

S. Andamans, May–June 1927 (Ferrar coll.), type in Mus. Brit., presented by the Agricultural Research Institute, Pusa. Great Nicobar, 2 ♂♂ in Mus. Tring, still smaller (37 and 39 mm.) but otherwise quite similar.

This form might, especially on account of the venation, have been taken for a race of *C. halo* rather than of *sublavaria*, but the genitalia of the type have been examined by Mr. W. H. T. Tams and agree with the last-named.

(*c*) **C. sublavaria psimythota** Prout.

Catoria sublavaria Rothsch., *Lep. Brit. Orn. Un. Exp.* p. 86 (1915) (Dutch New Guinea).
Catoria sublavaria (Guen.) *psimythota* Prout, *Bull. Hill Mus.* iii. (2) p. 110 (New Guinea).

A fine and very distinct race, widely distributed in New Guinea, at least near the coast. The Tring Museum possesses examples from Kapaur, Base Camp (Utakwa River), Humboldt Bay and Kumusi River.

(*d*) **C. sublavaria subnata** subsp.n.

♂, 46–48 mm.——*Forewing* appreciably more pointed, the termen more oblique; the blue-grey tone predominant, the drab markings, though sharp, being somewhat less diffused; cell-dot rather large; postmedian not very sinuous, the dots large, the band outside them narrow.——*Hindwing* with the cell-dot enlarged into a spot.——Underside rather dark.

[1] Cf. Pierce, *Genit. Geom. Brit.* p. 16, " *Boarmia consortaria* Fb."; McDunnough, *Studies N. Amer. Cleorini*, pp. 21, 22.

Bismarck Archipelago: Feni Island, E. of New Ireland, July 1924, type; Talasea, New Britain, January 1925, 1 ♂. Both in coll. Tring Mus., collected by A. F. Eichhorn.

The shape and tone bring about a superficial resemblance to some forms of *camelaria camelaria* and *c. baryconia*, from which, apart from the genitalia, the black face at once distinguishes it. The stalk of SC^{1-2} arises from the base of that of SC^{3-5} in the type, but is just separate therefrom in the New Britain example.

13. **Catoria hemiprosopa** (Turn.).

A rather small species, generally distinguishable, at least in the ♂, by the appreciably narrower and acuter forewing. Although Dr. Turner, in erecting it, only knew two species of the genus, the two differential characters which he emphasized hold throughout; namely, the coincidence (in both sexes) of SC^1 and SC^2 of the forewing and the sharply defined coloration of the face, with upper half black, lower half white. The genitalia are likewise exceedingly distinct: the sacculus arm is short and broad, tapering rather rapidly and with only a very small hardened point; the process from the costal fold terminates in a single, elongate spine. Uncus with two long dorsal arms.

This species has been little noticed, but proves to be extremely widely distributed, though never plentiful. The colour variation is considerable, at least in the ♂, and it is possible that even the single race which has been differentiated will not prove ultimately tenable.

(*a*) **C. hemiprosopa affinis** Prout.

Boarmia (*Catoria*) *affinis* Prout, *Nov. Zool.* xxxii. 58 (1925) (Malay Peninsula).
Catoria hemiprosopa affinis Prout, *Nov. Zool.* xxxv. 74 (1929).

The ♂ in general rather more pointed-winged than in the name-type. Ground-colour whiter. Described from Penang, Singapore and Engano, few examples known. A ♀ from N. Borneo, in Mus. Tring, and one from Ceylon, in Mus. Brit., seem conspecific, judging by the face.

(*b*) **C. hemiprosopa hemiprosopa** (Turn.).

Ectropis hemiprosopa Turn., *Tr. Roy. Soc. S. Austral.* xxviii. 230 (1904) (Queensland).

Besides North Queensland and Queensland, Waigeu, New Guinea (Kapaur, Upper Setekwa River, Milne Bay), Manus, New Britain and the Solomon Islands (Bougainville, Vella Lavella, Rendova, S. Christoval) have yielded a few specimens—mostly in coll. Tring Mus.

NEW PALAEARCTIC GEOMETRIDAE.

By LOUIS B. PROUT.

SUBFAM. STERRHINAE

1. Sterrha aversata indeviata subsp.n.

♂, 29–30 mm. Ground-colour as in the palest forms of *a. aversata* Linn. ——*Forewing* with median line anteriorly straight, almost as oblique as termen, crossing the cell-dot; postmedian much less bent than in *a. aversata*; no band between median and postmedian.——*Hindwing* with median line straight, or almost so, considerably proximal to the cell-dot.——In addition, the termen of both wings is slightly more sinuous than in most *aversata*.

Algeria: Hammam Rirha, 19–23 June 1916 (V. Faroult), type in coll. Tring Mus. Tunis: Aïn Draham, 6–19 August 1911 (V. Faroult), 2 ♂♂ in the same collection.

SUBFAM. LARENTIINAE

2. Ecliptopera mactata placata subsp.n.

♂♀. Distinguished from *m. mactata* Feld. (1875, Japan) as follows: *Forewing* with the antemedian white line bilobed rather than biangulate, the projections being shorter and blunter, usually well separated from the median; postmedian with the central prong looking broader, being as near the termen behind M^1 as before it, faintly incurved at M^1; subterminal formed of conspicuous white spots.——*Hindwing* with the postmedian more proximal anteriorly, more direct from costa to M^2, sharply outbent to fold.

China, very widely distributed, the type ♂ from Ningpo, July 1886 (native collector) in coll. Tring Mus., together with a specimen from "West China." I have it from Wenchow and Kiukiang, the British Museum from Moupin, the Hill Museum from Hunan, Central China, 4 examples.

3. Earophila semna sp.n.

♀, 42 mm. Best comparable with *Coenotephria* (!) *malvata* (Ramb.), but on the present tentative system of classification an *Earophila* (*vide L'Amat. Papil.* iii. 222, No. 16, where—as is shown by the context—"avant" is a misprint for "après"). Wings even broader than in the species named, the forewing having the costal margin more shouldered at the base, the hindwing the termen slightly more convex. Face without cone. Palpus nearly 1½. Antenna pubescent. Head and body concolorous with wings.

Forewing with termen markedly crenulate, except between apex and R^1; glossy russet, somewhat dulled by dark dots on the veins, especially in the areas on either side of the central; basal area slightly more tawny; apical dash short and weak, hardly more oblique than termen; cell-dot enlarged into a small spot, indistinctly ocellated; lines grey (dark gull-grey to slate-grey), with a tinge of blue; subbasal as in *malvata* or slightly more excurved; antemedian rather indistinct, about as in *malvata*; rounded median spots best developed posteriorly; postmedian proximally very finely white-edged from

costa to near R^1, more broadly dark-edged between the radials (here inbent) and again behind M^2, very weak and not greatly projecting between R^3 and M^2; subterminal paler from costal margin to SC^4, then weak, very near termen; terminal line indistinct, interrupted by minute whitish vein-dots; fringe with pale basal line very fine.——*Hindwing* with the tooth at M^1 longest; DC^1 strongly biangulate; colour as in *C. malvata* or dark *E. badiata* (Schiff.); a small blackish cell-dot; postmedian line brown, fairly distinct, with a strong outward curve culminating at the medians; terminal line and fringe as on forewing.

Underside browner than in *malvata*, more glossy, a great part of the forewing (except anteriorly) weakly marked and slightly more vinaceous; both wings with cell-dot, postmedian line (that of forewing weak) and fine terminal line; some other markings indicated, especially—on hindwing and anterior part of forewing—a narrow pale band outside the postmedian and double series of dark subterminal vein-dots, somewhat recalling a *Triphosa*.

Algeria: Hammam-Meskoutine, 2 February 1911 (W. Rothschild and E. Hartert), type in coll. Tring Mus.

4. **Carige cruciplaga debrunneata** subsp.n.

♂♀. Colour grey, less brown-tinged than name-typical *cruciplaga* Walk. (1861),[1] the wings slightly more angular, the excision in the termen of the hindwing generally appreciably deeper; the black markings which accompany the postmedian less variable than in *C. cruciplaga*, more uniform, scarcely ever much enlarged.

W. China, fairly common, the type from Pu-tsu-fu, 8,000–10,000 feet, July 1890, in coll. Tring Mus.

Unfortunately the specimen figured in Seitz, *Macrolep.* iv, t. 7 f., as *duplicaria*, belongs to this race and not to that of E. China; it is a ♂ from Omei-shan in coll. L. B. Prout.

Subfam. **GEOMETRINAE**

5. **Erannis miracula** sp.n.

♂, 44 mm. Considerably larger than *leucophaearia* Schiff. and its Japanese race *dira* Butl. (1878). Palpus scarcely so minute, though shorter than in *bajaria* Schiff.; tongue slight, as in those species. Antenna similarly pectinate, but with only two or three apical segments non-pectinate.

Forewing much broader than in *leucophaearia*, with costal margin more rounded; SC^1 short-stalked with SC^2, anastomosing with C; DC^2 longer than DC^3, its hinder part (behind the cell-fold) somewhat oblique outward, DC^3 again vertical; light brown, with cloud between postmedian and subterminal more as in *bajaria* than in *leucophaearia*, markings approximately as in *leucophaearia*; median line well developed, nearly straight; postmedian with its sinuses rather shallower than in *leucophaearia*, the second outward one at or behind, not in front of, M^2; subterminal nowhere enlarged into spots, its anterior half strongly dentate, its posterior slightly thicker and less deeply dentate.——*Hindwing* ample, recalling that of *defoliaria* Cl.; C anastomosing with SC for a good distance at middle of cell; cell-dot strong, the vague line from it to

[1] "Penang" must be an erroneous locality; the type, though in poor condition, seems clearly to belong to the collective species *duplicaria* Walk. (1862) = *nigronotaria* Brem. (1864), apparently the Japanese form. No Malayan material is yet known in the group.

abdominal margin at least as straight as in any *leucophaearia*, without the outward bend and thickening at its posterior end which characterizes *l. dira*.

Tokio, 22 February 1891 (Fritze), 2 ♂♂ in coll. Tring. Mus., the paratype labelled "Oaji" (?)—somewhat illegible and no such name traceable, but as both were taken on the same day it must be in the neighbourhood of Tokio.

The peculiarities of venation (biangulation of DC of forewing and especially anastomosis of C of hindwing) might suggest the need for a new genus, but *Erannis* is notoriously unstable in venation and there can be no doubt whatever as to the general affinities of *miracula*. I have seen *E. defoliaria* with DC of the *hindwing* biangulate; the subcostals of the forewing are in both the *miracula* as in the very great majority of *E. marginaria* Fb. and *aurantiaria* Hb.

6. **Erannis ectroma** sp.n.

♂, 47 mm. Head and thorax above orange-buff, the rest of the body somewhat less bright. Antennal structure about as in *defoliaria* Cl. or with the fascicles scarcely so long.

Forewing slightly broader than in *defoliaria*, the termen with a similar, or somewhat more pronounced, concavity between R^5 and fold; SC^2 out of SC^{1+3} near its base, slightly curved at its origin, exactly as in a specimen of *E. ankeraria* (Stgr.) before me; rather pale orange-yellow, irrorated with brownish drab, perhaps least strongly on the median area, or especially between the median and the postmedian line; antemedian line of a similar drab, slightly curved anteriorly, then straight, attended by a dusky suffusion proximally; postmedian darker, rather firm, arising from costa 5 mm. from apex, oblique outward to C, then oblique inward, though slightly less so than termen, with a similar gentle inward curve in its middle part, 4 mm. from termen at SM^2, somewhat incurved at hindmargin, a narrow shade outside it indicated by a slight reddening of the ground-colour; a weaker median line, slightly nearer to ante- than to postmedian, arising from a costal diffusion; fringe unspotted.——*Hindwing* as in *defoliaria*, but rather more rounded apically.

Forewing beneath similar but rather duller; hindwing more irrorated than above and with traces of curved postmedian line.

S. Ussuri: Anutshino, 100 km. from Nikolsk, June 1908. Type in coll. Tring Mus.

This must be near to *jacobsoni* Djakonov (*Ann. Mus. Zool. Ac. Sci. U.R.S.S.* xxvii. 223), possibly a local race of it. According to its author's careful description, *jacobsoni* must differ in its more produced apex, paler forewing, especially at termen, differently formed postmedian line, etc. The genitalia, so far as can be made out without dissection, favour *jacobsoni*; at least the ventral margin of the valva follows a closely similar course. The unique type of *ectroma* is asymmetrical, the right forewing being slightly undersized and with distorted venation and lacking the cell-spot both above and beneath.

7. **Cleora aechmeëssa** sp.n.

♂, 30 mm.; ♀, 38 mm. Face and palpus blackish fuscous, the palpus little over 1, with second joint moderately rough-scaled, third quite small. Antenna in ♂ shortish, with rather long, moderately stout pectinations, the last 7 joints merely ciliate; in ♀ nearly simple. Fillet and crown whitish, with

some irroration. Thorax and abdomen concolorous with wings, the abdomen dorsally with traces of paired dark spots. Legs predominantly pale; hindtibia of ♂ not or scarcely dilated, apparently without hair-pencil.

Forewing with termen smooth, gently rounded, moderately oblique; SC^1 from SC^2 near its base, anastomosing with C; fovea in ♂ strong; dull white, copiously irrorated with grey-brown, the ♀ only slightly whiter than the ♂—coloration about as in *Boarmia punctinalis* (Scop.) or *Aethalura punctulata* (Schiff.) ♀; antemedian line sharply angled close to costa, excurved in cell, rather oblique inward to hindmargin, with slight indentation on M; cell-mark elongate but weak, especially in the ♂; median shade marked by a heavy costal spot opposite the cell-mark and a smaller spot or dot at base of M^1, otherwise weak, sinuous; postmedian rather nearer to cell than to termen, nearly parallel with the latter except in front of R^1, where it recedes slightly; shallowly (at fold deeply) lunulate inward between the veins and with black teeth outward on the veins, on SC^5 rather thick, on R^3 small, on SM^2 moderate, on the four principal veins sharp; the succeeding band-like grey-brown shading irregular, broadest and strongest between R^3 and M^2; the white subterminal dentate, not very conspicuous, but with the usual proximal dark shading between the radials (here confluent), at costa, and between fold and tornus; terminal dots strong, subtriangular; fringe pale, weakly marked.——*Hindwing* with termen rounded, waved; cell-mark obsolescent; a rather weak median line, curved outward at abdominal margin; postmedian of forewing continued, strongly oblique outward behind the submedian lunule; markings of distal area rather weak but more regular than on forewing; similar terminal dots and fringe.

Both wings beneath with cell-mark (on hindwing rather broad), postmedian line (less black than above) and traces of the other markings, notably the mid-costal spot of forewing.

Japan: Chusendji Lake, above Nikko, 3 September 1910 (E. A. Cockayne), type and allotype in coll. L. B. Prout, kindly presented by Dr. Cockayne. I have discovered 1 ♀ from Tokio in the British Museum collection mixed with *leucophaea* Butl. (!), but know of no other examples. In structure it is near *obliquaria* (Motsch.) auctt., but in aspect it much more recalls an *Ectropis* or the South African *Boarmia ectropodes* Prout (1913). Probably nearest to *Cleora simpliciaria* (Leech, 1897), palpus shorter, wings slightly broader, forewing with anastomosis of SC^1 stronger, postmedian line less bent, etc.

8. **Gnophos variegata rothschildi** subsp.n.

♂, 24 mm. Distinguished by its small size, typically orange-cinnamon ground-colour, and copious blackish strigulation, only leaving the brighter colour at all obvious in parts of the median area. Hindwing with the termen only feebly crenulate. Underside less sharply marked than in most forms of the species.

Marocco: Tedders, Upper Bou-Regreg, 19 April–1 May 1924 (E. Hartert & F. Young), type in coll. Tring Mus.; Djebel Chedar, 16 hours S.E. of Mazagan, end of February 1902 (W. Riggenbach), 1 ♂, worn, also in coll. Tring Mus.; Mrassine, March–May 1921 (H. Powell), a good series in coll. Brit. Mus., ex coll. Oberthür.

The Tedders example is recorded by Lord Rothschild (*Bull. Soc. Sci. Nat. Maroc*, v. 147, 1925) as *Gnophos variegata* Dup. It is, as he noticed, extraordinarily like some dark forms of *mucidaria ochracearia* Stgr. except in the

build of the antenna ; the Mrassine series shows moderate variation, but lacks the sharp colour-contrasts of *v. variegata*.

Zernyia gen.n.

Face not protuberant, appressed-scaled. Palpus short, shortly rough-scaled beneath. Tongue short. Antenna less than one-half length of forewing, in ♂ bipectinate to apex or almost, with long branches, in ♀ sometimes shortly bipectinate. Pectus somewhat hairy. Foretibia without claw. Hindtibia not dilated, all spurs developed. Abdomen in ♂ slender, in ♀ moderately robust. Wings in both sexes fully developed ; frenulum and retinaculum normal.——*Forewing* with termen moderately oblique, waved, gently curved ; cell $\frac{1}{2}$, DC normal ; SC^1 and SC^2 free, from cell, or occasionally shortly stalked, M^1 well separate from R^3.——*Hindwing* with costal margin moderately long, termen subcrenulate in anterior half ; cell $\frac{1}{2}$ or nearly ; C approximated to SC to about middle of cell, rapidly diverging, SC^2 separate, R^2 wanting, M^1 well separate.

Type of the genus : *Zernyia enconistoides* (Zerny) = *Gnophos enconistoides* Zerny (1927).

Differs from *Dyscia* in the shape, the less aborted tongue and other details, from *Enconista* in the absence of foretibial claw and of fovea, from *Selidosema* in absence of fovea, reduction of tongue and continuation of the antennal pectinations virtually to the apex, from *Gnophos* in the stronger pectinations (sometimes also transferred to the ♀), the non-protuberant frons and reduction of tongue. The genitalia lack the costal arm of the "*Gnophinae*" of Pierce (approximately equivalent to the genus "*Crocota*" of Meyrick), but have an extended "costa," strongly spined distally, blunt uncus, and stout aedoeagus.

9. Zernyia selidosema sp.n.

♂♀, 35–40 mm. Differs from *enconistoides* Zerny, from Spain, in having the pectinations of the ♂ antenna longer, but with 2 or 3 segments non-pectinate, the ♀ antenna less strongly dentate.——*Forewing* with slight indications of a fovea ; ground-colour less pure grey, more drab or tinged with avellaneous ; irroration less coarse ; postmedian line (row of dots) rather more distally placed ; macular band between postmedian and subterminal less complete, variable, in the type ♂ and the allotype strongest between the radials and posteriorly, in the second ♂ almost obsolete.——*Hindwing* with the postmedian less proximal than in *enconistoides*.

Algeria : Glaciers de Blida, 12 August 1907, type ♂, 15 September 1911, 1 ♂, both in coll. Tring Mus. ex coll. Capt. Holl, together with a ♀ from the same collection, without locality label.

The genitalia, so far as can be made out without dissection, differ very little from those of *enconistoides*, but apparently the valva has the costal part of the costa rather less strong and lacking the first projection, though both agree in having a central tooth or small prong.

10. Zernyia gnophoides sp.n.

♂♀, 36–40 mm. Pectinations of ♂ antenna about as long as in *Z. selidosema* (*supra*) but continued to apex ; ♀ antenna also pectinated, except apically, the longest branches about 2. At least as *Enconista*-like as the genotype, but

perhaps also comparable, as Oberthür assumed, to *Gnophos crosi* Th.-Mieg (= *omararia* Oberth.) or rather to some forms of *Gn. mucidaria ochracearia* Stgr., the whitish ground-colour being tinged with flesh-colour or vinaceous-pink, especially costally, the grey (in some aspects slightly olivaceous) irroration exceedingly dense and interspersed with blackish scales, the cell-spots above and beneath enlarged (at least on forewing; on hindwing often obsolescent above), vaguely ocellated, all three lines arising on the forewing from blackish costal spots, the median line very weak, rather variable in position, the post-median placed about as in *enconistoides*, generally rather better developed; distal area without conspicuous darkening, except occasionally on underside.

Algeria: Aflou, Oran, 3 October 1911, type ♂ and allotype ♀ in coll. Tring Mus., ex coll. Holl. Also a long series from Aflou, September 1911 (H. Powell) from Oberthür in coll. Brit. Mus., labelled "*Gnophos ? omararia ?* (spec. ?)," and 1 ♀ from Géryville, September 1910 (H. Powell).

In the allotype ♀ and a few other examples SC^1 and SC^2 of the forewing are shortly stalked; occasionally, also, SC^1 anastomoses at a point with C.

11. **Zernyia annularis** sp.n.

♂♀, 36–40 mm. Structure about as in the preceding, forewing slightly longer and narrower, its straightish or subsinuate costa sometimes recalling a *Dyscia*. Ground-colour with similar fleshy tinge to that of *guophoides*, irroration much less dense, except in the distal area, where the cloudings, in strongly-marked specimens, resemble those of *enconistoides*; cell-marks further enlarged, especially on forewing, where a definite ring is formed (sometimes filled-in on the underside); costal spots undeveloped, though one strongly-marked ♀-ab. shows a blurred one just proximal to the cell-spot; apex of forewing pale. Underside characteristic, paler than upper, not or scarcely irrorated, lines obsolete, cell-spots or rings on both wings strong, subterminal shades strong, in places extended to termen, forewing with a sharply whitish, quadrate apical spot, which is usually well isolated from the rest of the pale terminal shading.

Algeria; Metlili, N. of Laghouat, 4–6 September 1917 (V. Faroult), 2 ♂♂, 3 ♀♀ in coll. Tring Mus.

The subcostal venation of the forewing is somewhat variable; in 1 ♂, SC^1 and SC^2 are shortly stalked, in 1 ♀ SC^1 anastomoses with C.

A slightly shorter-winged form from Batna (A. Nelva) measures 34 mm. and has the upper surface rather more uniformly irrorated, the under with the subterminal shades less strong, on the hindwing evanescent, and suggests a possibility that *annularis* may prove a local modification of *guophoides*. I propose for it the name of **Zernyia annularis nelvai** subsp.n. 3 ♂♂ in coll. Tring Mus. It superficially recalls *Enconista amoritaria* Püng. (1902).

12. **Siona galactica** sp.n.

♂, 46 mm. Head and front of thorax cream-colour to Naples yellow. Palpus more uniformly clothed than in *lineata* Scop.; ochraceous tawny, the projecting hair of 1st joint paler. Antenna and forecoxa ochraceous tawny.

Forewing with costa appreciably less arched near base than in *lineata*; very pale cream-yellow, entirely without markings, only the strongest veins (M and the proximal part of its branches) faintly browner.——*Hindwing* white, unmarked, at apex and part of termen faintly tinged with cream-yellow.

Underside very pale cream-yellow, the forewing becoming white behind M and M^2 and with a strong suffusion of dirty greyish red-brown in cell and on veins R^3, M^1, and M^2; traces of a slightly darker cell-dot also discernible on forewing.

Algeria: Souk-Ahras, 13 and 14 April 1914, type and another, both in Tring Museum, collected by Lord Rothschild and Dr. K. Jordan.

13. **Angerona prunaria turbata** subsp.n.

♂, 48–58 mm.; ♀, 58–74 mm. On an average larger than *p. prunaria* Linn. Ground-colour similar, or only very slightly less warm; strigulation stronger, with the strigulae in part long; cell-marks in general narrower, in the ♀—especially on the hindwing—often shortened or even obsolete; apical or terminal dark streak of forewing nearly always obsolete.

Japan, from Tesio to Yokohama; type ♂ from Asamayama, 18 July 1898, in coll. Tring Mus.

14. **Deuteronomos fuscantaria algeriensis** subsp.n.

♂, 35–37 mm. Similar to some of the small, pale S. European aberrations of *f. fuscantaria* Haw. with weak distal cloudings and little-darkened hindwing beneath, but with the lines of the forewing more widely separated and parallel in posterior part, the postmedian only in one example with the posterior curve inward of normal *fuscantaria*, in the other two examples almost meeting the first line of the hindwing, which is visible above; second line of hindwing crossing the cell-spot.

Algeria: N. side of Mt. Zacear (Miliano), 5 August 1910, the type, and 3 August 1910 (V. Faroult); Sebdou, Oran, 6 July 1918 (P. Rotrou); all in coll. Tring Mus.

Although the differences from some forms of this variable species are slight, the general impression is so different as to warrant the belief that we are dealing with a local race. In any case they are so very distinct from the name-typical British race that it is impossible to merge them under a common designation. The venation is, as usual in *Deuteronomos*, variable; in the type, SC^1 and SC^2 are very shortly stalked, the former anastomosing strongly with C, the latter (which is proximally slender) anastomosing slightly with C before the separation of SC^1 therefrom; in the others SC^1 and SC^2 arise separately and SC^1 anastomoses at a point or minute bar (topotype) or more strongly (Sebdou example) with C and with SC^2.

15. **Deuteronomos infidelis** sp.n.

♀, 46–48 mm. Nearest to *erosaria* Schiff. Larger. Antennal pectinations rather less rudimentary.——*Forewing* appreciably narrower, termen excavated between apex and R^2, the prong broadened (embracing R^2 and R^3), the excavation between R^3 and M^1 deepened; R^3–M^1 well stalked (their stalk about 2 mm. long); the lines rather heavy, somewhat less approximated than in normal *erosaria*, the antemedian more acutely angled near costa; an extensive apical region suffused with vinaceous-fawn and more or less strongly dark-irrorated. ——*Hindwing* with the tooth at R^3 rather long; SC^2–R^1 stalked (their stalk at least 2 mm. long); the line (except costally) better expressed than in most *erosaria*, more oblique, well curved behind R^2; irroration moderate (type) or

traceable (paratype).——Underside with the irroration coarse or strigulate; lines of forewing rather strong, that of hindwing lost posteriorly but continued to costa, oblique inward in front of C.

Amur: Chabarovsk, 22 July (type) and 14 July (paratype) 1910 (E. Borsow), both in coll. Tring Mus.

16. **Deuteronomos lissochila** sp.n.

♂, 35 mm. In essential structure entirely conformable to the already known species. In its small size, weak markings, and whitish edging to the true lines nearest to *quercaria* Hb. Termen of both wings almost smooth, only with faint sinuosity which results in a scarcely noticeable prominence at R^3. ——*Forewing* with the long stalk of $SC^{1,2}$ anastomosing slightly with C, DC deeply incurved, M^1 connate with R^3; colour nearly as in *quercaria*, or slightly more greyish; markings much as in the weakest-marked aberrations of that species, the lines being scarcely darkened except at costa; their course scarcely so parallel as in most *quercaria*.——*Hindwing* beneath with the pale line just distal to the small cell-dot.

Cyprus: Platres, 4,000 feet, 30 July 1916 (G. F. Wilson). Type in coll. Tring Mus.

The type is unfortunately worn, but the species is extremely distinct in shape and cannot fail to be recognized. I have seen other examples, collected on Cyprus by Capt. K. J. Hayward, but they are no longer accessible to me; my note states that they were "very grey," as compared with the ordinary coloration of *Deuteronomos*.

17. **Eumera mulier** sp.n.

♀, 49 mm. Head and body concolorous with wings; the face, except at its edges, mixed with a yellowish shade akin to that of the face of *regina* Stgr. (1892). Antennal pectinations about as in *regina* ♀ or scarcely so long (only a short proximal part of each remains intact).

Forewing broader than in *regina*, apex similarly produced, termen less waved than in even the ♀ of *regina* and less oblique behind the slight bulge; SC^1 connate with SC^2 (probably an individual aberration), connected by a bar with C, SC^2 anastomosing at a point with SC^1 and with $SC^{3,4}$; almost unicolorous vinaceous cinnamon, faintly mixed with olive-yellowish at costa; antemedian line faint, apparently as in the most oblique-marked *regina*; postmedian olive-grey, placed rather nearer the termen than in *regina*, definitely curved in its anterior part (4·5 mm. from termen at R^3, just over 5 mm. at costal margin); a pale line accompanying the postmedian distally, recalling that of *Colotois pennaria* (Linn.) but rather more buff; fringe rather deeper red, with a pale line proximally and white tips.——*Hindwing* with the terminal teeth slighter than in *regina*, that at R^3 scarcely stronger than the others; pale anteriorly, otherwise concolorous with forewing; postmedian line indicated in posterior half; fringe nearly as on forewing.

Underside rather paler, both wings becoming whitish behind fold; postmedian line of forewing reproduced, but darker grey, on the veins almost black; that of hindwing scarcely indicated, but closely followed distally by a curved series (continued at C) of dark grey vein-dots; fringes nearly as above.

Cyprus: Nicosia (J. A. Bucknill), 1 ♀ in coll. Tring Mus.

ON SOME GEOMETRID TYPES FROM THE STAUDER COLLECTION.

BY LOUIS B. PROUT.

IN incorporating into the Tring Museum some interesting material recently acquired by Lord Rothschild from that indefatigable collector and student of the Lepidoptera of the Adriatic countries, Hermann Stauder, of Castellrotto, I have had to face the question of the status of a number of ostensible "types," and Dr. Jordan considers it desirable, for the avoidance of possible confusion later, to place the results on record. It is evident that Herr Stauder has not realised the necessity for a single holotype in the case at least of species and subspecies, but has often labelled several specimens, or even an entire series, indiscriminately "type," leaving it to others to choose the "lectotype." The following notes cover the forms with which I have had to deal.

Aplasta ononaria (Fuessly) f. *squamata* Stauder, *Int. Ent. Zeits.* xiv. 35 (1920). A ♂ of the South Tyrol race (?) *spinosaria* Dannehl (1926) is labelled "*squamata* Stdr.," but the somewhat involved description seems to imply that the ab. should lack the transverse lines, which is by no means the case in this specimen. I have therefore not labelled it type, but have added the date to Stauder's label.——f. *monotonia* Stauder, *ibid.* Two fine Noghera ♀♀, 15 and 24 May 1917, bear this name, and in the absence of evidence to the contrary, I have assumed the later of them to be holotype.——f. *trifasciata* Stauder, *ibid.* I find no specimen thus labelled, but a ♀ from Muggia, near Trieste, has the median shade sufficiently well indicated to be referable to this ab.

Odezia atrata (Linn.) f. (? subsp.) *dalmatina* Stauder, *Int. Ent. Zeits.* xiv. 36 (1920). Founded on one ♂ and one ♀ from Dernis, 10 June [1908], both rather worn. The ♀ was merely labelled "*dalmatina* Stdr.," and I have made it allotype; the ♂ has been parted with elsewhere.

Pseudoterpna pruinata (Hufn.) f. *candidata* Stauder, *ibid.* Founded on two ♀♀, Trieste district, 6 and 14 June [1911]. The former is in the collection, labelled "*candidata* [sic] Stdr." and has been selected holotype.

Comibaena pustulata (Hufn.) f. *stigmatisata* Stauder, *ibid.* The unique type—a small ♀ from Trieste, Triestenicco, 4 June—is not in the collection.

Ortholitha chenopodiata (Linn.) = *limitata* (Scop.). Of the Salzkammergut material discussed by Stauder (*Ent. Anz.* ii. 81–2, July 1922) there remain in the collection a ♂ and two ♀♀ from Hallstadt and three pairs from Wels. Variable, though much less so than would be inferred from the article cited; probably the best aberrations have been dispersed for exchange purposes. A tendency to the development of the sharply marked forms (ab. *plurimelineata* Stauder, *loc. cit.* 82) is observable, at least in the ♀♀, one of which, from Hallstadt, bears a label with that name, but is not outstanding enough to deserve treating as "type."

Ortholitha moeniata (Scop.) *carsicola* Stauder, *Int. Ent. Zeits.* xiv. 36 (1920). Founded on two pairs from Rakitovic, interior of Istria, 1000–1200 m., 31 July

[1913]. The ♂♂, including, I suppose, the holotype, have been disposed of, but one of the ♀♀ (allotype) is labelled "*carsicola* Stdr."

Ortholitha bipunctaria (Schiff.) *hellwegeri* Stauder, *Deutsch. Ent. Zeits.* 1924, p. 29. A fine pair of the original series (dated 25 July [1913]) remain in the collection, the ♂ labelled "Hellwegeri Stdr." This has been selected as holotype, as the series of five has merely a comprehensive heading "*bipunctata* ss. *hellwegeri* Stdr. Typen."

Cidaria designata (Hufn.) f. [ab.] *hafneri* Stauder, *Int. Ent. Zeits.* xvii. 113 (Nov. 1923). Founded on 1 ♂, 1 ♀ from Crna Prst, Carniola, 17 July, 1910, 1300 m. (J. Hafner), suspected of being a local race. The ♂, which I assume to be holotype, has been disposed of; I have labelled the ♀ "allotype."——f. [ab.] *binderi* Stauder *ibid.* The unique type, a ♂ from near Ambras (Innsbruck district) remains in the collection.

"*Larentia*" *veuberata* [err. pro *verberata* (Scop.)] f. *bifasciata* Stauder, *Ent. Anz.* ii. 93 (Aug. 1922). I have made the labelled specimen holotype, but the ab. is scarcely more worthy of serious consideration than the somewhat analogous *Ortholitha chenopodiata* ab. *plurimelineata* (*supra*).

"*Larentia*" *caesiata* (Schiff.) ab. *mediodivisa* Stauder, *Ent. Anz.* ii. 83 (July 1922). Founded on two ♂♂. One of them, Dachstein, 1800 m., 23 July, 1917, is labelled "type," and I treat this as holotype.——ab. *hauderi* Stauder, *ibid.* The unique type ♂ has, I suppose, been parted with. A very similar ♂, Dachstein, 1800 m., 23 July, 1917, labelled "*caesiata* aber.," has the base not strictly concolorous, the median band not materially narrowed, and therefore can only be the specimen in question if the description is rather loose; on the other hand, if the series contained two of approximately this form it is curious that Stauder did not mention a second one.

[*Larentia bicolorata* (Hufn.) =] *Plemyria rubiginata* (Schiff.). Stauder has analysed the Innsbruck forms in *Int. Ent. Zeits.* xvii. 92 (Sept. 1923). The tendency towards a diminution or loss of the terminal smoky clouding of the hindwing (f. *rosarium* Stauder) is certainly very general, but I do not think we have here a well-defined race. The type is a good ♂, so labelled by its author and now in coll. Tring Mus.; it is actually, however, one of the "Kombinationsformen" mentioned on p. 93, having on the forewing the dots before and behind SM^2 on which is founded ab. *diadelphata*, the type whereof is not found in the series, though some half-dozen out of the eleven originals represent it, in more or less strong development. Form. *peralbata* Stauder, founded on 16 examples (sex not stated), seems to be the ♀ corresponding to f. *rosarium*, though it is very rarely, if indeed ever, that the hindwing above is literally without "any" trace of the subterminal band; the type is present, in beautiful condition, and is also one of the "Kombinationsformen"—"*peralbata* + *parvula* Retz."

["*Larentia autumnalis*" =] *Hydriomena coerulata sanfilensis* Stauder, *Zeits. Wiss. Ins.-Biol.* xi. 5 (January 1915). Founded on three ♂♂, near San Fili, 6 June [1913]. None of them remain in the collection.

Schistostege deeussata transiens Stauder, *Soc. Ent.* xxxv. 17 (May 1920). Founded on ample material from the Trieste district, Altipiano (Opcina—Prosecco), early June. A considerable part of the series has been dispersed and neither of the remaining ♂♂ (two labelled "Opcina—Prosecco, 12.vi.1914" and "Opcina, 8.vi.1911"—I exclude an Opcina aberration of the latter date which bears a label "*transiens* aberrat.") is specially labelled. The types of

ab. *praeclara* Stauder, *Boll. Soc. Adr. Sci. Nat.* xxvii. 164 (1913) and ab. *marginata* Stauder, *Iris* xxix. 32 (1915), both from Opcina, are in the collection.

Hydrelia testaceata (Don.) f. *deochrata* Stauder, *Ent. Anz.* v. 51 (1925). Founded on a rather prevalent Innsbruck aberration (not race). A good ♀, to which was attached a label "*testaceata* ss. *deochrata* Stdr. Typen," has been selected as holotype.

Minoa murinata ab. *lactearia* Stauder, *Ent. Anz.* ii. 82 (July 1922). The type—a ♀, not "♂" as printed—is in the collection and is in fairly good condition, although it may be questioned whether it would have been quite as pure white if fresh from the pupa.

["*Sterrha*" =] *Rhodometra sacraria* (Linn.) var. *desertorum* Stauder, *Zeits. Wiss. Ins.-Biol.* x. 173 (1914). "Typen (!), 5 ♂♂, 6 ♀♀, Biskra, El Kantara, V [= May] in meiner Sammlung (Fig. 13 ♂)." Assuming the quoted month to apply to all, only two out of the eleven potential "types" remain in the collection, both of them ♀♀ of *Rh. antophilaria consecraria* (Ramb.) Stgr. from Biskra, 12 May, 1912. In addition, however, there are two ♂♂ of a later generation of *sacraria* (El Kantara, beg. September 1912) which must have been in the author's possession when he wrote, and therefore probably belonged to the original series. One of these latter bears a pencilled label "*sacraria desertorum*." There can be little doubt that Stauder confounded the two allies, as they stood together in his collection, and there is no mention of *antophilaria* in his article ("Lepidopterologische Ergebnisse zweier Sammelreisen in den algerischen Atlas und die nördliche Sahara"). His description in most points speaks for *antophilaria consecraria*, but his figure seems to represent a summer-brood *sacraria* and apparently has—like the September El Kantara examples—a red base to the costa, which the type form lacked. He evidently used the word "varietas" in the Staudingerian sense of a local race, as he adds after his diagnoses "Atlasstücke nähern sich etwas den südeuropäischen." Of these latter, 1 ♂ and 1 ♀, both labelled "Alg. Atlas, Constantine, 7.v.1912," remain in the collection; the ♂ is a fairly normal, rather dull-lined *sacraria*; the ♀ an *antophilaria consecraria*, a trifle larger and brighter than the larger of the Biskra, but quite similar.

It should be added in reference to the *antophilaria* group of *Rhodometra*, which has never been adequately worked out, that I have followed Culot—Staudinger is non-committal—in treating the North African race as identical with the Andalusian; Rambur figures the aberration, which is much the rarer in North Africa, with clouded hindwing and reddish admixture in forewing, and I have not yet been able to study Andalusian material.

Eumera regina ab. *decoronata* Stauder, *Boll. Soc. Adriat.* xxv. 164, t. 2, f. 10 (1913). Zara. The type is not in the collection, though there are three typical specimens of more recent date from that locality, besides an undated ♂ from Spalato, which I assume to be transitional—the white spot in cellule 3 of the forewing reduced, weak, that of cellule 2 wanting.

["*Scoria*" =] *Siona lineata oenotriensis* Stauder, *Zeits. Wiss. Ins.-Biol.* xi. 6 (Jan. 1915). Founded on a long series (28 ♂♂, 16 ♀♀) from chestnut woods near San Fili, Calabria, 900 m., collected, according to the handwriting on the labels, on "6.6.1913," according to the published article "5.vi"—probably in reality some on each of two similar excursions (*op. cit.* x. 267). In conformity with the all too general slipshod method, a comprehensive label

"*oenotrensis* [sic] Stdr. Typen" is attached to one ♂, and this not a specially characteristic one. The given expanse, "38–46 mm." (Continental measurement), seems to indicate that the largest specimens were sent away, as the 9 ♂♂ and 1 ♀ of the original series which have come to Tring run from 38 to 44 mm. by this system; "26–29 mm." for the length of a forewing is an evident lapse or misprint, probably for "21–24." Assuming that a holotype has not yet been selected, I have chosen a good ♂ with a forewing length of 22·5 mm.

"*Venilia*" *macularia aureoadflava* Stauder, *Zeits. Wiss. Ins.-Biol.* xi. 6 (Jan. 1915). Founded on "6 ♂♂, 2 ♀♀" from Monte Martinello, Calabria, 600–1000 m. The Tring series, however, has three males and *three* females, all collected together (6 June, 1913), so that the published figures must be inexact. One ♀ is labelled "*aureoadflava* Stdr. typ." and I have treated this as allotype.

Chiasmia glarearia (Brahm) f. *schawerdae* Stauder, *Int. Ent. Zeits.* xiv. 38 (June 1920). Two ♂♂ (perhaps the only two—the number is not stated in the publication) are in the collection, both labelled "*schawerdae* Stdr."; the more strongly marked, from Dalmatia (Marjan, 4 June 1908) is in beautiful condition and I have labelled it holotype.——f. *aurearia* Stauder, *ibid.* 39. "Illyro-Adriatica," without more exact indication, erected as "f.n. (partim subsp.)," is differentiated by its deeper yellow, honey- to light gold-yellow ground-colour. Two ♂♂ (Salcano and Görz) and one ♀ (*sine loc.*) are labelled with the name, the two latter being of an aberration with only the median line well developed. I have not treated the Salcano ♂ as holotype.

Chiasmia clathrata (Linn.). In a first note (*Zeits. Wiss. Ins.-Biol.* xi. 6, Jan. 1915) Stauder refers to a splendid series from the Cocuzzo district and the Sorrentine Peninsula (beginning of June), including one ♀ Sorrent transitional to *nocturnata* Fuchs, 2 ♂♂ and 1 ♀ Sorrent of f. *cancellaria* Hb. and 2 ♂♂ Monte Martinello of f. *aurata* Trti., one almost perfectly but with some white remaining in the fringes, the other more transitional. In the *Int. Ent. Zeits.* xiv. 38 (June 1920) he analyses anew his series of 180, almost all of southern origin, and names three smaller Monte Martinello ♂♂ of a less deep colour than *aurata* "f. *flaveola*" and four ♂♂ (Sorrent 2 July ["2.6" on the hand-written labels and see *supra*], Monte Martinello 6 June) with ground-colour deeper honey-yellow than in *flaveola* but not reaching that of *aurata*, the latticed markings heavy, "f. *wehrlii*." Two of the former and three of the latter remain in the collection, all labelled with their varietal names but only a *wehrlii* (Sorrentino) with the addition of "typ." I select this specimen as holotype.

Ematurga atomaria (Linn.) ♀—ab. *virilis* Stauder, *Int. Ent. Zeits.* ix. 16 (May 1915). Founded on 2 ♀♀ from Terlan, South Tyrol, July 1904. One is in the collection and I have labelled it paratype.——♀-ab. *nocturna* Stauder, *ibid.* The unique type ♀ is in the collection.——Subsequently (*Int. Ent. Zeits.* xiv. 37–38, June 1920). Stauder discussed the Mediterranean race *orientaria* Stgr. and named no less than six "forms" (aberrations) of it. His collection contains an extremely fine series.——f. *dentaria* Stauder, founded on 10 ♂♂ and 1 ♀ from the Adriatic littoral, is represented by three labelled ♂♂—one Opcina–Prosecco and two Wippach—but neither noted as "type," which has probably been disposed elsewhere.——♀-f. *pseudoglarearia* Stauder, said to be "not rare in the South," is only represented by a somewhat damaged ♀ from Noghera, which can hardly be claimed as holotype.——♀-f. *ealoraria* Stauder, with the ground-

colour pale yellow, sometimes almost as in the ♀, shows 5 ♂♂, none labelled "type."——♀-f. *fallax* Stauder, p. 38, is said to recall *Bupalus piniaria* Linn. in the sharp contrast between the pale ground-colour and the concentrated dark scaling about the apex. Of the two examples, the one first mentioned (Görz, 10 July [1909]) is present and I have labelled it holotype.——f. *ophthalmaria* Stauder, produced by a looping of the median line of the forewing with (outside) the cell-spot, is shown by several examples. A ♂ from Trieste and one "S. Tyrol" bear the name, which has no scientific importance.——f. *melanostigma* Stauder. The holotype, Trieste [Scorcola], 7 April [1911] is in the collection.

ON FLEAS COLLECTED BY DR. H. M. JETTMAR IN MONGOLIA AND MANCHURIA IN 1927 AND 1928.

By DR. KARL JORDAN.

(With Plates VII to X.)

THE species of Siphonaptera are evidently very numerous in Siberia and the adjacent districts of Asia. Although Drs. Wagner and Joff as well as ourselves have already described a good many species from that region, the collections dealt with in the present paper prove that the flea fauna has as yet only been sampled. As Dr. Jettmar, to whom we are much indebted for these valuable collections, has formerly sent us material from Transbaicalia, we are now in the position to study the geographical variation of at least some of the Palaearctic Asiatic species. The study of the transmission of diseases, which is so closely linked up with the knowledge of the Ectoparasites which act as vectors or which are potential vectors, we find to be of the greatest assistance to the systematist by furnishing material, a fact we gratefully acknowledge. On the other hand, the collectors of warm-blooded Vertebrates for systematic purposes, who should and might be the chief source of increase in our knowledge of the species of Ectoparasites, as a rule neglect to collect the Arthropods occurring on the mammals and birds obtained, lack of time frequently combined with a narrowness of outlook preventing the collector from going beyond the amassing of skins. Fortunately, there are pleasing exceptions.

The descriptions we give of new forms are as much as possible restricted to essentials sufficient for the purpose of identification and classification. Detailed descriptions will appear in the monograph. When giving the limits of variability, particularly in the case of bristles, it must be understood that the bristles have been counted only in a limited number of specimens and that therefore the numbers given are approximative.

I. Manchuria: Excursion to Tungliao in Southern Manchuria, November 1928.

1. **Ceratophyllus tesquorum sungaris** subsp. nov. (Pl. VIII, figs. 9 & 10, ♂♂).

Near to *C. t. mongolicus* J. & R. 1911; differs in the exopodite F being more rounded posteriorly, with the apical margin more slanting than in the various other known subspecies. Our figures represent extremes; fig. 10 taken from type of *sungaris*.

A series from: Sand dunes near Ta-Lin, on *Cricetulus arenarius* and in its burrow; sand dunes near Chendjatien, in burrows of *Spermophilus* (probably *S. mongolicus*); Tungliao, in abandoned burrow of *Spermophilus* or *Zapus*.

2. **Ophthalmopsylla kukuschkini** Joff 1927.

2 ♂♂ from sand dunes near Chendjatien, in burrows of *Spermophilus* (probably *S. mongolicus*); and 1 ♀ from the same place in nest of *Cricetulus griseus fumatus*.

The ♂♂ differ a little *inter se* and from Joff's figure. In one the lower of the subapical spiniform bristles is but slightly shorter than the upper, while in the second specimen it is nearly as much shorter as in Joff's figure. The bristles are more numerous than in the unique specimen described by Joff. On tergite VIII several of the long bristles are marginal, which is not the case in the nearly related *O. volgensis* Wagn. & Joff 1926.

VII. st. of ♀ with a broad shallow upper sinus, the angle above which is very obtuse and strongly rounded; the lobe below this sinus projects considerably, is broad and apically emarginate, with the upper angle strongly rounded, but extending as far backwards as the ventral angle, somewhat similar to Pl. VII, fig. 5.

3. **Ophthalmopsylla jettmari** sp. nov. (Pl. VII, figs. 3 ♀, 4 ♂, 5 ♀).

♂♀. Agrees in essentials with *Ophthalmopsylla* Wagn. & Joff 1926, but has the frontal tubercle rounded. Differs from all allied genera (or subgenera) in the frontal tubercle being close above the oral corner (fig. 4), in the metanotum bearing on each side 3 or 4 blackish apical spines, in the first hindtarsal segment equalling II to IV together, etc.

Head.—Bristles on frons 4 to 6, 3 or 4; on occiput anteriorly 0 to 2, usually 1, in middle 2 or 3. Proboscis reaching to middle or apex of trochanter.

Thorax.—Pronotal comb with 24 or 25 spines. On mesopleura about 20, exclusive of the rather numerous small ones at and near the upper anterior corner; on metepimerum from 18 to 26

Abdomen.—On tergites I to VII 3 rows, with additional bristles on the anterior segments and on VII; on III. t. in ♂ 46 to 57, 26 to 30, in ♀ 50 to 76, 26 to 30, on the two sides together; in ♂ 1 long and 2 short antepygidial bristles, in ♀ 3 of which the upper is shorter than the bristles of the posterior row of VII. t., the lower one being about one-third shorter than the middle bristle; apical margins of tergites I to VII minutely dentate, on I and II, or also on III, a blackish spine each side.

Legs.—On hindfemur about 20 subventral bristles on outer surface, arranged anteriorly in 2 or 3 rows. Hindtibia with more than 40 bristles all over the outer side. Hindtarsus peculiar in ♂: segment I dorsally at apex with about 7 long thin bristles and in subapical notch 3, the longest apical bristle stout and reaching close to apex of II; in subapical notch of II 5 and at apex 5 to 7 long bristles, all much thinner than the ventral apical ones, the longest dorsal bristle extending to or beyond apex of V; in ♀ the apical bristles of I and II stout, the longest of II not quite reaching to apex of IV.

Modified Segments.—♂: VIII. t. from stigma downwards with over 40 bristles. VIII st. ventrally reduced, extending obliquely upward-anad, ending with a broad membranous lobe which bears numerous small hairs, beyond middle of posterior margin a short projection bearing a pair of long slender bristles. Process P of clasper about $\frac{1}{5}$ shorter than anterior margin of exopodite; acetabular bristle on a short cylindrical projection. Exopodite F a little over twice as long as broad, nose of anterior margin above $\frac{2}{3}$, apical anterior angle 90°, hindmargin somewhat convex to $\frac{2}{3}$, where F widens, from this point to anterior apical angle the margin evenly curved, there being no posterior apical angle; just above middle of widened portion a stout, somewhat claviform spine of which the apex is curved down; below the spine about a dozen marginal

and a dozen lateral bristles, besides a number of smaller ones on the outer surface, 2 of the marginal bristles longer than the others. Ventral arm of IX. st. moderately convex from $\frac{3}{10}$ to $\frac{5}{10}$, bearing here a double row of about 10 long bristles, besides small ventral and lateral hairs; the small apical lobe somewhat resembles a dog's head and bears several dorsal and lateral bristles. Paramere with a dorsal hood each side which is spiculose apically underneath.——♀: VII. st. on the two sides together with 25 to 36 bristles in front of the row of 18 to 21; apical margin slanting, with a broad shallow oblique sinus, below which the segment is subtruncate; from the stigma down on outer side 34 to 50 bristles (inclusive of small ones), on inner side 6 to 8. Spermatheca essentially as in *O. praefectus* J. & R. 1915; chitinized portion of bursa copulatrix elbowed.

Length: ♂♀ 2·9 to 3·3 mm.——Hindfemur ♂♀ 0·61 to 0·67 mm.

A long series from: Sand dunes near Chendjatien, in nests of *Cricetulus griseus fumatus*, also off *Cricetulus* sp. and from burrows of *Spermophilus* (perhaps *S. mongolicus*)

4. **Rhadinopsylla dives** sp. nov. (Pl. IX, fig. 16 ♂, 17 ♀).

♂♀. Not very close to any of the known species: genal comb with 8 spines, more rarely 7, pronotal comb with more than 25 spines, on abdominal tergite VIII some bristles above stigma, segment V of all tarsi with 5 pairs of plantar bristles, manubrium of clasper slender, head of spermatheca slightly narrower than midtarsal segment IV is long.

Head.—Frontal tubercle central. Spines of comb long, upper one shorter than the others, but not broader basally than the next, the row gradually slanting upwards, being almost horizontal. Labial palpus with 5 segments.

Thorax.—Pronotal comb with 26 to 28 spines. On mesonotum numerous small bristles between the anterior row and the base, the lateral bare space being small. On metanotum 3 rows, the anterior row irregular.

Abdomen.—Two rows on tergites, and on most segments some additional bristles; I to VI with apical spines, sometimes a spine even on VII.

Legs.—Longest bristle of hindtarsal I not reaching apex of II, and that of II not quite extending to apex of IV.

Modified Segments.—♂: On VIII. st. from 14 to 20 odd bristles, all distant from apical margin. Near dorsal margin of clasper one long bristle, and around the margins about 10 to 14 small ones of various sizes; lower margin of clasper rather strongly ventricose; below or just above lowest point of exopodite a small bristle on clasper. Notch of anterior margin of exopodite a little below middle of margin; posterior margin of F curved from base to apex, but rather more strongly in ventral than in apical half. Upper end of vertical arm of IX. st. angulate on anterior and posterior sides; dorsal margin of ventral arm concave in proximal $\frac{2}{3}$, ventral margin rather strongly rounded-explanate in apical third, being widest at apex, bristles all thin, a dorsal row anteriorly more or less double, distally continued as a subapical and subventral row, of which some bristles are rather larger, on outer surface of apical third about 8 to 11 bristles.——♀: VII. st. with broad, rounded, subventral sinus, above which there is a broad round lobe inerassate in centre; a posterior row of 12 to 14 bristles preceded by 17 to 24, on the two sides together. On outer surface of VIII. t. from above stigma to ventral and apical margins from 36 to 38 bristles, the upper and lower groups not being separated by a bare space; on inner side

at and close to apical margin 8 or 9 spiniform bristles, of which one marginal one is much longer than the others. Head of spermatheca (R.s.) very slightly narrower than midtarsal segment IV is long, tail subcylindrical, its anal side not caved in.

Length: ♂ 2·3 to 2·5 mm.; ♀ 2·8 to 3·3 mm.——Hindfemur ♂ 0·35 to 0·39 mm.; ♀ 0·41 to 0·45 mm.

A series from: Sand dunes near Chendjatien and near Ta-Lin, off *Cricetulus* sp. and *Cricetulus griseus fumatus*; also in abandoned burrow of (?) *Spermophilus*.

5. **Rhadinopsylla insolita** sp. nov. (Pl. IX, figs. 18 ♂, 19 ♀).

♂♀. Labial palpus with 6 segments; genal comb with 7 spines, rarely 6; frontal tubercle central in ♂, subcentral in ♀; pronotal comb with about 25 spines; longest apical bristle of hindtarsal II reaching beyond IV. ♂: bristles of VIII. st. at and near apical margin. ♀: VII. st. with deep and narrow subventral slit; tail of spermatheca not caved in.

Head.—Frontal tubercle prominent in both sexes. Genal spines 3 to 7 about equal in length and width, 7th not shorter than 6th, first the shortest and narrowest of all. Proboscis reaching beyond apex of coxa.

Thorax.—Mesonotum with two rows and at least dorsally with additional bristles.

Abdomen.—Tergites I to VI with apical spines, on the two sides together in ♂ 6 to 8, 8 or 9, 8 or 9, 8, 6, 5, or 6, in ♀ 8 to 10, 9 to 11, 8 or 9, 6 to 8, 4 to 6, 3 to 6.

Legs.—Longest bristles of hindtibia and hindtarsal I reach beyond the segment following; on segment V 4 pairs of plantar bristles in all tarsi.

Modified Segments.—♂: VIII. st. with 13 to 16 bristles each side placed at and near the apical margin. Manubrium (M) strongly broadened towards clasper; the latter with one long subdorsal bristle and about 12 small ones, some of them very small; acetabular bristle proximal of acetabulum. Exopodite feebly curved, except at base; notch of anterior margin below middle. Posterior margin of apical dilatation of vertical arm of IX. st. rounded, variable, not distinctly angulate; ventral arm of nearly even width from point of division to apex, much broader than vertical arm, its apex more strongly rounded-slanting dorsally than ventrally; dorsally about middle a double row of short spiniform bristles, the other bristles thin, apical ones longest.——♀: Apical margin of VII. st. strongly slanting dorsally; ventral portion of segment divided by a deep narrow slit, lobe above slit rounded-truncate, with the apex more or less emarginate, lobe below slit pointed in lateral view; on the two sides together 17 to 19 bristles. On VIII. t. at most one bristle above stigma, below stigma a row of 4 or 5, on widened ventral area 13 to 16, and on inside 6 or 7. Spermatheca large, head broader than segment III of midtarsus is long.

Length: ♂ 2·1 to 2·3 mm.; ♀ 2·4 to 2·6 mm.——Hindfemur: ♂ 0·35 mm.; ♀ 0·37 to 0·43 mm.

4 ♂♂, 5 ♀♀ from: Sand dunes near Chendjatien and Ta-Lin, in nest of *Cricetulus* sp.

6. **Rhadinopsylla tenella** sp. nov. (Pl. IX, figs. 20 ♀, 21 ♂).

A small species, with 5 genal spines, of which the upper one is much broader and much more dorsal than the ventral spine. Labial palpus with 5 segments.

In pronotal comb 16 or 17 spines. Longest apical bristle of hindtarsal II extending beyond IV; in all tarsi V with 4 pairs of plantar bristles. ♂: exopodite together with apical portion of clasper almost circular; ventral arm of IX. st. very slender. ♀: tail of spermatheca caved in; below stigma of VIII. t. one bristle, none above stigma.——Agrees with *Rh. dahurica* J. & R. 1923 in one apical bristle of hindtarsal II being long; otherwise very different.

Head.—Frontal tubercle a little more prominent in ♂ than in ♀, a little below centre in ♀. 5th genal spine more than twice as broad at base than 1st spine and a little longer, being about $\frac{1}{3}$ shorter than 4th spine.

Thorax.—Pronotum short (apart from comb), shorter above middle of side than midtarsal I.

Abdomen.—Tergites with 2 rows of bristles, in ♂ anterior row incomplete on II and III and absent from IV to VII, in ♀ anterior row incomplete on V to VII; apical spines (on the two sides together) in ♂ 6, 6, 4, 4, 2, 2, in ♀ 6, 5, 2 2, 0. Sternites IV to VII in ♂ 4 bristles on the two sides together, in ♀ 5 or 6 on III to V, 7 on VI.

Legs.—Longest apical bristle of hindtibia and of hindtarsal I extending beyond apex of segment following, that of II well beyond IV. In ♂ V of right hindtarsus with 4 plantar bristles on one side and 3 on the other. Length: midtarsus ♂ 9·5, 8·5, 6, 4, 11, ♀ 11, 9, 6·5, 5, 12·5; hindtarsus ♂ 21, 13, 8, 6, 12·5, ♀ 24, 16, 9·5, 6, 14.

Modified Segments.—♂: VIII. st. with a row of 3 bristles on each side. Manubrium of clasper gradually, but not strongly, widened towards base. Distal half of clasper peculiar (fig. 21), being strongly ventricose and dorso-apically strongly rounded, with the acetabulum extending close to apex, the nose above the acetabulum very prominent and subapical; one long subdorsal bristle and near it 2 much smaller marginal ones, at apex minute pale bristles, each on a more or less distinct tooth, on inner side some minute subapical bristles. Exopodite narrow, curved in basal half, almost straight in apical half; the notch of the anterior margin subapical. Upper end of vertical arm of IX. st. rounded-angulate on posterior side; ventral arm, from the point of division, narrower than the vertical arm, remaining slender to apex; at and near dorsal margin 6 small pale spiniform bristles from middle to near apex, at apex and subventrally and ventrally near it about a dozen small pale bristles.——♀: VII. st., on the two sides together, with a row of 8 bristles, in front of the row one or no bristle; no sinus, the lateral lobe very broad and rounded (fig. 20). VIII. t. with a single bristle below stigma, on widened portion of segment 8 bristles on outside and 7 or 8 on the inside. Head of spermatheca as broad as hindtarsal IV is long, gradually narrowing into the tail, which is caved in on anal side and bears a projection below the cavity.

Length: ♂ 1·5 mm.; ♀ 1·8 mm.——Hindfemur: ♂ 0·27 mm.; ♀ 0·28 mm.

One pair from: Sand dunes near Chendjatien, in nest of *Cricetulus* sp.

7. **Neopsylla bidentatiformis** Wagn. 1893.

A series from: Sand dunes near Chendjatien and Ta-Lin, on and in nests of *Cricetulus* sp., also in burrows of *Cricetulus griseus fumatus* and *Spermophilus* (probably *S. mongolicus*).

II. FLEAS COLLECTED DURING AN EXCURSION FROM HARBIN VIA SANSIN, LAHASSU, TAHEIHO TO NUNKIANG (= MERGEN) IN MANCHURIA, MAY–JULY 1928.

1. **Ceratophyllus tesquorum sungaris**, cf. p. 155.

A series from Bank of Sungari R. opposite Harbin, on *Spermophilus* (probably *S. mongolicus*), June 1928.

2. **Oropsylla elana** sp. nov. (Pl. VIII, figs. 7 & 8 ♀♀).

♀. Similar to *O. crassus* J. & R. 1911. Proboscis a little shorter. Frontal tubercle very small, barely traceable. Apex of genal process evenly rounded, dorsally not more projecting than ventrally, a little shorter than in *O. crassus*. Anterior frontal row represented by one bristle or absent.

Pronotum (from basal margin to base of comb) shorter than spines of comb, measurements at 3rd or 4th spine (counted from below) in *O. elana* 13 to 15, 17 to 19, in *O. crassus* 20 or 21, 16. In comb 23 to 26 spines inclusive of small ventral ones (in type 26).

VII. st. truncate, upper angle distinct, in one specimen a little more rounded than in fig. 7, apical margin slightly variable, sometimes a little convex below middle, as in fig. 7, sometimes nearly straight or very slightly incurved. Stylet with 3 lateral bristles as in *O. crassus*. Below stigma of VIII. t. 2 to 6 bristles, on widened portion of this segment 21 to 24 on outside and 3 or 4 on inside, one of the latter being marginal. Head of spermatheca larger than in *O. crassus*, somewhat variable in shape as illustrated by figs. 7 (from type) and 8.

Length: 3·2 to 3·4 mm. (specimens somewhat distended.)——Hindfemur: 0·56 mm.

Manchuria: Bank of Sungari R. opposite Harbin (= Charbin), 2 ♀♀ (type) on *Spermophilus* (probably *S. mongolicus*), June 1928; 2 ♀♀ from Anda Steppe near Harbin, on *Cricetulus campbelli*.

3. **Frontopsylla elatus botis** subsp. nov. (Pl. VIII, figs. 14 ♂, 15 ♀).

♂♀. Very near *F. elatus* J. & R. 1915, *F. elatoides* Wagn. 1929 and *F. luculentus* J. & R. 1923; but nearest to *F. elatus*. All these fleas may possibly be subspecies of one species. I treat the present form as a subspecies of *F. elatus* in order to draw attention to this suggestion.

The new form differs from the others especially in the ♂.——♂: Bristles at apical-dorsal margin of VIII. t. as in *F. luculentus*, long ones more or less alternating, or mixed, with shorter and thinner ones. Process P of clasper essentially as in *F. e. elatus*, but shorter, being even a little shorter than in *F. e. elatoides*. Apical margin of exopodite F shorter than in *F. e. elatus*, its longish bristle a little farther away from the stout spine, posterior margin but slightly incurved, the row of bristles below the spine slanting, the most ventral ones farther away from dorsal margin than in *F. e. elatus*; IX. st. as in *F. e. elatus* without an excision beyond the setiferous area, beyond the short spine some ventral marginal bristles, but not so many as in *F. luculentus*.——♀: VII. st. similar to that of *F. e. elatus* as figured by Joff in 1927. Below stigma of VIII. t. 1 long bristle and from 1 to 3 short ones; on the widened lower and apical portion 14 to 19 bristles, there being a wide gap between these bristles and those below the stigma.

2 ♂♂, 4 ♀♀ from Charithun near Nungkiang off a rat, probably not *R. norwegicus*; the specimens were presented to Dr. Jettmar.

4. **Amphipsylla vinogradovi** Joff 1927.

4 ♀♀ from Sansin, off *Cricetulus furunculus*. Identified from Joff's figures. The duct of the bursa copulatrix is much shorter and thicker than in the following species and its upper half curved anad, not forward. Abdominal sternites V and VI with strong vertical median incrassation.

5. **Amphipsylla aspalacis** sp. nov. (Pl. VIII, figs. 22 ♂, 24 ♀).

♂: exopodite much slenderer than in *A. primaris* J. & R. 1915, its upper anterior angle very obtuse. ♀: duct of bursa copulatrix long and thin, its upper half curved forward (or downward).

♂♀. *Head.*—Proboscis nearly extending to apex of coxa. One anterior occipital bristle.

Thorax.—Three rows on mesonotum with additional dorsal bristles, two rows on metanotum. On mesopleura 15 to 20 bristles, on metepisternum 4 or 5, on metepimerum in ♂ 10 to 13, in ♀ 12 to 16.

Abdomen.—Apical spines: ♂ I 4, II 4, III 2 or 3, IV 2, V 1 or 2; ♀ I 4, II 3 to 5, III 3 or 4, IV 2, V 0. Bristles on tergites: ♂ III 21 to 27, 20 to 22, IV 20 to 22, 19 to 21, VI 18 to 22, 18 to 21, VII 11 to 21, 19 to 22; ♀ III 23 to 34, 18 to 21, IV 24 to 30, 18 to 22, VI 21 to 25, 17 or 18, VII 23, 14 or 15. Two or three bristles of posterior row below stigma, usually two, occasionally one on VII. On sternites: ♂ III 7 to 10, IV, V and VI 10 to 12, VII 9 to 14, occasionally one small bristle in front of the row; ♀ III 1 to 3, 14, IV 3 to 6, 14 to 16, V 4 to 6, 15 or 16, VI 2 to 5, 15 to 19, VII 5 to 8, 19 to 27.

Legs.—On outside of hindtibia from 13 to 19 dorso-lateral bristles.

Modified Segments.—♂: The bristles of VIII. st. are drawn curved as they appear, accidentally, in the mounted specimens; in the unmounted specimens they are more or less straight and directed backwards. Exopodite similar to that of *A. primaris*, longer and narrower, with the upper anterior angle, which is about 90° in *A. primaris*, very obtuse; close below posterior angle a stout spiniform, at angle a pale subspiniform bristle, on inside near apical margin an oblique row of three, of which the first and third are spiniform, the middle one an ordinary pointed bristle; much above middle of posterior margin a spiniform, between the two marginal spiniforms 5 thin marginal bristles. Ventral arm of IX. st. distinctly longer than vertical arm, setiferous antemedian area less convex than in *A. primaris*.——♀: VIII. t. with one long bristle below stigma and 2 to 4 small ones, on widened area 23 to 26 on outside and 3 or 4 on inside, of which latter one is marginal. Head of spermatheca a little longer than tail (the latter measured in a straight line from ventral margin to tip) and sharply separated from it. Duct of bursa copulatrix about as long as first hindtarsal segment. Stylet very slightly upcurved.

Length: ♂ 2·4 to 2·7 mm.; ♀ 2·7 to 3·0 mm.——Hindfemur: ♂ 0·43 mm.; ♀ 43 to 0·48 mm.

A series from Sansin, end of May, and one ♀ from Lahassu, early July, all off *Myotalpa aspalax* (= *Siphneus*).

6. **Neopsylla bidentatiformis** Wagn. 1893.

A small series from Sansin, end of May, off *Crecetulus furunculus* and *C. triton*.

7. **Rhadinopsylla jaonis** Jord. 1929.

One ♀ from Sansin, end of May, off *Myotalpa aspalax*.

Originally described from a damaged ♀. The present ♀ is in fairly good order. Hindtibia with 6 dorso-lateral bristles on outside, none on inside; tips of long bristles of hindtarsus broken off, longest apical of segment I evidently reaching beyond III, that of II probably to or beyond apex of V. Spermatheca as figured in NOV. ZOOL. p. 40, but, as was to be expected, the head more strongly narrowing towards tail than in the split spermatheca of the type-specimen.

8. **Pectinoctenus adalis** sp. nov. (Pl. VII, fig. 6).

♂. Chaetotaxy essentially as in *P. lauta* Roths. 1915 (described as *Leptopsylla*). Genal comb with 15 spines; pronotal comb with 32. In front of the posterior row 3 rows on mesonotum, 2 on metanotum; on metepimerum 8 bristles (4, 3, 1). Abdominal tergites with 2 rows, the posterior one containing 15 bristles on III, on the two sides together.

Modified Segments.—♂: VIII. t. with 8 bristles on widened area below stigma; VIII. st. shorter and broader than in *P. lauta*, triangular in lateral aspect, with the base widened upwards, apart from this upward extension the sclerite, measured from the most proximal bristles to the dorsal margin and the apex, a very little more than ½ as broad as long; at ventral margin from beyond middle a row of bristles, the row proximally more or less irregularly double, the 3 distal bristles the longest. Clasper and exopodite in shape nearly as in *P. pectiniceps* Wagn. 1893, but the exopodite without short stout spiniform process of clasper and exopodite claw-like at end, the brown tips curved towards each other; exopodite widest above middle, the posterior margin rounded from this point to tip, at this rounded margin 2 long bristles below apex and further down about 6, the second (from above) of this row about as thick as the long subapical bristles, but very much shorter, being homologous with the spiniform of *P. pectiniceps*.

One ♂ from Charithun near Nunkiang (= Mergen), off a rat (probably not *R. norvegicus*); presented to, not collected by, Dr. Jettmar.

9. **Myodopsylla trisellis** sp. nov. (Pl. IX, figs. 23 ♂, 26 ♀).

♂♀. A very interesting discovery. Agrees in all essentials with the American genus *Myodopsylla*, particularly with the North American species. Metanotum without apical spine. Abdominal tergites I to III with false comb.

Meso- and metanotum with 3 rows of bristles; mesopleura with 10 to 15 bristles, metepisternum with 2, metepimerum with 7 to 10, usually 8 or 9, 2 of which are apical. Abdominal tergites I and II with 3 rows, the others with 2, but the anterior row with few bristles, particularly on the posterior segments. On outer side of hindtibia a subdorsal row of 9 or 10, apical bristle included.

Modified Segments.—♂: VIII. st. with a broad, rounded apical lobe which bears numerous moderately small bristles on the outer and inner surfaces, the outerside bristles being somewhat stouter than those of the inner side, at dorso-

apical margin 3 or 4 long ones. Clasper with an apical sinus which separates from the main apical portion a conical process (P) that bears 2 longish bristles. Exopodite F less than twice as long as broad, curved near base, bearing at elbow of posterior margin a long bristle, from elbow to apex subconical. Manubrium (M) broad, evenly curved, without projection on upper side. Ventral arm of IX. st. with a ventral sinus at $\frac{2}{3}$, beyond which there are 2 bristles, further distad 2 thin ones and one at apex. Paramere (Par) broad, entire, incurved in middle, somewhat sole-shaped (variable in outline according to its position on slide).——♀: VII. st. on the two sides together with a row of 11 to 13 bristles, and 4 or 5 in front of the row, apical margin strongly slanting. Spermatheca similar to that of *M. insignis* Roths. 1903; bursa copulatrix shorter than in that species. On outside of VIII. t. 18 to 23 bristles, on inside 3 to 5, of which one is marginal.

Length: ♂ 2·0 to 2·5 mm.; ♀ 2·5 to 2·7 mm.——Hindfemur ♂♀ 0·40 to 0·45 mm.

A series from Charithun near Nunkiang (= Mergen), in temple, off *Pipistrellus* sp., July 1928.

III. Mongolia: Sungei Valley near Urga, 1927.

1. **Ceratophyllus gallinae** Schrank 1803.

1 ♀ on table in room, 26 July.

2. **Ceratophyllus runatus** J. & R. 1923.

2 ♂♂, 1 ♀ in burrow of *Ochotona dahurica*, May.

3. **Oropsylla silantiewi** Wagn. 1898.

A small series, also some larvae, August, from *Arctomys bobac*. We have this Asiatic marmot-flea also from the Himalayas.

4. **Frontopsylla wagneri** Joff, 1927.

This species must not be confused with *Ceratophyllus wagneri* Baker 1904.

A series from burrow of *Ochotona dahurica*, May.

5. **Frontopsylla luculentus parilis** subsp. nov. (Pl. VIII, fig. 13 ♂).

Apparently differs only in the ♂; process P of clasper reaching a little above or to anterior apical angle of exopodite F, being longer than in *F. luculentus luculentus* J. & R. 1923.

A large series: from burrows of *Ochotona dahurica*, from *Microtus economus* and *Alactaga mongolica*, and single specimens from burrows of *Arctomys bobac* and *Spermophilus*, May and July.

6. **Ophthalmopsylla praefectus pernix** subsp. nov. (Pl. VII, figs. 1 ♂, 2 ♀).

♂♀. Differs from *O. p. praefectus* J. & R. 1925 more conspicuously in the ♀ than in the ♂.——♂: Exopodite F broader in proportion to its length; subspiniform below apical spiniform nearer to apical angle; projection bearing acetabular bristle a little shorter.

♀: VII. st. with a rounded, rather deep, sinus.

5 ♂♂, 4 ♀♀ from *Alactaga mongolica*, July, and burrows of *Ochotona dahurica*, May.

7. **Amphipsylla mitis** sp. nov. (Pl. IX, fig. 25 ♀).

♀. Similar to *A. casis* J. & R. 1911. As in that species the margin of VII. t. is somewhat dilated at a short distance below the antepygidial bristles, and the duct of the bursa copulatrix is very long and slender.

Bristles on frons 5 or 6, 2, 2, on occiput 1, 3, 7 or 8, on each side. Proboscis reaching to or close to apex of forecoxa. Bristles on mesopleura 10 or 12, on metepisternum 3, more rarely 4, on metepimerum 6, more rarely 7 (2, 3, 1 or 2, 4, 1). On abdominal tergites two rows, with a few additional dorsal bristles, the numbers varying: on II 15 to 18, 16 or 17, III 13 to 21, 16; only one bristle of posterior row below stigma. Sternites IV, V and VI with median vertical incrassation, strongest in VI; on VII 6 or 7, 16 or 17 bristles, on the two sides together, the anterior series probably varying more considerably than in the two specimens available; posterior margin of VII. t. slightly incurved, with the upper angle strongly rounded. On lower, widened, area of VIII. t. 18 bristles on outer side, 2 of which are apical. Spermatheca (R.s.) rather strongly convex dorsally and concave ventrally. Duct of bursa copulatrix slender, as long as first hindtarsal segment, strongly arched. Stylet slightly upcurved.

Length 2·5 mm.

2 ♀♀ from *Microtus economus*, May.

8. **Neopsylla bidentatiformis** Wagn. 1893.

Known to occur from the Crimea to Transbaicalia.

A series on *Ochotona dahurica*, July.

IV. HARBIN.

Among the fleas collected by Dr. Jettmar off *Rattus norvegicus* in the laboratory at Harbin there is a series of *Ceratophyllus anisus* Roths. 1907, which was originally described from a single Japanese ♂. In the mounted type the exopodite is in such a position that the apical bristles are covered by the bristles of VIII. t., in consequence of which the longish subapical bristle was not noticed. We give here a figure taken from another Japanese specimen (Pl. VIII, fig. 12). The exopodite F varies in the shape of its apical portion, in some specimens from Manchuria the apex being much less rounded posteriorly than in our figure. We add a figure of VII. st., spermatheca and bursa copulatrix of ♀ (Pl. VIII, fig. 11). The spermatheca is similar to that of certain Bird-*Ceratophyllus*.

TWO NEW AFRICAN SPECIES OF *CTENOPHTHALMUS* (SIPHONAPTERA).

