

NEW SPECIES OF AFRICAN GEOMETRINAE (GEOMETRIDAE)

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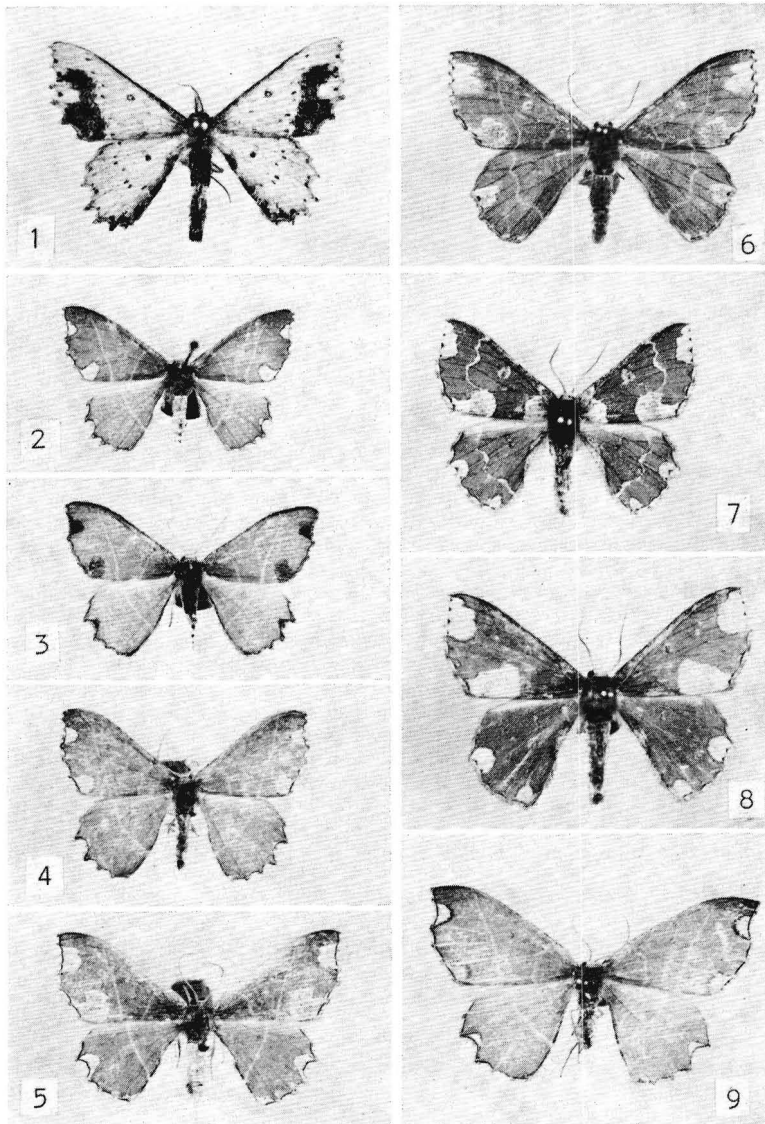
Victoria watsonae Carcasson, new species

Figs. 1, 14

Allied to *V. melanochlora* Carcasson (1962: 54) and to *V. gordonii* Prout (1912: 86), but differs from both in having the edges of the black markings diffuse, not well defined and in having no densely scaled green areas.

