

## HEMIPTERA

## HETEROPTERA OF GUAM

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## INTRODUCTION

This paper deals with the heteropterous Hemiptera collected mainly by O. H. Swezey and me during an insect survey of Guam in 1936. We were preceded by E. H. Bryan, Jr., who turned over to us his insect collections of two months. Mrs. Swezey accompanied us and assisted in many ways. Thanks are due, also, to various residents of Guam, especially A. I. Cruz, and to the naval authorities at that time, all of whom made our stay enjoyable and profitable.

I collected from April 27 to July 6, and Mr. Swezey continued until November 30. Daily trips were made from our house on the Root Agricultural School grounds at Piti. Adequate roads enabled us to drive to all sections of the island, and fairly good trails made it possible to reach even the most remote areas. Field work occupied most of the daylight hours and the light of our porch attracted many insects during the evenings. Mounting of specimens was done at the end of each day or early the following morning.

## HISTORY

Previous to our visit, 12 species of Heteroptera had been recorded from Guam and the neighboring Marianas Islands. The first of these, *Parealda chrysoptera*, was described by Herrich-Schaeffer in his "Die Wanzenartigen Insekten" in 1844. The three lygaeids, *Graptostethus nigriceps*, *Nysius pulchellus*, and *Ninus insignis*, were described next by Stål (1859) from the Eugénie Resa expedition in 1852. At the close of the century (1899) Marché evidently collected in the Marianas, for *Coleotichus breddini* Schouteden (1905), *Parealda bowvieri* Schouteden (1907) (= *chrysoptera* Herrich-Schaeffer), *Creontiades stramineus* Walker (see Poppius, Hist.-Nat. Mus. Nat. Hung., Ann. 13: 18, 1915), and *Anisops hyperion* Kirkaldy (Wien. Ent. Zeitung 23: 114, 1904) (= *Anisops cleopatra* Distant ?), were reported from his collection, which is apparently a part of the collection of the Paris Museum. *Creontiades* was definitely recorded from Agrigan, a small island north of Rota, but the others were simply recorded from the Marianas as a group.

Twenty-one additional species were collected by D. T. Fullaway in 1911, but only one species, *Cimex lectularius*, was actually listed by him [Guam Agric. Expt. Sta., Ann. Rept. (1911), 33, 1912] and present records suggest

that this was a misidentification of the tropical bed bug, *Cimex hemipterus*. The material collected by Fullaway was deposited in Bishop Museum and in the United States National Museum. It constitutes a valuable addition to the material available for study and contains representatives of species not seen by us in the field. Only one species of Hemiptera, *Tingis guamensis* Drake, was described from this material, and that not until 1941.

*Brachyplatys pacificus* was recorded from the "Marianne Is." by Distant (Nova Caled., Zool. 1: 370, 1914), presumably on the basis of material in the collection of the British Museum (Natural History).

Five species were collected by Hans G. Hornbostel on Guam and Rota in 1923 and were deposited in the Bishop Museum collection.

In 1925, S. R. Vandenberg became entomologist for the Guam Agricultural Experiment Station and continued until the station was closed in 1932. His first report [Guam Agric. Expt. Sta., Rept. (1925), 19, 1926] mentioned *Leptocorisa varicornis* as having ruined the rice crop at various times. As mentioned later, the Guam *Leptocorisa* now proves to be *acuta*. In his report for 1926 [Guam Agric. Expt. Sta., Rept. (1926), 15, 1928], Vandenberg states that an insect collection was started but was ruined by mold and by book lice. The last species of Hemiptera mentioned by Vandenberg was *Leptoglossus* species which was injurious to watermelons, squash, and muskmelons in the southern part of the island [Guam Agric. Expt. Sta. Rept. (1927), 16, 1929].

Esaki [Ins. Samoa 2(2):75, 1928] lists the gelastocorid, *Peltopterus macrothorax* (Montrouzier) from the "Marianne or Ladrone Is." but does not state on which island the specimens in the British Museum were collected. We looked in vain for this species on Guam.

At the time of our visit to Guam, Teiso Esaki was collecting on the neighboring islands of Saipan and Rota and elsewhere in the then Japanese mandated islands of Micronesia. He has made several additional trips since that time. The only report of the Marianas Hemiptera of these expeditions other than a cursory review in the Proceedings of the Sixth Pacific Science Congress was published by Esaki in *Tenthredo* in 1937. Included were *Microvelia diluta* from Saipan, *Halovelia bergrothi* from Rota, *Halobates mariannarum* from Rota, and *Limnogonus fossarum* from Saipan.

Following our collecting, R. G. Oakley was stationed on Guam by the Bureau of Entomology and Plant Quarantine of the United States Department of Agriculture. Mr. Oakley collected some insects not seen by us including one species of Heteroptera, *Plinachtus acicularis* (Fabricius).

Preliminary reports of our collections have been published by Swezey in *The Hawaiian Planters' Record* for 1936 and 1940, and in the *Guam Recorder* for January and February 1937.

The present work lists 69 genera, 99 species and one variety from Guam. Of these, one genus, 47 species, and one variety are described as new. By way of comparison, 73 genera, 104 species, and four varieties have been reported from Savaii, Upolu, Tutuila, and Manua in the Samoan Islands.

## GEOGRAPHIC DISTRIBUTION

A detailed comparison of the hemipterous faunas of the various island groups in Oceania must await complete study of the exhaustive collections already on hand or stored in Bishop Museum and in the collection of the Hawaiian Sugar Planters' Association Experiment Station. Meanwhile, relatively well-known Samoan, Hawaiian, and Philippine faunas will serve as useful guides to determine the place of Guam in the general zoogeographic picture. These island groups lie to the south, east, and west of Guam, and represent distinct but adjacent zoogeographic subregions, Guam being in the so-called Micronesian subregion. A summary of the Guam Heteroptera is given below, an × in the appropriate square indicating the occurrence of a species on one or more of the Samoan, Philippine, or Hawaiian Islands. In the last column, other localities are listed or the general distribution of the species is summarized according to zoogeographic regions and subregions as defined by China [Ins. Samoa 2(3) : 85-89, 1930].

Table 1. Distribution of Guam Hemiptera-Heteroptera

	SAMOA	PHILIPPINES	HAWAII	OTHER LOCALITIES
Family Plataspidae				
1. <i>Brachyplatys pacificus</i> Dallas	×			Tonga, Wallis, New Caledonia, and Austro-Oriental subregion
Family Cydnidae				
2. <i>Geotomus pygmaeus</i> (Dallas)	×	×	×	Society Islands, Oriental region
3. ? <i>Adrisa flavo-marginata</i> Vollenhoven				New Caledonia
Family Scutelleridae				
4. <i>Coleotichus breddini</i> Schouteden				
5. <i>Coleotichus marianensis</i> , new species				
6. <i>Calliphara munda</i> Stål				China, Rota Island
Family Pentatomidae				
7. <i>Glaucias inornata</i> (Stål)		×		
8. <i>Alciphron glaucus</i> (Fabricius)	×			New Caledonia, Australia, Fiji, Solomon Islands
9. <i>Catacanthus</i> species				
10. <i>Parealda chrysoptera</i> (Herrich-Schaeffer)				
Family Coreidae				
11. <i>Leptoglossus australis</i> (Fabricius)	×	?		Fiji, Society Islands, Austro-Oriental subregion
12. <i>Plinactus acicularis</i> (Fabricius)				India
13. <i>Leptocoris acuta</i> (Thunberg)		×		Oriental region
14. <i>Melanacanthus marginoguttatus</i> Distant	×			Fiji, New Zealand, Australia
15. <i>Leptocoris carnivorus</i> , new species				Palau Island (Carolines)

Table 1. Distribution of Guam Hemiptera-Heteroptera—Continued

	SAMOA	PHILIPPINES	HAWAII	OTHER LOCALITIES
<b>Family Lygaeidae</b>				
16. <i>Graptostethus nigriceps</i> Stål	×			Fiji, Ascension
17. <i>Nysius pulchellus</i> Stål				
18. <i>Nysius caledoniae</i> Distant		×		New Caledonia
19. <i>Ninus insignis</i> Stål		×		Ceylon, Java, Fiji
20. <i>Oxycarenus bicolor</i> Fieber				India, Saipan, Carolines
21. <i>Clerada apicicornis</i> Signoret	×	×	×	Tropicopolitan
22. <i>Pachybrachius pacificus</i> (Stål)	×			Fiji, Society Islands, Australia Tuamotus, Mangareva, Carolines
23. <i>Pachybrachius limbatus</i> (Stål)	×			Fiji, Niue
24. <i>Pachybrachius nietneri</i> (Dohrn)	×	×		Fiji and Oriental region
25. <i>Pachybrachius nigriceps</i> (Dallas)	×	×	×	Society, New Zealand, Australia
26. <i>Pachybrachius chinai</i> , new species				
27. <i>Paromius pallidus</i> (Montrouzier)	×			Fiji, Seychelles, New Caledonia, Australia, Mangareva, Oriental region
28. <i>Paromius piratoides</i> (Costa)		×		Carolines
29. <i>Cligenes marianensis</i> , new species				
<b>Family Aradidae</b>				
30. <i>Mezira marianensis</i> , new species				
31. <i>Neuroctenus pacificus</i> , new species				
32. <i>Calisius dilaticeps</i> , new species				
<b>Family Tingidae</b>				
33. <i>Tingis guamensis</i> Drake				
<b>Family Enicocephalidae</b>				
34. <i>Oncylocotis swezeyi</i> , new species		×		
<b>Family Reduviidae</b>				
35. <i>Hadrocranella pallidicoxa</i> , new species				
36. <i>Emesopsis pilosus</i> , new species				
37. <i>Ademula distincta</i> , new species				
38. <i>Empicoris tessellatus</i> McAtee and Malloch				Singapore
39. <i>Empicoris minutus</i> , new species			×	
40. <i>Polytoxus pilosus</i> , new species				
41. <i>Polytoxus marianensis</i> , new species				
42. <i>Peregrinator biannulipes</i> (Montrouzier and Signoret)	×	×		Fiji, New Caledonia, Tropicopolitan
43. <i>Physoderes minor</i> , new species				
<b>Family Nabidae</b>				
44. <i>Nabis capsiformis</i> Germar	×	×	×	Tropicopolitan
<b>Family Cimicidae</b>				
45. <i>Cimex hemipterus</i> (Fabricius)	×			Tropicopolitan
<b>Family Anthocoridae</b>				
46. <i>Lasiochilus marianensis</i> , new species				
47. <i>Lasiochilus swezeyi</i> , new species				
48. <i>Physopleurella mundula</i> (White)			×	
49. <i>Poronotus sodalis</i> (White)			×	
50. <i>Cardiastethus fulvescens</i> (Walker)			×	Oriental region
51. <i>Cardiastethus minutissimus</i> , new species				
52. <i>Scoloposcelis parallelus</i> (Motschulsky)				Oriental region
<b>Family Miridae</b>				
53. <i>Trigonotylus brevipes</i> Jakowlef	×	×		Cosmopolitan
54. <i>Hyalopenlus guamensis</i> , new species				
55. <i>Macralonidea hyalinus</i> , new species				
56. <i>Creontiades stramineus</i> (Walker)	×	×		South Pacific and Orient

Table 1. Distribution of Guam Hemiptera-Heteroptera—Continued

	SAOAO	PHILIPPINES	HAWAII	OTHER LOCALITIES
57. <i>Eurystylus costalis</i> var. <i>unicolor</i> Poppus		×		Sumatra, Mentawai
58. <i>Proboscidocoris malayus</i> Reuter		×		Austro-Oriental region
59. <i>Lygus guamensis</i> , new species				
60. <i>Lygus fullawayi</i> , new species <i>Lygus fullawayi</i> var. <i>rubroscutellatus</i> , new variety				
61. <i>Lygus cruzi</i> , new species				
62. <i>Lygus</i> species				
63. <i>Nesodaphne marianensis</i> , new species				
64. <i>Deraeocoris guamensis</i> , new species				
65. <i>Fulvius angustatus</i> , new species				
66. <i>Felisacus ochraceus</i> , new species				
67. <i>Felisacus crassicornis</i> , new species				
68. <i>Engytatus nicotianae</i> (Koningsberger)				Java, Fiji, New Caledonia
69. <i>Gallobellicus tenuis</i> (Reuter)	×	×		Sumatra, Madeira, India, Florida, probably tropicopolitan
70. <i>Zanchius fragilis</i> , new species				
71. <i>Zanchius piperi</i> , new species				
72. <i>Zanchius virescens</i> , new species				
73. <i>Cyrtorhinus lividipennis</i> Reuter	×	×		Oriental region
74. <i>Cyrtorhinus riveti</i> Cheesman	×			Tahiti Fiji
75. <i>Orthotylellus rufescens</i> , new species				
76. <i>Orthotylellus pallescens</i> , new species				
77. <i>Orthotylellus brunnescens</i> , new species		?		
78. <i>Aretas signatus</i> , new species				
79. <i>Aretas bifasciatus</i> , new species				
80. <i>Halticus insularis</i> , new species				
81. <i>Psallops oculatus</i> , new genus and new species				
82. <i>Campylomma breviceps</i> , new species				
83. <i>Campylomma pallida</i> , new species				
84. <i>Campylomma brunneicollis</i> , new species				
Family Cryptostemmatidae				
85. <i>Nesonannus saileri</i> , new genus, new species				
Family Mesoveliidae				
86. <i>Mesovelia orientalis</i> Kirkaldy		×		Oriental region
87. <i>Mesovelia pacifica</i> , new species				
Family Gerridae				
88. <i>Limnogonus fossarum</i> (Fabricius)		×		Fiji, Saipan, Orient
89. <i>Limnogonus luctuosus</i> (Montrouzier)	×			New Caledonia, Society Islands, Caroline, New Hebrides, Murray Islands
90. <i>Limnogonus lundbladi</i> , new species				
91. <i>Halobates mariannarum</i> Esaki				Rota Island
Family Veliidae				
92. <i>Microvelia douglasi</i> Scott	×			Oriental region
93. <i>Microvelia diluta</i> Distant				Saipan and Oriental region
94. <i>Halovelia marianarum</i> , new species				
Family Saldidae				
95. <i>Saldula balnearum</i> Bergroth		×		
96. <i>Saldula marianarum</i> , new species				
97. <i>Saldula swezeyi</i> , new species				
Family Notonectidae				
98. <i>Anisops cleopatra</i> Distant	×			New Caledonia, Oriental region
99. <i>Anisops nasuta</i> Fieber	×			Australian and Oriental regions

To summarize, 49 species and one variety are known only from the Marianas Islands, mostly from Guam. Six species are wide common to Guam, Samoa, Hawaii, and the Philippines; four are common to Guam, Samoa, and the Philippines; 12 are common to Guam and Samoa and, in most cases, elsewhere but not the Philippines and Hawaii; and 12 are common to Guam and the Philippines and, in most cases, elsewhere in the Oriental region as well. Specific endemism is slightly higher in Samoa (51 percent) than in Guam (49 percent) and is much higher (approximately 80 percent) in Hawaii.

The distribution of genera is even more significant as an indication of the relationships of the Guam heteropterous fauna. The genera to which endemic Guam species belong are distributed as follows: two genera peculiar to Guam; 10 widespread genera common to Guam, Samoa, the Philippines, and Hawaii; 17 genera common to Guam, Samoa (or other Polynesian islands), and the Philippines; two genera common to Guam, Samoa, and other Polynesian islands; and 17 genera common to Guam, the Philippines, and the Oriental region.

Generic endemism is much higher in Samoa (12 percent) than in Guam (3 percent), but I suspect that the number of endemic genera on all Pacific islands except Hawaii will be greatly reduced with more thorough collecting. For example, *Orthotylellus*, known previously only from Samoa, was found commonly by us in Guam and the Philippines, and I have now seen specimens from Fiji and Queensland.

Genera here recorded for the first time from oceanic Pacific islands are *Psallops*, *Zanchius*, *Proboscidocoris*, *Eurystylus*, *Macralonidea*, *Nesonannus*, *Scoloposcelis*, *Neuroctenus*, *Hadrocranella*, *Emesopsis*, *Ademula*, *Physoderes*, and *Plinachtus*. All of these are known elsewhere in the Philippine, Austro-Oriental, or Oriental regions, except for the two new genera, *Psallops* and *Nesonannus*.

The families Neididae and Pyrrhocoridae found on Samoa have not yet been collected on Guam and Mesoveliidae, Enicocephalidae, and Cryptostemmatidae found on Guam have not been reported from Samoa.

In general, Guam may be said to have a depauperate heteropterous fauna, typical of oceanic islands. It fits into the general Pacific island zoogeographic picture, having a high percentage of specific endemics and very few endemic genera. Of the island groups the hemipterous fauna of which is adequately known, Guam is closest to Samoa and the Philippines. The Guam fauna shows no close affinity with Hawaii, the few species found in common being widespread tropicopolitan types. Judging by the distribution of genera, most of the endemic Heteroptera of Guam came originally from the Oriental region by way of the Philippines.

## ZONAL DISTRIBUTION

Guam combines the topography and ecology of both coral and volcanic islands interestingly. Most of the northern part of the island consists of an elevated limestone platform rising abruptly back of the beaches to an altitude of several hundred feet. This area is quite level and densely covered with tropical trees and underbrush. Santa Rosa Mountain is the only elevation of any consequence in this area and the limestone is continuous over this relatively low prominence. Several mountain peaks, including Mt. Tenjo and Mt. Chachao, rise to about 1,000 feet through the surrounding limestone in the southern part of the island. Mt. Alifan in this area is the only peak with a limestone covering and consequently is the only peak covered with a dense forest. The other mountains have exposed volcanic slopes which have been burned by the natives and which support a sparse vegetation of sword grass, *Styphelia*, and a few other plants. In small, secluded valleys with small streams or rivers were found some of the most interesting and unique endemic Hemiptera. On Mt. Tenjo and Mt. Chachao, in particular, such pockets of dense native vegetation near the tops of the mountains were very productive.

The island may be divided conveniently into a series of zones defined by altitude, proximity to the ocean, and plant associations. The limits of these zones are sometimes rather vague, but the concept of ecologic zones is useful and facilitates the recording of particular habitats of species.

## PELAGIC HABITAT

Within the protecting coral reefs, both *Halobates mariannarum* and *Halovelia mariannarum* are common.

## STRAND

The shore line is characterized by open beaches, mangroves, coral ledges reaching to the water's edge, or grass-covered areas which usually extend to the water's edge near the mouths of rivers. On *Ipomoea*, *Messerschmidia*, *Scaevola*, and *Hibiscus* in this zone, the mirids *Zanichius fragilis* and *Campylomma breviceps* were found. *Cyrtorhinus riveti* occurred on low grasses along the shore in association with a small delphacid.

## LOWLAND ZONE

This includes the cultivated area and is confused with the lowland-limestone-forest association. Here are grown rice, corn, sugar cane, pineapple, taro, tomato, tobacco, many truck crops, citrus, coffee, kapok, manioc, mango, and many other cultivated plants. *Leptocorisa acuta*, the rice bug, occurs here and is perhaps the most injurious bug on Guam, its feeding punctures appearing as brown spots on the rice kernels. The two dicyphine bugs, *Engyatus nicotianæ*

and *Gallobellicus tenuis*, are common pests of tomato and tobacco, feeding and ovipositing on the stems and causing "blossom drop" in tomatoes. *Halticus insularis* is a pest of cucumbers and beans. *Melanacanthus margineguttatus* feeds on the pods of pigeon pea, and *Leptoglossus australis* sucks the fruits of *Passiflora* and melons. The most useful bug on Guam is *Cyrtorhinus lividipennis*. This small green mirid is common everywhere in the lowlands and lives on the eggs of injurious delphacids, especially the corn leafhopper, *Peregrinus maidis*. The eggs of *Cyrtorhinus* may be seen protruding from the leaf surface, capped with a small disk. They are laid along the midribs of leaves among the delphacid eggs. Although commonest on corn, this *Cyrtorhinus* was found in abundance on sugar cane and rice.

Aquatic Hemiptera were found in lowland streams and at Agana Spring. On the surface were found the widespread Oriental and Pacific species *Mesovelvia orientalis*, *Limnogonus fossarum*, *L. luctuosus*, and *Microwelvia douglasi*, and on the shore, the endemic *Saldula marianarum*. The only true aquatic found in lowland waters was *Anisops nasuta*.

#### SWORD GRASS-SAVANNA ASSOCIATION

The barren hillsides support two sedges, *Scleria margaritifera*, the host plant of *Orthotylellus brunnescens*, and *Rhynchospora corymbosa*, the host plant of *Orthotylellus pallescens*. The sedge-inhabiting *Ninus insignis* also occurs in this zone. *Campylomma brunnescens* was found on *Scaevola koenigii* on these open slopes.

#### LIMESTONE FOREST

This is the dense, relatively dry forest zone of Guam. *Cycas*, *Ficus*, *Piper*, *Areca* palm, *Pipturus*, limon de Chine and many other trees and shrubs comprise this dense forest. Nearly all of the endemic Hemiptera of Guam occur in this zone. This merges with the lowland agricultural land, most of which has been reclaimed from native forest by clearing. Hence the fauna is confused at low altitudes, many obviously introduced species being found. At high altitudes, such as the top of Mt. Alifan and in the small valleys on Mt. Tenjo and Mt. Chachao, however, the native fauna remains fairly pure. Here were found the endemic aquatics, *Mesovelvia pacifica* and *Limnogonus lundbladi*, as well as the more widespread *Anisops cleopatra* and *Microwelvia diluta*. Most of the phytophagous species found here as well as the predaceous emesine reduviids proved to be natives.

#### COMPARATIVE MATERIAL AND METHODS

During this study, specimens were before me for comparison from almost every island group in the Pacific. Most complete collections were from Hawaii

(Usinger collections, Hawaiian Sugar Planters' Association, and Bishop Museum), central and southeastern Polynesia (Zimmerman and Swezey, Bishop Museum), Marquesas (Mumford and Adamson, in collection of the California Academy of Sciences and Bishop Museum), Fiji (W. M. Mann collection in the Museum of Comparative Zoology; Swezey and Zimmerman in Bishop Museum), Austro-Oriental islands (Muir collection and others in the California Academy of Sciences and the Hawaiian Sugar Planters' Experiment Station), Caroline Islands (Ono and Kondo collections, Bishop Museum), New Caledonia (F. X. Williams collection, Hawaiian Sugar Planters' Association) and Philippine Islands (McGregor collection from H. M. Parshley, and my own collection). An opportunity was afforded for comparison of Guam material with Samoan and Fijian types during a visit to Hawaii in 1943, and additional Guam specimens were studied at the United States National Museum during the same year.

Types of all new species are in the type collection of Bishop Museum. All descriptions were made with a Spencer binocular microscope with 18, 36, and 108 power magnification. At the lowest power, 20 micrometer units are equal to 1 mm.; at the intermediate power, 40 units equal 1 mm.

#### SUPERFAMILY PENTATOMOIDEA

##### FAMILY PLATASPIDAE

###### 1. *Brachyplatys pacificus* Dallas.

*Brachyplatys pacifica* Dallas, List Hemipt. Brit. Mus. 1: 70, 1851.

One specimen each collected by Fullaway, 1911, and Hornbostel, August 1923. Five specimens, Usinger, and three specimens, Swezey, Ritidian Point, at the end of the road, June 30. These were found on a wide variety of plants, but eggs were discovered on only two kinds of plants, one of which was *Pipturus*. The eggs were found in batches of nine eggs each, arranged alternately in two parallel rows. They are creamy white with the chorion finely punctate, approximately 1 mm. in length and 0.50 mm. wide. The micropylar end is circular and subflattened with its surface feebly convex. A distinct, pale carina surrounds this apical plate. Along the middle of the egg is a broad, elevated ridge which is laterally impunctate and medially depressed and punctate. Upon hatching, the micropylar end opens as a hinged lid, the hinge being at the longitudinal ridge. A T-shaped egg burster is present. As development proceeds, red eye spots appear as is usual with hemipterous eggs. One batch of eggs collected at Ritidian Point, June 30, was parasitized by *Ooencyrtus pacificus* Waterston, as determined by D. T. Fullaway. Fourteen more specimens were taken by Swezey at Ritidian Point on August 6, 1936, one at Orote Point, Sept. 27, one at Dandan, July 17, one at Machanao, June 4, and one on

*Ipomoea* on Mt. Alifan, June 19. I collected one on Mt. Alifan, May 26 and two on morning-glory at Machanao, June 4, 1936.

This species had previously been reported from the Marianas Islands (Distant, *Nova Caled.*, Zool. 1: 370, 1914).

#### FAMILY CYDNIDAE

##### 2. *Geotomus pygmaeus* (Dallas).

*Aethus pygmaeus* Dallas, List Hemipt. Brit. Mus. 1: 120, 1851.

Piti, June, July, August, September, most frequently at light, 11 specimens, Swezey, and four specimens, Usinger.

##### 3. ?*Adrisa flavo-marginata* Vollenhoven, Versl. Akad. Amst., Natuurk. II: 177, 14, 1868.

One specimen, Machanao, June 4, on the ground, Usinger; one specimen, Mt. Alifan, June 27, Usinger; one specimen, Barrigada, July 22, under chips, Swezey.

These specimens were collected in a dead and dried condition with all appendages except a middle and a hind femur and rostrum of one specimen broken off. Hence the identification of these as a New Caledonian species is questionable. Even the generic assignment is doubtful because the number of antennal segments is not known.

The specimens agree fairly well with Signoret's description and figure (*Soc. ent. France*, Ann. VI, 1: 212, pl. 8, fig. 33, 1881) but the pronotum is almost entirely black and the ocelli are practically invisible. Only in one specimen is there even a trace of ocelli. This condition is at once suggestive of the New Zealand *Choerocydnus albosignatus* Buchanan White, but the Guam specimens differ from this in color, puncturation, and form of ostiolar canal.

#### FAMILY SCUTELLERIDAE

##### SUBFAMILY ELYISURINAE

##### 4. *Coleotichus* (*Paracoleotichus*) *breddini* Schouteden.

*Coleotichus breddini* Schouteden, Hist.-Nat. Mus. Nat. Hung., Ann. 3: 344, 1905.

One specimen, Guam, Fullaway (1178); eight specimens, Yigo, May 19, on *Premna gaudichaudii*, Usinger; six specimens, Piti, Sept. 11, 12, 13, Oct. 14, Nov. 10, at light, Swezey.

##### 5. *Coleotichus* (*Epicoleotichus*) *marianensis*, new species.

Moderately robust, predominantly fulvous with blue-green punctures. Lateral margins of head and pronotum nearly straight. Impunctate lateral margins of pronotum narrow but distinct. Connexival angles scarcely produced, almost right angles.