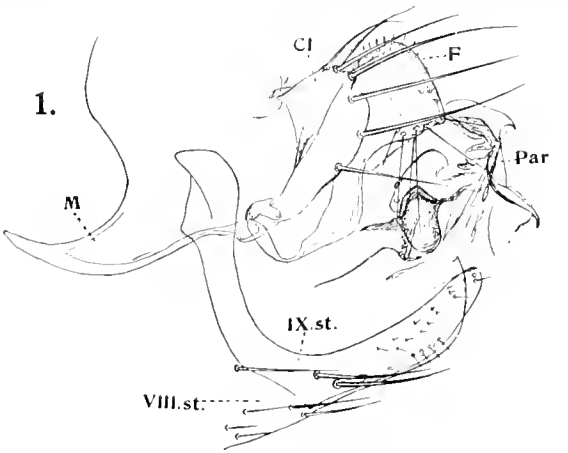
By DR. KARL JORDAN.

(With text-figures 1 to 4.)

1. Ctenophthalmus evidens (text-figs. 1 ♂, 3 ♀).

♂♀. Close to *Ct. atomus* J. & R. 1913 from Angola, of which only one ♀ is known. The ♀ of the new species differs from that specimen in the shape of sternites VII and VIII.

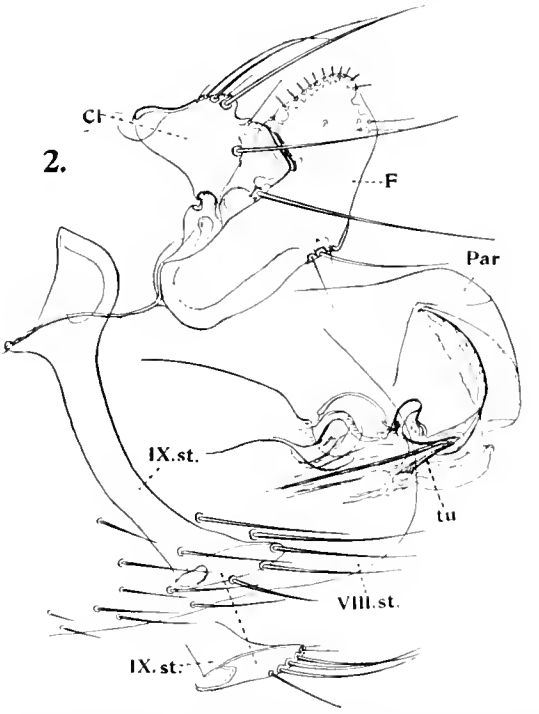
Comb of pronotum with 16 spines. On mesonotum (apart from the basal bristles) 2 rows, and in front of them some dorsal bristles, in one specimen also



a lateral one representing a third row. Mesopleura with 7 long bristles, metepimerum with 6 or 7 (3 or 4, 3); dorso-ventral ridges on lower area of metepimerum not so numerous as in *Ct. atomus*. In middle of side of basal abdominal sternite the ridges strongly arched backwards, particularly in ♀, recalling *Ct. lycosius* J. & R. 1913 and *Ct. moratus* Jord. 1926.

♂. On VIII. t. a few small bristles above stigma, on VIII. st. 8 or 9 bristles on each side, of which 3 longish ones form a posterior row. Clasper (Cl) apically rounded-truncate, feebly incurved, with a row of 6 long bristles along the margin and near the upper angle a long and a short marginal bristle. Exopodite F dorso-apically strongly rounded, anterior margin nearly straight, posterior margin deeply incurved in middle, apical posterior angle slightly projecting, more rounded in one exopodite than in the other, at the angle a thin bristle, below it 5, of which 4 are long but thin, along dorsal and distal margins a row of 9 or 10 short pale spiniform bristles. Ventral arm of IX. st. not much shorter than vertical arm, slightly turned up, dorsal margin incurved, ventral margin excurved, apex rounded, more so ventrally than dorsally, slightly narrower than middle, on inner side about 21 small thin bristles, of which 2 are apical and 6 or

7 subventral. Paramere (Par) of penis apically with a dorsal and a ventral hook (lateral aspect).——♀. VIII. st., on the two sides together, with a posterior row of 10 to 12 bristles and in front of the row 9 to 12; apex deeply sinuate below middle, the upper lobe broad, truncate-emarginate, its upper angle more rounded than the lower and less strongly projecting; ventral lobe (lateral aspect) triangular, not extending so far distad as lateral lobe. On each side of VIII. t. 2 or 3 small bristles above stigma, on lower area 10 to 14 bristles, of which two are apical and marginal, on inside 5 to 7, of which the lower ones are very



minute, apex rather deeply incurved, lower angle smaller than 90°, upper angle not quite so sharp. Head of spermatheca (R.s.) much longer than tail. Bursa copulatrix together with its duct as long hindtarsal segment III.

Length: ♂ 2·2 mm.; ♀ 2·3 to 2·5 mm.——Hindfemur: 0·36 mm.

Hab. Congo Belge: Région Bukwa, Village Tshusa, off Brown Rat (Mission Antipesteuse); 1 ♂, 3 ♀♀ (type in coll. N.C.R.).——I am much indebted to Dr. H. Schouteden, director of the Congo Museum, Tervueren, for sending me the specimens for study and description.

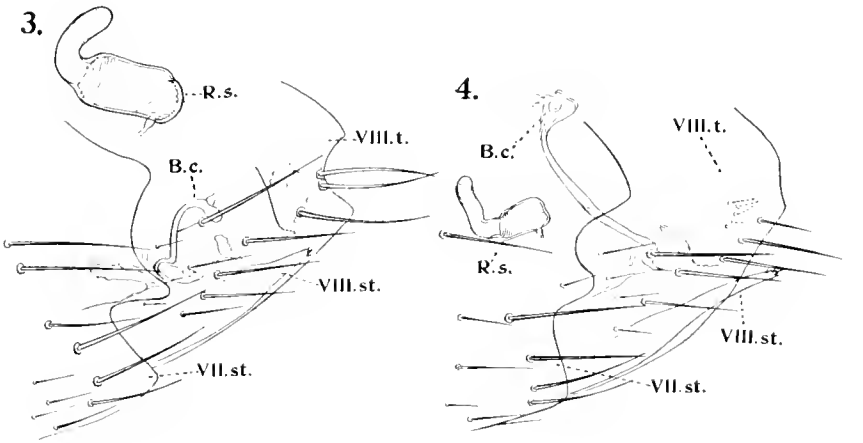
Among the specimens obtained by the Mission are also 3 ♂♂ of *Hypsophthalmus campestris* J. & R. 1913 from the same place and off "rats," a species known only from S.W. Uganda and British East Africa.

2. **Ctenophthalmus acunus** sp. nov. (text-fig. 2 ♂, 4 ♀).

♀♂. Nearest to *Ct. moratus* Jord. 1926, from the Gold Coast; differing in the reproductive organs.

♂. On each side above stigma of VIII. t. 2 or 3 small bristles, and on

VIII. st. 14 to 16, of which the posterior ones are long; clasper nearly as in *Ct. moratus*, apical margin with a small sinus above middle, at upper angle 5 bristles, of which one very long, 2 shorter and 2 thin and short, on side one long bristle and at ventral margin another, lower apical angle about 90°. Exopodite F broader than in *Ct. moratus*, dorsally less rounded, the posterior margin from the nose upwards more slanting and less incurved. Ventral arm of IX. st. a little longer than in *Ct. moratus*, with 4 ventral bristles, of which the 3 distal ones are long and strong, at apex 2 minute bristles. Apical armature of ejacu-



latory duct different: dorsal paramere (Par) without hook, apical tube of duct (tu) short.——♀. VII. st.: on the two sides together, a posterior row of 10 bristles, and before the row 15; apex bisinuate, dorsal lobe broader than median lobe, triangular, angle about 90°, tip rounded off, median lobe rounded, below it the margin straight, not excurved, ventral angle (in side-view) slightly obtuse, rounded off. On each side of VIII. t. above stigma 2 or 3 small bristles, on lower area 10 on left and 14 on right side (we have *one* specimen!), 5 or 6 of them forming a subventral row, the most distal one short, none at apical margin, lower angle of apex distinct, but obtuse, upper angle effaced, the apical margin being but slightly incurved. Spermatheca of the small type, with the head shorter than the tail. Bursa copulatrix inclusive of its duct a little longer than hindtarsal segment II.

Length: ♂ 2·5 mm.; ♀ 2·4 mm.——Hindtibia: 0·39 to 0·40 mm.

Habi. Nigeria: Lagos, on Bush Rat; 2 ♂♂, 1 ♀, received from Dr. G. A. K. Marshall, C.M.G., F.R.S.

ON A SMALL COLLECTION OF SIPHONAPTERA FROM THE ADIRONDACKS, WITH A LIST OF THE SPECIES KNOWN FROM THE STATE OF NEW YORK.

By DR. KARL JORDAN.

(With text-figures 5 to 8.)

THE majority of Fleas known from the Atlantic States of North America were collected in Maryland and Virginia at places which are in easy reach from Washington, D.C., the centre of taxonomic activities in U.S.A. In comparing specimens of the same species from various eastern localities it struck me as peculiar that, in contrast with the Western States, (1) there was no geographical variation discernible in the material examined, and (2) that the number of species was very small. In order to ascertain to some extent as to whether these phenomena were more apparent than real, I seized the opportunity which my attendance at the IV. International Congress of Entomology (Ithaca, August 1928) offered to go for a short collecting trip to the Adirondacks. I selected these mountains in the north of the State of New York, because I could expect to meet there northern elements in the fauna and to find species with a wide southward distribution which might possibly show some geographical modification in this northern district with a severe winter.

Just as the best collecting-ground for a beginner is the collection of an experienced friend, so the easiest way for a biologist of finding a suitable locality is to leave the choice to a friend who knows the ground. Dr. S. A. Bishop, professor at the University of Rochester, made arrangements for me to stay at the Adirondack Lodge of the Lake Placid Club, and, with truly American hospitality, even transported me there in his car. I am most grateful to Dr. Bishop for thus rendering the journey so easy and for introducing me to a place which exactly suited my requirements. I am likewise very much obliged to Mr. H. W. Hicks, secretary of the Lake Placid Club, for the great courtesy of giving me permission to stay in the camp as long as I liked and for assigning to Dr. Bishop and myself a spacious block-house where we could make ourselves comfortable, spread out our collecting paraphernalia and work and sleep undisturbed.

With Dr. Bishop as a guide I soon mastered the geography of the place and, when to my great regret my friend had to return to Rochester, could find my way about the woods, which, however, was not difficult, as the trails are all well marked. Adirondack Lodge being situated in the forest at an altitude of about 1,200 ft., 5 miles from the nearest farm, at a small lake under Mt. MacIntyre, it is an ideal spot for collecting the small mammals which occur in such situations.

The weather continued fine during the end of August and early September, with an occasional rainy day and Mts. Marcy and MacIntyre frequently capped with clouds. The camp was lively with the coming and going of people who hiked in the mountains, carrying a heavy camping outfit like hardy scouts, enduring heat and facing rain, slipping in the black mud of the trails and enjoying

it all in this glorious wooded country. I did not follow the enthusiastic and energetic hikers who ate up the miles as fast as feet and breath would permit, but strolled about in a more leisurely way, setting traps and becoming acquainted with what there was to see and observe for a lover of nature, only occasionally taking the traps as far as Indian Pass. Alluring as the heights were, I abstained from trapping high up, as I had no outfit for staying with the traps overnight far away from the camp, and did not feel inclined to carry the traps a distance of three or four hours one day and to walk the same distance the next morning with the probable result, the nights being cold, that the mammals caught would be dead and abandoned by the parasites which I wanted. My captures, therefore, were made on the slopes of Mt. Jo and Mt. MacIntyre and round about the lake. I was equipped for trapping Rodents and Insectivora only and did not try to obtain Carnivora and Bats, which were rare anyhow, and it was too late in the year for getting bird fleas from abandoned nests. The collection, therefore, is limited, but it comes nevertheless up to the result I usually have when trapping in a restricted area for a few weeks: round about a dozen species of fleas. The mammal most frequently caught in the little box-trap I use was the Short-tailed Shrew, *Blarina brevicauda*, from which I obtained no less than 5 different species of fleas, two of them new to science. Brewer's mole, *Parascalops breweri*, was likewise plentiful. The long-tailed Jumping Mouse, *Zapus insignis*, did not seem to be very rare on the MacIntyre side of the lake, but yielded only 2 specimens of one species of flea, which, however, as a compensation, turned out to belong to a species hitherto only known from Alberta and British Columbia. The Red Squirrel could be heard everywhere in the woods, and the merry Chipmunk was most numerous in and near the camp. I had especially looked forward to capturing and examining the Porcupine, as no flea had been recorded from the American species. But I was doomed to disappointment when I made the personal acquaintance of the creature in the woods. There were quantities of ticks and mites on it, but no flea. This negative result agrees with the experience of my friend Dr. Preston Clark, whose guides in Maine have examined for me porcupines as well as their winter-nest without finding a single flea, and we may take it as almost certain that the Canadian Porcupine has no flea of its own. A fact of this kind (provided it is a fact) is of great interest in the study of the history of the mammal and flea population. The Snowshoe Rabbit (or Varying Hare) seemed to be fairly plentiful in the Adirondacks; I expected to find on it the northern hare flea known to me in several geographical forms from Greenland, Baffinsland, New Brunswick, Idaho, British Columbia and Central Asia; but the few hares obtained had, like the porcupine, only ticks and mites, the absence of fleas probably being accidental. While Brewer's Mole was common, I only trapped one specimen of the Star-nosed Mole, on which I found the flea common on moles, shrews and voles; as there was no record of fleas off this host, the find was of some little interest to me.

Though the collection is small, it is nevertheless not unimportant as a contribution to our knowledge of the distribution of the fleas of North America, the discovery of a new species of the North-western genus *Catallagia* being of special interest. *Ceratophyllus quirini* was known only from Alberta and British Columbia, *Doratopsylla currata* from Iowa and Alberta, and of *Ceratophyllus acerbus* and *Leptosylla catatina* only the females were known, the former being

described from Canada and the latter from the Pennsylvanian Alleghanies. From Boston southward the ordinary Blarina flea is *Doratopsylla blarinae* Fox 1914; as at Adirondaek Lodge I got *D. curvata* instead, it would be interesting to ascertain where in the State of New York the two species meet. The two commonest mammal fleas of the Eastern States, *Ceratophyllus leucopus* and *Ctenophthalmus pseudagyrtes* remain the same in the Adirondaeks as in Virginia and further south.

I. List of Fleas.

1. **Ceratophyllus caedens durus** Jord. 1929.

3 ♀♀ off *Sciurus hudsonius*.——In these specimens, as well as in the ♀♀ we have from New Brunswick, the abdominal sternite VII has a deep sinus of variable width and depth, more or less as in figs. *f* and *g* of Pl. I of this vol., and I cannot find any difference that holds good between the Eastern specimens (♂♂ and ♀♀) and the British Columbia ones, although all the examples from Alberta are different. There may be a Northern connection between the Western and Eastern areas of distribution of *C. caedens durus*.

2. **Ceratophyllus leucopus** Baker 1904.

A series off *Peromyscus leucopus*, its true host.

3. **Ceratophyllus vison** Baker 1904.

A series off *Sciurus hudsonius*, its normal host.

One ♂ off *Tamias striatus*, an accidental occurrence, the Chipmunk being common in many places in the woods where the Red Squirrel abounds at Adirondaek Lodge.

4. **Ceratophyllus acerbus** Jord. 1925 (text-fig. 5 ♂).

A series of both sexes off *Tamias striatus*.——Originally described from a single ♀ obtained by Dr. Gordon Hewitt in Canada, without more precise indication of locality.

A second ♀ was collected off the same host by Dr. Preston Clark's guides at Red River Camp, Aroostock Co., Maine, in August 1927. And there is in U.S. Nat. Mus. a ♂ and a ♀ from Chapel Pond, Essex Co., N.Y. The material in collections being so scanty, the present series is most welcome.

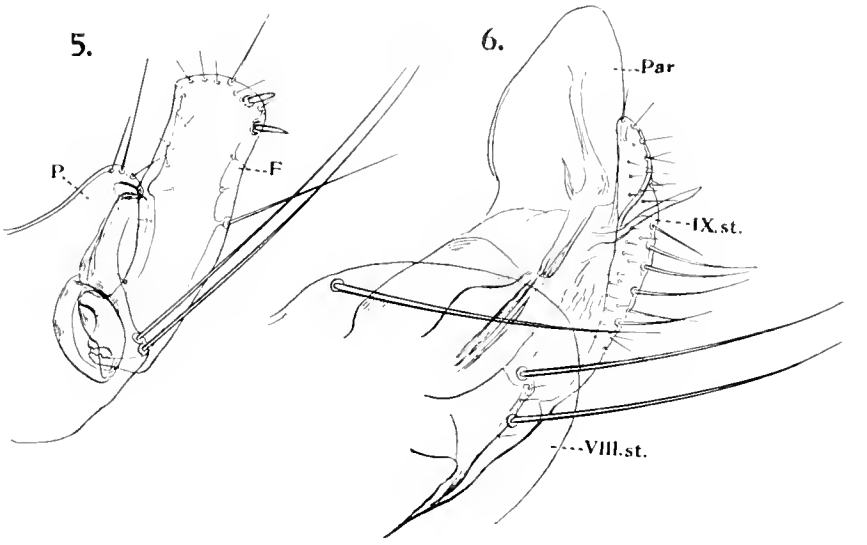
♂. Process P of clasper (fig. 5) broad and short, subtriangular, with the apex rounded off. Exopodite F three times as long as broad in apical half, angle of anterior margin below middle, from this point to apex the exopodite of nearly even width, with the apex posteriorly rounded, above and below point of strongest curvature of apex a blackish spiniform, more or less pointed, the lower one as a rule a little longer and slightly more bristle-like than the upper spine; a little above middle of posterior margin a long strong bristle. IX st. rod-like, very slightly curved upwards, very feebly widened distally, ending with a very narrow, pointed, membranous flap which has hardly any trace of hair-like filaments; below apex of IX. st. a long bristle on each side and more proximally long ventral margin a variable number of minute hairs.

5. **Ceratophyllus quirini** Roths. 1905.

One pair off *Zapus insignis*.——Known from British Columbia and Alberta; the occurrence in the Adirondacks renders it probable that the species is of wide distribution in Canada.

6. **Ceratophyllus gallinae** Schrank 1803.

One ♀ off *Tamias striatus*, an accidental occurrence. There were no domestic fowl at the camp; it is therefore probable that the flea lives there on



wild birds, the Junco, which was ubiquitous on the ground under the bushes at and near the camp, being the most likely host.

7. **Leptopsylla catatina** Jord. 1928 (text-fig. 6 ♂).

2 ♂♂ off *Parascalops breweri*.

2 ♀♀ off *Blarina brevicauda*.

1 ♀ off *Microtus pennsylvanicus*.

Described from one ♀ obtained by me in 1927 at Rolling Rock Club, Ligonier, Pa. The present 3 ♀♀ agree very well with the type; two have 4 antepygidial bristles on each side, the third 3 on one side and 4 on the other.

♂. On VIII. st. one minute and three very long bristles. Exopodite similar to that of *L. selenis* Roths. 1906, slightly broader, more rounded on anterior side, with 3 long and several small bristles on the posterior side. IX. st. (fig. 6) gradually curved on ventral side, with a ventral series of 5 or 6 longish bristles and numerous small lateral ones; apex not truncate as in *L. selenis*, but subacuminate. Paramere (Par) subpyriform, with the apex rounded.

8. **Ctenophthalmus pseudagyrtes** Baker 1904.

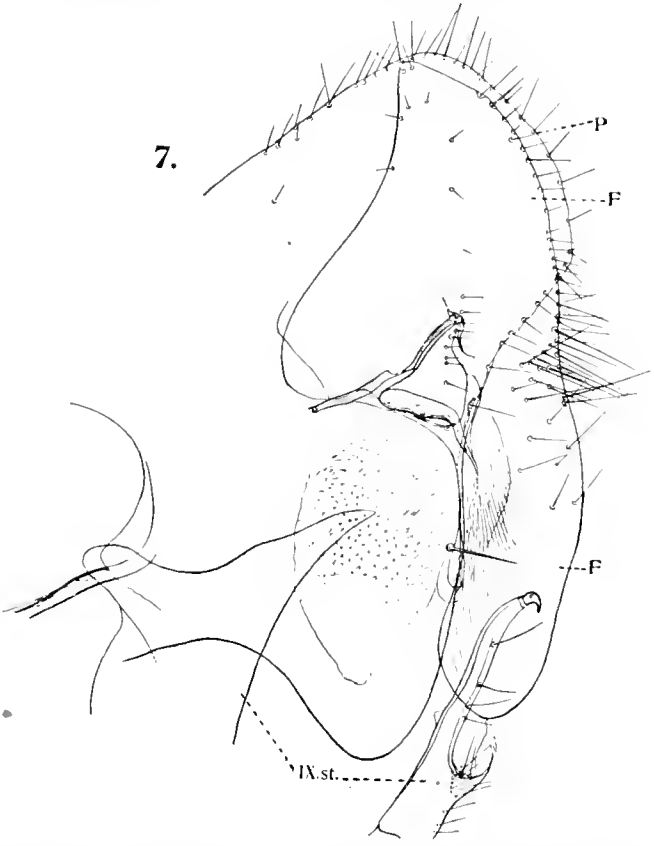
1 ♂ off *Parascalops breweri*; 1 ♀ off *Condylura cristata*; 2 ♂♂, 2 ♀♀ off *Blarina brevicauda*; 1 ♀ off *Rattus norvegicus*.

9. **Doratopsylla curvata** Roths. 1915.

2 ♂♂, 1 ♀ off *Blarina brevicauda*.——Only a few specimens are known, from Iowa City and Blackfalls, Alberta.

10. **Neopsylla wenmanni** Roths. 1904.

1 ♂ off *Parascalops breweri*; 1 ♀ off *Peromyscus leucopus*.——Widely



distributed, being in collections from British Columbia, Alberta, New Brunswick, Massachusetts, New York, Maryland and Arizona.

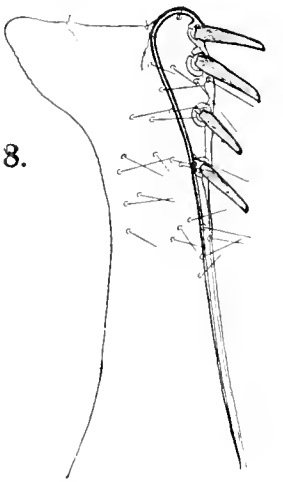
11. **Neopsylla grandis** Roths. 1900.

1 ♀ off *Tamias striatus*.——*Neopsylla striata* Stewart 1926 is the same species according to the type in the collection at Cornell, Ithaca. Baker, in 1895, identified this flea with *Pulex gigas* Kirby 1837, in which he was wrong, I think; cf. No. 13. The species is still very rare in collections; I have seen only 5 specimens, inclusive of the above ♀.

12. **Catallagia onaga** sp. nov. (text-fig. 7 ♂).

♂. Chaetotaxy as in the other species, but the lower antepygidial bristle nearly as long as the middle one, which will no doubt be found to be the case

also in the ♀. Modified segments very different from those of the other species: Manubrium of clasper widened at end, obtuse, slightly turned up. Clasper large, strongly rounded-dilated ventrally; process P very broad, rounded-truncate, with a series of thin short bristles at the margins as far down as the acetabulum, further down the posterior margin a single, stronger, short bristle. Exopodite F very peculiar, large, its upper portion subtriangular, with the anterior margin incurved and the apex pointed, this triangle extended down into a long broad nose, which, measured from the middle of the acetabulum, is about as long as the triangular portion and of nearly even width, being one-third as wide as long, with the apex rounded; posterior margin of F with a row of thin short bristles similar to those of P, longest on upper portion of nose, where there are also lateral bristles; lower half of nose without bristles. Upper end of vertical arm of IX. st. (cf. fig. 7) extended backwards into a sharply pointed triangle; ventral arm abruptly narrowed beyond middle; proximally of the sinus a row of thin bristles and on the narrow apical portion, which ends with a curved claw, a row of 4 or 5 bristles.



8.

2 ♂♂ off *Blarina brevicauda*.——The other 4 species of the genus are from Queen Charlotte Island, British Columbia, Alberta and California.

13. **Hystrichopsylla gigas tahavuana** subsp. nov. (text-fig. 8 ♂).

♂♀. Genal comb with 5 spines; pronotal comb with 30 in ♂ and 31 or 32 in ♀. In front of the two rows of bristles of pronotum no additional bristles or only one; on mesopleura 28 to 33 bristles and on metepimerum 16, more rarely 15. Apical spines of abdominal tergites (those of right side in brackets): on II 5 to 7 (7), III 4 (4), IV 1 or 2 (2). In ♂ two, in ♂ three rows of bristles; on tergites III to VII, with a few additional dorsal bristles representing another row. On outside of mid- and hindfemora a number of lateral bristles at base and again at apex, none in between. Hindtibia, on outside, apart from ventral marginal ones, with 25 or fewer lateral bristles; at dorsal margin 8 notches inclusive of apical one. Longest apical bristle of hindtarsal segment II reaching to apical of III in ♀, shorter in ♂.

Modified Segments.——♂: About middle of clasper an oblique row of 3 long bristles, in front of them 4 to 6 much smaller ones and a few marginal hairs; near and at posterior margin from 4 to 6 bristles, of which the two upper ones are moderately large. Ventral arm of IX. st. characteristic: with 4 spines each side and the apex enlarged upwards on (each side) into a compressed cone which leans slightly distad.——♀: VII. st. with a row of 16 or 17 bristles, in front of which there are from 32 to 45 bristles, on the two sides together. The bristles on VIII. t. are one long and 7 to 11 short below stigma, further down 14 to 20, of which 6 to 8 long, two of the long ones subapical; on inside 10 or 11, some of them very small. At apex of stylet one long bristle.

Length: ♂ 4·0 mm.; ♀ 4·8 to 5·5 mm.——Hindfemur: ♂ 0·8 mm.; ♀ 0·85 to 0·93 mm.

One pair off *Blarina brevicauda*, and one ♀ off *Microtus pennsylvanicus*.

The flea described and figured by Kirby in Richardson, *Fauna Boreali-Americana* IV, p. 318, Pl. VI, fig. 9 (1837) as *Pulex gigas* is a *Hystrichopsylla*; the dark colouring of the lower portion of the head of the figure corresponds to the genal comb, being well separated from the antennal groove, as is the comb. This little detail in the figure speaks against *Neopsylla grandis* being the species the figure represents. The two specimens on which Kirby based the name were obtained at 65° N. Lat., which means, according to the narrative of the Franklin expeditions, the Mackenzie River district south of Great Bear Lake. It is therefore highly probable that *Pulex gigas* is the same flea as *Hystrichopsylla dippiei* Roths. 1900 from Calgary, Alberta. However, before establishing the synonymy, it would be advisable to wait for material from the North of Alberta and to treat *H. dippiei* and *H. gigas* for the present as subspecies of one species, of which the name would be *H. gigas*.

II. List of Mammals.

1. **Blarina brevicauda** Say 1823. Numerous specimens, frequently caught in the traps set in mole runs.

Leptopsylla catatina, 2 ♀♀.
Ctenophthalmus pseudagyrtes, 2 ♂♂, 2 ♀♀.
Doratopsylla curvata, 2 ♂♂, 1 ♀.
Catallagia onaga, 2 ♂♂.
Hystrichopsylla gigas tahavuana, 1 ♂, 1 ♀

2. **Parascalops breweri** Bachm. 1842. Common in the woods.

Leptopsylla catatina, 2 ♂♂.
Ctenophthalmus pseudagyrtes, 1 ♂.
Neopsylla wenmanni, 1 ♂.

3. **Condylura cristata** L. 1758. One specimen, a short distance from camp on the trail to Indian Pass.

Ctenophthalmus pseudagyrtes, 1 ♀.

4. **Rattus norwegicus** Erxl. 1777. Near the lake.

Ctenophthalmus pseudagyrtes, 1 ♀.

5. **Peromyscus leucopus** Rafin. 1818. In and near camp, not common.

Ceratophyllus leucopus, 4 ♂♂, 14 ♀♀.
Neopsylla wenmanni, 1 ♀.

6. **Zapus insignis** Mill. 1891. Lake shore in a damp place overgrown with rank grass and bushes, 7 specimens, most of them caught alive in box-trap; only 2 fleas on them.

Ceratophyllus quirini, 1 ♂, 1 ♀.

7. **Zapus hudsonius** Zimm. 1780. One specimen together with *Z. insignis*. No flea.

8. **Microtus pennsylvanicus** Ord. 1815. Only one specimen.

Leptopsylla catatina, 1 ♀.
Hystrichopsylla gigas tahavuana, 1 ♀.

9. **Sciurus hudsonius** Erxl. 1777. Numerous.

Ceratophyllus caedens durus, 3 ♀♀.

Ceratophyllus vison, a series, common on this host.

10. **Tamias striatus** L. 1758. Many were caught alive, and these were practically the only ones from which fleas were obtained.

Ceratophyllus acerbus, 8 ♂♂, 11 ♀♀.

Ceratophyllus vison, 1 ♂.

Ceratophyllus gallinae, 1 ♀.

Neopsylla grandis, 1 ♀.

11. **Lepus americanus** Erxl. 1777. Two specimens examined, one alive, the other dead in a trap.

No flea.

12. **Erethizon dorsatus** L. 1758. One large specimen, examined immediately after death.

No flea.

III. The Fleas known from the State of New York.

In *The List of the Insects of New York*, edited by M. D. Leonard (1928), M. A. Stewart has enumerated (pp. 868, 869) 26 species of fleas with the localities where they have been found in the State of New York, a useful compilation, and the first of its kind in U.S.A. Two western species, *Ceratophyllus acutus* and *C. niger*, were doubtless included in the list by error, in consequence either of wrong locality labels or of erroneous identification. Three species of *Ctenophthalmus* are mentioned; but the genus is represented in America by one species only. The *Ctenophthalmus gigas* Kirby is probably meant for *Ct. gigas*, Baker nec Kirby, which is a *Neopsylla* and the same as *Neopsylla striata* Stew. of the list. *Ctenophthalmus wenmanni* also is a *Neopsylla*, *N. similis* Chapin of the list being the same species. These corrections reduce the number of species to 22. We can add 9 more (marked with * in the list). This total of 31 represents presumably three-fifths of the species actually existing in the State of New York. The discovery of the western genus *Catallagia* in the Adirondacks renders it probable that several other western genera will be found in the northern districts of New York. Of the known species the following may be expected to occur in the State:

Hoplopsyllus glacialis lynx Baker 1904; on Snowshoe Rabbit (Varying Hare, *Lepus americanus*); nearest locality: Maine.

Ceratophyllus diffinis Jord. 1925; in nests of various birds; evidently common in New England. Nesting-boxes are most useful for obtaining bird fleas.

Ceratophyllus idius J. & R. 1920; as previous species.

Ceratophyllus garei Roths.; especially in nests on the ground.

Ceratophyllus gallinulae perpinnatus Baker 1904; only known from Western States, but must be expected to occur also in the Eastern States, on various birds.

Ceratophyllus immitis Jord. 1929; on Lemming. I did not succeed in my search for the Lemming which occurs in the Adirondacks.

Odontopsyllus multispinosus Baker 1904; in nest of Cottontail Rabbit.

Neopsylla faceta J. & R. 1915; on *Sciurus hudsonius*; only a pair known, from Wilbraham, Mass.

Nearctopsylla hygini Roths. 1904; off *Mustela* and *Putorius*; a subspecies known from New Brunswick.

Stenoponia americana Baker 1899; on mice and voles; nearest place: Maine.

Nycteridopsylla chapini Jord. 1929: on *Eptesicus fuscus*, Large Brown Bat, which is common in southern New York.

Fleas off other Carnivora than those mentioned above, and off shrews, voles and sea-birds may bring the number up to 50. A species of *Trichopsylla* should occur on the Bear.

1. **Echidnophaga gallinaceus** Westw. 1875; an introduced Old World tropical and subtropical species; New York City; on rats.

2. **Pulex irritans** L. 1758; comparatively rare in the North-eastern States.

3. **Xenopsylla cheopis** Roths. 1903; introduced on ships' rats; an Old World tropical species.

4. **Ctenocephalus canis** Curtis 1826; Schenectady and New York City; on rats, but may be expected to occur on dogs and cats.

5. **Ctenocephalus felis** Bouché 1835; Ithaca, on cat; evidently not so common as in Europe.

6. **Cediopsylla simplex** Baker 1895; Ithaca, and Lyons Lake, Rensselaer Co. (Schoonmaker); on Cottontail Rabbit. This is a flea of the nest rather than of the rabbit itself. The European *Spilopsyllus cuniculi* Dale 1878, on the contrary, attaches itself to the rabbit, sometimes forming a dense crust on the ears.

7. **Trichopsylla lotoris** Stew. 1926; Olcott; on *Procyon lotor lotor*. The original pair is all that is known of this interesting species.

8. **Ceratophyllus pseudarctomys** Baker 1904; Newport, Herkimer Co., and Ithaca; on Woodchuck and Flying Squirrel.

9. **Ceratophyllus wickhami** Baker 1895; probably everywhere on Grey Squirrel, also on other squirrels and accidentally on other mammals; recorded from Ithaca and Halsey Valley.

*10. **Ceratophyllus caedens durus** Jord. 1929; Adirondack Lodge, Essex Co.; on *Sciurus hudsonius loquax*.

11. **Ceratophyllus leucopus** Baker 1895; probably everywhere on *Peromyscus leucopus*; Peterboro, Adirondack Lodge and Mt. Kisco.

12. **Ceratophyllus arctomys** Baker 1904; perhaps everywhere on Woodchuck; accidentally on other mammals; recorded from Peterboro, McLean, Keeseville, Ithaca and Stamford; in N.Y. State Museum, Albany, a ♀ off *Odocoileus virginianus* from Indian Lake, Hamilton.

*13. **Ceratophyllus asio** Baker 1904; Ithaca; on "field mice."

*14. **Ceratophyllus acerbus** Jord. 1925; Chapel Pond and Adirondack Lodge, Essex Co.; on *Tamias striatus*.

*15. **Ceratophyllus quirini** Roths. 1905; Adirondack Lodge; on *Zapus insignis*.

16. **Ceratophyllus vison** Baker 1904; Ithaca, Peterboro and Adirondack Lodge; on *Sciurus hudsonius loquax*, accidentally on *Tamias striatus* and *Putorius*.

17. **Ceratophyllus fasciatus** Bosc 1801; Ithaca; on rat and *Putorius noveboracensis*; a European species.

18. **Ceratophyllus gallinae** Schrank 1803; Perry, Barker, Adirondack Lodge and Mt. Kisco; in nests of *Passer domesticus*, in henhouses and, no doubt as in Mass., in nests of various other birds; accidentally on *Tamias striatus*.

19. **Ceratophyllus riparius** J. & R. 1920; Ithaca and Olcott; in nests of *Riparia riparia* and *Ceryle alcyon*.

20. **Leptopsylla hesperomys** Baker 1904; Ithaca and Alpine; on *Peromyscus leucopus*, and accidentally in vacated kingfisher's nest.

21. **Leptopsylla segnis** Schoenh. 1816 (=*musculi* Dugès 1832); cosmopolitan, New York City; on rats.

*22. **Leptopsylla catatina** Jord. 1928; Adirondack Lodge; on *Blarina brevicauda*, *Parascalops breweri* and *Microtus pennsylvanicus*.

23. **Ctenophthalmus pseudagyrtes** Baker 1904; Selkirk, Alpine, Ithaca, Adirondack Lodge, Mt. Kisko, Bronxville and Long Lake; on shrews, moles and mice, also obtained off *Fiber zibethicus*, *Rattus norvegicus*, *Tamias striatus*, *Sciurus hudsonius loquax*; a very common species.

*24. **Doratopsylla curvata** Roths. 1915; Adirondack Lodge; on *Blarina brevicauda*.

*25. **Doratopsylla blarinae** Fox 1914; Mt. Kisko; on *Blarina brevicauda*.

26. **Neopsylla wenmanni** Roths. 1904 (=*similis* Chapm.); Ithaca and Adirondack Lodge; on *Peromyscus leucopus* and *Parascalops breweri*.

27. **Neopsylla testor** Roths. 1915; Lansingburg; from a nest (of mouse ?); only one pair known.

28. **Neopsylla grandis** Roths. 1900 (=*N. striata* Stew. =*N. gigas* Kirby, Baker, error of identification); Ithaca and Adirondack Lodge; on *Tamias striatus*, accidentally on *Sciurus hudsonius loquax*.

*29. **Catallagia onaga** Jord. 1919; Adirondack Lodge; on *Blarina brevicauda*.

*30. **Hystrichopsylla gigas tahavuana** Jord. 1929; Adirondack Lodge; on *Blarina brevicauda* and *Microtus pennsylvanicus*.

31. **Myodopsylla insignis** Roths. 1903; Homer and Ithaca; on *Myotis lucifugus* and *M. subulatus*.

SOME NEW PALAEARCTIC FLEAS.

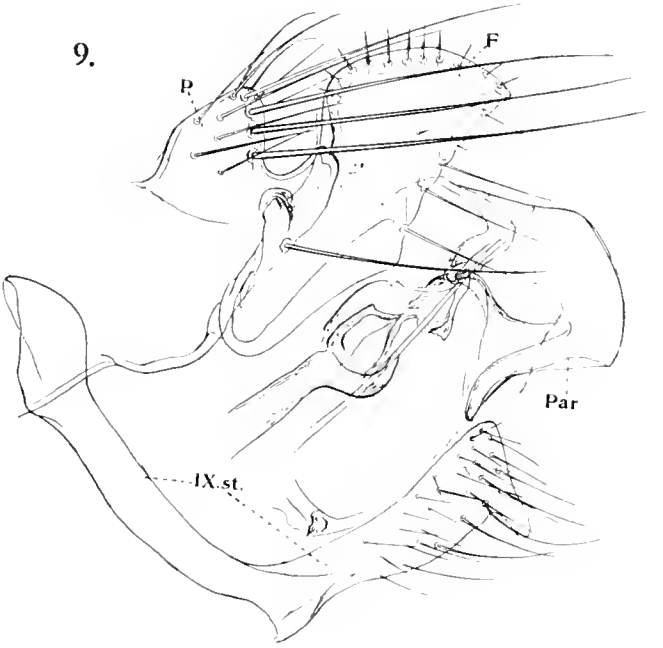
By DR. KARL JORDAN.

(With text-figures 9 to 18.)

1. **Ctenophthalmus jeanneli** sp. nov. (text-figs. 9 ♂, 10 ♀).

THE discovery of a *Spalax* flea in Transsylvania different from the *Spalax* flea known from the Deliblat and Croatia is surprising.

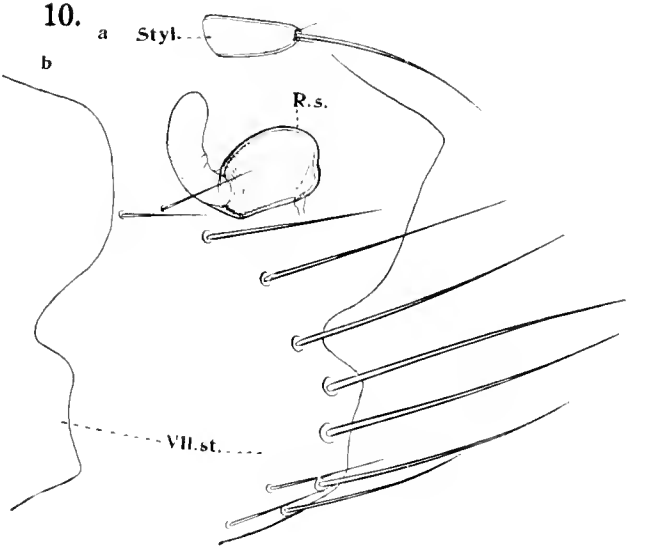
♂♀. Proboscis reaching to or a little beyond apex of forecoxa. Bristles of occiput in three rows, on each side in ♂ 2 (rarely 3), 3 (rarely 2), 6 (rarely 5), in ♀ 2 or 3, 1 (rarely 2), 6. Prothoraeic comb longer than, or in ♀ at least as



long as, pronotum. On mesopleura 9 or 10 bristles, on metepisternum 4, on metepimerum 8 to 14. Meso- and metanotum, and abdominal tergites with two rows of bristles, with hardly any additional dorsal bristles, on tergite II 18 to 22, 21 to 23; usually 4, rarely 5 below stigma of II, on III 2 or 3, on VII in ♂ usually 2, in ♀ 1; bristles on VII. t. in ♂ 8 or 9, 13 to 17, in ♀ 14 to 16, 10 to 15. Basal abdominal sternite with some lateral bristles posteriorly, besides the ventral ones; in ♂ on III to VII 0 to 6, 9 to 11, in ♀ 8 to 10, 17 or 18. Hindtarsal segment II in ♂♀ with 2 bristles extending beyond apex of III.

Modified Segments.—♂. Sternite VIII with 19 to 24 bristles on the two sides together. Apex of clasper divided into an upper and a lower process, the former bearing 4 (rarely 3) long submarginal bristles and a variable number of

lateral and apical ones, apex of lower process rounded, at ventral margin a long bristle. Exopodite F twice as long as apically broad, apical margin strongly rounded, particularly anteriorly, bearing 10 or 11 pale and rather long spiniform bristles, posterior apical angle a little smaller than 90°, forming a more strongly chitinized nose; posterior margin convex in middle, between this point and apex three long bristles and above these two short thin ones. Ventral arm of IX. st. characteristic: not quite so long as vertical arm, dorsal margin slightly incurved, apex truncate, upper angle smaller than 90°, but rounded off, lower angle prolonged downward into a nose, which is about twice as long as broad and rounded at apex; on side of IX. st. nearly 30 bristles, all pale and thin,



but several of the subventral ones about twice as long as the sclerite is broad in middle. Paramere of penis (Par) apically rounded, its ventral angle about 90° or a little less.——♀. VII. st. considerably variable (cf. text-fig. 5a and 5b taken from two specimens), bearing on the two sides together a posterior row of from 14 to 18 bristles and in front of the row 7 to 12; apex sinuate below middle, the upper lobe more or less pointed and ventrally rounded, as in text-fig. 10a, or more rarely broad and rounded as in text-fig. 10b, the sinus rather narrow, the margin below it excurved and then slightly incurved. Above stigma of VIII. t. 3 to 5 bristles on each side, on lower area 12 to 15, of which the most distal one is short and stout and subventral like the preceding long bristles; on inside 8 or 9, small, some minute; apex of VIII. t. more or less evenly rounded. Stylet two and a half times as long as proximally broad. Bursa copulatrix plus its duct nearly as long as hindtarsal segment II. Spermatheca (R.s.) with head and tail about equal in length, head strongly convex above, somewhat variable.

Length (specimens somewhat extended): ♂ 3·0 mm.; ♀ 3·2 to 3·5 mm.—— Hindfemur: ♂ 0·44 mm.; ♀ 0·48 to 0·51 mm.

Hab. Rumania: Cluj (Klausenburg), 27.v.1928, off *Spalax typhlus*

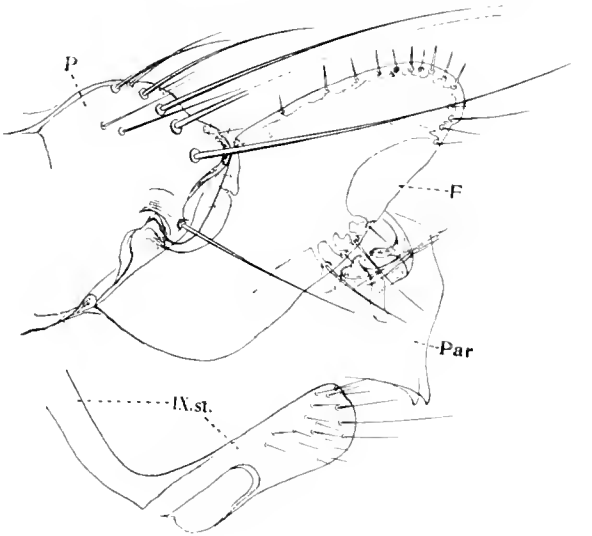
transsilvanicus, a series collected by Dr. R. Jeannel, to whom the species is dedicated.

2. **Ctenophthalmus ruris** sp. nov. (text-figs. 11 ♂).

♂. Similar to the specimens from the Deliblat and Croatia identified (perhaps erroneously) in the N. C. R. collection as *Ct. caucasica* Tasch., but proboscis reaching to apex of forecoxa and genital armature different. The only specimen we have is aberrant in having 2 instead of 3 genal spines on each side. Pronotal comb shorter than pronotum.

Modified Segments.—♂. Sternite VIII with 23 bristles on the two sides together. Lower apical angle of clasper less projecting than in *Ct. caucasica*,

11.



the apical margin above it being but very slightly incurved. Exopodite F shorter and broader, its apex much blunter. Apex of ventral arm of IX. st. slightly wider than middle, subtruncate, strongly rounded ventrally, apical margin faintly incurved below upper angle; about 20 thin bristles, 3 of the distal ones the longest, the middle one of the 3 being about half the length of the ventral arm of the sternite. Ventral angle of paramere (Par) produced downward into a sharp hook.

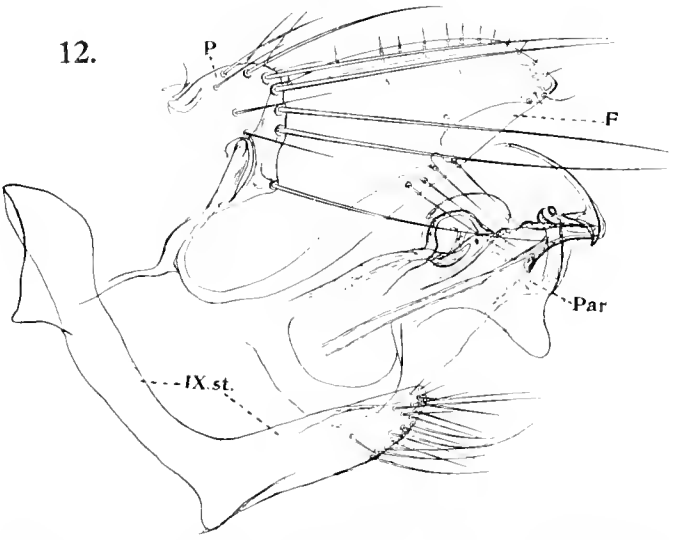
Hab. Rumania: Dobrogea, May 1913, off *Spalax typhlus dolbrogeae*, one ♂ (M. Aigner).

3. **Ctenophthalmus phrator** sp. nov. (text-figs. 12 ♂, 13 ♀).

♂♀. Similar to the preceding species. Proboscis not quite reaching to apex of forecoxa. Comb longer than pronotum, containing 16 to 19 spines. On meso- and metanotum two rows of bristles, on mesonotum additional dorsal bristles (and, of course, basal ones). Mesopleura with 6 or 7 bristles; metepisternum with 3, rarely 2; metepimerum with 5 or 6. Abdominal tergites with two rows, I with additional dorsal bristles; bristles in ♂ on II 7 to 10, 14 or 15, VII 5 to 9, 10 to 13, and in ♀ on II 10 to 14, 14 to 16; 2 bristles below stigma on II, one in front of the other, 1 or 2 on VII. Abdominal sternite II

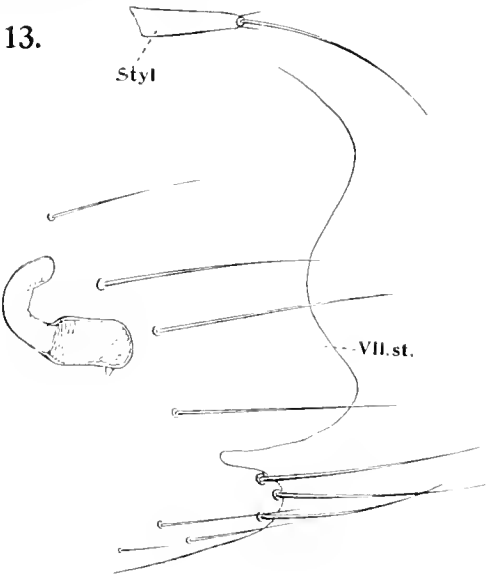
with 2 ventral bristles, no lateral ones, in ♂ on III to VII a row of 5 to 7, usually 6, with 0 to 3 bristles in front, usually 0 or 1, and in ♀ on III to V 3 to 5, 8

12.



to 11, on VI 6 to 8, 10 to 12. Longest apical bristle of hindtarsal segment II reaches to or beyond apex of IV.

13.



Modified Segments.—♂. On sternite VIII 12 to 17 bristles, on the two sides together. Process P of clasper not divided by a sinus, being rounded and bearing a row of 4 or 5 long bristles, besides several shorter ones. At ventral margin, where P is somewhat dilated, a single long bristle. Exopodite F about two and a half times as long as broad, of the long *Ct. caucasica* type; above

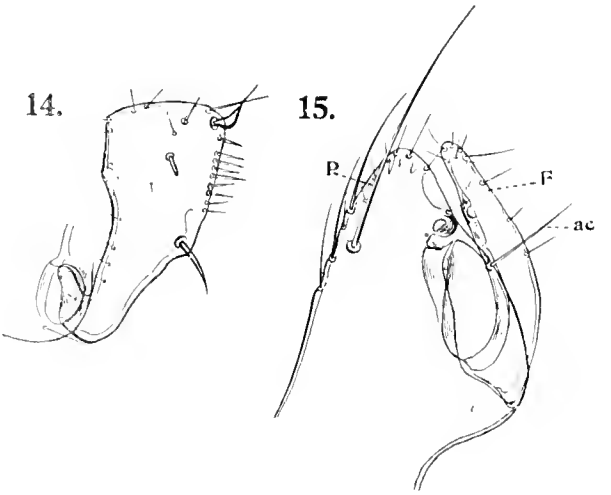
middle of posterior margin 4 or 5 long thin bristles, posterior apical corner somewhat more strongly chitinized, a curved bristle below this angle. Ventral arm of IX. st. similar to that of *Ct. spalacis* J. & R. 1911, with 17 to 19 bristles in apical third, which are about as slender as the anterior bristles of VII. t., but most of them longer. Paramere with a hook at the side of the apical tube of the duct and a ventral flap which is either rounded as in text-fig. 7, or subtruncate. Apex of manubrium of clasper sharply pointed and strongly curved upwards.——♀. VII. st., on the two sides together, with a posterior row of 10 to 14 bristles, and 7 to 9 bristles further forward ; a subventral sinus narrow, below it a rounded lobe bearing 3 stout bristles, of which the ventral one is the shortest ; apical area above sinus very broad, the margin incurved, upper and lower angle projecting, strongly rounded, slightly variable in outline. On each side of VIII. t. above stigma 2 or 3 bristles, rarely 4, on lower area 13, to 16, the most distal one as stout as the preceding long bristle and over half its length ; on inside 5 to 7. Spermatheca of the slender type ; head nearly twice as long as broad, its dorsal margin straight in middle or slightly incurved ; tail longer than head. Bursa copulatrix plus its duct as long as hindtarsal segment III. Stylet (Styl) slender, more than three times as long as basally broad.

Length (specimens somewhat distended) : ♂ 2·3 to 2·6 mm. ; ♀ 2·9 to 3·3 mm.——Hindfemur : ♂ 0·36 mm. ; ♀ 0·37 to 0·43 mm.

Hab. Caucasus : no special locality, on *Cricetulus* and *Prometheomys*, August 1925 (Montague Clark) ; a series.

4. **Amphipsylla primaris botis** subsp. nov. (text-fig. 14 ♂).

♂. Proportions of the exopodite and position of some of its spiniforms different : apical margin of F narrower in proportion to length of F ; submedian



spiniform of hindmargin lower down, placed just above middle ; between it and apical spiniform a marginal row of 8 or 9 bristles more or less subspiniform, but pale ; lateral spiniform farther away from apical curved spiniform ; inward from apical spiniform and obliquely above lateral one two bristles, of which the upper is subspiniform.

Hab. Transbaicalia: Tchita, off *Microtus* sp., September 1923 (Dr. Jettmar); one ♂.

5. **Rhadinopsylla bureschi** sp. nov. (text-fig. 15 ♂).

♂. Near *Rh. casta* Jord. 1928 and *Rh. integella* J. & R. 1921, all three possibly being subspecies of one species. Abdominal sternites with more bristles: on III 5, IV 5, V 6, VI 6, VII 6, VIII 9 (on the two sides together). Acetabular bristle (ac) far up the posterior margin of clasper, being placed midway between the most ventral point of the posterior margin of the exopodite and the apex of P. Notch of anterior margin of exopodite F at two-thirds. IX. st. distally rather more strongly rounded-dilated than in the allied forms mentioned.

Hab. Bulgaria: Cam-Kuria, Ryla Mts., south of Samokow, 1200 m., 30 July 1924, off *Microtus subterraneus* (Dr. Buresch); one ♂.

Key to the Species of *Rhadinopsylla* J. & R. 1912.

The regular, vertical, very dense striation of the lower part of the metepimerum observed in a few genera is very conspicuous in *Rhadinopsylla*.

A. Frontal tubercle much below middle of frons, its distance from maxillary palpus much shorter than first (= anterior) genal spine. Labial palpus with 5 segments. Tarsal segment V with 4 or 5 pairs of plantar bristles.

a. Hindtarsal segment II with long bristle in subapical notch reaching in ♀ beyond III, in ♂ near to apex of V. *Rh. bivirgis* Roths. 1913.

b. Hindtarsal segment II without long subapical bristle (but with long apical one).

*a*¹. Pronotal comb with 14 spines. Tarsal segment V with 4 pairs of lateral bristles. ♂: F evenly rounded; nose of posterior margin of clasper (upper angle of acetabulum) well above middle.——♀: VII. st. with additional bristles in front of row. *Rh. masculana* J. & R. 1912.

*b*¹. Pronotal comb with 18 spines (inclusive of small ventral ones). Tarsal segment V with 5 pairs of plantar bristles, at least in some tarsi. ♂: F nearly straight in middle; nose of posterior margin of clasper in middle.——♀: No bristles in front of row on sternites III to VII . . . . . *Rh. cedestis* Roths. 1913.

B. Frontal tubercle near middle, its distance from maxillary palpus about as long as (or even longer than) ventral (= first) spine of genal comb.

c. Labial palpus with 6 to 8 segments.

*c*¹. Genal comb with 6 or 7 spines, upper spine equalling the next. Prothoracic comb with 24 or 25 spines. Hindtarsal segment II with one long apical bristle. In ♀ no bristles above stigma of VIII. t. or only one . . . . *Rh. insolita*, cf. p. 158.

*d*¹. Genal comb with 4 spines, upper spine shorter than third. *Rh. jaonis* Jord. 1929.

d. Labial palpus with 5 segments.

*e*¹. Genal comb with 4 spines; metepisternum fused with metanotum. *Rh. sectilis* J. & R. 1923.

f^1. Genal comb with 7 or 8 spines. Pronotal comb with 28. Hindtarsal segment II with one long apical bristle, which, in ♀, does not reach beyond IV. On VIII. t. some bristles above stigma.
Rh. dives, cf. p. 157.

g^1. Genal comb with 5 (rarely 4 or 6) spines.

a^2. Hindtarsal segment II with one long apical bristle reaching beyond IV. ♂: IX. st. broadened. ♀: tail of spermatheca not caved in . . . . *Rh. dahurica* J. & R. 1923.

b^2. Longest apical bristle of hindtarsal segment II reaching beyond apex of IV.—♂: IX. st. very narrow.—♀: tail of spermatheca caved in on posterior side . . . *Rh. tenella* cf. p. 158.

c^2. Longest apical bristle of hindtarsal segment II not reaching beyond apex of IV.

a^3. Upper genal spine much shorter and much broader than first spine. Pronotal comb with 14 spines. Spermatheca large, tail not caved in . . *Rh. pentacanthus* Roths. 1897.

b^3. Upper genal spine not, or not much, shorter than first. Pronotal comb with 20 spines or more.

a^4. Upper and lower genal spines practically alike. ♂: bristles of VIII. st. apical . . *Rh. isacanthus* Roths. 1907.

b^4. Upper genal pine broader than first and somewhat shorter.

a^5. ♂: notch of anterior margin of exopodite F much below middle; IX. st. gradually narrowed; acetabular bristle on a level with lowest point of F.——♀: tail of spermatheca caved in; genal comb usually with 6 spines
Rh. mesa J. & R. 1920.

b^5. ♂: notch of anterior margin of F just below middle; IX. st. dilated-rounded at apex; acetabular bristle on a level with lowest point of F.——♀: not known
Rh. integella J. & R. 1921.

c^5. ♂: like b^5, acetabular bristle a little above lowest point of F.——♀: tail of spermatheca somewhat swollen, not caved in . . . . *Rh. casta* Jord. 1928.

d^5. ♂: notch of anterior margin of F much above middle; acetabular bristle at two-thirds of posterior margin of clasper; IX. st. rounded-dilated apically; VIII. st. with a row of 4 or 5 bristles on each side.——♀: not known . . . . *Rh. bureschi*, cf. p. 183.

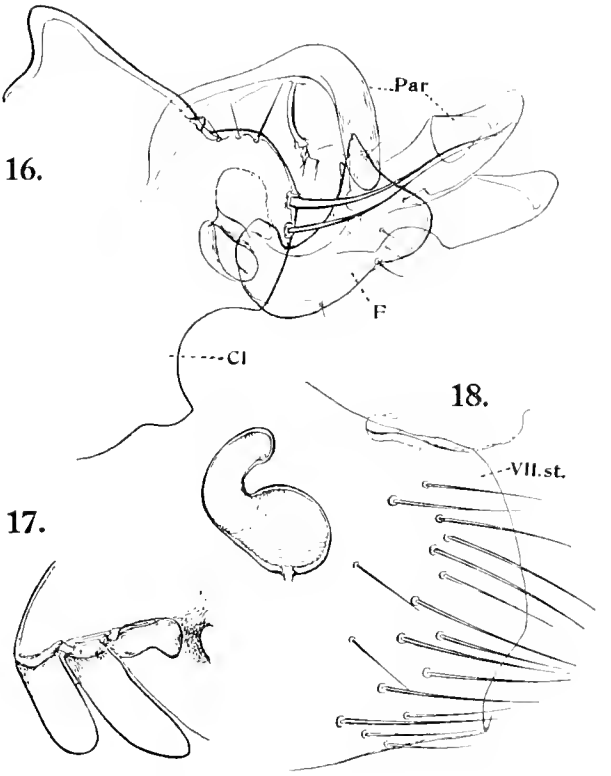
e^5. ♂: notch of anterior margin of F much above middle; acetabular bristle more or less on a level with lowest point of F; VIII. st. on each side with a row of 6 or 7 bristles.——♀: tail of spermatheca not caved in.
Rh. fraternus Baker 1895.

6. **Ischnopsyllus teres** sp. nov. (text-figs. 16 ♂, 17 and 18 ♀).

♂♀. In size similar to *I. intermedius* Roths. 1898, but abdominal combs with fewer spines and modified segments very different, particularly in ♂.

Head.—Supra-oral incrassation (text-fig. 17) widest at apex, which is more or less curved downward, sometimes rather more so than in our figure; the

sexes differ in there being in the ♀ a strongly chitinized dark area behind the incrassation, while in the ♂ the posterior boundary of this dark area is contiguous with the apical margin of the incrassation. Spines in metanotal and abdominal combs: in ♂ on met. 22 to 27, I 7 to 9, II 18, III 17 to 22, IV 12 to 15, V 9 to 12, VI 8 to 10; in ♀ on met. 24 to 26, I 7 to 9, II 16 to 20, III 13 to 18, IV 10 to 13, V 8 (rarely 9), VI 6 to 11 (usually 7 or 8). One complete row on abdominal tergites, containing on II to VII 12 to 14 bristles, in front of the row 2 to 6, in ♀ sometimes 7, small bristles. On the sternites (on the two sides



together) in ♂ on III 2 or 3, IV and V 4, VII 9; in ♀ on III 6 to 8, IV and V 7 to 11.

Proportional average lengths of tarsal segments: midtarsus in ♂ 33, 21, 14, 9, 15; in ♀ 32, 19, 14, 9, 15; hindtarsus in ♂ 48, 25, 17, 17; in ♀ 43, 24, 16, 10, 17.

Modified Segments.——♂. On tergite VIII 12 to 17 bristles. VIII. st. club-shaped, upper apical corner drawn out into a small hook curved frontad; on side of dilated apex 5 long bristles, slightly widened-flattened in basal half, ventrally 2 long bristles, strongly widened in basal half, from these bristles frontad a row of about 6 small ones. Clasper (Cl) with a dorsal, subtriangular, rounded-off projection, oblique apical margin from this hump to one-half straight, the lower half excurved, bearing ventrally 2 large acetabular bristles, of which the upper is the thicker, at upper portion of this curved margin 3 small bristles;

ventral margin of clasper from base of exopodite rounded-excised, this sinus bounded frontally by a projection. Exopodite about twice as long as broad, anterior margin almost evenly incurved from above base to apex, which is sharply pointed; disto-apical margin nearly straight, very slightly incurved, ventral margin rounded proximally, incurved beyond middle, rounded distally, merging into apical margin in an even curve; bristles all small, somewhat variable in number. Apical armature of penis characteristic: dorsally a ribbon-like sclerite which gradually curves downwards, and below it a slipper-like sclerite projecting distad.——♀. Sternite VII with 30 to 35 bristles on the two sides together; apex subtruncates ventrally somewhat incurved. Tergite VIII above stigma with 1 to 2 or no bristles, below stigma with 4 or 5 long ones, on widened triangular area 19 to 22, and on inside 3 stout apical ones. Stylet short, slender in apical half, a little over twice as long as basally broad. Spermatheca similar to that of *I. simplex* Roths. 1906, its head a little longer than broad.

Length: ♂ 2·3 to 2·7 mm.; ♀ 2·5 to 2·7 mm.——Hindfemur ♂ 0·39 to 0·45 mm.; ♀ 0·40 to 0·44 mm.

Hab. Caucasus: no special locality given, August 1925, off *Myotis* sp. (Montague Clark); a series.

ON *POLYPTYCHUS PYGARGA* AND SOME ALLIED SPECIES (LEP., SPHINGIDAE).

By DR. KARL JORDAN.

(With 12 text-figures.)

THE 6 species dealt with in this paper are all African and resemble each other very closely. They are characterized by the head and thorax being devoid of a dark dorsal median stripe, the forewing subfalcate, with a discocellular ring-mark, the apex produced and the distal margin entire, the hindwing bearing two dark spots at anal angle and, between them and base parallel with abdominal margin, a dark streak. ♂: anal tergite with simple median process, or the process bearing on each side a wing-like upward projection; anal sternite absent; clasper and inside of tergite VIII without friction-scales; penis-sheath with apical or subapical belt, or patch, of teeth, without long process. ♀: darker than ♂, less grey, more clay-colour. Tergite VIII medianly divided, the two halves smooth, thin, but well chitinized, the dorsal surface of each evenly or irregularly rounded; postvaginal plate prominent, forming a very distinct rounded ridge with smooth edge, antevaginal ridge laterally with a triangular or horn-like process, which is sometimes reduced to a mere tubercle in one of the species.

These Hawkmoths are remarkable for three reasons: (1) the marked sexual dimorphism, (2) the absence of reliable colour and pattern distinctions between the species, and (3) the disturbing fact that in several species the genital armature, though distinct in the ♂♂, does not exhibit any differences in the ♀♀, so that in most species we do not know how to distinguish the ♀♀ and to which ♂♂ to assign them.

The uncertainty referred to under (3) is most unsatisfactory, as is the scantiness of the material in collections. The solution of this feminine question must be relegated to the future, and for the present we have to be satisfied with conclusions based on the male population. In bringing together some of the ♂♂ and ♀♀ I am guided more by locality labels than anything else, and I only hope that the efforts of the Schadchen will not have to be nullified in the divorce court. In these circumstances it is awkward that two of the names have been based on single ♀♀: *pygarga* Karsch 1891 and *convexus* R. & J. 1903. I hope to have assigned to them their right ♂♂, but there remains still some doubt.

I am very much indebted to my friend Dr. B. Preston Clark for the loan of types and other specimens, which have been most valuable for this short survey.

1. **Polyptychus pygarga** Karsch 1891 (text-figs. 1 and 2 ♂).

Originally described from a single ♀ bred by Dr. Paul Preuss at Barombi, Cameroon. The Berlin Museum contains also a ♂, collected by Preuss at Victoria, Cameroon. This specimen, which agrees with *P. spurrelli* R. & J. 1912 in size, colour and markings, I regard as the ♂ of *P. pygarga*. In both this ♂ and that of *P. spurrelli* tergite X gradually narrows to a point, with the apex

curved downwards, the clasper bears a narrow dorsal marginal dentate lobe which projects inward (text-fig. 1), the dorso-apical lobe is large and curved inward, below it, as in the allied species, a short apical lobe directed distad. Penis-sheath (text-fig. 2) with an oblique, somewhat raised, subapical belt of numerous teeth, the belt open on the dorsal side. Penis-funnel dorsally trisinuate, the lobes bounding the median sinus denticulate and more or less triangular.—In ♀ the lateral process of the antevaginal plate prominent, more or less triangular or pointed.

P. pygarga and *P. spurrelli* evidently replace each other, the former presumably being confined to the Cameroon–Congo districts, the other to the Senegal–Niger countries, and should therefore be treated as subspecies of one species:

(*a*) **P. pygarga pygarga** Karsch 1891.

♂. Anal tergite longer than in *P. p. spurrelli*, dorso-apical lobe of clasper longer and strongly curved frontad, the tip of the lobe being on a level with the short dorso-marginal lobe (text-fig. 1).——In ♀ the lateral horn of the antevaginal plate drawn out into a spiniform point.

Cameroon.

(*b*) **P. pygarga spurrelli** R. & J. 1912.

♂. Dorso-apical lobe of clasper not curved frontad, but towards the side opposite.——A ♀ in coll. B. Preston Clark from Côte d'Ivoire probably belongs here. Ground-colour vinaceous cinnamon (Ridgway, *Nom. of Colors*, 1886, pl. 4, no. 15); forewing above somewhat shaded with mummy brown, especially at distal margin. Antevaginal lateral horn flattened, with the margins somewhat irregular, subdentate, the apex not spiniform. Tergite VIII deeply incised in middle, the two halves slightly convex, their apices irregularly rounded.

Gold Coast and Ivory Coast.

2. **Polyptychus serrator** sp. nov. (text-figs. 3 and 4 ♂).

♂. Differs from *P. pygarga*-♂ only in the genital armature: dorsal margin of clasper dentate, not expanded inward into a narrow lobe; dorso-apical lobe very strongly curved frontad, even more strongly so than in *P. p. pygarga*, and its dorsal and ventral margins dentate, on outside of the curved lobe a groove along ventral margin separating a narrow strip from the convex portion of the lobe (fig. 3 is taken from dorsal side). Penis-sheath (text-fig. 4) with an obliquely longitudinal stripe of teeth, the apical teeth the longest.

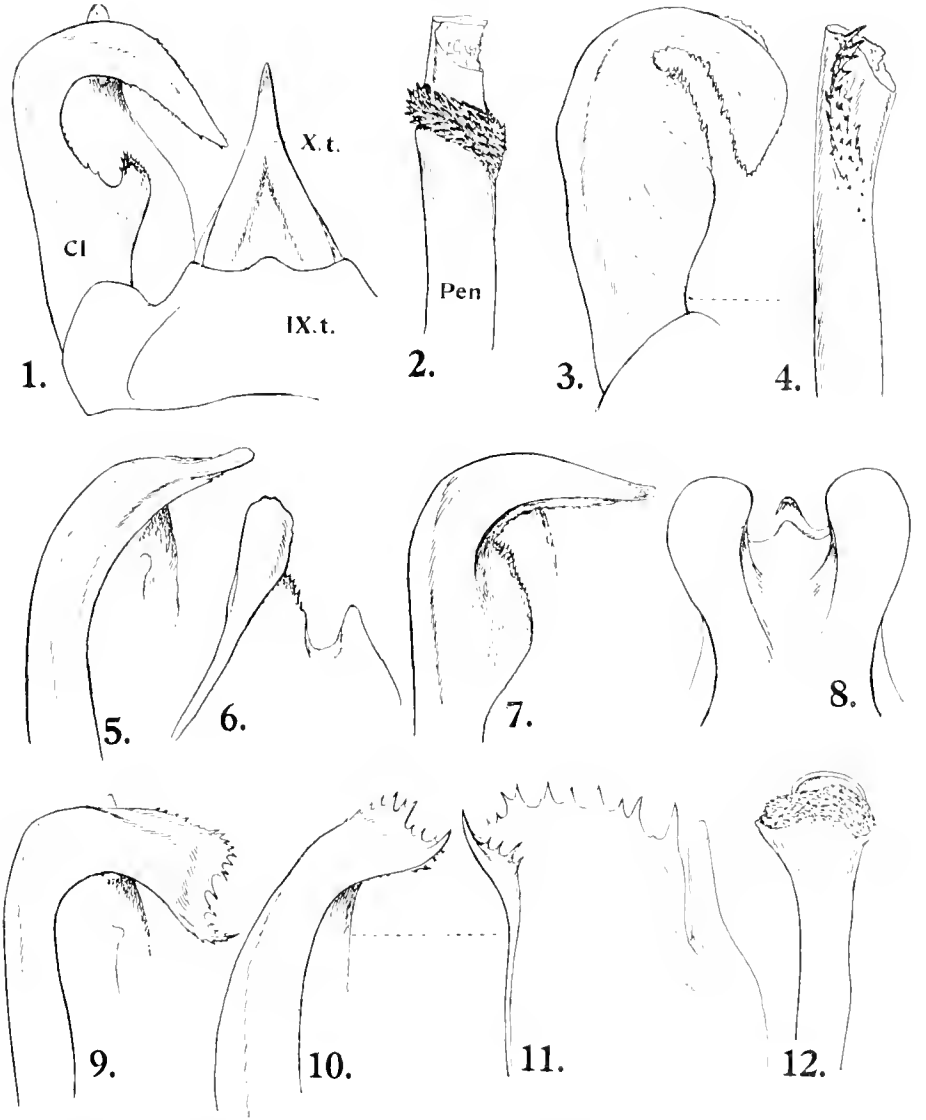
One ♂ in coll. B. Preston Clark from Cameroon.

3. **Polyptychus prionites** R. & J. 1916 (text-fig. 9 ♂).

Syn.: *Polyptychus roseola* Clark 1917.

The specimens vary in colouring, some being much more pink than others. Genital armature also individually somewhat variable in detail; the two ♂♂ from Bosum Uam, Spanish Guinea, differ in the genitalia *inter se* rather more than from other specimens. *P. roseola* was based on a pinkish Congo ♂. One of the Bosum Uam ♂♂ is nearly as pink, while the second ♂ from that district (both collected by Tessmann) is almost as dark grey as the type-specimen from Lake Chad district.

♂. Tergite X simple as in *P. pygarga*. Dorsal margin of clasper non-dentate (text-fig. 9), dorso-apical lobe long, curved inward and slightly frontad, its ventral margin strongly dentate, apex suddenly narrowed and somewhat twisted; the denticulate ventral edge of this twisted apical portion is the continuation of the



inner edge of the dorsal margin of the clasper, this edge extending obliquely across the inner surface of the curved lobe. Penis-sheath with a subapical belt of numerous teeth. Penis-funnel dorsally trisinuate, median sinus the widest.

♀. A specimen from Bosum Uam (Tessmann) in the Berlin Museum is smaller than *P. pygarga*-♀, length of forewing 30 mm. Antevaginal horns with spiniform apex; the halves of tergite VIII strongly convex, rounded, projecting,

the lobes well separated from each other; postvaginal plate very strongly rounded.

I now place here also the damaged ♀ from Agberi mentioned in the Revision under *P. pygarga*; it is much darker than the ♀ from Bosum Uam (which is evidently a bred one).

Lake Tchad: Ht. Chari, type of *P. prionites*.——Nigeria: Agberi.—Spanish Guinea: Bosum Uam.——French Congo: Fort Crampel, type of *P. roscola*.

4. **Polyptychus consimilis** R. & J. 1903 (text-figs. 5, 6, 7 ♂♂).

In both sexes the apex of the forewing a little more produced than in *P. prionites*.

♂. Tergite X simple as in the previous species. Dorso-apical lobe of clasper spatulate, with obtuse, rounded, non-dentate apex, the lobe bent inward (i.e. sagittad), but not frontad. Belt of penis-sheath narrower than in *P. prionites*, and apical, not subapical. Penis-funnel with one dorsal sinus, the other two excisions at most vestigial.——♀ (see under *b*).

(*a*) **P. consimilis consimilis** R. & J. 1903 (text-figs. 5, 6 ♂♂).

Syn.: *P. sudanensis* Clark 1927; *P. consimilis belgica* Clark 1926.

♂. Dorsal margin of clasper (text-figs. 5 and 6) not expanded inward; dorso-apical lobe short, quite gradually curved, pointing inward-distad. Penis-funnel with one dorsal sinus.

Sudan: Atbara.——Bahr-el-Ghazel.——Congo Belge.

Types of *P. c. belgica* and *P. c. sudanensis* compared.

(*b*) **P. consimilis ancylus** R. & J. 1916 (text-fig. 7 ♂).

♂. Dorsal margin of clasper expanded inward, dorso-apical lobe long, its direction about at right angles to the sagittal plain. Belt of penis-sheath broader than in *P. c. consimilis*. Penis-funnel with indication of dorso-lateral excisions. ——♀. Antevaginal lateral process flattened, obtuse; postvaginal plate more broadly rounded than in *P. prionites*; halves of tergite VIII strongly convex, their apical margins irregular, laterally somewhat produced. Length of forewing 30 mm.

Konakry I.——Gold Coast: Gambaga.——French Guinea: Dingiray, a ♀ in coll. B. Preston Clark.

5. **Polyptychus convexus** R. & J. 1903 (text-figs. 10, 11, 12 ♂♂).

P. pygarga convexus R. & J. 1903.

Originally described from a single ♀, which we figured. The specimen is now in the collection of Dr. B. Preston Clark. Dolman obtained in N.W. Rhodesia several ♂♂ and one ♀ which I believe to be *convexus*. These specimens represent a distinct species externally very similar to *P. consimilis* and *P. compar*. Some ♂♂ are much more pink than others, as in the case of *P. consimilis* and *P. prionites*.

♂. Tergite X simple. Dorsal margin of clasper not expanded and not dentate; dorso-apical lobe much broader in a view from inner side (text-fig. 11) than in *P. consimilis*, its distal margin very strongly dentate, the upper angle produced into a sharp triangular process which projects inward-upward and bears dorsally on the inner side some teeth similar to those of the distal margin of clasper;

ventral apical lobe close to upper, narrow, pale, soft. Apex of penis-sheath ventrally soft, somewhat swollen, covered with numerous small teeth, this patch transverse, not extending round to the upperside; within the sheath a flat broad sclerite with rounded apex. Penis-funnel broadly unisinuate dorsally and roundedly emarginate ventrally.

♀. I cannot distinguish the ♀ from that of *P. compar*. Lower half of termen of forewing slightly convex; lateral horn of antevaginal plate flattened, obtuse, shorter than in *P. pygarga*.