MALE. *Antennae:* Basal half pectinated, distal half simple. Dorsal aspect of shaft covered by pale pinkish brown (5YR 8/4 Munsell) white and sepia scales. *Head:* Vertex pinkish brown speckled with sepia. Frons whitish. Palpi cinnamon with sepia scales, laterally fringed with white below. *Thorax:* Patagia and tegulae light blue green (10G 7/4 Munsell). Dorsum anteriorly and laterally light blue green, reddish speckled with sepia at base. Venter whitish except for a vinaceous light red anterior collar. Inner surface of legs whitish, outer surface of tibiae and tarsi cinnamon speckled with sepia. *Abdomen:* Above pinkish white, 3 anterior segments heavily speckled with sepia and cinnamon. Segments 2 and 3 with a prominent dorsal crest consisting of very long, curly, pinkish cinnamon and sepia scales. Similar crests on 4, 5 and 6, but much paler, laterally edged with sepia. The crest on 6 just a small white tuft. Underside creamy white. *Upperside of forewing:* 17 mm from base to apex. Apex rather acute, termen regularly indented between veins. Wing lightly scaled, ground colour light blue green (10G 7/4 Munsell) with a few scattered blackish scales. Costa brownish pink speckled with sepia. Stigma a ring of raised blackish scales. Antemedial irregular, reduced to a blackish spot near costa, a faint blackish spot at cubitus and another at inner margin, connected by irregularly scattered blackish scales. Postmedial roughly parallel to outer margin, consisting of small irregular blackish dots at the veins from costa at 4/5 from base to inner margin at 2/3 from base. A large blackish blotch with diffuse margins containing scattered pinkish scales between postmedial and termen, from vein 6 to tornus and inner margin, reaching termen except between veins 3 and 4 where it encloses a large green marginal spot. A black terminal dot in space 3 and smaller one in space 6. Fringe blackish where dark areas reach the margin, otherwise pinkish mixed with blackish and green scales. *Hind wing:* Margin with deep inter-nervular indentations. Ends of veins 2, 3, 4 and 6 especially produced. Ground colour as in fw. A small patch of dense, silky white scales at base. Stigma a densely scaled black dot surmounted by a smaller orange pink dot. Postmedial irregular, consisting of small ill-defined blackish dots at the veins. Inner margin blackish with a few pink scales, except at base which is green. Tornus and termen up to vein 3 blackish. A blackish dot in space 2 near termen. A small black terminal spot in space 3, a larger one in 4, some black scales at termen of space 6 and at apex. Fringe as in fw. but with more green in pale areas. *Underside:* Thinly scaled, opalescent white, with dark stigmas, marginal spots and postmedial faintly showing through from upper surface. Blackish fw blotch as above, but denser, lacking pink scales.

Genitalia: Uncus sharply pointed, only slightly downcurved forming a rough equilateral triangle; a small rounded heavily sclerotised plate, almost at centre of uncus. Subunci membranous, hairy, not reaching tip of uncus. Gnathos a stout pointed process directed ventrad attached to a strong, heart-shaped sclerotised ring. Saccus short and pointed. Valve long and narrow, spatulate, terminating in a dorso-apical lobe densely covered internally by long, stout peg-like projections. Harpe long, narrow, sharply pointed, protruding beyond apex of valve. Aedeagus short and stout, lightly sclerotised, with long longitudinal apical opening on left side. Vesica protruding from



Figs. 1-9. African Geometrinae. 1, *Victoria watsonae* sp. nov., ♂; 2, *Archichlora rectilineata* sp. nov., ♂, holotype; 3, same, ♂, paratype (dark form, Mufindi); 4, same ♂ (Kigezi, Uganda); 5, same ♀, allotype; 6, *Archichlora sangoana* sp. nov., ♂, paratype; 7, *Archichlora jacksoni* sp. nov., ♂, holotype; 8, *Archichlora pulveriplaga* (Warren), ♂ (Kalinzu forest, Ankole, Uganda); 9, *Archichlora rectilineata* sp. nov., ♀ (Njoro, Kenya.)

All specimens reproduced at natural size.

left side of aedeagus, armed with two very large curved blunt spines, the apical larger and directed to the right, the smaller arising well below the apical and curving towards the left when not extruded.

Holotype. ♂, Grassfield, Nimba, Liberia, VI-VII 1967, Mrs. A. Forbes-Watson, to be deposited in the British Museum (Natural History). *Paratypes:* 4 ♂ ♂, data as above; 1, VI-VII 1967, 1 VII-VIII 1967, 1 II 1968, 1 VIII-IX 1967, to be deposited in National Museum, Nairobi, Kenya.

Archichlora jacksoni Carcasson, *new species*

Figs. 7, 10

Allied to *A. pulveriplaga* (Warren), (1898: 14), (figs. 8, 12), but differs in its smaller size, continuous pinkish postmedial line and in the presence of a basal pinkish blotch in the forewing.