Head one fifth broader than long, 93:78; eyes one fourth as broad as interocular space, 15:60; sides of juga moderately sinuate, narrowly impunctate; disk of head very sparsely, shallowly punctate in ill-defined rows, densely and more coarsely punctate just within lateral margins; tylus shallowly punctate and feebly rugose just behind the apex; apex smooth, impunctate, and feebly elevated. Proportion of antennal segments one to five as 21:21:40:46:50. Rostrum reaching to base of third abdominal segment; third segment slightly longer than fourth, 56:53.

Pronotum strongly, evenly convex at least posteriorly, gradually and continuously sloping onto head anteriorly; less than twice as broad across humeral angles as long, 207:126; lateral margins nearly rectilinear, the expanded impunctate area narrowing anteriorly; humeri nearly right angles, rounded at apices; disk rather evenly, shallowly punctate in sinuate, often broken lines, the punctures about one puncture width apart in the lines and two or more puncture widths apart between the lines; punctures much coarser and denser sublaterally; callosities surrounded by a row of punctures and with an irregular row transversely at middle; longitudinal impunctate line distinct except posteriorly.

Scutellum almost three fourths as broad as long, 153:210; sides rounded just at base, then subparallel to slightly beyond middle beyond which they converge to broad, subtruncate apex; disk closely, rather evenly punctate, the punctures less than one puncture width apart except along extreme base between sublateral impunctate elevations and along ill-defined midline. Hemelytra moderately exposed, the costal margin smooth and impunctate, with a broad row of deep, confluent punctures sublaterally; membrane exceeding tip of scutellum. Connexivum moderately exposed, the postero-lateral angles scarcely produced, but little more than right angles except on last segment. Male genital capsule a little more than half again as broad as long, 55:35, not extending beyond the edge of scutellum or membrane and roundly emarginate posteriorly; parameres each with a short, inner, subapical protuberance, the apex evenly hooked. Female genital plates distinctive, the median ventral plates subtriangular, broad mesad, acute laterally and subacute apically; posterior or tergal plates more strongly rounded apically with a broad, deep notch at middle.

Color rather uniformly fulvous brown tinged with bluish green in the punctures, with paler ochraceous lateral pronotal margins, sublateral elevated spots at base of scutellum, connexivum except on postero-lateral angles, and entire under surface including legs and antennae. Claws, setal bundle of rostrum, sublateral pronotal fasciae, spot at inner edge of each callosity, spot at inner edge of each sublateral scutellar elevation, two sublateral and one median fasciae on scutellar disk, and connexival angles black.

Size: male, length 17 mm., width 9.25 mm.; female, length 19.5 mm.; width 10.5 mm.

Holotype female, Piti, at light, Aug. 20, Swezey; allotype male, same data, Oct. 6; paratypes, three males, six females, Piti, at light, August to October, Swezey, one female, Piti, at light, June 18, Usinger.

*C. marianensis* is perhaps closest to the Philippine *schultzei* Taeuber, a species which is much broader and more robust with broader glabrous areas along lateral margins of pronotum, more arcuate lateral pronotal margins, brown-colored punctures, broader male genital capsule which exceeds the limits of scutellum and membrane, and more uniformly broad median ventral female genital plates with broadly rounded apices.

#### SUBFAMILY SCUTELLERINAE

##### 6. *Calliphara* (*Chrysophara*) *munda* Stål.

*Calliphara munda* Stål, Berlin. Ent. Zeitschr. 10: 153, 1866.

One damaged specimen, Guam, Fullaway (1177); six adults, two nymphs, and eggs, Ritidian Point, Aug. 6, on *Glochidion* and other trees, Swezey; 12

specimens, Piti, Aug. 12-27, on *Glochidion*, Swezey; eight specimens, Rota, Marianas, July 31, 1925, Hornbostel.

These specimens run directly to *C. munda* Stål and agree in size and color with Stål's description. However, the sides of the venter and the thorax and scutellum are said to be sparingly ("parce") punctate in Stål's male type which is from China. I have not seen specimens of this from China or elsewhere. The males lack connexival spines, thus agreeing with Stål's type, but the females have minute spines on the fourth, fifth, and sixth connexival segments. The male genital capsule is short and broadly, roundly widened and flaring posterolaterally with the apical margin broadly, roundly emarginate at middle.

#### FAMILY PENTATOMIDAE

##### SUBFAMILY PENTATOMINAE

#### 7. *Glaucias inornata* (Stål).

*Zangis inornata* Stål, Öfv. K. Vet.-Akad. Förh. 27: 633, 1870.

A single female specimen is at hand, labeled "Island of Guam" from the collection of D. T. Fullaway (1179). I have no Philippine specimens with which to compare it, but the Guam specimen agrees with Stål's description of a male except that it is only 7.5 mm. wide across the humeri. A female from Angaur in the Carolines collected by Y. Kondo, April 15, 1936, is very similar but has black connexival angles.

#### 8. *Alciphron glaucus* (Fabricius).

*Cimex glaucus* Fabricius, Syst. Ent., 714, 1775.

One specimen, Dededo, May 11, on *Cycas*, Usinger. Recorded previously from New Caledonia (type locality), Australia, and Fiji. The genus was proposed for this unique species by Stål (Enum. Hemipt. 5: 67, 101, 1876). I have seen specimens from North Queensland, Illingworth, and Viti Levu, Valentine and Zimmerman. New records include five specimens from Tutuila, Fullaway, and three from Guadalcanal, Kusche. The Fijian and Guam specimens are smaller and greener than the others but are similar structurally.

#### 9. *Catacanthus* species.

The head and appendages are missing. It is dark bluish black above with a striking, arcuate, transverse white fascia on the pronotum. This fascia is widest at the middle where it nearly touches anterior margin. It tapers laterally to humeri. The edges of pronotum, claval suture, embolar vein, and margins of corium are narrowly pale, the hind angles of connexival segments and extreme edges are dark, the narrow outer edges of connexivum are pale, the broad connexival plates are entirely black. The membrane is dark brown with a broad apical spot pale. The under surface is mostly pale, ochraceous. The abdominal spine extends forward between the front coxae and is subacute and slightly turned upward at tip. The male genital capsule is relatively small and is produced laterally as thick subrounded lobes rather than as subflattened, lamellate lobes such as occur in *taiti* Distant and *viridicatus* Distant. Size: length from anterior margin of pronotum to tip of abdomen, 17.5 mm.; width across humeri, 10 mm.

Mt. Alifan, June 27, one dead specimen, Usinger.

This is almost certainly a new species but I do not feel justified in proposing a new name on such a fragmentary specimen.

#### SUBFAMILY ASOPINAE

#### 10. *Parealda chrysoptera* (Herrich-Schaeffer).

*Asopus chrysopterus* Herrich-Schaeffer, Wanz. Insekt. 7: 114a, 115, fig. 781, 1844.

*Cantheconidea chrysoptera* Schouteden, Gen. Insect. 52: 44, 1907.

*Parealda bowvieri* Schouteden, Soc. ent. Belg., Ann. 51: 47, 1907. New synonymy.

*Parealda bowvieri* Schouteden, Gen. Insect. 52: 65, pl. 5, fig. 3, 1907.

*Asopus* ? *chrysopterus* Bergroth, Ann. Mag. Nat. Hist. VIII, 15: 484, 1915.

Two specimens, Guam, Fullaway (1418); one specimen, Guam, 1923, edge of forest, Hornbostel; one specimen, Mt. Alifan, April 21, E. H. Bryan, Jr.; one specimen, Inarajan, July 25, on *Triphasia*, Swezey.

This species was originally described from Guam by Herrich-Schaeffer and is easily recognizable from his colored illustration. As pointed out by Bergroth, Schouteden erroneously placed this in *Cantheconidea*. Bergroth, in suggesting that *chrysopterus* "belongs to an undescribed genus," overlooked the fact that Schouteden had already described a new genus and species, *Parealda bowvieri*, for this same insect and keyed it out in its proper place in his Genera Insectorum. Thus the specific name of Herrich-Schaeffer and the generic name of Schouteden stand, while Schouteden's specific name *bowvieri* falls as a synonym.

#### SUPERFAMILY COREOIDEA

#### FAMILY COREIDAE

#### SUBFAMILY COREINAE

#### TRIBE ANISOSCELINI

#### 11. *Leptoglossus australis* (Fabricius).

*Cimex australis* Fabricius, Syst. Ent., 708, 1775.

One specimen, Guam, Fullaway (1190); two specimens, Guam, 1923, American sunflower and milkweed, Hornbostel; 13 specimens, Barrigada, June 12 and 14, on *Passiflora foetida*, Usinger; four specimens, Barrigada, June 24, on *Passiflora* fruit, Swezey; two specimens, Barrigada, Nov. 25, at school farm, on sunflower, Swezey; Piti, Oct. 10, on pumpkin, Swezey; two specimens, Piti, Sept. 26, on pumpkin, Swezey; two specimens, Piti, Aug. 28, on pumpkin, Swezey; three specimens, Piti, Sept. 5, Oct. 17, on beans, Swezey; two specimens, Talofoto, Nov. 18, Swezey; Yigo, May 19, Usinger.

*Leptoglossus* was found in greatest numbers at Barrigada where eggs, nymphs, and adults were found on *Passiflora foetida*, feeding on the fruit. *L. australis* is a conspicuous species of wide distribution. In addition to Samoa, China records it from New Caledonia, New Hebrides, Fiji, and the Society Islands. I have specimens from all of these regions and can add the Caroline Islands and the Philippines. The Philippine species has been recorded from earliest times as the widespread Ethiopian and Oriental *membranaceus* (Fabricius) but specimens before me from Mindanao and specimens which I collected on Luzon fall well within the range of variation seen in the Oceanian series. Regardless of possible synonymy, the name *australis* will remain for Pacific specimens because it was described six years earlier than *membranaceus*.

#### TRIBE GONOCERINI

##### 12. *Plinachtus acicularis* (Fabricius).

*Alydus acicularis* Fabricius, Syst. Rhyng., 251, 1803.

Two specimens were kindly forwarded from the U. S. National Museum by H. G. Barber who made the identification. Collected on Guam, Oct. 17, 1938, R. G. Oakley (1247) on *Gymnosporia thompsonii*. These specimens agree perfectly with Distant's description and figures of specimens from India. The genus has not been recorded from Oceania except for *P. bellus* Stål in Fiji. Species are before me from Mangareva and from the Austral and Society Islands. These lack the acute spines on the humeri as does *bellus*, in contrast to the acutely spined Oriental *acicularis* of Guam.

#### SUBFAMILY ALYDINAE

#### TRIBE LEPTOCORISINI

##### 13. *Leptocorisa acuta* (Thunberg).

*Cimex acuta* Thunberg, Dis. Ent. Ins. Spec. 2: 34, 1783.

This species is clearly *acuta* (see China's revision of the Oriental species, Bull. Ent. Res. 14: 235-239, 1924) on the basis of the distinctive male genital claspers, and agrees with all specimens available to me from the Carolines and Philippines in antennal and rostral characters. However, the basal segment of the antennae is fulvous or darker in color with the apex often black. It seems evident that this color character is unreliable for the separation of species in the *acuta-varicornis* group. *Varicornis* is at hand from Fiji, Samoa, the Solomon Islands, and New Caledonia. Guam specimens of *acuta* include one collected by Fullaway (1192); one by Hornbostel in 1923; 16 specimens, Inarajan, May 7, May 14, June 8; eight specimens, Piti, May 1, May 9, and July 13; and two specimens, Agana Swamp, May 4. All collected by Swezey and Usinger on sedges, on *Paspalum orbiculare*, most commonly on rice, and at light.

## TRIBE ALYDINI

14. *Melanacanthus margineguttatus* Distant, Ann. Mag. Nat. Hist. VIII, 7: 585, 1911.

Twenty-two specimens, Piti, June 20 and 22, on *Crotalaria quinquefolia*, Usinger; one specimen, Yona, May 12, on pigeon pea, Usinger; one specimen, Piti, July 13, on sedges, Swezey; one specimen, Fullaway (1193). This is the northernmost record for this south Pacific species. I have three specimens from Fiji which fill an important gap in the distributional picture as outlined by China [Ins. Samoa 2(3):97, 1930].

Eight eggs were laid on *Crotalaria* leaves on June 22. The egg is blue-gray, cup-shaped, and, when recently laid, shows two parallel reddish lines, indistinct on the flattened dorsal surface, extending longitudinally toward the micropylar end. Size, 1.3 mm. long and 0.9 mm. wide. At the micropylar end is a ring of about 14 pits, each with an inconspicuous process at its middle. The ring extends broadly around the anterior rounded portion of the egg and only slightly onto the flattened part. The surface of the chorion is covered with numerous, round, very shallow depressions. Incubation period five days.

## SUBFAMILY RHOPALINAE

## TRIBE LEPTOCORINI

15. *Leptocoris carnivorus*, new species (fig. 1, *a, b*).

Elongate-oval, reddish in color with black appendages and membrane and infuscated clavus and inner corium; upper surface clothed with a very short, inconspicuous pubescence, rostrum reaching to second or third visible abdominal segment. Pronotum with a strongly elevated anterior lobe and a well-developed median longitudinal carina which becomes obsolete posteriorly. Size: 12 to 15 mm.

Head three fourths as long as broad across eyes, 35:47; tylus and juga convex, the tylus with a few, short, erect, black bristles anteriorly; vertex distinctly longitudinally sulcate at middle, with a swollen or elevated carina on either side in front of eyes extending to antenniferous tubercles; swollen postocular lobes about one third as long as eyes; eyes less than half as wide as interocular space, 10:26; ocelli prominent, about twice as far apart as distance from an ocellus to an eye; bucculae short, decreasing just behind level of bases of antennae. Antennae five times as long as head and pronotum together, proportion of segments one to four as 17:58:58:73. Rostrum reaching from middle of second to middle of third visible abdominal segment; proportion of segments one to four as 32:36:30:30.

Pronotum half again as long as head, about one third broader than long; anterior lobe a little less than one fifth of total length of pronotum, strongly convex, abruptly depressed behind, with a rounded elevated marginal lobe on either side; anterior margin distinctly but narrowly elevated; posterior lobe only moderately elevated, distinctly, closely punctate except along lateral and posterior margins, sublaterally slightly depressed; a distinct median longitudinal carina interrupted only at anterior constriction and becoming obsolete near posterior margin; posterior margin strongly depressed, carinate. Scutellum triangular, about as broad across base as long, feebly elevated and simple. Hemelytra exceeding tip of abdomen and concealing all of abdominal disk except narrowly at sides of middle of connexivum.

Under surface densely covered with a short, appressed, pale pubescence interrupted by numerous glabrous spots in which are inserted long, erect, pale hairs.

Male genital segment distinctive of the species, the ninth segment almost twice as broad at base as long to apices of posterior arms (26:14); these arms stout, subcylindrical, slightly converging posteriorly, the entire segment clothed with very long, erect hairs. Claspers long, slender and sinuate, curved downward apically, extending half again as far beyond level of apices of genital arms as total length of these arms.

Color bright red with black appendages and membrane, and more or less infuscated clavus, inner corium, thoracic sterna and pleura and faintly infuscated abdominal venter.

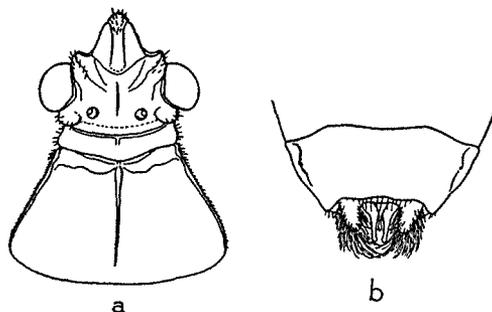


FIGURE 1.—*Leptocoris carnivorus*: a, outline of dorsal view of head and pronotum; b, ventral view of last abdominal segment of male showing hairy posterior arms, slender median process and slender claspers on each side of middle.

Holotype male, allotype female, and 24 paratypes, Cetti Bay, May 28, on *Thespesia populnea*, Swezey and Usinger; 11 specimens, Barrigada, July 22, on *Morinda*, Swezey; five specimens, Ritidian Point, June 2, Swezey and Usinger; four specimens, Mt. Alifan, June 27, Usinger; Barrigada, July 22, clustered by the hundreds on *Morinda* leaves, Swezey; one specimen, Guam, Sept. 28, 1938, on *Colubrina asiatica*, Oakley. A single, apparently perfectly typical male is at hand from Palau Islands, Ngeremlengui, Galmiskan, April 23, 1936, Z. Ono. At Ritidian Point, eggs, nymphs of all stages, and adults were common. They were also seen in large numbers at Machanao on June 5. The nymphs ran about on the ground and on dead leaves and were often seen feeding on dead nymphs and adults of their own species.

This species runs to *L. abdominalis* in Stål's key (Enum. Hemipt. 3:99, 1873) but differs from descriptions of that species in its smaller size (16 to 20 mm. in *abdominalis*) and its red abdomen (black in *abdominalis*). A more detailed comparison is impossible in the absence of authentically determined specimens but *taprobanensis* (Dallas), which Distant in 1902 placed as a variety of *abdominalis*, has very slender genital arms which are strongly convergent posteriorly. *L. ahnnei* (Cheesman) and related Polynesian species have much broader genital arms which are posteriorly strongly divergent. The Philippine *rufomarginatus* (Fabricius), although much larger, differently colored and with an entirely different pronotum, has genitalia somewhat similar to the Micronesian species. The arms are broader, however, and longer and

slightly divergent and the median claspers are relatively short, scarcely exceeding level of apices of arms. I have a single female from Luzon which resembles the Guam species very closely in structure but the head and pronotum are clothed with much longer, erect, black bristles, the pronotum is narrower behind and the clavus and corium are almost entirely infuscated. This last may be *augur* (Fabricius) whose lateral pronotal margins are described by Distant (Fauna Brit. India, Rhynch. 1: 420, 1902) as "moderately hirsute." A female of *insularis* Kirkaldy from Fiji differs in its uniformly darker coloration and longer rostrum.

## SUPERFAMILY LYGAEOIDEA

## FAMILY LYGAEIDAE

## SUBFAMILY LYGAEINAE

## TRIBE LYGAEINI

16. *Graptostethus nigriceps* Stål.

*Graptostethus servus* var. *nigriceps* Stål, Enum. Hemipt. 4: 117, 1874.

Three specimens, Fullaway (1186). Described by Stål from Guam, Ascension, and Fiji and subsequently recorded by China from Samoa, New Hebrides, and New Caledonia. Variation is great in members of this group but a Fijian example agrees well with one of the Guam specimens and confirms China's suspicions regarding the synonymy of *vitiensis* Kirkaldy. This species was not encountered by Swezey and me during our exploration of Guam.

## TRIBE ORSILLINI

17. *Nysius pulchellus* Stål, Freg. Eugenies Resa, Ins., 244, 1859.

One specimen, Fullaway (1184). Twenty-eight specimens collected as follows: four specimens, Umatac, May 14, 17, on *Euphorbia hirta*, Usinger and Swezey; four specimens, Umatac, May 28, on *Pemphis*, Usinger; five specimens, Machanao, Aug. 6, on amaranth, Swezey; seven specimens, Piti, April 30, May 1, June 3, on *Nicotiana*, sedge, and *Styphelia*, Swezey and Usinger; one specimen, Mt. Tenjo, May 3, Swezey; one specimen, Upi Trail, May 5, Usinger; four specimens, Mt. Chachao, May 16, on *Styphelia*, Usinger; one specimen, Sumay, Aug. 17, Swezey.

This is a common species known only from Guam, where it was first collected on the Eugenies Resa Expedition. It is nearest to *Nysius picipes* Usinger from Wake Island. I am indebted to O. Lundblad for the loan of a cotype of *pulchellus* from the Naturhistoriska Riksmuseum, Stockholm.

*Nysius pulchellus* occurs most commonly on *Euphorbia hirta*, *Portulaca*, *Pemphis*, and *Vernonia*. Eggs are laid rather loosely in composite heads and may be obtained from captive bugs in cotton-stoppered vials, the eggs being

inserted into the cotton plugs. After two days, red eye spots appear, becoming more distinct as development progresses. The eggs hatch in seven days. The first-instar nymphs are decidedly reddish in appearance. They molt in three days, becoming considerably more robust and ferrugineous in color with longitudinal stripes on the head and mottled pale testaceous areas over the dorsum. The second instar lasts five days and the three succeeding nymphal instars each last three days. The total period of development from egg to adult is 24 days.

18. *Nysius caledoniae* Distant, Ann. Mag. Nat. Hist. IX, 6: 151, 1920.

Thirty specimens collected at Piti, April 30, on *Emilia*, Usinger; one specimen, Piti, May 1, Usinger. This species was repeatedly observed throughout our stay on Guam on the recently (within the previous 10 years) introduced composite, *Emilia*. The incubation period of eggs in *Emilia* heads was five days. I collected the same species commonly at Los Banos and Montalban, Philippine Islands, on the closely related composite, *Erigeron*.

These specimens agree closely with topotypic New Caledonia material determined by Distant. They are close to *pacificus* China but have a slightly shorter and less dense pubescence dorsally, particularly on the hemelytra. The presence of *pacificus* on Tutuila, alone of the Samoan Islands, is not particularly remarkable since it was probably introduced there. I also have specimens from Fiji and Amboina. Specimens are at hand from India determined as *ceylanicus* Motschulsky by Distant. These also belong with *pacificus* while a paratype of *turneri* Evans from Tasmania is closely allied but has longer, erect pubescence, especially on the pronotum. These closely related species form a group which is widely distributed throughout the Austro-Oriental region. Representatives of this group are also at hand from south and central China and from Japan. The status of the various Oriental species of *Nysius* can only be determined by a thorough systematic revision based upon a study of type specimens.

#### SUBFAMILY CYMINAE

19. *Ninus insignis* Stål, Freg. Eugenies Resa, Ins., 253, pl. 3, fig. 5, 1859.

Twenty-one specimens, Piti, May 1, on a high sedge, Usinger; one specimen, Piti, June 1, Usinger; two specimens, Piti, July 3, Swezey; two specimens, Sept. 21, Swezey; six specimens, Dandan, July 17, Swezey; one specimen, Fonte Valley, Aug. 7, Swezey; one specimen, Santa Rosa Peak, May 19, Swezey, all taken on sedges; three specimens, Mt. Alifan, April 20, Bryan; one specimen, Merizo, April 24, Bryan; two specimens, Umatac, May 14, Swezey; one specimen, Fullaway (1185).

This monotypic genus was originally described from Guam. Species subsequently referred to *Ninus* by Distant and Bergroth were shown by Bergroth (Philippine Jour. Sci. 13D: 63, 1918) to belong to *Cymoninus* Breddin. Bergroth also synonymized *stylatus* Kirkaldy and *singalensis* Breddin with *insignis*

and gave the distribution as Ceylon, Fiji, the Philippines, and Guam. I have collected it in the Philippines and also have a specimen from Java.

#### SUBFAMILY OXYCARENINAE

##### 20. *Oxycareus bicolor* Fieber, Rhynchotographieen, 39, 1851.

Thirty-three specimens, Fadian, Aug. 19, on *Sida*, Swezey; one specimen, Barrigada, June 12, Usinger; two specimens, Fullaway (1182).

Described from India and since recorded by Esaki from Saipan and Palau (Sixth Pacific Sci. Congr., Proc. 4: 411, 1941). I have two Peleliu specimens which are smaller with pale at apices as well as at bases of coria and with apical margin of membrane faintly paler. A pair from Laloki, Papua, have the costal margins generally pale and agree with *lugubris* as described by Distant (Fauna Brit. India, Rhynch. 2: 44, 1904). The Guam series is very black including the membrane, with bases and subapices of coria but not clavi, acetabula, ostiolar canal and hind tibiae at middle, white.

#### SUBFAMILY RHYPAROCHROMINAE

##### TRIBE CLERADINI

##### 21. *Clerada apicicornis* Signoret in Maillard, Notes sur l'île de la Réunion, Ins., 28, pl. 20, fig. 8, 1862.

One specimen, Piti, June 21, collected at light, Swezey. Tropicopolitan.

##### TRIBE MYODOCHINI

##### 22. *Pachybrachius pacificus* (Stål).

*Pamera pacifica* Stål, Enum. Hemipt. 4: 149, 1874.

One specimen, headwaters of Talofofu River, June 17, Usinger; one specimen, Upi Trail, May 5, Usinger; two specimens, Piti, April 30, Usinger; two specimens, Piti, Nov. 5, swept from lawn grass, Swezey; one specimen, Ritidian Point, June 2, Usinger; one specimen, Agana Swamp, May 25, Usinger; one specimen, Mt. Alifan, May 21, on milkweed, Usinger; one specimen, Merizo, April 24, Bryan; one specimen, Yona, April 29, Bryan; one specimen, Tarague, May 17, on grass, Swezey.

Widespread over the Pacific region, having been recorded from Fiji, Samoa, and Tahiti, Raiatea, and Borabora, Society Islands. I can add Rimitara, Australis, Stokes; Makatea, Tuamotus, Wilder; Truk, Caroline Islands, Ono; Mangareva, Zimmerman.

##### 23. *Pachybrachius limbatus* (Stål).

*Pamera limbata* Stål, Enum. Hemipt. 4: 149, 1874.

Two specimens, Upi Trail, May 5, Usinger; two specimens, Ritidian Point, June 2, Usinger; one specimen, Machanao, June 30, Usinger.

Recorded previously from Fiji, Samoa, and Savage Island [Niue]. Guam specimens agree perfectly with specimens before me from Fiji.

24. *Pachybrachius nietneri* (Dohrn).

*Plociomerus nietneri* Dohrn, Stett. Ent. Zeitung 21: 404, 1860.

One specimen collected by Fullaway and bearing the determination label of C. S. Banks. Although both antennae are broken off, the specimen agrees well with the original description and runs to *nietneri* in Stål's key (Enum. Hemipt. 4: 148, 1874).

25. *Pachybrachius nigriceps* (Dallas).

*Rhyparochromus nigriceps* Dallas, List Hemipt. Brit. Mus. 2: 577, 1852.

Two specimens, Guam, Fullaway; nine specimens, Piti Hills, June 3, sweeping *Styphelia*, Swezey; 32 specimens, 2 miles south of Piti, June 13, on heliotrope, Usinger; one specimen, Piti, Nov. 22, at light, Swezey; one specimen each, April 30, Swezey and Usinger, May 1, May 2, May 26, Piti, Usinger; one specimen, Tarague, May 17, on *Tournefortia* [*Messerschmidia*], Usinger; one specimen, Mt. Chachao, May 16, on *Styphelia*, Usinger; two specimens, Ritidian Point, June 2, on *Euphorbia hirta*, Usinger.

Widely distributed over the islands of the Pacific. China [Ins. Samoa 2 (3): 129, 1930] remarks that it "is somewhat variable and is probably composite." Variation is most conspicuous in the form of the anterior lobe of the pronotum. Typical examples from Hawaii vary in this respect but average nearly half as long as broad. The Guam series averages two thirds as long as broad. Series from other islands, especially at the extremes of the range such as Rapa, suggest a *Rassenkreis* but the Guam series does not seem to be sufficiently extreme to warrant a special name at this time.