North-west Rhodesia.——North-east Rhodesia: South end of L. Tanganyika, Kalambo R.——Congo Belge: M'Pala, shore of L. Tanganyika.

6. **Polyptychus compar** R. & J. 1903 (text-fig. 8 ♂).

♂. Anal tergite on each side with a large wing-like flap which is rounded at apex and projects distad and upward, the median process being curved down; this peculiar structure of tergite X easily visible under the binocular without dissection. Clasper broader than in all previous species, apically feebly chitinized and not divided into two lobes, in its deep cavity a conical tooth about vertical on the inner surface of clasper. Penis-sheath with an apical (not subapical) half-belt of numerous teeth. Penis-funnel ventrally broadly and deeply sinuate, the sinus round, dorsally the funnel short, trisinuate.——♀. A series in B.M. and at Tring. Colour variable in depth of tone. Lobes of tergite VIII flat, feebly convex, rounded at apex. Lateral horn of antevaginal plate variable in length, sometimes reduced to a tubercle, always obtuse. Post-vaginal plate very broadly rounded.

South Rhodesia: Salisbury.——Nyasaland: Mlanje and Zomba.——Tanganyika Territory: Kilosa.

FOSSILE VOGELEI-SCHALEN.

VON M. SCHÖNWETTER.

ZU den schwierigsten und nur teilweise lösbaren Problemen der Oologie gehört die Bestimmung der Artzugehörigkeit fossiler Eischalen, wenn man von den freilich sehr einfach liegenden wenigen Fällen absieht, wo die Art allein auf das Ei gegründet ist, wie bei *Struthio chersonensis* Brandt und *Psammornis rothschildi* Andr., oder Cotypen in Gestalt von Skeletteilen nebst höchstwahrscheinlich zugehörigem Ei vorliegen, wie bei *Aepyornis titan* Andr.

Die bisherigen Versuche solcher Artbestimmung können selbst ihre Autoren nicht recht befriedigt haben, da noch immer zu wenig Anhaltepunkte vorhanden und die Methoden noch zu primitiv waren, soweit nämlich bloss Fundort und Grösse des Eies, letztere durch dessen Achsenlängen ausgedrückt, zu Grunde gelegt wurden. Denn darüber hinaus müssen berücksichtigt werden die Schalendicken oder Schalengewichte, die Oberflächengestaltung (" Korn "), die Form der Poren, der mikroskopische Bau der Kalkschale mit ihren Porenkanälen und Mammillen. Weiter kann vielleicht die Untersuchung von Schalenschliffen im polarisierten und im ultravioletten Licht Aufschlüsse über verwandtschaftliche Beziehungen oder doch Analogien geben. Weniger ist von der chemischen Analyse zu erwarten, da die Eischalen in dieser Hinsicht anscheinend recht gleichartig zusammengesetzt sind.

In Bezug auf Vogeleier sind all diese Methoden über die Anfangsstadien ihrer Entwicklung noch nicht weit genug hinausgekommen. Nicht einmal Photographien über die Oberflächengestaltung liegen vor, ja es fehlt sogar an einer übersichtlichen Zusammenstellung über die in den Sammlungen vorhandenen Objekte nebst dem erforderlichen Zahlenmaterial, ohne welche sachdienliche Studien und einigermassen befriedigende Schlussfolgerungen unmöglich bleiben.

Für 33 Aepyornis-Eier hat Dr. A. B. Meyer in den Abh. u. Ber. des Zoolog. Museums in Dresden 1901 eine Zusammenstellung gegeben. Aber darin fehlen die Schalendicken, für 3 alle näheren Angaben, für 21 Eier die Gewichte und für einige Eier enthalten die gemachten Angaben Widersprüche, die sich freilich erst bei der rechnerischen Nachprüfung zeigen.

In der spärlichen Literatur finden sich bald nur Längen und Breiten der Eier, bald nur Umfänge, zuweilen Volumina angegeben, nur ganz vereinzelt mehr oder weniger zuverlässige Schalendicken oder Gewichte, sodass eine kritische Vergleichung schon aus diesem Grunde nicht ohne Weiteres möglich ist. Hier muss die Rechnung einsetzen, um die Angaben nachzuprüfen und *mit einander vergleichbar* zu machen. Gleichgrosse Eier z. B. können ja kleine Stücke grösserer Arten bezw. grosse Stücke kleiner Arten sein.

Unter diesen Umständen bleibt fast Alles noch der Zukunft vorbehalten, und es wird daher selbst ein nur kleiner Beitrag zum Vorwärtskommen erwünscht sein. Aus diesem Grunde und angeregt durch das kostbare Material in *Tring*, bringe ich eine Beschreibung desselben nebst einer Zusammenstellung mit einigen anderen zuverlässig erscheinenden Angaben.

In dieser angefügten Tabelle sind die der *Grössen*vergleichung dienenden

Volumina bestimmt nach der Formel Vol. = 0,523 AB^2. Die Eigewichte sind berechnet mittels $G = Vol. + \frac{\gamma - 1}{\gamma} g$, wo g das *Schalengewicht* und γ das *spezifische Gewicht* der Kalkschale bedeutet. Letzteres fand ich an mehreren Scherben von *Aepyornis*, *Dinornis*, *Psammornis* und *Struthio* ziemlich übereinstimmend zu 2,50, bei *Struthio* zum Teil darunter, bei den Fossilien zum Teil ein wenig darüber.

Kleine Messungswidersprüche zwischen den *Umfängen* (U und u) und den *Eiachsen* (A und B) wurden ausgeglichen mittels der Formeln $u = B\pi$ und $U = 2A + \psi B$, wobei ψ eine vom Achsenverhältnis $k = \frac{A}{B}$ abhängige Grösse ist, worauf aber an dieser Stelle nicht näher eingegangen werden kann. Für $k = 1{,}20$ bis $1{,}50$ fällt ψ von 1,063 auf 0,965.

In den vereinzelten Fällen, wo das Schalengewicht nicht direkt gemessen wurde, ist es als " ber." (berechnet) bezeichnet, ermittelt aus dem spezifischen Gewicht γ, der Schalendicke d und der *Oberfläche* $O_m = (B - d)^2 K$, wo $K = \pi + 2{,}228\ (k - 1)$, also bloss vom Achsenverhältnis abhängig.

Das *Schalengewicht* ist $g = O_m \cdot d \cdot \gamma$ und die *Schalendicke* $d = \frac{g}{(B-d)^2 \cdot K \cdot \gamma}$

Das *relative Schalengewicht* $Rg = \frac{100g}{G}$ ist der prozentuale Anteil der Kalkschale am Eigewicht und dient dem Zweck, in einer *einzigen* Zahl Eigrösse und Schalendicke *zugleich* zu berücksichtigen, woraus sich interessante Aufschlüsse ergeben haben. Da kleine Eier grösserer Arten regelmässig dickschaliger sind, als gleichgrosse Durchschnittseier verwandter Arten oder grosse Eier verwandter kleinerer Arten, und das relative Schalengewicht diese Verhältnisse beleuchtet, kann es zum Erkennen und zur Trennung solcher Fälle dienen.

Die in vorliegender Arbeit benutzten Formeln habe ich aus dem *Rotations-Ellipsoid* abgeleitet, dem die Gestalt aller behandelter Eier sehr nahe kommt. Für die verschiedenen anderen Eigestalten, deren Einfluss auf diese Formeln ganz bedeutend geringer ist, als Unkundige vermuten, habe ich *Korrektionen* auf empirischem Weg ermittelt, die aber im vorliegenden Fall ohne Bedenken ganz unbeachtet bleiben durften. Alle derartigen Rechnungen, die schon allein wegen der Fülle von Druckfehlern, Messungsungenauigkeiten und oft zweifelhaften Angaben über die Masseinheiten in der Literatur nötig sind und oft mehrmals wiederholt werden müssen, können meines Erachtens zweckmässig nur mittels logarithmischen Rechenschiebers durchgeführt werden, der eine völlig ausreichende Genauigkeit gibt.

Der Einfluss Δg von *Schalendefekten* auf das Bruttogewicht g_o ist leicht zu berechnen:

$\Delta g_1 = \frac{o}{O} g_o$, $\Delta g = \frac{o}{O} (g_o + g_1)$, wo o den Flächeninhalt des Defektes bedeutet.

Unter Berücksichtigung der spezifischen Gewichte können auch *Ergänzungen stark defekter Eier* durch Gips und dergleichen Flickmaterial ebenfalls ohne Schwierigkeit völlig ausreichend genau berücksichtigt werden.

Wie man im Gegensatz zu früher verschiedene andere Disziplinen der Ornithologie nicht mehr ohne Messungen, Wägungen und Rechnungen betreibt, kommt man ebenso in der Oologie ohne solche nicht mehr aus, auch wenn heute die Ansicht des grossen Philosophen Kant nicht mehr uneingeschränkt gilt,

dass in einem Wissen nur soviel Wissenschaft stecke, als Mathematik darin enthalten sei.

Ein Wort noch betreffs *Mineralisation* und *natürlicher Abschleifung* bei fossilen Eischalen.

Von einer Mineralisation kann meines Erachtens kaum gesprochen werden, da die frische Eischale—abgesehen von der bei fossilen Eiern natürlich verschwundenen Eihaut—nur wenige Prozent organischer Substanz enthält, noch dazu eingebettet in Mineralkristalle. Was soll da " mineralisieren " ?

Eine *Abschleifung* dagegen ist häufig vorhanden, aber keineswegs immer, und oft auch nur minimal. Man erkennt sie leicht unter der Lupe an der Verflachung der Porengruben auf der Oberfläche, am deutlichsten an der Abflachung der Mammillenköpfe. Bei *Aepyornis* sind diese zuweilen vollständig erhalten und dann etwa 0,1 mm. hoch. Wo also überhaupt noch die Mammillenköpfe sichtbar sind, kann die Abschleifung kaum mehr als 0,1 mm. auf der Unterseite betragen. Auf der Oberseite wird sie nicht grösser, sondern eher geringer sein, weil die Oberseite im Allgemeinen glatter ist und daher weniger Reibungswiderstand bietet, als die Mammillenseite. Diese Tatsache wird bestätigt durch Scherben rezenter Strausseneier, bei denen trotz Rundschleifung der ursprünglich scharfrandigen, grossen Reibungswiderstand bietenden Bruchkanten die Oberfläche mit ihren pigmentierten feinen Poren sowohl, als auch die Mammillenköpfe völlig erhalten blieben.

Beschreibung der fossilen Eischalen in Tring.

1. **Struthio-Ei aus einem Grab,** zerbrochen gefunden zwischen Assuan und Korosko, von Elliot Smith erwähnt im Report of Archaeological Survey of Nubia. Die oberflächliche Glasurschicht der Scherben ist zum grössten Teil zerstört, dem Aussehen nach durch im Boden entstandene Säure zerfressen. Einige kleine Stellen der Oberfläche zeigen aber doch noch unter der Lupe deutlich die ursprüngliche glatte, glänzende, bräunlich gelbe Glasurschicht mit *einzeln* stehenden feinen Stichpunktporen. Vorwiegend sieht man aber, immer unter der Lupe, grössere rundliche Porengruben, die vielleicht nicht ursprünglich sind, sondern vermutlich dadurch entstanden, dass ätzende Feuchtigkeit an den winzigen Porenlumina eindrang und um sich frass, wobei dann auch die widerstandsfähigere Glasurschicht um die Porenmündung herum zermürbte und abfiel. Derartige flach eingesenkte grössere Gruben fanden sich auch bei andern älteren fossilen Eischalen (*Psammornis*, *Struthio* " *indicus* " und *chersonensis*), die ich zuvor untersucht hatte, und bei denen sie mir rätselhaft blieben. Beim Betrachten des Grabfundes aber drängte sich der vorstehende Erklärungsversuch geradezu auf ; bei den andern Scherben wohl deshalb nicht gleich, weil bei ihnen der Eindruck einer Ätzung nicht so unmittelbar erweckt wird, da die ganze Oberfläche einschliesslich der Porengruben gleichmässig poliert erscheint, offenbar verursacht durch Sandschliff. Daher braucht das Vorhandensein solcher " Ätzgruben " nicht immer ein Charakteristikum der Schalentextur (sog. Korn der Schale) zu sein.

Das in Rede stehende Ei gehört nach Schalendicke (stärkste Stellen 1,8 mm. ; dünnste, zerfressen 1,2 mm.), Grösse und Porencharakter anscheinend zu *Struthio camelus*. Schade, dass nichts für *Eremopezus eocaenus* Andr. spricht, dem fast straussengrossen Ratiten aus dem Eocän des Fayum, von dessen Ei nichts bekannt

ist. Die Angabe Lord Rothschilds im Berliner Congressbericht 1910 Seite 159, dass das Ei von *Eremopezus* zwischen dem von *Struthio* und *Aepyornis* stehe, bezieht sich auf *Psammornis rothschildi*, wie ein Vergleich mit Seite 150 daselbst ergibt.

2. **Struthio chersonensis Brandt.** Das Museum besitzt zwei vollständig erhaltene Eier aus einem Flussufer bei Wuan, Provinz Honan, China, welche bis auf Weiteres dieser Art zuzuschreiben sind. Ihre Schale ist hellbräunlich. Die grösstenteils zerstörte, teilweise durch harten, festanhaftenden Boden verkrustete Glasurschicht ist grünlichgrau, die Form elliptisch, also an beiden Enden gleichartig abgerundet. Auf den Resten der Glasurschicht sieht man unter der Lupe bei *Ei I* einzeln oder paarweise stehende runde Stichporen im mittleren Abstand vom 2–3 mm. Dieses Stück ist beträchtlich stärker als das andere verkrustet, sodass dem tatsächlichen Gewicht von 459 Gramm ein reines Schalengewicht von 440 Gramm entsprechen wird. Masse: 176 × 152 mm. Berechnete Schalendicke 2,30 mm.

Ei II: Elliptische Form und Grösse fast genau wie beim andern Ei: 178 × 150 mm. = 442 Gramm. Schalendicke wie bei jenem 2,30 mm. errechnet. Die äussere Farbe der Schale ist gleichfalls hellbraun. Nur wenig durch anhaftenden Boden inkrustiert. Nur an einzelnen Stellen ist die Glasurschicht noch vorhanden und lässt unter der Lupe feine Stichpunktporen in losen Gruppen von 1 bis 3 Poren erkennen, die nach dem einen Pol hin zu verschwinden scheinen. Mit blossem Auge erscheint dieses Ei überall reichlich besetzt mit 0,7 mm. breiten rundlichen Gruben, welche in etwa 2–3 mm. Abstand von einander die Glasurschicht unterbrechen und den Eindruck von geätzten Stellen machen, wie man solche freilich auch bei *Struthio molybdophanes* zuweilen findet, wo manche *Porengruben* so aussehen.

Diese beiden Eier in Tring stimmen nach ihren Dimensionen gut mit dem *Typus aus Galinowska*, Gouv. Cherson am schwarzen Meer überein (180 × 150 mm.; Schalendicke 2,60 mm.). Etwas kleiner sind zwei Eier aus *Kalgan* unweit Peking, mit 1896 und 1829 ccm. Inhalt, was den Dimensionen 170 × 144 und 172 × 145 mm. entspricht—beschrieben durch B. A. Bensley (University of Toronto, Studies Biolog. Series No. 19, 1921). Leider sind die Schalendicken und Gewichte nicht angegeben. Wahrscheinlich beziehen sich aber die von Dr. Andrews im Berliner Congressbericht 1910 Seite 173 nach Eastmann zitierten Schalendicken von 2,2 und 2,6 mm. nordchinesischer Eier auf diese Stücke.

Vergleichsweise fand ich für *nordafrikanische Strausseneier* die Schalendicke zu 1,65 bis 1,95 mm. nur einmal 2,05 mm. (Sammlung Domeier 163 × 140 = 340 Gramm, Ägypt. Sudan). Das schwerste und dickste mir überhaupt bekannt gewordene Straussenei befindet sich im Berliner Museum, gesammelt von Professor O. Neumann in Irangi Umbugwe August 1893, und zeigt bei 403 Gramm Schalengewicht eine Schalendicke von 2,35 mm, als wohl seltenste Ausnahme. v. Nathusius fand als Maximum 2,1 mm.

3. **Struthio indicus?** Das Museum Tring besitzt 2 Scherben von Nullas, Kain River, Banda, Nordindien, über die Dr. Andrews im Berliner Congressbericht 1910, Seite 173, ausführlich spricht. Danach sind sie durch einen Beamten des Archaeologischen Dienstes in Indien, Archibald Carlyle gefunden. Dr. Andrews hält ihren Porentyp für den von *Struthio molybdophanes* (Porenhaufen in flachen Einsenkungen), findet sie 2,4 mm. dick und lässt Spuren von anhaften-

dem Gestein für ihre fossile Herkunft sprechen, obwohl ihre Provenienz nicht zweifelfrei sei. Lord Rothschild vermutet daher (Berlin 1910, Seite 150 und 167), dass diese Scherben dem *Struthio molybdophanes* angehören und durch arabische Händler vor langer Zeit aus Ostafrika importiert sind.

An den beiden Scherben in Tring sah ich von Spuren anhaftenden Gesteins nichts. Sie sind ohne Glanz, aber sonst glatt und von blassbräunlicher Färbung. Die Mammillen sind auffallend stark entwickelt und machen etwa ein Fünftel der von mir zu 2,2 bis 2,4 mm. gemessenen Schalendicke aus. Die durchschnittlich 0,8 mm. breiten rundlichen Einsenkungen stehen in 5–10 mm. Abstand von einander und erscheinen dem unbewaffneten Auge wie hellgraubraune Flecken. Spezifisches Gewicht 2,45. Die Mammillenköpfe zeigen sich gut erhalten. Unter der Lupe hat man aber nicht den Eindruck von Porenhaufen, sondern als wenn die flachen Gruben am Grund durch Säure geätzt wären, wie man das aber bei manchen molybdophanes-Eiern gleichfalls findet. Der Gedanke, dass es sich bei den Scherben um *Struthio molybdophanes* handeln könnte, liegt danach allerdings sehr nahe. Trotzdem möchte ich diese Vermutung für nicht richtig halten wegen der erheblichen Schalendicke. Schon Dr. Andrews bemerkt, dass weder er noch v. Nathusius so dickwandige Eier jetziger Strausse feststellen konnte. Porengruben gleicher Art und auch dieselben Schalendicken finden sich beim *chersonensis* Ei II, das man doch nicht deshalb zu *molybdophanes* stellen wird.

Daher möchte ich diese Scherben als *zu einer ausgestorbenen Art gehörig* ansprechen, mögen sie nun von Banda stammen oder nicht.

4. **Struthio camelus L.** Dieser Art gehören wohl an die durch Dr. Hartert bei El-Meksa, Erg bent-Chaouli in der Sahara gefundenen Scherben von gelblicher bis dunkellederbrauner Farbe mit einem eigenartigen rosagrauen Hauch, den man erkennt, wenn man gelbliche Strausseneier daneben hält. Schalendicke 1,7–1,9 mm. Mammillenköpfe gut erhalten. Die sehr feinen Poren sind bei schräg auffallendem Licht mit blossem Auge eben noch erkennbar; sie stehen einzeln oder in losen, kleinen Gruppen und zeigen die Form von Nadelstichen bis ganz kurzen Strichen (kurze Kommaporen). Genau solche Scherben besitzt das Berliner Museum, gesammelt durch Baron Geyr von Schweppenburg in den Sanddünen 150 km. südlich von Ouargla. Schon Dr. Andrews bemerkte (S. 173), dass die Poren bei weiss-gelblichen Schalenstücken, die neben *Psammornis* aufgesammelt wurden, etwas abweichen von denen jetziger *camelus*-Eier, aber man muss ihm beipflichten in der Auffassung, dass diese Abweichung durchaus innerhalb der bei *camelus* zu beobachtenden Variation liegt, sodass es sich höchstwahrscheinlich um sehr alte Scherben von *camelus* handelt. Spräche irgend etwas für das Vorkommen von *Eremopezus* im nordwestlichen Afrika, so könnte man wohl auch an Eier dieser extincten Art denken.

5. **Psammornis rothschildi Andr.**

(*a*) Über die beiden durch Lord Rothschild und Dr. Hartert 1909 in der Südalgerischen Sahara aufgefundenen Scherben, welche den Typus dieser Art darstellen, hat Dr. Andrews berichtet (Berlin 1910 S. 169–172). Ich kann seine Feststellungen nur bestätigen. Da die Eischalen eine deutliche Abschleifung zeigen, wird die Schalendicke statt 3,3 mm. ursprünglich 3,5 mm. gewesen sein und reicht damit ziemlich an den Durchschnitt der *Aepyornis*-Eier heran. Ich komme zu der Vorstellung einer Grösse von etwa 280 × 210 mm. gegenüber der Annahme Dr. Andrews von etwa 250 × 190 mm.

Die *äussere* Farbe ist dunkelgraubraun. Eine solche von mir angeschliffene andere Psammornis-Scherbe zeigt *innen* elfenbeingelbe Färbung. Von den Mammillenköpfen ist nur noch wenig zu sehen. Die Poren sind *Punkte* bis zu etwa 0,5 mm. Durchmesser, einzeln oder in losen Gruppen stehend, also camelus-Typ, dazwischen stehen vereinzelte flache rundliche Gruben bis zu 2 mm. Durchmesser. Durch das lange Liegen im Sand allseitig glänzend poliert.

(*b*) Mehrere Scherben, gefunden 20 englische Meilen südlich von *Biskra* durch Hilgert sind betr. Erhaltungszustand, Schalendicke und Farbe ziemlich genau wie die vorigen. Die flachen Porengruben in denen wie zuvor unter der Lupe einzelne Stichporen noch eben erkannt werden können, sind deutlich auch mit blossem Auge zu sehen und neigen etwas zu *mehr viereckiger Form*. Schalendicke 3,2 mm., ursprünglich wohl 3,4 mm.

6. (*a*) Mehrere Scherben von *Ouargla und El Golea*, gesammelt durch Hartert und Hilgert sind *abweichend* von vorigen. Die Farbe ist sehr dunkel graubraun bis schwarzgrau, noch etwas dunkler als vorige, die Oberfläche glatt geschliffen, aber *netzartig granuliert*. Auffallend sind die ganz anderen, ziemlich radial verlaufenden Poren, welche die Form kurzer, gerader *Striche* (Kommaporen) haben. Unter der Lupe zeigen sich diese hellsafranrot gefärbt, etwas heller und rötlicher gegenüber den mehr sienna-braunen Poren rezenter Struthio-Eier. Glänzend. Innen ist die Schale graugelb. Die Mammillenköpfe sind nicht mehr vorhanden, da abgeschliffen. Schalendicke 2,5 mm., ursprünglich wohl 2,7 mm. Der Unterschied in der Schalendicke und der ganz andere Porencharakter weist auf das Vorliegen einer *besonderen Art* hin.

(*b*) Mehrere Scherben von *Temassin*, gesammelt durch Dr. Fromholz, sind weniger gut erhalten, stimmen aber soweit zu sehen ist, mit denen unter 6[a] überein.

7. **Aepyornis-Eien,** von Madagascar. Tring besitzt 5 vollkommen erhaltene, tadelfreie Exemplare. Das kleinste misst 285 · 213 mm. = 1560 Gramm, das grösste 314 × 242 mm. = 2025 Gramm. Unter Zugrundelegung des durch mich an Scherben ermittelten spezifischen Gewichtes von 2,50 ergeben sich die Schalendicken der allseitig geschlossenen Eier in Tring zu 3,53 bis 3,72 mm. Das sind geringere bis mittlere Dicken. Die Einzelheiten betr. Dimensionen sind aus der angefügten Tabelle ersichtlich. Wie bei fast allen *Aepyornis*-Eiern ist ihre Grundfarbe (Glasurschicht) hellbräunlich, teils mit gelblichem teils grauem Einschlag. Die Porengruben stehen sehr dicht und erscheinen meist als 2 bis 4 mm. lange, 0,1 bis 0,3 mm. breite, leicht gebogene, vielfach auch spirillenförmige, tief eingesenkte Strichel, zuweilen mit kurzen seitlichen Abzweigungen. Zwischen ihnen finden sich eine Menge z. T. in kurzen Reihen angeordnete feine und auch dicke Punktporen und zarte Komma. Der porenfreie Rest der Oberfläche ist glatt, meist etwas glänzend. Denselben Porencharakter fand ich bei allen durch mich untersuchten Eiern und Scherben solcher, mit einziger Ausnahme des Tring-Stückes No. 15 der Tabelle, wo von Strichen und Spirillen nichts zu sehen ist; dafür stehen eng aneinander *rundliche* Porengruben, wie sie *Struthio molybdophanes* zeigt, bei denen sie aber viel weniger dicht sind.

Das Tring-Ei No. 2 zeigt, genau wie eine meiner Scherben, zwar den allgemeinen Porencharakter, aber die Komma und Punkte sind soviel zarter, *ohne* alle dickeren Gruben und Punkte, dass sie vielleicht eine Art für sich begründen könnten.

Ich will einem Berufenern den Versuch überlassen, die Eier *bestimmten Arten* zuzuordnen, doch wage ich einige Andeutungen auf Grund meiner Studien und eigenen Beobachtungen über fast alle einschlägigen Beziehungen am Vogelei im Allgemeinen und über das relative Schalengewicht im Besondern (vergl. meinen Aufsatz in Beiträge Fortpfl. Biologie, Berlin 1925, p. 49 f.).

Daraus sind für die aufgeworfene Frage verwendbar folgende Feststellungen, *immer in Bezug nur auf nahe verwandte Arten* :

(*a*) Die grössere Art hat regelmässig das grössere *normale* Ei. (Auf die vereinzelten wirklichen Ausnahmen und die häufigen nur scheinbaren kann und braucht an dieser Stelle nicht eingegangen zu werden.)

(*b*) Das relative Schalengewicht wächst zwar mit zunehmender Eigrösse *verschiedener* Arten, bleibt aber ziemlich konstant bei verschiedenen Eigrössen *derselben* Art, solange diese nicht als anormal angesprochen werden müssen.

(*c*) Abnorm *kleine* Eier haben ein *höheres*, als das normale relative Schalengewicht, abnorm grosse Eier ein kleineres. (Die Kalkproduktion wird *nicht* proportional der Eigrösse vermindert und vermehrt, sondern nur in einem *geringeren* Masse.)

(*d*) Korn- und Poren-Gestaltung sind trotz individueller Variation in ihrer charakteristischen Erscheinung so konstant, dass beträchtliche Abweichungen das Vorliegen einer anderen Art wahrscheinlich machen.

Vom ersten flüchtigen Eindruck darf man sich dabei nicht zu einem Urteil verführen lassen, denn *so* leicht macht uns die Natur Erkenntnisse nicht.

Danach deute ich die Tabellen-Ergebnisse so :

Species I : Schalendicke 5,58 u. 5,85 mm.—Ei No. 1 ist ein sehr kleines Stück der grössten Art (No. No. 1 und 18).

Species II : Schalendicke 4,58 mm.—Nach der Schalendicke einer etwas kleineren Art angehörig (No. 14.)

Species III : Schalendicke 3,30–3,76 mm.—Nach der Schalendicke einer noch kleineren Art angehörig (No. 2 bis 13, 16 u. 17).

Wegen der stark verschiedenen Volumina vielleicht in 2 Arten zu trennen.

Species IV : Schalendicke 3,68 mm., Grösse wie III, aber durch Porencharakter geschieden (No. 15).

Dabei halte ich Ei No. 8 für ein abnorm dünnschaliges oder zu leicht gewogenes Stück, und No. 17 für ein abnorm grosses Stück, beide zu Species III gehörig.

Wenn in gleichem Zusammenhang Dr. A. B. Meyer in seiner eingangs zitierten Arbeit davon spricht, dass durch Erosion die Strukturunterschiede der *Aepyornis*-Eier bis zur Unerkennbarkeit beseitigt seien, kann er nur die wenigen in dieser Hinsicht schlechtest erhaltenen meinen. Alle mir bekannt gewordenen Eier zeigen eine charakteristische Oberflächenstruktur erfreulich deutlich, ebenso die Scherben, diese ausserdem gut sichtbare aber angeschliffene Mammillenköpfe. Manchmal hat man sogar den Eindruck, als könnten die Eier erst kürzlich produziert worden sein.

Ebensowenig kan ich ihm beipflichten in der Behauptung, dass die in wenigen Fällen sichtbare Ausfüllung der Porengruben mit einer "harten Masse" sei : "der macerierte Eiinhalt, der durch den Gasdruck des Fäulnisprozesses in die Poren drang und so zur besseren Conservierung der Schale beitrug usw."—Solche

Porenanfüllung und ähnliche Kalkauflagerungen kann man doch (bei manchen Arten sogar regelmässig) an Eiern von Francolinen, Wachteln, Pfauen (bes. Gefangenschaftsstücken) als eine alltägliche Erscheinung beobachten. Und der Fäulnisprozess des organischen Eiinhalts hat doch nicht Halt gemacht an der Eioberfläche! Kein *Aepyornis*-Ei enthält noch Reste des Eiinhalts, daher sind die Schalengewichte auch bei völlig geschlossenen Eiern zuverlässig feststellbar.

Andererseits verwirft Georg Krause (Ornitholog. Monatsschrift, Gera 1900) die Berücksichtigung der Schalengewichte als unmöglich, weil grosse Eier kleine Gewichte und umgekehrt zeigen, " ganz wie es die Verschiedenheit der Einlagerungsverhältnisse mit sich brachte." Der wahre Grund liegt aber darin, dass Krauses Zusammenstellung von 12 *Aepyornis*-Eiern Achsenfehler von 20 und 55 mm. enthält und sein grösstes Ei leider das allerleichteste ist wegen eines 2000 Gramm-Fehlers in der Gewichtsangabe! (meine No. 18). Mit seiner " höchst lehrreichen Gewichtsspalte " also ist es nichts, auch nicht mit seiner Abbildung No. 8, die längliche *Podiceps*-Form für *Aepyornis* zeigt! Dem kreisförmigen Breitenumfang von 670 mm. entspricht eben nicht eine Querachse von 160 mm., die aber Krause unüberlegt beibehält, wie Dr. Meyer ebenfalls. Ich will das jedoch nur als ein Beispiel für die Notwendigkeit überschüssiger Masse erwähnen, wodurch jeder, der Solches nicht nur flüchtig lesen, sondern damit weiterarbeiten will, in die Lage kommt, die Angaben selber rechnerisch nachzuprüfen als Schutz gegen Messungs- und Druckfehler.

8. **Dinornis spec.**—Moa von Neuseeland. Das in Tring befindliche kostbare Ei ist ein völlig fehlerfreies Exemplar, wie solche nur noch eins oder zwei bekannt sind. Es misst 198 × 140 mm. = 255 Gramm und ist von blassgraugelber Farbe und ohne Glanz. Form ziemlich elliptisch, beide Pole fast gleich gerundet. Die Poren bilden 2 bis 4 mm. lange, schmale, wellige und längsgerichtete Linien, die etwa 2 mm. von einander abstehen und mit einer schwärzlichen Masse angefüllt oder durch Spuren solcher braun gefärbt sind. Unter der Lupe zeigt sich, dass immer einige der eigentlichen Porenlumina in einer solchen tief eingesenkten Längsrille münden oder sich diese Linien aus einzelnen dicht neben einander stehenden Poren zusammensetzen.

Der Gesamteindruck dieser *Dinornis*-Poren kommt am nächsten dem von *argentinischen Rhea*-Eiern. Von irgend einer Ähnlichkeit der Oberflächengestaltung (Korn) bei *Dinornis* und *Apteryx* kann ich keine Spur entdecken.

Aus mehreren *Dinornis*-Scherben ergab sich das specifische Gewicht zu rund 2,50 und damit rechnerisch die Schalendicke des Tring-Eies zu 1,30 mm. Das Volumen beträgt 2,03 cbdcm, kommt also dem von *Struthio chersonensis* ziemlich gleich und übertrifft den Rauminhalt eines durchschnittlichen Straussen-eies um 35%. Sind die in meine Tabelle übernommenen Literaturangaben richtig, so gehört das Tring-Ei einer der *kleineren* Dinornis-Arten an.

Das Museum besitzt ausserdem eine ganze Anzahl matte *Scherben von Moa-Eiern* von blassgelblichrahmfarbenen Ton; 0,7 bis 1,5 mm. dick, welche vielleicht von 2 oder 3 verschiedenen Arten stammen. Anscheinend sind auch diese Scherben ursprünglich etwas stärker gewesen; um mehr als 0,1 oder 0,2 mm. wird es sich im Allgemeinen aber kaum handeln, denn nicht nur die Porenrillen und Poren sind meist deutlich erhalten, auch die Mammillen sind unter der Lupe zu erkennen, erscheinen aber flach und nicht als einzeln nebeneinanderstehende Kugelkalotten, sondern zu dünndarmförmigen Gebilden zusammengereiht

(Ähnlich wie die Erhöhungen bei Szielasko's Korn-Typ 17, Abb. Journal für Ornith. Berlin 1913 Tafel 2).

Jedenfalls besassen die *Dinornis*-Arten relativ *dünnschalige* Eier (Rg = 11–12%) im Vergleich mit *Struthio* (Rg. 18–20%). Vergleichsweise haben *Dromaeus, Casuarius* und *Rhea* Rg. = 12–14%; *Apteryx* 7–8%; Hühner 10%.

Im *Berliner Museum* befindet sich nur *eine* beiderseits ganz hell bräunliche Scherbe von 1,4 mm. Dicke mit Poren wie oben geschildert: längsgerichtete, parallellaufende Kommastriche mit einzelnen Punkten dazwischen, ziemlich dicht stehend und wie mit einem kleinen Meisel in die noch weiche Schale eingedrückt erscheinend; bis 2 mm. lang, 0,5 bis 2,0 mm. von einander abstehend. Das innere Drittel der Schale ist weiss, der Rest gelblich.

In die *Tabelle* übernahm ich aus der Literatur zum Vergleichen die im Eierkatalog des Britischen Museums erwähnten 3 *Dinornis*-Eier: 18,4 × 15,2, 19,7 × 13,3 und 20,6 × 15,0 mm.; ferner die beiden von George Dawson Rowley in Ornithological Miscellany abgebildeten und beschriebenen Stücke (Ibis 1878): 252 × 178 mm. und 190 × 151 mm.; schliesslich noch die in "Brehms Tierleben" (Leipzig 1911) 6. Band S. 81 erwähnten Exemplare 270 × 190 und 300 × 200 mm., sowie aus Ibis 1903 die von Dr. Meyer aufgeführten Stücke 233 × 183 (Otago Museum) und 229 × 127 mm. (Awaluai, Nordinsel).

Danach scheint es sich um etwa 3 Arten zu handeln:

Species I: 1,83 bis 2,43 ebdem Volumen.

Species II: 4,08 bis 5,10 ebdem Volumen.

Species III: 6,27 ebdem Volumen.

In diesem Zusammenhang möchte ich eine einzelne hellbräunliche *Scherbe aus der Mongolei* nicht unerwähnt lassen, die ich im *Britischen Museum* sah, als ich die vorübergehend dort befindlichen Cotypen von *Psammornis* aus Tring besichtigte. Flächeninhalt 16,8 qcm. Gewicht 11,62 Gramm. Schalendicke 2,7 mm. Das ergibt ein spezifisches Gewicht von 2,56. Die Mammillenköpfe sind ziemlich gut erhalten. Sehr *auffallend* ist die Form der Poren, kleine *Zickzack-Kritzel* wie sie mir bei keiner andern unter vielen fossilen Eischalen vorkamen. Sie stehen am nächsten den bei *Struthio camelus spatzi* Stres. zwischen den winzigen Punkt- und Komma-Poren verstreuten grösseren Kritzelporen, von denen sich eine Vorstellung ergibt, wenn man das geschlossene Netzwerk der Poren von *Struthio australis* Gurn. in einige Teile zerschnitten und diese weiter auseinander gestellt denkt (s. meine Abbildungen in Ornith. Mon. Berichte Berlin 1927 Seite 15). Wir finden also den Porentyp eines westafrikanischen Straussen in Ostasien wieder. Ich erwähne dies im Hinblick auf Dr. Andrews Bemerkung betreffend die umstrittenen *indischen* Scherben: " it seems curious that it should be the Somali Ostrich that most nearly resembles the fossil."

Interessant wäre auch, wenn sich über ein angeblich im Innern von *Celebes*(!) in 300 m. Höhe gefundenes Ei mit rundlichem Loch an einem Pol etwas Zuverlässiges feststellen liesse, von dem ich leider nur aus unwissenschaftlicher Quelle Kenntnis erhielt. (Bildbeilage der Berliner Morgenzeitung vom 15. III. 1903, wo es kurz beschrieben und zu Händen seines malayischen Besitzers abgebildet ist. Grösse etwa 18 × 14,5 mm., also wie bei chersonensis; dunkelbraun mit schwarzen Punkten.)

Zum Schluss möchte ich noch kurz eingehen auf die mir gestellte Frage, ob es sich bei dicken glatten fossilen Scherben aus der Mongolei vielleicht um *Dino-*

saurier-Eier handeln könne, im Hinblick auf den Fund von 40 Stück solcher im mongolischen Becken durch die amerikanische dritte sienforschungs-Expedition unter Roy Chapman Andrews im Jahre 1923. Im Brit. Museum befindet sich nur ein die Oberflächengestaltung nicht erkennen lassender Gipsabguss, dem ich nichts absehen konnte. Im Übrigen bin ich angewiesen auf den Bericht von Dr. Loeser, welchen dieser mit einer photographischen Abbildung eines der Eier nach der ersten Abhandlung von R. Ch. Andrews im "Asia Magazine" bringt in der naturwissenschaftlichen Wochenschrift "Umschau," Frankfurt am Main 1924 S. 732. Durch Ausmessung des 1 : 2,15 verkleinerten Bildes und Umrechnung auf die wirkliche Grösse ergeben sich die Eiachsen zu 200 : 80 mm.; Achsenverhältnis also $k = \frac{A}{B} = 2{,}50$ gegenüber dem äussersten Maximum von $k = 1{,}70$ bei noch als normal anzusprechenden längstgestreckten Vogeleiern. *Volumen* = 0·69 cbdem. Schalendicke 1,4—1,5 mm. Die Rechnung ergibt bei Annahme eines spezifischen Gewichtes von 2,5 ein Schalengewicht von g = 145 Gramm. Damit ein Eigewicht von G = 780 Gramm und das relative Schalengewicht Rg = 18,6%. Letzteres ist also wie bei Strausseneiern. Verwendbar für die Fragebeantwortung ist zunächst nur die Schalendicke. Da diese gegenüber den mongolischen Eischerben nur sehr gering ist, spricht sie *gegen* das Vorliegen von Dinosaurier-Eiern, wenn man bedenkt, dass die bis jetzt bekannten Stücke letzterer vermutlich schon einer *grossen* Art angehören, im Hinblick auf die Grösse von Eiern z. B. des Nilkrokodils (Volumen = 0,17 cbdem), des schwarzen Kaimans (Volumen = 0,10 cbdem) und des Breitstirn-Krokodils (Volumen = 0,07 cbdem). Ich möchte daher im Gegensatz zu Andrews die in der Nähe der Dinosaurier-Eier gefundenen Skelette von nur 3 m. Länge *nicht* für diejenigen der Erzeuger halten. Freilich ist man dabei leider auf blosse Analogieschlüsse angewiesen, die nie Gewissheit verbürgen.

Am meisten und deutlichsten spricht aber die kräftige Oberflächen-*Granulation* der Dinosaurier-Eier *gegen* das Vorliegen solcher. Die anscheinend halbkugeligen Körnel stehen dicht beieinander und haben in natürlicher Grösse etwa 1 mm. Durchmesser. Das ganz gleiche Bild, nur im verkleinerten Masse, zeigen in der Gefangenschaft gelegte Eier von grossen *Crax*-Arten. Eier rezenter Reptilien weisen solche Körnelung *nicht* auf. Die vielen Mongolischen *Vogel*-eischerben lassen keine Spur davon erkennen.

Die exakte Untersuchung fossiler Eischalen müsste auch die Prüfung von Dünnschliffen im *polarisierten Licht* umfassen, deren ausserordentliche Wichtigkeit für die Erkenntnis und für das Verständnis der Schalenstruktur besonders in der neuesten Arbeit von Professor W. J. Schmidt-Giessen über "Die Kalkschale des Sauropsideneies als geformtes Sekret" betont und erwiesen ist (Zeitschrift für Morphologie und Ökologie der Tiere, Berlin 1929, Seite 400—420), und in welcher auch wichtige Arbeiten anderer Autoren auf diesem Gebiete besprochen sind. Ob es möglich sein wird, *Mammillenköpfe* bei dem Dinosaurier zu untersuchen, entzieht sich meiner Kenntnis. Jedenfalls ist ihre Gruppierung schon bei den verschiedenen Vögeln verschieden.

MAASS-TABELLE

1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12.
Ifde Nr.	in Sammlung.	l. mm.	u. mm.	A. mm.	B. mm.	g. Gramm.	d. mm.	Vol. cbdm.	G. Kgr.	Rg. Prozent.	Bemerkungen.
	Aepyornis.										
1	London, No. 41848	777	670	280	213	2296	5,58	6,65	8,03	*28,6*	
2	Tring . . .	785	670	285	213	1560	3,64	6,73	7,66	20,4	zarte Porenstrichel, etwas abweichend
3	St. Omer . .	780	670	280	215	1500	3,53	6,75	7,65	19,7	
4	Hamburg . .	780	680	280	215	1580	3,58	6,75	7,70	20,5	
5	Dresden . .	790	675	285	215	1580	3,66	6,90	7,85	20,1	
6	Tring . . .	790	682	285	217	1645	3,74	7,03	8,02	20,5	
7	Berlin . . .	808	678	296	215	1490	3,35	7,16	8,06	18,5	
8	Athen . . .	810	670	298	217	*1380*	*3,05*	7,32	8,14	17,0	
9	Tring . . .	818	699	297	222	1645	3,53	7,63	8,62	19,1	
10	Dresden . .	843	720	305	229	1850	3,76	8,35	9,46	19,6	
11	Hildesheim . .	850	727	306	231	1665	3,38	8,55	9,55	17,4	
12	St. Omer . .	850	730	309	230	1800	3,61	8,55	9,63	18,7	
13	Paris . . .	897	708	340	225	2000	3,65	9,00	10,19	19,5	
14	Warmbrunn . .	867	735	315	234	2360	*4,58*	9,03	10,45	*22,6*	
15	Tring . . .	873	744	316	237	1935	3,68	9,30	10,46	18,5	runde Porengruben stark abweichend
16	Tring . . .	876	760	314	242	2025	3,72	9,61	10,82	18,7	
17	Hamburg . .	892	756	324	242	1830	3,30	9,90	11,00	*16,4*	
18	London, No. 41847	922	775	340	245	*3346*	*5,85*	10,68	12,69	*26,4*	
	Psammornis rothschildi Andr.										
19	Tring . . .	2 Scherben (ostlich Touggourt)		(250)	(190) nach Andrew		3,40	(4,47)		—	Typus
				(280)	(210) nach Schönwetter		3,30	(6,46)			
20	Tring . . .	mehrere Scherben (sudlich Biskra)					3,20				Hilgert coll.
	Struthio spec. extinct ?										
21	Tring . . .	mehrere Scherben (Ouargla, El Golea)		(180?)	(150?)		2,50				Hartert u. Hilgert coll.
22	Tring . . .	mehrere Scherben (sudlich Biskra)		(180?)	(150?)		2,50				Hilgert coll.
	Struthio indicus ?										
23	Tring . .	2 Scherben (Kain River)		(180?)	(150?)		2,30 2,40				
	Struthio camelus L.										
24	Tring . . .	zerbroch. Ei aus Grab Assuan (Korosko)					1,80				
25	Tring . . .	mehrere Scherben (El Meksa, Sahara)					1,80				Dr. Hartert coll.
26	Berlin . . .	mehrere Scherben (Ouargla)					1,90				Baron Geyr coll.
	Struthio chersonensis Brandt										
27*a*	Toronto ? . .	(494)	(452)	(170)	(144)	—	2,20?	1,83	—	—[1]	Kalgan,
b		(500)	(455)	(172)	(145)	—	2,60	1,90	—	—[1]	Peking
28	Leningrad . .	520	470	180	150	(505)	2,60	2,08	—	—	Typus (Gahnowska, Cherson)
29	Tring . . .	515	470	178	150	442	2,30	2,10	2,36	18,7	Provinz Honan, China
30	Tring . . .	516	478	176	152	440	2,30	2,13	2,39	18,4	Provinz Honan, China
31	London . .	eine einzelne Scherbe, Mongolei					2,70	—	—	—	Abweichende Porengruben wie bei *Str. camelus sputzi* Stres.

MAASS-TABELLE—*continued*

1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12.
lfde Nr.	m Sammlung.	U. mm.	n. mm.	A. mm.	B. mm.	g. Gramm.	d. mm.	Vol. cbdm.	G. Kgr.	Rg. Prozent.	Bemerkungen.
	Dinornis										
32	Cat. Eggs Brit. Museum	—	—	197	133	—	—	(1,83)	—	—	
33	Ibis 1903 (Dr. A. B. Meyer)	—	—	229	127	—	—	(1,93)		—	
34	Tring . . .	538	439	198	140	255	1,30	2,03	2,18	11,7	Tadelfreies Ei
35	Cat. Eggs, Brit Museum	—	—	184	152	—	—	(2,22)			
36	G. D. Rowley .	—	—	190	151	(ber. 291)	1,40	2,26	2,44	11,9	" *Dinornis crassus* "
37	Cat. Eggs, Brit. Museum	—	—	206	150	—	—	(2,43)	—	—	
38	Dunedin, N.Z. (Otago River)	—	—	233	183	—	—	(4,08)	—	—	Ibis 1903, Dr. A. B. Meyer.
39	G. D. Rowley .	—	—	252	178	(ber.) 508)	1,60	(4,16)	(4,46)	11,4	" *Dinornis ingens* "
40	Brehm's Tierleben, 1911 Seite 81	—	—	270	190	—	—	(5,10)	—	—	bei Kaiknra, 1860 gef.
41	Brehm's Tierleben, 1911 Seite 81	—	—	300	200	—	—	(6,27)	—	—	bei Cromwell 1867 gefunden
42	Tring . . .	mehrere Scherben					0,90bis 1,50				
43	Berlin . . .	eine Scherbe					1,50				
	Zum Vergleich :										
	Dinosaurus aus der Mongolei (Gobi) ; nach Abbildung " Umschau " Frankfurt am Main 1924 Seite 733.										
44		480	251	200	89	(ber. 145)	1,45	0,69	0,78	18,6	
45	*Crocodilus niloticus* Laur.	235	189	90	60	—	—	0,17	—	—	
46	*Caiman niger* Spix	200	155	76	49,5	10,5	0,60	0,10	0,11	9,6	2 Eier
47	*Osteolaemus tetraspis* Cope	185	135	72,5	43,0	9,0	0,55	0,07	0,08	11,2	1 Ei
48	*Struthio camelus* L.	457	421	156,5	134	290,5	1,85	1,47	1,64	17,6	Mittel aus 5 Eiern
49	*Struthio camelus syriacus* Rothsch.	405	362	142,3	115,1	193	1,58	1,00	1,11	17,5	Mittel aus 5 Eiern
50	*Struthio camelus spatzi* Stres. .	421	385	145	122,3	246	1,85	1,14	1,25	19,7	Mittel aus 7 Eiern
51	*Struthio molybdophanes* Reichw.	460	408	162	130	286	1,85	1,43	1,60	17,9	Mittel aus 4 Eiern
52	*Struthio massaicus* Neum.	447	389	159	124	258	1,78	1,28	1,43	18,0	Mittel aus 8 Eiern
53	*Struthio australis* Gurn	428	389	148	124	250	1,83	1,19	1,34	18,6	Mittel aus 4 Eiern
54	*Rhea am. rothschildi* Brab. u. Chubb	362	296	134,5	94,0	84,4	0,93	0,62	0,68	12,5	Mittel aus 4 Eiern
55	*Rhea garleppi* Chubb	329	266	122,5	84,8	57,5	0,81	0,46	0,50	11,6	Mittel aus 5 Eiern
56	*Casuarius bennetti* Gould	368	283	143	90	80	0,89	0,61	0,66	12,2	Mittel aus 2 Eiern
57	*Dromaeus nov. hollandiae* Lath.	355	290	132	92,5	75	0,86	0,60	0,65	11,6	Mittel aus 5 Eiern
58	*Apteryx mantelli* Bartl.	325	249	125,1	79,3	28,3	0,35	0,41	0,42	6,8	Mittel aus 32 Eiern
59	*Apteryx oweni* Gould	284	217	109,3	69,0	18,65	0,35	0,27	0,28	6,7	Mittel aus 18 Eiern

ÜBER DIE EIER DER PARADIESVÖGEL.

VON M. SCHÖNWETTER.

UNTER diesem Titel brachte Dr. Hartert in NOVITATES ZOOLOGICAE, Vol. XVII. Dezember 1910 die erste grössere Abhandlung über die Eier der Paradiesvögel einschliesslich der sogenannten Laubenvögel mit einer prachtvollen Bunttafel, welche alle bekannten Typen von Paradiesvogeleiern darstellt, und damit eine viel bessere Vorstellung ermöglicht, als die umständliche Beschreibung der Farben und Zeichnungscharaktere durch Worte geben könnte.

Die damaligen Ausführungen betrafen bereits 34 Arten, davon 23 in Lord Rothschilds Museum in Tring, in dem sich seiner Zeit 42 Eier befanden, und das wohl für immer die reichhaltigste Paradiesvogeleier-Sammlung besitzt.

Inzwischen hat sich die Zahl der hinsichtlich ihrer Eier bekannt gewordenen Arten und Formen auf 47 vermehrt, von denen sich in Tring heute 34 in 96 Stücken befinden.

Nachdem ich diese Eier und noch weitere 52 Stück anderer Sammlungen untersuchen konnte, möchten nachstehende Angaben als eine Ergänzung zu Dr. Harterts Arbeit dienen.

Der Vollständigkeit wegen notiere ich auch Massangaben aus der Literatur, erkenntlich am Fehlen der Schalengewichte,[1] wodurch die Anzahl der Stücke, für welche nachstehend Masszahlen vorliegen, sich auf 222 beläuft.

Von einigen gelegentlichen Anmerkungen abgesehen, gebe ich Beschreibungen der Eier nur bei den in Dr. Hartert's Arbeit nicht enthaltenen Arten, deren laufende Nummer durch ein * gekennzeichnet ist.

Die durch + verbundenen Angaben betreffen Gelege.

Die Hartert'sche *Einteilung in Färbungsgruppen* (s. Seite 484 seiner Arbeit) möchte ich etwas erweitern und wie folgt vorschlagen:

I. Aelurocdus-Typ: *Aelurocdus*, *Scenopoectes*, *Amblyornis*, *Prionodura* (einfarbig, Farbton wie bei *Ammoperdix*, *Galliperdix*, *Odontophorus* und manchen Fasanen).

II. Paradisaea-Typ: *Paradisaea*, *Ptilorhis*, *Seleucides*, *Astrapia*, *Diphyllodes*, *Falcinellus* (charakteristisch sind die sehr lang wie mit dem Pinsel ausgezogene Streifenflecken).

III. Corviden-Typ (erythritisch): *Phonygammus*, *Parotia*, *Drepanornis* u. *Lophorina* (purpurfarbener Typ) (*Phonygammus*, *Drepanornis* u. *Lophorina* erinnern etwas an *Heterocorax capensis*; *Parotia* an *Cissolopha beecheyi* und *melanocyanea*).

[1] Eierbeschreibungen ohne Gewichtsangaben sind unvollständig, denn die Eischale ist ein Körper, hat also 3 Dimensionen. Man soll die dritte, die Schalendicke, nicht unberücksichtigt lassen, sie gibt oft wertvollste Aufschlüsse z. B. über die Artzugehörigkeit, über das Vorliegen kleiner Eier grösserer Arten oder umgekehrt. Da die Schalendicke meist nicht ohne Zerstörung des Eies direkt feststellbar ist, nimmt man als Ersatz das Schalengewicht, aus dem sich die Dicke berechnen lässt. Seit ich so viele unrichtig bestimmte Eier selbst in den bedeutendsten Sammlungen und von sonst zuverlässigsten Sammlern ganz wesentlich durch Wägung fand, und auch andere interessante Beziehungen beim Wägen erkannte, möchte ich die Gewichtsangaben nirgends mehr missen, obgleich sie für manche wissenschaftliche Zwecke nicht nötig sind und in vielen Fällen als Kriterien sogar versagen.

IV. Ralliden-Typ: *Ptilonorhynchus*, *Manucodia* (Anklänge an *Porphyrio poliocephalus* und an *Rallus crepitans*).

V. Chlamydera-Typ: *Chlamydera*, *Sericulus*, *Lycocorax* (einen ähnlichen Fleckentyp-Wirrlinien zeigen z. B. *Emberiza cia* u. *Quiscalus major*).

Alle Masse sind in *Millimetern*, die Gewichte in *Gramm* angegeben.

Die Mass-Abweichungen in den nachstehenden Nummern 1, 3, 7, 24, 32 und 39 von den Angaben in Dr. Hartert's Arbeit beruhen auf Druckfehlern der letzteren.

1. **Ptilonorhynchus violaceus** (Vieill.).

Tring	43,7 × 28,7 = 1,30 gr.	47,0 × 30,0 = defekt
Nehrkorn	42,3 × 29,6 = 1,15 gr.	41,9 × 29,8 = 1,31 gr.
Campbell	44,7 × 30,2	44,2 × 29,8
North	44,5 × 29,2	43,2 × 29,4
(I. Auflage)	46,2 × 30,0	44,7 × 29,6

2. **Aeluroedus viridis** (Lath.).

Tring	— (siehe unter 4)	
Nehrkorn	42,2 × 31,6 = 1,23 gr.	42,4 × 31,4 × 1,18 gr.
Campbell	44,7 × 31,5 + 43,7 × 31,2 + 44,5 × 31,2	
	43,0 × 30,5 + 42,6 × 30,0	
Schönwetter	43,4 × 30,7 = 1,33 gr.	

Einfarbig, hellgelbbräunlich.

3. **Aeluroedus maculosus** Rams.

Tring	42,6 × 27,8 = 1,00 gr. + 41,0 × 27,8 × 1,00 gr.	
	38,4 × 28,1 = 1,15 gr.	
Nehrkorn	39,5 × 28,2 = 1,00 gr.	39,7 × 29,2 = 0,99 gr.
Domeier	40,5 × 26,1 = 0,87 gr.	39,0 × 26,9 = 0,84 gr.
Campbell	40,1 × 26,2.....+.....38,0 × 27,9	
	43,2 × 26,9 + 40,0 × 28,9 + 37,3 × 28,6	
Mus. Berlin	39,2 × 27,2 = 0,90 gr.	
Schönwetter	38,2 × 28,0 = 0,96 gr.	
v. Treskow	37,0 × 28,0 = 0,96 gr.	

4. **Aeluroedus buccoides molestus** R. & H.[1]

Tring	41,3 × 26,5 = 0,81 gr.	39,8 × 26,0 = 0,82 gr.
Nehrkorn	40,4 × 26,5 = 0,83 gr.	43,7 × 28,0 = 0,90 gr.
Schönwetter	38,5 × 27,4 = 0,84 gr.	

Tring besitzt ausserdem ein durch Nehrkorn dieser Art zugeschriebenes grösseres Stück: 45,0 × 29,1 = 1,25 gr. Stammt dies wirklich vom Sattelberg, dürfte es sich um eine noch nicht beschriebene Art handeln. Vermutlich liegt aber ein Irrtum Nehrkorns vor, und dieses Ei wird zu *Aeluroedus viridis* Lath. aus Australien gehören, worauf Grösse und Gewicht der Eischale hindeutet.

[1] S. *Nov. Zool.* XXXV, p. 59, 1929, wo die Formen von *Ae. buccoides* näher auseinandergesetzt wurden.

*5. **Aeluroedus stonei** Sharpe.

Brit. Museum . . . 42,0 × 25,4 S.O. Neu Guinea.

Dieses von Weiske gesammelte Stück wird im Katalog des Museums als zu *stonei* gehörig vermutet.—Schmaloval, leicht glänzend, blass gelbbräunlich.

*6. **Aeluroedus melanocephalus** (Ramsay).

Tring . . . . 42,4 × 30,9 = 1,00 gr. 42,2 × 31,0 = 1,03 gr.

Einfarbig blass gelbbräunlich.

Brit. Museum Cat. . . 45,7 × 31,0

S.O. New Guinea (Weiske).

7. **Scenopoeetes dentirostris** (Rams.).

Tring . . . . 43,3 × 27,0 = 1,02 gr. + 41,9 × 28,0 × 1,02 gr.

44,2 × 28,8 = 1,18 gr. + 43,5 × 29,3 = 1,25 gr.

Diese beiden Eier haben abnorme Kalkknötchen auf der Schale;

40,4 × 29,4 = 1,09 gr. 43,6 × 28,3 = 1,11 gr.

Alle einfarbig blassgelbbräunlich.

8. **Chlamydera cerviniventris** Gould.

Tring . . . . 40,9 × 28,0 = 1,32 gr.

Nehrkorn . . . 39,8 × 28,1 × 1,07 gr.

North . . . . 35,6 × 26,2

Wie *Sericulus chrysocephalus* gefärbt.

9. **Chlamydera maculata** (Gould).

Nehrkorn . . . 38,0 × 26,7 = 1,06 gr. 39,8 × 25,2 = 1,00 gr.

Campbell . . . 39,8 × 26,9.....+.....38,1 × 27,2

41,6 × 26,4 + 41,3 × 26,7 + 39,4 × 26,4

41,9 × 27,4.....+.....41,6 × 26,9

41,5 × 27,4

North . . . . 37,3 × 27,7 ....+.....38,1 × 27,7

38,1 × 28,0.....+.....38,9 × 27,7

Brit. Mus. Cat. gibt kleine

Masse. (S. 15.) . . 36,8 × 26,2 35,3 × 25,4 34,3 × 24,9

10. **Chlamydera nuchalis nuchalis** (Jard. & Selby).

Tring . . . . 43,5 × 30,3 = 1,51 gr. 42,2 × 30,1 = 1,58 gr.

42,7 × 28,6 = 1,22 gr. 40,7 × 30,0 = 1,38 gr.

42,8 × 29,7 = 1,29 gr. 39,0 × 28,2 = 1,15 gr.

Campbell . . . 45,8 × 30,0 43,0 × 28,2 41,2 × 30,5

*11. **Chlamydera nuchalis oweni** Mathews.

Tring: wie *nuchalis nuchalis* gefärbt.

47,0 × 28,9 = 1,39 gr. 42,8 × 29,5 = 1,34 gr.

41,2 × 28,9 = 1,25 gr. 41,0 × 28,2 = 1,24 gr.

42,1 × 29,6 = 1,50 gr. 41,3 × 28,0 = 1,29 gr.

Die Färbung ist wie bei *Chlamydera nuchalis nuchalis*.

12. **Chlamydera nuchalis orientalis** Gould.

Nehrkorn . . . 40,6 × 28,1 = 1,20 gr.
Domeier . . . . 40,6 × 28,9 = 1,25 gr.
Campbell . . . 42,7 × 28,4.....+.....39,8 × 29,5
38,6 × 28,4.....+.....39,1 × 27,9

13. **Chlamydera guttata** Gould.

Campbell . . . 39,6 × 25,9

14. **Amblyornis inornatus** (Schl.).

Nehrkorn . . . 40,2 × 28,3 = 1,00 gr.
Schönwetter . . . 43,4 × 29,2 = 0,98 gr.
Brit. Mus. Cat. . . 42,0 × 27,9

Alle 3 von Weiske in S.O. Neu Guinea gesammelt. Diese Eier sind rahmweiss, nicht gelblich, gleichen in der Farbe also denen von *Prionodura newtoniana*.

Ich vermute, dass auch das im Cat. Brit. Museum als *Amblyornis subalaris* Sharpe beschriebene Ei 40,6 × 28,2 S.O. Neu Guinea (Weiske coll.) rahmfarben, hierher gehört.

15. **Sericulus chrysocephalus** Lewin.

Nehrkorn . . . 36,8 × 26,0 = 0,85 gr. 38,5 × 26,8 = 0,90 gr.
Schönwetter . . . 37,6 × 25,4 = 0,83 gr.
Campbell . . . . 39,8 × 27,9.....+.....39,4 × 27,2
39,9 × 26,9.....+.....38,6 × 26,4

Färbung und Zeichnung genau wie die Hartert'sche Abbildung No. 17 (*Chlamydera cerviniventris*).

16. **Prionodura newtoniana** de Vis.

Tring . . . . 34,7 × 25,0 = 0,59 gr.

17. **Parotia sexpennis lawesi** Rams.

Tring . . . . 33,1 × 24,1 = 0,62 gr.

18. **Lophorina superba minor** Rams.

Tring . . . . 31,6 × 20,7 = 0,44 gr. 32,1 × 22,5 = 0,35 gr.

*19. **Lophorina latipennis** Rothsch.

N.O. New Guinea (Sattelberg). Wahnes coll.

Nehrkorn . . . 30,1 × 21,5 = 0,45 gr. 27,6 × 22,2 = 0,42 gr.
Domeier . . . . 33,8 × 23,8 = 0,55 gr. 32,2 × 23,3 = 0,48 gr.

Der Färbungscharakter dieser Eier steht in der Mitte zwischen den beiden Hartert'schen Abbildungen No. No. 22 und 23 (*Lophorina superba minor*).

20. **Ptilorhis magnifica intercedens** Sharpe.

Tring . . . . 34,8 × 23,6 = 0,60 gr...+ 34,3 × 23,4 = 0,65 gr.
34,3 × 23,7 = 0,61 gr. + 33,4 × 23,3 = 0,56 gr.
34,1 × 24,5 = 0,60 gr. + 34,4 × 24,5 = 0,62 gr.
Brit. Mus. Cat. . . 35,0 × 24,2 34,3 × 23,6 32,0 × 23,6
35,6 × 24,4 34,8 × 24,1

21. **Ptilorhis magnifica alberti** Elliot.

Nehrkorn . . . 32,0 × 23,0 = 0,54 gr.
Campbell . . . 32,3 × 22,8.....+.....33,0 × 22,6
32,5 × 24,1.....+.....34,0 × 24,9
Brit. Mus. Cat. . . 32,7 × 22,6.....32,0 × 22,9

22. **Ptilorhis victoriae** Gould.

Tring . . . . 31,2 × 22,3 = 0,50 gr. + 31,0 × 22,4 = 0,48 gr.
30,3 × 22,8 = 0,50 gr. + 31,2 × 23,1 = 0,51 gr.
Grundfarbe: rosa.
34,9 × 23,0 = 0,48 gr. + 32,9 × 23,3 = 0,49 gr.
Grundfarbe: gelblich.
Campbell . . . 31,5 × 23,4 + 31,5 × 22,6
Le Souëf . . . 31,2 × 23,4

23. **Ptilorhis paradisea** Sw.

Campbell . . . 32,8 × 24,9
32,8 × 23,9.....+.....35,0 × 23,4
34,5 × 23,4.....+.....34,5 × 22,8

24. **Seleucides ignotus** (Forst.).

Tring . . . . 39,1 × 27,1 = 0,66 gr.

Zeichnungscharakter wie *Paradisaea*, aber Farben wie *Manucodia*.

25. **Astrapia stephaniae** (Finsch & Meyer).

Ogilvie Grant (*Ibis* 1912) hält das von Dr. Hartert beschriebene und abgebildete Ei (36,5 × 25,4 Tring) für *Paradisaea raggiana* Sel.

Ein in Mr. Brooks Vogelhaus gelegtes sicheres Ei von *Astrapia stephaniae* ist grösser und misst 42,5 × 28,0 mm.

*26. **Astrapia rothschildi** Foerster.

Tring . . . . 35,3 × 26,2 = 0,63 gr.
33,6 × 27,8 = 0,65 gr.
36,8 × 28,2 = 0,72 gr.

Paradisaea-Charakter, Grundfarbe rötlichgrau bis rötlichbraun, von Lord Rothschild (*Ibis* 1912) beschrieben. Rawlinson Mts., N.O. Neu Guinea; Keysser coll.

*27. **Diphyllodes magnifica hunsteini** Finsch & Meyer.

Tring . . . . 30,5 × 23,0 = 0,46 gr. + 30,5 × 24,0 = 0,47 gr.
32,3 × 22,0 = 0,47 gr. + 32,3 × 22,0 = 0,47 gr.
32,8 × 23,3 = 0,45 gr. 32,5 × 23,3 = defekt

von Rawlinson Mts. N.O. Neu Guinea; gelblichrahmfarbener Grund mit hellbraunen und grauen Längswischern, ähnlich *Paradisaea minor*.

28. **Paradisaea apoda** L.

Tring . . . . 38,4 × 25,4 = defekt 35,2 × 25,5 = 0,63 gr.

Trotz der geringen Masse sicher, da von Aru stammend, wo nur *apoda* vorkommt.

Ogilvie Grant (*Ibis* 1912) meint, dass das von Dr. A. B. Meyer 1884 in Madarasz Zeitschr. f. d. ges. Ornith. beschriebene und abgebildete Ei (35 × 25) zu *Paradisaea raggiana* gehören werde. Da es von Aru stammt, dürfte es aber apoda sein. Das Stück im Brit. Museum von Wokan Ist (Aru) misst 39,1 × 27,4 und dürfte die normale Grösse darstellen.

*29. **Paradisaea guilelmi** Cab.

N.O. Neu Guinea (Sattelberg)

Tring 36,3 × 25,0 = 0,62 gr. + 36,3 × 26,0 = 0,62 gr.
36,2 × 26,3 = 0,70 gr. 38,5 × 27,1 = 0,79 gr. 36,3 × 24,5 = 0,57 gr.

Von Lord Rothschild (*Ibis* 1912) beschrieben. Grundfarbe gelblichrahmfarben bis rosa, Charakter wie die anderen Paradisaea Eier. Dass die braunroten und grauen Längswischer bald dünner, bald dicker sind und hier dichter, dort weniger dicht stehen, dürfte nur individuell sein, nicht spezifischer Unterschied.

30. **Paradisaea raggiana** Scl.

Tring . . . . 38,2 × 24,4 = 0,63 gr. 37,7 × 25,7 = 0,73 gr.
36,5 × 25,4 = —

(s. Bemerkung unter 25, *Astrapia stephaniae*.)

Ogilvie Grant (*Ibis* 1912 Abb.) 35,6 × 23,3 36,1 × 25,9

31. **Paradisaea rudolphi** (Finsch).

Tring . . . . 38,5 × 24,3 = 0,74 gr.

Rosa Grundfarbe, aber nicht so leuchtend rot, als wie bei *Paradisaea augustae-victoriae* vorkommend.

32. **Paradisaea minor minor** Shaw.

Tring . . . . 35,3 × 25,9 = 0,61 gr. 36,5 × 26,2 = 0,68 gr.

Gelblichrahmfarber Grund (ohne rosa Ton).

33. **Paradisaea minor finschi** A. B. Meyer.

Tring . . . . 36,0 × 26,0 = 0,67 gr. 35,2 × 26,2 = 0,68 gr.

34. **Paradisaea augustae-victoriae** Cab.

Tring . . . . 35,5 × 24,7 = 0,63 gr. + 35,2 × 24,5 = 0,62 gr.
34,2 × 24,9 = 0,67 gr. + 35,9 × 24,7 = 0,67 gr.
36,7 × 25,8 = 0,73 gr. + 35,1 × 25,9 = 0,71 gr.
39,0 × 25,8 = 0,72 gr.
38,2 × 26,3 = 0,69 gr. + 36,4 × 25,4 = 0,64 gr.
Nehrkorn . . . 35,5 × 24,1 = 0,62 gr. 36,2 × 24,9 = 0,66 gr.
A. B. Meyer . . . 38,0 × 25,5 / 36,5 × 25,0 = 0,70 gr.
Domeier . . . . 37,0 × 26,2 = —
Schönwetter . . . 34,4 × 24,6 = 0,60 gr.

Nur einzelne Stücke haben gelblichen Grund mit olivbrauner Fleckung, die meisten aber rosa Grund mit leuchtenden purpurroten Flecken, die immer stark langgezogen sind. Ganz prachtvolle Eier.

35. **Manucodia ater ater** (Less.).

Tring . . . . 41,4 × 27,2 = 0,96 gr.
N.O. New Guinea, Wahnes coll.
Nehrkorn . . . 39,0 × 26,4 = 0,72 gr. 37,5 × 26,5 = 0,72 gr.
Diese von "S.W. Neu Guinea" stammenden Stücke gehören vielleicht einer anderen Form an.
Schönwetter . . . 37,0 × 27,2 = ca. 0,80 gr. defekt.
Sattelberg, N.O. Neu Guinea, Wahnes coll.

36. **Manucodia ater subalter** Rothsch. & Hart.

Tring . . . . 41,1 × 27,5 = 1,04 gr. 42,4 × 29,4 = 0,88 gr.
Aru Inseln. Das letzte erinnert an ein Rallenei.
38,0 × 28,1 = 0,85 gr. 38,0 × 27,1 = 0,81 gr.

Wie *ater* und *chalybata* gefärbt. Sariba Insel, S.O. Neu Guinea. Hierher gehört wohl auch das Stück im Brit. Museum 39,4 × 25,2 von Weiske in S.O. Neu Guinea gesammelt.

37. **Manucodia chalybata orientalis** Salvad.

Tring . 35,2 × 26,8 = 0,70 gr. 35,0 × 27,0 = 0,69 gr. 36,8 × 26,8 = 0,66 gr.
Nehrkorn . 35,1 × 28,1 = 0,72 gr. 36,3 × 27,4 = 0,74 gr. 38,3 × 25,6 = 0,70 gr.
Schönwetter 35,8 × 26,3 = 0,71 gr. 34,5 × 27,2 = 0,70 gr.
Huhn . 33,6 × 25,6 = 0,66 gr. 36,0 × 25,7 = 0,69 gr.
Zum Teil lang gezogene Flecken.
Domeier . 35,5 × 25,7 = 0,71 gr. 35,4 × 26,5 = 0,70 gr.
v. Treskow 35,1 × 25,2 = 0,71 gr.
Oberflecke rundlich, Unterflecken längsstreifig.
Alle von Wahnes in N.O. Neu Guinea gesammelt.

38. **Manucodia comrii** Scl.

Tring . . 42,6 × 29,5 = ca. 1,10 gr. (defekt) 45,5 × 30,6 = 1,18 gr.

*39. **Manucodia jobiensis** Salvad.

Brit. Mus. . . . 31,8 × 24,2 + 31,8 × 24,6 } Pariman, Mimikafluss südliches Holländ. Neu Guinea.
Gefärbt wie die übrigen *Manucodia* Eier.

40. **Phonygammus jamesi** Sharpe.

Tring . . . . 37,7 × 24,1 = 0,58 gr. + 35,5 × 23,9 = 0,61 gr.
Owen Stanley Mts., S.O. Neu Guinea (Anthony coll.).
Nehrkorn . . . 36,8 × 25,9 = 0,68 gr.
S.O. Neu Guinea (Weiske coll.).
Schönwetter . . . 36,8 × 25,5 = 0,67 gr. } Gelege.
Huhn . . . . 36,6 × 25,6 = 0,67 gr. }
N.O. Neu Guinea (Wahnes coll.).

41. **Phonygammus gouldi** (Gray).

Le Souëf (*Ibis*, 1898), Cap York. Die Eier ähneln *Chibia bracteata*, schmutzigweiss oder mit rosa Schimmer; Längsstreifen über die ganze Eifläche

verteilt in verschieden braunen und grauen Tönen. Die Oberflecken sind am stumpfen Ende mehr gehäuft.

35,6 × 26,9 35,8 × 26,4

Campbell's Abbildung und Beschreibung ist aber ganz anders und entspricht den Eiern von *Phonygammus jamesi*: rosa Grund mit dunkleren rosaroten, rötlichbraunen u. purpurfarbenen, weniger hervortretenden Flecken 36,0 × 24,7 u. 36,0 × 24,2 N. Queensland.

*42. **Phonygammus keraudreni** (Lesson et Garnier).

Tring . . . . 32,4 × 23,1 = 0,54 gr.) Aru Inseln; Forster coll.,
33,0 × 23,1 = 0,52 gr.) wie *Phonygammus jamesi* gefärbt.

*43. **Phonygammus** ?

Tring . . . . 39,1 × 26,8 = 0,80 gr.

Aru Inseln; Forster coll.: wie *Phonygammus jamesi* gefärbt, wegen der starken Grössen- und Gewichtsunterschiede wohl einer anderen Art angehörig ?

44. **Lycocorax obiensis** Bernst.

Nehrkorn . . . 41,0 × 29,0 = 1,04 gr.

Einziges bekanntes Stück. Es hat rosagrauen Grund mit einem Kranz von purpurschwarzen Wirrlinien nahe dem stumpfen Pol. Die Oberfläche ist im Übrigen ohne Zeichnungen. Insel Obi.

*45. **Falcinellus striatus meyeri** Finsch.

Tring . . . . 36,4 × 25,5 = 0,59 gr.

S.O. Neu Guinea. Owen Stanley Mts.; Anthony coll. hellbraun mit recht dunklen bis schwarzbraunen Längswischern.

*46. **Drepanornis albertisi cervinicauda** Sclater.

Tring . . . . 31,5 × 24,1 = 0,54 gr.

Meliphagiden-Charakter; *keine* Längswischer. Rosa Grund mit kleinen rotbraunen und grauen Pünktchen; dazwischen einzelne blasse rotbraune grössere Fleckchen (etwa 2 × 3 mm.). S.O. Neu Guinea, Owen Stanley Mts. 6000 Fuss. Anthony coll.

*47. **Drepanornis albertisi geisleri** A. B. Meyer.

Tring . . . . 30,6 × 22,5 = 0,48 gr. 32,1 × 22,0 = 0,44 gr.

Gesamteindruck: rötlichbraun und grau. Über und über lebhaft rötlichbraun und grau gefleckt. Die Flecken sind etwas längsgerichtet, aber *nicht* nach *Paradisaea*-Art lang ausgezogen.

UEBER DEN FORMENKREIS DES *CHARADRIUS ALEXANDRINUS*.

VON OSCAR NEUMANN.

DIE SÜDKÜSTE des Somalilandes zwischen Obbia und Kismayu wird von einem kleinen Regenpfeifer bewohnt, den Erlanger, Journal für Ornithologie 1905, p. 62 als *Charadrius marginatus*, Hilgert, Katalog der Erlanger-Sammlung p. 447 als *Ch. marginatus marginatus*, Witherby, Ibis 1905, p. 524 als *Aegialites marginatus* und Zedlitz, Journal für Ornithologie 1914 p. 626 als *Charadrius marginatus tenellus* aufführen. Er ist von Hammerton am 15. Januar bei Obbia, von Müller am 6. März bei Mogadishu, von Baron Erlanger am 10. bis 13. Juli bei Kismayu gesammelt worden. Der direkte Vergleich aller dieser Stücke, für deren Zusendung ich den Leitern der Ornithologischen Abteilungen des British Museums, des Senckenbergischen und des Stockholmer Museums hier nochmals danke, zeigt, dass sie einer noch unbenannten Form angehören, die die Kluft zwischen den Formenkreisen *Charadrius alexandrinus* und *Charadrius marginatus* vollkommen überbrückt. Ich nenne sie

Charadrius alexandrinus pons nov. subsp.