MALE. *Antennae:* Basal half armed with short stiff pectinations. Proximal portion of shaft covered dorsally by white and light carmine scales, remainder light carmine. *Head:* Vertex white with a transverse carmine band mixed with sepia scales. Frons bright yellow green (10GY 6/6 Munsell). Palpi vinaceous red laterally, white ventrally. *Thorax:* Above bright yellow green (10GY 6/6 Munsell), shading to brownish red at posterior margin, uniform creamy white below. *Legs:* fore and mid legs white, speckled with carmine and vinaceous red on external surfaces; hind legs white. *Abdomen:* dorsal surface creamy white densely speckled with bright pink and sepia scales. Segments 2, 3, 4 and 5 armed with prominent pink and white, laterally sepia crests. Lateral and anal tufts creamy white. Venter creamy white. *Upperside of forewing:* 13-18 mm from base to apex. Costa very slightly incurved near middle, apex acute, but not falcate, outer margin slightly crenulate. Ground colour bright yellow green (10GY 6/6 Munsell). Costa broadly white, densely speckled with bright pink and sepia. An oval green spot at base of radius enclosed by an irregular whitish basal area speckled with sepia and pink particularly at base and inner margin. Pale basal area limited distally by narrow blackish antemedial and by some red scales. Ante medial starts at costa at 1/7 from base, bends sharply proximad in base of cell, curves regularly between cubitus and 1a, reaching inner margin at 1/4 from base. Stigma reniform, very large, pale pink surrounded by a narrow dark ring, enclosing irregular dark centre. Postdiscal very clearly defined, pale pink, narrowly edged on both sides with mixed blackish and red scales, from costa at 3/4 from base, angled distad at veins 7 and 6, broadening and bulging proximad from 6 to 4 narrowing and forming a broad, even curve distad to centre of space 2 where it becomes the inner margin of a large irregular pale pink tornal blotch. Tornal spot pale pink, narrowly edged with blackish and red scales, enclosing some red, brown and green scales; proximal margin of tornal spot (postmedial) curves abruptly proximad in space 1b reaching inner margin at just over 1/2 from base. Distally edge of tornal spot is angled distad at vein 2, then dips below it reaching termen at end of vein 2. A large pinkish white marginal spot with irregularly crenulate proximal margin edged with blackish and red scales, from apex to vein 3. Two small pinkish terminal lunules edged proximally with blackish and red in spaces 2 and 3. Termen narrowly sepia, broadening into small dark spots in spaces 4, 5, 6 and 7. Fringe whitish, mixed with some red and blackish, particularly at end of veins. *Hind wing:* Outer margin regularly crenulated. End of vein 6 especially produced. Ground colour as in fw, but costal area broadly white. Some bright red scales at base and separating white costal area from remaining green area. An elongated pinkish inner marginal area edged with blackish from base to middle of inner margin. Stigma narrower than in fw and more densely obscured by dark scales. Postmedial as in fw, of irregular thickness and shape but maintaining approximately same distance from margin throughout. A very large black-edged pinkish lunule in spaces 4-5 and a smaller one at tornus. A narrow blackish terminal

line wider at middle of internervular spaces. Fringe as in fw. *Underside*: Very pale green almost white with markings of upperside showing as pure white and faint red terminal line widening into minute lunules between the veins.

Genitalia: Uncus short, pointed, slightly downcurved, base 2/3 of length with a prominent lateral notch at each side. Subunci slender, membranous, hairy, shorter than uncus. Gnathos directed ventrad, slightly constricted at base, terminating in an antero-posteriorly flattened, bluntly pointed lobe armed with minute tubercles on posterior surface. Saccus short, broad and almost truncated apically. Valve regular, long and narrow, bluntly pointed apically. Harpe long and narrow, smooth, bluntly pointed apically and curving inward with dorsal margin almost parallel to costa of valve, somewhat shorter than valve. *Aedeagus*: basal half long and much narrower than remainder which is more lightly sclerotised except laterally and compressed into numerous minute folds. Apical opening long, longitudinal, on ventral surface, armed at base on left side by a blunt reflexed sclerotised lobe.

Holotype. ♂, Kakamega, Kenya, XII 1966, R. H. Carcasson and A. Forbes-Watson, to be deposited in British Museum (Natural History). *Paratypes*: ♂, Kakamega Kenya XI 1967, R. H. Carcasson, to be deposited in British Museum (Natural History); ♂, all data as above, to be deposited in National Museum, Nairobi; ♂, locality as above, III-1966, R. H. Carcasson, to be deposited in National Museum, Nairobi; ♂, Mt. Elgon, Kenya, VII-1966, T. H. E. Jackson, to be deposited in National Museum, Nairobi.