*P. nigriceps* was commonest on heliotrope on which eggs were laid on June 23. The eggs were deposited at the tip of a flower head among the small flowers. They were placed crosswise to one another and rather loosely in the open but were fastened together and to the flower calyx. They are elongate, slightly curved, about 1 mm. long by 0.35 mm. in diameter. The micropylar end is thicker, subtruncate, while the other end is tapering and rounded at the tip. The chorion is sculptured, exhibiting prominent hexagonal reticulations on the anterior (micropylar) third. Near the middle, these become inconspicuous or appear as slight rugosities. The posterior end is perfectly smooth. The whole surface is glabrous and the egg is almost water white in color. There are five small but very distinct processes forming a small ring on the surface of the micropylar end. The incubation period is six days.

26. *Pachybrachius chinai*, new species.

Elongate with sides subparallel, pronotum strongly constricted behind middle and rostrum relatively long, reaching to middle of metasternum. Head as long as broad across eyes, finely granulate-punctate above except surrounding ocelli, with subappressed white

pubescence anteriorly and laterally in front of eyes and posteriorly surrounding ocelli. With several erect, very long trichobothria-like hairs on vertex and adjacent to eyes and several shorter, erect hairs on surface of eyes. Interocular space over twice as wide as an eye, 16:7, and anteocular portion of head one fourth longer than an eye, 15:12. Rostrum relatively long, reaching to middle of metasternum, the first segment not reaching base of head, second segment reaching front coxae; proportion of segments 25:25:18:14; all segments beset with scattered, relatively short but erect hairs. Antennae about 2.5 times as long as width of pronotum across humeri, 115:45, first segment exceeding apex of head by slightly less than half its length, proportion of segments one to four as 16:36:28:35.

Pronotum one fifth longer than head on median line, one fourth broader across humeri than long, the disk sparsely clothed with subappressed pale hairs with a few erect long hairs. Postmedian transverse constriction relatively strong, the width at constriction only one fifth greater than width across anterior collar. Anterior lobe half again as broad as long, impunctate. Posterior lobe three times as broad as long, sparsely but distinctly punctate. Scutellum longer than broad, 29:23, elevated at base and subflattened apically. Hemelytra as in *ventralis* China. Thoracic pleura relatively coarsely, distinctly punctate. Legs and coloration of body and appendages as in *ventralis* China.

Size: male, length 4.4 mm., width (hemelytra) 1.2 mm.; female, length 4.7 mm., width (hemelytra) 1.3 mm.

Holotype male, allotype female, and 44 paratypes, Agana Swamp, May 4, sucking fruits of "Panama cherry", Usinger; three paratypes, same data but May 15, and one paratype, Umatac, May 14, on *Pemphis*, Usinger; one paratype, Inarajan, May 7, Usinger; one specimen, Talofoto, April 1, Bryan.

*P. chinai* is very close to the Samoan *ventralis* China, of which I have a relatively small (4.4 mm.) topotype from Fagasa. *P. ventralis* differs in its distinctly shorter rostrum, reaching only to middle of mesosternum, and in its relatively broader and less strongly constricted anterior pronotal lobe. *P. ventralis* was collected on Tahiti, Society Islands, and on Raivavai and Tubuai, Austral Islands, by Zimmerman.

Dedicated to W. E. China, whose Hemiptera fascicle of "Insects of Samoa" is one of the best contributions to our knowledge of the Hemiptera of Oceania.

## 27. *Paromius pallidus* (Montrouzier).

*Plociomerus pallidus* Montrouzier, Soc. Linn. Lyon (n.s.), Ann. 11: 229, 1864.

Ten specimens, Piti, May 1, sweeping grass, Usinger and Swezey; five specimens, April 30, *Paspalum conjugatum*, Usinger; four specimens, Piti, July 13, on sedges, Swezey; two specimens, Mt. Tenjo, May 3, Usinger and Swezey.

If the recorded synonymy is correct, this species occurs from the Seychelles through Ceylon and Burma to Japan and southward to Samoa (fide Kirkaldy, not recorded by China), Fiji, and New Caledonia. I have specimens from Fiji which agree well with the Guam series, a long series collected by Zimmerman on Mangareva, and three specimens from Eidsvold, Queensland, sent for determination by A. L. Tonnoir from the Council of Scientific and Industrial Research collection at Canberra.

## 28. *Paromius piratoides* (Costa).

*Plociomerus piratoides* Costa, Mus. Zool. Napoli, Ann. 2: 78, 1864.

One specimen, 3 miles south of Piti, May 23, 1936, Usinger.

This large species is at once distinguished from *pallidus* by the long rostrum reaching nearly to hind coxae and the longer antennae, with second segment one third longer than fourth segment (the two segments subequal in *pallidus*). All of the specimens before me from the Carolines belong here. The species was described from the Philippines.

### TRIBE RHYPAROCHROMINI

## 29. *Cligenes marianensis*, new species (fig. 2).

Relatively small, oval, nearly glabrous with pronotal disk rather evenly punctate throughout except on humeri and with corium punctured in regular rows except for smooth area laterad of second row of punctures along claval suture and smooth costal area. Apical margin of corium strongly sinuate on inner half.

Head three fourths as long as broad across eyes, very finely, unevenly, rugosely punctate with impunctate glabrous points in front of ocelli and broadly impunctate area at hind margin. Antecular portion of head about as long as an eye; interocular space slightly more than twice as wide as an eye, 11:4.5. Ocelli prominent, almost contiguous with eyes, the ratio of distance to eyes to distance between ocelli, 1:16. Antennae slightly more than one fourth longer than width of pronotum across humeri, 48:35, proportion of segments one to four as 10:13:10:15. Bucculae scarcely elevated but the rugose under surface of head with a distinct buccal trough. Rostrum reaching hind margins of middle coxae, the first segment not attaining base of head; proportion of segments one to four as 10:14:6:5.

Pronotum longer than head, 19:15; a little less than twice as broad across humeri as long, 35:19; converging anteriorly, the lateral margins slightly sinuate at middle and rounded to anterior angles. Hind margin distinctly but shallowly concave. Disk feebly elevated posteriorly, more strongly so anteriorly, relatively sparsely and evenly covered with setigerous punctures, the punctures from one (near anterior margin) to three or four puncture widths apart. Humeri impunctate.

Scutellum as long as pronotum and scarcely broader than long, 21:19. Disk broadly elevated and subflattened at middle of base, with a pair of converging impressions sublaterally, the disk abruptly depressed laterad of these at basal angles. Disk distinctly punctured, the punctures becoming sparser posteriorly.

Hemelytra slightly exceeding tip of abdomen and concealing the connexivum laterally. Clavus with two complete rows of punctures and a partial third row along inner margin. Corium with two rows of punctures laterad of claval suture. Beyond these rows with a broader impunctate area extending to median suture or furrow. Punctate laterad of this to impunctate costal margin, this last narrow basally but widening apically with the edge feebly reflexed. Costal margins curved outward subbasally, slightly inwardly sinuate before the middle and then gradually rounded to convergent apices. Apical margin of corium strongly sinuate, the inner half deeply concave. Clavus and corium subhyaline. Membrane clear, hyaline, with veins very ill-defined.

Under surface highly polished except on evaporating areas surrounding right-angled, apically tapering ostiolar canal. Thoracic pleura and sterna sparsely, coarsely punctate with an impunctate area at middle of propleura and on all of metapleura except along impression and near middle. Abdominal venter shining, clothed with backward-directed, short hairs and extremely long trichobothrial hairs.

Color light brown with darker brown eyes and hind lobe of pronotum, this last with humeri, hind margin narrowly at base of scutellum and a longitudinal line at middle, paler, ochraceous. Anterior margin of pronotum, antennae at least on basal half, rostrum and

legs except for slightly infuscated bases of femora, also pale. Scutellum brown, with a broad Y-shaped marking extending from basal angles to apex, ochraceous basally and white apically. Hemelytra pale and more or less hyaline except for infuscated apical portions of clavi; a fuscous spot on either side just before middle of costal margin extending inward to second row of punctures, and fuscous apical margin of corium, the sinuate portion narrowly infuscated and the entire apex of corium infuscated, except for a pale spot at extreme apex. Membrane immaculate.

Size: length 2.15 mm., width (base of hemelytra) 0.9 mm.

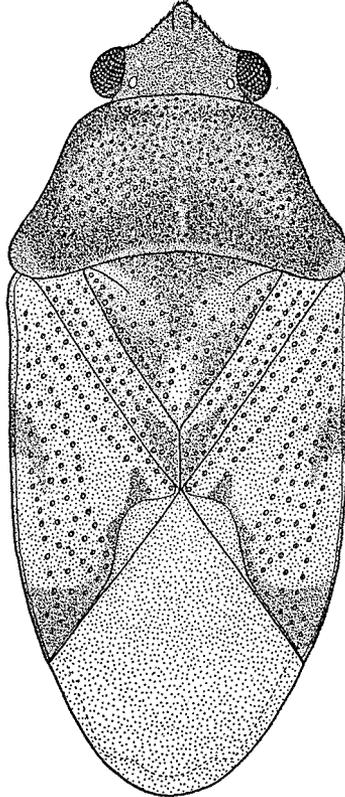


FIGURE 2.—*Cligenes marianensis*: dorsal view showing relative number and size of punctures and sinuate inner margin of membrane.

Holotype female, Piti, May 2, Usinger; three female paratypes, same locality, May 1, and May 11, Usinger, and July 27, Swezey. These specimens were attracted to light.

A closely related species from the Caroline Islands is much darker and has a strongly convex anterior pronotal disk. *C. flavicornis* Signoret is apparently closely related, but the second antennal segment is described as the longest with the others equal, and the hemelytra are differently colored.

This is a nearly cosmopolitan genus with a remarkable variety of species throughout the islands of the southwest Pacific. I have half a dozen undescribed species, the nearest to *marianensis* being one from Larat collected by Muir which is relatively broader with lateral margins of pronotum scarcely sinuate at middle and the pronotal disk ochraceous with large brown area at middle of anterior lobe and along posterior margin. *C. swezeyi* from Samoa differs in its impunctate pronotum as does the Philippine *assimulans*. Other geographically adjacent species lack the strongly sinuate apical corial margin.

#### SUPERFAMILY ARADOIDEA

#### FAMILY ARADIDAE

#### SUBFAMILY MEZIRINAE

#### TRIBE MEZIRINI

#### 30. *Mezira marianensis*, new species (fig. 3, *a*, *b*).

Suboval, second antennal segment much shorter than third, antero-lateral angles of pronotum distinctly lobulate, surface of body only sparsely granular, the granules similar in color to the body surface. Color predominantly black.

Head almost as long as wide across postocular spines, the anterior process relatively slender and scarcely widened anteriorly, reaching two thirds of length of first antennal segment, antenniferous tubercles reaching scarcely more than one third of length of first antennal segment, distinctly divergent and subacute at apices; eyes small, one fifth the width of interocular space; postocular spines straight, cylindrical, exceeding level of lateral margins of eyes by one half the width of an eye; surface with relatively small granules confined to anterior process, except apex of tylus, lateral margins and bases of antenniferous tubercles, and four longitudinal rows at middle of vertex and along lateral margins extending along inner margins of eyes. Antennae a little shorter than length of head and pronotum together, 50:54, proportion of segments one to four as 15:9:18:8; minutely granulate except at base of first segment. Rostrum reaching to hind margin of head, the buccal groove open behind.

Pronotum about two thirds as long as head on median line, 22:30; about 2.5 times as broad across humeri as long, 57:22, the width across anterior lobes about one fifth less than that across humeri, 48:57. Anterolateral angles broadly and finely granular laterally, concave and smooth sublaterally on anterior margin and then coarsely granular and produced just behind eyes; collar smooth, concave and distinct. Posterior lobe distinctly delimited by deep lateral constrictions and median transverse impression, its lateral margins with relatively large, erect, blunt, spinelike granules. Disk of pronotum smooth except for four longitudinal rows of granules on anterior lobe and sparsely scattered granules on posterior lobe becoming denser on humeri. Hind margin scarcely concave, almost straight. Scutellum transversely rugose, laterally, basally and medially carinate, and sparsely granulate except finely along carinae and densely and coarsely in clusters sublaterally at base.

Coria moderately dilated basally, only one twelfth wider across basal lobes than across humeri, with two distinct veins on basal two thirds terminating in a prominent cross vein, this entire area sparsely, inconspicuously granulate. Apical third of corium similar to membrane in texture, vaguely delimited by an ill-defined apical ridge. Membrane with ill-defined, reticulate veins at middle. Abdomen moderately, evenly rounded, almost one third broader across middle than width across humeri. Connexival angles prominent, rounded at apices, the surface of connexivum relatively smooth, only sparsely beset with

short, round granules. Subconnexival area with a small cluster of granules on edge of carina on second visible segment and a circumgranular cup-shaped elevation on third and fourth visible segments. Spiracles of sixth visible abdominal segment just visible from above.

Male apical genital segment granular and convex above with a faint median longitudinal ridge, the apex rounded except for feebly, roundly projecting portion of this ridge. Lateral lobes of basal genital segment broadest subapically, projecting two ninths of their length beyond apex of second genital segment.

Female genital segments distinctive, the median lobe roundly or obtusely subtriangular, small, the lateral lobes reaching just to level of its apex, the lobes straight except for spiracular interruptions on outer sides and tapering on inner sides to obtusely angular apices.

Under surface very sparsely, inconspicuously granulate except laterally on head and thoracic pleura and on sixth visible abdominal segment.

Color dark brown to black with middle of third antennal segment sometimes paler, the clusters of granules and granular elevations at basal angles of scutellum and on subconnexival area of abdominal disk, subconnexival carina posteriorly, connexival angles, and spiracles pale ochraceous to white.

Size: male, length 7.5 mm., width (abdomen) 3.75 mm.; female, length 8 mm., width (abdomen) 4 mm.

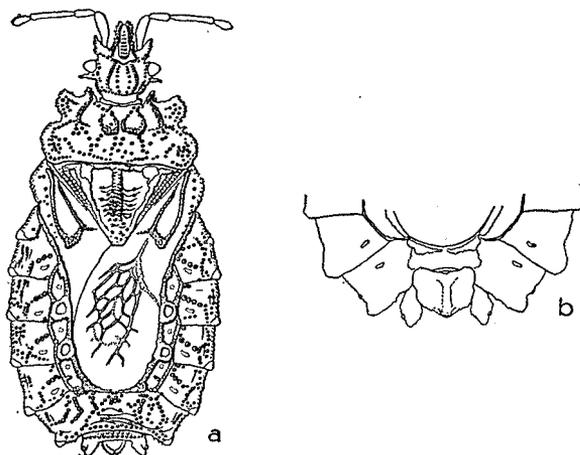


FIGURE 3.—*Mezira marianensis*: a, dorsal view of female; b, dorsal view of posterior abdominal segments of male.

Holotype male, allotype female, and nine paratypes, Machanao, June 30, Swezey and Usinger; one paratype, Barrigada, July 22, under bark of *Intsia bijuga*, Swezey.

Closely related to the Philippine *tagalicus* Stål and to an undescribed species from the Caroline Islands, both of which have the spiracles of sixth visible abdominal segment very near lateral margins. However, both the Philippine and the Caroline species are lighter brownish in color and much more densely covered with conspicuous pale granules. *M. tagalicus* is a little larger, 8.5 to 9.5 mm., with lateral lobes of first male genital segment shorter, not reaching

apex of second segment, and with lateral lobes of female genital segment much shorter, not reaching apex of large, rounded, median lobe. *Tagalicus* likewise has a shorter rostrum with the buccal cavity closed behind. Superficially similar Fijian and Samoan species are at hand. They resemble *tagalicus* in color and in degree of granulation but the spiracles of the sixth visible abdominal segment are remote from the lateral margins.

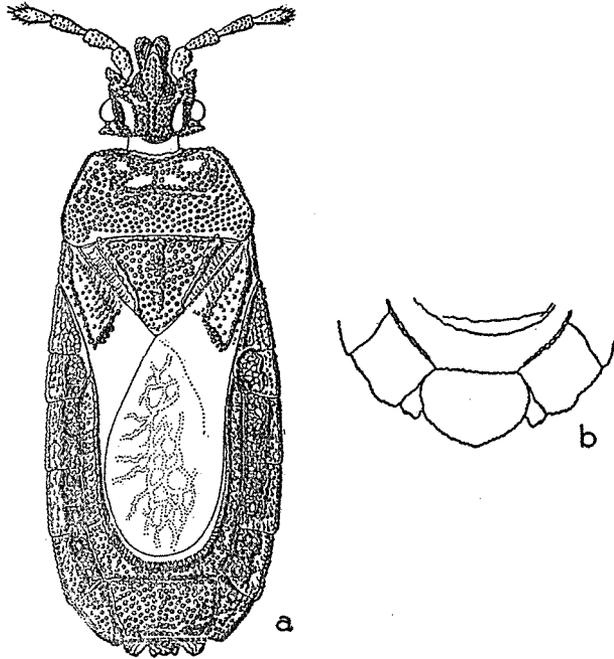


FIGURE 4.—*Neuroctenus pacificus*: a, dorsal view of female; b, posterior abdominal segments of male.

### 31. *Neuroctenus pacificus*, new species (fig. 4, a, b).

Elongate-oval, widest across abdomen but not strongly so, surface dull, granular. Color ferruginous with some black granules, white base of membrane, and black apex of membrane. Antennae less than half again as long as head, the first segment not reaching apex of head, second segment slightly shorter than third and third a little shorter than fourth.

Head about as long, including neck region, as width across eyes, the anterior process narrowest just beyond base, widened apically and emarginate at tip, exceeding apex of first antennal segment by one third the length of first segment visible from above. Antenniferous tubercles reaching about to middle of first antennal segment, their outer margins slightly divergent and their apices subacute. Postocular tubercles reaching just about to outer margins of eyes, acute. Rostral groove about half as wide at middle as long, 9:20, abruptly tapering anteriorly and only feebly narrowed posteriorly. Antennae about one fourth longer than head, 48:39, all the segments, including the third, thin at base and enlarged apically, the first thickest, second only slightly thinner, third still thinner, fourth elongate-pyriform; proportion of segments 11:11:12:14.

Pronotum a little shorter than head on median line, 15:18, over twice as broad as long, 32:15, distinctly narrowed anteriorly, the sides narrowly carinate, sinuate at middle and rounded at anterior angles. Corium longer than scutellum, apical margin sinuate, the apical angle blunt.

Abdomen about one sixth broader than width of pronotum, 39:32. Male genital capsule relatively strongly convex above and beneath, rounded and extending beyond level of apices of sixth visible abdominal segment by slightly less than half its length, 4:9; its surface rather evenly granular. Lobes of first genital segment very short, narrow, blunt at apices, reaching scarcely half the distance from level of apices of sixth abdominal segment to apex of second genital segment. Female abdomen abruptly truncate, the hind margin of sixth segment straight, the genital lobes scarcely longer than median process, projecting about one fourth the length of sixth tergite, the lobes subtriangular, rounded apically, the median process with short, parallel sides and broad, subtruncate, slightly concave apex.

Color almost entirely fusco-ferrugineous with numerous black granules. Membrane white on basal fourth, black apically. Tarsi brown.

Size: male, length 5.1 mm., width (abdomen) 1.95 mm.; female, length 5.6 mm., width (abdomen) 2.15 mm.

Holotype male, allotype female, and 17 paratypes, Barrigada, July 6, under bark of *Intsia bijuga*, Swezey; five nymphs, same data; four paratypes, Mt. Alifan, May 26, in rotten log, Usinger; one paratype, same data as holotype but July 22; one paratype, Yona, May 12, Swezey; one specimen, Dededo, Nov. 8, on taro, Swezey. The smallest male paratype is 4.75 mm. and the largest female is 5.8 mm.

Related to the Oriental (Philippines and Java) *medius* Bergroth but distinguished from that species by the long apical antennal segment. I have a closely related species from Larat (Muir) which agrees with *pacificus* in size and color but which has a more cylindrical third antennal segment, a narrower rostral groove, and slightly longer, broader, and more rounded lateral female genital lobes. This is the first species of *Neuroctenus* to be recorded from a Micronesian or Polynesian oceanic island.

#### TRIBE CALISIINI

### 32. *Calisius dilaticeps*, new species (fig. 5).

Elongate-oval, subflattened above, with lamellately dilated anterior margins of head and variegated coloration.

Head slightly longer than broad, 24:21, subflattened and densely, coarsely granulate above, the anteocular region reaching about to apex of third antennal segment, its sides depressed and distinctly lamellate; antenniferous tubercles short, scarcely attaining apices of first antennal segments, divergent, blunt at apices; postocular spines small but distinct, bent slightly forward, not reaching as far as lateral margins of eyes. Antennae slightly shorter than width of head including eyes, 19:21.5; proportion of segments one to four as 4:4:4:7.

Pronotum three fourths as long as head and about twice as broad across humeri as long, 38:18; six distinct but small tubercles on disk of anterior lobe and two on posterior lobe; lateral margins with four well-developed denticles on each side, each tooth stout and longer than broad; humeri rounded with ill-defined granular elevations.

Scutellum 2.5 times as long as pronotum, distinctly narrowing to slightly beyond middle, then briefly dilated at apical fifth beyond which it narrows roundly to subflattened

apex. Disk strongly triangularly elevated at middle of base with four basal tubercles, a subbasal, obliquely transverse carina laterally on either side, a marginal granular carina and a median longitudinal carina, this last decreasing posteriorly, granular, with two small white granules at apex. Connexivum less than half as broad as scutellum at level of apex of corium, 9:23, evenly arcuate, distinctly elevated laterally, with a double row of short but distinct, bluntly rounded denticles, 3 pairs to each segment, these denticles about half as long as denticles on antero-lateral margins of pronotum.

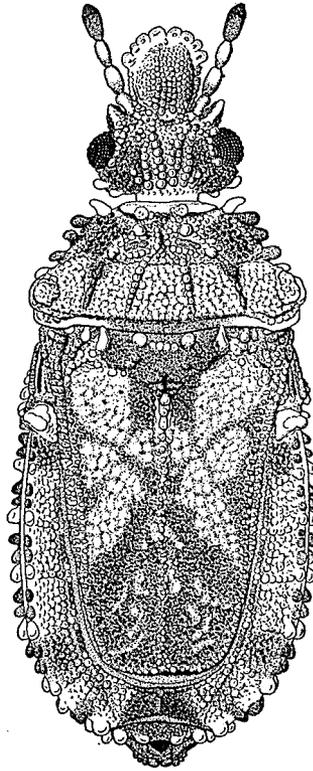


FIGURE 5.—*Calisius dilaticeps*: dorsal view of male showing number and arrangement of granules and tubercles.

Under surface convex and superficially punctured, the thoracic sterna flat and glabrous and impunctate at middle. Ostiolar canal with three prominent, blunt denticles along anterior margin. Eighth abdominal segment large beneath and produced postero-laterally into slender, apically obtuse arms on either side of genital segment. Male genital capsule convex, roundly elevated posteriorly and ventrally along middle and produced upward at middle postero-dorsally. A strongly arched median hood over genital capsule dorsally just behind connexivum proper, this short hood with a subflattened, elongate-oval tubercle on either side.

Color variegated white, ochraceous, and brown, the head white with brown eyes and postocular region laterally except for white postocular spines, the pronotum whitish ochraceous with brown antero-laterally, white anterior-most lateral denticles, and brown discal tubercles on posterior lobe; hind margin white with a brown submarginal carina just in front of scutellar base. Scutellum whitish with brown basal elevation and a brown

semilunar marking on either side just beyond this, a sublateral brown spot near middle of disk and irregularly brown apical fourth of disk extending further forward along either side of median carina. Connexivum ochraceous to whitish with first or first and second pair of denticles on each segment brown and entire disk just in front of genital segments brown. Antennae infuscated basally and apically. Legs pale with brown at base and middle of femora, at middle of tibiae and on claws. Under surface of thorax predominantly pale brownish, of abdomen whitish with brown genital segment medially.

Size: male, length 2.5 mm., width (pronotum) 0.95 mm., (connexivum) 1.05 mm.

Holotype male, and one male paratype, Machanao, June 30, beaten from dead leaves of a fallen tree, Usinger.

This species runs to the Australian *interveniens* Bergroth or the Papuan *cognatus* Horvath in Horvath's key (Hist.-Nat. Mus. Nat. Hung., Ann. 11: 623, 1913) but differs from these and all other species known to me, except an undescribed species from Rapa, in its lamellately dilated margins of anteocular portion of head. The proportions of antennae, head, pronotum, and scutellum, and the size and arrangement of pronotal and connexival denticles are also distinctive. This is the first *Calisius* to be described from north or east of Fiji but I have species from Tahiti, Samoa, and Rapa, and others will surely turn up with further collecting. *C. pacificus* Kirkaldy from Fiji is impossible to place from Kirkaldy's inadequate description, and the head is missing from the type. It differs from *dilaticeps* in that the spines on the lateral margins of the pronotum are shorter, the scutellum is longer and feebly widened beyond apical third, and the median carina of the scutellum is more distinct.

#### SUPERFAMILY TINGOIDEA

##### FAMILY TINGIDAE

#### 33. *Tingis guamensis* Drake, Washington Acad. Sci., Jour. 31: 142, 1941.

Six specimens, Tarague, May 17, on *Premna gaudichaudii*, Usinger; three specimens, Ritidian Point, June 2, Usinger.

Agrees fairly well with the original description except that the third antennal segment is nearly three times as long as fourth, 40:14, the costal area is triseriate rather than mostly biseriate, the subcostal area four- or five-seriate rather than "six areolae deep in widest part." The lateral pronotal carinae are very indistinct in this species. Size in the present series is as follows: male, length 2.9 mm., width (hemelytra) 1.35 mm.; female, length 3 mm., width (hemelytra) 1.5 mm.

#### SUPERFAMILY REDUVIOIDEA

##### FAMILY ENICOCEPHALIDAE

#### 34. *Oncycotis swezeyi*, new species.

Small, parallel-sided, hemelytra short, color uniformly dark brown above, densely clothed with an erect pubescence, the individual hairs bent at the tips.

Head about one third longer than pronotum on median line, the front lobe two thirds longer than hind lobe, eyes relatively small, one fourth as wide as interocular space. Hind lobe as wide as front lobe across eyes, three fourths as long as broad, evenly, transversely oval, the ocelli inconspicuous, scarcely projecting. Antennae as long as distance from head to middle of pronotum, the first segment exceeding apex of head, third and fourth segments relatively stout but fusiform; proportion of segments one to four as 7:20:15:18.

Pronotum broader than long, 40:36, the transverse impressions very distinct; proportional length of lobes from anterior to posterior on median line, 10:17:10; proportional widths of same, 18:34:40. Middle lobe with a distinct, inverted Y-shaped impression at middle and a distinct, glabrous, tripartite impression on either side. Front margin nearly straight, hind margin slightly concave.

