

## GEOMETRIDAE FROM THE MARQUESAS ISLANDS \*

By

LOUIS B. PROUT

The collections submitted to me by the Pacific Entomological Survey for examination consist of 323 specimens unequally distributed among nine species, more than half belonging to the single introduced geometrid which has not yet been taken in the Marquesas, *Gymnoscelis imparatilis* Walker.

Our previous knowledge of the Marquesan Geometridae was obtained exclusively from the St. George Expedition. From my report on the collection which was made on that occasion,<sup>1</sup> it will be seen that 9 species were recorded from the Marquesas; 2 *Scopula*, 3 *Chloroclystis*, 1 *Gymnoscelis*, and 3 *Cleora*. One of these, *Chloroclystis ambundata* Prout, was founded on two females, which remain its sole known exponents; another, *Scopula tersicallis* Prout, has not been rediscovered in its original locality nor in its original form, but is now shown to have two representative species—possibly local races—in other islands; seven species are found in both collections.

The Marquesas may therefore now be credited with 11 geometrid species, representing only four genera; the ten endemic species, indeed, belong to three genera only. Intensive collecting, especially at the higher altitudes, will probably be rewarded with a few further discoveries, but it is already manifest that the fauna is very poor.

The genus *Scopula* (subfamily Sterrhinae) is in some respects the most interesting. It is an exceptionally large genus of almost world-wide distribution and is not generally characteristic of high altitudes; on the contrary, Mr. H. M. Pendlebury, a good authority on collecting in the Malayan mountains, expressly associates it with "open country, especially cultivated areas, either in the plains or on hill stations."<sup>2</sup> But on Hivaoa it has only been found above 3000 feet, on Uahuka at 2850 feet, and on Uapou at 3200 feet. The combined influence of the two kinds of isolation, insular and vertical, has shown itself in the *tersicallis* group, which offers a clear example of island endemism, a condition already known to have developed to a high degree in other genera in the Marquesas.

The genus *Chloroclystis* (subfamily Larentiinae) has not yet shown any similar endemism. Its three representatives probably belong to three different

<sup>1</sup> Prout, L. B., The Geometridae of the St. George Expedition from French Oceania: Ent. Soc. London, Trans., vol. 77, pt. 2, pp. 265-277, 1929.

<sup>2</sup> Pendlebury, H. M., in Prout, L. B., On the Geometridae of Mount Kinabalu: Fed. Malay States Mus., Jour., vol. 17, pt. 1, p. 40, 1932.

\* Pacific Entomological Survey Publication 7, article 13. Issued January 30, 1934.

sections; *C. torninubis* Prout has been found on four islands, *C. coloptila* also on four, but I have not been able to discover racial peculiarities.

The genus *Cleora* (subfamily Geometrinae) comprises three Marquesan species. The individual variability of the first two renders their differentiation difficult and a delimitation of races still more difficult. Yet there are indications of "colonies" in some places, dependent perhaps more upon altitude than latitude or longitude. The remaining *Cleora*, *C. leucostigma* Prout has only been found in one locality, Feani Ridge, Hivaoa.

#### SUBFAMILY STERRHINAE

##### *Scopula oxystoma* Prout.

*Scopula oxystoma* Prout: Ent. Soc. London, Trans., vol. 77, pt. 2, p. 266, 1929.

Hivaoa: Temetiu Summit, altitude 3900 feet, January 20, 1930, at light, 1 male, LeBronnec.

A representative of the more primitive section of *Scopula*, sometimes regarded as a separate genus under the name *Pylarge* Herrich-Schaeffer, characterized by the retention of terminal spurs on the male hind tibia. *Scopula oxystoma* is not very similar to any other known species. The originals, 3 males, were captured at light on January 28, 1925, altitude 3500 feet.

##### *Scopula menytes*, new species.

Male, 23 mm. Antennal ciliation as in *S. tersicallis* Prout<sup>3</sup>; hind leg with tibia scarcely longer than femur, without spurs, tarsus one-third as long again as tibia. Body and wings decidedly more tinged with buff than in *S. tersicallis*. Forewing less strongly elongate than in *S. tersicallis*, shaped almost as in *S. oxystoma* Prout; markings distinguishable from those of *S. tersicallis* chiefly by the median shade, which is almost equally developed throughout—fairly broad, but ill defined—and has its acute angle at  $R^3$  instead of  $R^2$ . Hind wing with termen somewhat gibbous in the middle, very noticeably concave between  $M^1$  and  $SM^2$ ; cell dot relatively larger than in *S. tersicallis*, median shade broader, slightly more proximal, obsolescent anteriorly, postmedian also broader, both it and the subterminal more sinuous, bluntly angled outward about  $R^3$  and  $M^1$ .