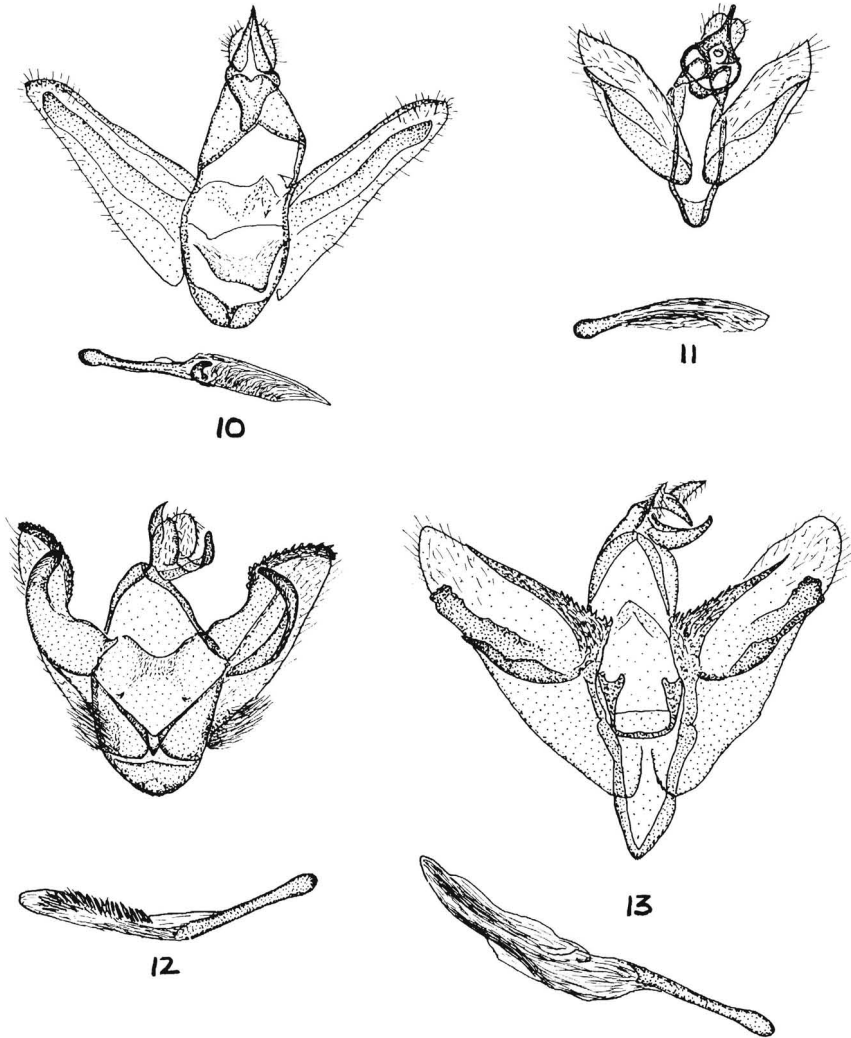
This species is dedicated to my friend, the late Mr. T. H. E. Jackson of Kitale, Kenya.

***Archichlora sangoana* Carcasson, new species**

Figs. 6, 13

Closely allied to *A. pulveriplaga* (Warren), (Figs. 8, 12), but differs in having continuous, sinuous postmedial lines and smaller terminal blotches.