Hemelytra short, not quite reaching tip of abdomen, the veins each with two rows of erect, long hairs bent at their tips. Venation as in *basalis* (Westwood) and all other members of this genus.

Legs stout, the front femora three times as long as greatest thickness. Tibiae four fifths as long as femora, a little more than one third as wide at apex as long, with several stout spines at inner apex. Hind femora but little longer than front femora and just as wide though subflattened and hence not so stout.

Color uniformly brown above except for fulvous antenniferous tubercles and juga, and slightly paler extreme bases of coria. Antennae ochraceous, the second segment more brownish. Rostrum fulvous. Legs brown with ochraceous knees and tarsi.

Size: length 4.5 mm.

Holotype female, Agana Spring, May 4, in rotten *Pandanus* log, Swezey.

Very close to *bakeri* (Bergroth) from Laguna, Los Banos, and Mount Maquiling on Luzon. Topotypic specimens of both sexes of *bakeri* were collected by me on Mt. Maquiling. The females of *bakeri* are longer (5 mm.) and relatively more slender than in *swezeyi*, the hind lobe of the head is less strongly transverse and the color, as described by Bergroth, is quite distinctive. The hemelytra are dark brown with pale across their entire bases including clavus and corium and the hind lobe of the head is quite pale. Four female specimens from Manila, collected by C. S. Banks and loaned to me from the Museum of Comparative Zoology, are apparently identical with *swezeyi*, though I have not labeled them as paratypes because of the possibility of differentiation under insular isolation.

Other Oceanian species of this group are before me from Fiji (*fungicola* Kirkaldy), New Hebrides, the Solomon Islands and New Guinea. I am indebted to O. Lundblad of the Naturhistoriska Riksmuseum in Stockholm for the loan of one of Stål's cotypes of *nasuta*, the genotype of *Oncyclocotis* Stål. It now becomes clear that all of the robust, densely pubescent species allied to *basalis* Westwood and formerly included in the genus *Enicocephalus* Westwood actually belong in Stål's genus.

I take pleasure in dedicating this first Micronesian species of Enicocephaliidae to O. H. Swezey, my companion during the field work on Guam and a constant source of inspiration during my stay in the Pacific.

## FAMILY REDUVIIDAE

## SUBFAMILY EMESINAE

35. *Hadrocranella pallidicoxa*, new species (fig. 6).

Body and appendages without long, erect hairs, the head and pronotum largely clothed with a dense coat of appressed pubescence, antennae with very short, fine subappressed hairs, middle and hind legs scarcely, very inconspicuously pubescent. Front coxae, trochanters and femora with longer, erect hairs most of which are shorter than leg diameter.

Head one fourth longer than broad across eyes, anterior lobe with an anteriorly bifurcate glabrous area at middle of postantennal region. Hind lobe evenly convex and evenly rounded behind, not impressed. Antennae about half again as long as body, 162:105; proportion of segments one to four as 68:60:25:9; slender throughout. Proportion of rostral segments, 15:7:10, the first segment moderately thick and curved, second strongly swollen, thicker than first, third very slender, slightly curved apically.

Pronotum about as broad across humeri as length of head, one fourth longer than broad, the anterior lobe one third as long as posterior lobe, with a conspicuous, tripartite glabrous area on either side. Hind lobe moderately elevated with an ill-defined depression along middle, its posterior margin concave before mesonotum. Mesonotum small, convex, two thirds as long as broad and briefly, broadly angulate posteriorly without a spine. Metanotum with a distinct, slender, tapering, pubescent spine directed posteriorly and dorsally about on a level with hemelytra, scarcely longer than mesonotal disk. First abdominal tergite with a relatively short, erect, stout, pale spine bent backwards and rounded at apex.

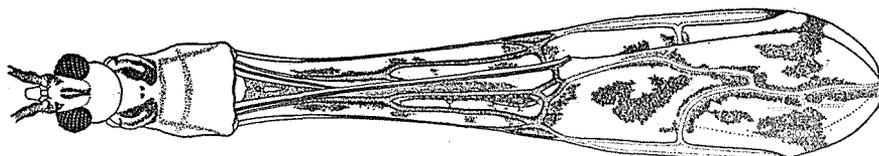


FIGURE 6.—*Hadrocranella pallidicoxa*: dorsal view of male showing venation and coloration of hemelytra.

Hemelytra long and slender, five times as long as greatest width, the venation as in *Emesopsis (Hadrocranella) neptunis* McAtee and Malloch. Abdomen about three times as wide subapically as subbasally. Legs very long, the hind femora exceeding tip of abdomen by three fifths the length of abdomen, very feebly thickened apically. Front legs without visible spines.

Median posterior process of male genital capsule broad and curved upward and outward on basal half, slender, tapering, and bent upward apically. Claspers long, broad, slightly narrowed subapically and rounded at apex, bent slightly inward towards the apex. Female abdomen simply tapering to subtriangular apex.

Color brown with gray pubescence on head and pronotum. Hemelytra pale and hyaline with brown veins on basal half except for extreme base, the stigma very pale fulvous. Cells with brown markings as follows: along outer side of main vein beyond level of apex of metanotal spine, narrowly and somewhat reticulately in elongate corial cell, generally at middle of hemelytron, at base of discal cell, broadly and subtriangularly at middle of discal cell with a broad hook-shaped pale area intruding from inner side, narrowly along lateral and apical margins of discal cell, along other veins in apical portion of hemelytron, and at middle of two apical cells. Antennae pale with fuscous annuli basally, subbasally, at middle, and subapically on first segment, subbasally on second segment and only vaguely elsewhere. Front coxae entirely pale or very faintly embrowned subapically, femora lightly infuscated on basal half, a little beyond middle, and broadly subapically. Tibiae brown

subbasally. Middle and hind legs pale, the femora fusco-annulate a little beyond middle and subapically and the tibiae subbasally.

Size: length 5 mm.

Holotype male, Dededo, May 11, on *Cycas*, Usinger; allotype female, three paratypes, Machanao, June 4, Usinger; three paratypes, Mt. Tenjo, May 3, Usinger; one paratype, Barrigada, June 12, Usinger.

Allied to *obsoletus* McAtee and Malloch from Singapore and *medusa* Kirkaldy from Fiji, but these species have distinctly fusco-annulate front coxae and the hemelytra are scarcely more than three times as long as broad. Horvath's name has been used in a generic sense because these Oceanian species differ in so many characters from the typical *Emesopsis*.

### 36. *Emesopsis pilosus*, new species (fig. 7).

Entire body and appendages clothed with long, fine, erect hairs with bent tips. Body relatively short and broad, pronotum strongly constricted, unarmed. Mesonotum unarmed, metanotum with a distinct spine and first abdominal tergite tuberculate.

Head longer than broad, 22:17; densely clothed with an appressed pubescence interrupted on front lobe between eyes by two longitudinal, anteriorly divergent, glabrous lines. Hind lobe rounded behind, strongly convex, and almost imperceptibly longitudinally impressed along middle. Entire head beset with long, erect, apically curved hairs in addition to the short appressed pubescence. Antennae a little shorter than length of body from tip of tylus to apex of abdomen, 149:155; proportion of segments one to four as 63:38:34:14; the segments not noticeably enlarged apically; first segment with moderately long, apically shorter, apically directed, straight hairs, third and fourth segments with extremely fine, inconspicuous appressed hairs. Rostrum stout, curved, proportion of segments 12:6:8, the first segment distinctly pubescent, second segment swollen and glabrous, third slender.

Pronotum a little longer than head, 25:22; strongly constricted, the front lobe two thirds as long as hind lobe, the hind lobe as broad across humeri as entire length of pronotum. Disk convex, without lateral carinae, the hind lobe roundly elevated to hind margin, this last roundly concave in front of scutellum. Disk irregularly clothed with short, appressed pubescence interrupted by three glabrous fasciae on either side of front lobe, and beset with many long, erect, apically curved hairs. Mesonotum about as long as wide, strongly convex but unarmed. Metanotum with a well developed spine, first abdominal tergite with an erect, blunt, spine-like tubercle.

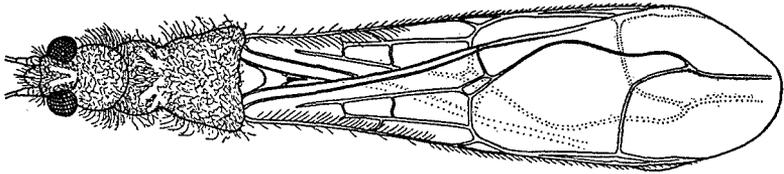


FIGURE 7.—*Emesopsis pilosus*: showing pilosity and details of venation.

Abdomen almost three times as wide just beyond middle as subbasally, the hind margin of first visible ventrite shallowly, roundly emarginate. Ventral surface beset with scattered, long, slender hairs.

Hemelytral venation as in *Emesopsis gainus* McAtee and Malloch (Philippine Jour. Sci. 30: pl. 1, fig. 3, 1926), the apical vein with a faint suggestion of a vein stump beyond apex of discal cell. Hemelytral margins with rows of fine, erect, apically curved hairs.

Legs relatively short, the hind femora reaching about to apices of hemelytra. Front tarsi two-segmented. Front femora with one or two inconspicuous spines among the dense

hairs at base. Front coxae and femora with relatively long, erect hairs. Middle and hind femora with exceedingly long, erect, apically curved hairs except at bases, the hairs about 4 or 6 times as long as diameter of femur. Tibiae with equally long hairs on basal half but diminishing apically.

Color rather uniformly light brownish to fulvous, the eyes dark brown, the legs very pale brown with the following slightly darker annulations faintly visible: apical half of front coxae and middle, subapices and apices of femora. Hemelytra with membranous areas subhyaline without fuscous markings.

Size: length 4.4 mm.

Holotype female, Machanao, June 30, Usinger.

This species occupies an anomalous position, not fitting precisely into any of the subgenera of McAtee and Malloch. It should perhaps be the type of a new subgenus but I do not wish to take such a step with only a single female specimen. It fits typical *Emesopsis* most closely but differs in having one or two spines at bases of front femora, distinct, trifasciate glabrous areas on either side of front lobe of pronotum and an obscure stump of a vein on apical vein just beyond discal cell. It differs specifically from the Oriental species of *Emesopsis* in its small size and immaculate hemelytra. From the Antillean genotype, *nubilus* Uhler, it differs in possessing the spines at base of front femora and in the relatively shorter third antennal segment.

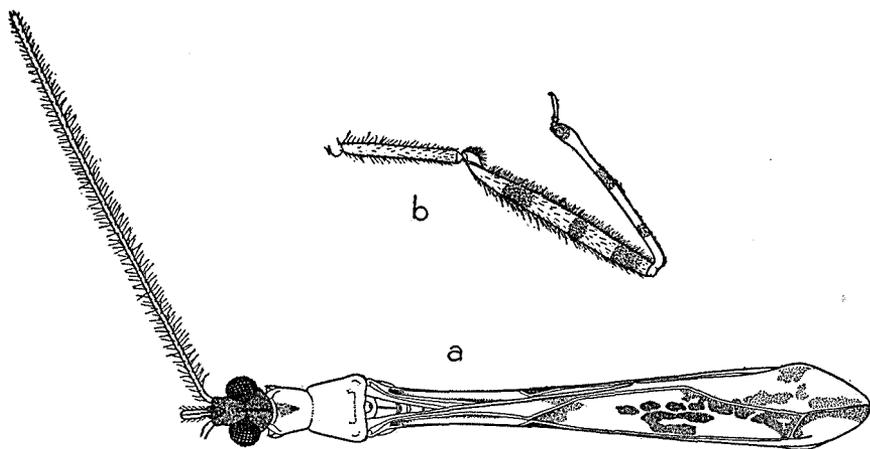


FIGURE 8.—*Ademula distincta*: a, dorsal view of male showing details of venation and pilosity of first antennal segment; b, foreleg showing pilosity and ventral spines on femur.

### 37. *Ademula distincta*, new species (fig. 8, a, b).

Head and pronotum above with only short pubescence, under surface of head, front coxae and femora and first antennal segment with long, erect hairs.

Head as long as wide, antenniferous tubercles projecting prominently above bases of jugs. Eyes large, half again as broad as interocular space, hind lobe of head rounded behind, feebly longitudinally impressed along middle. Antennae over half again as long as

body, 209:130, proportion of segments one to four as 83:83:30:13; slender throughout. Proportion of rostral segments about 13:10:13; middle segment only moderately swollen at middle, not exceeding greatest thickness of first segment.

Pronotum strongly constricted in front of middle, the front lobe about two thirds as long as hind lobe, rounded and smooth laterally, slightly granular at middle and impressed just behind middle. Hind lobe more coarsely granular, moderately convex with a broad longitudinal impression along middle nearly as long as broad across humeri, 24:26; laterally only faintly carinate. Anterior disk pubescent, especially laterally, posterior disk without pubescence and without spines or processes. Hind margin shallowly but distinctly angulately emarginate.

Mesonotum three fourths as long as broad, with an erect spine at middle, the spine half as long as mesonotum. Metanotum scarcely spined, with a very short subacute tubercle at apex. First abdominal tergite with a prominent, erect spine about the size of mesonotal spine.

Hemelytra very long and slender, six times as long as greatest width, the venation as figured for *Ademula reticulata* McAtee and Malloch (Philippine Jour. Sci. 30: pl. 3, fig. 23, 1926).

Legs relatively long and slender, the hind femora exceeding tip of abdomen by about one seventh their total length. Middle and hind femora not conspicuously enlarged apically. Front femora with four well-developed spines on basal half. Front tarsi apparently two segmented.

Abdomen more than twice as broad subapically as subbasally. Male with a short, rounded tubercle on either side of hind margin of pregenital segment. Genital capsule biemarginate apically as seen from behind with a broad, apically rounded process between, this process twice as long as broad at apex. Claspers elongate, about as long as posterior process, rounded apically. Female with a small, rounded process on either side of subapical tergite.

Color pale, testaceous, with brown head, brownish base and apex of rostrum, and irregularly and faintly infuscated first antennal segment except for pale apex. Subbasal, median, and subapical brown annulations on front femora and tibiae, at least subapical annulations on middle and hind femora and various brown hemelytral markings as follows: main veins at middle of basal third, broad suffusion slightly in front of middle of hemelytron rather broadly broken by large reticulations at middle, and along inner margin of apical half of discal cell and across this vein to middle of inner apical cell.

Size: length 6.3 mm.

Holotype male, allotype female, and seven paratypes, Mt. Tenjo, May 3, Usinger; two paratypes, Mt. Chachao, May 16, Usinger; three paratypes, Dededo, May 11, on *Ochrosia* and *Cycas*, Usinger; one specimen, Upi Trail, May 5, Usinger.

Very close to *Ademula reticulata* McAtee and Malloch, from Singapore, Borneo, and the Philippines, despite the apparently two-segmented front tarsi and the absence of uniformly long hairs on head and anterior lobe of pronotum. The hemelytra are only about four times as long as greatest width in that species, and the fuscous markings of the hemelytra are more extensive. From the present material I am not able to judge whether this is an unwarranted extension of the generic concept of *Ademula* or not. I collected a new species which is very close to this at Los Banos, Luzon, but this species has much longer hairs on the legs and on the first antennal segment, the mesonotal spine is longer, the black subapical annulations are strikingly narrow on the first antennal segment and on the middle and hind femora, and the posterior process of

the male genital capsule is narrower at base and broader and rounded apically. Both of these species will run directly to *Empicoris* in McAtee and Malloch's key but they obviously have nothing to do with this genus, the venation, in particular, referring them directly to *Ademula*. Kirkaldy's Fijian *calamine* is related to *distincta* but has shorter hairs on the first antennal segment, has a smoother pronotum with long, fine hairs anteriorly and laterally, and is shorter and broader with differently colored hemelytra.

**38. *Empicoris tessellatus* McAtee and Malloch, Philippine Jour. Sci. 30: 131, 1926.**

Piti, July 5, on mango leaves, Swezey.

A single, apparently perfectly typical female of this species. The unique type is from Singapore. Kirkaldy's Fijian *euryale* is close to this, but has long hairs on the first antennal segment and differs in coloration.

**39. *Empicoris minutus*, new species.**

Head as long as broad, the antenniferous tubercles prominently elevated anteriorly; hind lobe broadly rounded behind, longitudinally impressed along middle. Surface of head minutely pubescent, the hairs appressed to the surface. Antennae nearly half again as long as body, 207:142; proportion of segments one to four as 82:82:30:13; not swollen near apices of segments. Rostral segments as 8:5:7, glabrous, the middle segment moderately enlarged.

Pronotum about as long on median line as head and equally broad across humeri; only moderately constricted, the disk with a fine appressed pubescence interrupted by glabrous areas on anterior lobe. Lateral carinae distinct on anterior half of hind lobe, decreasing in height toward the middle of hind lobe. Hind margin trisinate, the edge concave and a little elevated at middle, depressed on either side of this. Mesonotum with a well-developed spine projecting at about a 45-degree angle to the longitudinal body axis, usually straight and appearing to be minutely, finely granular-pubescent throughout. Metanotum with an equally prominent, more pubescent spine. Spine of first abdominal tergite prominent, erect, bent slightly backward and slightly globose at apex.

Hemelytra essentially as in *rubromaculatus* (Blackburn), scarcely more than 4 times as long as greatest width and distinctly exceeding tip of abdomen.

Male genital capsule produced posteriorly into two tapering, subapically outwardly bent arms, the distance between apices of these arms three fourths as great as the depth of the emargination thus formed. Claspers large, rounded at apices, as broad as distance across posterior genital arms.

Legs very long, the hind femora exceeding tip of abdomen by more than one third their length. Middle and hind legs not swollen except at bases of hind femora. Here at basal eighth, each femur is half again as thick as at middle.

Color brown with ochraceous ill-defined longitudinal carinae on disk of hind lobe of pronotum, pale hind margin of pronotum, white lateral carinae of pronotum, infuscated mesonotal spine, white metanotal spine and dark glabrous spine on first abdominal tergite. Hemelytra predominantly brown, broken up by a network of irregular pale lines, the stigma pale with two brown spots near the middle, the apex usually tinged with reddish or orange. Under surface brown, with very short, pale pubescence, white spiracles, pale genital capsule including arms, and dark brown claspers. Appendages white annulated with brown. Rostrum with 5 brown annulations. First antennal segment with 11 annulations, the first one at extreme base and the last the longest, subapical; second segment with 10; third with 3; fourth with 2. Front coxae with an ill-defined brown spot at basal third, the apical third almost entirely brown. Front femora brown except for two

pale rings just beyond middle and narrowly pale apex. Front tibiae pale at extreme base and just before and just beyond middle. Middle femora with 9 short brown annulations, the tibiae with 14 or 15, those near the apex being indistinct. Hind femora with 14, the one nearest apex about as long as apical pale area. Tibiae with 13 or 14 annulations.

Size: length 3.6 to 3.8 mm.

Holotype male, Inarajan, May 7, Swezey; allotype female, Machanao, June 4, Usinger; three paratypes, same data as allotype, collected on dead leaves of a fallen tree; one paratype, Machanao, June 30, Usinger; one paratype, Tumon Beach, May 30, in dead *Barringtonia* leaves curled by caterpillars, Swezey; one specimen, Piti, Sept. 26, on mango, Swezey.

Three specimens from Hawaii apparently belong here although they have not been included in the paratype series because of possible differences due to insular isolation. One of the Hawaiian examples was collected by Timberlake at Naalehu, Hawaii, August 19, 1919, on ferns, another is from Pupukea, Oahu, Jan. 23, 1929, E. H. Bryan, Jr., and a third, damaged, specimen is from Kewalo, Dec. 8, 1908.

Typical *rubromaculatus*, which I have collected from the slopes of Mauna Loa, is much larger, 5 to 5.5 mm., with the first antennal segment usually slightly longer than second, mesonotal spine white and usually bent downward parallel with the longitudinal axis of the body. The hind femora are only feebly thickened basally and the annulation nearest the apex is distinctly longer than apical pale area. The arms of the male genital capsule are most distinctive, being shorter and more strongly divergent posteriorly, the distance across apices being greater than the depth of the emargination thus formed.

#### SUBFAMILY SAICINAE

#### 40. *Polytoxus pilosus*, new species (fig. 9, a-d).

Relatively large, pale in color with obscure median longitudinal fascia above, clothed with long, fine, erect hairs.

Head a little longer than broad across eyes, 37:32. Antennae slightly shorter than body, 175:190, proportion of segments one to four as 75:26:50:24.

Pronotum on median line nearly twice as long as head, 70:40; front lobe elevated, narrowed anteriorly, nearly as long as broad behind, 35:40. Hind lobe about twice as broad across humeri as long, 58:30; lateral spines acute, four fifths as long as width across humeri, 48:58, directed laterally and slightly forward.

Mesonotal spine acute; about as long as pronotal spines. Metanotal spine blunt at apex, about half as long as the other spines.

Hemelytra reaching almost to apex of abdomen, the connexivum moderately exposed on either side. Legs relatively long, the hind femora slightly exceeding apex of abdomen.

Male genitalia distinctive, the claspers four times as long as greatest width, broadest on basal half, then bent upward and tapering to slender but obtuse, slightly inwardly bent apex. Posterior process arising from broadly produced apical margin of genital capsule, about two thirds as long as claspers, laterally compressed to form a thin, plate-like process which is about one third as wide just behind middle as long, narrowest at base and at apical third, the apex subtruncate, being more produced postero-ventrally.

Female with hind angles of last connexival segment produced into distinct, acute spines slightly inwardly turned at apices. Pygidium convex, broadly rounded dorsally, strongly rounded laterally and then convergent to broad, slightly arcuate ventral margin.

Color ochraceous to fulvous with brownish head, antennae, rostrum and an ill-defined longitudinal fascia along middle of thorax and hemelytra. Apices of pronotal and mesonotal spines brownish. Under surface largely pale, the thoracic pleura and abdominal venter faintly brownish. Legs pale with fuscous subapically on femora, apically on tibiae, and on tarsi.

Size: length 9.5 mm., width (across humeri) 1.5 mm.

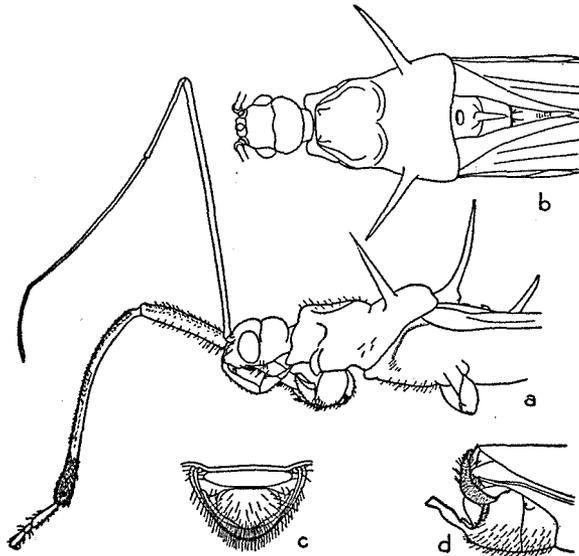


FIGURE 9.—*Polytoxus pilosus*: a, lateral view of head and thorax of female; b, dorsal view of head and thorax of female; c, posterior view of female genital segment; d, side view of genital capsule of male showing armlike claspers and median process.

Holotype male, allotype female, and eight paratypes, June 8, Inarajan, at bases of rice clumps, Swezey and Usinger; one paratype, June 25, Inarajan, Usinger.

Approaches the Samoan *similis* China in size but differs in the relatively shorter first and second antennal segments, the differently formed female genital plates, the longer metanotal spine, and probably in the pilosity and male genitalia, though these characters are not mentioned. The Philippine *longipes* Stål must be close to this according to the very brief and inadequate original description but runs to a different section of the genus devoid of a dorsal fuscous vitta in Stål's key (Enum. Hemipt. 4: 91, 1874). *Pilosus* agrees closely with *vagans* Miller in size, form of male genitalia, apical abdominal spines of female and even in thoracic spines, though the pronotal spines are somewhat longer and the mesonotal spine is much longer in *vagans*.

41. *Polytoxus marianensis*, new species (fig. 10, a-d).

Small, sparsely, inconspicuously pilose with distinct longitudinal fascia dorsally, relatively short pronotal spines, and distinctive genitalia.

Head distinctly longer than broad across eyes, 37:27. Antennae five sixths as long as body, proportion of segments one to four as 60:20:40:25.

Pronotum about one third longer, on median line, than head, 53:37; almost as broad across humeri as long, 50:53; front lobe elevated, five sixths as long as broad, abruptly narrowed anteriorly, produced into short rounded elevations antero-laterally. Hind lobe about twice as broad across humeri as long on median line, the disk slightly depressed at middle and clothed with subappressed, silky hairs. Lateral spines relatively short, acute, slightly more than one third as long as width of pronotum across humeri, 18:50; directed laterally and scarcely forward, straight.

Mesonotal spine one third longer than pronotal spines, 25:18, acute, bent just before middle and directed upwards on apical half. Metanotal spine short, one third as long as mesonotal spine, bluntly rounded at apex and scarcely or only feebly bent upward apically.

Hemelytra reaching tip of abdomen, exposing connexivum moderately at sides.

Legs moderately long, the hind femora just reaching apex of abdomen; hind femora and front tibiae most conspicuously curved.

Male genitalia with claspers three times as long as greatest width, 25:8, nearly equal in width throughout, slightly and rather evenly curved upward, the apex broad, feebly bent inward and produced on inner dorsal angle as a small, triangular tooth. Posterior process broad at extreme base, abruptly tapering to slender main process and then scarcely tapering to acute apex which is provided with a subapical ventral tooth, thus appearing subtriangular at apex.

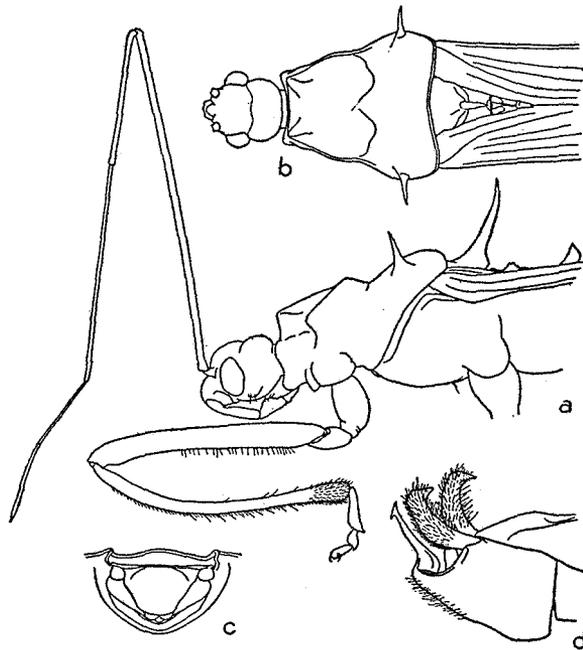


FIGURE 10.—*Polytoxus marianensis*: a, lateral view of head and thorax of female; b, dorsal view of head and thorax of female; c, posterior view of female genital segment; d, lateral view of genital capsule of male showing armlike claspers and slender median process.