Uahuka: Hitikau Ridge, altitude 2850 feet, March 4, 1931, 1 male, LeBronnec and H. Tauraa. Type in B. P. Bishop Museum.

It is regrettable that this and the following are only known from single specimens and *S. tersicallis* Prout only from three, the one male defective. They clearly represent a homogeneous group, and *S. menytes* may be accepted as giving evidence that, contrary to expectation, the leg structure differs from that of *S. oxystoma* Prout. The distinctions within the group, especially in shape, seem too great to be merely varietal, but it is necessary to add that the wings of *S. menytes* type are slightly crumpled, a condition which may

<sup>3</sup> Prout, L. B., The Geometridae of the St. George Expedition from French Oceania: Ent. Soc. London, Trans., vol. 77, pt. 2, p. 267, 1929.

indicate either that the specimen was killed before they were perfectly dry or that it is slightly crippled; there is sometimes an accompanying derangement of shape or markings.

**Scopula angusticallis**, new species.

Female, 23 mm. Smaller than *S. tersicallis* Prout, forewing less strongly elongate, the wing shape almost as in *S. oxystoma* Prout and with several further distinctions, as noted below. Foreleg mixed with fuscous on inner side. Forewing with the median and postmedian lines less extremely oblique, the latter more proximally placed, narrowing the clear band and scarcely marked with dark dots or dashes; well-defined lines or shades, bounding the subterminal proximally and distally. Hind wing with cell dot relatively larger; the markings beyond corresponding to those of the forewing.

Uapou: Tekohepu Summit, altitude 3200 feet, November 28, 1931, at light, 1 female, LeBronnec. Type in B. P. Bishop Museum.

SUBFAMILY LARENTIINAE

**Chloroclystis torninubis** Prout.

*Chloroclystis torninubis* Prout: Ent. Soc. London, Trans., vol. 77, pt. 2, p. 267, 1929.

Hivaoa: Kakahopuanui, Kaava Ridge, altitude 2460 feet, January 5 and 6, 1932, at light, 3 males, 7 females; Tenatinaei, Feani Ridge, altitude 3970 feet, January 13 and 14, 1932, at light, 1 male, 3 females; LeBronnec.

Uapou: Teoatea, Hakahetau Valley, altitude 1950 feet, November 17, 1931, at light, 1 female, LeBronnec.

Eiao: above Vaituha, altitude 1200 feet, October 3, 1929, at light, 1 female, A. M. Adamson.

Founded on a long series from Hivaoa, chiefly at 3500 feet, but some recorded from near sea level, and a few from Tahuata at 500-850 feet.

The series now under review shows considerable variation. The most striking aberration is a female from Kaava Ridge with the entire median area of the forewing darkened into a band, the dark tornal suffusion very strong. This aberration is not yet known in the male.

**Chloroclystis coloptila** Prout.

*Chloroclystis coloptila* Prout: Ent. Soc. London, Trans., vol. 77, pt. 2, p. 268, 1929.

Hivaoa: Atuona, May 15, 1929, at light, 3 females, Mumford and Adamson; Kaava Ridge, altitude 2460 feet, January 5 and 6, 1932, at light, 3 females; Feani Ridge, Tenatinaei, altitude 3960 feet, January 14, 1932, at light, 1 female; LeBronnec.

Uapou: Hakahetau Valley, altitude 1500 feet, December 26, 1929, 1 male. A. M. Adamson.

Eiao: above Vaituha, October 3, 1929, altitude 200 feet, 1 female; altitude 800 feet, 1 male, 3 females; altitude 1200 feet, 1 female, at light, A. M. Adamson.

The type series was from Nukuhiva, taken at low altitudes; the St. George Expedition also brought similar specimens from Hivaoa, sea level to 1200 feet. The Pacific Entomological Survey has added materially to our knowledge of its vertical distribution on the island and of its range in the Marquesas, but its variation is only slight.

**Gymnoscelis imparatilis** (Walker).

*Botys imparatilis* Walker: List Lep. Ins., pt. 34, p. 1416, 1865.

*Gymnoscelis imparatilis* Prout: Insects of Samoa, vol. 3, pt. 3, p. 142, 1928.

Hivaoa: Atuona, May 15, 1929, at light, 1 male, Mumford and Adamson; Avaao Valley, altitude 1350 feet, January 4, 1932, at light, 69 males, 29 females; Kakahopuanui, Kaava Ridge, altitude 2460 feet, January 5-7, 1932, at light, 7 males, 48 females; Tenatinaei, Feani Ridge, altitude 3970 feet, January 14, 1932, at light, 6 males, 7 females; LeBronnec.