Oberseite erheblich blasser als sowohl die unter *alexandrinus* als auch die unter *marginatus* bisher vereinigten Formen. Unterseite in beiden Geschlechtern—jedenfalls vom Januar bis Juli—rein weiss ohne Spur eines rötlichen oder gelblichen Tones. Dem *Ch. alexandrinus* somit äusserlich ähnlicher, aber ohne jede Spur des braunen oder schwarzen bandartigen Fleckens jederseits des Kropfes, welchen die bisher zu *alexandrinus* gerechneten Formen so deutlich zeigen. Ein helles (weisses oder hellisabellfarbenes) Nackenband meist nur angedeutet. Sehr wenig weiss an der Basis der Aussenfahne der innersten Handschwingen.

Fl. ♂ 100–4 mm. ♀ 98–102 mm.

Verbreitung: Küste des Süd-Somalilandes, zum mindesten von Obbia bis Kismayu.

Untersucht: 3 ♂♂ 6 ♀♀ (Frankfurt a. M., London, Stockholm).

Typus im Senckenbergischen Museum in Frankfurt a. M. No. 12223, ♂ Kismayu 11. Juli 1901 v. Erlanger leg.

v. Erlanger vermutet, dass die Rasse im Juli am Strande von Kismayu brütet, da die Stücke pärchenweise zusammenhielten und die Sexualorgane stark entwickelt waren.

Ich gebe hier nunmehr eine Zusammenstellung der in diesen Formenkreis gehörigen Formen mit ihren Brutgebieten und einigen kurzen Bemerkungen.

1. **Ch. a. alexandrinus** L.

Von den Azoren über das ganze gemässigte Europa und Asien bis Korea. In Afrika von Nord-Marokko bis Aegypten und zum Sinai Näheres siehe bei Hartert: Vögel der paläarktischen Fauna pp. 1538–9.

Ich möchte nach eingehender Untersuchung den *Charadrius a. elegans* Rchw. ex. Lcht., Journal für Ornithologie 1904 p. 307, der am Sinai brütet,

nicht von der Nominatform trennen. Der Typus hat allerdings einen *etwas* längeren Schnabel als die meisten Europäer. Gleichzeitig mit ihm erlegte Stücke sind aber nicht unterscheidbar vom typischen *alexandrinus*. Vielleicht ist die Sinai-Form jedoch auf dem Rücken etwas dunkler als Nordsee-Stücke.

2. **Ch. a. spatzi** nov. subspec.

Die in Rio de Oro brütende Form ist heller als alle Europäer. Der Fleck jederseits des Kropfes tiefschwarz.

Fl. ♂ 103–12 ♀ 112 mm.

3 Exemplare verglichen, cf. Ornithologische Monatsberichte 1927 p. 138.

Typus im Berliner Museum: ♂ Rio de Oro, 15. April 1926, Paul Spatz leg.

Wie weit das Brutgebiet dieser Form nach Norden und nach Süden reicht, bleibt festzustellen.

3. **Ch. a. alexandrinus ≦ a. seebohmi.**

An der Nordsomaliküste brütet eine Form, die in den Flügelmassen ziemlich genau in der Mitte steht zwischen dem echten *Ch. a. alexandrinus* und dem kleineren *Ch. a. seebohmi* Hart. et Jacks. von Ceylon.

4. **Ch. a. seebohmi** Hart. et Jacks.

Ceylon.

5. **Ch. a. dealbatus** Seeb.

Südchina, Hainan, Formosa und Riu Riu Inseln, nach Hartert bis Japan.

Japanische Brutstücke sollten mit solchen von Formosa und Hainan verglichen werden.

Diese Form ist nicht nur langschnäbeliger, was Hartert als einzigen Unterschied angiebt, sondern, zum mindesten Formosa Exemplare, von denen mir eine grosse Serie vorliegt, ganz erheblich dunkler als die vorgenannten Formen. Vielleicht ist die sehr dunkle Formosa Rasse von *Ch. a. dealbatus* (terra typica: Süd China) abzutrennen.

6. **Ch. a. pons** Neum. **(siehe oben).**

Küste des Süd Somalilandes.

7. **Ch. alexandrinus** subsp.

Einen merkwürdigen Vogel sammelte v. Heuglin bei Djeddah an der Westküste von Arabien und bildete ihn: "Ornithologie Nordost Afrikas" T. XXXIV No. 6 als *Charadrius marginatus* ab. Der Vogel ist viel blasser als alle zu diesem Formenkreis gehörenden Rassen der alten Welt und kann im Farbenton nur mit dem *Ch. a. tenuirostris* Lawr. von den Randländern des Golfes von Mexico (Florida, Mississippi, Alabama, Texas, Ost Mexico und grosse Antillen) verglichen werden. Ihm fehlt auch wie den amerikanischen Formen jede Andeutung eines dunklen Zügels. Sehr wahrscheinlich eine noch zu benennende Form.

Ehe ich die bisher unter dem Namen *Ch. marginatus marginatus* und *Ch. m. tenellus* resp. *Ch. m. pallidus* bekannten Formen bespreche, muss ich bezüglich der Namen *marginatus* und *pallidus* ein paar Vorbemerkungen machen.

Vieillot beschrieb im Nouveau Dictionnaire d'Histoire naturelle, Tome

XXVII (1818), pp. 138–9, den *Charadrius marginatus* Geoffr. St. Hilaire mit folgenden Worten: "Bandelette noire sur le sinciput; front, gorge et parties postérieures blancs, ailes et queue noires; lorum, reste de la tête et toutes les parties supérieures grises; longueur du *petit pluvier à collier* (*Charadrius minor* Meyer = *Ch. dubius*); mais taille plus ramassée." Ein Fundort ist nicht angegeben. Diese Beschreibung ist natürlich sehr ungenau. Sie passt auf viele Arten ziemlich gut, auf keine vollkommen.

Valenciennes bezieht im Dictionnaire des scienees naturelles, Tome 42 (1826), p. 25, den gleichen Namen auf den australischen *Ch. ruficapillus* Pen., gibt aber eine abweichende Beschreibung.

1827 giebt Wagler im "Systema avium": Charadrius p. 5 die vorzügliche Beschreibung des Vogels im Winterkleid, legt als Vaterland das Cap der Guten Hoffnung fest, sagt, dass sich Stücke im Pariser Museum befinden und verbessert den Namen gleichzeitig in *Ch. leucopolius*. Seine Beschreibung ist aber augenscheinlich nach einem ♀ des Berliner Museums genommen, welches auch dort seit altersher als Wagler's Typus bezeichnet gewesen ist. Es stimmt Feder für Feder mit Wagler's Beschreibung überein.

Wenn es auch vielleicht richtiger wäre, den unsicheren Namen Vieillots durch den sicheren Wagler's zu ersetzen, will ich doch keine Aenderung vornehmen.

8. **Ch. a. marginatus** Vieill.

Süd Afrika im Westen bis nach Damaraland, wo er mit der folgenden Rasse zusammentrifft, und vielleicht stellenweise noch neben ihr vorkommt, im Osten bis Natal.

9. **Ch. a. pallidus** Strickl. et Selt.

Nach eingehendstem Vergleich aller Stücke des Berliner Museums, inclusive der Typen von *Aegialites mechowi* Cab. schliesse ich mich der Ansicht W. L. Sclater's in "Systema avium Ethiopicarum" an und belasse diesen Namen der westafrikanischen Rasse. Die terra typica ist die äusserste Südgrenze der Rasse, Damaraland, wo sie Anderssen neben *Ch. nivifrons* Less. (= *Ch. marginatus* Viell.) sammelte. Nach Norden mindestens bis zur Goldküste.

10. **Ch. a. tenellus** Hartl.

Vielleicht von *Ch. a. pallidus* nicht verschieden. Ebenso ist es fraglich, ob die Exemplare von Ostafrika nicht vielleicht zur vorigen Rasse gehören oder eine weitere Rasse bilden.

Madagascar (terra typica) und Ostafrika von der Delagoa Bay bis Manda. Wenn auch diese 3 Rassen in erster Linie Vögel des Meeresstrandes sind, so kommen sie doch auch gelegentlich im Binnenlande vor. Whyte sammelte den *Ch. a. tenellus* am Nyassa See, Hofmann am Fuss des Uluguru Gebirges, v. Stegmann und Stein bei Kissenje am Kivu See.

11. **Ch. a. nivosus** Cass.

Westliches Nordamerika von Californien bis Mexico.

Von der Nordgrenze seines Verbreitungsgebietes im Winter nach Süden ziehend, angeblich bis nach Chile und zur Magellanstrasse. Ich möchte diese Angabe stark bezweifeln. Nordamerikanische Vögel dürften im Winter wohl

kaum über Centralamerika hinausziehen. Die Peruaner und Chilenen werden wohl alle zu der folgenden Form gehören.

12. **Ch. a. occidentalis** Cab.

Nur langflügeliger als *Ch. a. nivosus*. Fl. 108–113 mm. In der Färbung ganz gleich.

Chile, vermutlich nördlich bis Peru und südlich bis zur Magellan Strasse vorkommend. Wahrscheinlich werden die Stücke aus dem äussersten Süden während des antarktischen Winters nach nördlicheren Gegenden (Peru) ziehen. Sharpe zieht im Catalogue of Birds vol. XXIV, p. 295, zwei Arten zusammen. Schon Berlepsch und Stolzmann vermuteten bei der Beschreibung des, einem anderen Formenkreise angehörenden, schwarzfüssigen *Charadrius alticola*, P.Z.S. 1902, II, p. 51, dass der "*occidentalis*" des Cat. Birds *alticola* ist. Wie mir Herr Bannerman auf Befragen freundlichst mitteilt, gehören die Stücke von Taropacá und Sacaya tatsächlich zu *Ch. alticola*, während die 2 Exemplare von Laraquete grünfüssige *Ch. a. occidentalis* sind. Zu dieser Subspecies werden wahrscheinlich sämtliche l.c. p. 292 als *nivosus* aufgeführten Exemplare von Peru und Chile gehören.

13. **Ch. a. tenuirostris** Lawrence.

Bei weitem die blasseste aller *Ch. alexandrinus* Formen (neben dem unbenannten Stück, das v. Heuglin bei Djeddah, Westarabien sammelte).

Länder um den Golf von Mexico von Florida bis Yucatan. Salzsteppen von Kansas und Oklahoma, Bahamas, Cuba. Im Winter (nur im Winter?) bis Venezuela und Brasilien. Sharpe im Catalogue of Birds zieht *tenuirostris* als Synonym zu *nivosus*, hat allerdings nur Stücke von Corpus Christi, Texas, aus dem Verbreitungsgebiet der Rasse gesehen.

14. **Ch. a. ruficapillus** Temm.

Südliches Australien.

Sehr stark differenzierte Rasse. In den plastischen Verhältnissen und der allgemeinen Farbenverteilung aber doch mit seiner hier folgenden zweifelhaften Rasse als zum Formenkreis *alexandrinus* gehörend zu erkennen.

15. **Ch. a. tormenti** Mathews.

Jedenfalls ganz zweifelhafte Rasse. Angeblich blasser, auch etwas grösser als die vorige Form. Mir unbekannt. Leider gibt Mathews keine Maasse an. Während er in der ersten Beschreibung und in den "Birds of Australia" als Verbreitung von *Ch. r. ruficapillus* Süd-Australien und Ost-Australien bis Queensland, für *C. r. tormenti* Nordwest-Australien angibt, ist im "Syst. Av. Austr." für *Ch. r. ruficapillus* einfach südliches Australien, für *C. r. tormenti* nördlichest Australien angegeben.[1]

Ich kann mich nicht entschliessen, *Ch. peronii* Bp. von Malacca und den Sunda-Inseln mit seinem breiten schwarzen Nackenband, seiner oft auch beim ♂ geschlossenen schwarzbraunen Kropfbinde (vielleicht zerfällt die Art in mehrere Rassen) und besonders wegen der geschlossenen braunen Kropfbinde

[1] Diese vermeintliche Subspecies ist m. E. ganz ununterscheidbar, die angeblichen Unterschiede beruhen auf individueller Variation. — E. Hartert.

des ♀, welches dem *Ch. venustus* Fschr. et Rehw. von den Salzsümphen Ost-Afrikas ungemein ähnlich ist, in den Formenkreis *alexandrinus* mit aufzunehmen, wenngleich eine nahe Verwandtschaft mir festzustehen scheint.

Charadrius alexandrinus erscheint als eine sehr plastische Art. Die Formen des paläarktischen Gebietes erscheinen unter einander nur sehr wenig verschieden. Die Verbindung zu den tropisch-afrikanischen Formen (*marginatus* Gruppe) wird durch *Ch. a. pons* in idealer Weise hergestellt. Das Studium der Rassen scheint mir noch nicht abgeschlossen zu sein, am wenigsten in Amerika.

Die paläarktischen Formen des *Charadrius alexandrinus*, besonders *Ch. a. alexandrinus* in der westlichen Hälfte seines Verbreitungsgebietes, scheinen mir viel weniger Zugvögel zu sein, als man früher annahm. Aus dem ganzen tropischen Afrika liegt mir kein Winterstück vor. Im Tring Museum befinden sich (Hartert, in litt.), auch keine Winterstücke aus den Tropen. Die in Damaraland im Winter erlegten angeblichen Exemplare von *Ch. a. alexandrinus* müssen erneut untersucht werden. Im Roten Meer und an der Nord-Somaliküste leben Rassen als Standvögel.

Wahrscheinlich werden sich bei eingehender Untersuchung der Vögel der Westküste Süd-Amerikas analoge Verhältnisse ergeben.

UEBER DIE FORMENKREISE VON *PYRRHURA PERLATA* UND *PYRRHURA LEUCOTIS*.

Von OSCAR NEUMANN.

IN meiner Arbeit: *Die Formen von Pyrrhura perlata Spix* (Verh. Orn. Ges. Bayern, 17 (1927), p. 428–31) habe ich eine "Art" nicht erwähnt, die anscheinend gleichfalls in den Formenkreis *P. perlata* einzureihen ist, nämlich *Pyrrhura molinae* Massena et Souancé. *P. molinae* hat eine vollkommen gleiche Struktur der Kehl- und Brustfedern und eine sehr ähnliche Farbverteilung wie *P. perlata*. Sie unterscheidet sich von den anderen vier *perlata*-Formen in erster Linie durch bedeutendere Grösse, helleres Grün, helleres Blau der Schwingen und dadurch, dass die Schwanzfedern auch von unten kupferrot sind. Sie vertritt die *perlata*-Formen geographisch.

F. Todd hat (Proc. Biol. Soc. Wash. vol. XXVIII (1915) p. 82) die Rasse vom Rio Bermejo, Nord Argentinien, als *P. m. australis* abgetrennt, weil sie tieferes Grün, dunkleren Kopf und Nacken, so gut wie kein Blau an den Unterschwanzdecken und einen grösseren roten Brustfleck haben soll.

Ein Vergleich von 4 Exemplaren von S. Cruz und Guarajos, Bolivien, mit 3 Exemplaren von Jujui, Nordwest-Argentinien, zeigt, dass einige dieser Charaktere recht variabel sind, wenn auch tatsächlich die Oberseite der Bolivianer ein wenig heller und gelber ist als die der Jujui-Exemplare, und meist auch bei letzteren die Ausdehnung des roten Brustflecks etwas grösser ist. Ein Kennzeichen scheint aber konstant zu sein, nämlich die bei den Bolivianern deutlich bläulich verwaschenen, bei den Nordwestargentiniern fast oder ganz grünen Unterschwanzdecken. Aus diesem Grunde ist Todd's Subspeciesname anzuerkennen. Ein von Herrmann bei Villa Montes am Pilcomayo in Südost Bolivien gesammeltes ♂ gehört noch zu *P. perlata australis*.

Etwas verschieden sind vielleicht die 2 Rassen, welche Matto Grosse bewohnen. 3 von Natterer am 3. Juli 1826 bei Areias nahe Registo do Jaurú erlegte Exemplare des Wiener Museums (eines der Stücke trägt das ursprüngliche Etikett Natterers) (cf. Schlegel, Museum Pays Bas vol. III (Psittaci) (1864) p. 26, und Pelzeln, Ornith. Brasil 1871 p. 259) haben die Kehl- und Brustpartie etwas rötlich überflogen. Sonst gleichen sie der Form von Bolivien. Sie müssen den Namen:

Pyrrhura perlata phoenicura Schleg.

("*Conurus phoenicurus* Natt." Schleg. l.c.) tragen. Diese Form bildet Miranda Ribeiro, Revista Museu Paulista vol. 12 II (1920) Est. VIII. fig. 2 als Rasse von Nord Matto Grosso ab. In fig. 1. ist die Rasse von Süd Matto Grosso abgebildet. Die Abbildung zeigt ein Exemplar, bei dem Wangen und Mundwinkel grau wie die Kehle und nicht grün sind. Diese Rasse soll so gut wie kein Rot auf dem Bauch haben. Es ist also sicher nicht *P. p. australis* Todd.

Ich habe in einer Fussnote der gleichen Arbeit gesagt, dass vielleicht *Pyrrhura pfrimeri* Miranda Ribeiro—Revista Museu Paulista 1920 II. p. 30 von Santa Maria de Taguatinga im Staate Goyaz, nicht Goyaz und Sante Maria de Taguatinga, wie ich l.c. irrtümlich citierte—in den Formenkreis *Pyrrhura perlata* gehören

könne. Ich schloss das, ohne mir die Beschreibung näher durchzulesen, aus geographischen Gründen, beging aber mit dieser Bemerkung einen grossen Irrtum. Herr Dr. Rudolf Pfrimer, der zur Zeit in Europa weilt, war so freundlich, mir ein Exemplar dieser sonst nur im Museum in Rio de Janeiro vertretenen Art zukommen zu lassen, und es zeigte sich, dass *P. pfrimeri* mit *P. perlata* nichts zu tun hat, sondern eine hoch differenzierte Form des Formenkreises *Pyrrhura leucotis* ist.

Da die Revista Museu Paulista eine nicht zu sehr verbreitete Zeitschrift ist und portugiesisch nicht von jedermann fliessend gelesen wird, gebe ich hier eine ausführliche Beschreibung des mir vorliegenden Exemplars:

Schmaler Stirnstreif, Zügel und Kopfseiten düster und stumpf kirschrot. Das Auge ist oben noch von einem kirschroten Strich umsäumt. Ebenso schliesst diese Farbe den nackten Kinnfleck noch gerade ein. Kopfplatte matt und stumpf hellblau. Das Hellblau umzieht die kirschroten Kopfseiten bis auf die Kehle, deren Federn mattgraue Säume haben, Federn der Oberbrust grün mit blasseren gelblichen Säumen, Interscapularregion, Ober- und Unterflügeldecken, Aussenfahnen der Armschwingen, übrige Unterseite mit Unterschwanzdecken dunkel grasgrün. Handschwingen auf der Aussenfahne und dem grössten Teil der Innenfahne blau, die Spitzen der Schwingen fein schwärzlich eingesäumt, Rücken und Bürzel heller kirschrot. Ein dunkelkirschroter Längsfleck auf der Bauchmitte. Mittlere Schwanzfedern im Basalteil, insbesondere auf der Aussenfahne, grasgrün, im Caudalteil heller kirschrot, die äusseren Schwanzfedern ganz kirschrot. Unterseite des Schwanzes einfarbig trüb kirschrot (kupferrot). Ein hellroter Fleck am Flügelbug.

Die Kehl- und Brustfedern sind unten horizontal, oder ganz leicht geschwungen und nicht zugespitzt wie bei *P. picta*.

Von *P. leucotis leucotis* unterscheidet sich *pfrimeri* durch die ganz roten Kopfseiten ohne weissen Ohrfleck und durch hellblaue Kopfplatte, Nacken und Kehle.

Noch näher steht *P. l. pfrimeri* der *P. l. emma* von Nord-Venezuela, unterscheidet sich von ihr aber auch durch die scharf nach aussen abgegrenzten tief kirschroten Kopfseiten, das bis in den Nacken reichende und die Kopfseiten bis zur Kehle umziehende Blau des Oberkopfes, welches nicht wie bei *emma* durch eine graue Mittelzone unterbrochen ist, die blaue, nicht graue Basis der Kehlfedern und den Mangel jeden gelben Tones auf der Brust.

Der Formenkreis *Pyrrhura picta* unterscheidet sich von dem Formenkreis *P. leucotis*, dem er in der Farbenverteilung, insbesondere durch den dunkel kirschroten Rücken und Bürzel gleicht, in erster Linie durch die Form der Kehl- und Brustfedern, die nicht wie bei *P. perlata* und *P. leucotis* unten horizontal oder sanft geschwungen, sondern stumpf zugespitzt (tropfenförmig) sind.

VERBEITUNGSGEBIETE DER DREI FORMENKREISE.

I. Pyrrhura perlata.

A. *perlata* Gruppe (Schwanz oberseits kupferrot, unterseits schwärzlich):

1. *P. p. perlata* Spix. Unbekannt.
2. *P. p. lepida* Wagl. Pará nach Westen bis Guimaraes, nach Süden und Osten bis Rio Capin, Brasilien.
3. *P. p. coerulescens* Neum. Miritiba (Brasilien).

4. *P. p. anerythra* Neum. Linkes Ufer des unteren Tocantins, Brasilien.
5. *P. p. rhodogaster* Sel. Rio Madeira, Brasilien.

B. *molinae* Gruppe (Schwanz oberseits und unterseits rot):

6. *P. p. molinae* Massena und Souancé. Tiefländer Ost-Boliviens.
7. *P. p. australis* Todd. Nordwest Argentinien (Jujui) und äusserster Südosten Boliviens (Rio Pilcomayo und Rio Bermejo).
8. *P. p. phoenicura* Schleg. Nördliches Matto Grosso, Brasilien.
9. *P. p. subsp.* (cf. Rivista Museu Paulista Vol. 12 II, Est VIII, fig. 1). Südliches Matto Grosso, Brasilien,

II. Pyrrhura leucotis.

1. *P. l. leucotis* Kuhl. Brasilianisches Küstengebiet von Bahia bis Rio de Janeiro.
2. *P. l. griseipectus* Salvad. Ceara, Brasilien.
3. *P. l. pfrimeri* Miranda Ribeiro. Santa Maria de Taguatinga in Goyaz, Brasilien.
4. *P. l. emma* Salvad. Küstengebiet von Venezuela von Sucre bis Caracas.

III. Pyrrhura picta.

1. *P. p. picta* Müll. Holländisch und Britisch Guyana.
2. *P. p. amazona* Hellm. Unteres u. mittleres Amazonas Gebiet.
3. *P. p. luciani* Deville. Oberes Amazonas Gebiet (Westlichstes Brasilien und Ost Peru).

LIST OF LEPIDOPTERA COLLECTED IN MOROCCO IN 1927 BY ERNST HARTERT AND FREDERICK YOUNG.

By LORD ROTHSCHILD, F.R.S., Ph.D.

DR. HARTERT'S first collecting station was at Ouldjet-es-Soltan on the Upper Oued Beth, where, however, butterflies were not very numerous about the middle of May. He then went south to Marrakesch, where *Euchloë charlonia*, a rare species generally in Morocco, were flying, and where *Polyommatus phoebus* was quite common in one place. He then returned northwards to El Hadjeb on the west slopes of the Middle Atlas, and on 2 June once more to Marrakesch. From there a trip was made to the Great Atlas and a stay in the Valley of the R'dat and collections were made at elevations of about 1,700 m., Dr. Hartert ascending as far as the Tizi N'Tichka Pass, 2,450 m. high, not far from Telouet, where the pacha of the Glaoui has a large castle. Moths could be collected with the aid of an acetylene lamp, at El Hadjeb only, where a new form of *Phragmatobia fuliginosa* was discovered. A short stay was also made at Asni in the Great Atlas, where several French entomologists had already collected before.

1. **Papilio machaon maxima** Verity.

Papilio machaon maxima Verity, *Rhopalocera Palaearctica*, p. 296, pl. liii, f. 2 (1911) (gen. vern.) (Tangier).

Papilio machaon maxima gen. aest. *angulata* Verity, *Rhopalocera Palaearctica*, p. 296, pl. lx, f. 14 (1911) (Tangier).

1 ♀ Valley of the R'dat, 1,700 m. = 5,525 ft., N.E. of Telouet, 7–11 June 1927; 1 ♀ El Hadjeb, W. Slopes of Middle Atlas, 23–29 May 1927.

Both these ♀♀ are very worn and broken, but clearly exhibit the characters of the subspecies, especially the heavy dark markings. They are of the Spring generation.

2. **Papilio podalirius lotteri** Aust.

Papilio podalirius ab. lotteri Austaut, *Petites Nouvelles Entomologiques*, vol. ii, p. 293 (p. 304 nom. corr. *latteri*) (15 Jan. 1879) (Sidi-Bel-Abbès) (gen. aest.).

Papilio feisthameli form. *maura* Verity (gen. vern. ex Africa), *Rhopalocera Palaearctica*, p. 293, pl. i. ff. 7, 8 (Jan. 1911) (Lambèze).

1 ♂, 1 ♀ Marrakesch, 4 and 6 June 1927; 1 ♂ El Hadjeb, W. Slopes of Middle Atlas, 23–29 May 1927.

Although these 3 examples are from very late dates, they are undoubtedly of the Spring generation, *maura*, and not of the Summer one, *lotteri*.

3. **Aporia crataegi mauretanica** Oberth.

Aporia crataegi mauretanica Oberthür, *Étud. Lépid. Comp.* fasc. iii, p. 129 (1909) (Algeria).

1 ♂ Above Ouldjet-es-Soltan, Upper Oued Beth, 17 May 1927.

4. Ganoris brassicae brassicae (Linn.).

Papilio brassicae Linnaeus, *Syst. Nat.* i. p. 467, No. 58 (1758) (Sweden).

1 ♂, 2 ♀♀ Marrakesch, 3–5 June 1927.

In Mr. Meade-Waldo's article on his collections in Morocco (*Trans. Entom. Soc. Lond.* 1905, p. 371) the late H. J. Elwes says that some of Mr. Meade-Waldo's specimens resembled *G. brassicae wollastoni* (Butl.) from Madeira; this very loose statement could not have been made, if Mr. Elwes had not persistently ignored modern methods of treatment of local races. The two Atlantic races, *cheiranthi* from the Canary Islands and *wollastoni* from Madeira, have the 2 black spots of the forewing in the ♀ joined into a single large patch; whereas the N.W. African examples, as well as individuals of all other *brassicae* forms in which the 2 spots are joined, are casual sporadic aberrations, occurring very rarely among typical examples with the spots separate.

5. Ganoris rapae mauretanica (Verity).

Pieris rapae mauretanica Verity, *Rhopalocera Palaearctica*, p. 155, pl. xxxiii, ff. 43, 44 (gen. aest.); pl. xxxiv, ff. 15, 16 (gen. vern. *leucoteroides* Rothsch.) (1908) (Algeria, Morocco, Tunisia) (ff. and text Algeria) (xxxiv, 15, 16 as *leucotera* Stef.).

Pieris rapae mauretanica gen. vern. *leucoteroides* Rothsch. *Bull. Soc. Scien. Nat. du Maroc*, vol. v, nos. 7 and 8, p. 129 (July 1925) (Rabat, Morocco).

2 ♂♂, 2 ♀♀ Asni, Great Atlas S. of Marrakesch, 15–17 June 1927; 1 ♂ Tizi N'Tichka, Great Atlas, 13 kilometres W. of Telouet, 2,450 m. = 7,961 ft., 11 June 1927; 5 ♀♀ Valley of the R'dat, 1,700 m. = 5,525 ft. N.E. of Telouet, 7–11 June 1927; 1 ♀ El Hadjeb, W. Slopes of Middle Atlas, 23–29 May 1927; 23 ♂♂, 19 ♀♀ Marrakesch, 4 May–5 June 1927.

These are all gen. aest. *mauretanica*, but vary much as regards size and size of spots, some having the spots and the black of the apex almost absent. (Largest ♂ 58 mm., smallest 36 mm. in expanse; large ♀ 58 mm., smallest 35 mm. in expanse.)

These "whites" were very common in gardens and plantations just outside Marrakesch.—E. H.

6. Leucochloë daplidice albidice (Oberth.).

Pieris daplidice var. *albidice* Oberthür, *Étud. d'Entom.* fasc. vi, p. 47 (1881) (Algérie, Prov. Constantine Sud).

3 ♂♂, 1 ♀ Valley of R'dat, 1,700 m. = 5,525 ft., N.E. of Telouet, Morocco, 7–11 June 1927; 2 ♂♂ 4 ♀♀ Marrakesch, 4–13 June 1927.

All these are as heavily marked on the hind wings below as any European *daplidice daplidice*, but the green is strongly suffused with yellow, showing that they must be treated as belonging to Oberthür's *albidice*.

7. Euchloë charlonia (Donzel).

Anthocharis charlonia Donzel, *Ann. Soc. Entom. France*, vol. xi, p. 197, pl. viii, f. 1 (1842) (Emsilah, Algeria).

8 ♂♂, 2 ♀♀ Marrakesch, 7–9 May–5 June 1927.

It is very interesting to find this beautiful little butterfly ranging so far to the west. Riggenbach sent me specimens from near Mogador.

I saw several flying between Fez and Taza on 27 April.—E. H.

8. **Euchloë ausonia crameri** Butl.

Euchloë crameri Butler, *Entom. Month. Mag.* vol. v, p. 271, no. 2 (1869) (South Europe ! !) (gen. vern.).

Euchloë ausonia crameri gen. aest. *butleri* Rothschild, *Nov. Zool.* vol. xxiv, p. 82 (1917) (Spain and N. Africa) (gen. aest.).

3 ♂♂, 2 ♀♀ El Hadjeb, W. Slopes of Middle Atlas, 23–29 May 1927; 3 ♂♂ Ouldjet-es-Soltan, Upper Oued Beth, 15–16 May 1927; 1 ♂ Fez, 28 April 1927; 4 ♂♂, 4 ♀♀ Marrakesch, 7–9 May–13 June 1927.

All these 17 specimens belong to the gen. aest. *butleri*, but 1 from Marrakesch and 1 from El Hadjeb are somewhat intermediate between the Spring and Summer broods. 1 ♂ El Hadjeb has the black markings on the forewings above replaced by sooty grey, and 1 ♀ from Marrakesch has the black cellular stigma on the forewings above of gigantic size.

9. **Euchloë belemia** (Esp.).

Papilio belemia Esper, *Die Schmett.* vol. i, pt. 2, t. 110, f. 2 (1792) (?) (gen. vern.).

Papilio glauce Hübner, *Europ. Schmett.* i, ff. 546, 547 (1798–1803) (?).

2 ♂♂, 1 ♀ El Hadjeb, W. Slopes of Middle Atlas, 23–29 May 1927; 1 ♂ Fez, 28 April 1927; 3 ♂♂, 6 ♀♀ Marrakesch, 7–9 May–6 June 1927.

All these 13 specimens belong to the gen. aest. *glauce*, though some of them appear somewhat intermediate between the Spring and Summer broods.

10. **Colias electo croceus** (Geoff.).

Papilio croceus Geoffroy, in Fourcroy's *Entom. Par.* vol. ii, p. 250 (1785) (Paris).

1 ♂ Tizi N'Tichka, Great Atlas, 12 kilometres W. of Telouet, 2,450 m. = 7,879 ft., 11 June 1927; 1 ♂, 1 ♀ Asni, Great Atlas S. of Marrakesch, 15–17 June 1927; 2 ♀♀ (1 ab. *helice*) Valley of the R'dat, 1,700 m. = 5,525 ft., N.E. of Telouet, 7–11 June 1927; 1 ♀ (ab. *helice*) Ouldjet-es-Soltan, Upper Oued Beth, 15–16 May 1927; 3 ♂♂ Marrakesch, 6 June 1927; 1 ♂, 1 ♀ Rabat, 20 May 1927.

This series of 6 ♂♂ and 6 ♀♀ is extraordinarily variable both as regards colour and size. 1 ♂, 1 ♀ are almost as dark fiery orange as the oriental *Colias fieldii*. 2 ♂♂, 2 ♀♀ are of the normal yellowish orange colour, while the 3 ♂♂, 1 ♀ dwarf examples are much paler, more golden yellow; the 1 ♀ ab. *helice* has a pure white ground-colour, while the other has a darker cream buff ground-colour (but not so dark as ab. *helicina* Oberth.).

The largest male expands 61 mm., the smallest 39 mm.; the largest ♀ expands 66 mm., the smallest 44 mm.

11. **Gonepteryx cleopatra cleopatra** (Linn.).

Papilio cleopatra Linnaeus *Syst. Nat.* edit. xii, pt. 2, p. 765, no. 105 (1767) (Barbaria).

4 ♂♂ Asni, Great Atlas, S. of Marrakesch, 15–17 June 1927; 3 ♂♂ Ouldjet-es-Soltan, Upper Oued Beth, 15–16 May 1927; 3 ♀♀ El Hadjeb, W. Slopes of Middle Atlas, 23–29 May 1927.

12. **Pyrameis atalanta** (Linn.).

Papilio atalanta Linnaeus, *Syst. Nat.* edit. x, vol. i, pt. ii, p. 478, no. 119 (1758) (Sweden).

1 ♂, 1 ♀ Marrakesch, 6 and 13 June 1927.

This pair of specimens are small and somewhat dull coloured, as most of the N.W. African examples are.

P. atalanta is in Morocco only seen in gardens, at Rabat, Marrakesch, etc.—E. H.

13. **Pyrameis cardui cardui** (Linn.).

Papilio cardui Linnaeus, *Syst. Nat.* edit. x, pt. i, p. 475, no. 107 (1758) (Europe, Africa).

1 ♀ Valley of the R'dat, 1,700 m. = 5,525 ft., N.E. of Telouet, 7–11 June 1927; 1 ♂ Ouldjet-es-Soltan, Upper Oued Beth, 15–16 May 1927.

The fresh colours of this pair show they had only just emerged.

14. **Argynnis lathonia** (Linn.).

Papilio lathonia Linnaeus *Syst. Nat.* edit. x, vol. i, p. 481, no. 141 (1758) (Europe).

7 ♂♂ Valley of the R'dat, 1,700 m. = 5,525 ft., N.E. of Telouet, 7–11 June 1927.

15. **Melitaea desfontainii gibrati** Oberth.

Melitaea desfontainii var. *gibrati* Oberthür, *Étud. Entom. Comp.* fasc. xix, pp. 46 and 47, pl. dxxxii, ff. 418–422 (1922) (Massif de Zehroun).

1 ♀ El Hadjeb, W. Slopes of Middle Atlas, 23–29 May 1927.

This solitary ♀ in poor condition shows that at El Hadjeb, at least, the season for this *Melitaea* had come to an end.

16. **Melitaea phoebe punica** Oberth.

Melitaea phoebe var. *punica* Oberthür, *Étud. Entom.* fasc. i, p. 25, pl. i, f. 3 (1876) (Lambèze).

2 ♂♂ Asni, Great Atlas S. of Marrakesch, 15–17 June 1927; 4 ♂♂, 2 ♀♀ Valley of the R'dat, 1,700 m. = 5,525 ft., N.E. of Telouet, 7–11 June 1927.

The two Asni ♂♂ are considerably smaller and paler than the ♂♂ from the R'dat Valley.

17. **Melitaea didyma deserticola** Oberth.

Melitaea didyma ab. *deserticola* Oberthür, *Étud. Entom.* fasc. i, p. 25, pl. iii, f. 1 (1876) (Biskra).

2 ♂♂ Asni, Great Atlas S. of Marrakesch, 15–17 June 1927; 2 ♂♂, 1 ♀ Areg, Oued R'dat, Great Atlas, 1,470 m. = 4,778 ft., 12 June 1927; 2 ♂♂, 1 ♀ Valley of the R'dat, 1,700 m. = 5,525 ft., N.E. of Telouet, 7–11 June 1927; 1 ♂ Marrakesch, 7–9 June 1927.

These 9 examples are somewhat darker than most of the large series in the Tring Museum from the Biskra district and farther south, but I cannot separate them as one or two of the Algerian specimens agree perfectly.

18. **Satyrus (Eumenis) semele algirica** Oberth.

Satyrus semele var. *algirica* Oberthür, *Étud. Entom.* fasc. i, p. 27 (1876) (Daya, etc.).

2 ♂♂ Valley of the R'dat, 1,700 m. = 5,525 ft., N.E. of Telouet, 7–11 June 1927.

Two very highly coloured examples, but they can be matched with Algerian specimens.

19. **Satyrus (Eumenis) atlantis** Aust.

Satyrus atlantis Austaut, *Int. Entom. Zeitschr. Guben*, vol. xix, p. 29 (1905) (Tsauritz Entsaganz, Meade-Waldo).

1 ♂ Tizi N'Tichka, Great Atlas, 2,450 m. = 7,963 ft., 12 kilometres W. of Telouet, 11 June 1927; 1 ♀ Valley of the R'dat, 1,700 m. = 5,525 ft., N.E. of Telouet, 7–11 June 1927.

Two very fine examples of this exceedingly rare insect. The Tring Museum had only 2 ♂♂ taken by Vaucher at the Glaoui's at Telouet and 1 ♂, 1 ♀ from Meade-Waldo's original Tsauritz Entsaganz series. Dr. Hartert's ♀ is much larger than Mr. Meade-Waldo's and much less like the ♂♂; it is much paler and more resembles the ♀ of *pelopea*. The only other examples of this interesting insect which have been recorded are 4 taken in 1920 and 1 in 1921 in the Middle Atlas by Harold Powell, and 1 ♂ by M. Allnaud on the Haute Reraza in June 1921. These 6 examples and 2 ♂♂, 1 ♀ collected by Vaucher at Glaoui Telouet are in the British Museum ex Oberthür Collection.

These two were the only specimens seen; they would be more numerous later in the year.—E. H.

20. **Melanargia galathea meade-waldoi** Rothsch.

Melanargia galathea meade-waldoi Rothschild, *Nov. Zool.* vol. xxiv, p. 110, no. 54a (1917) (Tamarouth, Morocco).

1 ♂, 2 ♀♀ Asni, Great Atlas, S. of Marrakesch. 15–17 June 1927; 11 ♂♂, 2 ♀♀ Tizi N'Tichka, Great Atlas, 2,450 m. = 7,963 ft., 12 kilometres W. of Telouet, 11 June 1927; 12 ♂♂, 7 ♀♀ El Hadjeb, W. Slopes of Middle Atlas, 23–29 May 1927.

The examples from the Middle Atlas are decidedly bigger than those from the Great Atlas, ♂ expanse 72 mm. as against 58 mm. and ♀ 82 mm. as against 68 mm. The whole series of 35 examples shows the character of the subspecies quite clearly. 1 ♀ El Hadjeb has the black of the left hind wing replaced by grey.

[**Melanargia ines ines** (Hoffm.)

In my article (*Bull. Soc. Scien. Nat. Maroc*, vol. v, nos. 7–8, Dec. 1925) on the collection of Dr. Hartert made 1925 in Morocco, I stated that there were 3 forms of *M. ines* in Morocco and I put the specimen from the Tarseft Pass down as *i. jahandiezi*, but on receipt of the present series, the Tarseft example appears somewhat intermediate between that form and *i. ines*.]

21. **Melanargia ines jahandiezi** Oberth.

Melanargia ines var. *jahandiezi* Oberthür, *Étud. Lépid. Comp.* fasc. xix, Ire partie, pp. 80, 81, pl. dxlv, f. 4594.

23 ♂♂, 9 ♀♀ Valley of the R'dat, 1,700 m. = 5,525 ft., N.E. of Telouet, 7–11 June 1927.

This series is apparently *jahandiezi*, though not quite so dark as the type and not nearly as dark as the Cyrenaican *ines sublutescens* Turati.

22. **Pararge aegeria meone** (Cram.).

Papilio meone Cramer, *Pap. Exot.* vol. iv, pt. xxvi, p. 51, pl. cccxiv, ff. E.F. (1780) (Alger).

1 ♂, 3 ♀♀ Valley of the R'dat, 1,700 m. = 5,525 ft., N.E. of Telouet, 7–11 June 1927; 1 ♂ Ouldjet-es-Soltan, Upper Oued Beth, 15–16 May 1927.

The ♂ from Ouldjet-es-Soltan is much darker than the one from the R'dat Valley.

23. Pararge megera megera (Linn.).

Papilio megera Linnaeus, *Syst. Nat.* edit. xii, pt. ii, p. 771, no. 142 (1767) (Austria, Dania).

1 ♂, 2 ♀♀ Asni, Great Atlas, S. of Marrakesch, 15–17 June 1927; 2 ♂♂, 1 ♀ Valley of the R'dat, 1,700 m. = 5,525 ft., N.E. of Telouet, 7–11 June 1927; 1 ♂ Ouldjet-es-Soltan, Upper Oued Beth, 15–16 May 1927; 1 ♂ Marrakesch, 7–9 May 1927; 1 ♀ El Hadjeb, W. Slopes of Middle Atlas, 23–29 May 1927.

24. Epinephele lycaon mauretanica (Oberth.).

Satyrus cadora var. *mauretanica* Oberthür, *Étud. Entom.* vi, p. 58 (1881) (Sebdou, Lambèze).

2 ♂♂ Asni, Great Atlas, S. of Marrakesch, 15–17 June 1927; 2 ♂♂ Valley of the R'dat, 1,700 m. = 5,525 ft., N.E. of Telouet, 7–11 June 1927; 1 ♂ El Hadjeb, W. Slopes of Middle Atlas, 23–29 May 1927.

25. Epinephele jurtina hispulla (Hübn.)

Papilio hispulla Hübner, *Samml. Eur. Schmett.* vol. i, Phal. i, Fam. 6, no. 25, p. 27, Taf. 116, ff. 593-596 (1805) (Portugal).

4 ♂♂, 3 ♀♀ Asni, Great Atlas, S. of Marrakesch, 15–17 June 1927; 1 ♂ Tizi N'Tichka, Great Atlas, 2,450 m. = 7,963 ft., 12 kilometres W. of Telouet, 11 June 1927; 1 ♀ Valley of the R'dat, 1,700 m. = 5,525 ft., N.E. of Telouet, 7–11 June 1927; 2 ♂♂ Marrakesch, 7–9 May 1927; 3 ♂♂, 2 ♀♀ El Hadjeb, W. Slopes of Middle Atlas, 23–29 May 1927.

26. Epinephile pasiphae pasiphae (Esp.).

Papilio pasiphae Esper, *Schmett.* vol. i, pt. ii, Forts. p. 99, no. 135, pl. lxvii (cont. xvii), f. 4 (1777 (Envs. de Paris).

24 ♂♂, 6 ♀♀ Valley of the R'dat, 1,700 m. = 5,525 ft., N.E. of Telouet, 7–11 June 1927; 2 ♂♂, 1 ♀ Ouldjet-es-Soltan, Upper Oued Beth, 15–16 May 1927; 3 ♀♀ El Hadjeb, W. Slopes Middle Atlas, 23–29 May 1927.

All these 36 examples have the transverse band on the hind wings below yellowish cream colour and are thus quite typical.

27. Epinephele ida ida (Esper.).

Papilio ida Esper, *Schmett.* vol. i, pt. ii, Forts. p. 184, no. 176, pl. cxxii (cont. xli) (1777) (Pyrénées).

17 ♂♂, 2 ♀♀ Asni, Great Atlas, S. of Marrakesch, 15–17 June 1927; 15 ♂♂ Valley of the R'dat, 1,700 m. = 5,525 ft., N.E. of Telouet, 7–11 June 1927; 2 ♂♂ Rabat, 11–20 May 1927.

28. Coenonympha pamphilus lyllus (Esp.)

Papilio lyllus Esper, *Schmett.* vol. i, pt. ii, Forts. pl. cxxii (cont. 77), ff. 1, 2 (1777) (?)

1 ♂ Asni, Great Atlas, S. of Marrakesch, 15–17 June 1927; 2 ♀♀ Ouldjet-es-Soltan, Upper Oued Beth, 15–16 May 1927.

1 ♂, 1 ♀ are typical *lyllus* with the hind wings below heavily washed with yellow, but the 2nd ♀ has the underside almost as grey as in typical *pamphilus*.

29. **Chrysophanus phlaeas** (Linn.).

Papilio phlaeas Linnaeus, *Faun. Suec. edit. alt.* p. 285 (1761) (Sweden).

3 ♂♂, 2 ♀♀ Asni, Great Atlas, S. of Marrakesch, 15–17 June 1927 ; 1 ♂, 1 ♀ Tizi N'Tichka, Great Atlas, 2,450 m. = 7,963 ft., 12 kilometres W. of Telouet, 11 June 1927 ; 8 ♂♂, 1 ♀ Valley of the R'dat, 1,700 m. = 5,525 ft., N.E. of Telouet, 7–11 June 1927 ; 1 ♂, 1 ♀ Ouldjet-es-Soltan, Upper Oued Beth, 15–16 May 1927 ; 15 ♂♂, 7 ♀♀ Marrakesch, 7–9 May 1927 ; 1 ♂, 3 ♀♀ El Hadjeb, W. Slopes of Middle Atlas, 23–29 May 1927 ; 1 ♀ Rabat, 20 May 1927.

The larger number (33) of this series of 45 examples belong to the blackish form usually associated with the Summer brood, some being very extreme, and 2 absolute dwarfs (largest dark ♂ expands 39 mm., and the smallest 26 mm.). Among the remaining 12 more brilliantly coloured specimens is one ♀ ab. *coeruleopunctata*.

30. **Chrysophanus phoebus** Blach.

Chrysophanus phoebus Blachier, *Bull. Soc. Entom. France*, 1905, p. 212 (Moroccan Atlas, Ourika).

101 ♂♂, 17 ♀♀ Marrakesch, 7–9 May and 3–6 June 1927 (1 ♂ was destroyed) ; 1 ♀ Asni, Great Atlas, S.W. of Marrakesch, 15–17 June 1927.

This wonderful series shows some variation in the number and size of the black spots and also in the ground colour, some examples being of a more golden less fiery orange.

The specimen from Asni is the only one we saw in the Atlas, while they were common in one place near Marrakesch.—E. H.

31. **Lampides** (**Polyommatus**) **boeticus** (Linn.)

Papilio boeticus Linnaeus, *Syst. Nat.* edit. xii, vol. i, pt. 2, p. 789, no. 226 (1767) (Barbaria = Algeria).

1 ♀ Valley of the R'dat, 1,700 m. = 5,525 ft., N.E. of Telouet, 7–11 June 1927 ; 3 ♂♂, 1 ♀ Marrakesch, 3–13 June 1927.

32. **Tarucus theophrastus** (Fabr.).

Hesperia theophrastus Fabricius, *Entom. Syst.* vol. iii, pt. 1, p. 281, no. 82 (1783) (Morocco).

3 ♂♂ Asni, Great Atlas, S. of Marrakesch, 15–17 June 1927 ; 8 ♂♂, 38 ♀♀ Marrakesch, 7–9 May–3–6 June 1927.

As far as it is possible to tell without dissection of the genitalia, the whole of these 49 specimens are *T. theophrastus* and the Tring Museum only possesses *T. mediterraneae* from Western Morocco (Zoudj-el-Beghal) where the country is more desert. It may, however, yet be proved when we get larger series from all over Morocco that *mediterraneae* turns up in more districts than the extreme west.

33. **Lycaena icarus celina** Aust.

Lycaena celina Austaut, *Pet. Nouv. Entom.* vol. ii, p. 293, no. 212 (1879) (Sidi-Bel-Abbès).

10 ♂♂, 1 ♀ Asni, Great Atlas, S. of Marrakesch, 15–17 June 1927 ; 1 ♂, 1 ♀ Tizi N'Tichka, Great Atlas, 2,450 m. = 7,963 ft., 12 kilometres W. of Telouet, 11 June 1927 ; 3 ♀♀ Valley of the R'dat 1,700 m. = 5,525 ft., N.E. of Telouet, 7–11 June 1927 ; 4 ♂♂ Ouldjet-es-Soltan, Upper Oued Beth, 15–16 May 1927 ; 5 ♂♂, 2 ♀♀ Marrakesch, 7–9 May–4–13 June 1927.

34. **Lycaena astrarche calida** (Bell.).

Lycaena agestis var. *calida* Bellier de la Chavignerie, *Ann. Soc. Entom. France*, vol. 2, ser. iv, p. 615, no. 2 (1862) (no locality).

3 ♂♂, 1 ♀ Asni, Great Atlas, S. of Marrakesch, 15–17 June 1927 ; 5 ♂♂, 3 ♀♀ Valley of the R'dat, 1,700 m. = 5,525 ft., N.E. of Telouet, 7–11 June 1927 ; 6 ♂♂, 5 ♀♀ Marrakesch, 7–20 May–3 June 1927.

Of this series of 14 ♂♂, 9 ♀♀, 4 ♀♀ only are pronounced *calida*, the ♂♂ and 4 ♀♀ being *ornata* and 1 ♀ intermediate.

35. **Lycaena bellargus punctifera** Oberth.

Lycaena bellargus punctifera Oberthür, *Étud. Lépid. Comp.* fasc. iv, pt. i, pp. 268, 269 (1910) (Algeria).

2 ♂♂ Tizi N'Tichka, Great Atlas, 2,450 m. = 7,963 ft., 12 kilometres W. of Telouet, 11 June 1927.

These two examples are in poor condition and show practically no spotting.

36. **Lycaena abencerragus** (Pierr.).

Argus abencerragus Pierret, *Ann. Soc. Entom. France*, vol. vi, p. 21, pl. i, f. 7 (1837) (Oran).

2 ♂♂, 14 ♀♀ Asni, Great Atlas, S. of Marrakesch, 15–17 June 1927 ; 3 ♂♂, 9 ♀♀ Valley of the R'dat, 1,700 m. = 5,525 ft., N.E. of Telouet, 7–11 June 1927 ; 4 ♀♀ Ouldjet-es-Soltan, Upper Oued Beth, 15–16 May 1927 ; 1 ♀ Marrakesch, 3 June 1927 ; 1 ♂, 2 ♀♀ El Hadjeb, W. Slopes of Middle Atlas, 23–29 May 1927.

The genitalia prove this to be a perfectly distinct species and not a race of *baton*.

37. **Lycaena lysimon** (Hübn.).

Papilio lysimon Hübner, *Samml. Eur. Schmett.* vol. i, ff. 534, 535 (1799) (?).

5 ♂♂, 4 ♀♀ Marrakesch, 7–9 May–3, 4 June 1927.

In Algeria this species is pronouncedly an inhabitant of the Saharan Oases, but apparently in Morocco it is not so strictly a desert species.

38. **Lycaena melanops alluaudi** Oberth.

Lycaena melanops var. *alluaudi* Oberthür, *Étud. Lépid. Comp.* fasc. xix, p. 113 (1922) (Haut Reraya).

31 ♂♂, 16 ♀♀ Valley of the R'dat, 1,700 m. = 5,525 ft., N.E. of Telouet, 7–11 June 1927.

This form appears to be confined to the Great Atlas, but Mr. Meade-Waldo does not record it. Riggenbach, however, got 3 examples at Fenson, Truchat, and Tamarouth ; and Vaucher obtained 1 at Ourika.

39. **Adopaea thaumas** (Hufn.)

Papilio thaumas Hufnagel, *Berl. Mag.* vol. ii, p. 62 (1766) (Berlin).

2 ♂♂ El Hadjeb, W. Slopes of Middle Atlas, 23–29 May 1927.

In 1927 no examples of *lineola* were obtained, but Dr. Hartert was not in the locality late enough for it as it appears only in the latter half of June. In 1925 I recorded Dr. Hartert as having captured 20 *thaumas* and 5 *lineola* : how I came to make this extraordinary error I do not know ; all 25 specimens are *lineola* !!!

40. **Adopaea acteon** (Rott.).

Papilio acteon Rottenburg, *Naturf.* vol. vi, p. 30, no. 18 (1775) (Landsberg an der Warthe).

3 ♂♂, 1 ♀ Valley of the R'dat, 1,700 m. = 5,525 ft., N.E. of Telouet, 7–11 June 1927; 4 ♂♂ Asni, Great Atlas, S. of Marrakesch, 15–17 June 1927; 1 ♂ Ouldjet-es-Soltan, Upper Oued Beth, 15–16 May 1927; 1 ♂ Marrakesch, 6 June 1927; 1 ♂ El Hadjeb, W. Slopes of Middle Atlas, 23–29 May 1927.

41. **Adopaea hamza** (Oberth.).

Hesperia hamza Oberthür, *Étud. Entom.* fasc. i, p. 28, pl. iii, ff. 2 a, b (1876) (Oran).

5 ♂♂, 6 ♀♀ Valley of the R'dat, 1,700 m. = 5,525 ft., N.E. of Telouet, 7–11 June 1927.

This species is very close to *acteon* but is at once distinguished by the absence of the feathered yellowish streaks in both sexes and the reddish discs of the forewings in the ♀♀.

42. **Carcharodus alceae** (Esp.).

Papilio alceae Esper, *Schmett.* pt. i, Forts. p. 4, pl. li, f. 3 (1780) (Germany ?).

1 ♂ Valley of the R'dat, 1,700 m. = 5,525 ft., N.E. of Telouet, 7–11 June 1927; 11 ♂♂ Marrakesch, 7–9 May–3–6 June 1927.

43. **Hesperia ali** (Oberth.).

Syrichthus ali Oberthür, *Étud. Entom.* fasc. vi, p. 61, pl. ii, f. 3 (1881) (Algeria).

5 ♂♂, 1 ♀ Valley of the R'dat, 1,700 m. = 5,525 ft., N.E. of Telouet, 7–11 June 1927.

44. **Hesperia onopordi** Ramb.

Hesperia onopordi Rambur, *Faune de l'And.* p. 319, no. 4, pl. 8, f. 13 (1842) (Granada).

7 ♂♂ Valley of the R'dat, 1,700 m. = 5,525 ft., N.E. of Telouet, 7–11 June 1927.

45. **Procris orana** (Aust.).

Ino orana Anstaut, *Le Nat.* vol. ii, p. 284 (1880) (Oran).

4 ♂♂, 1 ♀ El Hadjeb, W. Slopes of Middle Atlas, 23–29 May 1927.

In my article on Dr. Hartert's 1924 collection (*Bull. Soc. Scien. Nat. Maroc*, vol. v, nos. 4 and 5, July 1925) I enumerated the 41 examples of *Procris* under the 2 headings of *Procris geryon* and *P. orana* owing to several showing antennae almost inseparable from European *P. geryon*. The 5 examples taken in 1927 are all typical *orana*; but the re-examination of the antennae of the 1924 series shows some with antennae a good deal intermediate. It is, therefore, quite possible that, when a large series from all over Morocco is available, we shall have to relegate *P. orana* to the rank of the N. African subspecies of *geryon*.

46. **Zygaena favonia borreyi** Oberth.

Zygaena favonia var. *borreyi* Oberthür, *Étud. Lépid. Comp.* fasc. xix, pt. i, p. 157 (1922) (Chabat-el-Hamma).

31 ♂♂, 2 ♀♀ Ouldjet-es-Soltan, Upper Oued Beth, 15–16 May 1927; 36 ♂♂, 4 ♀♀ above Ouldjet-es-Soltan, 17 May 1927; 14 ♂♂, 4 ♀♀ El Hadjeb, W. Slopes of Middle Atlas, 23–29 May 1927; 5 ♂♂ East Plateau of Tafoudait, 18 May 1927; 8 ♂♂, 4 ♀♀ Rabat, 11 May 1927.

47. **Zygaena loyselis ungemachi** Le Cerf.

Zygaena ungemachi Le Cerf, *Bull. Soc. Entom. France*, 1923, p. 200 (Oulmès, Léas, Hammam).

2 ♀♀ Rabat, 20 May 1927.

These two females are very worn as they were taken some 6 weeks later than the 49 examples captured in 1924. They are, however, most interesting as they have both complete pink abdominal rings; thus showing, once again, that species or subspecies whose normal coloration includes a uniform dark abdomen occasionally appear with an abdominal ring.

48. **Zygaena orana harterti** Rothsch.

Zygaena harterti Rothschild, *Bull. Soc. Scien. Nat. Maroc*, vol. v, nos. 7–8 (Dec. 1925) (Azrou, Middle Atlas).

1 ♀ Tizi N'Tichka, Great Atlas, 2,450 m. = 7,963 ft., 12 kilometres W. of Telouet, 11 June 1927; 1 ♀ El Hadjeb, W. Slopes of Middle Atlas, 23–29 May 1927.

These 2 ♀♀ are evidently the same form, but the Tizi N'Tichka one is very large, and has much less white surrounding the pink spots of the forewing.

49. **Dysauxes punctata separata** Bang-Haas.

Dysauxes punctata var. *separata* Bang-Haas, *Iris*, vol. xix, p. 143, pl. v, f. 15 (1906) (South Oran, Algeria).

1 ♂ Ouldjet-es-Soltan, Upper Oued Beth, 15–16 May 1927.

This example is somewhat intermediate between true *separata* and Spanish *servula* as the orange patch on the inner area of the hind wings is decidedly larger than in Algerian *separata*.

50. **Euprepia cribraria chrysocephala** (Hübn.)

Bombyx chrysocephala Hübner, *Europ. Schmett.* vol. ii, Bomb. ii, f. 251 (1876) (Spain ?).

1 ♂ El Hadjeb, W. Slopes of Middle Atlas, 23–29 May 1927.

51. **Phragmatobia fuliginosa harterti** subsp. nov.

Differs from *P. f. kroumira* Oberth. in its larger size; deeper coloration, the forewings brighter more golden cinnamon brown and the hind wings deeper salmon crimson; the black spots on the hind wings are also larger. Expanse *f. harterti* 38–47 mm.; *f. kroumira* 30–40 mm.

16 ♂♂ El Hadjeb, W. Slopes of Middle Atlas, 23–29 May 1927.

All these specimens came to the lamp in the early evening.—E. H.

52. **Utetheisa pulchella** (Linn.).

Phalaena pulchella Linnaeus, *Syst. Nat.* edit. x, vol. i, p. 534, no. 238 (1758) (South Europe, Mauretania).

2 ♂♂, 3 ♀♀ Marrakesch, 7–9 May–4 June 1927.

53. **Malacosoma alpicola mixta** Rothsch.

Malacosoma alpicola mixta Rothschild, *Bull. Soc. Scien. Nat. Maroc*, vol. v, nos. 7 and 8, p. 340, no. 84 (Dec. 1925) (Azrou).

1 ♀ (in poor condition) El Hadjeb, W. Slopes of Middle Atlas, 23–29 May 1927.

It is a great pity only 4 ♀♀ and *no* ♂♂ of this race are known.

54. **Sterrhopterix ? powelli** Oberth.

Sterrhopterix powelli Oberthür, *Étud. Lépid. Comp.* fasc. xix, pt. 1, p. 141, pl. dxxxvi, ff. 4468–4469 (1922) (Urassine).

35 ♂♂ El Hadjeb, W. Slopes Middle Atlas, 23–29 May 1927.

This interesting *Psychid* is apparently near the *helix* group.

55. **Pyropteron doryliformis tingitana** Le Cerf.

Pyropteron doryliformis tingitana Le Cerf in Oberthür's *Étud. Entom. Comp.* fasc. xi, Expl. pl., p. 13, pl. ccccix, ff. 4644 and 4645 (1916) (Tangier).

1 ♀ Rabat, 20 May 1927.

56. **Argyrospila musculosa** (Hübn.).

Noctua musculosa Hübner, *Samml. Europ. Schmett. Noct.* f. 363 (1808) (?).

1 ♂ El Hadjeb, W. Slopes of Middle Atlas, 23–29 May 1927.

57. **Cirphis l. album** (Linn.).

Phalaena l. album Linnaeus, *Syst. Nat.* edit. xii, p. 850 (1767) (Europe).

1 ♀ El Hadjeb, W. Slopes of Middle Atlas, 23–29 May 1927.

This example has very dark forewings.

58. **Athetis clavipalpis** (Scop.).

Phalaena clavipalpis Scopoli *Entom. Carn.* p. 213 (1763) (Carniolia).

1 ♂ El Hadjeb, W. Slopes of Middle Atlas, 23–29 May 1927.

There is a strong ashy-grey wash over the forewings of this example.

59. **Cucullia scrophulariphila** Stdgr.

Cucullia scrophulariphila Staudinger, *Stett. Entom. Zeit.* vol. xx, p. 215, no. 10 (1859) (Chiclana).

1 ♂, 1 ♀ El Hadjeb, W. Slopes of Middle Atlas, 23–29 May 1927.

60. **Metopoceras felicina** (Donz.).

Polia felicina Donzel, *Ann. Soc. Entom. France*, sér. ii, vol. ii, p. 199, pl. 6, f. 2 (1844) (Marseille).

1 ♀ El Hadjeb, W. Slopes of Middle Atlas, 23–29 May 1927.

61. **Cleophana baetica baetica** Ramb.

Cleophana baetica Rambur, *Faun. Entom. de l'Andal.* pl. 18, f. 4 (1842) (Andalusia).

1 ♂ El Hadjeb, W. Slopes of Middle Atlas, 23–29 May 1927.

On his way to Morocco, Dr. Hartert captured at Bou Saada, Algeria (6 April 1927), a ♂ of *C. b. diluta* Rothsch. which is almost as dark as this Moroccan example.

62. **Amephana aurita** (Fabr.)

Noctua aurita Fabricius, *Mant. Ins.* vol. ii, p. 179, no. 282 (1787) (Spain).

1 ♀ El Hadjeb, W. Slopes of Middle Atlas, 23–29 May 1927.

63. **Synthymia fixa australis** (Oberth.).

Metoptria monogramma australis Oberthür, *Étud. Lépid. Comp.* fasc. xvi, p. 199, pl. xdvii, f. 4137 (1919) (Géryville).

11 ♂♂ El Hadjeb, W. Slopes of Middle Atlas, 23–29 May 1927.

64. **Phyllophyla numerica disjecta** Warr.

Phyllophyla numerica ab. *disjecta* Warren in Seitz, *Grossschmett. Erde*, vol. iii, p. 274 (1912) (Spain).

1 ♀ Valley of the R'dat, 1,700 m. = 5,525 ft., N.E. of Telouet, 7–11 June 1927.

65. **Tarache lucida** (Hufn.).

Noctua lucida Hufnagel, *Berl. Mag.* vol. iii, p. 302 (1766) (Berlin).

1 ♂ El Hadjeb, W. Slopes of Middle Atlas, 23–29 May 1927.

This example is a typical *lucida*.

66. **Eublemma albida** (Dup.).

Anthophila albida Duponchel, *Lépid. France*, suppl. iv, p. 382, pl. 81, f. 1 (1842) (Marseille).

1 ♂ Marrakesch, 7–9 May 1927.

This example is very large (expanse 36 mm.).

67. **Apopestes spectrum maura** Warr.

Apopestes spectrum maura Warren in Seitz, *Grossschmett Erde*, p. 370, pl. 68b (1913) (Algeria).

5 ♂♂ (crippled) emerged Tring from larvae collected in Valley of the R'dat, 1,700 m. = 5,525 ft., N.E. of Telouet, 7–11 June 1927; 3 larvae in alcohol Taddert Mid-June 1927.

68. **Syneda cailino philippina** (Aust.).

Leucanitis philippina Austaut, *Le Nat.* vol. ii, p. 237 (1880) (Oran).

1 ♂ Above Ouldjet-es-Soltan, Upper Oued Beth, 17 May 1927.

69. **Hypena obsitalis** (Hübn.).

Pyralis obsitalis Hübner, *Samml. Europ. Schmett. Pyr.* ff. 164, 165, 179 (1827) (Europe).

1 ♂ El Hadjeb, W. Slopes of Middle Atlas, 23–29 May 1927.

70. **Scopula imitaria** (Hübn.).

Geometra imitaria Hübner, *Samml. Europ. Schmett. Geom.* pl. 10, f. 51 (1798) (Europe).

1 ♂, 2 ♀♀ El Hadjeb, W. Slopes of Middle Atlas, 23–29 May 1927.

71. **Scopula marginepunctata** (Goeze).

Phalaena Geometra marginepunctata Goeze, *Entom. Beytr.* vol. iii, pt. iii, p. 385, no. 85 (1781) (?).

1 ♀ El Hadjeb, W. Slopes of Middle Atlas, 23–29 May 1927.

72. **Sterrha litigiosaria** (Bdv.).

Acidalia litigiosaria Boisduval, *Gen. et Ind. Meth. Europ. Lépid.* p. 226 (1840) (S. France).

2 ♂♂, 3 ♀♀ El Hadjeb, W. Slopes of Middle Atlas, 23–29 May 1927.

73. **Sterrha humiliata** (Hufn.).

Geometra humiliata Hufnagel, *Berl. Mag.* vol. iv, p. 614 (1769) (Berlin).

6 ♂♂, 12 ♀♀ El Hadjeb, W. Slopes of Middle Atlas, 23–29 May 1927.

74. **Sterrha dimidiata** (Hufn.).

Geometra dimidiata Hufnagel, *Berl. Mag.* vol. iv, p. 602 (1769) (Berlin).

1 ♀ El Hadjeb, W. Slopes of Middle Atlas, 23–29 May 1927.

75. **Sterrha cervantaria depressaria** (Stdgr.).

Acidalia cervantaria var. *depressaria* Staudinger, *Iris*, vol. v, p. 289 (1892) (Tunis, Lambèze, Granada).

1 ♂ El Hadjeb, W. Slopes of Middle Atlas, 23–29 May 1927.

76. **Sterrha incarnaria** (Herr.-Sch.) ab. **ruficostata** (Zell.).

Acidalia incarnaria ab. *ruficostata* Zeller, *Stett. Entom. Zeit.* 1849, p. 215 (?).

1 ♂ El Hadjeb, W. Slopes of Middle Atlas, 23–29 May 1927.

77. **Orthonama obstipata** (Fabr.).

Phalaena obstipata Fabricius, *Entom. Syst.* vol. iii, pt. ii, p. 109, no. 257 (1794) (In Barbaria).

1 ♂, 1 ♀ El Hadjeb, W. Slopes of Middle Atlas, 23–29 May 1927.

78. **Eupithecia pantellaria illuminata** Joan.

Eupithecia illuminata L. de Joannis, *Bull. Soc. Entom. France*, p. lxxx (NOT clxxx as in Staud. Cat. 1901), no. 4 (1891) (Philippeville).

2 ♂♂, 3 ♀♀ El Hadjeb, W. Slopes of Middle Atlas, 23–29 May 1927.

Mr. Prout thinks it possible that this series is referable to the form *lusitanica* Dieze, but as the specimens, with the exception of 1 ♂, are rather worn, it is best to leave this undecided at present, especially as *lusitanica* is from N. of the Mediterranean.

79. **Eupithecia centaureata** (Schiff. and Den.).

Phalaena Geometra centaureata Schiffermüller and Denis, *Ank. Syst. Werk. Schmett. Wienergeg.* p. 114, no. 7 (1775) (Vienna).

1 ♀ El Hadjeb, W. Slopes of Middle Atlas, 23–29 May 1927.

80. **Eupithecia orana** Dietze.

Eupithecia unitaria ab. *orana* (? spec. nov.) Dietze, *Biol. Exp.* vol. ii, text, p. 101, vol. i, pls. 76, f. 589 (1913) (Oran).

1 ♂ El Hadjeb, W. Slopes of Middle Atlas, 23–29 May 1927.

81. **Gymnoscelis pumilata** (Hübn.).

Geometra pumilata Hübner, *Samml. Europ. Schmett. Geom.* pl. 75, no. 388 (1793–1827) (Europe).

82. **Amygdaloptera testaria** (Fbr.).

Phalaena testaria Fabricius, *Entom. Syst.* vol. iii, pt. 2, p. 143, no. 53 (1794) (In Barbaria).

5 ♂♂, 5 ♀♀ El Hadjeb, W. Slopes of Middle Atlas, 23–29 May 1927.

83. **Anaïtis efformata** Guen.

Anaïtis efformata Guenée in Boisduval and Guenée, *Hist. Nat. Ins. Spec. Gén. Lépid.* vol. x (vol. ii *Uran. and Phal.*), p. 500, no. 1730 (1857 (iss. 1858)) (Syria).

1 ♀ El Hadjeb, W. Slopes of Middle Atlas, 23–29 May 1927.

84. **Crambus craterellus chrysonuchelloides** Rothsch.

Crambus craterellus chrysonuchelloides Rothschild, *Bull. Soc. Scien. Nat. Maroc*, vol. v, nos. 4 and 5, p. 151, no. 104 (1925) (Azrou).

The ♂ differs from the ♀ in the more whitish or silvery ground-colour of the forewings and in having only two complete black segments of the abdomen and 2 black dots on the 2nd segment, whereas the ♀ has segments 2 to 7 entirely black above.

1 ♂, 1 ♀ El Hadjeb, W. Slopes of Middle Atlas, 23–29 May 1927.

85. **Eurhodope cruentella** (Dup.).

Ilythia cruentella Duponchel in Godart's *Hist. Nat. Lépid. France*, suppl. iv, p. 365, no. dx, p. 79, f. 5 (1842–1844) (Andalusia).

5 ♂♂ El Hadjeb, W. Slopes of Middle Atlas, 23–29 May 1927.

86. **Pyralis farinalis** (Linn.).

Phalaena Pyralis farinalis Linnaeus, *Syst. Nat.* edit. x, vol. i, p. 533, no. 226 (1758) (?).

1 ♀ El Hadjeb, W. Slopes of Middle Atlas, 23–29 May 1927.

87. **Aglossa pinguinalis asiatica** Ersch.

Aglossa pinguinalis L. var. *asiatica* Erschoff, *Hor. Soc. Entom. Ross.* vol. viii, p. 317, no. 8 (1871) (nr. Samarkand).

1 ♂ El Hadjeb, W. Slopes of Middle Atlas, 23–29 May 1927.

88. **Botys interjunctalis** (Guen.).

Cledeobia interjunctalis Guenée in Lucas, *Hist. Nat. Anim. Artic.* in Expl. Scient. d'Alg. vol. iii, p. 398, no. 150 (1849) (Lacalle).

25 ♂♂ El Hadjeb, W. Slopes of Middle Atlas, 23–29 May 1927.

89. **Myelois cribrella** (Hübn.).

Tinea cribrella Hübner, *Samml. Europ. Schmett.* ii Tineae, no. 67 (1793–1827) (Europe).

1 ♂ El Hadjeb, W. Slopes of Middle Atlas, 23–29 May 1927.

90. **Nomophila noctuella** (Schiff. and Den.).

Tinea noctuella Schiffermüller and Denis, *Ank. Syst. Werk. Schmett. Wienergeg.* p. 136, no. 35 (1775) (Vienna).

1 ♂ El Hadjeb, W. Slopes of Middle Atlas, 23–29 May 1927.

91. **Uresphita polygonalis** (Hübn.).

Pyralis polygonalis Hübner, *Samml. Auserl. Vög. and Schmett.* pl. 76 (1793) (Augsburg).

1 ♂ El Hadjeb, W. Slopes of Middle Atlas, 23–29 May 1927.

92. **Stenia bruguieralis tenebrosa** subsp. nov.

Differs from *b. bruguieralis* in being much blacker; forewings strongly suffused with black, almost obliterating pattern; hind wings, basal half almost black, outer half entirely black.

1 ♂ Valley of the R'dat, 1,700 m. = 5,525 ft., N.W. of Telouet, 7–11 June 1927.

93. **Hapalia martialis** Guen.

Scopula martialis Guenée, *Hist. Nat. Ins. Spec. Gén. Lépid.* vol. viii, p. 398, no. 517 (1854) (Abyssinia ?), *Pyralis ferrugalis* Hübner, *Samml. Europ. Schmett.* vol. vi, Pyr. i, pl. 23, f. 150 and Pyr. iii, pl. 9, f. 54 (1793–1827) (Europe).

1 ♂ El Hadjeb, W. Slopes of Middle Atlas, 23–29 May 1927.

The name *ferrugalis* Hbn., though it has the priority, is preoccupied.

94. **Pyrausta limbopunctalis** (Herr.-Sch.).

Hercyna limbopunctalis Herrich-Schäffer, *Syst. Bearb. Schmett. Europ.* suppl. vol. iv, p. 115, no. 102b, pl. Pyr. 17.

No. 117 (1849) (Spain).

3 ♂♂, 3 ♀♀ El Hadjeb, W. Slopes of Middle Atlas, 23–29 May 1927.

95. **Pyrausta cespitalis** (Schiff. and Den.)

Pyralis cespitalis Schiffermüller and Denis, *Ank. Syst. Werk. Schmett. Wienergeg.* p. 123, no. 32 (1775) (Vienna).

1 ♂ El Hadjeb, W. Slopes of Middle Atlas, 23–29 May 1927.

96. **Pyrausta sanguinalis** (Linn.).

Phalaena Pyralis sanguinalis Linnaeus, *Sys. Nat.* edit. xii, vol. i, p. 882, no. 339 (1767) (Portugal).

1 ♂ El Hadjeb, W. Slopes of Middle Atlas, 23–29 May 1927.

97. **Acompsia formosella** (Hübn.).

Tinea formosella Hübner, *Samml. Europ. Schmett.* viii Tineae, v Ignob. B. no. 160 (1793–1827) (Europe).

1 ♂, 1 ♀ El Hadjeb, W. Slopes of Middle Atlas, 23–29 May 1927.

98. **Orneodes grammodactyla** Zell.

Alucita grammodactyla Zeller, *Isis of Oken* 1841, pp. 867-9, no. 1 (Frankfort-on-the-Oder).

1 ♂ Rabat, 22 June 1927.

In addition there is 1 ♂ Tortricid from El Hadjeb too worn and rubbed for identification.