Female with hind angles of last connexival segment not acutely produced, rounded. Pygidial plate rounded dorsally, concealed laterally by side pieces and thus appearing concave at ventrally convergent sides, briefly arcuate ventrally.

Color ochraceous to fulvous with a fuscous fascia well marked at middle of hind lobe of pronotum and thence extending posteriorly along middle to apices of hemelytra. Spines infuscated apically. Head, rostrum and antennae infuscated. Under side of body laterally dark brown to black. Legs pale with dark apices of femora, dark tibiae apically and subbasally, and tarsi; the knees reddish.

Size: male, length 7.65 mm., width (across humeri) 1.3 mm.; female, length 8 mm., width (across humeri) 1.4 mm.

Holotype male, allotype female, and seven paratypes, Inarajan, June 8, Usinger; four paratypes, same locality, June 25, Usinger; all taken at bases of rice clumps.

Fifty-six eggs were laid in a glass vial on June 8. When freshly laid, the eggs are white and are covered with a somewhat longitudinally striated, transparent layer of mucus which is drawn out at the micropylar end. The egg is 0.75 mm. long and 0.4 mm. at its greatest width. It is oblong-oval, broadly rounded on one side and scarcely rounded on the other, rounded posteriorly, and with micropylar end carinate around a relatively small cap, the diameter across cap half that of greatest diameter of egg. The chorion is very smooth, polished, without spines and processes, and the egg thus resembles eggs of *Reduvius* and *Triatoma* rather than those of Emesinae. Incubation period of eggs, eight days.

*P. marianensis* is very close to the Philippine *fuscovittatus* Stål in size and coloration but the pronotal spines in that species, according to Distant (Fauna Brit. India, Rhynch. 2: 219, 1904), are "about as long as pronotum." A more detailed comparison is impossible because of the inadequate descriptions of the Philippine species. *P. similis* China from Samoa is much larger with relatively longer second antennal segment, more acute and upright metanotal spine, and convex sides of female genital plate. A male from Houailou, New Caledonia, agrees with *marianensis* in size and in genital characters but the pronotal spines are much smaller, only one seventh as long as width of pronotum across humeri, and the color is quite different, the head, pronotum, and legs being tinged with red. The male genitalia resemble those of *selangorensis* Miller but that species is smaller with relatively longer pronotal spines.

#### SUBFAMILY REDUVIINAE

#### 42. *Peregrinator biannulipes* (Montrouzier and Signoret).

*Opsicoetus biannulipes* Montrouzier and Signoret, Soc. ent. France, Ann. (4) 1: 69, 1861.

Machanao, June 4, Swezey, two specimens. A widely distributed tropical species recorded in the Pacific from the Marquesas, Tahiti, Fiji, Samoa, New Caledonia, and the Philippines.

43. *Physoderes minor*, new species (fig. 11).

Relatively small, the head half as broad as long, apical portion of scutellum about as broad as long, legs short and stout and color predominantly pale, fulvous to ochraceous on head, thorax, and appendages.

Head half as wide as long; transverse impression well developed, located just behind eyes, the anterior lobe thus delimited twice as long as the short, strongly transverse (17:10) posterior lobe; front lobe gradually tapering to blunt apex, the antennae inserted at its anterior third, antenniferous tubercles short, not produced, juga well developed, roundly convex, reaching to level of apices of antenniferous tubercles; eyes about one fourth as wide as interocular space. Hind lobe transverse, its hind margin broadly, evenly rounded, its sides roundly angled. Entire head sparsely clothed with curved hairs and with a pair of erect, posteriorly-directed hairs on hind margin of posterior lobe. Rostrum long, slender, tapering, proportion of segments one to three as 13:23:8. Antennae slightly longer than head, 37:35; proportion of segments one to four as 8:11:8:10.

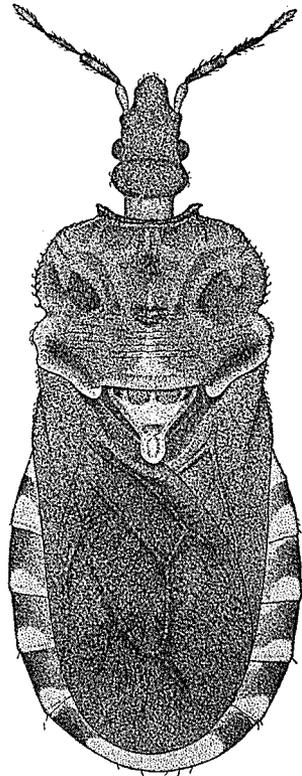


FIGURE 11.—*Physoderes minor*: dorsal view of male.

Pronotum as long on median line as head, almost half again as broad across humeri as long, 50:35; disk gradually sloping in back and more abruptly in front of transverse impression, the front lobe one seventh narrower than hind lobe, convex, elevated anteriorly at middle and carinate sublaterally, with four sinuate carinae on posterior part of front lobe, the two median ones connected to hind lobe which is subdepressed and transversely rugose at middle. Front margin strongly depressed and then a little reflexed, the lateral angles briefly, roundly produced. Lateral margins broadly, arcuately rounded, minutely

toothed and covered with stiff, curved hairs; constricted at transverse impression, and then abruptly flaring to rounded humeri. Hind margin feebly arcuate in front of scutellum, the parascutellar lobes relatively short, about half as long as width of posterior scutellar lobe, 3.5:6, straight on inner margins, sinuate on outer margins and rounded apically. Disk also depressed in front of middle of transverse impression and sublaterally beyond parascutellar lobes, glabrous between carinae of anterior lobe and very sparsely beset with sparse, subappressed hairs on posterior lobes.

Scutellum broader at base than long, 20:16; the sides sinuate and roundly carinate, the disk strongly depressed at base and deeply impressed as a trough on apical lobe, this last with subparallel sides, the width at this point nearly one sixth the total width of scutellum at base, 6:20; apex rounded.

Hemelytra complete, reaching to middle of apical abdominal tergite, exposing the connexivum a little more broadly at middle of sides of abdomen than posteriorly.

Female pygidium as broad dorsally as long, arcuate on dorsal margin, slightly concave and converging laterally, the ventral margin half as long as dorsal.

Femora relatively stout, the front femora one third as wide as long and provided with at least three very prominent spines one third as long as width of femur.

Color fulvous to dark brown and ochraceous, the head and pronotum brownish fulvous with antenniferous tubercles apically and discal carinae, lateral margins, posterior margin and posterior portion of pronotum at middle paler, fulvous to ochraceous. Scutellum whitish at least on apical two thirds, corium dark brown with paler veins apically, membrane dark. Connexivum dark brown with ochraceous posterior third to half of each segment. Under surface largely ochraceous with brownish longitudinal stripes and markings. Rostrum pale. Antennae with first segment, apical half of second and fourth segments, and joints between the segments pale. Legs ochraceous on coxae, trochanters, femora broadly at middle, tibiae subbasally and just beyond middle, and tarsi.

The male is a little smaller with the hemelytra slightly longer but still not reaching apex of abdomen.

Size: female, length 7.65 mm., width (hemelytra) 4.25 mm., (pronotum) 2.5 mm., (abdomen) 3.2 mm.; male, length 7.2 mm., width (hemelytra) 4.05 mm., (pronotum) 2.25 mm., (abdomen) 2.75 mm.

Holotype female, Dededo, May 19, taken in a rotten banana stump, Usinger; allotype male, Piti, May 22, beneath rotten breadfruit, Swezey; three paratypes, same data as holotype; five specimens, Piti, May 22, 23 and 26 and Oct. 27, in rotten banana log and breadfruit, Swezey and Usinger; four specimens, Mt. Alifan, May 26, in rotten papaya log, Usinger; and two specimens, Yigo, Nov. 13, in rotten banana stem, Swezey.

*P. minor* has the short head with the roundly angulate posterior lobe of *javanica* Miller but is smaller and has an unusually broad apical scutellar lobe. *P. fuliginosa* Stål, which I collected on Mt. Maquiling in the Philippines, differs in its larger size, darker coloration, longer and more slender head with rounded sides of posterior lobe, narrower apical scutellar lobe and more slender legs. *Physoderes* Westwood (= *Epirodera* Westwood) extends from Madagascar through the Oriental Region. The Oriental section of the genus is much the larger in described species, all of which differ from the Madagascar forms in the sulcate apical scutellar lobe. The center of distribution appears to be Java, Sumatra, and the Malay Peninsula. I have three species from the Philippines and a remarkable, nearly apterous species from Fiji. The Fijian and Guam species represent the easternmost extensions of the genus known to date.

## FAMILY NABIDAE

44. *Nabis capsiformis* Germar, *Sibermann's Rev. Ent.* 5: 132, 1837.

Piti, three specimens, April 30, nine specimens, June 20, one specimen, June 26, Usinger; two specimens, Mt. Tenjo, May 3, Swezey and Usinger; one specimen, Piti, July 13, on sedges, Swezey; one specimen, Mt. Alifan, May 21, on *Ipomoea*, Swezey; one specimen, Fadian, Aug. 19, on *Sida*, Swezey; one specimen, 2 miles south of Piti, June 14, Usinger; three specimens, Upi Trail, May 5, Swezey and Usinger; three specimens, Machanao, Aug. 6, on spiny amaranth, Swezey; one specimen, Dededo, May 11, Usinger; one specimen, Dededo, Aug. 11, Swezey; one specimen, Talofofu, Nov. 18, Swezey.

An extremely widespread and apparently variable species. China [Ins. Samoa 2(3): 157, 1930] notes differences between typical Mediterranean and South African specimens and those from Pacific islands. He also finds that "the hind femur and the second antennal segment in the Samoan specimens are distinctly longer than in Hawaiian specimens, although the shape of the male parameres is the same."

The Guam specimens are of two types, those from Piti and Mt. Tenjo being pale in color with relatively feebly sinuate subbasal angle of male genital clasper, whereas those from Upi Trail, Machanao, Dededo, and 2 miles south of Piti are darker in color and have the male genital claspers strongly sinuate subbasally. These differences seem to fall within the limits of variation when compared with hundreds of specimens from nearly all of the principal island groups of the mid Pacific, but the presence of these two fairly distinct types on the single island of Guam is difficult to understand.

## SUPERFAMILY CIMICOIDEA

## FAMILY CIMICIDAE

45. *Cimex hemipterus* (Fabricius).

*Acanthia hemiptera* Fabricius, *Syst. Rhyng.*, 113, 1803.

Agana, June 29, 1936, native collector. Recorded from New Hebrides and Samoa; probably occurs elsewhere in the western Pacific. *C. lectularius* Linnaeus is the bed bug of the Hawaiian Islands.

## FAMILY ANTHOCORIDAE

## SUBFAMILY LYCTOCORINAE

46. *Lasiochilus marianensis*, new species.

Relatively small, elongate-oval, pale at bases of coria and cuneal fractures, second antennal segment scarcely shorter than width of head across eyes. Male genital clasper, as seen from above, widened apically, with only a feeble basal ridge and without an entirely distinct apical lobe. Rostrum reaching to level of front margins of middle coxae.

Head slightly longer than broad across eyes, 17:14; anteocular portion a little longer than an eye, 6.5:5, and scarcely broader than length of an eye, 5.5:5; eyes relatively small, one third as wide as interocular space; disk smooth, shining, faintly rugose between ocelli and with a posteriorly arched impression between eyes. Tylus transversely rugose near middle. Disk with several long erect hairs located along inner margins and behind ocelli, between eyes, and anteriorly. Rostrum, when stretched to its fullest length, surpassing middle of mesosternum, reaching level of front margins of middle coxae; proportion of segments one to three as 6:16:9. Antennae one third longer than width of pronotum across humeri, 37:27, first segment reaching about to apex of head, second segment scarcely shorter than width of head including eyes, 13:14; proportion of segments one to four as 5:13:9:10.

Pronotum two thirds as long as head on median line, over twice as broad as long, 27:12, about half as wide at anterior margin (measured across postocular part of head) as at humeri, 13:27; sides feebly arcuate or almost straight posteriorly, broadly and strongly rounded only at anterior angles. Disk smooth, polished, with faint submarginal wrinkles anteriorly, a longitudinal impression faintly indicated on posterior half of large, moderately elevated median area, the short, flattened posterior area distinctly, transversely wrinkled. Middle of disk with only a few widely separated, backwardly directed hairs, becoming denser posteriorly and very dense along lateral margins, the sides with about four much longer, erect hairs and one of these on either side near anterior margin. Scutellum glabrous on basal fourth medially, dull and clothed with curved, subappressed hairs elsewhere.

Hemelytra exceeding tip of abdomen, the clavus, corium, and cuneus impunctate, uniformly clothed with moderately long, curved, subappressed, backwardly directed hairs. Embolium not quite as wide near cuneal fracture as inner portion of corium at the same level. Membrane dull except for shining narrow basal stripe.

Under surface with thoracic pleura naked, sterna with short hairs. Abdominal venter clothed with short, backwardly directed pubescence and with longer, erect hairs posteriorly and laterally. Ostiolar canal sinuate, curved slightly forward on hind margin basally and then backwardly rounded, not reaching postero-lateral margin. Legs shining, beset with scattered hairs, the front femora a little more than one third as thick as long, 6:16, hind femora slightly less incrassate and middle femora even less incrassate.

Male genital clasper, as seen from below (described from the Machanao paratype), sinuate, broad at base and then slightly bent forward and tapering to subacute apex which is bent feebly outward. Seen from above, the tapering portion is gradually broadened into a blade-like organ, one fifth as broad at apical fourth as entire length of clasper and rounded at apex.

Color brown, the head at apex, basal third of corium, extreme outer base of clavus, and cuneal fracture paler, ochraceous. Apical margin of membrane with a fringe of minute white hairs. Rostrum, trochanters, apices of femora, tibiae, and tarsi testaceous. Base and apex of second antennal segment often pale and last two segments dirty stramineous.

Size: length, male, 2.25 mm., female, 2.4 mm.

Holotype male, allotype female, Mt. Alifan, May 26, in rotten papaya log, Usinger; one paratype, Machanao, June 30, beating dead leaf-covered branches, Usinger; one paratype, Piti, June 10, at light, Swezey.

*L. marianensis* belongs to the subgenus *Dilasia* and differs in color, antennal, and rostral characters from the East Indian species *elongatus* Poppius, *bivittatus* Poppius and *fruhstorferi* Poppius. This last has been reported from Samoa [Knight, Ins. Samoa 2(5):228, 1935] but the identification must be regarded as provisional because no authentic material was available for comparison and the antennal proportions were noted as different. Such identifica-

tions based upon degree of correspondence to an inadequate description are of little value in this group. Reuter and Poppius evidently failed to note the striking differences existing in the form of male genital claspers in *Lasiochilus*. Furthermore, they considered *denigratus* (White) to be a single variable species with *decolor* as a variety. Kirkaldy (Haw. Ent. Soc., Proc. 1: 196-197, 1908) showed that each of the main Hawaiian islands has a distinct species of *Lasiochilus*. Distant (Linn. Soc. London, Trans. 16: 184-186, 1913) found an amazing number of endemics in the Seychelles and a large number of endemics may be expected among the numerous islands of Polynesia and Micronesia. *Denigratus* and other Hawaiian species differ from *marianensis*, *swezeyi*, and the undescribed species before me from Fiji in the large, inwardly bent apical lobe of the male genital clasper.

#### 47. *Lasiochilus swezeyi*, new species.

Small, oblong-oval, with head as broad as long, pronotum strongly rounded at anterior angles, scutellum polished on entire basal half, male genital clasper very broad and flattened apically, one third as wide subapically as long.

Head about as broad as long, the anteocular part as long as an eye and as broad as length of an eye, upper surface smooth, polished, faintly rugose between ocelli; the arcuate impression between eyes obsolescent at middle. Interocular space four times the width of an eye. Tylus feebly, transversely rugose near the base. Disk with hairs much as in *marianensis*. Rostrum, when stretched out fully, reaching to intermediate coxae, the proportion of segments one to three as 7:13:9. Antennae one fourth longer than width of pronotum across humeri, 30:23, first segment reaching apex of head, second distinctly shorter than width of head across eyes, 9:12, proportion of segments one to four, 5:9:8:8.

Pronotum as long as width of head and almost twice as broad across humeri as long, 23:12; sides fairly straight on posterior half, broadly, strongly rounded anteriorly. Disk smooth, polished, slightly elevated on anterior half and continuing to hind margin at middle, depressed sublaterally on posterior half, the median elevated area with a distinct longitudinal impression becoming obsolete near anterior and posterior margins. Depressed posterior area transversely rugose. Pubescence short, scattered and inconspicuous except along hind margin and dense but short along lateral margins, with a few very long erect hairs laterally and near anterior angles.

Scutellum broadly smooth and polished on basal half except along extreme lateral margins, elsewhere dull.

Hemelytra not quite reaching tip of abdomen, the clavus, corium and cuneus impunctate, uniformly clothed with curved, subappressed, backwardly directed hairs. Embolium two thirds as wide at apex as inner corium at the same level.

Under surface much as in *marianensis*, but with ostiolar canal bent abruptly backward subapically. Femora swollen as in *marianensis*. Male genital clasper (described from the male paratype) strongly, lamellately ridged basally and broadened subapically, the greatest width one third the total length, tapering to subangulate apex.

Color brown with ochraceous apex of head, outer basal two thirds of clavus and base and inner two thirds of corium, apex of scutellum narrowly, first antennal segment, base and apex of second, and third and fourth segments, rostrum, trochanters, apices of femora, tibiae and tarsi. Coxae and femora fulvous or slightly infuscated.

Size: length, male, 2.13 mm., female, 2 mm.

Holotype male, allotype female, and one male paratype, Mt. Alifan, May 21, under bark of dead breadfruit twigs, Usinger; one specimen, Piti, Oct. 5, in dead breadfruit branches, Swezey.

Differs from *marianensis* in the broader pale areas of clavus and corium, smaller size, shorter antennae with apical three segments subequal in length, narrower pronotum with different discal sculpturing, apically more strongly dilated male genital clasper, and the large glabrous area on base of scutellum.

A single female, Upi Trail, May 5, under bark, Usinger, agrees structurally with the above description but is much darker with only the extreme bases of coria pale.

SUBFAMILY DUFOURIELLINAE

48. *Physopleurella mundula* (White).

*Cardiastethus mundulus* White, Ann. Mag. Nat. Hist. IV, 20: 111, 1877.

Thirty-one specimens, Machanao, beaten from dead leaves of a fallen tree, June 4, Usinger; two specimens, Barrigada, June 24, Usinger.

These specimens seem to agree perfectly with topotypical specimens from Hawaii. I cannot see from the descriptions that the Japanese and Papuan species, *armata* Poppius and *obscura* Poppius, can apply to this series or that the slight differences mentioned between these two are significant.

49. *Poronotus sodalis* (White).

*Cardiastethus sodalis* White, Ann. Mag. Nat. Hist. V, 1: 372, 1878.

Five specimens, Machanao, June 30, Usinger; 2 specimens, Piti, April 30, on *Hibiscus tiliaceus*, Usinger; one specimen, Tumon Beach, May 30, on dead *Barringtonia* leaves, Swezey; one specimen, Tarague, May 17, on cotton boll, Usinger; one specimen, Inarajan, June 8, on *Hibiscus tiliaceus*, Usinger.

Agrees perfectly with topotypic Hawaiian specimens. *Poronotus* Reuter, as redefined by Champion (Biol. Centr. Am., Hemipt.-Heteropt. 2: 333, 1900), is known elsewhere from America, the islands of Madeira and Juan Fernandez, and from Tasmania.

50. *Cardiastethus fulvescens* (Walker).

*Xylocoris fulvescens* Walker, Cat. Heteropt. Brit. Mus. 5: 160, 1872.

Four specimens, Machanao, June 4; one specimen, April 30, Usinger; one specimen, Piti, Oct. 9, on dead orange twigs, Swezey.

These specimens and a series from Hawaii agree fairly well with Walker's original description and with subsequent descriptions by Distant (*Amphiareus fulvescens*, Fauna Brit. India, Rhynch. 3: 4, fig. 3, 1906) and Poppius [Acta Soc. Sci. Fennicae 37(9): 19, 1909] but the second antennal segment is scarcely longer than the head width including eyes and the hind margin of the pronotum is more than twice as wide as the front margin. Specimens from Guam and Hawaii should be compared with Walker's type in the British Museum (Natural History) for positive identification. *C. fulvescens* has been recorded from Ceylon, Burma, Malacca, Singapore, Sumatra, Celebes, and New Guinea.

51. *Cardiastethus minutissimus*, new species (fig. 12, a, b).

Very small, elongate-oval, pale, the eyes and antennae strongly sexually dimorphic, rostrum reaching between front coxae.

Male: head distinctly broader across eyes than long, 15:13, the antecular portion small, only half as long as an eye and about one third as broad as length of an eye. Eyes enormous, almost twice as wide as interocular space, 6.5:3.5, above and nearly contiguous beneath. The narrow interocular space above with ocelli closely approximate and nearly touching inner margins of eyes, slightly elevated. Rostrum reaching to apices of front coxae, the first segment very short, reaching about to level of bases of antennae; proportion of segments 4:10:5. Antennae relatively short, one sixth longer than width of pronotum across humeri, 28:24, first segment slightly surpassing apex of head, second greatly thickened, as thick apically as width of head apically, proportion of segments one to four as 4:12:5:7.

Pronotum over half again as wide as head including eyes, 24:15; distinctly shorter on median line than head, 9:13; the hind margin rather deeply concave. Side margins nearly straight, the edges distinctly carinate, especially anteriorly. Disk abruptly elevated within the sublateral depressed area, shallowly but distinctly punctate, with a distinct subflattened anterior collar and a second, convex collar behind this followed by the relatively smooth callosities. Disk deeply, broadly depressed behind callosities and then subflattened to posterior margin. Rather uniformly clothed with curved, backwardly directed hairs with similar dense hairs along lateral margins and a long, erect hair on either side at antero-lateral angle. Scutellum very superficially punctured, the disk transversely depressed, especially on either side, near the middle and clothed with moderately long, backwardly directed hairs.

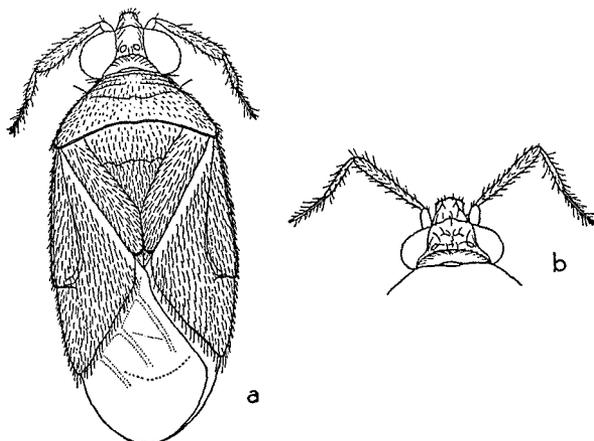


FIGURE 12.—*Cardiastethus minutissimus*: a, dorsal view of male; b, head and antennae of female.

Hemelytra broad and long, completely covering the abdomen, clavus, corium, and cuneus, scarcely punctate except for insertions of hairs, evenly and rather densely clothed with backwardly directed hairs as elsewhere, embolium about two thirds as wide near apex as inner corium at same level, costal margins feebly arcuate. Membrane with three very faintly indicated veins, one near inner margin, one near middle and one more distinct than the others at about outer third, all bent outward apically. With a fringe of fine, minute hairs along apical margin.

Under surface glabrous and punctate laterally on thoracic pleura, dull and densely punctate on metapleuron, with curved hairs on sterna and abdominal venter. Ostiolar

canal extending outward and joining postero-lateral carina which bends forward to form lateral margin of metapleuron. Legs relatively slender and unarmed, the front femora not thicker than other femora, about one fourth as thick as long.

Genital clasper about four times as long as broad, relatively simple, broadly arcuate, and bent inward as well near the tip.

Female: head slightly broader across eyes than long, 12:11; anteocular portion nearly equal to length of an eye, 4.5:5, and over half as wide as length of an eye, 3:5; eyes much smaller than in the male, half as wide as interocular space, this last broadening posteriorly, the ocelli three times as far apart as width of an ocellus (one width of an ocellus apart in male) and the width of an ocellus distant from eyes, disk with some long hairs near ocelli and short erect hairs on eyes. Antennae but little longer than width of pronotum, 25:23; first segment reaching apex of head, second much shorter than width of head, 9:12, gradually thickened toward apex and there only two thirds as thick as width of head at apex; proportion of segments one to four as 3:9:5:8. Costal margins a little more strongly arcuate behind middle than in male. Abdomen without an ovipositor.

Color ochraceous to yellowish testaceous, the hairs very pale, eyes brownish, ocelli tinged with red, membrane uniformly, lightly clouded. Under surface mostly pale fulvous and appendages testaceous.

Size: length, male, 1.7 mm., female, 1.5 mm.

Holotype male, allotype female, and six paratypes, Machanao, June 4, beaten from dead leaves of a fallen tree, Usinger; other paratypes: six, Agat, May 31, on *Calophyllum inophyllum*, Usinger; one, Agana Swamp, May 25, *camachile*, Usinger; one, Mt. Alifan, June 27, on dead, leaf-covered branches, Usinger; one, Ritidian Point, June 30, Usinger; three, Machanao, June 30, Usinger; two, Piti, April 30, in leaves of *Hibiscus tiliaceus* rolled by pyralid caterpillars, Usinger; one, Yona, May 12, on *Ficus*, Usinger; one, Agat, Oct. 17, on *Calophyllum*, Swezey; one, Piti, Oct. 27, on bamboo, Swezey.

This is not closely related to any *Cardiastethus* known to me and should possibly form the type of a new genus. However, it has the ostiolar canal of a *Cardiastethus*, lacks an ovipositor and keys out satisfactorily to this genus. It differs from *ophthalmicus* Reuter in its small size, pale coloration, and short second antennal segment. It agrees in some respects with *pergaudei* Reuter and *minutus* Poppius but differs in its shorter second antennal segment, relatively shorter head, and strong sexual dimorphism.

## 52. *Scoloposcelis parallelus* (Motschulsky).

*Anthocoris parallelus* Motschulsky, Soc. Nat. Mosc., Bull. 36(3): 89, 1863.

Thirty-five specimens, Machanao, June 30, under bark of dead *Elaeocarpus*, Swezey and Usinger; one specimen, Upi Trail, May 5, in dead limb of *pago*, Usinger.

The femoral spines are minute but distinct. The species has been reported from Ceylon, Engano, Mentawai, Aru Islands, Java, and Formosa, and is said to be widely distributed in tropical Asia (Poppius, Wien. Ent. Zeitung 29: 140, 1910).