MALE. *Antennae*: Basal pectinations decreasing very gradually from base to apex. Dorsal aspect of basal third of shaft covered by white scales. *Head*: Vertex white with a reddish dot at base of each antenna and a reddish basal tuft at each side. Frons bright green with some reddish scales at superior margin. Palpi whitish below, light orange brown above. A fringe of reddish hair-scales at lower margin of eye. *Thorax*: Uniform bright green above, except last segment which is light brown dorsally, yellowish laterally. Ventral surface of thorax woolly, pale green anteriorly, white laterally and posteriorly. *Legs*: Orange brown externally, creamy white internally. *Abdomen*: 1st segment light brown with a small paler dorsal tuft. Subsequent segments very pale brown with a dark dot flanking each side of the pale dorsal tufts. Underside uniform creamy white. *Upperside of forewing*: 17-20 mm from base to apex. Costa very slightly concave near middle, evenly convex at 3/4 from base. Apex acute. Termen moderately crenulate, tornus blunt. Ground colour green (25C 6/8 Munsell). Costa creamy white, mixed with purplish and red scales at base. A narrow blackish line separating white of costa from green ground colour near apex. Antemedial narrow, greenish yellow, from costa at 1/6 from base, to inner margin at 1/3 from base, slightly angled distad at cubitus and at 1b. Postmedial narrow, greenish yellow, from costa at 3/4 from base to inner margin at 2/3 from base, evenly and slightly curved distad from costa to vein 3, more strongly curved proximad from vein 3 to inner margin. Stigma large, pinkish white, surrounded by a ring of mixed blackish and red scales with a central dot of the same colour. A large whitish terminal blotch from vein 7 almost to vein 4, the proximal edge of which projects proximad in space 6 and more strongly so along vein 5. The pale blotch enclosing some bright ochreous scales and a few blackish scales in spaces 5 and 4, and narrowly edged proximally by a mixture of blackish and red scales. A similar but more rounded whitish blotch at tornus, in



Figs. 10–13. Male genitalia of African Geometrinae. 10, *Archichlora jacksoni* sp. nov., paratype; 11, *Archichlora rectilineata* sp. nov., paratype (Nairobi, Kenya); 12, *Archichlora pulveriplaga* (Warren), (Kalinzu forest, Uganda); 13, *Archichlora san-goana* sp. nov., paratype.

spaces 1a, 1b and 2, with a narrow terminal extension in space 2. Termen narrowly blackish, forming small internervular lunules in the areas occupied by the pale blotches. Cilia whitish, chequered with blackish at the ends of the veins. *Hind wing*: Outer margin somewhat produced at vein 6 and slightly concave between 6 and 4. Ground colour as above. Postmedial as above, parallel to outer margin. Stigma very small. A marginal blotch similar to those of fw but smaller and more regular between veins

6 and 4. A very small whitish blotch at tornus, joined to a similar small triangle pointed proximad along vein 1b, both edged with blackish and red scales. A small white patch at base. Inner margin narrowly edged with pinkish, blackish and red scales and hairs. Termen as in fw. Cilia uniformly grey, tipped with pinkish. *Underside*: Uniformly white, with markings of upperside showing through very faintly. Termen and cilia very narrowly blackish.

Genitalia: Uncus short, pointed, downcurved, almost as wide basally as long. Subunci short, membranous, hairy, pointed, projecting laterad and posterad, almost as long as uncus. Gnathos stout, pointed, projecting backwards, almost as long as uncus, its inner (posterior) surface serrated. Saccus short, broad and blunt. Valve apically pointed, tapering rapidly from a very broad base. Harpe broad, long, curved inwards, irregularly shaped, with irregularly jagged margin, shorter than valve. A long sharply pointed process projecting backwards from dorsal part of base of valve, armed dorsally and on internal face with numerous sharp appressed teeth. Aedeagus long, basal half much narrower than remainder, terminating in a pronounced rounded bulb-like expansion. Apical half membranous, compressed into numerous small longitudinal folds, unarmed. Opening long, ventral, longitudinal.