Nukuhiva: Taiohae, sea level, June 4, 1931, at light, 3 males, 2 females, LeBronnec.

I have published the synonymy and need not repeat it here. This very widely distributed *Gymnoscelis* has been found from India to the Society Islands and is the only Marquesan geometrid which may prove of economic importance. It "is probably . . . . a general feeder and adaptable in its larval habits . . . . At Pusa it has been bred from flowers of *Cassia fistula*. At Kuala Lumpur larvae of the *subtristigera* (Walker) form have been found boring in *Tabernaemontana* species. At Townsville the larvae of *G. delocyma* (Turner) fed on *Scyphiphora hydrophylacea*, turning over and fastening down the young foliage and feeding under cover like a pyrale."<sup>4</sup>

SUBFAMILY GEOMETRINAE

**Cleora collenettei** Prout.

*Cleora collenettei* Prout: Entomologist, vol. 62, p. 255, 1929; Ent. Soc. London, Trans., vol. 77, pt. 2, p. 274, 1929.

Hivaoa: Atuona, May 15, 1929, 3 males, Mumford and Adamson; Avaao Valley, altitude 1350 feet, January 4, 1932, at light, 2 males, LeBronnec.

Fatuhiva: Omoa [Oomoa] Valley, near sea level, August 18, 1930, 2 males, LeBronnec.

Uapou: Teavanui Pass, altitude 2900 feet, November 28, 1931, at light, 1 male, LeBronnec; Hakahetau Valley, altitude 1500 feet, December 26, 1929, 2 females, R. R. Whitten.

<sup>4</sup> Prout, L. B., The Geometridae of the St. George Expedition from French Oceania: Ent. Soc. London, Trans., vol. 77, pt. 2, p. 271, 1929.

Uahuka: Hane Valley, altitude 150 feet, March 8, 1931, at light, 1 male, LeBronnec and H. Tauraa.

Eiao: Vaituha, sea level, October 2, 1929, 1 male, 8 females, the male and 2 females taken at light, altitude 200 feet, October 3, 1929, at light, 1 female; above Vaituha, altitude 800 feet, October 3, 1929, at light, 4 males, 2 females; Adamson.

Moderately variable, perhaps more so in size than in markings. The series from Eiao includes the smallest specimen which I have seen, the female from above Vaituha at 800 feet measuring barely 26 mm.; except for one or two females the average size is perhaps small, but I do not see any palpable racial distinctions. The male from Uapou, noteworthy for the high altitude at which it was captured (2900 feet) is in very poor condition, but I do not feel any doubt regarding its determination. Its subterminal spots appear relatively well developed—probably an individual aberration, anyway not unique. Two of the males from Atuona and one from Avaoa represent the fine banded male aberration recorded from the same island in my report on the Geometridae of the St. George Expedition. The two specimens from Fatuhiva, both worn, do not admit of any generalization.

#### **Cleora esoterica** Prout.

*Cleora esoterica* Prout: Entomologist, vol. 62, p. 255, 1929; Hill Mus. Bull., vol. 3, no. 3, p. 214, 1929; Ent. Soc. London, Trans., vol. 77, pt. 2, p. 275, 1929.

The original form of male *C. esoterica* is not found in the Pacific Entomological Survey collection and may represent a strictly localized colony. Careful examination of the 53 mountain *Cleora* which most closely approach it, especially of the 32 males, shows that they cannot be merged in *C. collenettei* but have very nearly—sometimes almost exactly—the structural distinctions which I gave for *C. esoterica*. Yet these distinctions, slight at best, prove to be inconstant, though within narrow limits. The precise number of nonpectinate joints of the male antenna certainly varies, even within a single colony; so, too, does the exact relation of the hind-tarsal to the hind-tibial length. The genitalia have not yet yielded “tangible results;” the suggestion<sup>5</sup> that the tip of the valve is less narrowed than in *C. collenettei* holds as a generalization but cannot be over-pressed. There is evidence, therefore, of an assemblage of incipient species which will demand biological as well as morphological investigation. It is to be hoped that in the future workers may be found to devote to it the intensive study which is being bestowed on some parallel groups in Europe, such as *Zygaena* or *Oporinia*. Mr. Collette's station at 3500 feet was not worked by M. LeBronnec but produced,

<sup>5</sup> Prout, L. B., A revision of the Indo-Australian *Cleora* of the alienaria group: Hill Mus. Bull., vol. 3, p. 215, 1929.

besides true *C. esoterica*, two or three small specimens which on account of their size I assumed to be *C. collettei*; unless there be three Marquesan species of the group, I must perforce deal with them as a form of *C. esoterica*, forma *pusillanimis*.