## FAMILY MIRIDAE

## SUBFAMILY MIRINAE

**53. *Trigonotylus brevipes* Jakowlef, Horae Soc. Ent. Ross. 11: 63, 1880.**

Five specimens, Upi Trail, May 5, on grass, Usinger; two specimens, Atantano, Sept. 3, rice seedling plot, Swezey; two specimens, Tarague, May 17, on grass, Swezey; one specimen, Piti, Sept. 1, rice seedling plot, Swezey; one specimen, Piti, Nov. 5, swept from lawn grass, Swezey; one specimen, Guam, Fullaway (1198).

Reuter [Acta Soc. Sci. Fennicae 36(2): 6, 1909] and Poppius (Arch. Naturges. 80A: 44, 1914) took a broad view of this species, recording it as widespread in the tropical and subtropical regions of the Old and New Worlds. Knight [Ins. Samoa 2(5): 210, 1935] questioned this but recorded the species without further comment from Samoa. My Oriental specimens from Guam, the Philippines, and Macao differ from California specimens as follows: the body is usually tinged with pink on the antennae and less conspicuously on the head, pronotum, coria, and apices of legs; the first antennal segment is shorter than width of head across eyes, 9: 12; the second antennal segment is but little longer than third, 26: 23; the first segment of hind tarsi is distinctly longer than the second and third together; and the rostrum usually reaches almost to apices of middle coxae. These characters might be considered sufficient to place it as *ruficornis* (Geoffroy) but the matter had best await a thorough study of this nearly cosmopolitan genus.

## SUBFAMILY CAPSINAE

**54. *Hyalopeplus guamensis*, new species (fig. 13).**

Elongate with sides subparallel, shining above with pubescence limited almost entirely to costal margins posteriorly, disk of cuneus, and appendages.

Head broader across eyes than long, 27: 22; highly polished in front of eyes and duller behind this, the tylus strongly elevated, depressed at hind margin and disk of head convex behind this, the surface faintly, obliquely, arcuately rugose between the eyes. Rostrum reaching apices of middle coxae; proportion of segments 30: 32: 20: 30. Antennae one tenth shorter than length of insect to tip of abdomen, 135: 150; the second segment as long as costal margin of corium and first segment scarcely longer than width of anterior collar of pronotum, 20: 19; proportion of segments 20: 74: 25: 16; first segment thickest, second gradually enlarged to apex; third and fourth segments slender.

Pronotum as long as width of head across eyes, over half again as wide across humeri as long, 42: 27, and over twice as wide across humeri as width of anterior collar, 42: 19. Collar one fifth as long as wide, convex and strongly constricted behind, its surface not rugose. Callosities subdepressed and not conspicuously rugose, about twice as long as length of collar. Pronotal disk behind this rather strongly convex, very distinctly, densely rugose, the wrinkles interrupted by ill-defined punctures. Hind margin narrowly smooth and impunctate, feebly sinuate and turned down at middle, rounded and then sinuate and slightly reflexed sublaterally. Humeral angles extending, plate-like, over bases of hemelytra, nearly right-angular. Lateral margins slightly but distinctly concave, feebly sinuate

near the middle. Scutellum (including mesoscutum) slightly longer than pronotum, 30:27; longer than broad, 30:26. Disk behind mesoscutum feebly depressed at middle and distinctly, finely, transversely rugose.

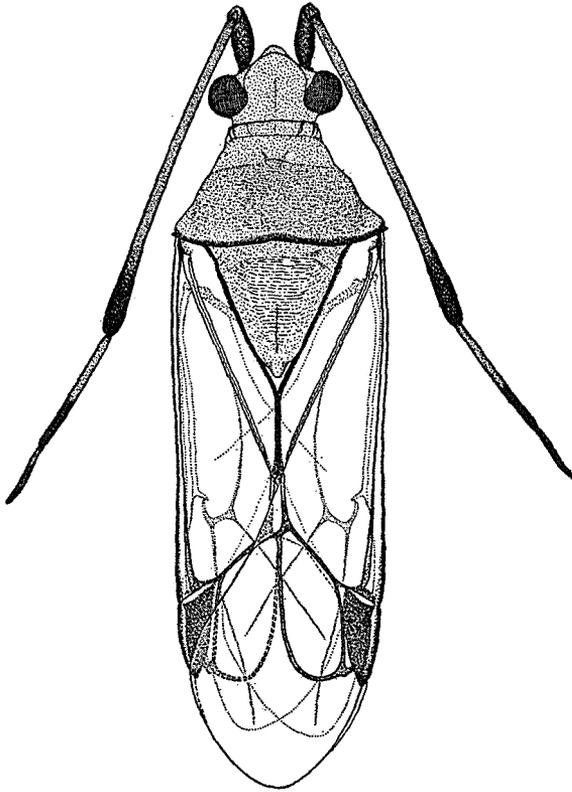


FIGURE 13.—*Hyalopeplus guamensis*: dorsal view of female.

Hemelytra greatly exceeding apex of abdomen, the costal margins gradually dilated to basal third, narrowed behind this and subparallel posteriorly; clavus, corium, and membrane clear hyaline, with only the costal margins and cuneus partially opaque and beset with short, stiff, black hairs postero-laterally.

Under surface smooth with short pubescence on abdominal venter and legs.

Color yellowish ochraceous with two long, interrupted brown stripes laterally and one short median stripe on tylus, a median longitudinal brown stripe on vertex, seven longitudinal stripes on collar. Brown elsewhere as follows: hind margin of pronotum narrowly, eyes, inner margin and commissure of clavus, veins of hind wings and membrane, and apex of rostrum. Cuneus mostly reddish and costal margin of corium and cuneus light brown to ochraceous posteriorly. Antennae reddish with brown at extreme base and apex and brown spots on inner basal half of first segment, brownish apex of second segment, and ochraceous bases and brownish apices of third and fourth segments. Front and middle legs pale with reddish apices of tibiae and reddish tarsi except for brown apices and claws. Hind femora pale with brown spots and red apices, tibiae and tarsi red with brown tarsal apices and claws.

Size: length 7.5 mm., width (basal third of hemelytra) 2.15 mm.

Holotype female, Cetti Bay, May 28, on *Thespesia populnea*, Usinger.

Runs to the west African *horvathi* Poppius in Poppius' key (Hist.-Nat. Mus. Nat. Hung., Ann. 10: 416, 1912) but differs from this and all other species known to me in its immaculate and finely transversely rugose central pronotal disk, short, convex pronotal collar, and absence of hairs on head, pronotum, and scutellum. *H. guamensis* is related to the Hawaiian *pellucidus* in body form and opaque reddish cuneus, but *pellucidus* has the pronotum and scutellum distinctly pubescent. *Vitripennis* Stål, which is widespread in the Austro-Oriental region, is larger and paler with hyaline cuneus and three longitudinal stripes on the head and pronotum. *Bakeri* Poppius from the Philippines has a longer and differently colored pronotum.

55. *Macralonidea hyalinus*, new species (fig. 14).

Elongate, parallel-sided, nearly naked above, the head small, transverse, first antennal segment nearly as long as pronotum, second half again as long as first, third about as long as first, fourth less than half as long as third. Rostrum reaching to hind coxae. Pronotum narrow anteriorly, broadened and strongly convex posteriorly with distinctly punctate disk. Hemelytra hyaline. Wing cell without a hamus. Female ovipositor extending backwards four fifths of total length of abdomen.

Female: head transverse, shining, impunctate, one fourth broader across eyes than greatest length, strongly declivent anteriorly, tylus swollen at middle, narrowed anteriorly, juga and lora only feebly convex. Interocular space scarcely wider than an eye, 12: 11, the vertex very finely longitudinally sulcate. Rostrum exceeding middle coxae but scarcely reaching hind coxae, proportion of segments 19: 17: 13: 18. Antennae shorter than body to tip of membrane, 163: 186, first segment thickest, shorter than pronotum, 39: 45, second over half again as long as first, third subequal to first, fourth less than half as long as third, proportions 39: 67: 40: 17.

Pronotum broader than long, 52: 45, strongly narrowed anteriorly, the anterior margin being less than half as wide as hind margin across humeri, 24: 52, sides strongly narrowed, subparallel at and in front of callosities. Hind margin feebly concave in front of scutellum, then somewhat rounded to humeral angles. Disk strongly convex, especially posteriorly, rather uniformly, densely punctured throughout except narrowly sublaterally on humeri, narrowly along an ill-defined longitudinal carina at middle and on callosities, these distinct, depressed near middle and separated by an elevated area, convex laterally and practically reaching obscure lateral carina, as wide as anterior, punctate collar region.

Scutellum a little broader than long including mesonotum, 24: 20, with a puncture on either side of middle of hind margin of mesonotum. Disk impunctate, moderately elevated, subflattened anteriorly at middle, gradually depressed on apical third, the sides of disk roundly depressed and margined with deep punctures or depressions separating eight rounded lobes on either side before depressed apex.

Hemelytra greatly exceeding apex of abdomen, the apices of cunei nearly reaching abdominal tip; hyaline or subhyaline, with coarse punctures along claval suture. Corium without discal veins, large membranal cell reaching slightly beyond middle of membrane, rounded at inner angle. Costal margins nearly parallel, scarcely arcuate beyond middle.

Under surface with short hairs posteriorly and on legs; impunctate except on prothorax. Abdomen very deeply emarginate to accommodate long ovipositor, only the first, second, and very narrow third ventral segments visible at middle. Tibiae without stiff spines or bristles, the hind tarsi with very minute brown spots. Arolia free, divergent, reaching nearly to apices of claws. Last segment of hind tarsi longer than the preceding two together, slightly enlarged apically.

Color ochraceous with fulvous anteriorly on head, brown eyes, dark brown apex of second antennal segment and all of apical segments except for narrow white base of third. Pronotum with brown humeri and a brown fascia on either side of middle near hind margin. Scutellum yellow with black base (mesonotum), an ill-defined brown line along middle, and brown apex. Hemelytra clear, hyaline, the inner margins of clavus broadly dark brown to black, the outer punctate margin of clavus brown. Corium pale along costal margin and narrowly at apex of clavus, elsewhere along inner and apical margin brown. Cuneus dark brown at inner base, pale along outer margin. Membrane clear. Under surface mostly pale, brown at middle of abdomen. Apex of rostrum and tarsal apices brown.

Size: length 4.65 mm., width (pronotum) 1.3 mm.

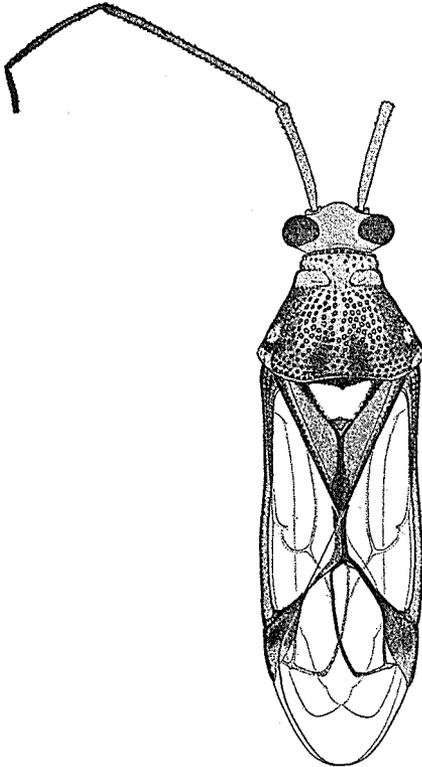


FIGURE 14.—*Macralonidea hyalinus*: dorsal view of female.

Holotype female, and three female paratypes, Ritidian Point, June 2, on *paiPAY* (*Guamia mariannae*), Usinger; one female paratype, Tarague, May 17, Usinger.

*Macralonidea* Hsiao was recently described (U. S. Nat. Mus., Proc. 95: 372, 1944), based upon the single new species, *M. cyanescens* Hsiao, from Borneo. *Cyanescens* is larger than *hyalinus* and has the anterior lobe of the pronotum strongly narrowed, almost collar-like.

**56. *Creontiades stramineus* (Walker).**

*Capsus stramineus* Walker, Cat. Heteropt. Brit. Mus. 6: 120, 1873.

Four specimens, Piti, April 30, on *yerbas babue*, Usinger; three specimens, May 2, Swezey; one specimen, June 20, Usinger; one specimen, Piti, hills, on sedges, June 3, Swezey; two specimens, Mt. Tenjo, May 3, Usinger; two specimens, Mt. Tenjo, May 3, Swezey; two specimens, Dededo, May 11, on *Piper guahamense*, Swezey and Usinger; one specimen, Inarajan, May 7, Usinger; one specimen, Machanao, Aug. 6, on spiny amaranth, Swezey; one specimen, Fadian, Aug. 19, on *Sida*, Swezey; one specimen, Upi Trail, May 5, on ferns, Swezey; one specimen, Talofoto, Nov. 18, Swezey; one specimen, Mt. Alifan, May 21, Usinger; one specimen, Guam, Fullaway (1181); six specimens, Yigo, April 13, Bryan.

Reported from India, Ceylon, Java, Philippines, New Hebrides, Santa Cruz I., "Mariannen: Agrigan!, M. A. Marché", Fiji, Samoa, and Formosa.

Other material before me includes a specimen from Los Banos, Philippine Islands, a specimen from Amboina, collected by Muir, several specimens from Palau and Truk, Carolines, Ono, and one specimen from Tubuai, Austral Islands, Zimmerman.

Van Duzee's records of the New Caledonian *insularis* Poppius [Calif. Acad. Sci., Proc. 4(22): 115, 1937] are entirely confused. After studying his material, it is evident that the Solomon Island specimens are *stramineus*, though the first antennal segment is even longer than in specimens from other localities. One specimen from Pitcairn and one from Mangareva agree with *stramineus* while the remaining material, including one specimen from Pitcairn and all of the specimens from the Australs and the Marquesas, belongs to *samoanus* Knight. Both *samoanus* and *stramineus* are now known to occur on Tutuila and Upolu in Samoa, on Tubuai in the Australs and on Pitcairn. The much larger *insularis* Poppius from New Caledonia is quite distinct. The Tahitian *pacificus* Stål may not even belong to the Pacific island fauna, because many of the localities recorded on the Eugénies Resa expedition were erroneous (Kirkaldy, Soc. ent. Belg., Ann. 51: 120-122, 1907).

**57. *Eurystylus costalis* variety *unicolor* Poppius, Öfv. K. Vet.-Akad. Förh. 53A(4): 6, 1911.**

One specimen, Machanao, Aug. 6, Swezey; one specimen, Yona, May 12, on pigeon pea, Usinger.

The genus *Eurystylus* Stål (= *Eurycyrtus* Reuter, *Olympiocapsus* Kirkaldy, and *Paracalocoris* Distant part.) is widespread in Africa and in the Austro-Oriental region. The present specimens will not run to *costalis* Stål in Poppius' key (Öfv. K. Vet.-Akad. Förh. 53A(4): 2, 1911) but agree with his description of the variety *unicolor*. The type locality of the variety is not given, but the species is reported from the Philippines, Sumatra, and Mentawai. The

rostrum reaches only to the apices of middle coxae in the Guam specimens and other specific characters might become obvious upon comparison with typical *costalis*.

58. *Proboscidocoris malayus* Reuter, Naturhist. Hofmus. Wien, Ann. 22: 188, 1907.

One male, Agana Swamp, June 26, sweeping grasses and *Jussiaea*, Usinger; one female, Piti, Sept. 1, rice seedling plot, Swezey.

These differ slightly from Reuter's description, the apex of the scutellum and the lateral margins of the coria being narrowly pale. In this they agree with the nearly allied African *punctaticollis* Reuter but the golden pubescence mentioned for *malayus* is very conspicuous and is not present in the African species or in any of the Oriental species before me, including specimens from Java, Larat, Amboina, and Borneo.

*P. malayus* is widespread in the Austro-Oriental region. Poppius (Archiv für Naturgesch. 80A:42, 1914) mentions the following localities: Java, Lombok, Malacca, Sumatra, Mentawai, Celebes, New Guinea, Philippines, Formosa, and Japan.

59. *Lygus guamensis*, new species.

Oval, polished, and uniformly clothed above with rather short, backwardly directed, pale hairs except on head where the hairs are shorter, more irregular, and directed upward or forward. General color fulvous to brownish ferruginous. Antennae long, slender, and pale. Rostrum slightly exceeding apices of hind coxae.

Head transverse, about two thirds as long as broad across eyes, 29:42; produced less than half as far in front of eyes as length of an eye, 8:20, the tylus, juga, and lora moderately swollen, the antecular portion of head thus appearing short and rounded at sides. Inner margins of eyes strongly concave near insertions of antennae, the interocular space at this point over twice as wide as narrowest width across vertex, 36:16; vertex at narrowest point more than one third as wide as head including eyes, 16:42. Vertex distinctly margined posteriorly, the ledge feebly arcuate and the actual hind margin of head strongly depressed behind this margin. Disk of head impunctate. Rostrum exceeding apices of hind coxae but not exceeding apices of hind trochanters, proportion of segments 17:20:15:20. Antennae shorter than body from head to apex of membrane, 150:173, slender, the second segment very slightly and gradually thickened apically, proportion of segments 22:68:40:20.

Pronotum about one third longer than head, 38:29, less than twice as broad across humeri as long, 64:38, collar very narrow, half as thick as base of second antennal segment, callosities poorly defined, the pronotal disk feebly depressed behind them, shallowly but evenly punctate. Side margins nearly straight, feebly arcuate anteriorly, hind margin broadly arcuate, feebly sinuate at middle. Scutellum moderately convex, impunctate but transversely rugose.

Hemelytra moderately long, the membrane surpassing apex of cuneus but not reaching apex of abdomen. Surface of clavus, corium, and even cuneus slightly roughened by shallow punctures, mostly at bases of hairs. Costal margin of corium moderately, evenly arcuate, one third longer than width of pronotum, 86:64.

Under surface very sparsely pubescent. Hind femora 4.5 times as long as greatest thickness. Tibiae with a few erect spines.

Color pale fulvous on head and pronotum with brown and red oblique stripes at middle of head and generally reddish anterior portion of head. First and second antennal segments

entirely pale ochraceous, the last two segments embrowned. Rostrum ochraceous with reddish base and black apex. Disk of pronotum brown antero-laterally including outer portions of callosities and broadly brown posteriorly (not reaching humeri) except for narrow testaceous posterior margin. Scutellum pale fulvous to ochraceous with white apex and with two ill-defined reddish longitudinal vittae at middle. Hemelytra brownish ferrugineous, the costal margins narrowly pale basally and broadly pale at middle. Cuneus subhyaline, white laterally, red apically and along inner margin. Membrane uniformly, faintly clouded, the veins reddish. Under surface brown on thorax, ochraceous on abdomen, with reddish laterally. Legs pale, testaceous tinged with reddish, the hind femora, except at bases, brownish ferrugineous.

Size: length 4.34 mm., width (hemelytra) 1.9 mm.

Holotype female, Tumon Beach, May 30, taken from a spider web, Usinger.

*L. guamensis* runs to *rosaceus* Poppius from Sumatra in Poppius' key to the Indo-Australian species (Hist.-Nat. Mus. Nat. Hung., Ann. 12: 337, 1914) but *rosaceus* lacks the brown basal portion of pronotum, has a narrower vertex, longer second antennal segment and a relatively longer last antennal segment.

#### 60. *Lygus fullawayi*, new species.

Small, oval, covered with a fine pubescence of pale hairs above. Rostrum not quite reaching apices of hind coxae. Vertex distinctly margined. Color yellow with black clavus, inner apex of corium, and inner angle of cuneus. First two antennal segments entirely pale.

Head about one third broader across eyes than long, 39:28; produced only one third as far in front of eyes as length of an eye, the tylus distinctly swollen and lora broadly rounded. Interocular space, in the male, 2.5 times as broad across antennal concavities as at narrowest portion of vertex; two times as broad in the female. Vertex at narrowest point one fourth as wide as head across eyes in the male, one third as wide in the female. Vertex polished and impunctate, distinctly margined posteriorly, the actual posterior margin strongly depressed behind and beneath this concave ledge. Rostrum reaching but not surpassing hind coxae, proportion of segments 15:13:8:14. Antennae shorter than body from head to tip of membrane, 125:141, the second segment gradually and only feebly enlarged from base to apex; proportion of segments 20:59:31:15.

Pronotum about as long as head, 29:28, less than twice as broad across humeri as long, 51:29, collar about as thick as base of second antennal segment; disk rather evenly convex, the callosities scarcely elevated; disk finely and rather densely punctate; hind margin broadly arcuate and almost imperceptibly sinuate at middle.

Scutellum moderately elevated, sloping posteriorly, the apex acute.

Hemelytra relatively long, the apex of cuneus slightly exceeding tip of abdomen, costal margin of corium evenly arcuate, one fifth longer than width of pronotum. Disks of clavus and corium distinctly, shallowly punctate, disk of cuneus roughened.

Under surface sparsely pubescent. Hind femora about four times as long as greatest thickness. Tibiae with stiff, erect bristles. Hind tarsi with first and second segments subequal.

Left genital clasper of male broadly sickle-shaped, thickened basally and slightly narrowed toward the blunt apex. Right clasper very broad, widening apically, the upper apical angle produced into a short, slender, downward curved hook.

Color yellowish ochraceous, the hind margin of pronotum narrowly white, eyes brown, apical two antennal segments and apex of rostrum infuscated. Clavus black with brownish outer margins. Corium broadly at inner apex and inner angle of cuneus forming a large black area. Membrane generally embrowned with slightly paler veins. Under surface entirely pale, the abdomen brown dorsally. Apices of hind femora ringed with brown subapically.

Size: male, length 3.5 mm., width 1.5 mm.; female, length 3.5 mm., width 1.6 mm.

Holotype male, allotype female, and one paratype, Mt. Tenjo, May 3, on *Piper guahamense*, Usinger; one paratype, Machanao, Aug. 6, on *Piper guahamense*, Swezey; one paratype, Fullaway (1206); three paratypes, Tarague, May 17, Usinger. One of these paratypes has a red-tinged scutellum suggestive of the variety described below and the black area of the clavus is confined to the inner half on some specimens. Two specimens, Ritidian Point, April 16, Bryan.

*L. fullawayi* runs to *erimensis* Poppius from New Guinea but that species is larger, differently colored, and has the last two antennal segments together somewhat longer than the second.

This species is dedicated to D. T. Fullaway of the Board of Agriculture and Forestry, Honolulu, in recognition of his early insect survey of Guam.

**Lygus fullawayi** variety **rubroscutellatus**, new variety.

Structurally similar to the typical form but with the scutellum, meso- and metapleura and apical half of hind femora red.

Holotype male, allotype female, and 14 paratypes, Upi Trail, May 5, on a small-leaved *Ficus*, Usinger; one paratype, Piti, May 2, on *Cestrum pallidum*, Usinger; two additional specimens, Ritidian Point, June 2, Usinger.

**61. Lygus cruzi**, new species.

Elongate-oval, convex above, the surface rugosely punctate and clothed with numerous backwardly directed hairs.

Head nearly half again as broad as long, 34:24; eyes large, nearly three times as long as antecular region, 17:6; and about as wide as narrowest point of vertex, 11.5:11; surface impunctate, minutely rugose and clothed with very scattered inconspicuous hairs; vertex distinctly carinate. Rostrum short, its tip obscured but apparently reaching only to apices of middle coxae; proportion of segments one to three, 14:13:10. Antennae over twice as long as width of pronotum, 98:46; proportion of segments, 17:40:23:18.

Pronotum less than twice as broad as long, 46:28; longer than head on median line, 28:24; disk rather strongly convex, the callosities poorly defined but slightly elevated, smooth; hind margin scarcely concave at middle.

Scutellum about as long as wide at base; slightly more than half as wide as pronotum, 25:46; disk quite strongly convex, smooth only apically.

Hemelytra long, the membrane exceeding tip of abdomen by two fifths of its total length; commissure of clavus four fifths as long as scutellum.

Color brown above, the front of head reddish on jugs and lora and brownish between eyes except for yellow at bases of antennae and along inner margins of eyes. Antennae with first segment pale basally and ferruginous apically, second segment ferruginous basally and dark brown apically, third segment white on basal half and dark brown on apical half, fourth segment white on basal fourth and darker apically. Pronotum with pale anterior collar, posterior margin and humeri. Scutellum pale apically. Hemelytra pale brownish with darker brown at middle of clavus, extreme inner apex of corium, and apical two thirds of cuneus. Outer apex of corium tinged with reddish and base of cuneus clear, hyaline. Membrane faintly embrowned throughout. Under surface pale brown tinged with red, the middle of abdominal venter yellow and tarsi very pale.

Size: length 4.1 mm., width (pronotum) 1.53 mm.

Holotype male, Upi Trail, May 5, miscellaneous sweeping, Swezey.

The characteristic markings will distinguish this species from other *Lygus* of Guam and elsewhere. This species is named in honor of Antonio Cruz, Guam agriculturist, who helped us in so many ways during our visit.

### 62. *Lygus* species.

A single, badly damaged female, Guam, Fullaway (1183) may belong here. All of the tarsi are broken off and the apical portion of the membrane is gone. The specimen is dark brown with ochraceous basal margin of pronotum and base of cuneus. The antennae are relatively strongly incrassate, the vertex is margined behind, and the rostrum is short, though the head is so distorted that it is difficult to determine whether the rostrum would reach the intermediate coxae.

### 63. *Nesodaphne marianensis*, new species.

Elongate-oval, densely pubescent, the second antennal segment with two white rings on basal fourth.

Head three fourths as long as broad, 23:31; abruptly narrowed in front of the eyes, the width of head at this point, one third of total head width, 10.5:31; interocular space about one third as wide as head, 10:31; inner margins of eyes deeply concave anteriorly. Clypeus strongly convex, widened apically, beset with numerous long hairs, depressed at base. Juga strongly convex. Vertex carinate posteriorly. Rostrum reaching a little beyond middle of mesosternum, the first segment reaching about to base of head; proportion of segments, 14:11:9:14. Antennae over twice as long as head and pronotum together, 119:54; proportion of segments, 27:52:23:17.

Pronotum half again as long as head, 32:23; two thirds as long as broad, 32:45; strongly and regularly narrowed anteriorly, the width at anterior collar one third as great as across humeri, 16:45. Collar one fourth as long as wide, 4:16, feebly convex and briefly emarginate at middle. Pronotal disk moderately convex, slightly depressed behind poorly defined callosities, and beset with ill-defined punctures and long, erect hairs. Disk with 10 clumps of stiffer, black hairs regularly placed, two near middle, six across posterior disk at and between humeri and two behind this near middle.

Scutellum scarcely broader than long, 23:21; convex with a broad depression at middle of base, the disk with poorly defined punctures, long pale hairs, and two clumps of long black hairs.

Hemelytra over twice as long as width of pronotum, 100:45, impunctate, sparsely clothed with erect pale hairs and more densely clothed with appressed white hairs, the actual surface covered with a soft tomentum. Commissure of clavus longer than scutellum, 24:21, the clavus moderately convex. Corium subflattened, the embolar region depressed and costal margin a little reflexed, moderately arcuate. Corium less than three times as long as its greatest width, 62:23. Cuneus twice as long as wide, 21:10, its outer margin feebly arcuate.