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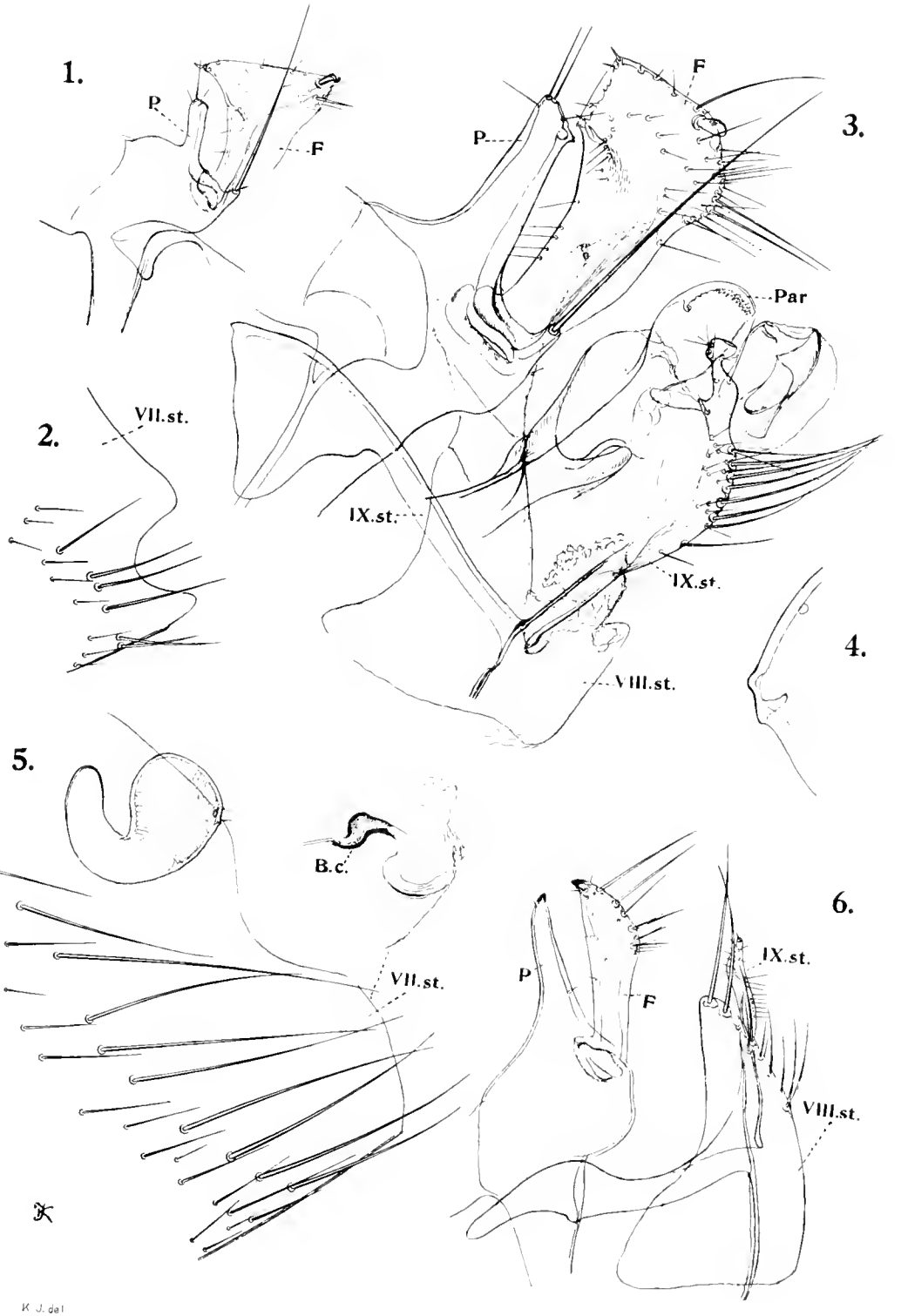

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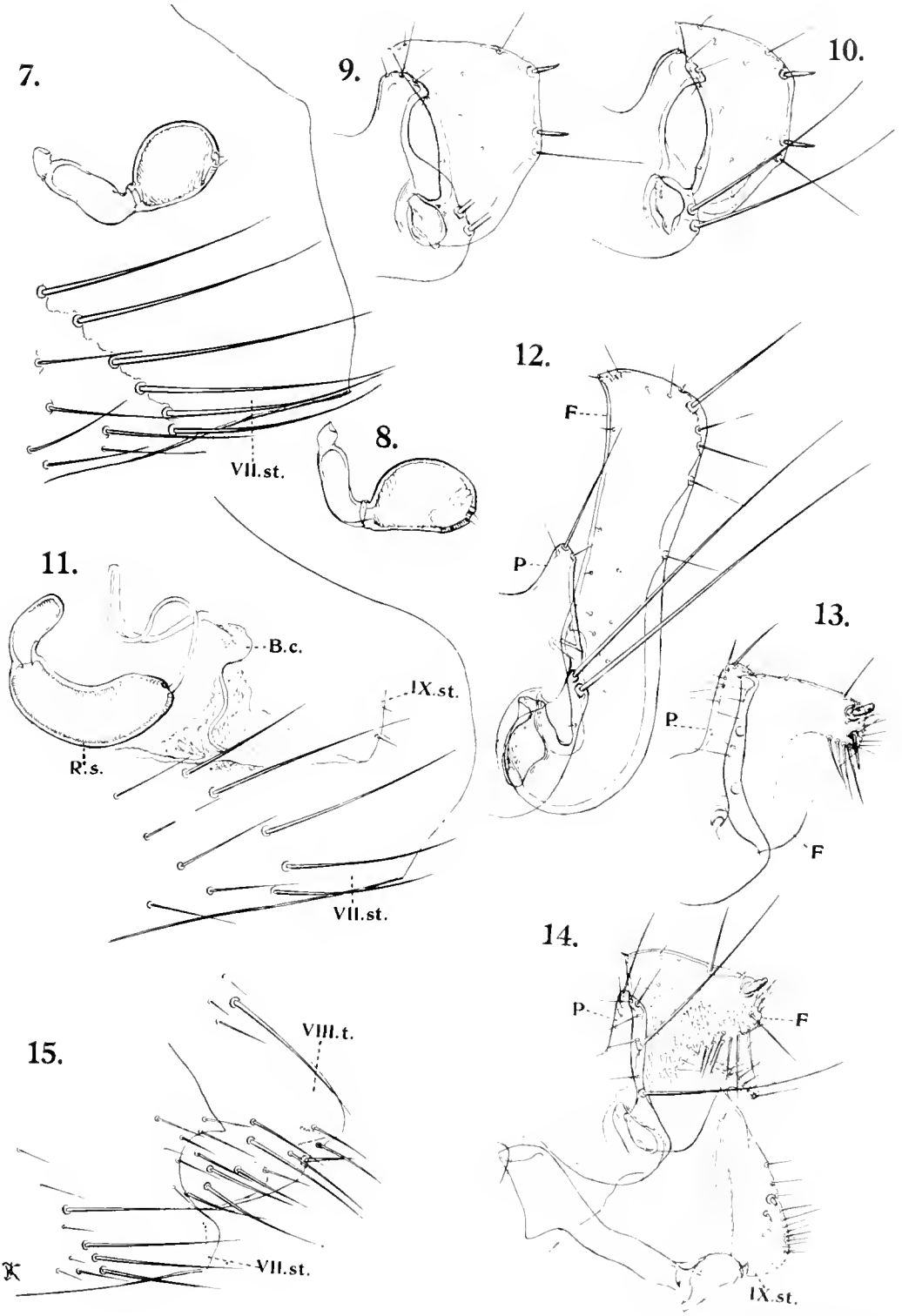
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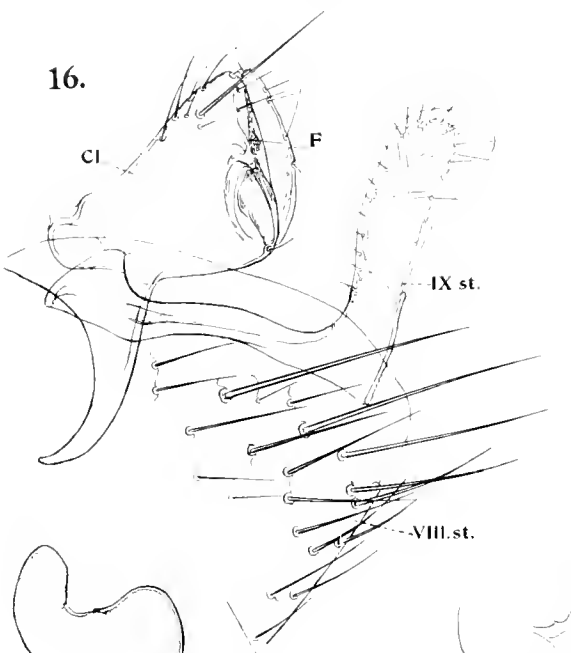

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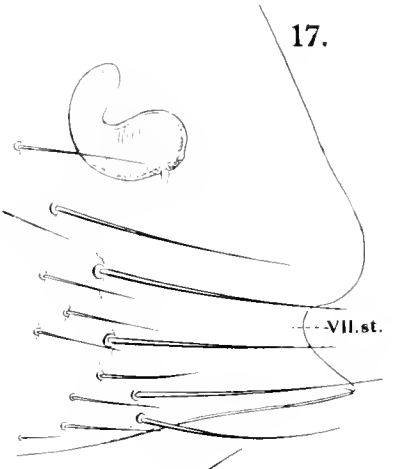

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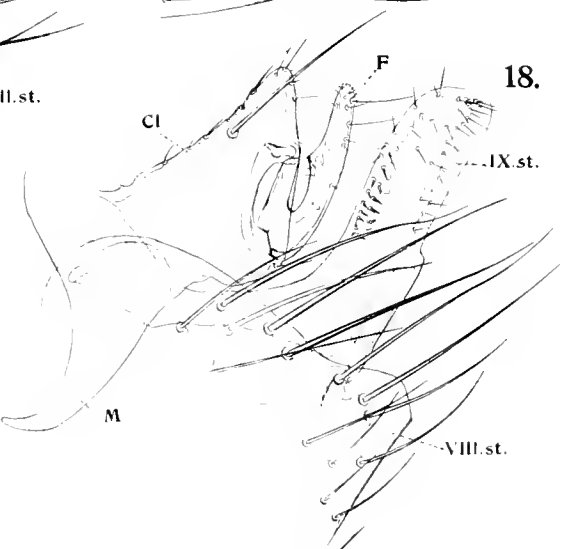

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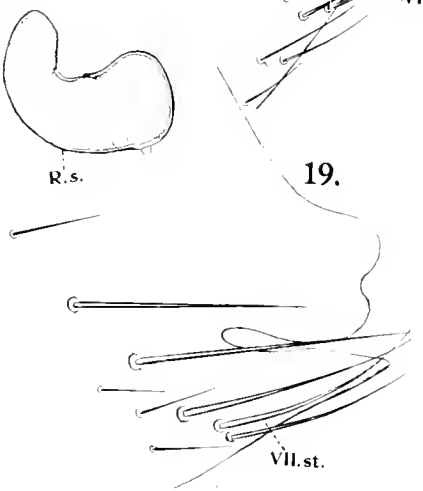

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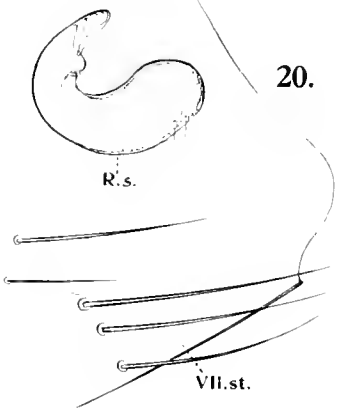

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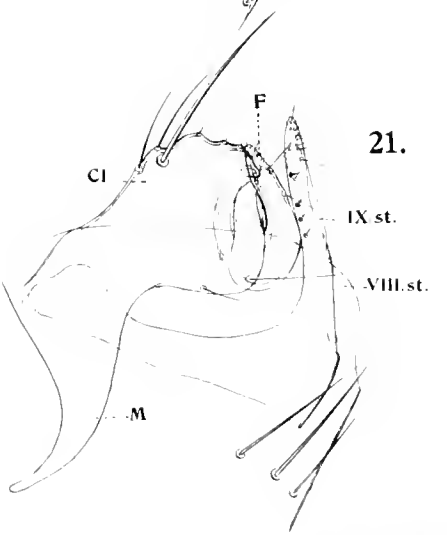

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NOVITATES ZOOLOGICAE

Vol. XXXV. APRIL 1930. No. 3.

ON THE LEPIDOPTERA COLLECTED IN MOROCCO BY DR. E. HARTERT IN 1929.

By LORD ROTHSCHILD, F.R.S., Ph.D.

THE collection of 1929 is much smaller than Dr. Hartert's three previous collections from Morocco. The reasons for this are various: he spent only about half the time in Morocco, he was without the assistance of our caretaker and taxidermist F. Young, who on former occasions did much of the collecting of lepidoptera, and during his stay in Azrou thunderstorms and heavy rains made collecting most of the time impossible.

At Agaiouar, in the Great Atlas, 1,800 m. high, Dr. Ungemach, with whom Dr. Hartert visited that place, put up an acetylene lamp, but not a single moth came to it—apparently because it was too cold, there being hoar-frost on the grass in the mornings.

The forms of the genus *Zygaena* from various localities and the moths from El-Hadjeb are very interesting.

1. **Papilio machaon maxima** Verity.

Papilio machaon maxima gen. aest. *angulata* Verity, *Rhopalocera Palaearctica*, p. 296, pl. lx, f. 14 (1911) (Tangier).

A single large ♂ in fine condition was collected.

1 ♂ Marrakesh, 7 May 1929.

2. **Ganoris rapae mauritanica** (Verity).

Pieris rapae mauritanica gen. aest. *mauritanica* Verity, *Rhopalocera Palaearctica*, p. 155, pl. xxxiii, ff. 43, 44; pl. xxxiv, ff. 15, 16 (1908) (Algeria, Morocco, Tunisia, ff. Algeria text) (ff. 15, 16, pl. xxxiv as *leucotera* Stef.).

1 ♂, 1 ♀ are in the collection.

1 ♂, 1 ♀ Marrakesh: ♂ 16, ♀ 17 March 1929.

3. **Euchloë charlonia** (Donzel).

Anthocharis charlonia Donzel, *Ann. Soc. Entom. France*, vol. xi, p. 197, pl. viii, f. 1 (1842) (Emsilah, Algeria).

Dr. Hartert only obtained 2 examples of this neat little species.

2 ♂♂ Marrakesh, 13 May 1929.

(A few more were seen the same day.—E. H.)

4. Euchloë belemia (Esp.).

Papilio belemia Esper, *Die Schmett.* vol. i, pt. ii, t. 110, f. 2 (1792) (?) (gen. vern.).
Papilio glauce Hübner, *Europ. Schmett.* i, ff. 546, 547 (1798–1803) (?).

Only 2 ♂♂ were captured which appear intermediate between gen. vern. *belemia* and gen. aest. *glauce*, but are probably *glauce*.

2 ♂♂ Marrakesh, 13 May 1929.

5. Colias electo croceus (Geoff. in Fourer.).

Papilio croceus Geoffroy, in Fourcroy's *Entom. Par.* vol. ii, p. 250 (1785) (Paris).

1 ♂, 1 ♀ were taken ; the ♂ is a large normally coloured specimen, but the ♀ is a small example of the ab. *helice* with very white forewings, very grey hindwings. On the forewings the black border is abnormally wide, occupying at least ⅓ of the wing.

1 ♂ Marrakesh, 8 May 1929 ; 1 ♀ ab. *helice*, 13 May 1929.

6. Argynnis lathonia (Linn.).

Papilio lathonia Linnaeus, *Syst. Nat.* edit. x, vol. i, p. 481, no. 141 (1758) (Europe).

Only one specimen taken.

1 ♂ Azrou, Middle Atlas, 1,300 m. = 4,225 ft., 16 April 1929.

7. Melitaea desfontainii gibratii Oberth.

Melitaea desfontainii var. *gibratii* Oberthur, *Étud. Entom. Comp.* fasc. xix, pp. 46 and 47, pl. dxxxii, ff. 418–422 (1922) (Massif de Zehroum).

Of this fine insect, the series taken consists of 13 ♂♂ and 3 ♀♀ ; they are very fresh and show clearly the much more brilliant coloration as well as great size when compared with *desfontainii desfontainii* Godart of Algeria and *desfontainii boetica* Ramb. of Spain and Portugal.

13 ♂♂, 3 ♀♀ Azrou, Middle Atlas, 1,300 m. = 4,225 ft., 24 April 1929.

(Quite a number were seen, but few in very good condition.—E. H.)

8. Pararge aegeria meone (Cram.).

Papilio meone Cramer, *Pap. Exot.* vol. iv, pt. xxvi, p. 51, pl. ccexiv, ff, E.F. (1780) (Alger).

1 ♂ El Hadjeb, West Slopes of Middle Atlas, 17 April 1929.

9. Pararge megaera megaera (Linn.).

Papilio megaera Linnaeus, *Syst. Nat.* edit. xii, pt. ii, p. 771, no. 142 (1767) (Austria, Dania).

1 ♂ Rabat, 10 April 1929 ; 1 ♀ Marrakesh, 7 May 1929.

10. Epinephele pasiphaë pasiphaë (Esp.).

Papilio pasiphaë Esper, *Schmett.* vol. i, pt. ii, Forts. p. 99, no. 135, pl. lxvii (cont. xvii), f. 4 (1777) (Envs. de Paris).

1 ♂ Rabat, 10 April 1929.

11. Epinephele ida ida (Esp.).

Papilio ida Esper, *Schmett.* vol. i, pt. ii, Forts. p. 184, no. 176, pl. cxxii (cont. xli), f. 4 (1777) (Pyrénées).

1 ♂ Marrakesh, 13 May 1929.

12. Coenonympha pamphilus lyllus (Esp.).

Papilio lyllus Esper, *Schmett.* vol. i. pt. ii. Forts. pl. cxxii (cont. 77), ff. 1, 2 (1777) (?).

The ♂ example from El Hadjeb has very heavy dark borders to the wings.

2 ♂♂ Agaiouar, Great Atlas, 1,800 m. = 5,850 ft., 11 May 1929; 2 ♂♂, 1 ♀ Azrou, Middle Atlas, 1,300 m. = 4,225 ft., 24 and 25 May 1929; 1 ♂, 1 ♀. El Hadjeb, West Slopes, Middle Atlas, 17 April 1929.

13. Callophrys rubi (Linn.).

Papilio rubi Linnaeus, *Syst. Nat.* edit. x. p. 483, no. 154 (1758) (Sweden by subs. desig.).

1 ♀ Azrou, Middle Atlas, 1,300 m. = 4,225 ft., 26 April 1929.

14. Chrysophanus phlaeas (Linn.).

Papilio phlaeas Linnaeus, *Faun. Suec. edit. alt.* p. 285 (1761) (Sweden).

1 ♀ (very dark, tails long), Marrakesh, 13 May 1929.

15. Chrysophanus phoebus Blach.

Chrysophanus phoebus Blachier, *Bull. Soc. Entom. France*, 1905, p. 242 (Ourika, Moroccan Atlas).

This series is very fine. 1 ♂ has the ground colour deeper coppery red, less coppery orange, and the post-discal black spots run together into 7 large black bands.

(This beautiful little "copper" was quite common on uncultivated ground, near Marrakesh.—E. H.)

27 ♂♂, 10 ♀♀ Marrakesh, 7–13 May 1929.

16. Lycaena icarus celina Aust.

Lycaena celina Austaut, *Pet. Nouv. Entom.* vol. ii, p. 293, no. 212 (1879) (Sidi-Bel-Abbés).

1 ♀ Agaiouar, Great Atlas, 1,800 m. = 5,850 ft., 11 May 1929; 2 ♂♂ Azrou, Middle Atlas, 1,300 m. = 4,225 ft., 24 April 1929; El Hadjeb, West Slopes, Middle Atlas, 17 April 1929.

17. Lycaena astrarche calida Bell.

Lycaena agestis var. *calida* Bellier de la Chavignerie, *Ann. Soc. Entom. France*, vol. ii, ser. iv, p. 615, no. 2 (1862) (no locality).

Both the examples are of the spring form gen. vern. *ornata* Stdgr.

1 ♂ Marrakesh, 17 May 1929; 1 ♂ El Hajeb, West Slopes, Middle Atlas, 17 April 1929.

18. Lycaena minima (Fuessly).

Papilio minimus Fuessly, *Verz. bek. Schweiz. Ins.* p. 31 (1775) (Switzerland).

The two examples are very large.

1 ♂, 1 ♀ El Hajeb, West Slopes, Middle Atlas, 17 April 1929.

19. Adopaea acteon (Rott.).

Papilio acteon Rottemburg, *Naturf.* vol. vi, p. 30, no. 18 (1775) (Lansberg an der Warthe).

1 ♂ Marrakesh, 13 May 1929.

20. **Celerio euphorbiae mauretanica** (Stdgr.).

Deilephila euphorbiae mauretanica Staudinger, *Cat. Lep. Europ. Faun.* edit. ii, p. 36, no. 466 (1871) (Mauretania).

Again only a single large ♀ was taken, but it differs from the ♀ taken at the same place in 1924, by the heavier black submarginal band on the hindwings, and in having the white inner margin of the tegulae saturated with rose colour,

1 ♀ Azrou, Middle Atlas, 1,300 m. = 4,225 ft., April 26, 1929.

21. **Amorpha populi austauti** (Stdgr.).

Smerinthus populi var. *austauti* Staudinger, *Pet. Nouv. Entom.* tome ii, p. 190 (1877) (*Mauritania occidentalis*).

All 3 specimens are pronounced typical *austauti*, NOT the pale aberration *staudingeri* Aust.; in fact, they are darker purer grey than most Algerian examples.

1 ♂, 1♀ El Hadjeb, W. Slopes of Middle Atlas, 17 April 1929; 1 ♀ Azrou, Middle Atlas, 1,300 m. = 4,225 ft., 26 April 1929.

22. **Haemorrhagia tityus aksana** Le Cerf.

Haemorrhagia tityus L. s.sp. *aksana* Le Cerf, *Bull. Soc. Entom. France*, 1923, p. 199 (Azrou).

A single very poor specimen from the topotypical locality.

1 ♀ Azrou, Middle Atlas, 1,300 m. = 4,225 ft., 26 April 1929.

23. **Procris orana** (Aust.).

Ino orana Austaut, *Le Nat.* vol. ii, p. 284 (1880) (Oran).

The Mauretanian species of the genus *Procris* are very puzzling and require much more careful study. As the 4 examples enumerated below agree fairly well with Austaut's type, i.e. the example of Dr. Codet's in the Oberthur collection, I am quoting them under his name till Dr. Jordan's paper on the genus *Procris* is published, which I hope will clear up this difficult genus.

3 ♂♂ El Hadjeb, W. Slopes of Middle Atlas, 17 April 1929, 1 ♂ Azrou, Middle Atlas, 1,300 m. = 4,225 ft., 26 April 1929.

24. **Zygaena loyselis montana** Rothsch.

Zygaena ungemachi montana Rothschild, *Bull. Soc. Scien. Nat. Maroc.* tome v, nos. 4–5, p. 140, no. 53 (1925) (Azrou).

Again only a single example, so that the subspecies is as yet only recorded in the 3 examples at Tring.

1 ♂ El Hadjeb, W. Slopes of Middle Atlas, 17 April 1929.

The specimen from Azrou taken in 1925 and the present one have the red on the tegulae more extended than in the type.

25. **Zygaena zuleima** Pierr.

Zygaena zuleima Pierret, *Ann. Soc. Entom. France*, vol. vi, p. 22, tab. i, f. 8 (1837) (Bône).

3 ♂♂ Azrou, Middle Atlas, 1,300 m. = 4,225 ft., 26 April, 1929.

It is strange to find this diminutive species occurring at sea-level and then again high in the mountains.

26. **Zygaena orana media** Rothsch.

Zygaena orana media Rothschild, *Bull. Soc. Scien. Nat. Maroc.* tome v, nos. 7–8, p. 338, no. 74 (31 Dec. 1925) (Azrou).

A nice series of this interesting form, from a new station.

22 ♂♂, 3 ♀♀ El Hadjeb, W. Slopes of Middle Atlas, 17 April 1929.

27. **Zygaena harterti** Rothsch.

Zygaena harterti Rothschild, *Bull. Soc. Scien. Nat. Maroc.* tome v, nos. 7–8, p. 338, no. 76 (31 Dec. 1925) (Azrou).

I again must treat this binomially for the present till the status of the form can be definitely established.

2 ♂♂, 1 ♀ Agaionar, Great Atlas, 1,800 m. = 5,850 ft., 11 May, 1929.

28. **Phragmatobia occidentalis** (Rothsch.).

Macnas breveti occidentalis Rothschild, *Novit. Zool.* vol. xvii, p. 119 (1910) (Mazagan, Morocco).

2 ♂♂ El Hadjeb, W. Slopes of Middle Atlas, 17 April 1929.

The late Mr. Charles Oberthur received from Henry Powell a series of this insect; which he renamed *Phragmatobia emmanuelii*, as he did not consider my description fitted his insect. I have compared this series from Powell, now in the British Museum, with my own from Riggenbach and find them to be the same insect.

29. **Phragmatobia fuliginosa harterti** Rothsch.

Phragmatobia fuliginosa harterti Rothschild, *Novit. Zool.* vol. xxxv, no. 2, p. 229, no. 50 (El Hadjeb).

1 ♀ El Hadjeb, W. Slopes of Middle Atlas, 17 April, 1929.

This example agrees with the typical series of males in its distinguishing characters, but being a ♀ (the only one) is darker on the forewings.

30. **Arctia villica angelicae** (Boisd.).

Chelonia villica var. *angelicae* Boisduval, *Gen. et Ind. Meth. Europ. Lépid.* p. 42 (1829) (Spain).

1 ♂ El Hadjeb, W. Slopes of Middle Atlas, 17 April 1929; 1 ♀ Azrou, Middle Atlas, 1,300 m. = 4,225 ft., 24 April 1929.

31. **Ichthyura pigra powelli** (Oberth.).

Pygaera powelli Oberthur, *Etud. Lépid. Comp.* Fasc. xi, pl. ccexxx, ff. 4729–4731 (expl. pls. p. 22) (Lambessa). In Fasc. vii photograph of larva and imago are published.

1 ♂ El Hadjeb, W. Slopes of Middle Atlas, 17 April 1929.

This example is greyer than 2 Alger ones and a series from Batna.

Oberthur quotes Vaucher and Olchese as the authority for the record of *Ichthyura pigra* (Hufn) from Tangiers. Although I have not seen this form from Morocco myself I can quite believe it to be a correct identification, as *pigra pigra* does occur on the opposite Spanish coast and we find many other Spanish forms in the northern ports of Morocco.

32. **Axia margarita** (Hbn.).

Noctua margarita Hübner, *Samm. Europ. Schmett. Noctuae*, fig. 514 (1805) (Europe).

It was a great surprise to find Dr. Hartert's two fine ♀♀ from El Hajeb belonged to *margarita* and not to *vaulogeri*, which is the Algerian species. As

these ♀♀ are very large it is quite possible when a large series of both sexes comes to hand that the Moroccan examples may prove to belong to a separate subspecies, but as I have no European ♀♀ and no Morocean ♂♂ I cannot yet decide this question.

2 ♀♀ El Hadjeb, W. Slopes of Middle Atlas, 17 April 1929.

33. **Sideridis albipuncta** (Schiff. and Den.).

Noctua albipuncta Schiffermüller and Denis, *Ank. Syst. Werk. Schmett. Wienergeg.* p. 84 (1775) (Vienna).

2 ♂♂, 1 ♀ El Hadjeb, W. Slopes of Middle Atlas, 17 April 1929.

34. **Sideridis vitellina** (Hbn.).

Noctua vitellina Hübner, *Samml. Europ. Schmett. Noctuae*, ff. 379, 589 (1805).

These two specimens are of the more abundant darker form.

2 ♂♂ El Hadjeb, W. Slopes of Middle Atlas, 17 April 1929.

35. **Cirphis loreyi** (Dup.).

Noctua loreyi Duponchel, *Lépid. France*, vol. vii, p. 81, pl. 105, f. 7 (1827) (France).

The 6 examples all show the black streaks along median vein very strongly marked.

2 ♂♂, 4♀♀ El Hadjeb, W. Slopes of Middle Atlas, 17 April 1929.

36. **Athetis superstes** (Treits.).

Caradrina superstes Treitschke, *Schmett. Europ.* vol. v, pt. 2, p. 260 (1825) (Europe).

2 ♂♂, 2 ♀♀ El Hadjeb, W. Slopes of Middle Atlas, 17 April 1929.

37. **Athetis flava** (Oberth.).

Caradrina flava Oberthur, *Etud. d'Entom.* Fasc. i, p. 45, pl. iv, f. 3 (1876) (Algeria).

Dr. Hartert caught a single much worn example of this species which is peculiar to Mauretania. I believe this is the first record for Morocco.

1 ♂ El Hadjeb, W. Slopes of Middle Atlas, 17 April 1929.

38. **Athetis flavirene noctivaga** (Bell.).

Caradrina noctivaga Bellier de la Chavignerie, *Ann. Soc. Entom. France*, 1863, p. 420, pl. ix, f. 4 (Barcelona).

1 ♂, 1 ♀ El Hadjeb, W. Slopes of Middle Atlas, 17 April 1929.

39. **Athetis clavipalpis** (Scop.).

Phalaena clavipalpis Scopoli, *Entom. Carn.* p. 213 (1763) (Carniolia).

2 ♂♂, 2 ♀♀ El Hadjeb, W. Slopes of Middle Atlas, 17 April 1929.

40. **Euxoa puta puta** (Hbn.).

Noctua puta Hübner, *Samml. Europ. Schmett. Noctuae*, no. 255 (1802) (Europe).

There have been many discussions as to the correct name for this species; chiefly owing to the doubts as to what should be considered the correct date for the various sections of Hübner's work. It is now pretty sure that the greater

part of the "*Noctuae*" were issued in 1802 and so Haworth's name of *radius* dating from 1803 loses priority for the species; but must be used as the name for the form usually considered the typical one: so that what we usually called *Euxoa radius radius* becomes *Euxoa puta radius*, and what was called *Euxoa radius erythroxylea* Treits. must now bear the name of *Euxoa puta puta*.

While the examples I have from the extreme east of Morocco and also from the Atlantic coast of Morocco are all *puta radius* the 20 specimens Dr. Hartert brought back from the Middle Atlas are all *puta puta*. Of this series of 20, 6 ♀♀ are of the black form and 1 ♂, 2 ♀♀ intermediate and 11 ♂♂ normal in colour.

12 ♂♂, 8 ♀♀ El Hadjeb, W. Slopes of Middle Atlas, 17 April 1929.

41. **Euxoa segetum** (Schiff. and Den.).

Noctua segetum Schiffermüller and Denis, *Ank. Syst. Werk. Schmett. Wienergeg.* pp. 81, 252, ff. 3*a*, *b* (1775) (Vienna).

1 ♂ Azrou, Middle Atlas, 1,300 m. = 4,225 ft., 26 April 1929; 1 ♂ Casablanca, 22 May 1929.

42. **Euxoa trux trux** (Hbn.).

Noctua trux Hübner, *Samml. Europ. Schmett. Noct.* ff. 723, 725, 770 (1802) (Europe).

1 ♂, 2 ♀♀ El Hadjeb, W. Slopes of Middle Atlas, 17 April 1929.

43. **Acronycta rumicis pallida** Rothsch.

Acronycta rumicis pallida Rothschild, *Novit. Zool.* vol. xxvii, p. 7, no. 22 (1920) (Algeria).

1 ♂ El Hadjeb, W. Slopes of Middle Atlas, 17 April 1929.

44. **Polia corsica** Ramb.

Polia corsica Rambur, *Ann. Soc. Entom. France*, tom. i, p. 279, pl. ix, f. 3 (1832) (Ajaccio and Bastia, Corsica).

1 ♂, 1 ♀ El Hadjeb, W. Slopes of Middle Atlas, 17 April 1929.

45. **Polia carpophaga** (Borkh.).

Phalaena Noctua carpophaga Borkhausc, *Syst. Beschr. Europ. Schmett.* vol. iv, p. 422, no. 169 (1792) (Europe).

1 ♂ El Hadjeb, W. Slopes of Middle Atlas, 17 April 1929.

46. **Metapoceras felicina** (Douz.).

Polia felicina Donzel, *Ann. Soc. Entom. France*, ser. ii, vol. ii, p. 199, pl. vi, f. 2 (1844) (Marseille).

1 ♀ El Hadjeb, W. Slopes of Middle Atlas, 17 April 1929.

47. **Cucullia verbasci** (Linn.).

Phalaena Noctua verbasci Linnaeus, *Syst. Nat.* edit. x, p. 15, no. 105 (1758).

The Algerian and Moroccan specimens appear to be very large, but I have seen too few to decide if there is a N. African subspecies.

1 ♂ El Hadjeb, W. Slopes of Middle Atlas, 17 April 1929.

48. **Cleophana pectinicornis youngi** Rothsch.

Cleophana pectinicornis youngi Rothschild *Bull. Soc. Scien. Nat. Maroc*, tome v, nos. 4-5, p. 143, no. 72 (1925) (Tiflet, West Morocco).

A ♂ was taken at El Hadjeb the second only obtained by Dr. Hartert. It is rather smaller than the type, but shows the same characters.

1 ♂ El Hadjeb, W. Slopes of Middle Atlas, 17 April 1929.

49. **Omphalophana serrata** (Treits.).

Cleophana serrata Treitschke, *Schmett. Eur.* (*Suppl.*), vol. x, pt. ii, p. 121 (1835) (Sicily).

1 ♂, 2 ♀♀ El Hadjeb, W. Slopes of Middle Atlas, 17 April 1929.

50. **Calophasia almoravida** Grasl.

Calophasia almoravida Graslin, *Ann. Soc. Entom. France*, 1863, p. 319, pl. viii, f. 6 (Grenada).

1 ♀ Azrou, Middle Atlas, 1,300 m. = 4,225 ft., 26 April 1929.

51. **Acontia luctuosa** (Schiff and Den.).

Phalaena luctuosa Schiffermüller and Denis, *Ank. Syst. Werk. Schmett. Wienerg.* p. 90 (1775) (Vienna).

1 ♂ El Hadjeb, W. Slopes of Middle Atlas, 17 April 1929.

52. **Phytometra gamma** (Linn).

Phalaena gamma Linnaeus, *Syst. Nat.* edit. x, p. 513, no. 91 (1758) (Sweden).

1 ♂, 1 ♀ El Hadjeb, W. Slopes of Middle Atlas, 17 April 1929.

53. **Minucia lunaris maura** (Oberth.)

Pseudophia lunaris ab. *maura* Oberthur, *Etud. Entom.* livr. ix, p. 39, pl. iii, f. 13 (1884) (Sebdou in Algeria).

1 ♂ El Hadjeb, W. Slopes of Middle Atlas, 17 April 1929.

54. **Lithostege cinerata** Turati.

Lithostege cinerata Turati, *Atti Soc. Ital. Sci. Nat.* vol. lxxxiii, p. 118 f. (1924) (Cyrenaica).

1 ♂ El Hadjeb, W. Slopes of Middle Atlas, 17 April 1929.

55. **Sterrha laevigata** (Scop.).

Phalaena laevigata Scopoli, *Entom. Carn.* p. 230, no. 575 (1763) (Carniolia).

1 ♀ Marrakesch, 6 May 1929.

56. **Rhodometra sacraria** (Linn.).

Phalaena sacraria Linnaeus, *Syst. Nat.* edit. xii, vol. i, pt. ii, p. 863 (1767) (Barbaria).

The oblique discal band is strongly pronounced

1 ♂ Marrakesh, 13 May 1929.

57. **Eupithecia pantellaria illuminata** Joan.

Eupithecia pantellaria illuminata L. de Joannis, *Bull. Soc. Entom. France*, p. lxxx (not clxxx as in Staud. Cat. 1901), no. 41 (1891) (Philippeville).

1 ♂ El Hadjeb, W. Slopes of Middle Atlas, 17 April 1929.

58. **Gnophos variegata rothschildi** Prout.

Gnophos variegata rothschildi L. B. Prout, *Novit. Zool.* vol. xxxv, p. 145, no. 8 (1929) (Jedders, Upper Bou Regreg, Morocco).

1 ♂ El Hadjeb, W. Slopes of Middle Atlas, 17 April 1929.

59. **Fidonia plumistraria atlanticaria** (D. Luc.).

Eurrhantis plumistraria atlanticaria Daniel Lucas, *Bull. Soc. Entom. France*, 1920, p. 254 (Meknes).

3 ♂♂ Plateau of Middle Atlas, 27 March 1929.

60. **Aspilates ochrearia** (Rossi).

Phalaena ochrearia Rossi, *Mant. Ins.* vol. ii, p. 33, pl. vii, f. n. (1794) (Etruria).

3 ♀♀ El Hadjeb, W. Slopes of Middle Atlas, 17 April 1929.

Nos. 33 to 53 are not in strict systematic order.

SOME NEW ANTHRIBIDAE FROM TROPICAL AFRICA.

By DR. KARL JORDAN.

1. **Litocerus ceriger** spec. nov.

♂♀. Speciei *L. filicornis* dictae simillimus; sulco pronoti transverso antemediano minus impresso; elytro macula sinuata postmediana dorsali cremoris colore.

Long. 6·5–7·5 mm.

Hab. Congo Belge: Barumbu, vii.1925 (J. Ghasquière), 1 ♂, type; Mayumbe: Tshela, ii.1916 (R. Mayné), 1 ♂; Mayumbe: Zobe, i.1916 (R. Mayné), 1 ♀; Bumbuli, i–iv.1916 (R. Mayné), 1 ♀.——♂ from Tshela (= Chela) and ♀ from Zobe transferred to Mus. Tring; the other pair in Musée du Congo Belge.

In structure and colouring close to *L. filicornis* Thoms. (1858). Head and pronotum more uniformly cinnamomeous. Light-coloured markings of upperside and of legs creamy, not white. On pronotum the median stripe vestigial in front of carina or at least not so well marked as in *L. filicornis*; transverse groove less distinct. Elytra without grey markings at base; behind middle a creamy spot from interspaces 3 to 7, somewhat projecting forward in 5 and backward in 4 and 7, not broken up. Creamy grey rings of tibiae somewhat closer together than in *L. filicornis*. Possibly a subspecies of *L. filicornis*.

2. **Litocerus filicornis senniger** subsp. nov.

♂♀. Differs from *L. f. filicornis* Thoms. (1858) in the base of elytra being more extended whitish grey, and the whitish grey postmedian zigzag spot being somewhat larger.

Hab. Gold Coast: Kumassi (Newbery), 2 ♂♂, 1 ♀, type ♂; Aburi (W. H. Patterson), 1 ♂; no special locality (A. E. Evans), 1 ♂.

3. **Gulamentus picatus** spec. nov.

♀. Brunneo-niger, antenna (clava excepta) pedibusque rufis; infra albogriseus, supra plus minus nigrans, elytris duabus maculis communibus sat magnis griseis notatis, una antemediana subcordiformi, altera apicali. Segmentum 2 antennae tertio parum longius, clava lata, 11 latitudine paululo longius. Pygidium triangulare, lateribus apice rotundatis, mucrone apicali truncato.

Long. (cap. excl.) 5·7 mm., lat. 2·3 mm.

Hab. Cameroon: Joko, vii.1912, 1 ♀.

Greyish white pubescence dense in apical half of rostrum, forming an apical half-moon, an elongate spot in middle of head and posterior border of eye greyish white, conspicuous, otherwise the pubescence of head scattered. Interspace between antennal groove and eye as broad as segment 2 of antenna. Segment 9 of antenna as long as broad, 10 nearly twice as broad as long, 11 one-tenth longer than broad. Pronotum one-third broader than long; on each side a large patch at apex and another before carina, diffuse, whitish grey, not distinctly

separated from each other, dorsal and lateral carina bordered with the same grey pubescence, a median stripe broadly interrupted in middle and not quite reaching apical margin likewise grey, the anterior portion of this stripe connected before middle of pronotum with the lateral apical patch, the brown median area being imperfectly broken up into four patches. Scutellum dark brown. Pubescence on dark portions of elytra shaded with ochraceous; behind scutellum the suture convex, granulose, black; grey antemedian patch recalling the apical portion of a maple-leaf, being posteriorly produced into a sharp projection on suture and excised on each side of the projection; this patch indistinctly connected by scattered grey pubescence with an ill-defined basal spot situated above black shoulder; grey apical area well defined, extending laterally to the level of apex of abdominal segment 3, anteriorly indistinctly bisinuate on each elytrum. Median groove of pygidium not quite extending halfway to apex, apical mucro recalling a button, its terminal surface concave. Apical margin of anal ventral segment rounded.

4. **Gulamentus guttatus** spec. nov.

♀. Niger, pube sub-isabellina tectus, rostro cum capite griseo, pronoto et elytris guttis nigris notatis, elytris plaga nigra postmediana communi, sed sutura extrema ipsa isabellina. Latitudo frontis longitudine rostri major. Pronotum longitudine fere dimidio latius. Pygidium apice cum segmento ventrali truncato emarginato.

Long. (cap. excl.) 7·4 mm., lat. 3·1 mm.

Hab. Cameroon (Conradt), 1 ♀.

Near *G. cylindricus* Jord. (1895), but much broader. Frons distinctly narrower than the proboscis is long. Interspace between eye and antennal groove broader than first antennal segment (♀). Segment 9 of antenna a little longer than 10, 11 nearly as long as 9 and 10 together. Proboscis more densely pubescent grey than head. Centre of pronotum black (partly denuded), with some grey isabella pubescence anteriorly, sides grey isabella, with about 6 irregular, ill-defined, black spots. Suture and alternate interspaces of elytra regularly dotted with black, the dots smaller than the spaces between them, dots less numerous and less regular laterally, here an indication of a diffuse, interrupted black macula before and behind middle; dorsal postmedian patch extending to interspace 5 (counting sutural interspace as first), two dots being joined to it in 5, and another dot posteriorly at suture, the patch therefore being tridentate on each elytrum. Pygidium broader than long; as in *G. cylindricus* the apex emarginate, pygidium and anal ventral segment forming a sort of cone with a hole at the top. Intercoxal process of mesosternum triangular, with apex truncate.

5. **Gulamentus virgatus** spec. nov.

♂♀. Rufo-brunneus, pronoto elytrisque griseo-luteo vittatis, pedibus rufis.

Long. 4·5 mm., lat. 2·6 mm.

Hab. Congo Belge: Haut Uelé, Moto (L. Burgeon), 2 ♂♂, 1 ♀, type in Musée du Congo, 1 ♂ paratype at Tring.

Similar to *G. taeniatus* Jord. (1924), but rufous brown instead of black, end-segment of antenna (♂, in our ♀ of *G. taeniatus* both antennae broken) longer, stripes of pronotum less regular, between lateral stripes a spot from carina

forward, luteous stripe which runs from base of elytrum above shoulder to apical sutural angle interrupted, anal ventral segment of ♂ with broad, rounded, shallow impression.

Proboscis luteous grey. Eye narrowly bordered with luteous grey, no luteous grey median spot on occiput. Antenna rufous, club brown, end-segment a little longer than 9 and 10 together. Pronotum with 5 luteous grey streaks which are less than half as wide as the brown interspaces, the streaks connected at base, admedian brown interspace slightly broader anteriorly than posteriorly, in dorso-lateral interspace a luteous grey elongate spot in front of carina, farther forward a small dot, lateral streak continued dorsad at apical margin. Scutellum brown, at apex luteous grey. On elytrum the following luteous grey streaks: a broadish one from base, touching scutellum, reaching suture a little distance behind scutellum, then running along suture, but separate from it, to beyond middle, a similar streak from base above shoulder as long as the sub-sutural one or a little longer and in its posterior half incompletely divided longitudinally into a double line; from in between the ends of these streaks to angle of suture an oblique streak, which is continued forward by two (or one) very thin lines; from below shoulder to apex a thin line consisting of three separate sections, anterior end of second and third sections a little more dorsal than the posterior end of preceding section. Pygidium with a largish brown rounded spot each side beyond middle, in ♂ pygidium longer than broad, narrowing apicad, truncate, with the angles rounded, in ♀ not quite semicircular, being less than twice as broad as long. In both sexes fore- and hindtarsal segment 1 longer than, in midtarsus as long as, claw-segment (in ♂ of *G. taeniatus* Jord. (1924) segment 1 of fore- and midtarsus shorter than claw-segment, in midtarsus as long as tibia is broad).

6. **Aneurhinus breviclava** spec. nov.

♂♀. Antenna clava tri-articulata. Pronotum omnino convexum. Elytra luteo-grisea sparsim nigro-guttulata pone medium fascia transversa nigra antice gradatim diffusa ornata. Prosternum ante coxas brevissimum utrinque carina acuta instructum.

Long. (cap. excl.) 8·5–9·5 mm.

Hab. Belgian Congo: Buta, 1 ♂ (type) in Mus. Tring, received from Messrs. Staudinger and Bang-Haas; Kassai, Kondue (Leohard), 1 ♂ in Musée du Congo, Tervueren; 1 ♀ without locality at Tring.

Black-brown, pubescent luteous grey (type) or grey, the pubescence sparser on pronotum. Antenna uniformly brownish black, in ♂ reaching to base of elytra, in ♀ shorter, segments 7 and 8 very little broader than 6, the club consisting in both sexes of segments 9 to 11; in ♂ 9 a little longer than 11, in ♀ a little shorter, 10 in ♂♀ transverse, half as broad again as long. Pronotum convex, without impression, barely one-tenth broader than long, coarsely reticulate-coriaceous, in type a luteous grey median line which fades away posteriorly; anterior angles very distinctly projecting, but rounded off. Elytra parallel, convex, somewhat paler grey basally and subapically, suture and alternate interspaces dotted with black, before apical declivity a black transverse band, anteriorly gradually fading away, posteriorly sharply defined, and more or less indented on the suture and alternate interspaces, the band narrow at the sides and here somewhat curved forward.

Prosternum about one-fifth of a mm. long in front of coxa; from coxa obliquely forward-laterad a sharp carina which rises abruptly at the coxal cavity and fades away laterally, not reaching the lobe-like anterior angle of the prothorax. Transverse groove in front of triangular intercoxal process of mesosternum deep. In ♂ pubescence of middle of metasternum and of impressed area of abdomen more silky and less luteous than at sides. Tibiae and tarsi unicolorous luteous grey.

7. **Cylindroides albocinctus canus** subsp. nov.

♀. Markings in depression of pronotum deeper brown than in *C. a. albocinctus* Fåhrs. (1839), and dorso-lateral brownish black spots more conspicuous; on elytra, which are much shaded with white between the two band-like transverse patches, no ochraceous dots or only a few immediately in front of the black dots which form the anterior boundary of the subapical white patch.

Hab. West Africa: Gaboon (type), 5 ♀♀; Buta, Belgian Congo, 1 ♀: all at Tring.

8. **Anacerastes tenuipilis** spec. nov.

♂♀. Speciminibus olivaceo-griseis *A. geometrici* simillimus, sed squamis pallidis multo tenuioribus piliformibus.

Long. (cap. excl.) 11–17 mm.

Hab. Congo: Buta (type), at Tring; Libreville; in Musée du Congo a series from Stanleyville, Yangambi and the Aruwimi.

Upperside olivaceous grey, behind the middle of the elytrum a triangular, brown or blackish, macula reaching neither suture nor lateral margin, narrowest at the sutural end, extending from here somewhat obliquely forward, declivous apical area usually also of this colour, the grey pubescence in front and behind the macula usually condensed, as it is also in the middle line of the pronotum, there being in addition on the prothorax (as in *A. geometricus* Jord. 1894 and in *A. scriptus* Jord. 1910) a grey lateral line from the apex obliquely ventrad and backward. While the grey scales of upper and underside in the allied species are nearly as broad as the dark scales of the postmedian macula, they are reduced in width in the new species, resembling the grey pubescence of the tibiae, being more like short hairs than scales.

9. **Anacerastes varius** spec. nov.

♂♀. Carinae rostri postice divergentes. Linea mediana pronoti plus minus rugulosa. Indumentum variat: specimina similia aut *Mecocero barombino*, aut *M. tigrino*, aut *M. mniszechi*.

Long. 10–16 mm.

Hab. Cameroon, Spanish Guinea, Gaboon and Belgian Congo, a series of all three forms in Mus. Tring; type from Spanish Guinea: Benito.

Median stripe of pronotum either totally rugulose or at least in centre of pronotum. I think that I am correct in treating the forms here united as belonging to one species, as there are no structural differences, as far as I have been able to ascertain. The first and second forms described below I have hitherto treated as belonging to *A. variegatus* Kolbe (1895), from Cameroon. But in that species the median stripe of the pronotum is said to be smooth; the elytra of the type (in Mus. Berlin) are buff, tessellated with black. On

re-examination *A. variegatus* may prove to be the same as form *b*, in which case the species and form *b* would have to bear the name *variegatus*.

a. A. varius f. *griseus* nov.——Resembles *Mecocerus barombinus* Kolbe (1895). Elytra tessellated with grey; in middle a transverse, more or less elliptical, macula without grey (at least so it appears to the naked eye), the grey spots more or less rectangular, variable in number, usually more numerous and contiguous or confluent in front of and behind the black macula. Pronotum at least with an indication of a grey median line; on sides an oblique stripe from apex downward and backward. Light and dark scales of elytra practically of the same size, those on underside somewhat narrower, but truncate, not hair-like. First tarsal segment black from about middle to apex.——Type from Benito. A series from Cameroon, Spanish Guinea, and Congo Belge.

b. A. varius f. *varius*.——Resembles *Mecocerus tigrinus* Thoms. (1858), differing from f. *griseus* only in the markings above being more or less tawny. In a few specimens the black median macula of the elytra is broken up.——Type from Benito. A series from: Spanish Guinea and Gaboon.

c. A. varius f. *nubilus* nov.——Resembles *Mecocerus mniszechi* Thoms. (1858). Light-coloured scaling clayish buff, denser than in the two previous forms, especially on pronotum, metasternum and abdomen: on elytra basal half or the greater part of it more or less uniformly clayish buff, behind the dark median patch a sort of clayish, transverse, somewhat oblique band, declivous apical area variegated with this scaling. The scales at the base of the elytra and on the sides of the thoracic sterna are larger than in the previous forms. ——Type from Joko, Cameroon. A series from Cameroon and Congo Belge.

10. **Anacerastes pictus** spec. nov.

♂♀. Speciebus huiusque descriptis in toto minor. Carinae rostri posticae divergentes. Pronotum luteo-griseo maculatim notatum, omnino rugatum. Elytra antice grisea, macula nigra irregulari subbasali (in utroque elytro) notata, macula vel fascia transversa ad suturam interrupta nigra, ab hac macula ad apicem luteo-grisea nigro variegata.

Long. 9–11·5 mm.

Hab. Gold Coast: Kumassi (type; Newbery) and Abetifi; 3 ♂♂, 3 ♀♀, at Tring.

Close to *A. varius* (cf. above), which it possibly represents in the countries from the Niger to Senegambia, from which countries little material of *Anthribidae* has as yet come to hand. Pronotum granulate-rugate also in middle, a smooth median stripe being at most indicated in front and behind; an apical and a basal spot, both rather broad, the posterior one tripartite in front of the carina, from dorsal carina forward a lateral spot, and diffuse scaling at sides partly representing the oblique subventral stripe of other species, these markings luteous, usually reduced by abrasion, sometimes the whole pronotum with dispersed luteous scaling not concentrated into spots. Scutellum and about the basal third of elytra grey, on subbasal swelling an irregular olivaceous black spot variable in size, behind naked shoulder three dots confluent or separate, a transverse median band also black, irregular, narrowest at sides, variable in size, interrupted at suture by a few grey dots (usually 3 on the two sides together); from this band to apex luteous grey variegated with black, or black-

brown spotted with luteous grey, in the latter case a luteous grey band separates the dark apical area from the deeper black median band. Size of scales as in *A. varius* f. *nubilus*.

Key to the species of *Anacerastes*:

I. Pronotum with a smooth, dull (not glossy), median stripe, usually covered with pubescence.

a. Upperside glossy black . . . . . **A. ater** Jord. (1894).

b. Upperside dull, pubescent.

a^1. Grey pubescence of upper- and underside hair-like, nearly as on tibiae . . . . . **A. tenuipilis** (cf. p. 247).

b^1. Grey pubescence of elytra consisting of truncate scales as large (or very nearly) as the dark scales.

a^2. Upperside all grey, with a black median or postmedian round spot on each elytrum.

A. bimaculatus Jord. (1894).

b^2. Elytra each with a median, transverse, black spot, in front of it a diffuse, broad, grey band across both elytra.

A. subfasciatus Jord. (1894).

c^2. An oblique line above shoulder and a median or antemedian obliquely transverse line forming a rhomboid on the two elytra together, the lines sometimes much obscured by extension of grey or clay scaling.

a^3. A transverse line from angle of rhomboid in or before middle of metasternum **A. scriptus** Jord. (1910).

Rhomboidal area dark brown (blackish) f. *scriptus*.

Rhomboidal area grey . f. *canescens* f. nov.[1]

b^3. This line at posterior margin of metasternum.

A. geometricus Jord. (1894).

Rhomboidal area dark brown . f. *geometricus*.

Elytra grey, with oblique blackish postmedian spot, lines obscured f. *cinerascens* Jord. (1894).

Elytra fulvous clay, with postmedian spot as before . . . . . f. *fulvus* f. nov.

d^2. Elytra yellowish grey, slightly greenish, tessellated with black . . . **A. variegatus** Kolbe (1895).

II. Smooth median stripe of pronotum vestigial, the centre of pronotum being rugate-granulate more or less like rest of dorsum.

c. Elytra with a small number of whitish grey spots behind base and behind middle . . . . **A. lepidus** Imh (1842).

d. Elytra densely tessellated with clay-colour or grey, or the markings merged together.

c^1. A prominent brownish black macula on subbasal swelling of elytrum . . . . . **A. pictus** (cf. p. 248).

d^1. No conspicuous macula on subbasal swelling of elytrum.

A. varius (cf. p. 247).

Elytra tessellated with fulvous clay-colour *f. varius* (cf. p. 248).

Elytra tessellated with grey . f. *griseus* (cf. p. 248).

Elytra with clayish buff clouds . f. *nubilus* (cf. p. 248).

[1] Type from Buta, Congo Belge.

NEW FLEAS FROM SOUTH AFRICA.

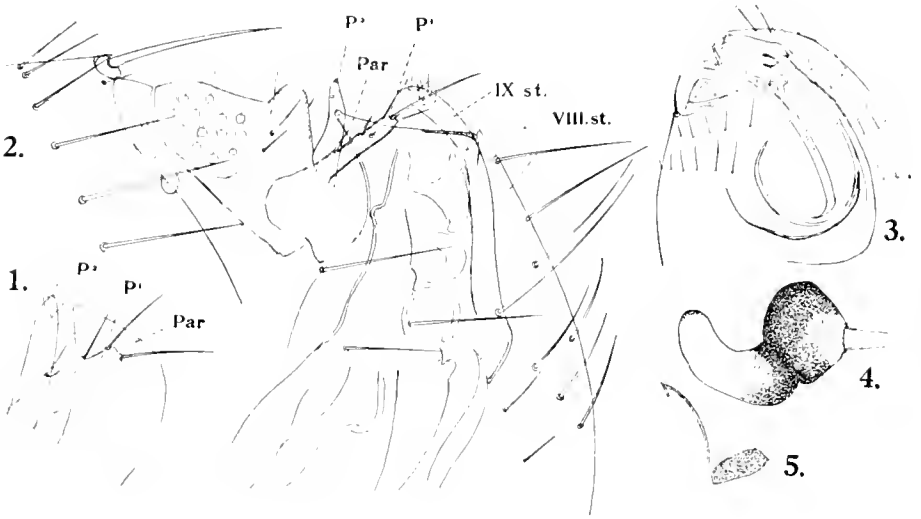
BY BOTHA DE MEILLON, M.Sc., F.E.S.,

South African Institute for Medical Research, Johannesburg.

(With 9 text-figures.)

THE following two species were found among some material submitted for identification to the Department of Entomology of the Institute for Medical Research.

I am greatly indebted to Dr. K. Jordan for allowing me access to the collection at Tring, and for his help during the preparation of this paper.



1. **Xenopsylla trifarius** sp. nov. (text-figs. 2–5).

This species is intermediate between three subgroups of the genus *Xenopsylla*,[1] as follows :

No bristle behind or above metepisternal stigma ; antepygidial bristle of the male on a small cone . . . *brasiliensis* subgroup

Presence of a double, chitinised, sclerite in female behind the opening of the bursa copulatrix (fig. 5) reminiscent of *X. eridos* . . . . . *cheopis* subgroup

Dorsal hump on ejaculatory duct of male (fig. 2) ; lamina of male organs narrow, its proximal end acuminate and turned up (fig. 3) . . . . . *niloticus* subgroup

[1] Jordan, K. (1925), "On *Xenopsylla* and Allied Genera of Siphonaptera," in *Verhandl. III. International. Entomologen-Kongresses*, pp. 593–624 (1926).

According to the male genitalia this flea is very near *Xenopsylla niloticus* J. & R. 1908. The two species are separable as follows :

Xenopsylla niloticus

Eye reduced.

P^1 of the male with two apical bristles of equal length (fig. 1).

Paramere rounded on its apical ventral margin (fig. 1, par.).

A bristle above and behind the spiracle of the metepisternum.

Sternites III–VI with 12–16 bristles in the female.

Base of the tail of the spermatheca hardly swollen at all, much narrower than the head.

Xenopsylla trifarius sp. nov.

Eye well developed.

P^1 with one apical bristle longer than the other (fig. 2).

Apical margin of paramere straight, forming a right angle with the ventral margin (fig. 2, par.).

No bristle in these places.

Sternites III–VI with 6–10 bristles.

Base of the tail swollen and wider than the apex (fig. 4).

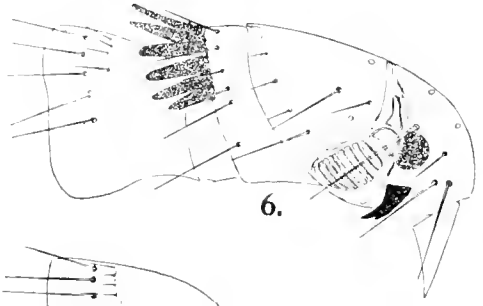
Presence of a double chitinised sclerite behind the opening of the bursa copulatrix (fig. 5).

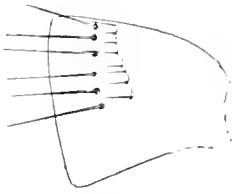
Length of *X. trifarius* : ♂ 1·6 mm., ♀ 1·8 mm.

Klaver, Cape Province, South Africa, in the nest of *Tatera lobengulae*, 11.vii.28. Collector C. V. Muller.——Type in coll. N. C. Rothschild.

2. **Chiastopsylla quadrisetis** sp. nov. (text-figs. 6, 7, 8).

This species belongs to the same group as *C. numae* Roths. and *C. rossi* Waterst. In this group there is a dorsal incrassation from the base of the antenna





to the vertex of the head ; the female of *C. quadrisetis*, resembling *C. octavii* Roths. in having the distal margin of sternite VII evenly rounded (fig. 6), can very easily be separated by this means. The male of *C. octavii* is unknown. Another group in which this incrassation is present is *C. mulleri* Ingram and *C. pitchfordi* Ingram. In these, however, the teeth of the pronotal comb are very short, much shorter than the pronotum itself, while in *C. quadrisetis* these teeth are as long or longer than the pronotum (fig. 7).

The male is easily separated from those of *C. rossi* and *C. numae* by the

shape of the flattened bristles on sternite IX (fig. 8). In *C. rossi* and *C. numae* these bristles are fan-shaped and about as broad as the horizontal limb of sternite IX. The female can be distinguished from those of *C. rossi* and *C. numae* by the median row of bristles on the mesonotum not reaching as far down as the postmedian row (figs. 6 and 7). It also differs in having about 6–7 large bristles on each side of tergite VIII (fig. 9); in the females of *C. rossi* and *C. numae* these bristles are much more numerous.

♂, ♀. *Head* (fig. 6) evenly rounded in the female; in the male there is a small notch on the frons near the origin of the maxillary palps. There are two spines at the genal angle resembling those of *Chiastopsylla rossi*. Hairs and bristles on the head as in *Chiastopsylla rossi*. Eye well developed. Relative lengths of the segments of the maxillary palpi 15, 15, 12, 22 in ♂, and 18, 17, 12, 21 in ♀.

There is a dorsal inerassation from the base of the antenna up to the vertex of the head (fig. 6).

Pronotum short, with a row of 10–11 bristles before the comb, which consists of 12–13 teeth. Pronotal teeth longer than the pronotum itself (fig. 6).

Mesonotum with a row of fine hairs at the base, a median row of about 9 hairs in ♂, 8–12 in ♀, and a postmedian row of 12 bristles (fig. 6).

Metanotum.—Antemedian row of 8 hairs in ♂, 10 in ♀, and a row of 12 bristles medianly. The posterior edge bears 3–4 short heavy spines. The epimeron of the metanotum bears the following bristles: anterior row ♂ 3, ♀ 3–5; posterior row ♂ and ♀ 3.

Similar spines as on metanotum, one on each side, occur on the posterior edge of abdominal tergites I–IV. In one ♀ there are two such spines on one side and one on the other in the first abdominal segment.

Legs.—There are six pairs of bristles on the outer side of the hind tibia; there is a single bristle between the second and third pairs and one between the fourth and fifth pairs. The relative lengths of the tarsal segments are as follows:

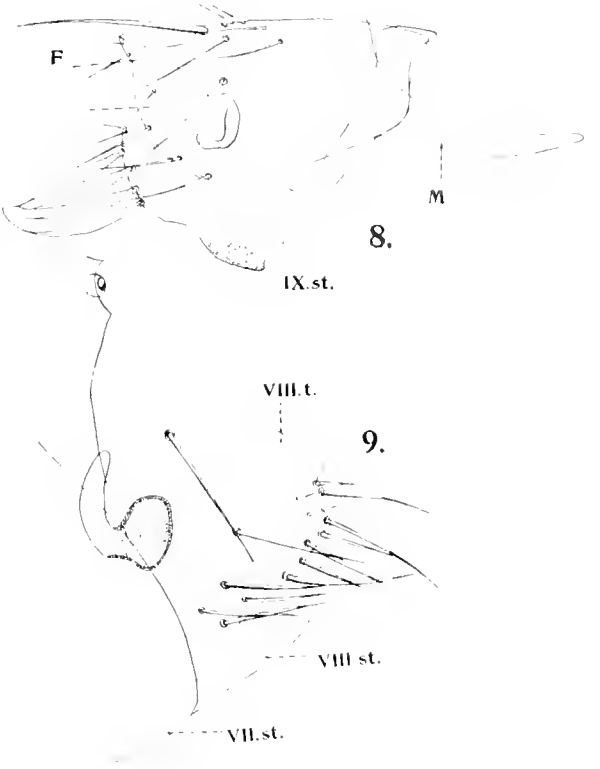
	I	II	III	IV	V
Foreleg	10	11	11	9	20
Midleg	18	18	12	10	20
Hindleg	42	28	16	11	22

Abdomen.—There are two rows of bristles on the tergites of the first seven segments, one on the sternites. Bristles and spines on the tergites and sternites are as follows:

Tergites	I	II	III	IV	V	VI	VII
			MALE.				
Antemedian row	6	4	?	3	4	4	3
Postmedian row	8	12	12	12	12	12	12
Teeth	1	1	1	1	—	—	—
Sternites	—	5	5	5	5	6	5
			FEMALE.				
Antemedian row	8	7–8	6	6	3–6	4	3–6
Postmedian row	11	12	12–15	12–14	12–13	12–13	10–11
Teeth	1 2	1	1	1	—	—	—
Sternites	—	2	7–9	8	8–9	9–11	11

Antepygidial bristle long, accompanied by two very short ones. Stylet three times as long as broad at the base.

Modified segments.—♂: The "finger" (F, text-fig. 8) is nearly four times as long as it is broad at the base. The hairs on the "finger" are inconspicuous, there being, however, two fairly long ones at the distal margin. The clasper is ovoid in shape; it has a long bristle—with a few shorter ones just before it—



beyond the middle at the dorsal edge; a few short bristles on its distal margin and some on the lateral surface. Sternite IX is characteristic and enables the species to be easily recognised (text-fig. 8); the vertical limb is narrow and more heavily chitinised than the broader horizontal limb; the ventro-apical margin carries a row of four long narrow leaf-like bristles.

♀: The distal margin of tergite VIII is sinuous and carries 8–9 bristles; laterally there are 5–6 bristles. The posterior border of sternite VII is evenly rounded (text-fig. 9).

Length: ♂ 1·3 mm., ♀ 1·7 mm.

One ♂ (type) and four ♀♀ from the nests of Karroo rats (*Parotomys luteolus*) at Klaver, Cape Province, August 1928. The burrows were stated to be far up on the sides of the mountain. Coll. C. V. Muller.——Type in coll. N. C. Rothschild.

DESCRIPTIONS OF NEW SPECIES OF JAPANESE, FORMOSAN AND PHILIPPINE GEOMETRIDAE.

BY R. J. WEST.

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THE descriptions in this paper are based on material in the collection of the late A. E. Wileman, now in the British Museum (Natural History), and form a continuation of a previous paper in this journal.[1]

SUBFAMILY **STERRHINAE**

Anisodes acritophyrta sp.n.

♂: *Palpus* vinaceous-brown above, warm buff beneath. *Antenna* pectinate. *Head:* frons vinaceous-brown, vertex warm buff, occiput vinaceous-brown. *Thorax:* patagium and tegula warm buff mixed with vinaceous-brown. *Abdomen* warm buff mixed with vinaceous-brown, venter light buff. *Pectus* light buff. *Legs:* foreleg light buff, vinaceous-brown above; midleg light buff, tinged with vinaceous-brown outwardly; hindleg light buff. *Forewing* warm buff mottled with vinaceous-brown; a small cartridge buff spot on discocellulars; a medial share gradually narrowing toward inner margin; a very faintly marked, crenulate, fuscous postmedial line; fringe light buff with interneural vinaceous-brown spots. *Hindwing* concolorous with forewing; markings similar to those of forewing, the cartridge buff spot on discocellulars being larger, and surrounded with vinaceous-brown. *Underside:* forewing light buff lightly suffused with vinaceous-brown, medial and postmedial lines faintly marked; hindwing light buff, medial and postmedial lines faintly marked.

Expanse 36 mm. (*tip to tip* 33 mm.).

♀: Similar to ♂, antenna minutely ciliate, wings more heavily mottled with vinaceous-brown, making the space between the medial shade and postmedial line appear as a crenulate band.

Expanse 34 mm. (*tip to tip* 32 mm.).

Holotype ♂: 10.iii.1912, Philippine Is., Luzon I., subprov. Benguet, Baguio, 5,000 ft.; *allotype* ♀: 25.vii.1913, subprov. Benguet, Pauai, Haight's Place, 7,000 ft.; *paratype* ♂: 30.v.1914, Mindanao I., subprov. Lanao, Kolambugan (plains).

Nearest ally: *A. ceramis* Meyr.

Ptochophyle virgata sp.n.

♂: *Palpus* light buff, suffused with Pompeian red. *Antenna* pectinate for three-fourths, apical fourth ciliate. *Head:* frons light buff, tinged with Pompeian red, vertex light orange-yellow, occiput Pompeian red. *Thorax:* patagium light orange-yellow, tegula light orange-yellow, suffused with Pompeian red. *Abdomen* light orange-yellow, Pompeian red at joints of segments, and extending along segments laterally, venter light buff. *Pectus* light buff. *Legs:*

[1] Cf. *Nov. Zool.*, XXXV, pp. 105–131.

foreleg light buff, tinged with Pompeian red above; other legs light buff. *Forewing* light orange-yellow mottled with Pompeian red; irrorated with Hessian brown on costa; antemedial fascia light orange-yellow, bordered distally by Pompeian red, straight across the wing; in the cell, a short bar of Hessian brown from distal edge of fascia to discocellulars, terminating with slightly raised scales; postmedial fascia consisting of a Hessian brown line, outwardly bowed to vein 3, then inwardly oblique to inner margin; a bar of Hessian brown from distal edge of fascia to termen between veins 3 and 4; veins in subterminal area streaked with Pompeian red. *Hindwing* concolorous with forewing; a Hessian brown streak along subcosta from base to termen; postmedial fascia Hessian brown, outwardly oblique to vein 5, angled, then inwardly oblique to inner margin; in angle formed by postmedial fascia and subcostal streak, two prominent light orange-yellow patches; termen Hessian brown, angled at vein 4. *Underside:* forewing glossy, light buff tinged with Pompeian red; hindwing glossy, light buff.

Expanse 22 mm. (*tip to tip* 20 mm.).

Holotype ♂: 27.xii.1912, Philippine Is., Luzon I., subprov. Benguet, Palali, 2,000 ft.

Nearest ally: *P. lineata* Warr.

Problepsis wilemani sp.n.

♂: *Palpus* white below, drab-grey above. *Antenna* with basal three-fourths pectinate, apical fourth ciliate. *Head:* frons white, upper half drab-grey, vertex white. *Thorax:* patagium and tegula white. *Abdomen* white above and beneath. *Pectus* white. *Legs* white, foreleg suffused with drab-grey above. *Forewing* white; light drab on costa; postmedial fascia consisting of an elongate patch defined by light drab, and white metallic scales, proximal edge touching discocellulars, the light drab and metallic scaling broken at vein 2; subterminal fascia consisting of three drab-grey lines, the middle one composed of dots, outwardly bowed to vein 2, then straight to inner margin. *Hindwing* concolorous with forewing, fascia forming continuations of those on forewing. *Underside:* fore- and hindwings white, glossy.

Expanse 32 mm. (*tip to tip* 28 mm.).

♀: Similar to ♂.

Expanse 38 mm. (*tip to tip* 34 mm.).

Holotype ♂: 18.vii.1912, *allotype* ♀: 11.vii.1912, Philippine Is., Luzon I., prov. Rizal, Manila (plains); *paratypes* 1 ♂: 23.iii.1914, 1 ♀: 12.xi.1911, prov. Rizal, Montalban; 1 ♀: 2.iv.1912, Luzon I., subprov. Benguet, Klondyke, 800 ft.

Nearest ally: *P. apollinaria* Guen.

Idaea jordani sp.n.

♀: *Palpus* pinkish buff. *Antenna* minutely ciliate. *Head:* frons pinkish buff, suffused with fuscous, vertex pinkish buff, occiput avellaneous. *Thorax:* patagium and tegula pinkish buff. *Abdomen* pinkish buff above and beneath. *Pectus* light buff. *Legs:* pinkish buff, foreleg suffused with fuscous above. *Forewing* pinkish buff, sparsely irrorated with fuscous; fasciae avellaneous, antemedial fascia outwardly oblique from costa to middle of cell, angled, then

inwardly oblique to inner margin ; cell spot fuscous ; postmedial fascia inwardly oblique, from costa subterminally to inner margin medially ; subterminal fascia, a slightly crenulate line with fuscous points on veins ; followed by two wavy shades in subterminal area ; interneural fuscous spots on termen. *Hindwing* concolorous with forewing, fasciae forming continuations of those on forewing ; cell spot fuscous. *Underside :* forewing light buff, postmedial fascia fuscous, followed by two pinkish buff shades in subterminal area ; cell spot and termen fuscous ; hindwing light buff, cell spot, postmedial fascia and termen fuscous.

Expanse 24 mm. (*tip to tip* 20 mm.).

Holotype ♀ : 12.vi.1906, Formosa, Kanshirei, 1,000 ft.

Nearest ally : *I. hanna* Butl.

Chrysocraspeda rothschildi sp.n.

♂ : *Palpus* amber-yellow, mineral-red above. *Antenna* basal three-fourths pectinate, apical fourth ciliate ; shaft mineral-red. *Head :* frons and vertex light buff, mineral-red at base of antennae, a fine mineral-red transverse line. *Thorax :* patagium and tegula amber-yellow mixed with mineral-red. *Abdomen* mineral-red with amber-yellow at joints of segments, venter light buff. *Pectus* light buff. *Legs* light buff tinged with mineral-red. *Forewing* amber-yellow irrorated with mineral-red at base ; a wide band medially, densely irrorated with mineral-red, proximal edge outwardly oblique from costa subbasally to middle of cell antemedially, sharply angled, then inwardly oblique to median nervure, then wavy to inner margin, distal edge inwardly oblique from costa postmedially to vein 7, excurved to below vein 6, inwardly to discocellulars, incurved, then outwardly oblique to vein 3, a sharp outward angle, inwardly to just below lower angle of cell, inwardly oblique to anal vein, outwardly oblique to inner margin ; subterminal fascia a wide band densely irrorated with mineral-red, crenulate, with streaks on veins from distal edge to termen, terminal line mineral-red. *Hindwing* concolorous with forewing, the amber-yellow forming an irregular elongate patch through centre of wing from base to termen ; subbasal, antemedial and postmedial fasciae, all indicated by a curved elongate spot from costa and a patch on inner margin ; subterminal fascia a wide band, crenulate, with streaks on veins from distal edge to termen, this band being broken at vein 5, giving it the appearance of two patches, one at apex, the other at tornus. *Underside :* fore- and hindwings, similar in pattern to upperside but slightly paler in colour.

Expanse 22 mm. (*tip to tip* 20 mm.).

Holotype ♂ : 20.xii.1911, Philippine Is., Luzon I., subprov. Benguet, Klondyke, 1,300 ft.

Nearest ally : *C. togata* Fabr.

Chrysocraspeda polycyma sp.n.

♀ : *Palpus* pinkish buff. *Antenna* minutely ciliate, shaft white at base. *Head :* frons and vertex cinnamon-brown. *Thorax :* patagium and tegula cinnamon-brown. *Abdomen* cinnamon-brown, venter light buff. *Pectus* and *legs* light buff. *Forewing* light drab, covered with a number of wavy, transverse, benzo brown lines ; medially these lines are absent, the space being occupied by a band of straw yellow suffused with ochraceous-tawny, in which is a straw-

yellow cell spot, outwardly oblique from costa to median nervure, outwardly angled, then obliquely incurved to inner margin; a straw-yellow border on termen gradually decreasing in width to vein 4, where it is obsolescent, then increasing in width to tornus. *Hindwing* concolorous with forewing, lines forming continuations of those on forewing, termen angled at vein 3. *Underside:* fore- and hindwings glossy, drab.

Expanse 28 mm. (*tip to tip* 25 mm.).

Holotype ♀: 17.v.1914, Philippine Is., Mindanao I., subprov. Lanao, Kolambugan (plains).

Nearest ally: *C. croceimarginata* Warr.

Eois themeropis sp.n.

♀: *Palpus* pinkish buff. *Antenna* minutely ciliate. *Head:* frons fuscous, vertex pinkish buff. *Thorax:* patagium and tegula pinkish buff. *Abdomen* pinkish buff above and beneath. *Pectus* and *legs* pinkish buff. *Forewing* pinkish buff tinged with fuscous, fasciae fuscous, antemedial fascia excurved to median nervure, inwardly oblique to inner margin; medial fascia consisting of a fine, inwardly oblique, fuscous line, cell spot fuscous; postmedial fascia slightly excurved; a faint wavy shade in subterminal area. *Hindwing* concolorous with forewing, fasciae forming continuations of those on forewing. *Underside:* fore- and hindwings similar to upperside.

Expanse 22 mm. (*tip to tip* 20 mm.).

Holotype ♀: 17.xi.1912, Philippine Is., Luzon I., subprov. Benguet, Pauai, Haight's Place, 7,000 ft.

Nearest ally: *E. comparanda* Warr.

Subfamily **HEMITHEINAE**

Comostola exaereta sp.n.