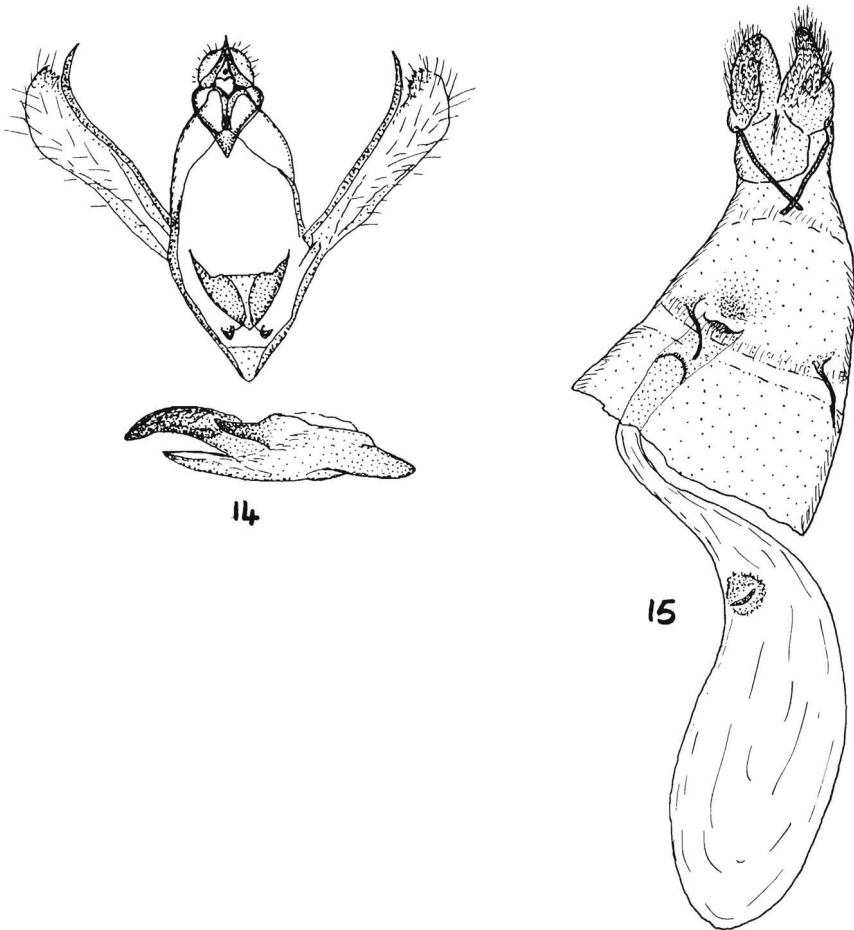
Holotype. ♂, Katera, Sango Bay, Masaka, Uganda. X-1960, R. H. Carcasson. *Paratypes*: 9♂♂, Malabigambo forest, Sango Bay, Uganda, II-1968, A. L. Archer. Holotype and 4 paratypes to be deposited in British Museum (Natural History); remaining 5 paratypes to be deposited in National Museum, Nairobi.

***Archichlora rectilineata* Carcasson, new species**

Figs. 2, 3, 4, 5, 9, 11, 15

Superficially similar to *A. pulveriplaga* (Warren), (Figs. 8, 12), and to *A. sangoana* Carcasson (Figs. 6, 13), but differs from both in being smaller, more slenderly built and in having straight postmedial lines.

MALE. *Antennae*: Basal half of shaft decorated dorsally with white, black and red scales. *Head*: Vertex white, sprinkled with red and black scales. Frons bright green, palpi creamy, speckled dorsally and especially apically with rusty brown. *Thorax*: Bright green (10GY 5/6 Munsell) dorsally. Very pale green below, shading to creamy white posteriorly. *Legs*: Very pale creamy buff, forelegs spotted with dark brown on exterior surface. *Abdomen*: Above: 1st segment purplish brown, remaining segments creamy buff, creamy white from segment 6 to apex. A pinkish dorsal crest on first 4 segments. A dark brown dorsal spot on segments 5, 6 and 7. Below: uniformly creamy white. *Upperside of forewing*: 15–16 mm from base to apex. Costa slightly but evenly arched. Apex acute. Outer margin slightly sinuous. Ends of veins 3, 4 and 7 slightly produced. Outer margin slightly concave from vein 4 to vein 7. Ground colour bright green (10GY 5/6 Munsell) with very faint paler vermiculations. Costa whitish, densely speckled with blackish and red scales. A small patch of such scales at base of costa. Antemedial narrow, light yellow-green, evenly curved from costa at 1/5 from base to inner margin at 2/5 from base. Postmedial slightly wavy, narrow, light yellow green, from costa at 3/4 from base to inner margin at 2/3 from base. Stigma a small whitish dot edged with blackish and red scales. A very pale pinkish, somewhat irregular, marginal lunule from just above vein 4 to middle of space 6, edged proximally by a very narrow blackish line. A similar but larger rounded blotch at tornus enclosing an area speckled with dark scales. Terminal line blackish, very narrow, of uniform width. Cilia whitish mixed with pink, blackish at the veins. *Hind wing*: Margin deeply crenulate, veins 6 and 4 especially produced. Ground colour as above. Postmedial as above, almost straight from just above junction of veins 6 and 7 to inner margin just beyond 2/3 from base. Stigma very small, white. A whitish marginal lunule similar to that of fw with its apex directed proximad along vein 5. A similar but much smaller spot at tornus. Terminal line as in fw, cilia somewhat darker. Inner margin narrowly edged with blackish and red scales and by long