Color pale testaceous and brownish, the head pale with fulvous on vertex. Rostrum brown at apex. Antennae pale with an oblique brown fascia at base and a broad fulvous area at apex of first segment. Second segment brown with short white pubescence and with two pale rings on basal fourth, one at middle, and one at apex; third segment dark brown except for pale ring at apex, and fourth segment entirely brown. Pronotum fulvous with paler anterior margin of collar, disks of callosities, humeri, and narrow hind margin. Scutellum brownish with a white tomentum, the apex white. Clavus brown with white tomentose spots basally and apically. Corium with numerous pale spots occupying most of basal half, the costal area interrupted with only two brown areas. Apical half more

broadly brown. Cuneus brown at middle and at apex. Membrane dark brown at base, infumate apically, with white on apical angle of areole. Under surface largely pale. Legs pale with median and subapical brown rings on femora, two brown rings on anterior tibiae, three on middle tibiae, and four on posterior tibiae. Tarsi brown.

Length 4.83 mm.; width (pronotum) 1.5 mm., (hemelytra) 1.76 mm.

Holotype male, Fullaway (1200). This specimen was kindly loaned from the U. S. National Museum by R. I. Sailer. It was discovered among miscellaneous Oriental mirids by T. Y. Hsiao who referred it to me as an undescribed species.

*N. marianensis* is closely allied to *knowlesi* Kirkaldy, which I have seen from Fiji (Kirkaldy's type), Samoa (Swezey and Zimmerman) and Tahiti (J. M. Clements). *N. knowlesi* has a smoother head which is less abruptly narrowed in front of the eyes; the rostrum is slightly longer, reaching beyond the middle of the mesosternum; the second antennal segment has only a single basal pale ring; and the hemelytra are more extensively brown basally.

It will be necessary to use the name *Tingidotum* Kirkaldy (Ent. Soc. London, Trans., 263, 1902) in place of *Nesodaphne* Kirkaldy (Linn. Soc. N. S. Wales, Proc. 33: 380, 1908) if a study of the genotypes shows the two to be congeneric.

#### SUBFAMILY DERAEOCORINAE

##### 64. *Deraeocoris guamensis*, new species.

Elongate-oval, convex, the upper surface almost entirely naked. Scutellum and head impunctate, the head transversely carinate at hind margin. Pronotum and hemelytra coarsely punctate. Rostrum not reaching hind margins of middle coxae. Color brown, marked with reddish ochraceous on head, pronotum, scutellum, and cuneus and with a pale longitudinal fascia on corium adjacent to claval suture.

Head a little broader than long, 45:40, interocular space as wide as an eye; vertex impunctate, distinctly, transversely carinate at base, tylus moderately swollen, feebly impressed at base; juga short, convex, bucculae prominent, flaring. Rostrum reaching onto middle coxae, proportion of segments 25:22:20:28. Antennae less than twice as long as width of pronotum, 152:85; proportion of segments 25:74:29:24, the second segment slightly thickened toward apex.

Pronotum half again as broad across humeri as long, 85:57; rather strongly convex, especially posteriorly, the callosities smooth, impunctate, moderately elevated and somewhat confluent at middle, the rest of disk coarsely punctate, the punctures more than one puncture width apart; feebly depressed behind middle. Sides roundly carinate, strongly sinuate at middle, rounded at anterior angles. Collar nearly as wide as thickest portion of second antennal segment. Hind margin broadly, convexly rounded and a little sinuate sublaterally.

Scutellum almost half again as broad across base as long, 38:28; strongly convex and impunctate. Clavus and corium distinctly punctate. Cuneus more finely and indistinctly so.

Color dark brown with reddish ochraceous on basal half of vertex, at insertions of antennae, and laterally and at apex of tylus. Pronotum with three reddish fasciae behind callosities, the longest at middle, tapering posteriorly, and a shorter one on either side sublaterally. Humeral angles reddish ochraceous. Scutellum tinged with red at basal angles and at apex. Hemelytra brown with a partially obscured pale longitudinal line

on either side of claval suture. Cuneus reddish at outer basal angle. Membrane entirely clouded, palest apically, brown on and around veins. Under surface brown, the ostiolar area paler. Antennae brownish, the first segment somewhat paler, second segment with a pale ring at base and another at middle, third and fourth narrowly pale basally. Rostrum and legs ochraceous, the femora more or less infuscated with one or two pale rings sub-apically, tibiae brown, ringed with ochraceous subbasally, at basal fourth, and broadly beyond middle. Tarsi brown basally and apically, pale at middle.

Size: length 6.2 mm., width (hemelytra) 2.5 mm.

Holotype female, Fullaway (1183).

Allied to such large species as *celebensis* Poppius and *discoidalis* Poppius but differing in color and antennal proportions.

#### SUBFAMILY CYLAPINAE

##### TRIBE FULVIINI

#### 65. *Fulvius angustatus*, new species.

Slender with margins of coria only moderately rounded, evenly beset with short, thick, appressed hairs on upper surface, the hairs most conspicuous on hemelytra, restricted to middle of vertex on head.

Head slightly longer than broad, 22:20, the antecular portion slightly shorter than an eye, 9:10. Interocular space in the male but little wider than an eye, 7:6, the vertex feebly longitudinally impressed at middle. Rostrum slightly exceeding apices of hind coxae, the first segment not reaching base of head; proportion of segments approximately 15:17:17:14. Antennae one third longer than costal margin of corium and cuneus, 80:60, the first segment as long as pronotum at middle, second segment as long as width of pronotum at base, gradually thickened toward apex; proportion of segments 15:32:14:19.

Pronotum much shorter on median line than head, 15:22, about as wide across anterior collar as long and over twice as broad posteriorly as long on median line, 32:15. Anterior collar distinct, front margin feebly concave at middle. Side margins distinctly concave, sinuate, hind margin rather deeply, broadly concave, thus broadly exposing mesonotum. Pronotal disk very finely granulate-punctate as are the disks of head and scutellum, the middle of pronotal disk broadly convex, the subdepressed posterior disk feebly, transversely rugose medially. Mesonotum and scutellum together almost as long at middle as broad at base, the disk of mesonotum smooth and naked antero-laterally and with shorter hairs than scutellum medially.

Hemelytra distinctly surpassing tip of abdomen in the male, the cuneus one fifth as long as costal margin of corium (embolium), the so-called embolium (depressed lateral area) occupying only one sixth of total width of corium at level of apex of clavus.

Femora with a few very long, fine, erect hairs. Tibiae and tarsi densely clothed with short hairs.

Female with relatively smaller antennae, less than one third longer than costal margin of corium and cuneus, 79:70, the first segment shorter than pronotal length at middle, 15:17; the second segment distinctly shorter than width of pronotum at base, 31:35, scarcely thickened toward the apex; proportion of segments 15:31:15:18. Interocular space relatively wider, one third wider than an eye, 8:6. Hemelytra not quite reaching apex of abdomen.

Color dark brown, the basal fourth of head and extending briefly beyond at middle of vertex, brownish ochraceous. Mesonotum laterally brownish-ochraceous. Extreme base of corium pale and outer apex of corium just before cuneus white for about the width of embolium. Membrane uniformly infuscated except for a small pale spot at inner base and darker brown vein. Hairs of upper surface pale. First antennal segment brown, second paler brownish, fulvous to ochraceous, last two segments more or less infuscated

and clothed with long, pale hairs. Rostrum fulvous. Under side brown with somewhat paler base of abdomen. Trochanters, tibiae, and tarsi testaceous. Coxae and femora brownish, the latter paler at apices.

Size: male, length 2.9 mm., width (hemelytra) 1 mm.; female, length 3.25 mm., width (hemelytra) 1.1 mm.

Holotype male, allotype female, and 14 paratypes, Mt. Alifan, taken in a rotten papaya log, May 26, Usinger; five paratypes, Machanao, four on June 4 and one on June 30, Swezey and Usinger, one under bark and another under a fallen *Pandanus* fruit; one paratype, Mt. Tenjo, May 3, Usinger; one paratype, Barrigada, July 6, Swezey; two specimens, Yigo, Nov. 13, ex dead papaya leaves, Swezey.

This species does not run out satisfactorily to any of the species in Poppius' key [Acta Soc. Sci. Fennicae 37(4): 29, 1909]. Of the species described since that time, it is perhaps closest to *tagalicus* Poppius from the Philippines and *macgillavryi* Poppius from Java. *F. tagalicus* has a relatively longer pronotum, as long as the head and nearly as long as broad across hind margin, and *macgillavryi* has a broader vertex.

#### SUBFAMILY BRYOCORINAE

#### 66. *Felisacus ochraceus*, new species (fig. 15).

Elongate, shining, pale ochraceous with brown eyes, and brown inner clavus and inner margin of corium apically, the inner half of cuneus red or yellow. Eyes longer than postocular portion of head.

Head almost half again as broad across eyes as long, 24:17, interocular space less than twice as wide as an eye, 10:7. Eyes very large, longer (as seen from above) than length of postocular portion of head, 9:8. Head cylindrical to basal sixth and then arcuately flaring to hind margins of eyes where the head is two thirds as wide as width across eyes. Rostrum reaching beyond middle of mesosternum. Antennae a little longer than body, 159:150, first segment cylindrical, only sparsely pubescent, second more slender, the last two very slender and curved; proportion of segments 38:48:53:20.

Pronotum over half again as long on median line as head, 28:17; about one fourth broader across humeri than long, 34:28, the disk evenly convex on both anterior and posterior lobes except for depressed areas sublaterally near humeri; strongly constricted in front of middle and punctate in the constriction. Hind margin distinctly, roundly emarginate in front of scutellum.

Hemelytra long, the corial margin a little over twice as long as total length of pronotum, 63:30, very feebly arcuate posteriorly, the costal margins nearly parallel.

Right genital clasper of male straight on basal half, tapering and sickle-shaped on apical half and bent posteriorly. (Broader at base and tapering on apical two thirds in *fellicicola* Kirkaldy.) Left clasper broad on basal half, abruptly narrowed and slender on apical half, this apical arm feebly curved inward and upward.

Color testaceous to ochraceous, the hind margin of pronotum at bases of clavi, inner half of clavus, inner margins of corium adjacent to apex of clavus and extending to cuneus, brown. Cuneus reddish or yellow on inner half. Costal margins of corium at least apically and veins of membrane ochraceous. Elsewhere clear hyaline. Eyes brown to black. First antennal segment white on basal fourth, fulvous apically, second fuscous tinged with red on apical half, third and fourth infuscated. Under surface pale yellowish testaceous. The legs pale with infuscated tarsal apices.

Size: male, length 3.75 mm., width (hemelytra) 0.9 mm.; female, length 4 mm., width (hemelytra) 1 mm.

Holotype male, and allotype female, Upi Trail, May 5, Usinger; three paratypes, same data as above, but collected on ferns, Swezey; 10 paratypes, Piti, Aug. 24, on ferns, Swezey; eight specimens, Ritidian Point, April 16, Bryan.

*F. fellicicola* Kirkaldy, which I have from Rewa, Fiji, Muir is very similar to *ochraceus* but has smaller eyes (shorter than postocular portion of head,

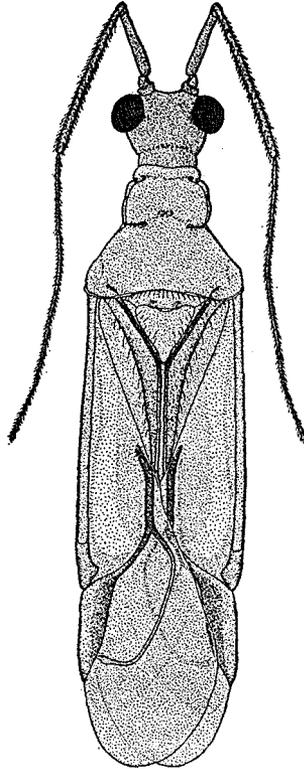


FIGURE 15.—*Felisacus ochraceus*: dorsal view.

8:9), a slightly longer first antennal segment and proportionately shorter second antennal segment (ratio of first and second, 39:44). The color of *fellicicola* is distinctly fulvous on head and pronotum and the right genital clasper of the male differs as mentioned above. I have a series from Amboina which differs slightly from either of these, but clearly pertains to the same group of the genus.

**67. *Felisacus crassicornis*, new species (fig. 16).**

Elongate, shining, the head broader than long, first antennal segment shorter than pronotum and distinctly swollen subbasally.

Head about one fifth broader across eyes than long including antenniferous tubercles, 22:18; a little more than two thirds as broad immediately behind eyes as width across eyes, 16:22, and thence gradually narrowed to base of head, ratio of width behind eyes to width at base, 16:13. Eyes small, less than half as wide as interocular space, 5:12. Anterior portion of head strongly vertical, abruptly tapering to narrow apex. Rostrum scarcely attaining hind coxae. Antennae shorter than body, 113:138; the first segment shorter than pronotum, 26:29, a little longer than width of head, 26:22, thickest at basal third and tapering to just before apex, the apex slightly thicker than slender subapex; second segment slender, cylindrical; third and fourth slender and curved; first segment with only a few inconspicuous hairs, remaining segments distinctly pubescent; proportion of segments 26:29:38:20.

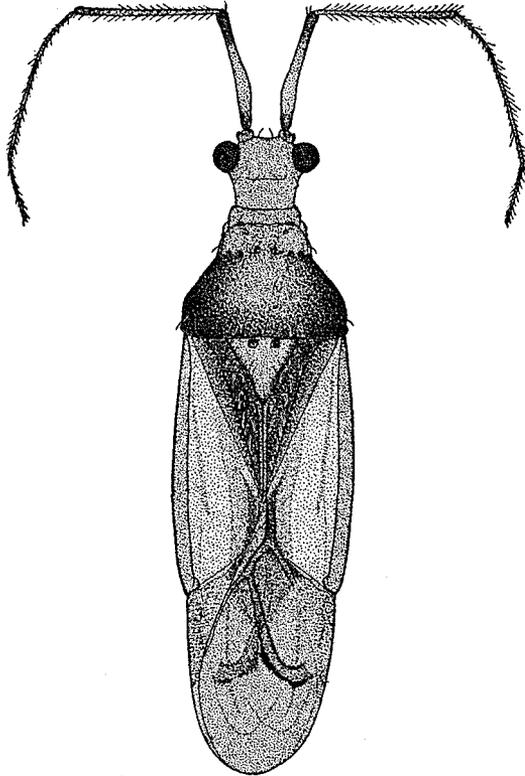


FIGURE 16.—*Felisacus crassicornis*: dorsal view.

Pronotum over half again as long as head, 29:18; the apical collar one seventh the total length of pronotum, antemedian stricture marked by deep punctures across the entire disk, the punctures at middle placed slightly forward. Width across humeri over twice the width at anterior margin, 34:15, hind margin nearly straight, only very feebly concave. Scutellum moderately elevated, smooth except for two large punctures on basal margin.

Hemelytra long, the costal margin of corium slightly less than twice as long as pronotum, 54:29, thick and feebly arcuate, especially posteriorly. Cuneus a little less than one third as long as corium, 19:54. Veins of membrane prominent. Right genital clasper of male very slender, sickle-shaped. Left clasper short, half as wide as long, feebly curved on outer edge.

Color ochraceous to fulvous, the eyes red, the sides of hind lobe of pronotum broadly brown, the inner, elevated portion of clavus light brown, inner margins of corium adjacent to and beyond apex of clavus brown, membrane faintly clouded, the veins dark. Costal margins white to ochraceous, the disk of corium subhyaline, partially suffused with white and finely, sparsely punctured. Clavus pale fulvous, subhyaline. First antennal segment ochraceous at middle, fulvous basally and black at apex. Second narrowly black at base and thence ochraceous, becoming infuscated apically. Apical segments dark brown to black. Under surface in great part testaceous, the legs pale with lightly infuscated tarsal apices.

Size: female, length 3.5 mm., width (hemelytra) 1 mm.; male, length 2.9 mm., width (hemelytra) 0.75 mm.

Holotype female, one female paratype, Machanao, Nov. 25, Swezey, allotype male, Machanao, June 4, Usinger; one female paratype, Guam, Fullaway (1210). Seven specimens, two damaged, are at hand from Upi Trail, May 5, on ferns, Swezey and Bryan.

This species is related to *magnificus* Distant and *pulchellus* Poppius in having a subbasally swollen first antennal segment, but these species differ entirely in color; and these and a pale species which I collected at Los Banos differ in having a narrower head which is scarcely broader than long. I have specimens of *magnificus* from Amboina and Java (Muir).

#### SUBFAMILY DICYPHINAE

#### 68. *Engytatus nicotianae* (Koningsberger) (fig. 17, a, b).

*Leptoterna nicotianae* Koningsberger, Mededeel. Lands Plantent. 64: 32, pl. 4, fig. 8, 1903.

*Cyrtopeltis* (?) *nicotianae* Kirkaldy, Linn. Soc. N. S. Wales, Proc. 33: 377, 1908. New synonymy.

*Dicyphus nicotianae*, Fulmek, Deli Proefstation, Bull. 25: 2, 1925.

One specimen, Piti, May 2, and two specimens, Piti, April 30, on *Nicotiana*, Usinger; seven specimens, Yona, May 12, on *Nicotiana*, Usinger.

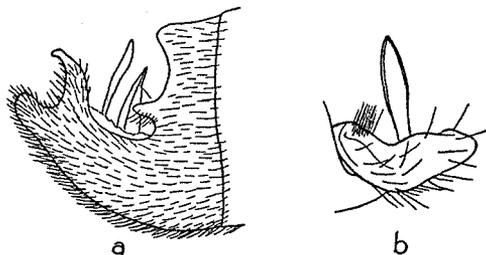


FIGURE 17.—*Engytatus nicotianae*: a, posterior view of end of abdomen of male from right side showing broad prolongation of last segment and its broad dorsal arm with a small curved projection at its apex; b, postero-dorsal view from the left side of the left clasper showing its stout, curved form with long bladlike projection extending at a right angle from middle.

I follow Fulmek in assuming that this is the species described by Koningsberger from Java, though the length is given as 4 mm. in the original description, whereas my series is uniformly about 3.5 mm. *E. nicotianae* may be separated from *tenuis*, aside from the distinctive male terminalia, by the dark dorsal pubescence, and by the third antennal segment which is pale even at the base.

Judging from the damaged female types, Kirkaldy's *Cyrtopeltis* (?) *nicotianae* from Fiji belongs here. Whether Froggatt's *Dicyphus tabaci* (Agric. Gaz. N. S. Wales 31:715-716, figs., 1920) from Australia belongs here or elsewhere is impossible for me to determine from the brief description. I have seen *nicotianae* from Noumea, New Caledonia, on *Datura*, F. X. Williams.

69. *Gallobellicus tenuis* (Reuter) (fig. 18, a, b).

*Cyrtopeltis tenuis* Reuter, Rev. d'Ent. 14: 139, 1895.

One specimen, Piti, May 1; 10 specimens, Piti, May 10, all on tomato, Usinger; one specimen, Agana Swamp, May 4, Usinger; two specimens, Talofofo, Nov. 18, Swezey; one specimen, Guam, Fullaway (1196); 16 specimens, Machanao, June 30, on *Nicotiana*, Usinger; one specimen, Fonte Valley, Aug. 7, on weeds, Swezey. Swezey and Zimmerman took specimens of *tenuis* in Samoa.

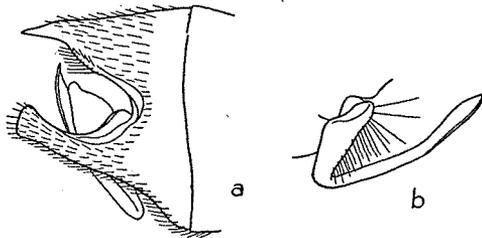


FIGURE 18.—*Gallobellicus tenuis*: a, posterior ventral view of last abdominal segment of male showing long truncate projection and shorter tapering projection; b, posterior ventral view of left clasper of male showing short basal portion, abrupt elbow and long slender blade-like portion.

Few species of insects are in a more confused state both taxonomically and nomenclatorially than the dicyphine pests of tobacco and tomato. Their small size and superficial similarity have contributed to this but do not excuse the situation, for the male terminalia exhibit striking differences which are specifically distinct and point the way to a sound generic classification. The literature on the subject was summarized by China (Ann. Mag. Nat. Hist. XI, 1: 604-607, 1938) although Kirkaldy's description of *Cyrtopeltis* (?) *nicotianae* (Linn. Soc. N. S. Wales, Proc. 33: 377, 1908), Froggatt's description of *Dicyphus tabaci* (Agric. Gaz. N. S. Wales 31: 715, 1920), and Knight's discussion of the genus *Cyrtopeltis* (Brooklyn Ent. Soc., Bull. 17: 65-67, 1922) were omitted.

China concluded that *nicotianae* Koningsberger, *crassicornis* Distant, *javanus* Poppius, and *nocivus* Fulmek were all synonyms of *tenuis* Reuter, stating that Fulmek's figures of the left genital claspers of different species (Deli Proefstation, Bull. 25: 4, 1925) were not of the same organ but of different parts of the same insect. To quote China further, "Judging by the shape of the *Haftzange* in *nicotianae* it appears to be a broken portion of the inferior lateral margin of the pygophor (ninth abdominal segment) viewed from the left side of the pygophor but with the drawing actually reversed."

In the case of *nocivus* he figured the actual paramere, calling it again the "*linke Haftzange*." Careful comparison of Fulmek's figures with the two species which I found on tobacco on Guam reveals that Fulmek was correct, his drawings actually being of homologous structures of two distinct species. The left clasper of *nicotianae* is truly an amazing structure and corresponds, except for minor details in structure of the apex of the broad lobe, with my Guam specimens. The last abdominal segment also differs strikingly in the two species, *nicotianae* having a bifurcate posterior process suggestive of the American tobacco bug, *Engytatus geniculatus* Reuter (fig. 19, *a, b*), whereas *tenuis* (= *nocivus* Fulmek) has a simple main posterior process (see China's excellent figure of a cotype).

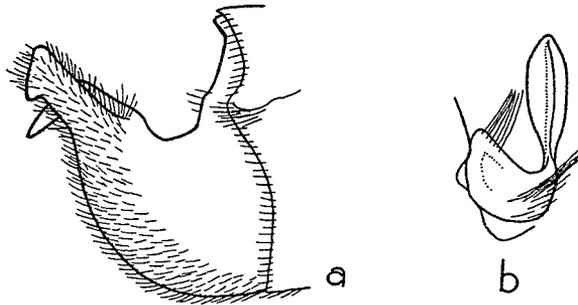


FIGURE 19.—*Engytatus geniculatus*: *a*, posterior ventral view of last abdominal segment of male showing two curved arms; *b*, posterior dorsal view of left clasper of male showing stout basal portion, abrupt elbow and bladelike apical portion.

The generic classification of the Dicyphinae has long been confused so that Reuter, Poppius, and Horvath as well as other, lesser, authorities changed species from one genus to another with no apparent reason, only to change them back again. Knight has lumped many of these into the genus *Cyrtopeltis*, a practice which is at least consistent though making it almost impossible to use his keys to the genera. In this work I have concluded that the male terminalia provide us with the only sound basis for a generic classification of the Dicyphinae. Reluctance to base a higher classification upon characters of one sex is

understandable but this practice has been found necessary in other groups (scale insects and Lepidoptera) and seems justifiable in the Dicyphinae considering the hopeless confusion that has resulted from attempts to classify these bugs on the basis of such superficialities as size of eyes or color of head and pronotum.

The following characters will suffice to distinguish the questionable Dicyphine genera in so far as my material is concerned. Modifications will undoubtedly be necessary when further material is examined. I have not seen the types of *Dicyphus* and *Macrolophus*.

*Dicyphus* Fieber (type *pallidus* Herrich Schaeffer). Left genital clasper thickened at base, bent at middle, and tapering to acute apex. Last abdominal segment not produced into long spines, knobs, or processes. Pronotum more or less constricted at middle and eyes relatively large.

*Macrolophus* Fieber (type *nubilus* Fieber). Left genital clasper thickened at base, bent near middle, and flattened into a broad but apically tapering blade. Last abdominal segment not produced into long spines, knobs or processes. Eyes relatively small.

*Cyrtopeltis* Fieber (type *geniculata* Fieber). Left genital clasper as in *Macrolophus*. Last abdominal segment roundly produced as a short, broad, upturned lobe posteriorly and with a prominent rounded knob on the left side of the segment. Eyes relatively large. This is apparently monotypic.

*Engytatus* Reuter (type *geniculatus* Reuter). Left genital clasper as in *Macrolophus* or with the thickened basal portion much enlarged and extending beyond the point of origin of the bladelike arm (as in *nicotianae*). Last abdominal segment more or less strongly produced ventrally into an upturned process which branches into two arms apically. Eyes variable in size. *Confusa* Perkins and *hawaiiensis* Kirkaldy belong here. *Geniculatus* Reuter was a secondary homonym in *Cyrtopeltis*, where Reuter and Knight placed it. Hence the name of the next oldest synonym, *varians* Distant, was used. According to the Banks and Caudell Code and the recommendations of the British Commission on Entomological Nomenclature, the name *geniculatus* may now be restored but the International Code is not so clear on this point.

*Gallobelicus* Distant (type *crassicornis* Distant = *tenuis* Reuter). Left genital clasper abruptly elbowed and typically with the apical arm very long and tapering. Last abdominal segment produced ventrally into a more or less prominent, unbranched arm and with a second projection near base of clasper at least in the type species. I have collected another species of this genus on Luzon, and Knight's Marquesan species (B. P. Bishop Mus., Bull. 142: 173-177, 1938) may belong here.

## SUBFAMILY ORTHOTYLINAE

70. *Zanchius fragilis*, new species (fig. 20, *a, b*).

Elongate, entirely pale except for eyes and antennal annulations. Sparsely clothed above with pale pubescence. Surface smooth, shining impunctate.

Head broader than long, 22:15, the eyes prominent, suboval, less than half as wide as interocular space, 5:12, located anteriorly on head, the postocular portion of head two thirds as long as an eye. Head strongly declivous in front of eyes, tylus moderately convex. Vertex with a broad, shallow depression on either side near eyes and a faint longitudinal impression between them at middle. Hind angles of head behind eyes broadly rounded, a brief, transverse, rounded carina just before hind margin. Rostrum surpassing hind coxae, proportion of segments one to four as 8:10:19:14. Antennae longer than body to apex of membrane, 137:120; the first segment thickest, second more slender, cylindrical, third and fourth most slender; proportion of segments 15:55:32:35.