♂: *Palpus* white beneath, cinnamon above. *Head:* frons and vertex cinnamon. *Thorax:* patagium and tegula deep glaucous-green. *Abdomen* deep glaucous-green, venter white. *Pectus* white. *Legs* pinkish buff, foreleg suffused with cinnamon above. *Forewing* deep glaucous-green, costa pinkish buff, cell spot cinnamon surrounded with cartridge-buff, termen cinnamon, fringe cartridge-buff. *Hindwing* concolorous with forewing, termen angled at vein 4. *Underside:* fore- and hindwings pale glaucous-green.

Expanse 24 mm. (*tip to tip* 22 mm.).

♀: Similar to ♂.

Expanse 26 mm. (*tip to tip* 23 mm.).

Holotype ♂: 7.iv.1912, *allotype* ♀: 11.iv.1912, Philippine Is., Luzon I., subprov. Benguet, Klondyke, 800 ft.

Nearest ally: *C. meritaria* Wlk.

Comostola acteana sp.n.

♂: *Palpus* pinkish buff. *Antenna* pectinate, shaft white. *Head:* frons and vertex bice green, white on lower half and at bases of antennae. *Thorax:* patagium and tegula bice green. *Abdomen* bice green, venter white. *Pectus* white. *Legs* white. *Forewing* bice green, costa sepia, a small sepia cell spot,

fringe cartridge-buff. *Hindwing* concolorous with forewing. *Underside :* fore- and hindwings pearl-grey, glossy.

Expanse 24 mm. (*tip to tip* 22 mm.).

Holotype ♂ : 4.xii.1912, *paratypes* 3 ♂♂ : 11, 12.xi., 3.xii.1912, Philippine Is., Luzon I., subprov. Benguet, Panai, Haight's Place, 7,000 ft.

Nearest ally : *C. leucomerata* Wlk.

Comostola callista sp.n.

♀ : *Palpus* light buff. *Antenna* minutely ciliate. *Head :* frons and vertex burnt lake. *Thorax :* patagium and tegula calliste green, rest of thorax burnt lake. *Abdomen* calliste green, burnt lake at base, venter white. *Pectus* white. *Legs :* light buff, foreleg suffused with burnt lake above. *Forewing* calliste green, bordered on costa and termen from base to just beyond tornus with burnt lake irrorated with fuscous-black, bordered inwardly by white, and separated from the green by a narrow edging of burnt lake, the width of the border irregular, being increased at the following points : antemedially and postmedially on costa, at apex, between veins 4 and 5 on termen, and at tornus ; fringe warm buff. *Hindwing* concolorous with forewing, the border increased in width between veins 4 and 5 on termen, and at tornus. *Underside :* fore- and hindwings white, glossy ; fringe warm buff.

Expanse 26 mm. (*tip to tip* 24 mm.).

Holotype ♀ : 30.v.1914, Philippine Is., Mindanao I., subprov. Lanao, Kolambugan (plains).

Nearest ally : *C. dispansa* Wlk.

Prasinocyma peristicta sp.n.

♀ : *Palpus* dark greenish glaucous above, white beneath. *Antenna* minutely ciliate, with paired setae, white at base of shaft. *Head :* frons and vertex dark greenish glaucous, a white transverse band between antennae. *Thorax :* patagium and tegula dark greenish glaucous. *Abdomen* dark greenish glaucous, venter white. *Pectus* white. *Legs :* foreleg, coxa white, rest of leg warm buff ; midleg, coxa and femur white, tibia and tarsus warm buff ; hindleg white. *Forewing* dark greenish glaucous strigulate with white, cartridge-buff on costa. *Hindwing* concolorous with forewing. *Underside :* fore- and hindwings pale glaucous-green.

Expanse 32 mm. (*tip to tip* 29 mm.).

Holotype ♀ : 13.iv.1913, *paratype* ♀ : 10.iv.1913, Philippine Is., Palawan I., Taytay (plains).

Nearest ally : *P. albicosta* Wlk.

Thalassodes pantascia sp.n.

♀ : *Palpus* grape-green above, white below. *Antenna* minutely ciliate, with paired setae, shaft white. *Head :* frons grape-green, vertex pistachio green, a white bar between bases of antennae. *Thorax :* patagium and tegula pistachio green. *Abdomen* pistachio green, venter white. *Pectus* white. *Legs :* foreleg, coxa white, femur cartridge-buff, warm buff above, tibia and tarsus cartridge-buff, avellaneous above ; mid- and hindlegs, coxae white, remainder cartridge-buff. *Forewing* translucent, pistachio green strigulated with white,

costa pinkish buff; postmedial fascia faintly marked, defined by a shade proximally, slightly waved. *Hindwing* concolorous with forewing; postmedial fascia outwardly oblique to vein 4, excurved, then inwardly oblique to inner margin. *Underside:* fore- and hindwings greenish glaucous.

Expanse 38 mm. (*tip to tip* 35 mm.).

Holotype ♀: 28.vi.1913, Philippine Is., Luzon I., subprov. Benguet, Pauai, Haight's Place, 7,000 ft.

Nearest ally: *T. curiosa* Swinh.

Gelasma panterpna sp.n.

♂: *Palpus* fuscous-black above, honey-yellow beneath. *Antenna* basal four-fifths pectinate, apical fifth ciliate. *Head:* frons fuscous, vertex deep grape-green, white anteriorly. *Thorax:* patagium and tegula deep grape-green. *Abdomen* deep grape-green, anal tuft honey-yellow, venter pinkish buff. *Pectus* pinkish buff. *Legs* honey-yellow. *Forewing* deep grape-green, costa cartridge-buff irrorated with warm sepia; postmedial fascia consisting of a fine, white, wavy line; termen warm sepia, fringe cartridge-buff, with warm sepia spots at ends of veins. *Hindwing* concolorous with forewing, fascia forming continuation of that on forewing, termen angled and produced to a short tail at vein 4. *Underside:* fore- and hindwings, honey-yellow for two-thirds, postmedially a white band defined by honey-yellow; beyond, a band of fuscous-black, subterminal area grape-green.

Expanse 35 mm. (*tip to tip* 31 mm.).

Holotype ♂: 29.vi.1913, *paratypes:* 1 ♂, 29.vi., 1 ♂, 4.vii.1913, Philippine Is., Luzon I., subprov. Benguet, Palali, 2,000 ft.; 1 ♂, 20.xii.1911, 1 ♂, 15.iii., 1 ♂, 14.iv.1912, subprov. Benguet, Klondyke, 800 ft.

Nearest ally: *C. venimotata* Warr.

Rhanidopsis gen. nov.

♂: Unknown. ♀: *Face* smooth. *Palpus* long, slender. *Antenna* lamellate. *Pectus* slightly hairy. *Hindtibia* with one pair of spurs. *Abdomen* not crested. *Frenulum* wanting. *Wings* thickly-scaled. *Forewing* costa gently arched, apex moderate, termen rather straight anteriorly, then curved and becoming oblique, cell short, discocellulars incurved; veins, 2 well before angle, 3 just before, 4 at angle; 5 nearer 6 than 4; 6, 7, 8, 9, 10 stalked, 10 from 9 before 8; 11 free. *Hindwing* apex rounded, termen curved, tornus angled, inner margin longer than abdomen, cell short, discocellulars outwardly oblique; veins, 2 before angle, 3 and 4 from angle; 5 nearer 6 than 4; 6 and 7 on long stalk; 8 anastomosing with cell near base.

Genotype *R. neophantes* sp.n.

Rhanidopsis neophantes sp.n.

♀: *Palpus* light yellowish olive. *Antenna* lamellate. *Head:* frons and vertex light yellowish olive, a transverse white bar between bases of antennae. *Thorax:* patagium light yellowish olive, tegula light greyish vinaceous mixed with benzo brown, rest of thorax light yellowish olive. *Abdomen* light greyish olive mixed with benzo brown, venter cartridge-buff. *Pectus* cartridge-buff. *Legs* light buff. *Forewing* benzo brown, with a wide border of light yellowish olive along costa and termen to tornus; a small patch of light greyish vinaceous

at base below median nervure ; postmedial fascia brick-red, wavy, from vein 6 to inner margin near tornus, with proximally below median nervure, a patch of light greyish vinaceous. *Hindwing* proximal half benzo brown, in which are two light vinaceous spots, one at base, the other on inner margin subbasally ; followed by a fascia of white, edged distally with benzo brown and brick-red, obliquely incurved to vein 3, straight to vein 2, deeply incurved to inner margin ; postmedial fascia, a wide band of light greyish vinaceous, bordered distally with benzo brown ; a wide border of light yellowish olive on termen. *Underside :* fore- and hindwings glossy, cartridge-buff, markings faintly showing through from upperside.

Expanse 25 mm. (*tip to tip* 23 mm.).

Holotype ♀ : 26.xii.1911, *paratype* ♀ : 17.iv.1912. Philippine Is., Luzon I., subprov. Benguet, Klondyke, 800 ft.

Superficially this species resembles the American species *P. rhanis* Cram.

Colutoceras mianta sp.n.

♂ : *Palpus* pinkish buff. *Antenna* pectinate for three-fourths, apical fourth ciliate. *Head :* frons fawn colour, vertex white. *Thorax :* patagium and tegula light cress green, rest of thorax dark vinaceous-brown, a light cress-green spot posteriorly. *Abdomen* fawn colour, with dorsal crests, venter and anal tuft cartridge-buff. *Pectus* cartridge-buff. *Legs* pinkish buff. *Forewing* light cress green, costa white ; antemedial fascia an ill-defined, broken, dark vinaceous-brown, wavy line ; two dark vinaceous-brown dots on discocellulars, an elongate, dark vinaceous-brown patch in subterminal area, reaching from vein 5 to inner margin, proximal edge wavy, distal edge outwardly oblique to termen at vein 3, then along termen to tornus ; termen fawn colour. *Hindwing* concolorous with forewing, two dots on discocellulars, a dot on each of veins 2, 3 and 4 postmedially, a patch at apex, fawn colour on inner margin. *Underside :* forewing yellowish glaucous, glossy, patch at tornus fuscous ; hindwing yellowish glaucous, glossy, patch at apex fuscous.

Expanse 34 mm. (*tip to tip* 31 mm.).

Holotype ♂ : 10.v.1914, Philippine Is., Luzon I., prov. Rizal, Montalban ; *paratype* ♂ : 22.iii.1912, Luzon I., subprov. Benguet, Klondyke, 800 ft.

Nearest ally : *C. mariae* Lucas.

Colutoceras dialitha sp.n.

♂ : *Palpus* white, mixed with light cress green. *Antenna* pectinate for three-fourths, apical fourth ciliate, shaft white at base. *Head :* frons light cress green, white on lower edge, vertex light cress green. *Thorax :* patagium and tegula light cress green. *Abdomen* light cress green, venter and anal tuft white. *Pectus* and *legs* white. *Forewing* light cress green, fuscous on costa, a white spot edged with Indian red on costa at base ; antemedially three white spots edged with Indian red, one each on costa, median nervure, and inner margin ; a series of white spots edged with Indian red, from costa postmedially to tornus, slightly waved ; termen Indian red, with a white spot at end of each vein. *Hindwing* concolorous with forewing, a small fuscous-black spot on discocellulars. *Underside :* forewing pale glaucous-green, suffused with light cress green on upper half ; hindwing pale glaucous-green.

Expanse 24 mm. (*tip to tip* 21 mm.).

♀: Similar to ♂.

Expanse 26 mm. (*tip to tip* 23 mm.).

Holotype ♂: 29.v.1914, *paratypes* 2 ♂♂: 15.v., 22.vi.1914, Philippine Is., Mindanao I., subprov. Lanao, Kolambugan (plains); *allotype* ♀: 3.vii.1913, Luzon I., subprov. Benguet, Palali, 2,000 ft.

Nearest ally: *C. inductaria* Guen.

Spaniocentra apatella sp.n.

♂: *Palpus* white, wood-brown above. *Antenna* proximal three-fourths pectinate, apical fourth ciliate, shaft white. *Head:* frons wood-brown, vertex white, occiput dark greyish brown. *Thorax:* patagium and tegula asphodel green. *Abdomen* white, mixed with dark greyish brown, venter white. *Pectus* white. *Legs* white, wood-brown on tibia and tarsus of foreleg. *Forewing* asphodel green, costa dark greyish brown, outer edge white; a narrow border of dark greyish brown on termen, increased in width from vein 3 to tornus forming a patch; within the border a white spot at apex, another and larger one in patch at tornus; termen slightly angled at vein 4, fringe light buff. *Hindwing* concolorous with forewing, border on termen enlarged at apex to a small patch with white centre; inner margin dark greyish brown. *Underside:* forewing pale glaucous green, glossy, a fuscous-black patch near tornus; hindwing pale glaucous-green, glossy, a fuscous-black spot at apex.

Expanse 32 mm. (*tip to tip* 30 mm.).

Holotype ♂: 28.iii.1912, Philippine Is., Luzon I., subprov. Benguet, Klondyke, 800 ft.

Nearest ally: *S. pannosa* Moore, from which it differs in the forewing having termen angled and a white spot at apex.

Lophomachia lepta sp.n.

♂ *Palpus* white, suffused with blackish brown above. *Antenna* serrate. *Head:* frons dark yellowish green, vertex white. *Thorax:* patagium and tegula dark yellowish green. *Abdomen* white, dark yellowish green at base laterally, venter white. *Pectus* and *legs* white. *Forewing* white, blackish brown on costa, a blackish brown spot in distal end of cell, touching costa, surrounded by a suffusion of blackish brown reaching from wing-base to just beyond discocellulars, followed by a grape-green suffusion; a small dark yellowish green patch at base below median nervure; medially, a dark yellowish green patch, proximal edge from median nervure to inner margin, upper edge along median nervure to just beyond base of vein 4, distal edge excurved from vein 4 to vein 2, wavy to inner margin; subterminal area dark yellowish green, broken by white below apex and at vein 4, and a white wavy fascia. *Hindwing* white, antemedial fascia dark yellowish green, proximal edge slightly excurved, distal edge obliquely incurved to vein 7, excurved at vein 5, excurved at base of veins 3 and 4, incurved to inner margin; postmedial fascia, a diffused band of dark yellowish green, wavy, with a conspicuous patch on distal edge between veins 2 and 4; subterminal fascia a diffused band of dark yellowish green parallel with termen, termen angled at vein 4. *Underside:* forewing white, a blackish brown suffusion on upper half from base to subterminal area; hindwing white.

Expanse 28 mm. (*tip to tip* 24 mm.).

Holotype ♂: 16.iii.1912, *paratype* ♂: 7.iv.1912, Philippine Is., Luzon I., subprov. Benguet, Klondyke, 800 ft.; *paratype* ♂: 3.vii.1913, subprov. Benguet, Palali, 2,000 ft.

Nearest ally: *L. semialba* Wlk.

Terpna eucryphes sp.n.

♀: *Palpus* buffy citrine, mixed with warm sepia. *Antenna* simple. *Head:* frons warm sepia, with a transverse fuscous-black band, vertex buffy citrine. *Thorax:* patagium buffy citrine, tegula buffy citrine, fuscous-black laterally. *Abdomen* buffy citrine, irrorated with fuscous-black, venter pinkish buff. *Pectus* pinkish buff. *Legs:* foreleg, coxa and femur pinkish buff, warm sepia above tibia pinkish buff, warm sepia and fuscous-black above, tarsus fuscous-black; other legs pinkish buff. *Forewing* buffy citrine, warm sepia striated with fuscous-black on costa, warm sepia at base; antemedial fascia, a fuscous-black, incurved line, bordered distally by a suffusion of warm sepia; area to just beyond postmedial fascia, striated with fuscous-black and warm sepia; postmedial fascia crenulate (points distad), fuscous-black defined by warm sepia proximally, and some white scaling distally, outwardly oblique from costa to vein 5, straight to vein 4, inwardly oblique to inner margin; subterminally an incurved, warm sepia band, from costa to termen at vein 5. *Hindwing* concolorous with forewing, fasciae forming continuations of those on forewing. *Underside:* forewing cartridge-buff, lightly suffused with warm sepia; a wide subterminal band of warm sepia, edged proximally by fuscous-black; hindwing cartridge-buff, a wide subterminal band of fuscous-black.

Expanse 50 mm. (*tip to tip* 43 mm.).

Holotype ♀: 26.xii.1912, *paratype* ♀: 28.xii.1912, Philippine Is., Luzon I., subprov. Benguet, Palali, 2,000 ft.

Nearest ally: *T. costistrigaria* Moore.

Terpna eupines sp.n.

♂: *Palpus* warm buff mixed with livid brown. *Antenna* basal half pectinate, distal half ciliate. *Head:* frons livid brown, with a transverse fuscous band, vertex buffy citrine. *Thorax:* patagium and tegula buffy citrine. *Abdomen* buffy citrine, speckled with fuscous, two dark vinaceous-drab tufts dorsally, venter pinkish buff. *Pectus* warm buff. *Legs:* foreleg pinkish buff, coxa and femur livid brown above, tibia livid brown and fuscous above, tarsus fuscous above, pinkish buff at joints of segments; midleg pinkish buff, femur and tibia livid brown outwardly, tarsus fuscous above, pinkish buff at joints of segments; hindleg pinkish buff. *Forewing* buffy citrine, striated with dark vinaceous-drab on costa, irrorated with dark vinaceous-drab at base; antemedial fascia, a dark vinaceous-drab, crenulate (points basad) line, sharply defined proximally, diffusely edged distally; a diffused, dark vinaceous-drab patch on costa medially, reaching to middle of discocellulars; postmedial fascia, a crenulate (points distad), dark vinaceous-drab line, incurved from costa to vein 5, then inwardly oblique to inner margin; subterminal fascia represented by two dark vinaceous-drab patches, one from costa to vein 5, the other from vein 3 to near tornus. *Hindwing* concolorous with forewing, fasciae forming continuations

of those on forewing. *Underside :* forewing cartridge-buff, warm buff at base on upper half, lightly suffused with livid brown on lower half, cell spot fuscous ; subterminal fascia wide, fuscous ; hindwing cartridge-buff suffused with warm buff on basal half, subterminal fascia wide, fuscous.

Expanse 50 mm. (*tip to tip* 44 mm.).

Holotype ♂ : 22.vi.1914, Philippine Is., Mindanao I., subprov. Lanao, Kolambugan (plains).

Nearest ally : *T. variocolaria* Moore.

Subfamily **OENOCHROMINAE**

Ozola pyraloides sp.n.

♀ : *Palpus* fuscous. *Antenna* minutely ciliate. *Head :* frons warm buff, with transverse fuscous bar in middle, vertex warm buff. *Thorax :* patagium warm buff, tegula warm buff, fuscous posteriorly, rest of thorax warm buff, with a fuscous spot posteriorly. *Abdomen* warm buff, banded with fuscous, venter warm buff. *Pectus* warm buff. *Legs* pinkish buff, lightly suffused with fuscous. *Forewing* white, fuscous on costa ; subbasal fascia an excurved fuscous line ; antemedial fascia excurved, fuscous ; medially, a triangular fuscous patch on costa, point touching base of vein 4, and a fuscous bar from vein 2, to inner margin ; postmedially, a fuscous patch on inner margin reaching up to vein 2 ; apical area fuscous, an elongate fuscous patch from vein 3 to tornus. *Hindwing* concolorous with forewing, a spot on inner margin antemedially, a triangular patch on costa medially, the point touching base of vein 4, two patches postmedially, one between veins 4 and 6, the other on inner margin reaching up to vein 3, a small patch on apex with a spot below, and an elongate patch at tornus. *Underside* similar to upperside.

Expanse 34 mm. (*tip to tip* 32 mm.).

Holotype ♀ : 27.vii.1913, Philippine Is., Luzon I., subprov. Benguet, Pauai, Haight's Place, 7,000 ft.

Nearest ally : *O. falcipennis* Moore.

Noreia phauda sp.n.

♂ : *Palpus* warm sepia. *Antenna* ciliate, with paired setae. *Head :* frons warm sepia, vertex deep brownish drab. *Thorax :* patagium and tegula deep brownish drab. *Abdomen* deep brownish drab, anal tuft cartridge-buff, venter cartridge-buff, suffused with deep brownish drab. *Pectus* and *legs* cartridge-buff, suffused with deep brownish drab. *Forewing* deep brownish drab ; a warm sepia excurved line antemedially ; cell spot fuscous ; a warm sepia line, from costa subterminally, inwardly oblique and slightly curved to inner margin postmedially. *Hindwing* concolorous with forewing, postmedial line forming a continuation of that on forewing. *Underside :* fore- and hindwings slightly paler, but similar in colour to upperside ; two tufts of hair on hindwing, one at base of vein 2, the other on inner margin.

Expanse 42 mm. (*tip to tip* 37 mm.).

Holotype ♂ : 15.v.1914, Philippine Is., Mindanao I., subprov. Lanao, Kolambugan (plains).

Nearest ally : *N. unilineata* Wlk.

Alex nephodes sp.n

♂: *Palpus* russet, suffused with fuscous-black above. *Antenna* basal five-sixths pectinate, apical sixth ciliate. *Head:* frons and vertex russet suffused with fuscous-black. *Thorax:* patagium russet mixed with fuscous-black, tegula and rest of thorax snuff-brown. *Abdomen* snuff-brown, lightly suffused with fuscous-black, venter light buff suffused with russet. *Pectus* light buff suffused with russet. *Legs* russet, mottled with fuscous-black. *Forewing* snuff brown, sparsely irrorated with fuscous-black, cell spot fuscous-black; from apex to inner margin medially, a warm sepia oblique line, area beyond suffused with fuscous-black. *Hindwing* concolorous with forewing, an oblique line forming a continuation of that on forewing. *Underside:* fore- and hindwings russet with fuscous-black markings similar to those on upperside.

Expanse 42 mm. (*tip to tip* 46 mm.).

♀: Larger than ♂, with fuscous-black dots in subterminal area, in place of the fuscous-black suffusion seen in the ♂.

Expanse 54 mm. (*tip to tip* 50 mm.).

Holotype ♂: 23.xii.1911, Philippine Is., Luzon I., subprov. Benguet, Klondyke, 800 ft.; *allotype* ♀: 22.vi.1914, Mindanao I., subprov. Lanao, Kolambugan (plains).

Nearest ally: *A. continuaria* Wlk.

Eumelea lipara sp.n.

♂: *Palpus* primuline yellow, grenadine red above. *Antenna* minutely ciliate, with paired setae. *Head:* frons primuline yellow, grenadine red on upper half, vertex primuline yellow, with a grenadine spot behind antenna. *Thorax:* patagium and tegula Kaiser brown. *Abdomen* Kaiser brown, venter dull dark purple, with xanthine orange at joints of segments. *Pectus* primuline yellow. *Legs* primuline yellow, with patches of grenadine red on coxae, femora and tibiae. *Forewing* Kaiser brown; antemedial fascia a faintly marked, excurved deep dull purple line; medial fascia a deep dull purple line, faintly marked, outwardly oblique from costa to vein 6, excurved, then slightly incurved to inner margin; postmedially, two small patches of primuline yellow, one at vein 5, the other below vein 2; subterminal fascia a faintly marked, slightly incurved deep dull purple line. *Hindwing* concolorous with forewing, with a purplish tinge, medial fascia a continuation of fascia on forewing, outwardly oblique to vein 4, excurved, then inwardly oblique to inner margin. *Underside:* fore- and hindwings xanthine yellow, suffused with deep dull purple, markings similar to those on upperside.

Expanse 52 mm. (*tip to tip* 48 mm.).

Holotype ♂: 29.iv.1912, Philippine Is., Luzon I., subprov. Benguet, Baguio, 5,000 ft.

Nearest ally: *E. vulpenaria* Stoll.

(Colours, except those in italics, from Ridgway's *Color Standards and Color Nomenclature*, 1912.)

ON TWO UNDESCRIBED NEOTROPICAL BIRDS.

BY C. E. HELLMAYR (CHICAGO).

IN the course of studies undertaken during a short visit to England in the spring of 1928, two new forms came to light, which are described in the succeeding pages. For the use of material, I am indebted to Lord Rothschild, the authorities of the British Museum (Natural History), Dr. F. M. Chapman, of the American Museum of Natural History, New York, and Mons. J. Berlioz, of the Muséum d'Histoire Naturelle, Paris. Definite colour terms are taken from Ridgway's *Color Standards and Color Nomenclature* (1912).

Cichlopsis leucogenys peruvianus n.subsp.

Most nearly related to *C. l. chubbi* Chapm., of western Ecuador, but supraloral streak, orbicular ring, throat, and foreneck paler, ochraceous tawny instead of chestnut hazel; auricular likewise paler; breast bright ochreous brown (near antique brown) instead of dull brownish; upper parts brighter, more tinged with ochraceous.——Wing 108; tail 100; bill 13½ mm.

Type, in collection of Tring Museum: Male (first annual). Perené, alt. 1,000 metr., Dept. Junín, Peru. July 1921. C. O. Schunke coll.

Habitat.—Tropical zone of central Peru (Perené, Dept. Junín).

Remarks.—The discovery of this form, which adds a genus heretofore unrecorded to the fauna of Peru, is of considerable interest. Although represented by a single specimen (in first annual plumage, as is shown by the fluffy ochraceous-tipped greater upper wing coverts and tertials retained from the juvenile dress), there can be no doubt that it constitutes a distinct form, separable from both *C. l. leucogenys*, of eastern Brazil, and *C. l. chubbi*, of western Ecuador. In colour characters it occupies, just as it does geographically, an intermediate position, combining the strongly ochraceous underparts of *chubbi* with the paler throat and head markings of the eastern races. Compared with twelve specimens of *C. l. gularis* and three of *C. l. leucogenys*, the Peruvian bird may be distinguished by the greater extent of the ochraceous tawny gular area, which embraces the whole of the throat instead of being confined to the middle and leaving the lateral portion, especially anteriorly, dark brown like the malar region, and by the much more ochraceous lower parts. Foreneck and chest are decidedly ochraceous brown (somewhat duller than antique brown), passing into Dresden brown on the sides, paling into dull buff in a narrow zone along the abdominal line, and deepening again on the under tail coverts to ochraceous tawny (rather lighter than the throat). In *leucogenys* and *gularis*, on the other hand, only a restricted zone across the upper chest is Brussels brown, the remainder being pale greyish, tinged with dull brownish along the flanks, while the under tail coverts are much paler, warm buff instead of ochraceous tawny. The supraloral streak and orbicular ring, in *C. l. peruvianus*, are as prominent as in *gularis*, though of a lighter tone. The upper parts are Brussels brown, passing into Sudan brown on rump and tail coverts, thus not conspicuously different from *C. l. leucogenys*, whereas *C. l. gularis* generally is of a darker brown (near raw

umber) above. No constant difference in size appears to exist between the various members of the genus.

The ranges of the four races now known are as follows :

(*a*) *C. leucogenys leucogenys* Cab.—Wooded coast region of south-eastern Brazil from Espirito Santo to southern Bahia.[1]——Three specimens (two from Espirito Santo, one from " Brazil ") examined.

(*b*) *C. leucogenys gularis* Salv. & Godm.—British Guiana (Merumé Mts., Carimang River, Roraima).——Twelve specimens examined.

(*c*) *C. leucogenys peruvianus* Hellm.—Central Peru (Perené, Dept. Junín).

(*d*) *C. leucogenys chubbi* Chapm.—Western Ecuador (Mindo, Huila).——Three specimens (two from Mindo in the American Museum of Natural History, one from Huila, coll. Dr. Espinay, in the Paris Museum) examined.

Diglossa glauca tyrianthina n.subsp.

Adult.—Similar to *D. g. glauca*, of Bolivia and southern Peru, in texture of plumage, violaceous blue edging to wing feathers, and black frontal band, but wings rather shorter, coloration duller (less violaceous), varying from Tyrian blue to indigo blue, and black forehead distinctly wider (3 to 4 mm. broad).—— Wing 61. (female) 57 ; tail 46, (female) 41–44 ; bill 11 mm.[2]

Type in collection of American Museum of Natural History, New York, No. 183390. Adult male. Lower Sumaco, eastern Ecuador, January 16, 1924. Olalla y hijos coll.

Habitat.—Subtropical zone of eastern Ecudaor (Rio Cyacachi, below Chaco ; lower Sumaco ; Mapoto).

Remarks.—This is the *D. indigotica* of Chapman,[3] but not of Sclater, as careful examination of the type in the British Museum revealed. True *D. indigotica*, which is restricted to the subtropical zone of *western* Ecuador, is quite a different bird, with the plumage of a firmer texture, the nostrils more concealed, and the general coloration much more glossy, about cyanine blue or Prussian blue, while the edges to the wing and tail feathers, instead of being uniform in tone with the back as in *D. glauca*, are distinctly greenish blue (blackish green blue to marine blue). In other words, *D. indigotica* corresponds to the species described by Chapman [4] as *D. cryptorhis*, and a topotype of the latter, which Dr. Chapman kindly allowed me to take to Europe, on direct comparison proved to be identical with Sclater's type and specimens from Mindo. *D. indigotica* never has any black on the forehead proper, this colour being restricted to a loral streak, whereas both *D. g. glauca* and the form here described are provided with a distinct frontal band, more prominent in the northern race.

The East Ecuadorian form is no doubt the northern representative of *D. glauca* Scl. & Salv.,[5] originally based on a single specimen from Nairapi, Yungas of La Paz, Bolivia. The type in the British Museum is an immature

[1] Cf. Hellmayr, *Verh. Orn. Ges. Bay.*, 12, p. 127, 1915 ; Lima, *Rev. Mus. Paul.*, 12, 2, p. 100, 1920.

[2] The dimensions of *D. g. glauca* are as follows : Wing (five males) 63–66, (four females) 60–62 ; tail 45–51, (females) 44–47 ; bill 11 mm.

[3] *Bull. Amer. Mus. N.H.*, 55, p. 640, 1926.

[4] *Bull. Amer. Mus. N.H.*, 31, p. 164, 1912 – Gallera, Western Andes, Colombia.

[5] *P.Z.S. Lond.*, 1876, p. 253—Nairapi, Bolivia.

male with yellow basal half of the lower mandible and retaining both above and below a good deal of the sooty juvenile plumage, between which the new purplish blue feathers of the adult livery are just appearing. In colour, these feathers as well as the edges to the flight quills agree precisely with the corresponding parts in a series from Santo Domingo, Carabaya, Peru, for which Chapman [1] proposed the name *D. indigotica incae*, and I have very little doubt that the Bolivian and Peruvian birds are the same. Dr. Chapman was evidently misled by Sclater's description [2] of the female of *D. glauca*, which seemed to indicate a bird quite different from the usual style of coloration in this section of the genus *Diglossa*. The specimen in question, however, turns out to be a female of *D. s. sittoides*, its underparts being dingy yellowish, obsoletely streaked anteriorly, and by no means "ochraceous." The range of *D. g. glauca* I can trace as far north as Perené, Dept. Junín, whence the British Museum has an adult male collected by C. O. Schunke in May 1921.

In the adult plumage, *D. g. glauca* is very similar to *D. g. tyrianthina*, but somewhat larger, and its general coloration is of a brighter purplish blue, nearest to dusky blue, with, however, a slight dark dull violet blue hue; the edges to the upper wing coverts and inner remiges have very nearly the same tone as the back, while those of the primaries are a little duller than dark dull violet blue. The black of the loral region extends up to the forehead, but the frontal band is decidedly narrower than in *D. g. tyrianthina*. The anterior part of the nostrils, in both forms, is exposed (instead of being mostly concealed by plumules as in *D. indigotica*), and the female differs from the male merely by slightly smaller size and slightly duller colouring.

Thus, I can recognize the following species:

(*a*) *D. indigotica* Scl. (Syn. *D. cryptorhis* Chapm.).—Western Ecuador and western Andes of Colombia (Gallera; trail between Nóvita and Cartago).

Specimens Examined.—Colombia: trail between Nóvita and Cartago 1.——Ecuador: Nanegal (Fraser) 1; Rio Blanco, below Mindo (Goodfellow) 1; Mindo (Goodfellow) 5; above Gualea (Goodfellow) 1; foot of Pichincha (E. Whymper) 1; Paramba, alt. 3,500 ft., Prov. Imbabura (R. Micketta) 1; unspecified (the type) 1.

(*b*) *D. glauca tyrianthina* Hellm.—Eastern Ecuador (Rio Oyacachi; lower Sumaco; Mapoto).

Specimens Examined.—Ecuador: below Chaco, Rio Oyacachi 2; lower Sumaco 3.

(*c*) *D. glauca glauca* Scl. & Salv. (Syn. *D. indigotica incae* Chapm.).—Southern Peru (north to Junín) and adjoining section of Bolivia (Nairapi).

Specimens Examined.—Peru: Perené, Junín (C. O. Schunke) 1; Marcapata, alt. 1,000 metr., Cuzco (O. Garlepp) 1; Santo Domingo, Carabaya (G. Ockenden and H. Watkins) 6; Rio Inambari, Puno (H. Watkins) 1.——Bolivia: Nairapi (the type) 1.

[1] *Amer. Mus. Novit.*, No. 160, p. 8, Feb. 1925—Inca Mine, Santo Domingo, Peru.

[2] *Cat. B. Brit. Mus.*, 11, p. 11, 1886.

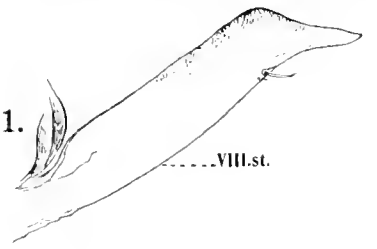
TWO NEW AMERICAN FLEAS.

BY DR. KARL JORDAN.

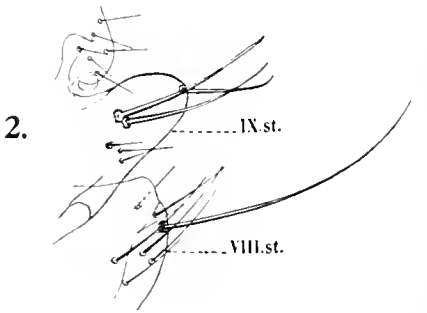
(With 2 text-figures.)

1. **Cediopsylla spillmanni** sp. nov. (text-fig. 1).

♂♀. Close to *C. simplex* Baker 1895, but the upper genal spine separated from eye; angle of frons farther down; sternite VIII of ♂ much broader, almost devoid of bristles; head of spermatheca larger.



Frontal angle in ♂ above, at or below three-fifths, in ♀ in or somewhat below middle, whereas in *C. simplex* the angle is placed at three-fourths in ♂ and at five-eighths in ♀. Internal incrassation at anterior oral angle resembling an Indian club (lateral aspect), more gradually widening than in *C. simplex*. Genal comb with 7 or 8 spines, interspace between eye and upper spine about equalling the breadth of this spine, much smaller than in *C. inaequalis* Baker 1895. Prontal comb with 13 to 16 spines, usually 15 or 16.



Genitalia: similar to those of *C. simplex*.——♂ differs especially in sternite VIII (text-fig. 1) being of nearly even width to apical third (measured along dorsal side), thence strongly but gradually narrowing to a point, the apical portion slightly curved downwards; no bristles except 1 to 3 short ones at ventral margin, the distal one being slightly spiniform, but very pale.——In ♀ the head of spermatheca one-fourth broader than in *C. simplex*.

Hab. Ecuador: Pichincha, off *Sylvilagus ecaudatus*, December 1927 (Professor F. Spillmann), a series.

The discovery in Ecuador of a species closely agreeing in nearly every detail with the rabbit flea of the Eastern United States is most interesting and surprising, and may be taken as evidence that *Cediopsylla* occurs also in Central America, whence hardly any fleas (of wild mammals and birds) are known.

2. **Ceratophyllus gladiolis caducus** subsp. nov. (text-fig. 2).

♂. As in *C. g. gladiolis* Jord. 1925, from California, the hindtarsal segment I has a subapical and an apical bristle which reach beyond II; the longer of the two bristles in the second notch from apex does not nearly extend to apex of I, whereas in *C. g. gladiolis* ♂ it reaches to near apex of II. Exopodite F a little

broader than in *C. g. gladiolis* ; anterior angle of paramere slightly less projecting ; the pair of sword-like bristles on ventral lobe of sternite IX (text-fig. 2) less proximal, their distance from apex shorter than segment IV of hindtarsus, in *C. g. gladiolis* longer than that segment, the lobe also narrower in *C. g. caducus* than in *C. g. gladiolis*.

♀. Pygidium as long as, or about one-twelfth shorter than its distance from stylet ; in *C. g. gladiolis* about one-twelfth longer than this distance.

Hab. Utah : Vernal, off *Ammospermophilus leucurus cinnamomeus*, November 1927 (A .W. Moore), 3 ♂♂, 8♀♀, type (♂) in U.S. National Museum.

BIRD-TYPES IN THE ROYAL SCOTTISH MUSEUM.

By SURGEON REAR-ADMIRAL J. H. STENHOUSE.

PARADISAEIDAE.

1. **Epimachus brisbanii** Wilson = *Ptilorhis paradisea*.

Epimachus brisbanii J. Wilson, *Illustr. Zoology*, pl. 9 (1831).

Type: no date. No sex (adult ♂ plumage). Port Macquarie, New South Wales. "Sent from New Holland by Sir Thomas Brisbane early in the year 1824."

Reg. No. 1921. 173.

Ex Edin. Univ. Museum Register, 1823–24. No. 58.

(Edin. Univ. Register year began on July 1.)

STURNIDAE.

2. **Sturnus faroensis** Feilden = *Sturnus vulgaris faroensis*.

Sturnus faroensis Feilden, *Zoologist*, p. 3257 (1872).

Type: ♂ May 23, 1872. Skuoe, Faroe. H. W. Feilden Coll.

Reg. No. 1898. 4. 9.

FRINGILLIDAE.

3. **Loxia curvirostra scotica** Hartert.

Loxia curvirostra scotica Hartert, *Vögel der Pal. Fauna*, i. p. 120 (1904—Scotland).

Type: ♂ ad. December 26, 1870. East Ross. Feilden and Harvie Brown Coll.

Reg. No. 1917. 2. 157.

4. **Loxia curvirostra hispana** Hartert.

Loxia curvirostra hispana Hartert, *Vögel der Pal. Fauna*, i. p. 119 (1904—Spain).

Type: (♂ plumage) July 1897. Aguilas, Spain.

Reg. No. 1897. 91. 14. Purchased from John Gray, Aguilas.

5. **Pyrgita (Pipilo) arctica** Sw. & Rich. = *Pipilo maculatus arcticus*.

Pyrgita (Pipilo) arctica Swains. & Richardson, *Fauna Boreali Americana*, vol. ii, p. 260, pl. 51 and 52 (1831).

Co-type: ♀ Saskatchewan. Franklin's Second Overland Expedition (from the description probably ♀ obtained May 29, 1827).

Reg. No. 1926. 109. 33. Ex Edin. Univ. Mus. Register 1830–31, No. 25.

6. **Nesospiza goughensis** Eagle Clarke = *Phrygilus* (*Rowettia*) *goughensis*.

Nesospiza goughensis Eagle Clarke, *Bull. B.O.C.* xv. p. 18 (1905).

Type: no sex. Gough Island, April 22, 1904. Scotia Expedition.

Reg. No. 1921. 143. 171.

7. **Nesospiza jessiae** Eagle Clarke = *Phrygilus* (*Rowettia*) *goughensis* juv. !

Nesospiza jessiae Eagle Clarke, *Bull. B.O.C.* xv. p. 18 (1905).

Type: no sex. April 22, 1904. Gough Island. "Scotia Expedition." Reg. No. 1921. 143. 173.

MOTACILLIDAE.

8. **Alauda crocea** Vieillot = *Macronyx croceus*.

Alauda crocea Vieillot, *Nouv. Dict. d'Hist. Nat.* vol. i, p. 365 (1816—Java !).

Type: no sex or date. "Java." Dufresne Collection.
Reg. No. 1929. 186. 14. Ex Edin. Univ. Mus. Register, 1819–20. No. 1.
Dufresne's Catalogue: *L'Alouette jaune*—Java. *Alauda crocea* Vieillot. *N.D. d'H. n.t.* i. p. 365.

Vieillot did not state where his type was to be found, but his locality was Java. He had full access to Dufresne's collection, and in our opinion, an opinion shared by the Director of the Paris Museum, Dufresne's specimen (erroneously) from Java should be regarded as the bird Vieillot described.

MNIOTILTIDAE.

9. **Sylvia discolor** Vieillot = *Dendroica discolor*.

Sylvia discolor Vieillot, *Hist. Nat. d'Oiseaux Amérique Sept.* vol. ii, p. 37, pl. 98 (1807).

Type: ♂. No date. des Antilles. Dufresne Collection.
Reg. No. 1929. 186. 15. Ex Edin. Univ. Mus. Reg. 1819–20. No. 1.
Dufresne's Catalogue: *Sylvia dicolor*. La fauvette dicolor Vt., des Antilles.
A female and a young bird of this species were also in Dufresne's collection, the latter is still in existence.

10. **Sylvia velata** Vieillot = *Geothlypis aequinoctialis velata*.

Sylvia velata Vieillot, *Hist. Nat. d'Oiseaux Amérique Sept.* vol. ii, p. 22, pl. 74 (1807) (de la collection de M. Dufresne).

Type: no date or sex. *Amérique Sept.* (North America).
Reg. No. 1929. 186. 16. Ex Edin. Univ. Mus. Reg. 1919–20. No. 1.
Dufresne Catalogue: "*Sylvia velata* Vieillot. La fauvette voilée. *Amér. Sept.*"

VIREONIDAE

11. **Muscicapa altiloqua** Vieillot = *Vireo calidris*.

Muscicapa altiloqua Vieillot, *Hist. Nat. d'Ois. Amérique Sept.* vol. i. p. 67, pl. 38 (1807).

Types: ♂ and ♀. No date. Isle St. Thomas (Dufresne Coll.).
Reg. No. ♂ 1929. 186. 16*a*. ♀ 1929. 186. 16*b*. Ex Edin. Univ. Mus. Reg., 1819–20. No. 1.
Dufresne Catalogue: *Muscicapa altiloqua*. Le moucherolle altiloque. M. & F. Isle St. Thomas. Rare.

MUSCICAPIDAE.

12. **Rubecola tytleri** Jameson = *Muscicapa p. parva.*

Rubecola tytleri Jameson, *Edin. New Philos. Journal*, p. 214 (1835).

Type (♂ plumage): no date or sex. Himalayas, N. India. Coll. by Lieut. Tytler.

Reg. No. 1929. 186. 9. Ex Edin. Univ. Mus. Reg. 1830–31. No. 14.

TURDIDAE.

13. **Turdus magellanicus** King = *Turdus falcklandicus magellanicus.*

Turdus magellanicus King, *Proc. Zool. Soc.* p. 14 (1830).

Type: no date or sex. "Straits of Magellan."

Reg. No. 1926. 109. 89. Ex Edin. Univ. Mus. Reg. 1831–32. No. 35. "Presented by Captain King."

14. **Turdus musicus hebridensis** Eagle Clarke.

Turdus musicus hebridensis Eagle Clarke, *Scot. Nat.* p. 53 (1913).

Types: ♂ April 24, 1912. Barra. ♀ April 25, 1912. Barra. Coll. by W. L. MacGillivray, Barra.

Reg. No. ♂ 1913. 133. 1. ♀ 1913. 133. 2.

15. **Nesocichla eremita gordoni** Stenhouse.

Nesocichla eremita gordoni Stenhouse, *Scott. Nat.* p. 94 (1924—Inaccessible I.).

Type: no sex. April 26, 1923. Inaccessible Island. Collected by Tom Rogers and — Glass, Tristan d'Acunha.

Reg. No. 1924. 68. 13.

TROGLODYTIDAE.

16. **Troglodytes troglodytes zetlandicus** Hartert.

Troglodytes troglodytes zetlandicus Hartert, *Vögel der Pal. Fauna*, i. p. 777 (1910—Shetland).

Type: ♂. December 12, 1906. Dunrossness, Shetland. Collected by N. B. Kinnear.

Reg. No. 1919. 4.

17. **Troglodytes troglodytes hebridensis** Meinertzhagen.

Troglodytes troglodytes hebridensis Meinertzhagen, *Scott. Naturalist*, p. 135 (1925).

Type: ♂. October 1, 1914. Butt of Lewis. Coll. by W. Eagle Clarke.

Reg. No. 1914. 168. 23.

EURYLAEMIDAE.

18. **Eurylaimus dalhousiae** Jameson = *Psarisomus dalhousiae.*

Eurylaimus dalhousiae Jameson, *Edin. New Phil. Journal*, xviii. p. 389 (1835).

Type: no date or sex. Himalayas, 10,000 feet.

Reg. No. 1926. 109. 32. Ex Edin. Univ. Mus. Reg. 1832–33. No. 1–29. Presented by Countess of Dalhousie.

CAPITONIDAE.

19. **Megalaema ramsayi** Walden = *Cyanops franklinii ramsayi.*

Megalaema ramsayi Walden, *Annals and Mag. Nat. Hist.* (4), xv. p. 400 (1875).

Co-type : ♂. March 11, 1874. Karen-Nee. R. G. W. R. collected.

Reg. No. 1896. 133. 1373. Ex Tweeddale Collection.

The British Museum claims to have ♂ and ♀ types ; the present bird is, however, a co-type with them. Its label is a "type" label of the Tweeddale Collection and the writing on it looks to be Wardlaw Ramsay's. Its measurements are : wing, 100 ; tail, 60 ; tar. 26 ; bill, 22 mm.

PICIDAE.

20. **Picus magellanicus** King = *Ipocrantor magellanicus.*

Picus magellanicus King, *Zoological Journal*, vol. iii. p. 430 (1827—Port Famine).

Type (or co-type) : (♀ plumage). No date. "Straits of Magellan."

Reg. No. 1926. 109. 110. Ex Edin. Univ. Mus. Reg. 1831–32. No. 35. "Presented by Captain King."

21. **Picus (Apternus) arcticus** Swainson & Richardson = *Picoides arcticus.*

Picus (Apternus) arcticus Swains. & Richardson, *Fauna Boreali Americana*, vol. ii. pp. xxvi and 313, pl. 57 (1831—Rocky Mountains).

Type : (♂ plumage). No data. Franklin's Second Overland Expedition.

Reg. No. 1921. 1. 42. Ex Edin. Univ. Mus. Reg. 1830–31. No. 25. "Franklin and Richardson Arctic Birds. Presented by Lord Goderich."

22. **Picus rubidicollis** Vieillot = *Melanerpes portoricensis.*

Picus rubidicollis Vieillot, *Ois. Amérique Sept.* vol. ii. p. 63, pl. 117 (1807). "De la collection de M. Dufresne."

Type : no data. Dufresne Collection.

Reg. No. 1929. 186. 19. Ex Edin. Univ. Mus. Reg. 1819–20. No. 1.

Dufresne Catalogue : *Picus portoricensis* Daud. Le pic de Portorico Daud, très rare.

Dufresne made two catalogues, one in 1815—the second dated 1819, just before his birds came to Edinburgh. In both catalogues this woodpecker is entered as "*portoricensis.*" Apparently between 1807 and 1815 he discovered that *rubidicollis* of Vieillot and *portoricensis* of Daudin were identical.

PSITTACI.

23. **Trichoglossus brooki** Ogilvie Grant = *Trichoglossus cyanogrammus brooki.*

Trichoglossus brooki Ogilvie Grant, *Bull. B.O.C.* xix. p. 102 (1907).

Co-type : ♂ died in captivity, October 1915.

Collected at Pulo Swangi (Spirit Island) off S. coast of Terangan, Aru Islands, by Walter Goodfellow.

Reg. No. 1924. 154. 61.

Ogilvie Grant described this new race of *Trichoglossus* from two living birds in the possession of Mr. Brook. He did not specify either as being the type. The other co-type is in the British Museum.

24. **Psittacara leptorhyncha** King = *Henicognathus leptorhynchus.*

Psittacara leptorhyncha King, *Proc. Zool. Soc.* p. 14 (1830—Chiloe).

Type: No sex or date. "Straits of Magellan" (error). Chiloe Island.

Reg. No. 1925. 38. 49. Ex Edin. Univ. Mus. Reg. 1831–32. No. 35. "Presented by Captain King."

STRIGES.

25. **Strix nana** King = *Glaucidium n. nanum.*

Strix nana King, *Zool. Journal*, vol. iii, p. 427 (1827—Port Famine).

Co-type: no sex or date. "Straits of Magellan."

Reg. No. 1920. 39. Ex Edin. Univ. Mus. Reg. 1831–32. No. 35. "Presented by Captain King."

ACCIPITRES.

26. **Pernis elliotii** Jameson = *Pernis ptilorhynchus.*

Pernis elliotii Jameson, *Mem. Werner Soc.* vii. p. 493 (1836).

Type: no date or sex. South India. Collected by Walter Elliot.

Reg. No. 1916. 65. Ex Edin. Univ. Mus. Reg. 1835–36.

PLEGADIDAE.

27. **Ibis spinicollis** Jameson = *Carphibis spinicollis.*

Isis spinicollis Jameson, *Edin. New Phil. Journal*, xix. p. 213 (1835).

Type: no date or sex. "Banks of River Murray," Australia.

Reg. No. 1916. 64. Ex Edin. Univ. Mus. Reg. Presented by Lieut.-Col. Lindsay, 39th Regt.

Three lots of birds were received in the Museum from this officer; one in 1828–29, one in 1829–30, and the third in 1830–31; but it cannot now be stated in which of these consignments this "new bird" was.

ANSERES.

28. **Anas speculiaroides** King = *Anas cristata.*

Anas specularioides King, *Zool. Journal*, vol. iv, p. 98 (1828).

Type (probable): no date or sex. "Straits of Magellan."

Reg. No. 1926. 109. 112. Ex Edin. Univ. Mus. Reg. 1831–32, No. 35. "Presented by Captain King."

29. **Oidemia patachonica** King = *Tachyeres cinereus.*

Oidemia patachonica King, *Zool. Journal*, vol. iv. p. 100 (1828).

Type (probable): no date or sex. "Straits of Magellan."

Reg. No. 1926. 109. 90. Ex Edin. Univ. Mus. Reg. 1831–32. No. 35. "Presented by Capt King."

COLUMBAE.

30. **Phlogoenas keayi** Eagle Clarke = *Phlegoenas keayi*.

Phlogoenas keayi Eagle Clarke, *Ibis*, 1900, p. 359 (Negros).

Types: not sexed, not dated. Negros. Collected by W. A. Keay.

Reg. No. (type) 1900. 116. 31. (co-type) 1900. 116. 32. Probably ♂ and ♀. The wings measure 159 and 148 mm.

LARIDAE.

31. **Larus rossii** Richardson = *Rhodostethia rosea*.

Larus rossii Richardson, Appendix *Parry's Second Voyage*, p. 359 (1825).

Type: not sexed. June 23, 1823. Alagnak, Melville Peninsula, lat. 69° 15′ N. Collected by Lieut. James Clark Ross.

Reg. No. 1929. 186. 17. Ex Edin. Univ. Mus. Reg. 1823–24.

32. **Larus jamesoni** J. Wilson = *Larus novae-hollandiae*.

Larus jamesoni J. Wilson, *Illustr. Zoology*, pl. 23 (1831).

Type: adult. No sex or locality. "Brought to Leith by an Australian ship."

Reg. No. 1920. 36.

33. **Larus franklinii** Richardson.

Larus franklinii Richardson, *Fauna Boreali Americana*, vol. ii, p. 424, pl. 71 (1831—Saskatchewan River).

Type: no details. Franklin's Second Overland Expedition.

Reg. No. 1926. 109. 91. Ex Edin. Univ. Mus. Reg. 1830–31, No. 25. (One of Richardson's three specimens.)

34. **Larus bonapartii** Richardson = *Larus philadelphia*.

Larus bonapartii Richardson, *Fauna Boreali Americana*, vol. ii, p. 425, pl. 75 (1831—Great Slave Lake).

Type: ♂. May 26, 1826. Fort Franklin, Great Bear Lake. Collected by Franklin's Second Overland Expedition.

Reg. No. 1926. 109. 125. Ex Edin. Univ. Mus. Reg. 1830–31, No. 25.

Richardson's type locality is erroneously given as Great Slave Lake instead of Great Bear Lake.

35. **Catharacta lonnbergi clarkei** Mathews = *Stercorarius skua antarctica*.

Catharacta lonnbergi clarkei Mathews, *B. Australia*, ii, p. 494 (1913—South Orkneys).

Type: not sexed. November 5, 1903. South Orkneys. Collected by "Scotia" Expedition.

Reg. No. 1909. 61. 31*a*.

36. **Catharacta maccormicki wilsoni** Mathews = *Stercorarius maccormicki*.

Catharacta maccormicki wilsoni Mathews, *B. Australia*, ii, p. 495 (1913—No exact locality).

Type: not sexed. March 9, 1904. Lat. 74° S., long. 22° W. in Weddell Sea off Coats Land. Collected by "Scotia" Expedition.

Reg. No. 1909. 61. 30*a*.

RALLIDAE.

37. **Fulica gallinuloides** King = *Fulica leucoptera*.

Fulica gallinuloides King, *Zoological Journal*, vol. iv, p. 96 (1828).

Type (possible): not sexed; not dated. "Straits of Magellan."

Reg. No. 1926. 109. 113. Ex Edin. Univ. Mus. Reg. 1831–32. No. 35. "Presented by Captain King."

The type was a young bird and the above answers to the description.

GALLI.

38. **Tetrao (Lagopus) leucurus** Swains. & Richardson = *Lagopus leucurus*.

Tetrao (Lagopus) leucurus Swainson & Richardson, *Fauna Boreali Americana*, vol. ii, p. 356, pl. 63 (1831).

Co-types: no sex. No date. Rocky Mountains.

Reg. No. 1926. 109. 118 (winter plumage); 1926. 109. 119 (summer plumage). Ex Edin. Univ. Mus. Reg. 1830–31. No. 25.

Richardson described five specimens, all he had. The two in the Museum are the second and fifth described. One of them (but it cannot be said which) was collected in 54° N. by Mr. Drummond; the other by Mr. Macpherson in lat. 63°.

SOME NEW BUTTERFLIES AND MOTHS FROM EASTERN NEW GUINEA.

By DR. KARL JORDAN.

(With six text-figures.)

WHERE not otherwise stated, the specimens here described were obtained by Mr. A. F. Eichhorn on his trip to the Herzog (= Hertzog) Mts., situated inland from Huon Gulf on the south side of the Markham (= Wussi) River. The collection made during this expedition was but a small one, as a serious illness cut short Mr. Eichhorn's activities and necessitated his removal to the coast by aeroplane. Though he has not yet entirely regained the use of the right arm, we are very glad to know that Mr. A. F. Eichhorn is progressing favourably. He has our cordial good wishes for a complete recovery.

As was to be expected, the collection from the higher altitude (6,100 ft.) consists chiefly of *Delias*, among which we find representatives of several new subspecies, and of *Satyrinae* of the genera *Erycinidia*, *Pieridopsis* and *Platypthima*, described by us in 1905 and all confined to the mountains of New Guinea. The series of *Platypthima decolor* R. & J. 1905, of which only one specimen was known, includes both sexes, the female being rather paler than the male, but bearing, on the underside of the hindwing, the same conspicuous, forked, white band. There is also a series of *P. homochroa homochroa* R. & J. 1907, described from a pair collected by A. S. Meek on the Biagi R.

PIERIDAE.

1. **Delias clathrata limata** subsp. nov.

♂. Upperside; forewing with 6 subapical–submarginal dots, of which the 3 posterior ones minute; black area slightly reduced; white spots outside discocellulars triangular, longer than broad, touching each other at black discocellular spot.

On underside the white discal band of forewing anteriorly narrower than in *D. c. clathrata* R. & J. 1904; on hindwing the white subbasal bar narrower, suffused with yellow, this yellow colouring less conspicuous than in *D. c. clathrata*; black discal blotches on the whole smaller, particularly the fourth.

♀. Upperside; forewing: black area more extended, the three discal blotches from M^1 forward vestigial, being much dimmed by black scaling.

Underside; forewing: white discal band anteriorly narrower than in *D. c. clathrata*, the costal spot isolated, the second usually missing.

In one ♀ the upperside of forewing slightly yellow and the white discal band of forewing beneath not narrower than in some specimens of *D. c. clathrata*.

Hab. Eastern New Guinea: West side of Herzog (= Hertzog) Mts., Edie R., 6,100 ft., 1 ♂ (type), 6♀♀.

2. **Delias mira excelsa** subsp. nov.

♂. Upperside; forewing: white area larger than in *D. m. mira* R. & J. 1904 and *D. m. reversa* Roths. 1925, nearly filling the entire cell, with the exception of one specimen, in which apical fourth of cell is black.

Underside; anal area of hindwing brighter yellow than in the other two known subspecies mentioned, penetrating farther basad at abdominal margin, abdominal marginal area shaded with yellow, black termen on the whole narrower.

♀. Upperside; white area of forewing extending beyond base of M^2, the greater portion of the cell being white; on hindwing the white area less large than in *D. m. mira* ♀ (this sex of *D. m. reversa* not known), reaching to lower angle of cell, only in one ♀ a little beyond.

Underside; anal area of hindwing as in ♂ brighter yellow; small costal dot outside black oblique stripe yellowish.

Hab. Eastern New Guinea: West side of Herzog Mts., Edie Creek, 6,100 ft., 6 ♂♂, 7♀♀.

3. **Delias callima satura** subsp. nov.

♂. Underside; red markings of hindwing much less bright than in *D. c. callima* R. & J. 1905, of about the same dull tint as in *D. bornemanni keysseri* Roths. 1925, larger than in *D. c. callima*, discal band broader than black interspace between it and cell-patch and than black terminal border, spots 1 and 2 of this band smaller than 3 to 5, some red scales between band and cell-patch.

Hab. Eastern New Guinea: West side of Herzog Mts., Edie Creek, 6,100 ft., 1 ♂ (type); and Watut R. to Buiang, 3,200 to 5,400 ft., 1 battered ♂.

4. **Delias bornemanni entima** subsp. nov.

♂♀. On upperside similar to *D. b. keysseri* Roths. 1925 and *D. b. aegle* Joicey & Talb. 1922, but on underside closely resembling *D. b. rubrina* Eecke 1915, the white on upperside of forewing more restricted than in *rubrina* and the red markings of underside of hindwing much larger than in *aegle* and *keysseri*.

♂. White area of forewing, above, reaching to base of M^1 or nearly.——Black terminal border, as in *D. b. aegle*, anteriorly broader than in *D. b. rubrina*.

On underside the white streak along hindmargin of forewing as in *D. b. keysseri* and *D. b. aegle*, shorter than in *D. b. rubrina*.——Markings of hindwing dull red as in *D. b. rubrina*, and about as large: cell-spot much longer than its distance from their submarginal spot, the black discal area being very much smaller than in *D. b. keysseri* and *D. b. aegle*, being proximally of third submarginal spot about as wide as black abdominal marginal border, often much narrower; in most specimens a red spot in angle R^1–R^2.

♀. White area of forewing, above, extending to or beyond base of M^2, but not reaching M^1, usually slightly yellowish.

Red markings of underside as in ♂.

Hab. Eastern New Guinea: West side of Herzog Mts., Edie Creek, 6,100 ft., 11 ♂♂, 5♀♀ (type ♂); Watut R. to Buiang, 3,200 to 5,400 ft., 4 ♂♂, 1♀.

5. **Delias cuningputi aemula** subsp. nov.

♂. Upperside: white area of forewing wider than in *D. c. cuningputi* Ribbe 1900, extending 1·5 to 2·5 mm. beyond upper angle of cell, its distance from fringe of termen being 2·5 to 3·0 mm. before tornus.——Black terminal band of

hindwing nearly 5 mm. broad at SC^2 (below apex), its inner margin rather strongly undulating.

Underside: yellow markings brighter than in *D. c. cuninggnti* and double spot at $\frac{3}{4}$ of costa of forewing larger.

Hab. Eastern New Guinea: West side of Herzog Mts., Edie Creek, 6,100 ft., 4 ♂♂.

6. **Delias pheres endela** subsp. nov.

♂. Upperside as in *D. ph. hyperapproximata* Roths. 1925; terminal band of hindwing a trifle broader, less broken up posteriorly.

Underside.——Forewing black, the white area of the other subspecies suppressed, but paler black than terminal band, only a streak along hindmargin white, between M^1 and M^2 some white or yellow scaling in 3 of the 4 specimens. ——Hindwing: yellow spot in cell isolated; discal yellow band reaching to abdominal margin.

♀. Similar to ♀ of *D. ph. hyperapproximata*.——Forewing, upperside, with two subapical yellowish spots; terminal black band covering extreme apex of cell, 6 mm. broad at M^2.——Hindwing with traces of three submarginal yellowish white dots; terminal band 4·5 mm. wide at R^2; white area penetrating to fringe below M^1, nearly to fringe above M^1.

Underside.——Yellowish white area of forewing as in *D. ph. hyperapproximata*, somewhat paler (faded ?), not quite reaching anterior margin of cell; terminal band 5 mm. wide at M^2.——Hindwing: orange cell-spot nearly isolated; median band narrower than in *D. ph. hyperapproximata*, orange spots within it deeper orange, first partition (C–SC^2) of band transversely somewhat wider than it is long midway between the veins.

Hab. Eastern New Guinea: West side of Herzog Mts., Edie Creek 6,100 ft., 4 ♂♂, 1♀.

NYMPHALIDAE: SATYRINAE.

7. **Pieridopsis ducis** sp. nov. (text-fig. 1).

Upperside milky white, slightly glossy, less creamy than in P. *virgo* R. & J. 1905; white bands of underside sharply defined, on forewing a prominent submarginal white line.

♂. Body dark brown, hairs of upperside more or less grey, especially on thorax; underside of abdomen grey; segments I and II of palpus greyish white, long hairs brown. On inner surface of shaft of antenna scaling white at bases of segments, on outer surface white from base to apex of segments.

Wings; underside.——Forewing milky white from base close to disco-cellulars, the costal margin olive-brown, the white area distally extending across costal vein and posteriorly about 3 mm. distant from termen, its outer margin almost straight from below M^1 to costa; 8 mm. from apex two white dots at costal margin, one behind the other.——Hindwing milky white, termen (and fringe) narrowly black, the border gradually widening posteriorly, anal lobe black with a white line; abdominal margin brownish black.

Underside dark sepia, with sharply defined creamy white bands.—— Forewing: abdominal margin white except at termen; beyond middle of cell from close to costal margin a band 1½ mm. broad, ending at M in between M^1 and M^2 or extending to white area of posterior (= abdominal = inner) margin; at

8 mm. from apex a white line, about $\frac{3}{4}$ mm. broad, parallel with cell-band, and about 3 mm. from termen a somewhat thinner line parallel with termen, the two lines meeting in front of or at M^2, in the triangular space between them four minute white dots (remnants of ocelli); close to termen, but separate from margin, an inconspicuous greyish brown line continuous from near apex to near termen; posterior margin white except at termen, varying in width.——On hindwing a large creamy white V open at costal margin, composed of a band parallel with abdominal margin and commencing near base at costal margin, and a median band which joins the former at lower angle of cell, each about $1\frac{1}{2}$ mm. broad, apex of V about halfway between cell and anal angle; parallel with termen a creamy white submarginal band, $1\frac{1}{2}$ or 2 mm. wide anteriorly, tapering posteriorly, not quite reaching M^1; near margin a thin, continuous, white line widened on anal lobe into a spot; at and near abdominal margin two similar lines, of which the posterior one joins the subterminal line; between submarginal band and V a row of minute white dots, anal lobe black, in front of it, between M^1 and M^2, an inconspicuous ocellus consisting of a minute white central dot, a black pupil (diameter about $1\frac{1}{2}$ mm.) and an obscure brownish outer ring.

Neuration: M^1 of forewing midway between R^3 and M^2 (in *P. virgo* M^1 nearer to R^3).

Genitalia: Anal tergite (X. t., text-fig. 1) shorter than in *P. virgo*, apically compressed. Lateral spur (X. st.) of anal segment much shorter than in *P. virgo*, not curved upwards above the level of X. t. Clasper (Cl) apically narrower than in *P. virgo*, its ventral margin not excurved in proximal half. Ventral portion of penis-funnel narrower than in *P. virgo*.

Length of forewing: 21 mm.

Hab. Eastern New Guinea: West side of Herzog Mts., Edie Creek, 6,100 ft.; 2 ♂♂.

8. **Erycinidia hemileuca** sp. nov.

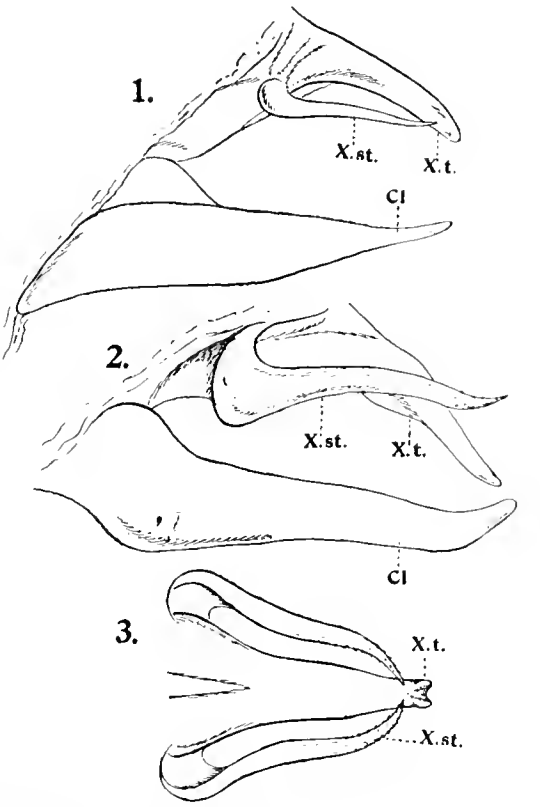
Upperside of forewing black, an oblong bar across cell and a thin vestigial line on disc white; hindwing white, with narrow black margins.

♂. Body above dark olive. underside grey, long hairs of palpus dark brown. Shaft of antenna with white scales at bases of segments on inner side, more extended white on outer side.

Wings, upperside; forewing black, slightly olivaceous towards base; before apex of cell a white bar nearly 2 mm. broad and 4 mm. long, not quite reaching costal edge, and so placed that its distal margin is a little beyond the point of origin of M^1; halfway to apex a small (single or double) white spot close to costal edge continued by a diffuse greyish line, slightly curved and disappearing about 3 mm. from termen at M^2 or M^1.——Hindwing in shape similar to that of *E. maudei* Joic. & Talb. 1916, white with a faint bluish (milky) tone, costal and terminal margins black, the border about $1\frac{1}{2}$ mm. broad, narrower towards anal lobe, bearing a thin white admarginal line from tail to near apex, abdominal area and base suffused with brownish black; before tail, between M^1 and M^2, a minute black dot.

Underside greyish drab.—Forewing: a white cell-bar as above, but somewhat narrower and more sharply defined, parallel with it a narrow white discal line from costa to M^2 (or nearly), of even width, area between these white markings blackish brown, outside discal line three ocelli from subcostal fork backwards,

inconspicuous, upon which follows an undulate blackish, indistinct line parallel with termen.——Hindwing: base and abdominal area shaded with grey scales; a thin, brown, broken line from near costal margin to abdominal area, crossing cell near origin of M^2, where it forms the outer boundary of a small whitish spot; from beyond middle of costal margin straight towards anal lobe, which it does not reach, a white band sharply defined on basal side by brown and gradually shading off on distal side; a row of five submarginal ocelli, of which the last, before tail, deep black, the others paler, all with buffish ring; an undulate brown line nearly parallel with termen, disappearing posteriorly, where its silvery outer border forms a white line; close to termen a clayish line bounded on both sides by a brown line.



Neuration as in *E. gracilis* R. & J. 1905.

Genitalia: Anal tergite (uncus) slightly compressed beyond middle, apex feebly spathulate, rounded, strongly convex above. Lateral spur (X. st.) of anal segment curved upwards and then down and inwards, extending beyond apex of tergite, gradually narrowing to a sharp point. Clasper ventrally strongly convex near base.

Length of forewing: 20–22 mm.

Hab. Eastern New Guinea: West side of Herzog Mts., Edie Creek, 6,100 ft., 3 ♂♂.

9. **Erycinidia tenera** sp. nov. (text-figs. 2 and 3).

Similar to *E. gracilis* R. & J. 1905, darker above, with a median and a discal grey band which unite at posterior margin and are shaded over with seal-brown on upperside.

♂. Body olivaceous seal-brown above, grey beneath; most of the long hairs of palpus seal-brown. Segments of shaft of antenna on inner side white at bases, on outer side almost entirely white.

Wings, upperside, olivaceous seal-brown.——Forewing: a median band from near costal margin to hind margin, which it reaches beyond middle, nearly 2 mm. wide, narrower at costa, a discal band slightly incurved above its middle and anteriorly and posteriorly a little curving basad joins median band at hindmargin, both bands greyish sepia, this brown colouring extending to base from cell to

hindmargin, interspace between these shadowy bands seal-brown, 3½ mm. wide in front and 2 mm. behind.——Hindwing somewhat broader anteriorly than in *E. gracilis*; a seal-brown line from middle of costal margin in direction of tail, which it does not reach, the line shading off on proximal side, better defined on outer side, the ground of wing here being somewhat paler; before tail a small black spot with white central dot, further forward faint indications of other ocelli.

Underside greyish drab.—Forewing: median and discal bands nearly as above, but almost white, a submarginal, dark sepia, crenulate line from SC^4 to R^3, where it merges into a broadish, diffuse, dark sepia band, proximally of it below subcostal fork two inconspicuous ocelli and near termen a trace of a dark brown line.——Hindwing: from one-third of costal margin to below M^2 a thin brown line, more or less dentate on proximal side at veins, excurved between veins, on submedian fold sharply broken basad–abdominad, along basal side of line a whitish grey diffuse band; parallel with this line a discal one, commencing just beyond middle of costal margin and directed towards tail, which it does not reach, being posteriorly sharply bent basad–abdominad; along outside of this line a diffuse whitish grey band, fading away posteriorly, as does the antemedian grey band; in greyish distal area a row of five ocelli, first and second larger than third and fourth, iris of fifth deep black; near termen two sepia-brown lines, of which the inner is crenulate, interspace between the outer one and dark sepia marginal line slightly clay-colour.

Neuration as in *E. gracilis*.

Genitalia: Anal tergite (= uncus, X. t., text-figs. 2 & 3), instead of being compressed in middle and apically strongly convex above and rounded at tip, is flattened distally and gradually narrowed to apex, which is sinuate–bidentate. Lateral spur (X. st.) broader and shorter than in the other known species, not reaching to apex of X. t., with the sharp tip curved upward. Clasper (Cl) in proximal half broader and in apical half narrower than in *E. gracilis*, apex more sharply pointed.

Length of forewing: 18 mm.

Hab. Eastern New Guinea: West side of Herzog Mts., Edie Creek, 6,100 ft. 1 ♂.

RIODINIDAE.

10. **Praetaxila weiskei huonis** subsp. nov.

♀. Differs from ♀ of *P. w. weiskei* R. & J. 1901 in the white cell-bar on upperside of forewing being much shorter and separated from white band, interspace at hindmargin of cell 3 mm., white band narrower than in *P. w. weiskei* from cell backwards, its distance from cell 3 mm. at M^1 and 9 mm. at M^2, last spot 6 mm. long.——On underside the black discocellular spot continued as a band to near hindmargin; white band essentially as above; white cell-bar longer than above, but as widely separate from band as above. Orange colouring of termen of hindwing brighter than in *P. w. weiskei* ♀.

Hab. Eastern New Guinea: West side of Herzog Mts., Edie R., 6,100 ft., one ♀.

LYCAENIDAE.

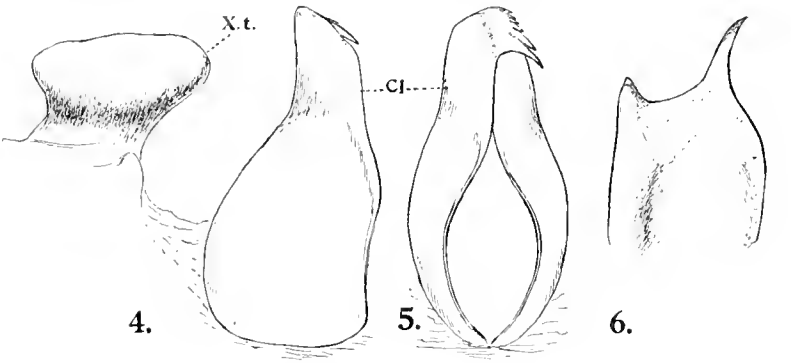
11. **Candalides hemileuca** sp. nov. (text-fig. 6.)

♂. Body olivaceous black above, white beneath; frons white at eyes; shaft of antenna ringed with white; palpus olivaceous black above, white beneath.

Wings, upperside.—Forewing olivaceous black, apex pointed, distal margin nearly straight; long hairs of posterior margin white.——Hindwing white, slightly creamy, basal area olivaceous black except at costal margin, not quite extending to base of M^1, long hairs on this patch milky white.

Underside cream colour, a little deeper yellow at base of costal margin of hindwing; forewing from middle of cell to hindmargin and to tornus white.

Genitalia: Anal tergite broad, divided into two broad, obtuse, lobes as usual in this genus; on each side a sternal prong, long, slender, sharply pointed, first directed frontad and the curved anad, the distal arm being the longer. Clasper (text-fig. 6) truncate at apex, broad, with two conical teeth at apical margin, the



one dorsal, short, directed straight backward, the other subventral, longer, sharper, somewhat curved laterad and ventrad.

Length of forewing: 13–14 mm.

Hab. Eastern New Guinea: West side of Herzog Mts., Edie R., 6,200 ft., 2 ♂♂.

12. **Celastrina leucothelia** sp. nov. (text-figs. 4 & 5).

Allied to *C. drucei* B. Baker 1906 (described as a *Cyaniris*); upperside of ♀ white, with broad black terminal border on forewing.

♂. Upperside of wings campanula-blue, with a white tint, though there are no white scales on the wing-surface; androconia fan-like, a little longer than broad (apart from pedicel), apex moderately rounded; both wings narrowly margined with black, terminal black border of forewing 1 mm. broad, that of hindwing much narrower, widening at apex; long scales of fringe of hindwing and around tornus of forewing white.

Underside dull greyish white, resembling old silver, markings pale sepia. ——On forewing a discocellular bar, at distal side of point of bifurcation of subcostals (SC^1 and SC^5) a slightly oblique bar to R^1, from R^1 to M^2 a continuous submarginal line, at R^1 2·5 mm. from fringe, posteriorly a little nearer to the termen, the 4 bars composing the line at right angles to the veins, the last two bars slightly incurved; near termen a row of 7 inconspicuous dots; termen itself very narrowly pale sepia-colour; shorter scales of fringe white.——Hindwing: a narrow discocellular bar; between it and base a row of 4 spots, second in cell bar-like, more or less broken up into 2 spots, third below cell, more proximal, subrotundate, fourth near abdominal margin, more distal than the others; on

disc from C to SM^2 a line of 7 bars, first, third and seventh nearly straight, the others more or less anguliform, first and second much more proximal than third and fourth, which are halfway between cell and termen, fifth and sixth again nearer cell, but in a line with third, fourth and seventh; near termen a row of 7 dots, the last double, all sepia-brown; extreme termen likewise pale sepia-colour; fringe white, with pale brown dots at ends of veins.