***Cleora esoterica* forma *pusillanimis*, new form.**

Male, 30-34 mm.; female, 33-38 mm. Smaller than name-typical *C. esoterica*, especially the male. Antenna of the male perhaps generally with only 20-22 nonpectinate joints (nearly all broken, at least at the tips). Hind wing with termen less crenulate, sometimes scarcely more so than in *C. collettei*. Coloration of the male in general much less dark, more variegated, the prevailing tone more drab or buffy brown, the bands which accompany the antemedian and postmedian lines generally inclining to tawny olive. Female at least as variable as the name-typical form, not yet sharply differentiable.

Hivaoa: Kakahopuanui, Kaava Ridge, altitude 2460 feet, January 5-7, 1932, at light, 19 males, 6 females, the typical series; Avaao Valley, altitude 1350 feet, January 4, 1932, at light, 2 males; Temetiu Summit, altitude 2900 feet, January 20, 1932, at light, 2 males; Feani Ridge, altitude 2960 feet, January 13-14, 1932, at light, those of the latter date labeled Tenatinaei, 6 males, 15 females; LeBronnec.

Fatuhiva: Vaikoao, altitude 1600 feet, August 21, 1930, at light, 1 male, LeBronnec.

Uapou: Tekohepu Summit, altitude 3200 feet, November 28, 1931, at light, 2 males, LeBronnec.

Type in B. P. Bishop Museum.

Probably some further separations may be possible with longer and fresher series. The Fatuhiva male is much rubbed and torn. The two from Uapou show wide disparity; one, expanding nearly 36 mm., is in fair condition, almost as dark as typical *C. esoterica*, of which, if *pusillanimis* be a separate species, it might be regarded as a less crenulate-margined race; the other, expanding only 30 mm., is poor, but seems closely like some Kakahopuanui *pusillanimis*.

A few clouded aberrations occur among the Hivaoa series. The most striking is one from Temetiu Summit; in it a broad median band on the forewing and the whole hindwing as far as the postmedian line are black-grey. The males from Feani Ridge, 3960 feet, show some tendency in the direction of racial differentiation; four of them are large (about equalling typical *C. esoterica*), of a warmer tone, and with a more or less pronounced pale area outside the antemedian line, in one specimen reaching the postmedian.

*Cleora collettei* is generally very easy to distinguish from *pusillanimis* by its color. The male always and the female generally have a tawny-buff

to vinaceous-buff ground color, with the bandlike shades merely a little darker (avellaneous to wood-brown) and with very little irroration; even when the female is whiter it is probably never entirely devoid of this tint. Its lines are generally weak, but arise from stronger blackish costal spots. The few strongly marked aberrations developed narrow dark shades in place of the avellaneous, as accompaniment to the antemedian and postmedian.

In the one locality, Avaoa Valley, 1350 feet, where the two were taken together, the color difference is clearly manifest. The female under side is very much less mottled than that of *pusillanimis* and commonly has a very characteristic, though shadowy, band near the termen of the forewing, conspicuously pale-edged distally.

**Cleora leucostigma** Prout.

*Cleora leucostigma* Prout: Ent. Soc. London, Trans., vol. 77, pt. 2, p. 276, 1929.

Male

Antenna rather long, pectination extremely long (perhaps 12), lax, inclined to curl about the shaft as in the preceding group, well ciliated; apical fifth nonpectinate, with single bristles. Hind tibia not dilated. Fovea moderate.

Hivaoa: Feani Ridge, altitude 3960 feet, January 13, 1932, at light, 2 males, 6 females; Tenatinaei, Feani Ridge, altitude 3960 feet, January 14, 1932, at light, 2 males, 27 females; LeBronnec.

This interesting species was founded on a single female, taken at light on Hivaoa, altitude 3500 feet, on January 28, 1925, by the St. George Expedition. It is now possible to add the male characters.

The structure confirms the generic position which I had given, but *C. leucostigma* remains a somewhat isolated member of Section B of my revision.<sup>6</sup>

Variability slight, consisting chiefly in the degree of development of the light spot outside the cell of the forewing; this spot is often very little paler than the ground color, occasionally almost concolorous therewith.

<sup>6</sup> Prout, L. B., A revision of the Indo-Australian *Cleora* of the alienaria group: Hill Mus. Bull., vol. 3, no. 3, pp. 179-222, 1929.