Figs. 14, 15. Male and female genitalia of African Geometrinae. 14, *Victoria watsonae* sp. nov., ♂, paratype; 15, *Archichlora rectilineata* sp. nov., ♀, paratype.

whitish hairs. *Underside*: Generally whitish, shading to light green at costa and apex of fw. Costa of fw narrowly blackish, stigma a minute reddish dot barely visible in hw. Lunule of fw sepia, if present, with ill defined proximal edge. Terminal line and cilia of both wings as above.

Genitalia: Genital capsule slender and lightly sclerotised. Uncus short, downcurved and sharply pointed. Subuncus broad, membranous, hairy, almost as long as uncus. Gnathos a simple, bluntly pointed short projection. Saccus short, apically rounded. Valve simple, regular, with apex gently pointed, rather broad at base, and with ventral margin strongly elbowed midway from tip of saccus to apex. Harpe simple, broad, close to ventral margin of valve, terminating in a smooth, inwardly curving spoon-like lobe, apex of harpe not reaching apex of valve. Aedeagus lightly sclerotised, unarmed, with basal bulb much shorter and broader than in other species. Opening of aedeagus long, ventral.

FEMALE. Similar to male, but larger, with more rounded wings. Fw 18–20 mm from base to apex. Ovipositor lobes long and slender, curving inwards near apex. Anterior and posterior struts slender and moderately long. Ostium simple, opening posterad, vaginal plates very weakly sclerotised. Colliculum absent, ductus long and slender with a sack-like expansion near base. Bursa long and slender, ovoid. Signum at base of bursa, a smooth, large, irregularly rounded sclerotised plate with an inward projecting, straight, transverse median ridge.

Two males from Mufindi, Iringa, Tanzania, belong to an individual melanistic variant in which the dorsum of the abdomen is much darker, the marginal lunules and blotches are completely filled in by blackish scales and the cilia are uniformly blackish. A male from Kigezi, Western Uganda, and a female from Njoro, Kenya are identical, with typical form, but have a slightly curved postmedial in the hw and may represent a West Rift subspecies.

Holotype. ♂ (pale form), Mufindi, Iringa, Tanzania, P. Burdon, to be deposited in British Museum (Natural History); *Allotype:* ♀ (pale form), Amani, Usambara, Tanzania, X-1962, G. Pringle (No P 1188); *Paratypes:* ♂ (pale form), Ngong, Nairobi, Kenya, II-1954, Fowler and Coulson, in National Museum, Nairobi; ♂ (dark form) Mufindi, Iringa, Tanzania, 1955, P. Burdon, to be deposited in British Museum (Natural History); ♂ (dark form), data as above, in National Museum, Nairobi; ♀ (pale form) Nairobi, Kenya, VI-1958, R. Carcasson, in National Museum, Nairobi.

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BOOK REVIEW

A KEY TO THE RHOPALOCERA BUTTERFLIES OF WYOMING, by Clifford D. Ferris. Science Monograph No. 21, Agriculture Experiment Station, University of Wyoming, Laramie, Wyo. January 1971. 64 pp., 3 figs., 8 pls.

Dr. Ferris has tried to present in this slim volume a useable key to the butterflies of Wyoming. Like all keys that I have seen, it is useful in the hands of those of us who need no key and not so in the hands of a rank amateur. The eight plates at the back of the book figure in black-and-white all of the species that the 4-H member or beginner will find. The key to *Colias* and the discussions of *Speyeria* and *Euphydryas* will be found helpful to those who have Wyoming material to name. An annotated checklist for the state is promised for "late 1971." From what I have seen of Ferris's notes for this it is going to be a most useful index to the species found and where they usually may be caught. Dr. Ferris did not see final page proof, so, there are a few typographical errors that he would have caught.

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