♀. Body, above, black, shaded with white scaling, long hairs of pronotum pale brown.——Wings, upperside, white.——Forewing shaded with black at extreme base; between cell and costal edge pale greyish brown, with a faint metallic green sheen in oblique light; a broad black terminal border, touching upper angle of cell, its proximal boundary curved, crossing M^1 beyond middle and reaching almost exactly to apex of SM^2, the boundary somewhat diffuse under the less; fringe of termen pale sepia, white at tornus.——Hindwing shaded with black about to middle of cell; a very thin terminal line brownish black; fringe white, with brown spots at ends of veins; traces of brown subterminal dots anteriorly and posteriorly.

Underside as in ♂; discal bars of forewing straighter, not anguliform; discal spots near lower angle of cell of hindwing smaller and a little more proximal than in ♂.

Genitalia of ♂: Lobe of anal tergite (X. t., text-fig. 4) constricted at base, apically broader (in a vertical sense) than long (in a horizontal sense), in aspect from apical side irregularly pisiform; no X. st.; clasper (Cl) in basal half broadened dorsally and incurved ventrally, subconstricted above middle (cf. text-figs. 4 & 5); apex curved mesad, with a row of sharp, conical, marginal teeth, of which the ventral one is the longest, left clasper with 5 teeth above the long one and right clasper with 3.

Length of forewing: ♂♀ 15 mm.

Hab. Eastern New Guinea: West side of Herzog Mts., Edie R., 6,200 ft., one pair, type ♂.

ZYGAEIDAE.

Atelesia gen. nov.

♂. Frons broader than the eye is high. Forewing: 4 subcostals, SC^2 being absent; no transverse veinlets from C to costal margin; R^1 from cell, R^2 and R^3 close together from cell; M^2 on a level with SC^4; hindwing: SC^2 well separated from R^1 and the cross-vein between them missing (cell open at upper angle), but SC^2 with a vestige of an angle as remnant of the missing vein, this angle farther distal than tip of closed portion of cell.——Genotype: *A. nervosa* sp. nov.

Near *Doclcopsis* Jord., 1907, but distinguished by the broader frons, the absence of costal veinlets and the open cell of hindwing.

13. Atelesia nervosa sp. nov.

♂. Antenna and body black: hindmargins of head and of thoracic and abdominal tergites as well as middle of frons creamy buff; palpus, margins of thoracic sternites, legs and underside of abdomen somewhat deeper yellow, laterally the margins of abdomen orange.

Wings, upperside.——Forewing olivaceous black, all veins and hindmargin

light ochraceous, these lines very narrow, not quite reaching to fringe of termen. ——Hindwing dull orange-ochraceous, shaded with olivaceous black in cell and between veins except from R^2 forward, the abdominal area olivaceous black, with two lines and the abdominal-marginal fringe dull orange-ochraceous; an olivaceous black terminal border about 1·5 mm. broad, indented on the veins, and merging into the blackish abdominal area.

Underside.——Forewing: orange-ochraceous lines broader than above, especially in proximal three-fourths.——Hindwing brighter orange-ochraceous than above, with hardly any blackish scaling from costal margin to well below cell, apart from a short streak in base of cell; terminal border olivaceous black, indented on the veins, tapering behind, about 1·5 mm. broad anteriorly.

Genitalia: Anal tergite, in dorsal aspect, much broader than long, broadly sinuate, the apical lobes triangular, turned ventrad and not visible from above; anal sternite likewise broad, with a straight, strongly chitinized conical process each side. Clasper with two long and rather slender processes: the dorsal one sabre-shaped, gradually but not strongly curved downward, its upper inner margin membranous; lower process feebly chitinized, pale, straight, slightly tapering, not quite so long as upper process.

Hab. Eastern New Guinea: West side of Herzog Mts., from between Watut R. and Buiang, 2300–5400 ft., 1 ♂.

14. **Eusphalera pernitens** f. **aspila** nov.

The species occurs in two forms: (*a*) f. *pernitens* Jord. 1925, hindwing, above and below with a creamy white patch across apex of cell, and forewing, below, with the blue area bounded by a narrow white median band. One pair from Rawlinson Mts. and a ♂ from Edie Creek.——(*b*) f. *aspila* nov., without the white markings of the preceding form. One ♂ and two ♀♀ from: Eastern New Guinea, West side of Herzog Mts., Edie Creek, 6,100 ft.

Herpolasia augarra ducalis subsp. nov.

♀. White spots of forewing a little smaller than in *H. a. augarra* R. & J. 1905; black terminal border of hindwing, above, more sharply defined, of nearly even width and 4 to 5 mm. broad.

Hab. Eastern New Guinea: West side of Herzog Mts., Edie Creek, 6,100 ft., 3 ♀♀.

15. **Hemiscia parthenia** sp. nov.

♀. Close to *H. meeki* Roths. 1896. Pectinations of proximal segments of antenna much shorter, the fifth branch of inner side not nearly reaching to base of seventh branch, whereas in the various subspecies of *H. meeki* the fifth reaches to base of eighth or at least beyond base of seventh. Frons narrower than in *H. meeki*. Posterior margin of pronotum, apical half of mesonotum, the entire metanotum and first abdominal tergite, apical margins of abdominal sternites, apices of coxae and undersides of femora white (on thorax above and below here and there white scales, but specimen too much worn to show exact distribution of colours on thorax). Body otherwise as in *H. meeki*.

Wings, upperside, creamy white to beyond middle, the extreme base green.——Forewing: costal edge very narrowly black: white area extending to near base of M^1; distal area black, veins green, a subcostal and a subterminal

white dot vestigial, fringe white at apex of wing.——Hindwing: white area reaching close to base of R^3, black area not extending to anal angle, veins and extreme terminal margin blue, fringe white at apex of wing.

Underside nearly as above.——Forewing with short bluish green costal streak at base; metallic scaling on veins of distal area blue; the two white spots larger than above.——Hindwing: no metallic scaling at base; near apex two white spots, one close to costal margin, the other subterminal, metallic scaling around anterior spot and proximally of it, terminal band from second spot towards anal angle, but ending at white area, and veins blue.

Neuration as in *H. meeki*; but M^2 of hindwing more proximal, originating almost exactly from middle of cell.

Length of forewing: 22 mm.

Hab. Eastern New Guinea: West side of Herzog Mts., from between Watut R. and Buiang, 3200–5400 ft., 1♀.

16. **Hemiscia meeki lota** subsp. nov.

♀. All the scales of chaetosema of head white. Wings as in *H. m. acelis* Jord. 1907 from Southern New Guinea, but white area of forewing extending to near base of M^1 as in *H. m. fergussonica* Jord. 1907 from Fergusson and *H. m. meeki* Roths. 1896 from Woodlark I.; subapical white spots vestigial on upperside.

Hab. North-eastern New Guinea: Stephansort, 1 ♀.

17. **Hemiscia meeki anthera** subsp. nov.

♂. White band of forewing, above and below, narrower, white spot of hindwing smaller than in *H. m. meeki*, and above not produced basad along costal margin.

♀. White area barely reading to base of M^2 on forewing and extending only a little beyond base of M^1 on hindwing (not reaching lower cell-angle); subapical white spots of forewing above distinct.

Hab. Eastern New Guinea: Kumusi R., low elevation, VI., VIII.–IX. (A. S. Meek), one pair.

18. **Hemiscia meeki placiva** subsp. nov.

♂. Like *H. m. meeki*, but band of forewing of even width, broader and reaching to hindmargin. White patch of hindwing extended to below M^1, its portion below cell narrow and shaded with black-brown, anteriorly the patch produced basad.——On underside, band of forewing widened behind. Patch of hindwing prolonged as a band which narrows posteriorly and nearly reaches fringe in front of anal angle.——Hindmargin of head orange below as well as at sides and above.

♀. White area of upperside extending on forewing just beyond base of M^2, on hindwing beyond base of M^1; subapical spots of forewing as large as in *H. m. fergussonica* Jord. 1907; hindwing with a white subterminal spot between R^2 and R^3.——On underside subterminal spot rounded, nearly 3 mm. wide, much larger than the subcostal spot. On hindwing a small subcostal spot and between R^2 and M^2 an elongate subterminal one white, more or less shaded with blue.

Hab. Louisiade Archipelago: Rossel I., Mt. Rossel, 2,100 ft., XII. 1915 (W. F. Eichhorn), one pair.

AGARISTIDAE.

19. **Argyrolepidea concisa stilbalis** subsp. nov.

♂♀. Discal band of upperside of forewing broader than in *A. c. concisa* Jord. (in Seitz, Macrolep. XI., p. 23, 1912), of the Snow Mts. in Dutch N. Guinea, its anterior half narrower than posterior half, measuring about 2·5 mm. at M^1; white patch of hindwing larger, less regular, extending farther distad in middle, outwardly incurved before and behind its median portion, bordered with blue all round, veins within the patch likewise blue.

On underside the discal band of forewing somewhat broader than above; blue scaling of hindwing more extended than in *A. c. concisa*.

In ♂ abdominal sternite VII bluish white in middle, while in *A. c. concisa* it is black.

Hab. British New Guinea: Hydrographer Mts., 2,500 ft., I., II., & III. 1918 (Eichhorn Bros.), a short series of both sexes.

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EDITED BY

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

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

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NOVITATES ZOOLOGICAE

Vol. XXXV. SEPTEMBER 1930. No. 4.

ON THE JAPANESE GEOMETRIDAE OF THE AIGNER COLLECTION.

By LOUIS B. PROUT.

THE Geometridae of the extremely rich M. Aigner collection of Japanese Lepidoptera, recently acquired by the Tring Museum, have been placed in my hands for working out, and include so much of interest that it has been found desirable to catalogue them very completely, and to publish this catalogue together with some notes on variation, taxonomy and synonymy.

As there is not, so far as I know, very much phenological information yet published regarding the Japanese Geometridae, I have gives the dates of capture in considerable detail and have frequently commented upon the modifications in the later broods. It might, however, be made a generalisation that the second (and third ?) generations differ chiefly from the first emergences in their smaller size. It is to be added that the collecting on Takao-San was not continuous, and several of the species may really show a succession of emergences throughout the summer months, including August, when the locality was not visited.

Takao-San, which is about 60 km. west of Tokyo, must be extremely rich in species. Of the 295 species of Geometridae sent by Mr. Aigner, at least 226 occur in that locality; with the addition of the winter species and others that were missed, and a probable further addition of many *Eupithecia* which are rarely seen except through breeding, it may be safely said that the number would surpass the total for the British Isles.

Subfam. **OENOCHROMINAE.**

1. **Alsophila tenuis** (Butl.) (1879).

Tokyo and vicinity, April 1925, 16 ♂♂; 30 March 1926, 1 ♂.

The series, mostly not in very fresh condition, shows some variation in size and in the degree of separation of the lines, but it cannot be called striking. The corrected synonymy of this species and its nearest ally, *punctigera* Prout (1915), is given on p. 414 of vol. iv of Seitz.

2. **Naxa (Psilonaxa) seriaria** (Motsch.) (1866).

Asamayama, July 1926, 1 ♂; Takao-San, 7 July 1926, 1 ♀.

SUBFAM. **HEMITHEINAE.**

3. **Pingasa aigneri** sp.n.

♂, 49 mm. Head and body concolorous with wings, face with a black band above. Palpus with terminal joint slightly longer than in the ♂♂ of the other Japanese species. Genitalia with the arms of the harpe long and slender, the dorsal (not, as in *pseudoterpnaria* Guen., the ventral) the shorter, simple, rather blunt, the ventral only broadening a little at its tip, forming a small triangular plate and a quite rudimentary prong (totally unlike the strong thorn of *pseudoterpnaria*). Wings white, strongly irrorated and clouded with a light olivaceous drab-grey; cell-marks about as in *alba brunnescens* or slightly narrower; postmedian line black, fine and sharp, the lunules not so deep as in *pseudoterpnaria*, the teeth fairly sharp but without the black dots at their tips; antemedian with the posterior prong elongate. Underside much as in *pseudoterpnaria*, but without the strong proximal cloud of forewing.

Takao-San, 18 June 1925, 1 ♂.

4. **Pingasa alba brunnescens** Prout (1913).

Takao-San, 9 June 1926, 1 ♂, 1 ♀.

5. **Terpna superans** (Butl.) (1878).

Nikko, August 1924, 1 ♀. Takao-San, 18 June 1925, 1 ♂; 20 September 1925, 1 ♂; 7 July 1926, 3 ♂♂.

6. **Dindica virescens** (Butl.) (1878).

Nikko, 26 June 1925, 1 ♂. Takao-San, 21 May 1925, 5 ♂♂; 18 June 1925, 1 ♀; 25 June 1925, 1 ♂; 5 June 1926, 2 ♂♂; 9 June 1926, 1 ♀.

Apparently somewhat local or sporadic in its occurrence; among the moderately extensive Japanese material previously received at the Tring Museum only one specimen is found, merely labelled "Japan."

7. **Agathia carissima** Butl. (1878).

Nikko, June 1925, 1 ♂. Takao-San, 14 July 1925, 1 ♂; 5 June 1926, 1 ♂.

8. **Agathia curvifiniens** Prout (1917).

Takao-San, 21 May 1925, 4 ♂♂; 25 June 1925, 1 ♂; 9 June 1926, 1 ♂, 1 ♀. Tokyo, 16–31 May 1926, 1 ♀.

The originals of this species were from Ningpo, Corea and Kiushiu, so that the present record extends its range. In addition to the distinctions from *carissima* noted in the type description, *curvifiniens* differs in having the hindtibia of the ♂ dilated, with hair-pencil. The cell-dot of the hindwing is wanting in one or two examples, thus not quite a constant distinction; that of the forewing, on the other hand, is always conspicuous, placed on, or immediately outside of, the central band.

9. **Aracima muscosa** Butl. (1878).

Takao-San, 1 ♀, 7 July 1926.

10. **Tanaorhinus reciprocata confuciaria** (Walk.) (1862).

Nikko, October 1925, 1 ♂. Takao-San, 18 June 1925, 1 ♂, 1 ♀; 25 June 1925, 1 ♂; 29 September 1925, 1 ♂; 9 June 1926, 1 ♂; 7 July 1926, 5 ♂♂ Tamagawa, W. of Tokyo, 25 June 1926, 1 ♂; Tokyo, June 1925, 2 ♂♂; June 1926, 1 ♂.

The second-brood specimens are not markedly smaller than those of the first brood.

11. **Tanaorhinus vittata prasinus** Butl. (1879).

Takao-San, 5 June 1926, 2 ♂♂; 7 July 1926, 1 ♂; 15 September 1926, 1 ♂; 20 September 1926, 1 ♂.

Both the second-brood specimens are smaller, the later one especially small and dull.

12. **Hipparchus dieckmanni** (Graes.) (1889).

Nikko, November 1925, 1 ♂, 1 ♀. Takao-San, 14 June 1925, 1 ♂; 18 June 1925, 2 ♂♂; 9 June 1926, 1 ♂, 1 ♀; 7 July 1926, 1 ♂. Tamagawa, 25 June 1926, 1 ♂.

The Nikko specimens are small, no doubt a second brood.

The figure of this species in Seitz (*Macrolep.* iv, t. 1h) is not recognizable and looks as though it had been taken from a somewhat faded *Hemistola dijuncta* (Walk.); the specimen figured as *sponsaria* is probably a large ample-winged *dieckmanni*, of which species the Japanese forms not seldom have the white costal spots somewhat reduced. It should be added that I was also (following the British Museum collection) guilty of a misidentification of *sponsaria* Brem.; the species which I called by that name (*tom. cit.*, p. 17) has since been named *ussuriensis* Sauber (1915) = *herbeus* Kardakoff (1928). For the true *sponsaria*, see No. 14 (*infra*).

13. **Hipparchus valida** (Feld.) (1875).

Takao-San, 25 June 1925, 3 ♂♂. Tokyo, June 1925, 1 ♂; June 1926, 1 ♂.

14. **Hipparchus sponsaria** (Brem.) (1864).

Takao-San, 14 June 1925, 3 ♂♂.

Bremer's poor figure and description clearly point to the species which was subsequently named *mandarinaria* Leech (1897) and is recognizably described and figured under that name in Seitz (*Macrolep.* iv. 18, t. 1i). A crude figure, with antemedian line obsolete, is also supplied by Matsumura (*Thous. Ins. Jap.*, supp. ii, t. xxix, f. 10) under the misidentification of "*Megalochlora glaucaria* Brem. ♀." Compare the note under No. 12 (*supra*).

15. **Hipparchus glaucaria** (Ménétr.) (1859).

Tokyo, 25 June 1925, 1 ♂; June 1925, 1 ♀.

Both are extremely discoloured, but recognizable.

16. **Hipparchus vallata** (Butl.) (1878).

Takao-San, 21 May–18 June 1925 and 5–9 June 1926, 18 ♂♂, 4 ♀♀; 15 September 1925, 1 ♂.

The September specimen is considerably smaller, manifestly representing a second generation; otherwise the variation is negligible.

17. **Comibaena procumbaria** (Pryer) (1877).

Takao-San, 14 May 1925, 2 ♂♂; 25 June 1925, 2 ♂♂; 15 September 1925, 1 ♂; 20 September 1925, 1 ♂; 7 July 1926, 2 ♂♂. Hachijoshima (Fatsizio I.), 23 July 1926, 1 ♂.

The Fatsizio and the two September specimens are considerably smaller than the others. A similar small form occurs at Kanshirei, Formosa, in April and May. In all the nine specimens of the Aigner collection, as well as in the Formosan, SC^1 of the forewing is stalked and SC^2 arises well before SC^5.

18. **Comibaena amoenaria** (Oberth.) (1880).

Nikko, October 1925, 1 ♀.

19. **Comibaena delicatior** (Warr.) (1897).

Takao-San, 21 May 1925, 1 ♂; 14 June 1925, 1 ♂; 18 June 1925, 5 ♂♂; 25 June 1925, 1 ♂; 15 September 1925, 2 ♂♂, 1 ♀; 5 June 1926, 1 ♀; 14 July 1926, 1 ♂. Tokyo, 16–31 May 1926, 1 ♂.

Variable in size and somewhat in the extent of the apical patch of the hindwing and the clearness or suffusedness of its red part, but never approaching at all closely *nigromacularia* Leech (1897) = *eurynomaria* Oberth. (*Et. Lép. Comp.* xii. 109, f. 3274, 1916) from W. China. It may perhaps be a race of the last-named, but certainly not a synonym as I earlier assumed, in the absence of adequate material and probably influenced by Leech's union of them. Oberthür (*loc. cit.*) cleared up the confusion and beautifully figured the two forms in question, 3273 representing *delicatior*. Notwithstanding his professed inability to recognize written descriptions, he correctly interpreted Leech's by the "black" apical patch of the hindwing, but transferred the name *nigromacularia* to the Japanese *delicatior* (which he differentiates by its *red* apical patch) because that was the first figured form in Seitz!

20. **Comibaena argentataria** (Leech) (1897).

Takao-San, 7 July 1926, 6 ♂♂, 1 ♀; 14 July 1926, 1 ♂.

21. **Culpinia diffusa** (Walk.) (1861).

Tokyo, 16–31 May 1926, 1 ♂.

22. **Gelasma albistrigata** Warr. (1895).

Takao-San, 14 June 1925, 1 ♂; 18 June 1925, 1 ♀; 5 June 1926, 1 ♀; 9 June 1926, 1 ♂. Tokyo, 1–15 June 1926, 1 ♂.

23. **Gelasma ambigua** (Butl.) (1878).

Sado I., 1–15 August 1925, 1 ♀.

The specimen is rather large and is badly worn, but its lighter red face, more wavy lines, white cell-spot of hindwing and more acute, sinuous-bordered forewing separate it from *albistrigata* and refer it here.

24. **Gelasma immunis** sp.n.

♂, 26 mm. Face black. Palpus rather short, blackish above, pale beneath. Vertex white; occiput narrowly green. Antennal pectinations short, the longest scarcely 2. Thorax and abdomen concolorous with wings. Hindtibial pencil moderate, process short; hindtarsus short.

Forewing not very dark, of the usual dirty yellowish-green of old or captured specimens of the group; costal edge narrowly buff, not dark-spotted; lines whitish, indistinct; antemedian at $\frac{1}{3}$, somewhat sinuous; postmedian at about $\frac{2}{3}$, slightly sinuous, not appreciably dentate, obsolescent at costa, slightly incurved at fold, reaching hindmargin at beyond $\frac{2}{3}$; termen and fringe concolorous or slightly paler.——*Hindwing* with angle at R^3 very blunt, a very faint concavity between this and R^1; concolorous with forewing; postmedian line continued, sinuous, becoming more proximal.——Underside paler, unmarked.

Takao-San, 7 July 1926, 1 ♂.

Readily distinguishable by its small size and short pectinations; recalls a small *Hemithea*.

25. **Gelasma illiturata** (Walk.) (1862).

Takao-San, 25 June 1925, 7 ♂♂; 7 July 1926, 23 ♂♂, 4 ♀♀.

Seven of the smallest specimens (25 June, 4 ♂♂; 7 July, 1 ♂, 2 ♀♀) appear to have been rather paler, the teeth of the postmedian less deep, pectinations rather more erect, tail of hindwing perhaps rather shorter (sp. div. ?), but are all in poor condition.

26. **Gelasma protrusa** (Butl.) (1878).

Takao-San 25 June 1925 2 ♂♂ 1 ♀; 14 July 1925, 1 ♂; 20 September 1925, 2 ♀♀; 7 July 1926, 4 ♂♂, 2 ♀.

In this species, the second-brood specimens are only a little smaller than the others.

27. **Gelasma grandificaria** (Graes.) (1890).

Takao-San, 25 June 1925, 1 ♂; 7 July 1926, 1 ♂, 2 ♀.

28. **Hemithea aestivaria** (Hb.) (1789).

Takao-San, 18 June 1925, 2 ♂♂, 1 ♀; 25 June 1925, 1 ♂, 1 ♀; 7 July 1926, 2 ♀♀. Tokyo, 4 July 1925, 1 ♀. Also 1 ♂ without exact locality (Japanese Alps), July 1926.

29. **Hemithea** sp.

Takao-San, 18 June 1925, 1 ♂; 15 September 1925, 1 ♂.

Smaller than *aestivaria* and with other differences, but unfortunately not in a fit condition for describing.

30. **Hemithea marina** (Butl.) (1878).

Takao-San, 21 May 1925, 1 ♂; 14 June 1925, 6 ♂♂; 18 June 1925, 1 ♂; 25 June 1925, 2 ♀♀; 5 June 1926, 1 ♂; 9 June 1926, 2 ♂♂, 1 ♀; 7 July 1926, 1 ♂. Sado I., 3–11 August 1926, 1 ♀.

Several of the specimens are very badly faded, but seem unquestionably

to belong here. One ♂ of 9 June is of a curiously *grey* green, and so is that of 5 June, the latter in addition much dwarfed.

31. **Hemithea anadema** sp.n.

♂, 23 mm. Closely like a small *marina*, but sufficiently distinct. Crown of head and antennal shaft dull purple, not white. Forewing with SC^1 connate with SC^{2+3} (from cell in *marina*), M^1 stalked with R^3 (generally connate in *marina*); the buff costal edge only slightly dark-dotted; lines very fine and weak, slightly dotted with cleaner white on the veins. Hindwing more rounded than in *marina*, the bend at R^3 only noticeable with careful attention; line faint.

Takao-San, 5 June 1926, 1 ♂.

On account of the shape, this species might be referred to (section ?) *Chlorissa*, near *C. obliterata* Walk. and its crests are only a little more developed than in that species. In any case it must be congeneric with *marina* and both are in a measure intergrades, as are also several species which have been discussed on other occasions.

32. **Hemithea amphitritaria** (Oberth.) (1879).

Takao-San, 21 May 1925, 1 ♂ (+ 2 ♂♂ ?); 14 June 1925, 2 ♀♀; 18 June 1925, 1 ♂; 25 June 1925, 1 ♀; 14 July 1925, 1 ♂.

I am uncertain how many species may be united under this name. The two best Ussuri ♂♂ before me (Vladivostok and district) show definite red dorsal ornamentation on only two abdominal segments (Oberthür says three); Aigner's, when good enough to show it, have it on four, and the crests perhaps a little better developed, and an Oiwake ♂ and smaller Chang Yang pair in coll. Brit. Mus. agree with them, while an Ussuri ♀ and a Hokkaido ♂ in the same collection, labelled *nigropunctata* Warr., scarcely differ from one Takao-San ♀ except in having blackish cell-dots. The two ♂♂ which are queried above are worn beyond recognition.

The species is clearly related to the two preceding, though larger, paler and with slenderer lines.

33. **Diplodesma ussuriaria** (Brem.) (1864).

Takao-San, 18 June 1925, 1 ♀; 14 July 1925, 1 ♀; 20 September 1925, 1 ♂; 7 July 1926, 1 ♂.

The September specimen is smaller than the others.

34. **Euchloris albocostaria** (Brem.) (1864).

Tokyo, 1 ♂, June 1925. Takao-San, 15 September 1925, 1 ♂; 7 July 1926, 2 ♂♂. Japanese Alps, July 1926, 1 ♂.

Except that the second-brood specimens are smaller, this is a very constant species.

35. **Hemistola dijuncta** (Walk.) (1861).

Takao-San, 18 June 1925, 2 ♂♂; 21 June 1925, 1 ♂.

36. **Hemistola veneta** (Butl.) (1879).

Takao-San, 14 July 1925, 1 ♂; 7 July 1926, 1 ♂.

37. **Iodis lactearia** (Linn.) (1758).

Takao-San, 14 June 1925, 1 ♂; 5 June 1926, 1 ♂; 7 July 1926, 1 ♂. Hirayama, Nindo, 5 May 1926, 2 ♂♂.

38. **Iodis putata orientalis** Wehrli (1923).

Takao-San, 14 June 1925, 1 ♂; 5 June 1926, 1 ♂; 7 July 1926, 1 ♂.

Some of the Takao-San examples of this species and the preceding are so wasted as to be scarcely determinable without anatomical research, but in any case the occurrence of both in the locality is assured.

39. **Iodis praerupta** (Butl.) (1878).

Takao-San, 21 May 1925, 1 ♂. Hirayama, Nindo, 5 May 1926, 3 ♂♂.

40. **Iodis urosticta** sp.n.

♂, 20–24 mm.; ♀, 26 mm. Palpus with 3rd joint elongate, in ♀ about 1, in ♂ over $\frac{1}{2}$. Face green. Vertex white. Abdomen above green with white spots; beneath white.——*Forewing* with R^1 generally stalked, SC^3 well beyond it, anastomosing shortly (in the ♀ connected) with C; greenish olive-grey, iridescent—especially in proximal and distal areas—with light gull-grey; markings as in *argentilineata* (Wileman, 1916); a white spot or dot on DC^3 posteriorly. ——*Hindwing* with tail moderate; as forewing, the white terminal dot on R^3 enlarged. Underside whiter.

Tokyo, April 1926, 1 ♂, type. Takao-San, 20 September 1925, 1 ♂, 1♀. Japanese Alps, July 1926, 2 ♂♂.

None of the examples is perfect, nor are the few others which I have seen in different collections; but the smaller size, and especially the different position of SC^1, as well as the locality, distinguish it readily from *argentilineata* Wileman.

41. **Iodis dentifascia** Warr. (1897).

Takao-San, 5 June 1926, 1 ♀; 7 July 1926, 3 ♀♀. Japanese Alps, July 1926, 1 ♂, 1 ♀.

42. **Comostola nympha** (Butl.) (1881).

Nikko, November 1925, 2 ♀♀. Sado I., 1–15 August 1925, 3 ♀♀. Takao-San, 21 May to 25 June 1925, 17 ♂♂; 15 September 1925, 1 ♂, 1 ♀; 9 June 1926, 2 ♂♂; 7 July 1926, 2 ♂♂; 14 July 1926, 1 ♂.

There is some little variation in the size of the cell-spots and in the extent of the red edging to the vein-spots. The September ♂ is small and vivid green and is almost exactly matched by one of 7 July; the other from the latter date is larger and worn, as is also that of 14 July, and it may well be that two generations overlap at that period, at least in favourable years.

Subfam. **STERRHINAE.**

43. **Dithecodes erasa** Warr. (1900).

Takao-San, 18 June 1925, 1 ♂, 1 ♀.

A re-examination of the type of this rare species (Nov. Zool. vii. 102), with which these specimens agree in size, etc., shows traces—especially on the

underside—of the white cell-spots which are conspicuous in them. Hence I do not now think that *vacua* Swinh. (*Tr. Ent. Soc. Lond.* 1902, p. 671) can be treated as even an aberration, much less a species.

Pylargosceles gen.n.

External characters mostly as in *Scopula* sect. *Pylarge* (hindtibia of ♂ with 2, of ♀ with 4 spurs), but with the ♂ antenna bipectinate, with slender branches, one pair to each joint, bearing long branching cilia, the hindwing with SC^2 shortly

(or very shortly) stalked. Wing-pattern more as in *Tanaotrichia* or some *Rhodostrophia*. Genitalia (text-figs.) abundantly confirming its wide separation from *Scopula* and its approximate association with the *Rhodostrophia* section. Uncus long, bilobed. Gnathos developed. Valves short, divided. Transtilla present. No true "mappa and cerata"; instead a peculiar two-pointed body-plate at the posterior end of the 8th sternite, extending half across the segment, comparable to those of the *Rhodostrophia* group ("pseudo-mappa" of Burrows, *in litt.*).

Type of the genus: *Pylargosceles steganioides* (Butl.) = *Acidalia steganioides* Butl. (1878).

To this genus will belong also "*Ptychopoda*" *limbaria* Wileman (1915), which is probably a local race (Formosan) of *steganioides*.

44. **Pylargosceles steganioides** (Butl.) (1878).

Takao-San, 19 April 1925, 1 ♀. Tokyo, 15–31 May 1926, 1 ♂.

45. **Calothysanis amata recompta** subsp.n.

On an average smaller than *a. amata* Linn. (1758), the ground-colour clearer buff, chiefly on account of the reduction or entire suppression of the grey irroration, the pink line strong, generally broad, nearly always bright (approximating to Pl. xxxviii*b* of Ridgway), often without any blackish admixture, termen generally with extended pink suffusion which is rare in *a. amata*. The scobinate flanges of the "uncus" (Pierce, *Genit. Geom. Brit.* p. 36) are more heavily armed.

Japan, Corea and Ussuri, the type from Chabarovsk, Ussuri railway, 5 July 1911 (E. Borsow), in coll. Tring. Mus.

The discovery that *comptaria* Walk. is a distinct species, differing markedly in the ♂ genitalia, has explained the extreme variability of Japanese *Calothysanis* (= *Timandra*) which was assumed in Seitz (*Macrolep.* iv. 48) and has left the true eastern race of *amata* without a name. Although it remains moderately variable, it is almost always distinguishable from the European by its reduced size and cleaner, brighter line, that of *a. amata* generally favouring Pl. xxvii centre or row *i* of Ridgway. In the Aigner collection it is only represented by two examples:

Takao-San, 21 May 1925, 1 ♂; 7 July 1926, 1 ♂.

As both of these strongly favour the ab. *effusaria* Klem. (1894) in the abnormal broadening of the pink shade, it has not been thought desirable to make either of them the type of the race.

46. **Calothysanis comptaria** (Walk.) (1862).

Takao-San, 21 May 1925, 1 ♂; 14 June 1925, 3 ♂♂; 18 June 1925, 4 ♂♂; 14 July 1925, 1 ♂; 15 September 1925, 1 ♂; 20 September 1925, 1 ♂, 2 ♀♀; 5 June 1926, 1 ♂, 1 ♀; 7 July 1926, 1 ♂. Tokyo, 4 ♀♀; June and July 1925, 1–15 May and 16–31 May 1926.

The dates point to two or three separate broods. Three out of the four specimens taken on 18 June are worn and all are of the size of the earlier specimens; those dated July and September 1925 are smaller and in good condition (that of 7 July 1926 very worn, probably a delayed specimen of the first brood) and the gap between their dates leaves ample time for another brood to feed up, although it is possible that we have here a protracted second generation. Even in the later emergences this species is well irrorated; the line is more vinaceous-rufous than pink, always mixed with black, not diffused distally, often thickened at apex; the postmedian line is usually distinct and is more sharply angled on the hindwing than in most *amata*; terminal line dull, without pink diffusion. Uncus much less blunt, its flanges quite differently shaped, branch of costa of valve much more proximal.

Range more extended than in *amata recompta*, reaching W. China. Walker's type was from "China," probably in the Shanghai district.

47. **Somatina indicataria** (Walk.) (1861).

Takao-San, 40 ♂♂, 3 ♀♀, one (a ♂) on 21 May, 1925 the majority from 14 June to 14 July. Tokyo, June 1925, 1 ♂. Kuma, Shikoku, 27 August 1925.

Variation very slight, the August specimen rather small.

48. **Problepsis superans** (Butl.) (1885).

"Japan" (without exact data), 1 ♂.

Lord Rothschild has besides only two specimens of this fine species, Yokohama, July and August (Dr. Fritze).

49. **Problepsis discophora** (Fixsen) (1887).

"*Problepsis phoebearia* Ersch." Matsumura, *Thous. Ins. Jap.*, supp. ii, t. xxvii, f. 13 (1910) (err. det.).

Takao-San, 25 June 1925, 1 ♂; 14 July 1925, 1 ♂; 9 June 1926, 2 ♂♂; 7 July 1926, 2 ♂♂.

The specimens of 1926 are fine dark forms. The sinking of this species to the preceding is incorrect. Smaller; hindtarsus of ♂ relatively a little longer; retinaculum of ♂ without defined black spot posteriorly; both wings with ocellus less extreme, the black scaling in it not nearly so continuous (in *superans* on the forewing it encircles the entire centre except anteriorly), the outer subterminal spots generally developed.

50. **Scopula cineraria** (Leech) (1897).

Hachijoshima (Fatsizio I.), 23 July 1926, 2 ♂♂, 1 ♀.

51. **Scopula impersonata** (Walk.) (1861).

Tokyo, June 1925, 1 ♂.

The specimen belongs to the form *macescens* Butl. (1879), though slightly intermediate towards name-typical *impersonata*, which was described from China (Fu-chau), but occurs among f. *macescens* on Kiushiu. I suspect the name-typical form to be a product of warmth.

52. **Scopula confusa** (Butl.) (1878).

Takao-San, 14 July 1925, 1 ♂.

53. **Scopula hanna** (Butl.) (1878).

Hachijoshima (Fatsizio I.), 23 July 1926, 1 ♀.

54. **Scopula nigropunctata subcandidata** (Walk.) (1862).

Hirayama, Nindo, 5 May 1926, 30 ♂♂. Takao-San, 2 May–14 July and 15–20 September, 73 ♂♂, 40 ♀♀.

The above series shows little variation; the few September specimens are on an average smaller, but not extreme. The following are somewhat more doubtfully placed:

Kuma, Shikoku, 27 August 1925, 1 ♀, small and apparently not very heavily dusted, but not very fresh.

Nikko, October 1925, 1 ♂; November 1925, 1 ♀. Both small and very weakly marked, possibly a third brood, but worn; perhaps an allied species.

55. **Scopula modicaria** (Leech) (1897).

Tokyo, 1–15 June 1926, 1 ♂. Takao-San, 15 September 1925, 1 ♀; 7 July 1926, 1 ♀.

56. **Scopula apicipunctata** (Christ.) (1881).

Takao-San, 14 June 1925, 1 ♂; 25 June 1925, 1 ♂, 1 ♀; 15 September 1925, 1 ♀; 9 June 1926, 1 ♀; 7 July 1926, 2 ♀♀.

The September example is small, as is also the case with the following species.

57. **Scopula superior** (Butl.) (1878).

Takao-San, 14 June 1925, 1 ♂; 15 September 1925, 1 ♂. Tokyo, June 1925, 1 ♀; 16–31 May 1926, 1 ♀.

58. **Scopula** sp.

Takao-San, 21 May 1925, 4 ♂♂, 1 ♀; 21 June 1925, 1 ♀; 14 July 1925, 1 ♀; 7 July 1926, 5 ♂♂.

Pass as a form (or forms) of *subpunctaria* H.-Sch. (1847) but probably—at least in part—wrongly. There seem to be two mixed, a larger and a smaller, among the Takao-San series, but nearly all are in poor condition, and in any case I do not care to deal with the group at present, as I believe Mr. A. M. Djakonov is making a thorough study of them, particularly as regards the Ussuri forms.

59. **Scopula superciliata** (Prout) (1913).

Takao-San, 14 June 1925, 2 ♂♂; 21 June 1925, 2 ♀♀; 15 September 1925 1 ♀; 7 July 1926, 1 ♀.

The September specimen, much smaller than the rest, shows that this species, in common with most of the Japanese *Scopula*, produces at least a partial second brood.

60. **Scopula floslactata claudata** (Prout) (1913).

Takao-San, 21 May 1925, 5 ♂♂, 3 ♀♀; 5 June 1926, 2 ♀♀. Hirayama, Nindo, 5 May 1926, 1 ♀.

61. **Scopula ignobilis** (Warr.) (1901).

Takao-San, 14 June 1925, 3 ♂♂; 18 June 1925, 1 ♀; 25 June 1925, 1 ♂; 15 September 1925, 3 ♀♀; 20 September 1925, 1 ♂, 2 ♀♀; 5 June 1926, 1 ♂; 7 July 1926, 8 ♂♂, 3 ♀♀. Sado I., 3–11 August 1926, 1 ♂. Hachijoshima (Fatsizio I.), 23 July 1926, 1 ♀. Nikko, October 1926, 1 ♀.

In addition there is an anomalous-looking ♂ from Takao-San, 15 September 1925, with the ground-colour of *ignobilis* or slightly yellower, but with the hindwing appreciably more angled than in other examples (shaped as in *nigropunctata*), the cell-dots minute, the underside weakly marked, the median shade on the forewing scarcely oblique enough for *ignobilis* (almost touching the cell-dot), thus almost impossible for any form of *nigropunctata*. Probably a new species.

62. **Scopula personata** (Prout) (1913).

Hachijoshima (Fatsizio I.), 23 July 1926, 2 ♀♀.

63. **Sterrha muricata minor** (Sterneck) (1927).

Takao-San, 15 September 1925, 1 ♀.

64. **Sterrha impexa** (Butl.) (1879).

Takao-San, 25 June 1925, 2 ♀♀; 7 July 1926, 1 ♂, 2 ♀♀; 15 September 1925, 1 ♂, 1 ♀.

Here again the second-brood specimens are considerably smaller.

65. **Sterrha foedata** (Butl.) (1879).

Tokyo, June 1925, 2 ♀♀.

66. **Sterrha nudaria infuscaria** (Leech) (1897).

Takao-San, 7 July 1926, 2 ♀♀.

67. **Sterrha invalida** (Butl.) (1879).

? Nikko, October 1926, 1 ♀. Takao-San, ? 21 May 1925, 1 ♂ (very worn); 14 June 1925, 1 ♂; 18 June 1925, 2 ♂♂, 1 ♀; 21 June 1925, 1 ♂; 25 June 1925, 1 ♂, 1 ♀; 14 July 1925, 1 ♀; 20 September 1925, 1 ♀; 5 June 1926, 3 ♂♂. Sado I., 1–15 August 1925, 2 ♀♀; 3–11 August 1926, 1 ♂. ? Hachijoshima (Fatsizio I.), 23 July 1926, 2 ♀♀.

Variable. The ♂ of 25 June is small, very worn, possibly a different species. The September ♀ is a nice dark example of ab. *lauta* Warr. (1901), and some others from Takao-San approach this form. The ♀ from Nikko is a curious aberration, rather brown and smooth-looking, the postmedian line apparently scarcely dotted on the veins (but rather worn). The Hachijoshima form is rather small, browner, heavily marked, possibly a separate species, but one Sado ♀ connects it with the more normal forms.

68. **Sterrha remissa** (Wileman) (1911).

Takao-San, 7 July 1926, 2 ♂♂, 2 ♀♀.

69. **Sterrha effusaria** (Christ.) (1881).

Takao-San, 25 June 1925, 1 ♀; 14 July 1925, 10 ♀♀; 7 July 1926, 2 ♂♂, 2 ♀♀. Japanese Alps, July 1926, 1 ♀.

70. **Sterrha trisetata** Prout (1922).

Tokyo, 9 July 1925, 1 ♀. Takao-San, 14 July, 15 and 20 September 1925, 1 ♀ on each date.

SUBFAM. **LARENTIINAE.**

71. **Xanthorhoë quadrifasiata ignobilis** (Butl.) (1881).

Nikko, October 1925, 2 ♀♀; November 1925, 2 ♀♀.

72. **Xanthorhoë saturata** (Guen.) (1858).

Takao-San, 20 September 1925, 1 ♀. Tokyo, 5–31 October 1925, 1 ♂; 20–30 November 1925, 1 ♂.

73. **Orthonama obstipata** (Fb.) (1794).

Tokyo, 15 September 1925, 1 ♂.

A fine sharply-banded aberration of this cosmopolitan species, which seems rather rare, though distributed, in Japan.

74. **Ortholitha propinguata niphonica** (Butl.) (1878).

Takao-San, 21 May–14 July, and again 15–20 September, 26 ♂♂, 16 ♀♀.

One ♂, 14 June 1925, is a striking aberration, with the median band of the forewing greatly narrowed, the postmedian line of the hindwing correspondingly displaced proximad.

75. **Colostygia grataria** (Leech) (1891).

Nikko, October 1925, 1 ♂.

76. **Coenotephria amelia** (Butl.) (1878).

Nikko, 16 June 1925, 4 ♂♂, 4 ♀♀. Takao-San, 14 April 1925, 3 ♂♂; 19 April 1925, 1 ♂, 3 ♀♀; 2 May 1926, 2 ♂♂, 3 ♀♀. Tokyo, April 1925, 11 ♂♂, 5 ♀♀. Hirayama, Nindo, 5 May 1926, 1 ♂, 1 ♀.

The series shows the usual range of variation.

This species is, I think, misplaced generically, but its actual affinities have not yet been worked out, though the remarkable, long curved spines with which it is beset near the base of the ♂ valve, together with a few other characters, suggest a probable association with *Larentia* (type *clavaria* Haw.).

77. **Coenotephria umbrifera** (Butl.) (1879).

Takao-San, 21 May 1925, 1 ♀.

78. **Coenotephria consanguinea** (Butl.) (1878).

Takao-San, 21 May 1925, 1 ♀.

The ostensible figure of this species in Matsumura (*Thous. Ins. Jap.*, supp. ii, t. xxvii, f. 26) represents *taczanowskiaria* Oberth. (1880), which in Japan is chiefly northern and was not obtained by Aigner.

79. **Perizoma taeniata saxea** (Wileman) (1911).

Nikko, October 1925, 1 ♀; November 1925, 1 ♀.

80. **Euphyia obscura obscura** (Butl.) (1878).

Takao-San, 21 May–14 July, 19 ♂♂, 20 ♀♀.

81. **Euphyia cineraria** (Butl.) (1878).

Takao-San, 5 June 1926, 2 ♂♂. Sado I., 1–15 August 1925, 1 ♀; 3–11 August 1926, 4 ♀♀.

82. **Euphyia unduliferaria unduliferaria** (Motsch.) (1860).

Asamayama, July 1926, 2 ♀♀.

The Japanese race *u. unduliferaria* is generally larger and more greyish than *u. albostrigaria* Brem. (1864) and shows several other small differences.

83. **Melanthia procellata inquinata** (Butl.) (1878).

Nikko, October 1925, 1 ♀; November 1925, 2 ♂♂, 2 ♀♀. Takao-San, 14 April–20 September, 30 ♂♂, 19 ♀♀. Sado I., 3–11 August 1926, 1 ♀.

Variable as usual, but with a strong preponderance, in the Takao-San series, of ab. *infuscata* Prout and transitions (perhaps 70 per cent.).

84. **Ecliptopera mactata mactata** (Feld.) (1875).

Nikko, October, 1925, 1 ♂; November 1925, 7 ♂♂, 7 ♀♀. Takao-San, 21 May–14 July and again 15–20 September, 18 ♂♂, 5 ♀♀. Sado I., spring, 1 ♀; August, 2 ♂♂, 1 ♀.

85. **Ecliptopera decurrens excurrens** subsp.n.

Not quite so broad and dark as *d. decurrens* Moore (1888, Himalayas), forewing less suffused with whitish between cell and tornal patch, the dark element in the latter more extended, less intense, didymate line on middle of hindmargin less extremely oblique (in *d. decurrens* nearly parallel with antemedian).

Takao-San, 14 May–14 July and 15–20 September, 18 ♂♂, 7 ♀♀. Type in coll. Tring Mus.

This is the usual Japanese form, not heretofore differentiated. Together with it, though not on the same dates, occurred an enigmatical form which I have long had separated as a provisional species.

f. **insurgens** form.n. (? sp.n.). On an average slightly larger and longer-winged, termen of forewing generally slightly more bent in middle; forewing cinnamon-brown to snuff-brown rather than fuscous, subbasal line indistinct and curved, not straight, almost always only three white lines in the postmedian group (in *decurrens* almost always four, the second from the base, however, extremely slender, rarely distinct to costa), tornal brown shade still more uniform than in *d. excurrens*; hindwing and underside generally rather paler. As the genitalia are identical and most of the distinctions more or less inconstant, I still hesitate as to its status.

Takao-San, 19 April 1925, 1 ♂; 21 May 1925, 2 ♂♂; 21 June 1925, 1 ♂; 2 May 1926, 2 ♂♂. Near Tokyo, April 1925, 1 ♀. Also from Nikko, Yokohama, 1886 (Manley) and Nagasaki, in coll. Tring Mus. and from Shinano, Minomo and Kioto in coll. Joicey. From Yokohama, whence I have selected the type, I know this form only.

86. **Ecliptopera pryeri** (Butl.) (1881).

Nikko, October 1925, 1 ♀; November 1925, 3 ♂♂, 3 ♀♀.

This is a good species, not—as previously indicated—a synonym of *E. capitata* H.-Sch. It is rather closely similar to *fastigata* Püng. (1909), though with the postmedian line not quite so acutely bent.

87. **Ecliptopera umbrosaria** (Motsch.) (1860).

Nikko, 26 June 1925, 1 ♂; October 1925, 2 ♀♀; November 1925, 1 ♂, 1 ♀. Takao-San, 2 May–14 July and again 15–20 September, 73 ♂♂, 30 ♀♀. Tokyo, 14 April 1925, 1 ♀; 18 May 1925, 1 ♀; April 1926, 1 ♂; June 1926, 1 ♂. Hachijoshima (Fatsizio I.), 23 July 1926, 3 ♀♀.

Variable in size and colouring. There are clearly two broods, possibly even three; the specimens taken up to the middle of June are nearly always more mixed with white than the later ones, particularly on the hindwing; the later, darker specimens are on an average smaller. A few, including all the three from Hachijoshima, have a rather pronounced admixture of ochreous brown on either side of the median area of the forewing. A single ♂ (Tokyo,

April 1926) has the median area of the forewing cut with white behind M, recalling the ab. *insulata* of *E. silaceata* Schiff. Differences in the ♂ genitalia and abdominal tufts show *umbrosaria* to be a good species, not—as it was treated in Seitz (*Macrolep.* iv. 250)—a race of *silaceata*.

88. **Eustroma aerosa** (Butl.) (1878).

"*Lygris testata* L. ♀" (!!) Matsumura, *Thous. Ins. Jap.*, supp. ii, t. xxix, f. 16 (1910) (err. det.).

Nikko, 1 ♀, 26 June 1925. Takao-San, 21 May 1925, 1 ♂; 14 June 1925, 1 ♀; 18 June 1925, 3 ♂♂; 15 September 1925, 1 ♂, 1 ♀; 5 June 1926, 1 ♂.

89. **Eustroma melancholica melancholica** (Butl.) (1878).

Takao-San, 21 May 1925, 1 ♀; 15 September 1925, 7 ♂♂; 2 May 1926, 3 ♂♂.

90. **Photoscotosia atrostrigata** (Brem.) (1864).

Nikko, 26 June 1925, 1 ♂; October 1925, 3 ♂♂; November 1925, 1 ♂, 19 ♀♀.

Takao-San, 5 June 1926, 1 ♀, a form or mountain race (?), dark, with median area of forewing heavily marked, distal area sufficiently darkened to bring out sharply the posterior part of the pale subterminal line.

91. **Callabraxas maculata** (Swinh.) (1894).

Sado I., spring 1926, 1 ♀.

92. **Calleulype compositata** (Guen.) (1858).

Takao-San, 14 July 1925, 1 ♂.

93. **Calleulype whitelyi** (Butl.) (1878).

Takao-San, 9 June–7 July, 14 ♂♂, 9 ♀♀.

94. **Gandaritis fixseni magnifica** (Prout) (1915)

Nikko, October 1925, 3 ♂♂, 2 ♀♀; November 1925, 11 ♂♂, 2 ♀♀. Takao-San, 14 July 1925, 2 ♂♂. Tokyo, 4 July 1925, 1 ♀.

95. **Lygris agnes agnes** (Butl.) (1878)

Takao-San, 2 June–7 July, 22 ♂♂, 8 ♀♀.

96. **Lygris ledereri** Brem. (1864).

Nikko, October 1925, 1 ♀; November 1925, 7 ♂♂, 4 ♀♀. Takao-San, 18 June 1925, 1 ♂; 21 June 1925, 2 ♂♂, 1 ♀; 14 July 1925, 1 ♂, 1 ♀; 7 July 1926, 1 ♂, 1 ♀.

97. **Lygris convergenata** Brem. (1864).

Sado I., spring 1926, 1 ♂, 1 ♀; 8–11 August 1926, 1 ♂, 7 ♀♀.

98. **Dysstroma corussaria** (Oberth.) (1880).

Nikko, November 1925, 1 ♀ (badly worn).

99. **Dysstroma japonica** Heydem. (1929).

Nikko, November 1925, 2 ♀♀.

This species is no doubt the "*Cidaria russata*" of Pryer, *Tr. As. Soc. Jap.* xii. (1) 79 (1884), but is still closer to *cinereata* Moore, with which Sterneck (and I in 1908, *Tr. City Lond. Ent. Soc.* xvii. 58) confused it. See *Mitt. Münchn. Ent. Ges.* xix. 228 for Heydemann's good description and figures.

100. **Dysstroma citrata citrata** (Linn.) (1761).

Nikko, 26 June 1925, 1 ♂; November 1925, 1 ♀.

Dr. Heydemann in his excellent monograph on Old-World *Dysstroma* (*Mitt. Münchn. Ent. Ges.* xix. 207–292) regards the Japanese *citrata* as "rather large, but otherwise differing so little from Central European specimens that their separation does not seem warranted. The range of variation is the same" (*loc. cit.*, p. 271). The Aigner specimens are not large, though that distinction will hold for a fairly high percentage of Japanese material. I am inclined to think that in other respects a racial separation will ultimately be found justified, as the *ensemble* of characters produces an impression which, to the eye accustomed to the European forms, is nearly always distinctive. The hindwing above is generally a shade darker and more unicolorous, the forewing often has the cell-dot more elongate, the proximal brown band is nearly always narrow, except posteriorly, the antemedian rarely much bent, the median area broad, generally with its distal prong elongate (recalling that of *dentifera* Warr., 1896), and showing a very frequent tendency (except, of course, in the wholly black-banded forms) to produce a dusky suffusion from the antemedian band in the posterior part of the cell. All these points, however, are very subtle and more or less inconstant, and will need verification on much larger material than is yet accessible to me. The Nikko ♂ belongs to the black-banded ab. *strigulata* Fab. (1794) = *immanata* Haw. (1809), the ♀ approaches the form which Lange (*Iris* xxxv, t. i, f. 19) figures as "*immanata* (Typus)," presumably a lapse for "*citrata* (Typus)," since it is recognized on p. 150 and t. i, f. 22, 23 that the black-banded is ab. *immanata*.

101. **Thera postalbida** (Wileman) (1911).

Nikko, November 1925, 1 ♂. Takao-San, 21 May 1925, 1 ♀. Tokyo, 16–31 May 1926, 2 ♂♂, 3 ♀♀.

102. **Thera comis** (Butl.) (1879).

Nikko, November 1925, 4 ♂♂. Tokyo, 20–30 November 1925, 1 ♀.

All the specimens are very wasted, showing that the period of emergence was past.

103. **Calocalpe excultata** (Christ.) (1881).

Takao-San, 14 April 1925, 1 ♂.

The specimen is an aberration with the central band of the forewing narrowed, between M^2 and the fold interrupted.

104. **Telenomeuta punctimarginaria** (Leech) (1891).

Nikko, 2 May 1926, 1 ♂. Takao-San, 21 May 1925, 2 ♂♂; 14 July 1925, 5 ♂♂, 2 ♀♀; 5 June 1926, 2 ♂♂; 7 July 1926, 2 ♂♂. Tokyo, July 1925, 1 ♂.

Triphosa inconspicua Bastelb., *Ent. Zeit.* (Stuttgart) xxiii. 77, from Formosa, is synonymous with this.

105. **Loxofidonia hortensiaria** (Graes.) (1890).

Tokyo, 1–15 April 1926, 1 ♂; 16–30 April 1926, 1 ♀.

This species is wrongly placed with *Xanthorhoë* in Seitz (*Macrolep.* iv. 223), its close resemblance to some of the species in that genus having apparently led to the untested assumption that the venation would support this resemblance. Only recently, when I was determining Chinese material for Dr. Sterneck, was the error discovered (see *Iris*, xlii. 155).

106. **Loxofidonia muscicapata** (Christ.) (1881).

Nikko, October 1925, 1 ♂; November 1925, 2 ♂♂. Takao-San, 21 May 1925, 1 ♂; 14 July 1925, 1 ♂; 20 September 1925, 2 ♂♂.

Unlike its Indian representative *obfuscata* Warr. (1893), this species seems to vary very little; Aigner's seven ♂♂, as well as the eight examples ("Japan") previously in the Tring Museum, are, apart from the slight sexual dimorphism which is prevalent in the *Xanthorhoë* group, very constant.

107. **Epirrhoë supergressa** (Butl.) (1879).

Takao-San, 21 May 1925, 3 ♂♂; 14 July 1925, 1 ♂, 1 ♀; 20 September 1925, 1 ♀; 7 July 1926, 1 ♂.

108. **Epirrhoë placida** (Butl.) (1878).

Sado I., 1–15 August 1925, 1 ♀; 3–11 August 1926, 1 ♂.

Both examples are a modification of ab. *propinqua* Butl. (1881) with the lines which form the central band rather less heavy and confluent than in the common form figured in Seitz, pl. 8e.

As noted in Seitz (*Macrolep.* iv. 258), this species has evidently no near relationship with true *Epirrhoë*, notwithstanding the venational identity. More probably it may belong in the *Callabraxas* group, but pending a further revision I have abstained from erecting a new genus for it; *Epirrhoë* (sens. lat.) still contains some other more or less dissonant elements.

109. **Epirrhoë evanescens** (Butl.) (1881).

Takao-San, 18 June 1925, 1 ♂.

This is obviously a separate species, as the distinctions in the markings are constant and include, in addition to those noted in Seitz (p. 258, as *placida* ab. *evanescens*), the development of a single solid (though often interrupted at M^1) postmedian band of the hindwing, whereas that of *placida* is almost invariably double or only partially fused into one, and a rather clearer white tone. The mimicry of *Abraxas* is much more manifest in it than in the preceding species.

110. **Baptria tibiale** (Esp.) (1791).

Takao-San, 2 June 1926, 1 ♂.

111. **Eulype hecate** (Butl.) (1878).

Asamayama, July 1926, 3 ♂♂.

112. **Horisme (Pseudocollix) minuta** (Butl.) (1881).

Takao-San, 5 June 1926, 1 ♂.

Whatever may be the correct generic location of this rare or overlooked species, it and the others listed under *Pseudosterrha* are certainly not *Collix* (cf. Prout, *Ins. Samoa*, iii (3) 132). In spite of the *Collix*-like underside of *minuta*, they have more in common with *Horisme* Hb. (= the "*Eucymatoge* Hb." of Meyrick, "*Phibalapteryx* Steph." of Hampson), and as that is, in its comprehensive sense, a nearly cosmopolitan genus, they may stand there, pending further research. Only *sparsata* Hb. ("*Collix* Guen." of Meyrick, overlooking Guenée's own notes, *Spec. Gén. Lép.* x, 358) appears to be sui generis.

113. **Horisme tersata chinensis** (Leech) (1897).

Nikko, 26 June 1925, 1 ♀. Takao-San, 21 May 1925, 4 ♂♂ (wasted); 15 September 1925, 1 ♀ (smaller).

114. **Horisme stratata** (Wileman) (1911).

Nikko, November 1925, 3 ♂♂.

Apparently a rather scarce species; previously only represented in the Tring Museum by a ♀ from Oiwake, October 1886 (Leech).

115. **Eupithecia rufescens** Butl. (1878).

Takao-San, 18 June 1925, 1 ♀; 5 June 1925, 1 ♀; 9 June 1925, 1 ♀.

116. **Eupithecia subicterata** sp.n.

♀, 28 mm. Comparable to the greyest forms of *icterata* Vill. (1789) in which the brown admixture is not very bright (appearing pinkish-cinnamon or pinkish-buff rather than apricot-buff) and almost confined to the triangular area at end of M and along R^3–M^1. Palpus rather longer (nearly 2).——*Forewing* with cell-mark rather longer than in most *icterata*, postmedian heavier, with its angle at R^3 instead of R^2, posteriorly inclining a little more towards tornus and with a more noticeable curve outward between fold and SM^2, black longitudinal dashes along fold sharp, though extremely fine.——*Hindwing* with termen slightly less convex than in *icterata*, markings rather stronger, cell-dot larger.——Underside sharply marked.

Takao-San, 2 May 1926, the type ♀ only.

A ♀ (?), slightly less sharply marked (or perhaps less fresh), is figured by Dietze, *Biol. Exp.*, t. 79, f. 862, but not named; the explanation of the plate merely gives "? n.sp., Japan. Färbung ähnlich *subfulvata*. Original in Kgl. Naturalien-Kabinett, Stuttgart."

117. **Eupithecia sophia** Butl. (1878).

Takao-San, 21 May 1925, 1 ♂; 20 September 1925, 1 ♀.
Both are rather small and short-winged.

118. **Eupithecia addictata** Dietze (1908) (?).

Takao-San, 20 September 1925, 3 ♂♂.

As Dietze has remarked (*Iris*, xxi. 195), Eastern Asia seems to hold a perfect "nest-full" of small species, superficially alike, in the *selinata* (H.-Sch., 1861) group. It is therefore highly inexpedient to add to them on the strength of a single good specimen (two are badly worn), at least until I have been able to study Dietze's own material. In most respects the Aigner specimen tallies with the description and figures of *addictata*, but it is as greasy-looking and strongly spotted costally as *selinata* and its appreciably shorter palpus makes one think of *tenebricosa* Dietze (1910), which, however, should have bisinuate postmedian line on the hindwing and apparently a longer termen to the forewing—that of the Takao-San examples being, if either, *shorter* than in *selinata* and *addictata*.

119. **Eupithecia tripunctaria** H.-Sch. (1851).

Takao-San, 15 September 1925, 1 ♀.

I think new for Japan, though well known from Amurland. The specimen is worn and the record may need confirmation.

120. **Eupithecia mandschurica** Stgr. (1897) (?).

Sado I., 1–15 August 1925, 1 ♂, 5 ♀♀; 3–11 August 1926, 6 ♀♀.

A series of *absinthiata*-like forms, mostly in poor condition. The only ♂ (body and forewings only) is small but has, so far as can be made out without dissection, a body-plate like that of *absinthiata*. I am not aware that any anatomical work has yet been undertaken to test the status of *mandschurica*, which was published as a form of *absinthiata* and afterwards separated.

121. **Eupithecia** sp.

Takao-San, 21 May 1925, 1 ♂.

Worn. The divided body-plate suggests affinity with *castigata* Hb. (1808–14) and the markings may have been somewhat similar, but the wings are a little narrower. It does not particularly resemble the figures of *assuriensis* Dietze (1910).

122. **Eupithecia** sp.

Nikko, November 1925, 1 ♀.

Very worn. The tone and fine markings suggest, in its present condition, *parallelaria* Bohatsch (1893); smaller, less extremely elongate, the termen of the hindwing subconcave between R^1 and R^3 or M^1 and with a conspicuous cell-dot. Recalls also the figure of *detritata* Stgr. (*Iris*, x. t. iii, f. 77), except that the postmedian line is much more distal, on the forewing passing midway between cell-dot and termen,

123. **Eupithecia** sp.

Takao-San, 15 September 1925, 1 ♂.

Worn, rather recalling *virgaureata* Dbld. (1861), but with more nearly the structure of *selinata* H.-Sch., perhaps belonging to that group.

124. **Chloroclystis consueta** (Butl.) (1879).

Tokyo, 18 May 1925, 1 ♀

A rather large form, agreeing well with a ♂ from the same locality (Dr. Fritze, 1890) in the Tring Museum.

125. **Chloroclystis coronata lucinda** (Butl.) (1879).

Takao-San, 9 June 1926, 1 ♀; 7 July 1926, 1 ♂.

126. **Chloroclystis (Rhinoprora) excisa** (Butl.) (1878).

Takao-San, 2 May 1926, 1 ♂. Sado I., 1–15 August 1925, 1 ♀; 3–11 August 1926, 2 ♂♂, 3 ♀♀.

127. **Brabira artemidora** (Oberth.) (1884).

Nikko, 26 June 1925, 1 ♂. Sado I., 3–11 August 1926, 1 ♂.

128. **Microloba bella bella** (Butl.) (1878).

Takao-San, 21 May–14 July, 10 ♂♂, 4 ♀♀; 15 September 1925, 1 ♂. Hachijoshima (Fatsizio I.), 23 July 1926, 1 ♂.

129. **Heterophleps fusca** (Butl.) (1878).

Takao-San, 9 June 1926, 1 ♀.

Worn and presenting rather a strange appearance, in some respects recalling an unnamed Chinese species, but probably an example of the not very rare aberration of *fusca* in which the subterminal costal spot of the forewing is absent.

130. **Carige irrorata** Butl. (1879).

Takao-San, 14 June 1925, 1 ♀; 14 September 1925, 1 ♂, 20 September 1925, 1 ♂, 5 ♀♀.

It has not yet been definitely proved that this is anything more than a very stable dimorphic form of *cruciplaga* Walk., which—as I have recently pointed out, NOV. ZOOL. XXXV. 143—is probably of Japanese origin. The shape of the wings, however, though slightly variable, is nearly always more extreme in *crueiplaga* than in *irrorata*, the antemedian line of the forewing rather more sinous, and these distinctions, added to the difference in maculation, renders it extremely probable that we have to deal with two species. *C. absorpta* Warr. (1899) is synonymous with *irrorata*, though the selected type-specimen was a rather extreme form (ab.).

131. **Carige cruciplaga cruciplaga** (Walk.) (1861).

Semiothisa (*Carige*) *cruciplaga* Matsumura, *Thous. Ins. Jap.*, Supp. ii, t. xxiv, f. 20 (1911).

Takao-San, 18 June 1925, 1 ♂; 25 June 1925, 1 ♂.

A curious greyish (heavily irrorated) form with rather elongate forewing, bearing rather pronounced dark markings distally to the subterminal, beginning to recall *extremaria* Leech (1897), which is, however, a distinct species.

132. **Naxidia maculata** (Butl.) (1879).

Takao-San, 18 June 1925, 1 ♀.

133. **Trichopterigia volitans** (Butl.) (1878).

Near Tokyo, April 1925, 3 ♀♀.

134. **Nothopteryx obscuraria** (Leech) (1891).

Takao-San, 21 May 1925, 1 ♂; 14 June 1925, 2 ♂♂; 9 June 1926, 2 ♀♀.

135. **Nothopteryx hemana** (Butl.) (1878).

Nikko, 26 June 1925, 2 ♀♀. Takao-San, 14 July 1925, 1 ♀; 2 May 1926, 2 ♀♀. Near Tokyo, April 1925, 1 ♂; 16–30 April 1926, 1 ♂; 15–31 May 1926, 1 ♂.

136. **Nothopteryx terranea** (Butl.) (1879).

Takao-San, 2 May 1926, 3 ♂♂, 3 ♀♀.

137. **Nothopteryx misera** (Butl.) (1879).

Near Tokyo, April 1925, 1 ♀.

138. **Otoplecta frigida** (Butl.) (1879).

Nikko, 2 May 1926, 1 ♂.

139. **Sauris nanaria** Leech (1897).

Takao-San, 25 June 1925, 1 ♂; 7 July 1926, 1 ♂, 1 ♀.

It has not hitherto been pointed out that this species, which was accidentally omitted from Seitz, vol. iv, is closely related to *subalba* Hmpsn. (1895), the Indian form or representative of *cupithecciata* Snell. (1881, Celebes).

140. **Oporinia mediolineata** (Prout) (1914).

Nikko, 26 June 1925, 7 ♂♂; 2 May 1926, 1 ♂.

Basing it on a single ♀ from Owakidana, I overlooked the affinities of this species and placed it in *Cidaria* (*Coenotephria*). Subsequently Mr. Joicey received a series, mostly ♂♂, from the Kyoto-Osaka district, collected in the middle of November, and I transferred it to *Oporinia*, which is approximately correct, although the discocellulars of the fore-, as well as of the hindwing, are biangulate. I suspect some error in dating the Nikko specimens of this, *Operophtera brumata* and some others.

141. **Operophtera relegata** Prout (1908).

Tokyo, December 1925, 1 ♂.

142. **Operophtera brumata** (Linn.) (1758).

Nikko, 26 June 1925, 1 ♂.

143. **Asthena amurensis** (Stgr.) (1897).

Sado I., 1–15 August 1925, 1 ♂; 3–11 August 1926, 4 ♂♂.

Attention should be called to an important note by Djakonov (*J.B. Mart. Staatsmus. Minussinsk.* iv. (1) 47), showing this to be a valid species. Typically, *amurensis* should have cell-dots, which are not present in the Sado I. specimens. They are therefore presumably a race or still another closely allied species. In any case they are not *nymphaeata* Stgr. (1897), by the less projecting antennal joints, short ciliation and apparently the genitalia.

144. **Asthena anseraria corculina** Butl. (1878).

Takao-San, 21 May 1925, 2 ♂♂; 14 June 1925, 1 ♂, 1 ♀; 18 June 1925, 2 ♀♀; 20 September 1925, 1 ♀. Sado I., 1–15 August 1925, 1 ♂, 1 ♀.

To the differentiation of this race, as given in Seitz, *Macrolep.* iv. 272, should be added that this is the "var. ?" noted by Staudinger (*Iris*, x. 98) in his article on the "Geometridae of Amurland," with the terminal dots not strigiform.

145. **Asthena nymphaeata** (Stgr.) (1897).

Takao-San, 21 May 1925, 7 ♂♂, 1 ♀; 14 June 1925, 1 ♂, 2 ♀♀; 18 June 1925, 1 ♂; 15 September 1925, 1 ♀. Sado I., 1–15 August 1925, 3 ♂♂, 8 ♀♀; spring 1926, 1 ♂; 3–11 August 1926, 1 ♂, 1 ♀.

Some of the ♀♀ enumerated above may belong to the Japanese race (?) of *amurensis* (*supra*), which I confess I can at present only distinguish by ♂ characters.

146. **Asthena ochrifasciaria** Leech (1897).

Takao-San, 21 June 1925, 1 ♂; 9 June 1926, 2 ♂♂; 7 July 1926, 1 ♀.

147. **Laciniodes unistirpis** (Butl.) (1878).

Takao-San, 21 May–14 June, 27 ♂♂, 4 ♀; 7 July 1926, 1 ♂ (worn); 20 September 1925, 2 ♀♀.

The September specimens are not noticeably smaller, but both have the dark subterminal shade of the forewing unusually heavy. On the whole the series shows very little variation, and the same is true of the rest of the Japanese material known to me. Presumably *unistirpis* is the E. Asiatic race of *purilinearia* Moore (1867) from the Himalayas, but as I find there are two or three apparent species in that region and W. China, it is not safe to attach *unistirpis* definitely to any particular one until a revision of the group has been undertaken.

148. **Hydrelia adesma** sp.n.

♂♀, 18–20 mm. Extremely similar to *nisaria* Christ., but slightly rounder-winged and markedly more suffused, with the cell-dots weakened, presenting a more uniform appearance of greyish drab. Antennal ciliation of the ♂ less minute, on the broad proximal segments about ½, on the narrower distal ones about ¼. Very readily distinguished in both sexes by having the normal hindwing venation of *Hydrelia*, with M^1 arising well separate from R^3, while in *nisaria* these veins are rather strongly stalked.

Takao-San, 5 June 1926, ♂ type; 7 July 1926, 1 ♀.

A ♂ from "Japan," determined by Warren as *nisaria*, has stood in the Tring Museum over a blank label and I find, on examination of the British Museum series of ostensible *nisaria*, a ♂ from Gensan (Corea), a ♂ from Yezo and a ♀ from Hakodate. The species will doubtless be found in other collections mixed with *nisaria*.

149. **Hydrelia nisaria** (Christ.) (1881).

Takao-San, 2 May 1926, 1 ♂; 5 June 1926, 1 ♂.

150. **Venusia (Discoloxia) phasma** (Butl.) (1879).

Nikko, October 1925, 1 ♀; November 1925, 9 ♂♂, 16 ♀♀. Takao-San, 15 September 1925, 2 ♂♂; 20 September 1925, 15 ♂♂, 7 ♀♀; 9 June 1926, 1 ♂.

The June specimen is worn, but so are most of the Nikko ♂♂ and several ♀♀. Leech took the species at Nikko in September and at Hakodate in August, but specimens from Gensan, Corea, are dated July.

I accept the view of Forbes (*Journ. N. Y. Ent. Soc.* xxv. 60) that *Discoloxia* is nothing more than a non-pectinate subgenus of *Venusia*.

151. **Eschatarchia lineata** Warr. (1894).

Takao-San, 21 May 1925, 7 ♂♂; 14 June 1925, 2 ♂♂; 25 June 1925, 1 ♂; 5 June 1926, 2 ♂♂, 1 ♀; 9 June 1926, 1 ♂.

Apparently a very local species; the Tring Museum previously possessed only the type ♂ ("Japan") and one ♀ from Gifu.

Palpoctenidia (Warr. MS.) gen.n.

Face smooth. Palpus slender, rather short, terminal joint distinct. Tongue developed. Antenna in ♂ bipectinate, in ♀ simple. Hindtibia with all spurs. Wings smoothly scaled; ♂ retinaculum a broad bar.——*Forewing* with termen rounded; cell not quite $\frac{1}{2}$, DC normally curved; $SC^{1,5,2,3,4}$ stalked, R^1 separate, R^2 normal, M^1 separate.——*Hindwing* with abdominal margin fairly long, termen bluntly angled at R^3; cell $\frac{1}{3}$ or $\frac{2}{5}$, DC straightish, oblique; C anastomosing with cell to rather beyond middle; SC^2 very shortly stalked, R^1 slightly before middle, M^1 well separate.

Type of the genus: *Palpoctenidia phoenicosoma* (Swinh.) = *Chrysocraspeda phoenicosoma* Swinh. (1895).

Differs essentially from *Chrysocraspeda* in the Larentiine (or Asthenine) anastomosis of C of the hindwing; from *Cambogia*, to which Hampson (*Faun. Ind., Moths*, iv. 561) transferred it, in that SC^5 of the forewing arises before SC^5 and M^1 of the hindwing is well separate from R^3.

152. **Palpoctenidia phoenicosoma** (Swinh.) (1895).

Takao-San, 7 July 1926.

New for Japan, probably a separable race, or even a distinct though closely allied species, as the specimen is rather broad-winged and pale, the postmedian, especially on the hindwing, with its central projection less developed. The name-typical form is fairly common in the Khasis and is also known to me from Gopaldhara, Sikkim.

153. **Hastina azela azela** (Butl.) (1878).

Takao-San, 14 July 1925, 1 ♀; 18 July 1925, 1 ♀.

SUBFAM. **GEOMETRINAE.**

154. **Arichanna tetrica** (Butl.) (1878).

Nikko, 26 June 1925, 2 ♂♂, 2 ♀♀. Takao-San, 14 April 1925, 1 ♂; 19 April 1925, 1 ♀; 21 May 1925, 1 ♀; 2 May 1926, 1 ♀.

155. **Arichanna jaguararia gaschkevitchii** (Motsch.) (1860).

Asamayama, June 1926, 1 ♀. Ikako, Central Hondo, 25 July 1926, 2 ♂♂. Takao-San, 21 June 1925, 1 ♂; 25 June 1925, 1 ♂; 14 July 1925, 2 ♂♂; 5 June 1926, 1 ♂; 18 June 1926, 1 ♀. Japanese Alps, June 1926, 3 ♂♂. Sado I. 1–15 August 1925, 1 ♂, 6 ♀♀; spring 1926, 1 ♂; 3–11 August 1926, 2 ♀♀.

The Japanese race is whiter than the Chinese *j. jaguararia* Guen., generally with heavier maculation.

156. **Metabraxas clerica** Butl. (1881).

Tokyo, 16–31 May 1926, 1 ♂. Sado I., 1–15 August 1925, 8 ♂♂, 2 ♀♀; 3–11 August 1926, 4 ♂♂.

157. **Dilophodes elegans elegans** (Butl.) (1878).

Takao-San, 21 May–25 June, 8 ♂♂, 3 ♀♀; 15 September 1925, 1 ♀.

The September specimen is small.

158. **Percnia albinigrata** Warr. (1896).

Takao-San, 21 May–7 July, 54 ♂♂, 10 ♀♀.

Presumably abundant locally, as is the case with so many of the *Abraxas* group. The Tring Museum previously possessed, in addition to Warren's type, only four Asamayama and four Yokohama examples and a short series from different localities in W. China and from Ichang. The variation is only slight, but the accession of this splendid series brings out clearly that the Japanese forms (or at least those from the mountains—the four from Yokohama and Wileman's material are more equivocal) have the black spots more strongly developed than the Chinese, so that the latter may probably be found worthy of a subspecific name. *Arichanna jaguararia* and *Dilophodes elegans* show the same tendency in Japan. *P.* "*felinaria*" (!) *formosana* Mats. (*Thous. Ins. Jap.*, supp. ii. t. xxvi. f. 8) is apparently a somewhat intermediate specimen of *albinigrata*; I do not know the species from Formosa.

159. **Percnia giraffata** (Guen.) (1858).

Takao-San, 14 April 1925, 2 ♂♂; 5 June–7 July, 36 ♂♂. Kuma Shikoyu, 27 August 1925, 1 ♀.

The Takao-San series is very constant. The ♀ has the markings enlarged, partly confluent, notably the cell-spot of the forewing with the central post-medians. The enlargement of the cell-spot is in a measure characteristic of the sex (compare Felder's type of "*grandaria*," t. cxxix. 28), but this Kuma Shikoyu specimen is much more extreme.

160. **Culcula panterinaria sychnospilas** subsp.n.

"*Perenia exanthemata* Moore," Wileman, *Tr. Ent. Soc. Lond.* 1911, p. 318 (1911) (Japan).

Very variable and often extremely asymmetrical in the median area of the forewing, in these respects agreeing with all the races, or at least with those from China. Yet differentiable by the general copiousness and heaviness of the markings, especially by the complete or almost complete postmedian of both wings. Nearest in all respects to *p. abraxata* Leech (*Tr. Ent. Soc. Lond.* 1889, p. 143, t. ix, f. 14), but with the yellow line or band of the hind-, as well as of the forewing continued, uninterruptedly or interruptedly, to the costa, very generally accompanied by apical dark spots, the black clouding at tornus increased, central inner-marginal spot almost invariably well developed, costa of forewing often darkened, abdomen heavily clouded above.

Sado I., 1–15 August 1925, 14 ♂♂, including the type. Takao-San, 18 June 1925, 1 ♂; 21 June 1925, 1 ♂; 7 July 1926, 4 ♂♂. Also in coll. Wileman from Yamato and Kiushiu (Hyuga) and in coll. Joicey from Takao and Mt. Kurama near Kyoto.

Unfortunately I have not seen name-typical *panterinaria* Brem. & Grey (1853), from Pekin, and erroneously figured *p. exanthemata* Moore (1888), from the Himalayas, as Palaearctic (Seitz, *Macrolep.* iv, t. 14 f.).

161. **Cystidia stratonice** (Stoll) (1782).

Asamayama, July 1926, 1 ♂, 1 ♀. Ikaho, Central Hondo, 25 July 1926, 1 ♀. Takao-San, 25 June 1925, 2 ♂♂. Tamagawa, W. of Tokyo, 25 June 1926, 1 ♂. Tokyo, July 1925, 1 ♂.

162. **Cystidia couaggaria** (Guen.) (1858).

Asamayama, July 1926, 1 ♂. Ikaho, Central Hondo, 25 July 1926, 1 ♂. Takao-San, 25 June 1925, 2 ♂♂; 14 July 1925, 1 ♂; 9 June 1926, 1 ♂, 1 ♀. Tokyo, June 1925, 3 ♂♂; July 1925, 2 ♂♂, 1 ♀.

163. **Abraxas latifasciata** Warr. (1894).

The Japanese *Abraxas* of the *miranda* group are still in great need of revision and little can at present be said concerning the long Aigner series except that it will add some useful material for investigation whenever such revision may be found possible. It seems fairly evident, however, that *latifasciata* is not, as it was made to appear in Seitz (*Macrolep.* iv. 311), a form of *miranda* Butl., seeing that in the last named the ♂ hindwing has a costal protuberance near the base which is scarcely even adumbrated in *latifasciata*. On the basis of this distinction it has become possible to catalogue roughly the material, although there may still be a further mixture, and in any case the placing of some ♀♀ is precarious.

Nikko, October 1925, 1 ♂.

Not extremely small; rather heavily marked.

? Asamayama, July 1926, 1 ♀.

The large, broad midcostal spot (cell-spot) of the forewing and some strong maculation between the postmedian and the terminal series of the hindwing

give this a strange, at first glance rather *miranda*-like, appearance. Perhaps it is a new species, but it is difficult to deal with a single ♀.

Takao-San, 21 May 1925, 9 ♂♂, 1 ♀; 14 June 1925, 1 ♂; 18 June 1925, 1 ♂, 2 ♀♀ (and see *fulvobasalis*, *infra*); ? 20 September 1925, 1 ♀ (transitional towards *miranda*); ? 2 June 1926, 1 ♀ (large, clean, transitional towards [form. ?] *fulvobasalis*). Tokyo, April 1925, 1 ♂; 18 May 1925, 2 ♂♂, 3 ♀♀; June 1925, 2 ♀♀; 16–31 May 1926, 4 ♀♀.

Moderately strongly variable, both in size and maculation; several examples have the basal patch almost as bright as in *fulvobasalis*, which will probably prove to be a form of the same species.

Sado I, 1–15 August, 1925, 2 ♀♀.

Presumably a second (or third ?) brood, rather small, not quite so *fulvobasalis* like as the following specimen, but helping to connect that with normal *latifasciata*.

? Corea: Kikai Nojo, 19 August 1926, 1 ♀.

A very small (32 mm.) late-brood form of the *latifasciata* series, not quite clean and bright enough for (form. ?) *fulvobasalis*, though tending in that direction.

164. **Abraxas fulvobasalis** Warr. (1894).

Takao-San, 18 June 1925, 1 ♀.

Very similar to typical *fulvobasalis*, but with the basal patch of the forewing not quite so free from blackish admixture, median spots developed behind M. If *fulvobasalis* (Yezo) is really a separate species, concerning which I have already expressed my doubts, it may well be that the present specimen should remain with the preceding series as a very extreme ab.

165. **Abraxas miranda** Butl. (1878).

Takao-San, 14 May 1925, 1 ♀; 21 May 1925, 6 ♂♂. Tokyo, 15–31 May 1926, 1 ♂.

The female is considerably larger than the rest of the series, more creamy, postmedian of forewing more broken into irregular pairs of vein-spots, cell-spot large, broad, with irregular projections proximad; hindwing with median series more band-like, postmedian pairs more widely sundered. It is so different from the rest as to be hard to reconcile, though a series of undoubted *miranda* already in the Tring Museum shows intergrades with *deminuta* Warr. (1894), which I now consider a probable form of *miranda* and to which I refer Aigner's seven males. One of the Takao-San is banded, closely analogous to *continuata* Warr. (NOV. ZOOL. x. 269, as *sylvata* ab. !), which was founded on a ♀, but seems to be an ab. of *latifasciata*, not of the present species.

166. **Ligdia japonaria** Leech (1897).

Takao-San, 14 June 1925, 2 ♂♂; 18 June 1925, 5 ♂♂; 5 June 1926, 1 ♂; 7 July 1926, 2 ♂♂.

167. **Bapta** (?) **simplicior** (Butl.) (1881.

Nikko, October 1925, 3 ♂♂, 1 ♀; November 1925, 6 ♂♂, 9 ♀♀. Takao-San, 9 June 1925, 1 ♂, 1 ♀; 20 September 1925, 1 ♂.

168. **Bapta bimaculata subnotata** Warr. (1895).

Takao-San, 5 June–14 July, 44 ♂♂, 7 ♀♀. Sado I., 1–15 August, 9 ♂♂, 2 ♀♀. Mostly much worn.

169. **Bapta temerata** (Schiff.) (1775).

Takao-San, 21 May 1925, 7 ♂♂, 3 ♀♀; 18 June 1925, 1 ♂, 2 ♀♀; 21 June 1925, 2 ♂♂, 2 ♀♀; 25 June 1925, 1 ♂; 5 June 1926, 2 ♂♂; 7 July 1926, 1 ♀. Sado I., 1–15 August 1925, 7 ♂♂, 2 ♀♀; 3–11 August 1926, 2 ♂♂.

Rather strongly variable in the heaviness of the bands.

170. **Bapta foedata** (Butl.) (1879).

Takao-San, 21 May 1925, 3 ♂♂; 14 June 1925, 1 ♀; 5 June 1926, 1 ♂; 9 June 1926, 1 ♀.

171. **Crypsicometa incertaria** (Leech) (1891).

Sado I., 1–15 August 1925, 1 ♂.

172. **Parabapta clarissa** (Butl.) (1878).

Hirayama, Nindo, 5 May 1926, 3 ♂♂. Takao-San, 19 April 1925, 1 ♂; 21 May–25 June, 35 ♂♂, 19 ♀♀.

173. **Peratophyga hyalinata grata** (Butl.) (1879).

Takao-San, 14 June 1925, 1 ♂

The name-typical, Himalayan race of this species (*hyalinata* Koll., 1844 = *aerata* Moore, 1867) is so variable that it is not easy to discriminate the very similar, though less variable, *grata* Butl. of Japan. As, however, the moderately trained eye can nearly always pick it out, I consider that it was premature to sink the latter (Hampson, *Faun. Ind., Moths*, iii. 164; Prout in Seitz, *Macrolep.* iv. 316). The tone is rather different (less ochreous), the proximal edge of the median area of the forewing generally less sinuous, the distal edge with its central tooth smaller and more pointed, the pale mid-subterminal spot not or little developed, etc. The Chinese race *totifasciata* Wehrli (1923) is in general more distinct from both the above than they are from one another.

174. **Lomographa hyriaria** (Warr.) (1894).

Takao-San, 21 May 1925, 1 ♂; 14 June 1925, 1 ♂; 18 June 1925, 5 ♂♂; 21 June 1925, 1 ♂, 1 ♀; 25 June 1925, 1 ♀; 14 July 1925, 1 ♀; 9 June 1926, 1 ♂; 7 July 1926, 1 ♂, 3 ♀♀.

Warren (Nov. Zool. i. 406) only gave his type locality as "Japan" and some of the specimens were only so labelled; but the holotype and two others were from Nagasaki, May 1886 (Leech). The species, however, seems everywhere very constant.

175. **Lomographa (Ingena) deletaria hypotaenia** subsp.n.

♂, 37–39 mm. Larger than name-typical *deletaria* Moore (1888) from Sikkim and the Khasis. Darker, the prevailing tone brownish drab to benzo-

brown ; the pale parts less ochreous (pale cream-buff), the apical patch of the forewing standing out sharply. Underside much less weakly marked than in *d. deletaria*, both wings with strong cell-spot and postmedian, the latter generally broad, band-like.

Takao-San, 5 June 1926, 1 ♂ ; 9 June 1926, 3 ♂♂, including the type.

Moore (*Lep. Coll. Atk.* 261), with his good eye for species, recognized that there were two in the present group and named them " *Macaria* " *deletaria* and *indistincta*. But he failed to notice—or at least did not mention—a structural difference, and thus left the way open for Hampson (1895) to sink the latter to the former ; *deletaria*, but not *indistincta*, has the hindtibia dilated, with a fuscous hair-pencil, the correlated abdominal spine developed. Hampson was further at sea in placing the species in *Bapta* and especially in assigning it to " Sect. I " (*Leucetaera*). It is by his key a *Lomographa* (= *Stegania*), SC^5 being absent (coincident with SC^3), SC^4 arising from the cell. *Chrostobapta* Warr. (1909), erected for this group, must in any case sink to *Ingena* Walk. (1862). Wileman (*Tr. Ent. Soc. Lond.* 1911, p. 298) first recorded " *deletaria* " from Japan, having obtained three specimens from Yoshino, Yamato, August and September. He says that they " are referable to *indistincta* Moore," which clearly implies that he accorded to the latter the status of an aberration rather than—as in Hampson—a synonym. As a matter of fact *d. hypotaenia* has nearly the coloration of typical *indistincta*. An inspection of the Wileman collection shows that the Yamato specimens agree accurately with the Takao-San. A further ♀, rather faded (Satsuma, J. H. Leech), stands in the British Museum collection.

176. **Ninodes splendens** Butl. (1878).

Takao-San, 21 May 1925, 1 ♂ ; 9 June 1925, 1 ♂, 1 ♀ ; 14 June 1925, 1 ♂ ; 18 June 1925, 1 ♀ ; 9 June 1926, 1 ♂.

177. **Pogonitis cumulata** Christ. (1881).

Takao-San, 9 June 1926, 1 ♀.

178. **Cabera purus** (Butl.) (1878).

Hirayama, Nindo, 5 May 1926, 5 ♂♂. Takao-San, 21 May 1925, 1 ♂ ; 9 June 1926, 1 ♂. Sado I., spring 1926, 1 ♂ ; 1–15 August 1925, 1 ♀ ; 3–11 August 1926, 1 ♂, 1 ♀.

Moderately variable. The August specimens are small, but the spring ♂ from Sado I. is somewhat intermediate between these and the mainland examples. The Hirayama five are all heavily dusted, but one lacks the cell-dot of the forewing. On the other hand the August ♂ from Sado I. has so little dusting as to be virtually *schaefferi* Brem. (1864), of which I now suspect *purus* Butl. will prove a form.

179. **Cabera griseolimbata** (Oberth.) (1879).

Takao-San, 21 May–14 July, 35 ♂♂. 10 ♀♀. Tokyo, April 1925, 1 ♂.

Very constant. Apparently a local species, hitherto only represented in the Tring Museum by one ♂ from Sidemi, Manchuria, and two ♀♀ from " Japan."

180. **Cabera** (?) **punctata** (Warr.) (1894).

Takao-San, 21 May 1925, 1 ♂.

This rarity, described by Warren (Nov. Zool. i. 405) from a single ♀ from Japan, as *Deilinia* (?) [i.e. *Cabera* Tr.], and redescribed by Leech three years later (*Ann. Mag. Nat. Hist.* (6) xix. 198) as *Bapta candidaria*, from two Oiwake ♀♀ which he mistook for a pair, is not a true *Cabera*, as it has—in addition to the venational discrepancy noted in Seitz (iv. 318)—simple instead of fully pectinate ♂ antenna.

181. **Synegia hadassa** (Butl.) (1878).

Takao-San, 18 June 1925, 2 ♂♂, 1 ♀; 25 June 1925, 9 ♂♂; 14 July 1925, 1 ♀; 7 July 1926, 1 ♀. Sado I., spring 1926, 1 ♂; 3–11 August 1926, 4 ♂♂, 3 ♀♀.

The above series shows transitions towards *omissa* Warr. (1894), which is probably a South Japanese race of *hadassa*. In addition, the following forms are somewhat problematical.

Sado I., 1–15 August 1925, 1 ♂; 3–11 August 1926, 1 ♂.

These are small, rather pale, the lines intensified, less band-like, less dentate. Both are in poor condition.

Sado I., 1–15 August 1925, 2 ♂♂; 3–11 August 1926, 1 ♂, 2 ♀♀.

The ♂♂ are very small; colour in both sexes rather bright, though not like that of the following species; postmedian line little bent in the middle (in the preceding form well bent).

182. **Synegia inconspicua** (Butl.) (1881).

Takao-San, 18 June 1925, 1 ♀; 25 June 1925, 2 ♂♂, 1 ♀; 14 July 1925, 6 ♂♂, 1 ♀; 15 September 1925, 1 ♂; 9 June 1926, 1 ♀; 7 July 1926, 1 ♀. Tokyo, 15 November 1925, 1 ♂.

I think, from the rather less elongate wings and more bent postmedian, that this will prove a form of *esther* Butl. 1881 (which has page-priority) rather than of *hadassa* Butl., as given in Seitz (*Macrolep.* iv. 318). It may, however, be a third species, as Butler thought—costal margin of forewing strongly darkened, etc.

Form. (?) *suffusa* Prout (1915): Takao-San, 20 September 1925, 3 ♀♀.

183. **Petelia albifrontaria** (Leech) (1891).

Takao-San, 21 May 1925, 2 ♂♂, 1 ♀.

184. **Petelia morosa** Butl. (1881).

Takao-San, 21 May 1925, 2 ♂♂; 14 June 1925, 1 ♂; 14 July 1925, 1 ♂; 15 September 1925, 1 ♂.

All except the May specimens are rather small.

185. **Hypephyra terrosa** Butl. (1889).

Nikko, 2 May 1926, 1 ♂. Takao-San, 2 May–14 July, 35 ♂♂, 11 ♀♀; 15 and 20 September 1925, 9 ♂♂, 4 ♀♀. Tokyo, 15 July 1925, 1 ♂.

186. **Anagoga pulveraria japonica** (Butl.) (1881).

Sado I., 1–15 August 1925, 4 ♂♂, 3 ♀♀; 3–11 August 1926, 7 ♂♂. Japanese Alps, July 1926, 1 ♂.

187. **Ephoria arenosa** (Butl.) (1878).

Takao-San, 21 May–7 July, 45 ♂♂. Haehijoshima (Fatsizio I.), 23 July 1926, 1 ♂.

Variation slight. None approach the interesting race *insularis* Kardakoff (1928), recently described from Russian Island (8 km. S.W. of Vladivostok).

188. **Proteostrenia leda** (Butl.) (1878).

Asamayama, July 1926, 2 ♂♂. Takao-San, 21 June 1925, 1 ♂; 25 June 1925, 5 ♂♂, 1 ♀; 7 July 1926, 1 ♂.

The sole ♀ is of the form *strenioides* Bult. (1878).

189. **Scardamia aurantiacaria** Brem. (1864).

Takao-San, 7 July 1926, 1 ♀.

190. **Nothomiza formosa** (Butl.) (1878).

Hirayama, Nindo, 5 May 1926, 4 ♂♂; Takao-San, 21 May 1925, 2 ♂♂; 25 May 1925, 1 ♀; 5 June 1926, 1 ♂; 9 June 1926, 1 ♂; 7 July 1926, 1 ♂, 1 ♀. Near Tokyo, April 1926, 1 ♂. Tokyo, 16–31 May 1926, 1 ♂.

191. **Ennomos autumnaria nephotropa** subsp.n.

The Japanese race of *autumnaria* Werneb. (1864) should be separated from the European, although, on account of the extreme variability of the species, most of the distinctions fail in certain individual examples. The best character is in the wing-form, the tooth at R^3 being appreciably stronger, particularly on the forewing. General tone as in the brighter forms of *a. autumnaria*, the costal margin of the forewing generally more sharply pale; the irroration and minute strigulation on an average brighter, its grey element being more dominated by the deep orange on which it is set; cell-marks more elongate (especially that of forewing), that of hindwing less blackened; antemedian line of forewing almost straight after the pronounced subcostal angle, sometimes with a cloudy spot at the bend; subapical dark shading of forewing generally more developed, typically forming an oblique, broadening band (more or less interrupted by the veins) from costa just outside postmedian to M^1 at or close to termen.

Nikko, October 1925, type and another ♂; November 1925, 1 ♂. Hachijoshima (Fatsizio I.), 23 July 1926, 1 ♀. Also in the Tring Museum from Yezo (3 ♂♂) and from Asamayama, 13 August 1898, 8 ♂♂, 2 ♀♀; further represented in most of the larger collections.

The Hachijoshima ♀ has the irroration small, the lines sharply expressed, approaching the enigmatical pair which are figured by Matsumura (*Thous. Ins. Jap.*, supp. ii, t. xxiv, f. 5, 6) as *alniaria* L. and which presumably represent aberrations of *autumnaria nephotropa*; his figure 8 on the same plate (as *autumnaria* Wern. ♂) is a different ab., with both lines strong anteriorly but obsolete from M and R^3 hindward.

192. **Ennomos fumosa** sp.n.

♂, 60–65 mm. Face ochraceous-orange, with a few dusky spots. Palpus rather short, at tip dark-mixed. Tongue weak. Hindtibia not hairy; all spurs present. Head and body concolorous with wings, the thorax in front more orange.

Forewing with apex produced, a tooth at SC^5, the latter not very acute, the termen being straightish, rather strongly oblique, without excavation, only very slightly waved; $SC^{1, 2}$ coincident, sometimes connected with stalk of $SC^{3, 4}$, R^3 and M^1 arising rather widely separate; cream-buff, in part suffused with ochraceous buff, coarsely and irregularly irrorated and strigulated with grey, least densely in median area; markings dark grey; cell-spot large, oval, enclosing a thick streak of the ground-colour at DC; antemedian line very proximal, strongly excurved in its anterior part, obscured posteriorly; median rather strong, proximal to cell-spot, extremely oblique outward from costa, acutely angled between C and SC, then straightish; postmedian browner, about 6 mm. from termen, nearly parallel therewith, but more gently curved and without the anterior teeth; distal cloudings strongest at tornus and (especially) between the radials.——*Hindwing* with apex well-marked, nearly rectangular, termen crenate in anterior half, faintly waved in posterior; R^2 vestigial, R^3 and M^1 rather widely separate; cell-mark small and very weak, scarcely noticeable; median line as on forewing, but fading out at costa; postmedian rather more proximal than on forewing; distal cloudings forming an ill-defined, macular presubterminal band.

Underside rather more warmly coloured, with similar but more blurred pattern; lines of forewing fading out posteriorly; hindwing more densely irrorated, with median line strong to costa.

Nikko, October 1925, the type only. Mt. Kurama, near Kyoto, 23 October 1920 (I. Sugitani), 3 ♂♂ in coll. Joicey, sent as *Ennomos fumosa* Mats. (MS.) and as "*Sebastosema bubonaria* Warr."

Not quite a typical *Ennomos* either in structure or pattern, but best placed here. Close to *E. aenigma* Prout (1914), but with 4 spurs and with more markings—cell-spot and subterminal clouds. Much larger and darker than "*Angerona*" *stramineata* Warr. (1888), to which it bears a slight superficial resemblance.

193. **Selenia tetralunaria** (Hufn.) (1767).

Nikko, 26 June 1925, 1 ♂, 1 ♀; 2 May 1926, 1 ♂.

Apparently not a common species in Japan. The specimens (first generation) are large, sometimes less purple than the ordinary European forms, but no necessity has yet been shown for racial separation. Matsumura's (*Thous. Ins. Jap.*, supp. ii, t. xxiv) fig. 2, erroneously determined as *pallidaria* Leech, gives a much more normal representation of *tetralunaria* than his fig. 1.

194. **Garaeus mirandus** Butl. (1881).

Takao-San, 21 May 1925, 1 ♂; 2 May 1926, 1 ♂.

This rare and striking species was not previously represented in the Tring Museum collection.

195. **Ocoelophora lentiginosaria** (Leech) (1891).

Takao-San, 21 May 1925, 1 ♂.

196. **Xyloscia subspersata** (Feld.) (1875).

Takao-San, 21 May 1925, 4 ♂♂, 3 ♀♀; 14 June 1925, 1 ♂; 18 June 1925, 2 ♂♂; 14 July 1925, 1 ♂, 1 ♀; 9 June 1926, 1 ♂.

197. **Auaxa cesadaria** Walk. (1860).

Takao-San, 25 June 1925, 1 ♂.

198. **Zethenia albonotaria** (Brem.) (1861).

Hirayama, Nindo, 5 June 1926, 1 ♀. Takao-San, 14 April–21 June, 23 ♂♂, 15 ♀♀. Tokyo, 1–15 June 1926, 1 ♀.

199. **Zethenia rufescentaria** Motsch. (1860).

Takao-San, 14 April–14 July, 68 ♂♂, 27 ♀♀. Tokyo, 1–15 June 1926, 1 ♂.

After about the beginning of June both the *Zethenia* species were so worn as to be scarcely worth taking, but on 14 July there seems to have been a partial second emergence of *rufescentaria*, all the three of that date being in good condition.

200. **Endropiodes indictinaria** (Brem.) (1864).

Takao-San, 19 April 1925, 1 ♂; 21 May 1925, 4 ♂♂, 2 ♀♀; 14 July 1925, 1 ♂, 1 ♀; 2 May 1926, 2 ♂♂; 7 July 1926, 1 ♂. Sado I., 1–15 August 1925, 1 ♂, 1 ♀; 3–11 August 1926, 3 ♂♂, 3 ♀♀.

One ♂ (21 May) is ab. *abjecta* Butl. (1879), the two ♂♂ of 2 May transitional. The July and August specimens are small, evidently a second brood.

201. **Gonodontis arida** (Butl.) (1878).

"*Gonodontis obliquaria* Moor." Matsumura, *Thous. Ins. Jap.*, supp. ii, t. xxiv, f. 18 (1910) (err. det.).

Nikko, 26 June 1925, 1 ♂, 5 ♀♀; October 1925, 1 ♂, 1 ♀; November 1925, 1 ♀; 2 May 1926, 1 ♂, 1 ♀. Takao-San, 13 April–9 June, 17 ♂♂, 6 ♀♀; 15 and 20 September, 2 ♂♂. Tokyo, 14 November 1925, 1 ♀; 1–15 April 1926, 1 ♂, 1 ♀.

202. **Gonodontis aurata** Prout (1915).

Nikko, 26 June 1925, 2 ♂♂; 2 May 1926, 1 ♂.

All three are more strongly irrorated and suffused than the type form.

203. **Colotois pennaria ussuriensis** O. B.-Haas (1927).

Nikko, 26 June 1925, 1 ♂ (erroneously dated ?); October 1925, 2 ♂♂; November 1925, 6 ♂♂. Tokyo, 20–30 November 1925, 1 ♂.

So far as I am aware, this species has not previously been recorded from Japan. When arranging the group in the Tring Museum a few years ago, I found, in addition to four males from Ussuri, one labelled 10 December 1887, Yokohama, all belonging to a race which was at that time without a name, but which was shortly afterwards named *pennaria ussuriensis* by Bang-Haas, based on three males from Sutschansk, S. Ussuri.

204. **Pachyligia dolosa** Butl. (1878).

Nikko, 2 May 1925, 3 ♂♂, 5 ♀♀; 26 June 1925, 17 ♂♂, 14 ♀♀. Takao-San, 19 April 1925, 1 ♀. Komaba, near Tokyo, 7 April 1925, 1 ♂. Tokyo and vicinity, April 1925, 4 ♂♂, 2 ♀♀; June 1925, 1 ♀; 30 March 1926, 1 ♂; 1–15 April 1926, 1 ♀.

Evidently an early species to appear. In view of the suspicion attaching to the data "Nikko 26.vi.25" (see Nos. 140, 142, 203), we cannot attach much importance to the second Nikko record above. It is perhaps legitimate to conjecture that a consignment from Nikko may have been *received* by Aigner on that date. On the other hand, I see no grounds for challenging the "Tokyo, June 1925" ♀, and it may possibly be that the emergence is spread over a long period, though the fact that the Tring Museum previously contained only one pair (undated) further suggests that *P. dolosa* is not on the wing at the time when collectors are the most active. The Wileman collections contains 3 ♂♂ from Tokyo dating from 18 to 24 March.

205. **Angerona prunaria turbata** Prout (1929).

Corea: Kikai Nojo, 19 August 1926, 1 ♂.

A small aberration and with the cell-mark of the hindwing less reduced than in true *p. turbata*, from Japan. Probably the Corean race will require naming separately.

206. **Angerona nigrisparsa** Butl. (1879).

Takao-San, 5 June–7 July, 28 ♂♂, 1 ♀; 15 September 1925, 2 ♂♂.

The September specimens are very small; otherwise the variation consists chiefly in details of the size and distribution of the black dots. A few examples show differentiable, more or less elongate, black cell-marks.

207. **Angerona grandinaria grandinaria** (Motsch.) (1860).

Nikko, October 1926, 1 ♀. Takao-San, 20 September 1925, 1 ♂.

Differs from *g. serrata* Brem. (1864, E. Siberia) in its less deep colouring and less heavy median shade.

As already pointed out (in Seitz's *Macrolep.* iv. 333), the subcostal venation is not that of true *Angerona*. From the genitalia, and even the superficial aspect of some of the forms, I have very little doubt that it will have to be transferred to *Ctenognophos*.

208. **Angerona (Bizia) aexaria** Walk. (1860).

Takao-San, 21 May–7 July, 33 ♂♂, 6 ♀♀; 15 September 1925, 1 ♀.

The September ♀ is small.

209. **Ourapteryx nivea** Butl. (1883).

"*Ourapteryx sambucaria* L. var. *percica* Mén." Matsumura, *Thous. Ins. Jap.*, supp. ii, t. xxiii, f. 12 (1910).

Nikko, October 1925, 1 ♀; November 1925, 4 ♂♂, 3 ♀♀. Takao-San, 21 May–14 July, 73 ♂♂, 15 ♀♀; 15 and 20 September, 6 ♂♂, 5 ♀♀. Tokyo, 4 July 1925, 1 ♀. Hachijoshima (Fatsizio I.), 23 July 1926, 3 ♂♂.

One Nikko ♀ (November) is rather small for that sex, the tail at R^3 of the hindwing shortened, the strigulation rather sparse, the lines of the forewing rather broad; perhaps a separate species—somewhat intermediate in shape towards *obtusicauda* Warr. The Tokyo ♀ is large. One Takao-San ♀ (20 September) is analogous to the above-noted Nikko in its shortened tail and broad lines, but these are more approximated, the strigulation and irroration are strong and so is the long dark cell-mark of the forewing. All the three Hachijoshima have the lines slender, the spots at the tail of the hindwing small.

There are, I believe, several unnamed species in this group. In any case, there is no authority for sinking the Japanese *nivea* to the sharper-winged, less pure white *persica* Ménétr. (1832) of Azerbaijan. Staudinger united all the white Palaearctic species of the *sambucaria* group as "var. *persica*."

210. **Ourapteryx obtusicauda** (Warr.) (1894).

Takao-San, 21 May–14 July, 39 ♂♂, 3 ♀♀.

Warren described this as a *Tristrophis* and did not indicate the course of the line of the hindwing; it was therefore not only excusable but inevitable that Leech (*Ann. Mag. Nat. Hist.* (6) xix. 192) should sink it to his *subpunctaria* (*Ent. Supp.* 1891, p. 42) and that—Warren's type being mislaid at that time—I followed Leech's synonymy in Seitz *Macrolep.* iv. 336. A study of the original series shows, nevertheless, that Warren's species is that which was subsequently named *crctea* Swinh. (*Tr. Ent. Soc. Lond.* 1902, p. 601); and in the light of this knowledge Warren's description of the bands of the forewing as "broadish" becomes significant, though it remains possible that an aberration of *Tristrophis subpunctaria* with that character might be discovered. In *obtusicauda* they are oftenest (as in Warren's type) fairly broad, but occasionally—notably in a Takao-San ♂ of 5 June 1926—quite slender; in this specimen they do not reach the costal margin.

211. **Euctenurapteryx maculicaudaria** (Motsch.) (1860).

Nikko, October 1925, 1 ♂; November 1925, 1 ♂. Takao-San, 15 September 1925, 1 ♂; 20 September 1925, 1 ♂; 7 July 1926, 1 ♂. Tokyo, 5–30 November 1925, 1 ♀. Sado I., 1–15 August 1925, 3 ♀♀.

Both the Nikko specimens are small.

212. **Tristrophis veneris** (Butl.) (1878).

Takao-San, 21 June 1925, 1 ♂; 25 June 1925, 3 ♂♂, 1 ♀; 7 July 1926, 1 ♂, 4 ♀♀.

213. **Thinopteryx crocoptera striolata** Butl. (1883).

Takao-San, 9 June 1926, 1 ♂; Tokyo, 1–15 June 1926, 1 ♀.

214. **Thinopteryx delectans** (Butl.) (1878).

Takao-San, 21 May 1925, 1 ♂; 14 June 1925, 1 ♂; 18 June 1925, 2 ♂♂; 14 July 1925, 1 ♂; 5 June 1926, 2 ♂♂; 9 June 1926, 2 ♂♂; 9 July 1926, 1 ♂.

215. **Plagodis dolabraria** (Linn.) (1767).

Takao-San, 21 May 1925, 1 ♂. Sado I., 1–15 August 1925, 5 ♂♂, 1 ♀.

216. **Scionomia mendica** (Butl.) (1879).

Nikko, November 1925, 2 ♂♂. Takao-San, 5 June 1926, 2 ♂♂; 9 June 1926, 1 ♀.

217. **Corymica arnearia** Walk. (1860).

Tsushima, 6 September 1925, 1 ♀.

The figure of this species in Matsumura (*Thous. Ins. Jap.*, supp. ii, t. xxv, f. 7, as *C. specularia* Moore) is large and too broad-winged, even for the ♀.

218. **Corymica pryeri** (Butl.) (1878).

Takao-San, 18 June 1925, 1 ♀.

219. **Heterolocha laminaria** f. **niphonica** (Butl.) (1878).

Nikko, 26 June 1925, 1 ♂.

I am unable to say whether the accepted synonymy is correct, as I am still unacquainted with Herrich-Schaeffer's *laminaria* (1847). If that should prove a different species, the present insect will stand as a synonym or race of *aristonaria* Walk. (1860), described from " N. China " [Shanghai].

220. **Heterolocha stulta** (Butl.) (1879).

Takao-San, 18 June 1925, 1 ♀.

Belongs to the greenest form (dark olive-buff), with the peculiar purple gloss which characterizes the species only weakly developed.

221. **Parepione grata** (Butl.) (1879).

Takao-San, 7 July 1926, 2 ♂♂.

Also, from the same locality, 21 May 1925, 1 ♂, 1 ♀ of the form. ? (gen. I ?) *lapidea* Butl. (1881).

222. " **Epione** " **magnaria** Wileman (1911).

Nikko, November 1925, 1 ♀.

On this species see Seitz, *Macrolep.* iv. 342. I have no further suggestion to offer as to its systematic position. The face is perhaps too smooth for association with the present group.

223. **Cepphis advenaria** Hb. (1798).

Takao-San, 21 May 1925, 2 ♂♂; 14 June 1925, 1 ♂; 5 June 1926, 2 ♂♂; 9 June 1926, 2 ♂♂.

224. **Spilopera debilis** (Butl.) (1878).

Nikko, 26 June 1925, 1 ♂. Takao-San, 14 June 1925, 1 ♀. Sado I., 1–15 August 1925, 1 ♀; 3–11 August 1926, 6 ♀♀.

225. **Spilopera gracilis** (Butl.) (1879).

Nikko, November 1925, 1 ♀. Hirayama, Nindo, 5 May 1926, 3 ♂♂. Takao-San, 2 May–14 July, 31 ♂♂, 13 ♀♀.

226. **Rhynchobapta flaviceps** (Butl.) (1881).

Takao-San, 25 June 1925, 1 ♂; 14 July 1925, 1 ♂, 3 ♀♀; 7 July 1926, 4 ♂♂. Japanese Alps, July 1926, 1 ♂.

227. **Rhynchobapta punctilinearia** (Leech) (1891).

Takao-San, 21 May 1925, 2 ♂♂, 1 ♀. Hirayama, Nindo, 5 May 1926, 1 ♂.

The Takao-San specimens are in poor condition. Leech only obtained the species on Kiushiu. Hitherto unrepresented in the Tring Museum.

228. **Nadagara prosigna** sp.n.

♂. 29 mm. Head mixed with ochreous. Thorax and abdomen concolorous with hindwing. Hindtibia not dilated.

Forewing slightly narrower than in typical *Nadagara*, termen rather strongly curved, oblique, not long; pale cinnamon-drab (with the lens appearing as a mixture of whitish-drab and cinnamon-drab), with scattered darker scales and with an ill-defined cinnamon-drab cloud in middle of distal area; cell-dot small; lines fine and slender, punctuated on the veins, indistinctly whitish-edged, both equally developed, arising from heavy blackish costal marks; these are oblique outward—especially the antemedian—and curve or bend at their junction with the lines, which are approximately parallel with termen, though the postmedian turns slightly more distad behind; terminal dark line thickening between the veins; fringe whitish, spotted with the ground-colour.——*Hindwing* with termen slightly waved, not crenulate; very slightly paler than forewing, at costa whitish; cell-dot weak; postmedian close beyond it, straightish, much as in *rigaia* Walk. and *inordinata* Walk.; terminal line and fringe as on forewing.

Underside coloured about as in pale *rigaia*, with distinct cell-marks and postmedian line, the former slightly elongate, the latter dotted on the veins, on the forewing shaped as above, on the hindwing curved parallel with termen; terminal line and fringe as above.

Takao-San, 21 May 1925, type ♂. A second ♂ in the Tring Museum from E. Wahr, received without label in a mixed collection, partly from Hong Kong, partly—doubtless including this specimen—from Japan.

The type is worn, but easily recognizable. The paratype is in better condition, but has lost the right hindwing. In it, the median area is only 3–4 mm. wide, in the type 4–5.5 mm. The species is distinguished from all other *Nadagara* by the costal spots and from the great majority by the less oblique, more proximal postmedian line of the forewing. The genus is new for Japan.

229. **Semiothisa proximaria** (Leech) (1897).

"*Semiothisa temararia* Swinh." Matsumura, *Thous. Ins. Jap.*, supp. ii, t. xxiv, f. 19 (1910) (nec *temeraria* Swinh. 1891).

Takao-San, 21 May 1925, 1 ♀; 14 June 1925, 1 ♀; 18 June 1925, 1 ♀; 2 June 1926, 1 ♂; 5 June 1926, 1 ♀; 9 June 1926, 1 ♀. Sado I., 1–15 August 1925, 1 ♀.

The Sado I. specimen is rather small, with the black markings outside the postmedian reduced, probably a local or seasonal modification.

I have noticed elsewhere (*Ann. S. Afr. Mus.* xix. 596) that according to the latest findings on the dates of Hübner's *Verzeichniss*, *Macaria* Curt., as employed in Seitz's *Macrolepidoptera*, must yield priority to *Semiothisa* Hb.

230. **Semiothisa defixaria** (Walk.) (1861).

Hirayama, Nindo, 5 May 1926, 2 ♂♂. Takao-San, 21 May–14 July and 15–20 September, 49 ♂♂, 12 ♀♀. Sado I., 1–15 August 1925, 1 ♀.

231. **Semiothisa proditaria** (Brem.) (1864).

Takao-San, 21 May 1925, 1 ♂; 14 June 1925, 1 ♂; 18 June 1925, 1 ♂; 21 June 1925, 1 ♂; 25 June 1925, 2 ♂♂; 14 July 1925, 1 ♂; 5 June 1926, 1 ♂; 9 June 1926, 1 ♂; 7 July 1926, 4 ♂♂. Hirayama, Nindo, 5 May 1926, 1 ♂.

Several species have evidently been confused under the name of *pluviata* Fab. (1798). The oldest applicable name for the present species seems to be *praditaria* Brem.

232. **Krananda (Trigonoptila) latimarginaria** Leech (1891).

Tokyo, " 5–31 " [!] November 1925, 1 ♂.

233. **Luxiaria amasa amasa** (Butl.) (1878).

Takao-San, 21 May 1925, 2 ♂♂ (worn); 21 June 1925, 1 ♂; 25 June 1925, 2 ♂♂; 14 July 1925, 5 ♂♂, 2 ♀♀; 15 September 1925, 1 ♀; 20 September 1925, 1 ♀; 2 May 1926, 1 ♂, 1 ♀; 9 June 1926, 2 ♂♂, 2 ♀♀; 7 July 1926, 8 ♂♂, 3 ♀♀.

Are there two broods? Or are two species confused under this name? The May specimens have rather narrow, rather sharp forewing and the shade between the postmedian and subterminal (which in the majority of the others, but not in all, forms a fairly continuous, dusky band) is represented only by two elongate blackish spots on the forewing, respectively from R^1 to R^3 and from M^2 to SM^2.

The notice of *Luxiaria contigaria* (auett. nec Walk.) in Seitz (*Macrolep.* iv. 350) is practically worthless. Not having studied the group personally, I very rashly accepted the synonymy given by Hampson (*Faun. Ind., Moths*, iii. 195) and the chaotic series which consequently stood in the British Museum under the collective name; and though I observed that the Japanese *amasa*, which which alone I was concerned in the strictly Palaearctic fauna, had a distinctive facies, I was misled by the presence of its Indian race *fasciosa* Moore (1888) among the heterogeneous assemblage into pronouncing it (*amasa*) " not, however, everywhere constant." For elucidation of the group, the following references should be consulted: Nov. Zool. xxxii. 62–4; xxxv. 77. *Journ. Bomb. Nat. Hist. Soc.* xxxi. 792. *Bull. Hill Mus.* ii. 60, 61.

234. **Erannis leucophaearia dira** (Butl.) (1878).

Tokyo and vicinity, April 1925, 36 ♂♂.

Very variable in size and moderately so in markings. The Japanese form is a race, not a synonym (as previously quoted) of *leucophaearia* Schiff. (1775). Its correct status was incidentally given in Nov. Zool. xxxv. 143, but no differentiation was offered; the most stable distinction is in the posterior postmedian mark of the hindwing, which in *l. dira* is markedly oblique outward between fold and SM^2, angled on SM^2, thence generally more or less thickened to abdominal margin.

235. **Erannis obliquaria** (Motsch.) (1860).

Hibernia obliquaria Motsch., *Et. Ent.* ix. 37 (1860) (Japan).
Lozogramma bela Butl., *Ann. Mag. Nat. Hist.* (5) i. 406 (1878) (Yokohama).

Tokyo, 11 April 1925, 3 ♂♂; 20–30 November 1925, 23 ♂♂; December 1925, 3 ♂♂.

Motschulsky's brief description points unmistakably to this common Japanese species. How the name can have been transferred to the *Alcis* (No. 255 *infra*) I am at a loss to imagine, although probably the words "antennis ♂ valde pectinatis," referring to the exceptionally long and heavy *fascicles of cilia*, started a "false scent."

236. **Zamacra juglansiaria** Graeser (1889).

Tokyo, April 1925, 5 ♂♂; 1–15 April 1926, 1 ♂; June 1926, 1 ♂.

237. **Zamacra (Acanthocampa) excavata** Dyar (1905).

Tokyo, April 1925, 3 ♂♂; 1–15 April 1926, 4 ♂♂; 7 April–1 May 1926 (2 ♂♂); 16–30 April 1926, 3 ♂♂.

Both this and the preceding species are new to the Tring collection and so far as I know the *excavata* are the first examples to be received in this country. They are evidently near relatives and are at first glance confusingly alike, except for the sharply angular antemedian line of *excavata*; its postmedian is also more sinuous on both wings than that of *juglansiaria*, the tone rather less red, etc. They have in common a strong triangular crest on the vertex of the head. The short and hairy legs are in most of the specimens tucked in so that the tibial spurs are very difficult to investigate; but I have dissected one of each species and confirmed the presence of the proximal spurs in *excavata*—rather nearly approximated to the terminal and very unequal in length. With the specimens before me I am able to cancel the query with which the synonymy was given in Seitz (*Macrolep.* iv. 357, 358); *Acanthocampa okamotonis* Matsumura (*Thous. Ins. Jap.*, supp. ii, t. xxv, f. 21) is almost certainly a strongly banded ♂ of *juglansiaria*, though the artist has rounded the hindwing rather too much, while "*A. albofasciaria* Leech" Matsumura in err. (*ibid.*, f. 22) is unmistakably *excavata* Dyar, the obsolescence of the posterior part of the antemedian disguising its characteristic angulation.

238. **Megabiston plumosaria** (Leech) (1891).

? *Boarmia theae* Matsumura, *Oyo Konchugaku* (ed. 2) 603, t. 27, f. 5 (1920) (Japan).

Tokyo, November 1925, 30 ♂♂.

239. **Wilemania nitobei** (Nitobe) (1907).

Tokyo, 20–30 November 1925, 2 ♂♂.

240. **Biston robustum** Butl. (1879).

Nikko, 26 June 1925, 22 ♂♂; 2 May 1926, 1 ♂. Kogane, 25 km. from Tokyo, 18 April 1926, 9 ♂♂. Tokyo and vicinity, April–18 May, 28 ♂♂, 2 ♀♀.

An extremely fine series. The Kogane specimens are on an average small and nearly all belong to ab. *albicollis* Warr. (1901), though in one or two the

white patagium is just tinged with cream-buff ; the pale parts of the wings are also generally whiter in this form than in the name-type, bringing about a superficial resemblance to *B. cognataria* (Guen., 1858). The Nikko and Tokyo series intergrade and three Nikko ♂♂ (June) are rather dark, the median area and apex of the forewing being little whiter than the bands.

241. **Biston comitata** (Warr.) (1899).

Nikko, July 1925, 1 ♂.

242. **Buzura recursaria superans** (Butl.) (1878).

Takao-San, 21 May–7 July, 44 ♂♂, 3 ♀♀.
Variable in size but scarcely so in other respects.

243. **Erebomorpha consors** Butl. (1878).

Takao-San, 21 May 1925, 1 ♂ ; 18 June 1925, 1 ♂.

244. **Medasina nikkonis** (Butl.) (1881).

Nikko, 26 June 1925, 11 ♂♂ ; 2 May 1926, 1 ♂, 1 ♀. Takao-San, 14 April 1925, 4 ♂♂ ; 2 May 1926, 1 ♀.

Not generally a common species ; previously only represented in the Tring Museum by one ♂ without exact data. There is possibly a mistake in labelling the last specimen recorded above, as a Nikko ♂ and ♀ bear the same date ; but this date occurs for both localities elsewhere in the collection. Fortunately the matter is here of no importance, as there are other examples to confirm the occurrence on Takao-San.

245. **Hemerophila** (?) **amphidasyaria** (Oberth.) (1880).

Nikko, 26 April 1925, 1 ♂ ; 26 June 1925, 1 ♂ ; 2 May 1926, 1 ♂.

As the ♂ has a fovea, this fine species is not a true *Hemerophila*. By Meyrick's key to the Palaearctic genera (*Tr. Ent. Soc. Lond.* 1892, pp. 99, 100) it would fall into *Cleorodes* Warr. (= *Cleora* Meyr. nec Curt.) or—if the antennal teeth of the last couple of joints are not treated as true pectinations—into *Alcis* Hb., *sens. lat.* (*Selidosema* part. Meyr., nec Hb.). In any case it has no near connection with *Cleorodes lichenaria* Schiff. (1775).

242. **Hemerophila senilis** Butl. (1878).

Takao-San, 21 May 1925, 12 ♂♂, 2 ♀♀ ; 2 May 1926, 12 ♀♀. Sado I., 1–15 August 1925, 1 ♂.

247. **Hemerophila** (**Phthonandria**) **atrilineata** Butl. (1881).

Takao-San, 5 June–14 July, 20 ♂♂, 2 ♀♀ ; 15–20 September, 2 ♂♂, 1 ♀.

Variable ; 4 ♂♂ are more or less strongly melanic, 1 ♀ (20 September 1925) partly so, with very conspicuous zigzag subterminal line on forewing ; the second-brood specimens are, as usual, small, but so is also one ♂ dated 5 June 1926.

248. **Jankowskia athleta** Oberth. (1884).

Takao-San, 14 April–14 July, 15–20 September, 57 ♂♂; Tokyo, 4 July 1925, 1 ♂; Japanese Alps, July 1926, 1 ♂; Sado I., 6 ♂♂, 3–11 August 1926.

The second-brood specimens are small. The entire absence of the ♀ is noteworthy, though this sex seems to be always very rare in the species; probably it is not attracted by light.

249. **Phthonosema tendinosaria** (Brem.) (1864).

Takao-San, 21 May–7 July, 38 ♂♂. Tamagawa, W. of Tokyo, 25 June 1926, 1 ♂. Sado I., August, 24 ♂♂.

Variable especially in the breadth of the median area of the forewing; in one (5 June 1926) the lines are closely approximated; one (7 July 1926) is remarkably asymmetrical, the right forewing being normal, the left having the postmedian running inward along and behind M^3, coalescing slightly with antemedian, then vertical or slightly oblique outward to hindmargin.

In this species again the absence of ♀♀ points to a difference of habit in the two sexes. Compare also *Megabiston plumosaria*, of which no ♀♀ were obtained, and *Biston robustum*, with only two ♀♀ against 60 ♂♂. In all these three species the ♀ is well known and was fairly well represented in the Tring Museum.

250. **Cleora rimosa** (Butl.) (1879).

Nikko, October–November 1925, 13 ♂♂, 7 ♀♀. Takao-San, 21 May–14 July, 25 ♂♂, 3 ♀♀; 15 September 1925, 1 ♂; 20 September 1925, 7 ♂♂, 1 ♀. Tokyo, October 1925, 1 ♂.

Very constant, though the second-brood specimens are on an average slightly smaller than the first-brood.

In Seitz (*Macrolep.* iv, 365) it was stated that this is "in . . . structure a normal *Cleora*," i.e. in the very comprehensive sense in which that name was employed prior to the advent of McDunnough's "Studies in North American Cleorini" (1920); but even so, the statement was not quite correct, as it was overlooked that it has no true fovea. The abdomen is long-scaled beneath, almost hairy, and I suspect it may belong somewhere between *Hemerophila* and *Medasina*, but I have not yet proceeded far enough with the taxonomy of the group to propose a transference; SC^1 arises from near the base of SC^2 and nearly always anastomoses well with C.

251. **Cleora charon** (Butl.) (1878).

Takao-San, 21 May–14 July, 40 ♂♂, 40 ♀♀. Tokyo, 15 May–4 July, 11 ♂♂, 3 ♀♀; 5 October 1925, 1 ♂.

This very distinct species is likewise probably nearer to *Hemerophila* than to *Cleora* but seems likely to demand a separate genus; see Seitz's *Macrolep.* iv. 365. Apart from the wide antennal difference, it is structurally distinct from *rimosa* in the smooth venter and non-dilated hindtibia of the ♂.

252. **Cleora cinctaria insolita** (Butl.) (1878).

Takao-San, 21 May 1925, 1 ♂; 18 June 1925, 1 ♀.

In a recent revision of a section of this genus I have called attention (*Bull. Hill Mus.* iii. (3) 181) to a very slight, perhaps not constant, morphological

difference between this form and its European representative *c. cinctaria* Schiff. (1775). I have since found vestiges of the basal abdominal spine in two or three European males and in any case I doubt whether it is any longer functional even in the Japanese, though their hindtibia does appear on an average somewhat more heavily dilated, therefore presumably enclosing a stronger hair-pencil.

253. **Cleora leucophaea** (Butl.) (1878).

Nikko, 26 June 1925, 8 ♂♂; 2 May 1926, 1 ♂. Takao-San, 1 April–1 May, 10 ♂♂, 5 ♀♀.

254. **Alcis angulifera** (Butl.) (1878).

Nikko, October–November 1925, 11 ♂♂, 31 ♀♀. Takao-San, 21 May 25 June, 106 ♂♂, 13 ♀♀.

All the Nikko ♂♂ and many of the November ♀♀ are badly worn. One October ♀, extremely worn, looks whitish and presents a very different aspect, superficially recalling *jubata* Thnb., but I think belongs here; it is an interesting sport in venation, having C^1 of the forewing forked, its longer arm connected, on the *left* wing only, with SC^5.

255. **Alcis lomozemia** nom.n.

"*Boarmia obliquaria* Motsch." Leech, *Ann. Mag. Nat. Hist.* (6) xix. 415 (1897); Prout in Seitz, *Macrolep.* iv. 369, t. 20 g (1915) (err. det.) (Japan).

Nikko, 26 June 1925, 4 ♂♂, 2 ♀♀; 2 May 1926, 4 ♂♂. Takao-San, 14 June 1925, 1 ♀. Tokyo, 3 April 1925, 1 ♂.

Variable. The ♀♀, being shorter- and broader-winged, have the antemedian line of the forewing less produced anteriorly than the ♂♂. One Nikko ♂ (2 May) is very interesting, being so aberrant that I at first took it for a new species and even now do not feel certain that it may not prove to be so, though I find a connecting link in the Tokyo ♂. Lighter and apparently somewhat more delicate-winged, the texture and in some measure the markings superficially suggesting *Erannis leucophaearia* (Schiff.); forewing with SC^5 not anastomosing with C, postmedian line with the anterior angle somewhat accentuated; hindwing whitish. It is perhaps more than a coincidence that in the Tokyo ♂, which also has the hindwing pale, though less extreme, SC^5 likewise escapes the usual anastomosis of *obliquaria*.

256. **Alcis grisea** (Butl.) (1878).

Takao-San, 5 June–14 July, 18 ♂♂, 9 ♀♀; 15–20 September 1925, 3 ♂♂, 3 ♀♀. Tokyo, 16–31 May 1926, 1 ♂.

The September specimens are somewhat smaller.

257. **Alcis simpliciaria** (Leech) (1897).

Takao-San, 26 May–7 July, 21 ♂♂, 14 ♀♀; 15 September 1925, 1 ♀. ? Nikko, November 1925, 1 ♀ (wasted).

The September ♀ is small and dark.

258. **Alcis ribeata** (Clerck) (1759).

Nikko, October 1925, 1 ♂. Ikaho, Central Hondo, 25 July 1926, 1 ♀. Takao-San, 18 June 1925, 2 ♂♂; 20 September 1925, 1 ♂; 5 June 1926, 1 ♂; 9 June 1926, 1 ♂, 3 ♀♀.

259. **Alcis picata** (Butl.) (1881).

Nikko, October 1925, 1 ♂.

260. **Alcis pryeraria** (Leech) (1897).

Takao-San, 14 July 1925, 1 ♀; 30 September 1925, 1 ♂; 7 July 1926, 1 ♂. The second-brood specimen is very small.

Of this species only the type was known when vol. iv of Seitz was prepared, and it remains scarce in Japan, whence Mr. Joicey received a few specimens labelled *nigroguttata* Mats. [MS.]. Matsumura subsequently (*Journ. Coll. Agric. Sapporo*, xv. 179) made the correct determination and reported it "not rare in Saghalien." In all the specimens known to me SC^1 and SC^2 are free, and I suspect an error of observation on Matsumura's part when he gives these as long-stalked.

261. **Alcis melanonota** sp.n.

♂. 28 mm. Closely similar to *A. jubata* (Thnb., 1788), possibly a race Thorax with a stronger, entirely black, posterior crest, recalling "*Cleora*" *aagostigma* Prout (1927). Hindtibia about 5 mm. long, only very weakly dark-spotted on the outer side, the pencil strong, tarsus about 2 mm.

Rather more greyish white than typical *jubata*.——*Forewing* with SC^1 and SC^2 separate (probably variable as in *jubata*); costal spots less strong than in *jubata*, the subterminal one almost obsolete; postmedian line more proximal than in *jubata*, little outbent behind SC^5; between it and subterminal a strong black spot at R^3–M^1; distal area otherwise very weakly dark-shaded; fringe weakly clouded.——*Hindwing* with cell-dot small.

Japanese Alps, July 1926, the type only.

262. **Boarmia roboraria arguta** Butl. (1879).

Takao-San, 21 May 1925, 1 ♂; 18 June 1925, 6 ♂♂; 25 June 1925, 4 ♂♂; 5 June 1926, 2 ♂♂; 9 June 1926, 2 ♂♂; 7 July 1926, 2 ♂♂. Tokyo, 16–31 May 1926, 1 ♂.

263. **Boarmia lunifera** Butl. (1878).

Nikko, October and November 1925, 2 ♂♂. Takao-San, 18 June 1925, 3 ♂♂; 20 September 1925, 1 ♂, 2 ♀♀; 7 July 1926, 7 ♂♂. Tokyo, 4 July 1925, 1 ♀.

The second-brood specimens are smaller.

264. **Boarmia invenustaria** (Leech) (1897).

Takao-San, 21 May–14 July, 45 ♂♂, 2 ♀♀. Tokyo, 4 July 1925, 1 ♂. Sado I., August, 23 ♂♂, 2 ♀♀.

A dark form is not infrequent on Takao-San.

265. **Boarmia (Serraca) conferenda** Butl. (1878).

Hirayama, Nindo, 5 May 1926, 16 ♂♂. Takao-San, 2 May–14 July, 91 ♂♂, 24 ♀♀. Tokyo, April 1925, 1 ♂; 18 May 1925, 2 ♂♂, 1 ♀; 1 15 June 1925, 1 ♂ (very worn). Sado I., spring 1926, 1 ♂; August, 14 ♂♂, 12 ♀♀.

A few examples are melanic, almost as in *B. punctinalis* Scop. ab. *humperti* Humpert. The Sado I. specimens are mostly in poor condition, but not so bad as would have been expected if they had been belated first brood.

266. **Boarmia definita** Butl. (1881).

Takao-San, 5 June–14 July, 22 ♂♂, 13 ♀♀; 15–20 September 1925, 11 ♂♂, 3 ♀♀.

267. **Boarmia sordida** (Butl.) (1878).

Takao-San, 18 June 1925, 1 ♀; 21 June 1925, 1 ♀; 5 June 1926, 1 ♀.

268. **Boarmia (Calicha) ornataria** Leech (1891).

Nikko, 26 May 1925, 1 ♂. Takao-San, 2 June 1926, 1 ♂; 5 June 1926, 1 ♂. Sado I., 3–11 August 1926, 1 ♀.

Dr. Wehrli has recently shown (*J.B. Mart. Staatsmus. Minussinsk.* vi. (1) 26, 1929) that this is a very close relative, or probably race, of the rare *B. nooraria* Brem. (1864), which was unrecognizably figured by its author and not very fully described, in consequence of which it was conjecturally placed by me (Seitz's *Macrolep.* iv. 368) in a position which proves erroneous. As some appreciable—though perhaps inconstant—differences were found in the genitalia, the build of *nooraria* (= *ornataria nigrisignata* Wehrli, 1927) is somewhat less robust and the range of the two shows some complications, I have not cited Leech's form as *nooraria ornataria* without further information.

269. **Ophthalmodes irrorataria** (Brem. & Grey) (1853).

Takao-San, 21 May 1925, 3 ♂♂; 18 June 1925, 4 ♂♂, 2 ♀♀; 5 June 1926, 1 ♂; 7 July 1926, 1 ♂.

270. **Ophthalmodes albosignaria** (Brem. & Grey) (1853)

Takao-San, 14 June 1925, 5 ♂♂; 18 June 1925, 6 ♂♂; 21 June 1925, 1 ♂; 25 June 1925, 4 ♂♂; 5 June 1926, 1 ♂.

271. **Ascotis selenaria cretacea** (Butl.) (1879.

Nikko, 26 June 1925, 1 ♂. Hirayama, Nindo, 5 May 1926, 1 ♂. Takao-San, 21 May–14 July, 29 ♂♂, 1 ♀. Kogane, 25 km. from Tokyo, 18 April 1926, 1 ♂. Tokyo, June 1925, 1 ♂; 10 September 1925, 1 ♀; 1–3 October 1925, 1 ♂; 16–31 May 1926, 6 ♂♂.

On the whole not very variable. Only two or three of the ♂♂ and one ♀ have the irroration slight enough (except perhaps in the proximal area of the hindwing) to leave the general impression of a whitish insect. One ♂ (Takao-San, 14 July 1925) has it exceptionally dense, producing on the hindwing a strikingly sharp contrast between the whitish proximal area and the rest of the

wing, the median line accompanied distally by a blackish shade. A Tokyo ♂ (May 1926) has the brown bands exceptionally clear, including an unusually proximal median on the forewing—close to antemedian at costa, midway between ante- and postmedian at hindmargin.

272. **Cusiala stipitaria** (Oberth.) (1880).

Nikko, October 1925, 1 ♀. Takao-San, 21 May 1925, 6 ♂♂; 14 June 1925, 1 ♂; 18 June 1925, 1 ♂, 1 ♀; 25 June 1925, 2 ♂♂; 5 June 1926, 6 ♂♂; 9 June 1926, 1 ♂; 7 July 1926, 2 ♂♂.

Variable in the density of the dark irroration; one ♂ (25 June) rather outstandingly dark.

273. **Ectropis bistortata** (Goeze) (1781).

Nikko, 26 June 1925, 6 ♂♂, 26 ♀♀; 2 May 1926, 1 ♂, 2 ♀♀. Sado I., 1–15 August 1925, 1 ♂; 3–11 August 1926, 2 ♂♂, 1 ♀. Takao-San, 19 April 1925, 1 ♀; 21 May 1925, 5 ♂♂; 21 June 1925, 4 ♂♂, 1 ♀; 25 June 1925, 9 ♂♂; 14 July 1925, 6 ♂♂, 1 ♀; 2 May 1926, 4 ♂♂; 5 June 1926, 1 ♂; 9 June 1926, 1 ♂; 7 July 1926, 31 ♂♂, 2 ♀♀.

The Nikko series is not extraordinarily variable. The Sado I. specimens are similar to the Nikko, rather small, probably a second or third generation. The Takao-San 66 are variable, possibly two species mixed, as the demarcation on certain dates is rather clear; a large, browner, more heavily marked form which might, but for some of the dates, have been assumed to be gen. 1, was taken on 19 April (♀), 21 May (3 ♂♂), 25 June (1 ♂), 14 July (2 ♂♂, ? 1 ♀) in 1925, on 2 May (3 ♂♂), 5 June (1 ♂) and 9 June (1 ♂) in 1926; similar, but rather smaller, forms occurred on 7 July 1926, only two or three being very pronounced but several others suggesting intergradations to the smoother, finer-marked forms.

274. **Ectropis aigneri** sp.n.

♂, 44–47 mm.; ♀, 48–52 mm. Head and body concolorous with wings. Face indefinitely darkened in upper part. Patagia somewhat darkened at tips. Antenna of ♂ with the ciliation a trifle shorter than in *bistortata* and its closest allies (scarcely $1\frac{1}{4}$). Hindtibia of ♂ without hair-pencil. Abdomen with the paired dark dorsal spots present, at least anteriorly; ovipositor in ♀ long.

Forewing rather elongate, the termen appreciably longer and more oblique than in *bistortata*; stalk of $SC^{1,2}$ unusually well separate at its origin from that of SC^{3-5}; in one ♀ $SC^{1,2}$ coincident, as in most ♀♀ of the group, in the other ♀ stalked; rather blurred and glossy (but none perfectly fresh), with a peculiar fleshy-brown tone, nearest to that of *grisescens* Warr. (1894) but slightly whiter, at least in the ♀♀; markings as in the allies; ante- and postmedian lines not strong, with little or no black admixture, the fleshy-brown accompanying bands well developed, a median line of the same colour also in general well developed; a darkening of the postmedian band at R^3–M^1 recalling that of *excellens* Butl., except in its less black colour; subterminal well dentate, its accompanying shades rather variable, in general fairly equal throughout.——*Hindwing* rather elongate; concolorous with forewing or proximally a little less suffused; a cell-dot often indicated but never strong; lines and bands (except antemedian) as on forewing, only the postmedian band without darkening at R^3–M^1.

Underside with faint indications of the principal markings of upper.

Takao-San, 21 May 1925, 7 ♂♂, 1 ♀; 14 June 1925, 1 ♂ (type); 18 June 1925, 2 ♂♂; 20 September 1925, 1 ♂; 2 June 1926, 1 ♀; 5 June 1926, 1 ♂.

From *excellens* Butl. and *obliqua* Warr., the only Japanese species of the group which have SC^{1+2} arising from the cell, *aigneri* is easily distinguished by the absence of the ♂ hindtibial pencil; quite different from the former in colour, from the latter in its large size, more sinuate postmedian and well developed spot beyond it.

275. **Ectropis obliqua** Warr. (1894).

Nikko, 26 June 1925, 2 ♂♂; October 1925, 1 ♂. Takao-San, 14 April 1925, 1 ♂; 7 July 1926, 4 ♂♂. Tokyo, 18 May 1925, 1 ♂.

This little-known species was founded by Warren (Nov. Zool. i. 434) on a single aberrant ♀ from Hakodate, with exceptionally strong and complete band outside the postmedian line and the blackish dashes on R^3 and M^1 obsolete. As it was treated as an aberration of *grisescens* Warr. (*loc. cit.*, Ningpo), the name had no assured status under the Code, although the type label gives *Ectropis grisescens* "var." *obliqua* and the different localities might indicate the employment of that much-abused term in the Staudingerian sense. In Seitz (*Macrolep.* iv. 377) I gave it the rank of a subspecies. But on closer study I find that it differs structurally in two particulars: (1) presence of ♂ hindtibial hair-pencil and short abdominal spine; (2) origin of SC^{1+2}, which in the ♂ is always (in the ♀ often) from the cell, well proximal to SC^{3-5}, whereas in *grisescens* the two stalks are well stalked together. The species is as variable as its congeners, but generally recognizable, apart from its structural characters, by the small size (♂, 26–36 mm.; ♀, 31–41 mm.) and relatively rather broad forewing and by the postmedian line, which is more as in *consonaria* Hb. than in the immediate allies, on the forewing straightish (or only with a weak inward curve in the posterior part) and about parallel with the termen. The underside is in general less blurred or blotched than in *bistortata*, often with well-developed postmedian line and cell-dots, but both species vary beneath.

The three Nikko examples are rather dark. The Takao-San specimens collected in July are a little smaller, paler and less brownish than the first-brood specimens, but at least as strongly marked.

276. **Ectropis excellens** (Butl.) (1884).

Takao-San, 21 May–7 July, 70 ♂♂, 2 ♀♀. Hachijoshima (Fatsizio I.), 23 July 1926, 1 ♂.

In structure, *E. excellens* approaches *obliqua* Warr., though the tibial pencil and the spine may be a little stronger and the origin of SC^{1+2} of the forewing is on an average more distal; normally it may be regarded as connate with SC^{3-5} in the ♂ (but there is some variation in both directions from this mean), stalked (though often extremely shortly) in the ♀. The specimen from Hachijoshima is small (38 mm.), rather ochreous-tinged and strongly marked and may represent a local race. In any case, there seems to be some geographical, as well as individual, variation in this species. Specimens from Yezo (loc. typ.) are whitish, those from Kiushiu much browner, with a tinge of vinaceous buff; the fine series from Takao-San is intermediate, or in some specimens more greyish.

Additional localities to those given in Seitz are Ningpo (J. H. Leech) and the Riu-kiu Islands (two of each sex in Mus. Tring, approximately of the Kiushiu form).

277. **Ectropis costipunctaria** (Leech) (1891).

Takao-San, 5 June–14 July, 27 ♂♂, 17 ♀♀; 15 September 1925, 1 ♂.

Slightly variable, but none agree with *opertaria* Leech (see Seitz, *Macrolep.* iv. 378).

278. **Ectropis petrosa** (Butl.) (1879).

Takao-San, 21 May 1925, 1 ♂ (worn); 14 June 1925, 1 ♂; 18 June 1925, 1 ♂; 25 June 1925, 1 ♀; 14 July 1925, 4 ♂♂, 3 ♀♀; 7 July 1926, 2 ♂♂, 1 ♀. Sado I., 3–11 August 1926, 1 ♂.

Probably a development of the Indian genus *Racotis*. The series shows a similar, though less extreme, variability on the underside, as regards the development of broad dark borders, to that obtaining in the Khasi *R. boarmiaria* (Guen., 1858) and its ab. *obliterata* Warr. (1894). SC^1 of the forewing, though similarly short-stalked with SC^2, anastomoses shortly with C, but this is rarely of generic value in the *Boarmia* group.

279. **Ectropis sinearia noctivolans** (Butl.) (1881).

Takao-San, 21 May 1925, 1 ♂ (worn); 14 June 1925, 3 ♂♂; 21 June 1925, 1 ♂; 25 June 1925, 1 ♂; 5 June 1926, 2 ♂♂; 7 July 1926, 1 ♂, 2 ♀♀ (worn).

280. **Ectropis** sp.

Sado I., 1 ♀, 3–11 August 1926.

Very worn; closely similar to the doubtful *E. ictractabilis* (Walk., 1864) recorded by me from Upper Burma in *Journ. Bomb. Nat. Hist. Soc.* xxxi. 937, but with the cells slightly longer, postmedian line of hindwing more incurved in the middle. I cannot reconcile it with any species known from Japan.

281. **Aethalura ignobilis** (Butl.) (1878).

Takao-San, 14 July 1925, 2 ♂♂; 7 July 1926, 1 ♀. Near Tokyo, April 1925, 1 ♂. Hirayama, Nindo, 5 May 1926, 9 ♂♂, 1 ♀.

282. **Aethalura nanaria** (Stgr.) (1897).

Takao-San, 21 May 1925, 6 ♂♂; 14 June 1925, 1 ♂; 18 June 1925, 4 ♂♂, 1 ♀; 5 June 1926, 1 ♀; 9 June 1926, 3 ♂♂; 7 July 1926, 1 ♂, 1 ♀.

Smaller than the preceding species (22–28 mm. as against 28–35 mm. for *ignobilis*), ♂ antenna with fascicles of cilia rather less heavy, hindtibia of ♂ without hair-pencil (therefore not quite a typical *Aethalura* according to the diagnosis of McDunnough, *Studies N. Amer. Cleorini*, p. 36); forewing with antemedian line generally less irregular, median rarely, if ever, obsolescent posteriorly, postmedian rather more bent at radials; hindwing with cell-dot stronger, *closely* followed by the postmedian, which is costally contiguous to the posterior end of the median of the forewing; uncus more pointed, valve perhaps less long. Emergence apparently mainly between the two broods of *ignobilis*, though lasting to the beginning of July.

This species has been entirely overlooked. It is manifestly the one which Staudinger informs us (*Iris*, x. 61) he distributed under the name of *Bourmia punctularia* var. *nanaria* but which on publication he confused with *ignobilis*. It has therefore never been adequately described, though the indication " kleiner und etwas dunkler als deutsche *punctularia*," together with the locality " Amur " [-gebiet] is sufficient to validate the name; I select as type the very small (20 mm., by Staudinger's measurement) ♂ from Vladivostok, 21 May. Mr. J. J. Joicey has acquired, in the Kardakoff collection, a ♂ from the Vladivostok district, 24 May 1927, of exactly the same size as this lectotype. The Tring Museum already possessed one ♂ from Tokyo, December 1890, and six pairs from " Japan," undated. The Wileman and British Museum collections also had it mixed with *ignobilis*, the former containing 1 ♀ from Oyama, prov. Sagami, the latter a short series from Gifu.

283. **Hirasa paupera** (Butl.) (1881).

Takao-San, 14 June 1925, 1 ♂; 18 June 1925, 1 ♂, 1 ♀; 15 September 1925, 1 ♂, 3 ♀♀; 5 June 1926, 1 ♂, 1 ♀; 9 June 1926, 1 ♂, 3 ♀♀.

The second-brood ♂ is rather small, but not the ♀♀. There is an almost constant sexual dimorphism in the venation; the 5 ♂♂ have SC^1 of the forewing approaching SC^2 but without anastomosing, while anastomosis occurs in all the ♀♀ but one (5 June), in which the veins in question are appressed for some distance but without any fusion (*cf.* Sterneck, *Iris*, xlii. 225).

284. **Elphos insueta** Butl. (1878).

Nikko, October 1925, 1 ♂.

285. **Xandrames dholaria sericea** Butl. (1881).

Sado I., 1–15 August 1925, 10 ♂♂; 3–11 August 1926, 3 ♂♂.

286. **Xandrames latiferaria** (Walk.) (1860).

Sado I., 1–15 August 1925, 3 ♂♂, 1 ♀.

A rather small, rather dark form which, if it proves constant on the island, will be worthy of a separate name. The white, brown-strigulated band of the forewing is more or less narrowed, the white line of the hindwing also narrowed, in extreme cases almost obsolete. The female and one of the males, however, are much less extreme than the other two.

287. **Duliophyle agitata** (Butl.) (1878).

Takao-San, 15 September 1925, 1 ♂.

The curious coincidence of the capture of one specimen of each in the same locality, and within a few days of one another, led me to wonder whether this specimen, which is rather worn, could possibly be an extraordinarily *agitata*-like, dwarfed aberration of the following species. A careful examination, however, shows it to be a perfectly normal *agitata*, or only aberrant in the slightly enlarged cell-spot of the hindwing.

288. **Duliophyle majuscularia** (Leech) (1897).

Takao-San, 20 September 1925, 1 ♀.

This is not, as was suggested by Warren and in Seitz (*Macrolep.* iv. 381), a form of *agitata* Butl., for the ♀ antenna is pectinate, which is not the case in that species. The real distinction between *Xandrames* and *Duliophyle* is not in the antennae but in the venation (*cf.* Sterneck, *Iris*, xlii. 228).

289. **Itame fulvaria sordida** (Butl.) (1881).

Asama, July 1923, 2 ♂♂.

290. **Chiasmia lutearia** (Leech) (1891).

Takao-San, 15 September 1926, 1 ♂.

Smaller and less heavily marked than the originals from Oiwake, no doubt a second brood. The Wileman collection contains equally small specimens from Yoshino, Yamato, August and September.

291. **Tephrina vapulata** (Butl.) (1879).

Tokyo, 1–15 June 1926, 1 ♂.

292. **Aspitates formosaria** Eversm. (1837).

Takao-San, 14 June 1925, 1 ♂; 14 July 1925, 1 ♂; 7 July 1926, 1 ♂. Tokyo, June 1925, 1 ♂.

293. **Compsoptera simplex** (Butl.) (1878).

Nikko, May and June, 10 ♂♂, 4 ♀♀. Takao-San, 14 April 1925, 5 ♂♂; 19 April 1925, 2 ♂♂, 1 ♀. Tokyo, 3 June 1925, 1 ♀.

Planociampa gen.n.

Crown slightly tufted in front. Frons protuberant, with a (typically horseshoe-shaped) corneous ridge in front and projecting tuft of hair at side. Palpus short, hairy. Tongue developed. Antenna of ♂ bipectinate almost to the apex; of ♀ simple. Pectus densely hairy. Femora hairy. Hindtibia with all spurs.——*Forewing* rather narrow; cell long (about $\frac{3}{5}$); SC^1 from cell, connected by bar with C, SC^2 from stalk of SC^{3-5}, M^1 separate. Hindwing in ♂ ample, in ♀ narrow, in both sexes with abdominal region relatively ample; cell over $\frac{1}{2}$ (usually $\frac{3}{5}$); C approximated to SC to considerably beyond middle of cell, SC^5 variably stalked (very rarely about connate) with R^1, R^2 vestigial, M^1 well separate, SM^1 rather long.

Type of the genus: *Planociampa modesta* (Butl.) = *Pachyligia modesta* Butl. (1878).

In Seitz (*Macrolep.* iv. 413) I conserved the impossible taxonomic position assigned to Butler's *modesta* in the British Museum. Apart from the differences noted (*loc. cit.*), the frons is totally dissimilar and the suggestion that it probably belongs to the archaic Australian group of which *Chlenias* is perhaps the best-known genus seems warranted. I find, however, that it does not fit well into any described genus. From *Ciampa* Walk. (= *Ceratucha* Turn., *Proc. Linn.*

Soc. N. Sth. Wales, xliv. 399), which, as Turner says, "differs from *Chlenias* only by the horny frontal process." *Planociampa* deviates not only in the subcostal venation but also very essentially in the formation of the frontal process. The venation is as given by Turner for *Fiscra*, but that also has different antenna and is also dissimilar in shape, coloration and general habitus, so that any near affinity seems very improbable.

294. **Planociampa modesta** (Butl.) (1878).

Nikko, 26 June 1925, 2 ♂♂. Komato, near Tokyo, 7 April 1925, 1 ♂. Takao-San, 14 April 1925, 4 ♂♂; 19 April 1925, 1 ♂. Tokyo, April 1925, 24 ♂♂, 5 ♀♀; 1–15 April 1926, 2 ♂♂; 16–30 April 1926, 1 ♂; 30 June 1926, 1 ♂.

Very variable in size, all the ♀♀ and a few ♂♂—especially the last two—very small. One Tokyo ♂ (April 1925) is a pretty aberration, the forewing having the proximal area and the region between the postmedian and the subterminal suffused with rose-colour.

295. **Planociampa antipala** sp.n.

♂, 40–44 mm.; ♀, 50 mm. Differs from *modesta* as follows:

Frontal prominence less long, more densely clothed, the corneous ridge more concealed, more open below. Antenna ochreous. Hindwing in ♂ perhaps rather less elongate tornally, its line feeble, less zigzag than in *modesta*. General coloration more whitish, the hindwing white. ♀ *larger* than the ♂, less narrow-winged than that of *modesta*.

Nikko, 26 June 1925, 3 ♂♂, including the type. Takao-San, 14 April 1925, 1 ♂. Tokyo, 1–15 April 1926, 1 ♀.

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