Pronotum as long on median line as head, almost twice as broad across humeri as long, 28:15, the sides sinuate, roundly converging anteriorly, roundly diverging posteriorly to humeral angles. Front margin distinctly concave at middle, with a minute ledge or collar. Hind margin broadly concave in front of mesoscutum and slightly sinuate at middle. Disk elevated anteriorly, depressed a little behind middle and sublaterally on posterior lobe. Mesoscutum large, half as long as scutellum, the width at base of mesoscutum about equal to length of mesoscutum and scutellum together.

Hemelytra long and slender, the apices of cunei exceeding tip of abdomen. Costal margins of coria 2.33 times as long as width of pronotum, subparallel, only feebly arcuate on basal half. Cuneus less than one third as long as corium, 20:66. Membrane long and narrow, extending beyond apex of cuneus for a distance equal to one third the length of cuneus. Clavus, corium, and cuneus subhyaline, scarcely, sparsely, minutely punctured and with very scattered hairs except along costal margins.

Legs long and slender, the tibiae with very fine, long spines. Arolia distinct, flap-like and converging apically.

Right genital clasper of male short and broad, with a short, inward curved spine on upper edge and a slightly curved, slender, tapering apical arm as long as the basal portion of clasper, with acute apex. Left clasper relatively simple, curved. Appendages of aedeagus remarkably complex.

Color entirely pale, testaceous, the eyes pale brown, and with brown at apex of first antennal segment, at basal fourth and slightly beyond middle of second segment, at apex of rostrum, and at apices of male genital processes. Hemelytra subhyaline, sometimes faintly tinged with green, the membrane faintly clouded, more distinctly so within the areole.

Size: male, length 3.1 mm., width (hemelytra) 0.9 mm.; female, length 3.4 mm., width (hemelytra) 1 mm.

Holotype male, allotype female, and one teneral specimen, Machanao, June 4, on *Macaranga*, Usinger; one paratype, Piti, April 30, Usinger; two paratypes and one damaged specimen, Piti, July 30, on *Ipomoea*, Swezey; two paratypes and one teneral specimen, Dededo, May 19, on *Terminalia*, Usinger; one paratype, Guam, Fullaway (1431) and one specimen in poor condition, Barrigada, July 22, on *Hibiscus*, Swezey.

Poppius [Archiv für Naturgesch. 80A(8):59, 1914] redescribed Distant's genus *Zanchius* (Fauna Brit. India, Rhynch. 2:477, 1904), and placed it in the Macrolophinae (=Dicyphinae), probably because the arolia "sind schmal, mit den Klauen verwachsen und etwas über die Mitte derselben sich erstreckend." Poppius also mentions the distinct apical stricture of the pro-

notum. The arolia are of course not visible in Distant's figure and are not mentioned in his description but there is certainly no trace of a collar in Distant's genus. As mentioned above, *fragilis* has a very small collar, visible only under highest magnification (108 diameters). The arolia are free and convergent apically as in typical Orthotylinæ. I refer this species to *Zanchius* because it agrees so perfectly with Distant's description and figure, differing only in the more slender body form and in the absence of a "cell-like process at apex of corium", though the costal margin widens near the apex. I have seen species of *Zanchius* from Samoa and Fiji.

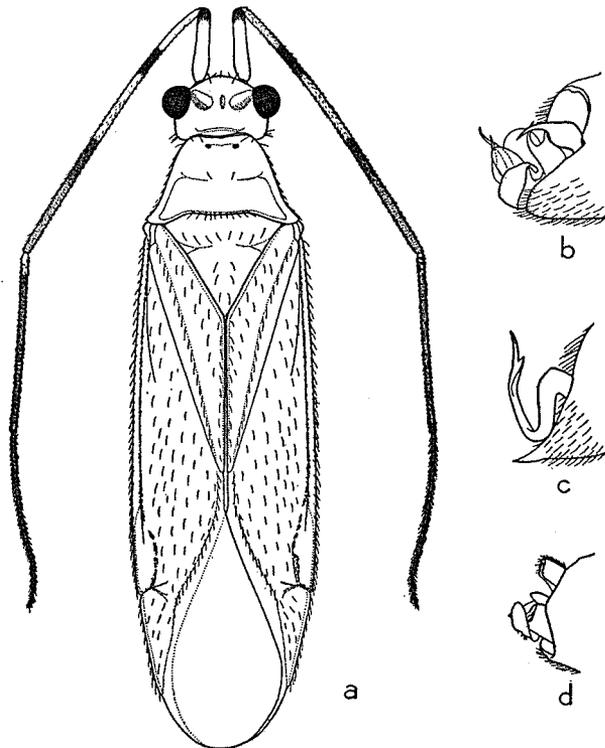


FIGURE 20.—a, b, *Zanchius fragilis*: a, dorsal view; b, lateral view of last abdominal segment of male showing the right genital clasper broad basally and narrow and curved apically; c, *Zanchius piperi*: right genital clasper of male; d, *Zanchius virescens*: last abdominal segment of male showing the clasper short and simply lobelike.

#### 71. *Zanchius piperi*, new species (fig. 20, c).

Elongate, entirely pale, the upper surface almost entirely impunctate, with scattered, pale hairs. Right genital clasper long, sickle-shaped, angulately bifurcate apically, with inner and outer angles acute.

Head three fourths as long as broad across eyes, 15:20, eyes half as wide as interocular space, 5:10. Vertex almost imperceptibly longitudinally impressed and faintly

impressed on either side near eyes. A feeble transverse carina before hind margin. Rostrum extending well beyond apices of hind coxae; proportion of segments one to four as 12:11:15:14. Antennae longer than body to apex of membrane, 115:106, proportion of segments 11:46:28:30.

Pronotum shorter than head on median line, 13:15, twice as broad across humeri as long, the sides relatively straight, only feebly concave at middle and very shallowly broadly concave on hind margin, the front margin distinctly sinuate and minutely margined. Disk swollen anteriorly, distinctly depressed behind callosities.

Mesoscutum and scutellum together relatively short, one fourth broader across base of former than length of two together.

Hemelytra long, the apices of cunei considerably surpassing apex of abdomen. Costal margins of coria over twice as long as width of pronotum, 57:26, gradually arcuate throughout their length, and distinctly widened at apex to form a cell. Cuneus less than one third as long as corium, 17:57. Clavus, corium, and cuneus subhyaline and only faintly, sparsely punctate.

Right genital clasper long, narrow, and sickle-shaped with the outer apical angle produced into a strong, acute spine and the inner apical angle produced into a short, acute spine. Left clasper relatively simple, sickle-shaped. Processes of aedeagus less prominent than in *fragilis* but complicated and apparently distinctive.

Color entirely pale testaceous except for brownish eyes and brown apices of male terminalia.

Size: male, length 2.75 mm., width (hemelytra) 0.95 mm.; female, length 2.9 mm., width (hemelytra) 1 mm.

Holotype male, allotype female, and one male paratype, Dededo, May 11, on *Piper guahamense*, Usinger. A fourth specimen was collected on the same host at Machanao, Aug. 6, Swezey.

Shorter and broader than *fragilis* with differently proportioned antennae and without the dark antennal annulations. Right male genital clasper distinctive. The broadened costal margin of corium at apex results in a cell which may be the "cell-like process" mentioned by Distant although details are lacking in his figure (Fauna Brit. India, Rhynch. 2:477, fig. 309, 1904).

## 72. *Zanchius virescens*, new species (fig. 20, d).

Elongate, sparsely pubescent, pale with large green areas on clavus, corium, and in the cells of membrane. Right genital clasper in male small, lobelike, without curvature, spines or processes.

Head two thirds as long as broad across eyes, 16:24, the eyes large, half as wide as interocular space, 6:12. Entire vertex broadly depressed at center but this may be due to shriveling of specimen. Clypeus strongly convex, transversely impressed at base. Rostrum extending well beyond apices of hind coxae, proportion of segments 11:14:18:13. Antennae about as long as body including membrane, proportion of segments 14:60:35:28.

Pronotum longer on median line than head, 18:16, less than twice as wide across humeri as long, 33:18, the sides strongly sinuate behind middle, rounded anteriorly, the front margin concave at middle and minutely margined. Hind margin broadly, shallowly concave. Disk smooth, moderately elevated anteriorly where it is feebly longitudinally impressed, hind lobe subdepressed.

Hemelytra very long, the apices of coria exceeding apex of abdomen, corial margins slightly arcuate, over twice as long as width of pronotum, 76:33; 3.5 times as long as cuneus. Corial margins widened at apex. Clavus, corium, cuneus, and area within membranous cells subhyaline.

Male right genital clasper short, narrow, simple, uncurved, without spines or processes. Left clasper wide, arcuate, not forming a complete semicircle.

Color entirely pale, whitish ochraceous with brown apex of rostrum and processes of aedeagus. Hemelytra subhyaline spotted with numerous small white punctures apically and sublaterally on corium and near base of membranal cells. Clavus tinged with green at middle of basal half. Corium broadly covered with small green punctures on basal half except at extreme base, with a broad green area beyond middle, another at apex, and two large green areas in membranal cell. Cuneus clear, hyaline, with testaceous margin and green apex. Membrane outside of cells clear hyaline.

Size: male, length 3.5 mm., width (hemelytra) 1 mm.

Holotype male, Upi Trail, May 5, Usinger.

Longer and more slender and differently colored than in other species with distinctive male genitalia.

### 73. *Cyrtorhinus lividipennis* Reuter.

*Cyrtorhinus lividipennis* Reuter, Ent. Tidskr. 5: 199, 1884.

Nine specimens, Piti, Sept. 14, *Ipomoea*, in corn field, Swezey; 12 specimens, Inarajan, May 7, in rice field, Swezey; one specimen, Inarajan, May 7, in rice field, Usinger; six specimens, May 7, two specimens, May 14, one specimen, Sept. 30, all in rice fields, Inarajan, Swezey and Usinger; one specimen, Yona, Nov. 18, on corn, Swezey; six specimens, Merizo, Oct. 2, on rice seedlings, Swezey; five specimens, Atantano, Sept. 30, rice seedling plot, Swezey; one specimen, Agana Swamp, May 25, on grass, Usinger; one specimen, Merizo, June 11, grape vine, Usinger; three specimens, Piti, Sept. 1, rice seedling plot, Swezey; one specimen, Piti, Aug. 13, on *Glochidion*, Swezey; one specimen, Guam, Fullaway (1197).

*C. lividipennis* was associated with *Peregrinus maidis* (Ashmead) on corn (see Usinger, Haw. Ent. Soc., Proc. 10: 271, 1939), the eggs of the fulgorid apparently being its preferred food. It was also common on rice where it preyed upon the eggs of *Nilaparvata lugens* (Stål). It has been reported from Great Nicobar, Formosa, Java, Ceylon, Burma, Sumatra, Japan, the Philippines, China, and Samoa. It was introduced into the Hawaiian Islands recently in an effort to control the corn leafhopper, but did not become established.

### 74. *Cyrtorhinus riveti* Cheesman.

*Cyrtorhinus riveti* Cheesman, Ann. Mag. Nat. Hist. IX, 19: 94, 1927.

One specimen, Inarajan, May 7, Usinger; one specimen, Atantano, Sept. 3, rice seedling plot, Swezey; one specimen, Tarague, May 17, on grass, Swezey; and three specimens, three miles south of Piti, May 23, on *Sporobolus* grass, Swezey. As recorded by me (Haw. Ent. Soc. Proc. 10: 273, 1939), this species was found sucking the eggs of *Sogata ochrias* (Kirkaldy) on *Sporobolus virginicus* and of *Nilaparvata lugens* (Stål) on rice. *C. riveti* is known elsewhere from Samoa and Tahiti.

### 75. *Orthotylellus rufescens*, new species.

Elongate-oval, rufescent with pale laterally on humeri and hemelytra, clothed above with rather fine subappressed hairs and a few shorter appressed hairs.

Head broader than long, 23:19; anteocular portion nearly as long as an eye, 8:9 in the male, equal to length of an eye in the female. Interocular space less than three times as wide as an eye in the male, 13:5, three times as wide in the female, 15:5. Upper surface moderately convex, rather smooth and shining with sparse concolorous erect hairs and a few short, appressed pale hairs. Vertex feebly but distinctly depressed just before hind margin of head, the hind margin feebly sinuate at middle. Rostrum reaching to middle of fifth visible abdominal segment in the male, the first segment reaching onto front coxae, somewhat shorter in the female but reaching well beyond apices of hind trochanters. Antennae about twice as long as width of pronotum, first segment rather short, reaching about to apex of head, second segment slightly longer than head across eyes, 25:23; proportion of segments in the male, 6:25:15:14, in the female, 6:27:16:14.

Pronotum much shorter than the head, 13:19, over twice as broad as long, 30:13; disk rather smooth, the callosities scarcely elevated. Hind femora about three and one half times as long as thick.

Color reddish brown with paler bucculae and gula, and with ochraceous humeral angles, outer margin of clavus at least basally, corium broadly basally and laterally and cuneus laterally, the upper surface thus appearing rufescent medially and broadly pale laterally. Membrane clouded, especially medially, the veins reddish. First antennal segment reddish brown, the remaining segments pale. Rostrum pale with black apex. Front legs including coxae entirely pale except for black apical halves of tarsi. Middle and hind legs pale in region of trochanters, on tibiae except for small reddish brown spots from which the pale tibial bristles arise, and on tarsi except for dark apices. Elsewhere on coxae and most of femora reddish brown. Under surface broadly rufescent with pale abdominal margins.

Size: male, length 2 mm., width (hemelytra) 0.9 mm.; female, length 2.3 mm.; width (hemelytra) 1 mm.

Holotype male, allotype female, and 30 paratypes, Mt. Chachao, May 16, on a species of sedge taller than *Rhynchospora corymbosa*, Usinger.

*O. rufescens* differs from *samoanus* Knight in its shorter rostrum and different coloration, the sides of hemelytra not pale either in the typical form of *samoanus* or in the variety *nigrellus*. I have seen specimens of *Orthotylellus* from Cairns, Queensland.

A single male labeled "Fiji, 1905" appears to be identical with *rufescens*, though I cannot be certain of this without a series of better preserved specimens. A second specimen, from Rewa, Fiji, 1909, collected by Muir has the second antennal segment half again as long as width of head and differs in type of pubescence and coloration.

#### 76. *Orthotylellus palleescens*, new species.

Oval, rather uniformly pale in color with long, fine hairs above intermixed with short, appressed silvery hairs.

Head two thirds as long as broad, 15:22; produced in front of eyes almost as far as length of an eye, 7:8; eyes less than half as wide as interocular space, 5:12; disk moderately convex, shining, with long hairs very sparse, the short, appressed, silvery hairs more conspicuous. Vertex feebly transversely impressed just before hind margin. Rostrum reaching sixth visible abdominal segment in the male, shorter in the female but extending well beyond apices of hind trochanters. Antennae less than twice as long as width of pronotum, 51:27; second segment slightly shorter than width of head, 21:22; proportion of segments 6:21:13:11.

Pronotum shorter than head, 11:15; over twice as broad as long, 27:11, the disk relatively smooth with callosities scarcely elevated. Pubescence of pronotum, scutellum,

clavus, corium, and cuneus consisting of fine subappressed hairs with a few short, appressed golden hairs intermixed.

Color light brown, the head fulvous, the eyes reddish, the callosities of pronotum fulvous, the rest of upper surface paler fulvous to ochraceous, the humeri still paler. Membrane faintly clouded. First antennal segment brown, the remaining segments ochraceous. Rostrum pale with black apex. Legs pale with middle and hind femora reddish brown apically and with tarsi infuscated apically. Under surface pale with a broad longitudinal rufescent stripe on either side sublaterally.

Size: male, length 1.75 mm., width (hemelytra) 0.8 mm.; female, length 2 mm., width (hemelytra) 0.8 mm.

Holotype male, allotype female, and six paratypes, Inarajan, June 8, on a sedge, *Rhynchospora corymbosa*, Usinger; one paratype, Inarajan, May 7, on rice, Usinger; six paratypes, 5 miles south of Piti, June 23, on sedge in mangrove swamp, Usinger; seven paratypes, Agana Spring, May 15, on *Rhynchospora corymbosa*, Usinger.

Closely allied to *rufescens* but with much shorter antennae and paler coloration.

#### 77. *Orthotylellus brunnescens*, new species.

Elongate-oval, brown, with conspicuous, short, appressed, silvery hairs intermixed with the longer, fine, subappressed pubescence.

Head about three fourths as long as broad, produced about three fourths as far in front of eyes as length of eye, 7:9, in the male, and nearly as far as length of an eye, 8:9, in the female. Eyes half as wide as interocular space in the male, scarcely more than one third as wide as interocular space in the female, 5:14. Disk relatively smooth, polished and moderately elevated, the hind margin almost imperceptibly transversely impressed subbasally. Pubescence of disk sparse and somewhat irregular, of the two types mentioned above. Rostrum reaching about to middle of fifth visible abdominal segment in the male and considerably exceeding the apices of hind trochanters in the female. Antennae over twice as long as width of pronotum, 67:31, in the male, 64:31 in the female, second segment distinctly longer than width of head in the male, 27:24, slightly shorter than width of head in the female, 23:24; proportion of segments in the male, 7:27:18:15, in the female, 7:23:17:16.

Pronotum about two thirds as long as head, over twice as broad as long, 31:13. Disk very faintly transversely rugose, shining, with rather regular, fine, subappressed hairs and sparse, appressed, silvery hairs as on scutellum and hemelytra.

Color rather uniformly brown with very obscure transverse darker stripes on head, and with paler anterior margin of pronotum, apex of scutellum, lateral portions of coria broadly, cuneal fracture and apex of cuneus. Membrane generally clouded, the veins pale. Antennae brown, the second segment broadly pale at middle. Rostrum pale with black apex. Legs fulvous or paler with brown bases of coxae, hind femora except at apices, and infuscated apices of tarsi. Under surface brown except for pale margins of thoracic pleurites and pale ostiolar area.

Size: male, length 2 mm., width (hemelytra) 0.85 mm.; female, length 2.1 mm., width (hemelytra) 1 mm.

Holotype male, allotype female, and seven paratypes, Piti, June 20, on *Scleria margaritifera*, Usinger; one paratype, 5 miles south of Piti, June 23, Usinger; two paratypes, Inarajan, May 7, Usinger, May 7, on rice, Swezey; two specimens, Guam, Fullaway (1203).

Quite distinct in general appearance from *pallescens* and *rufescens* because of the dark color and conspicuous silvery pubescence. This is very close to, if not identical with, a series of specimens which I collected at Montalban, Luzon, Philippine Islands, July 14, 1936 and differs only slightly from a single specimen which I collected at Los Banos on July 17.

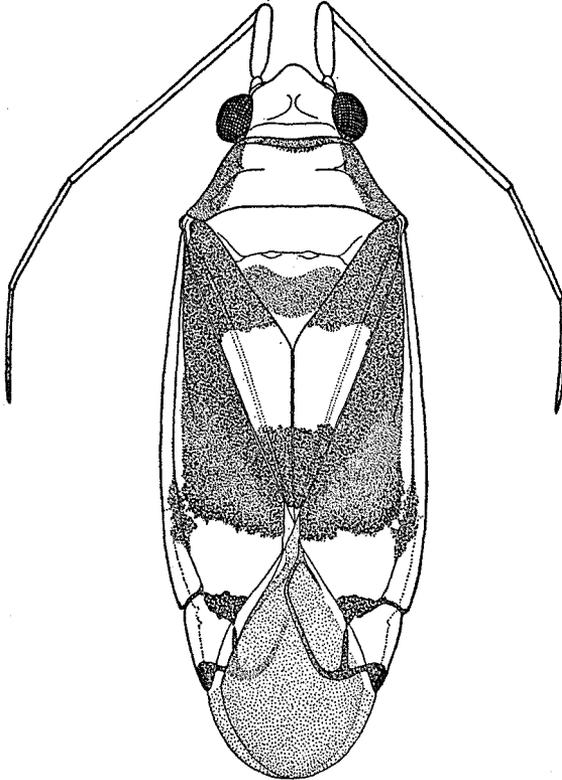


FIGURE 21.—*Aretas signatus*: dorsal view of female showing color pattern.

**78. *Aretas signatus*, new species (fig. 21).**

Elongate-oval, shining, and densely clothed with a pubescence of pale, mostly backwardly directed hairs which average about 0.1 mm. in length and which are inserted closer together than the length of a hair.

Head broader across eyes than long, 28:21; the eyes less than half as wide as interocular space, 6.5:15; twice as long as broad; vertex narrowly depressed at base, feebly transversely sulcate subbasally, these impressions joining to form a shallow median longitudinal sulcus which extends forward to middle of vertex. Vertex broadly convex between bases of antennae and then abruptly depressed to base of vertical tylus. Lora distinctly inflated midway between front margins of eyes and loral apices. Rostrum scarcely surpassing apices of middle coxae, the four segments subequal in length. Antennae one ninth shorter than length of insect to tip of membrane, 120:135; the first segment

shorter than head, 17:21; proportion of segments one to four as 17:53:26:24; first segment with stiff, erect bristles and all segments with short, fine pubescence.

Pronotum only three fourths as long on median line as head, 16:21, over twice as broad across humeri as long, 40:16; anterior margin feebly concave at center; disk faintly impressed surrounding callosities and very obscurely longitudinally impressed at middle in front of callosities. Posterior disk minutely, irregularly roughened. Lateral margins feebly concave, with three erect hairs in addition to the general backwardly directed hairs which clothe the entire surface.

Mesonotum and scutellum large and broadly exposed, together five sevenths as long as broad and only one eighth narrower at base than pronotum; mesonotum about one half as long as scutellum. Pubescence continuing over these disks as well as on clavus, corium, and cuneus.

Male with left genital clasper briefly produced as a slender arm and then dilated into a stout lobe twice as wide as long, projecting farther caudad than cephalad and rounded at apices. Right clasper extending dorsally into an arm abruptly elbowed at its middle and ventrally into an arm which is more roundly bent downward subbasally.

Color pale, ochraceous, the eyes brown, the vertex fulvous, the tylus and juga reddish, the lora red and brown, the rostrum pale with black apex, antennae entirely pale, or the first segment slightly tinged with pink. Pronotum tinged with red anteriorly and distinctly brown laterally. Mesonotum and narrow basal portion of scutellum ochraceous, middle of scutellum broadly brown its apex nearly white. Hemelytra very distinctively marked, the clavi red on basal third, extending nearly to level of apex of scutellum, then abruptly ochraceous to apical fourth where they are again red to apices. Entire inner areas of coria red to slightly beyond level of apex of commissure of clavus, then broadly, transversely ochraceous to front margin of cuneus which is narrowly red laterally and broadly red medially. Middle of cuneus pale, its apex red at joining of red membranous veins and dark brown at tip. Costal margin of corium entirely pale, the pale area broader than embolium except at level of apex of commissure of clavus. Membrane rather uniformly infuscated, with an ill-defined paler area across center. Under surface and legs entirely pale except for brown claws.

Size: female, length 3.4 mm., width (hemelytra) 1.3 mm.; male, length 3.3 mm., width (hemelytra) 1.2 mm.

Holotype female, Yona, May 12, on *Ficus*, Usinger; allotype male, Mt. Alifan, May 26, on *Pipturus*, Usinger; one paratype, same data as holotype, and one same data as allotype; six paratypes, Piti, Aug. 13, 18, and 24, on *Glochidion*, and Sept. 12, on *Pithecolobium*, Swezey; two paratypes, Merizo, Oct. 2, on golden shower tree, Swezey; one paratype, Dededo, May 19, Usinger; two paratypes, Tarague, May 17, on *Premna gaudichaudii*, Usinger; one specimen, Mt. Alifan, April 20, Bryan.

The paratypes show some color variation, there being reddish flecks around the eyes in some specimens, an occasional reddish tinge on the scutellum, and a suggestion of brown subapically on hind femora. The brown of the lateral margins of pronotum extends over onto a portion of the propleura. The most distinctive feature of this species, other than the male genitalia, is the red central area of hemelytra with contrasting ochraceous across the middle of clavi. This is a common species on Guam and is obviously not host specific.

*A. signatus* will run to *flavus* Knight or *imperatorius* Distant in Knight's key (B. P. Bishop Mus., Bull. 142:167, 1937) but does not agree with these or any other described species in color or in shape of male genital claspers.

79. *Aretas bifasciatus*, new species (fig. 22).

Elongate-oval, clothed with long, backwardly directed hairs much as in *signatus*.

Head broader than long, 25:19, the interocular space twice as wide as an eye, 13:6.5; eyes nearly twice as long as wide, 12:6.5. Vertex depressed basally and sulcate longitudinally much as in *signatus*, the frons convexly produced between bases of antennae and then abruptly depressed to base of tylus. Lora likewise feebly lobed. Rostrum slightly exceeding apices of middle coxae, the segments subequal. Antennae nearly as long as insect to tip of membrane, 122:129, the first segment about as long as head; proportion of segments 18:56:26:22; first segment with stiff, erect hairs, all segments with a short, fine pubescence.

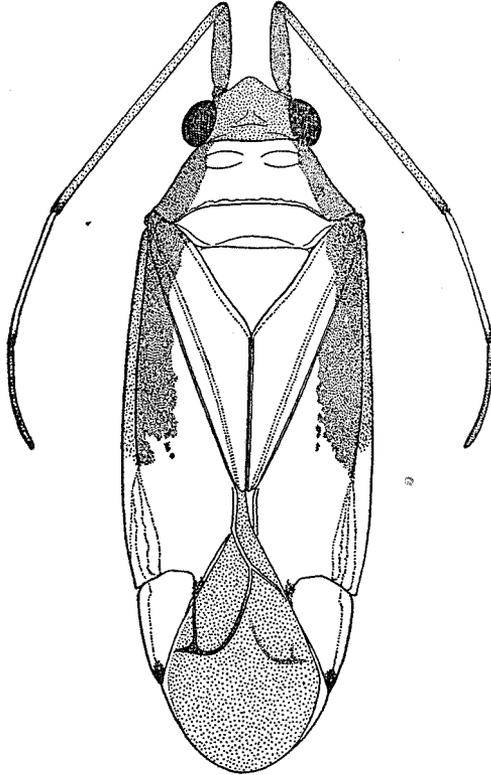


FIGURE 22.—*Aretas bifasciatus*: dorsal view of female showing color pattern.

Pronotum shorter than head on median line, 15:19; over twice as broad across humeri as long, 37:15; the anterior margin convex and sinuate at middle, lateral margins very feebly concave, hind margin shallowly, broadly concave. Disk feebly impressed around callosities, with some erect hairs antero-laterally.

Other structural characters except male genitalia as in *signatus*.

Left genital clasper twisted subbasally and enlarged into a broad organ with a straight, stout outer arm which is blunt at apex and a longer, slender, sinuate inner arm which is minutely truncate at apex. Right clasper shorter, strongly convex and enlarged with a slender, inwardly turned arm.

Color flavous to ochraceous with red as follows: on portions of tylus, juga, and lora, eyes and areas immediately adjacent, lateral margins of pronotum and extending over

the sides onto propleura, lateral margins of hemelytra on basal two thirds including extreme outer basal angles of scutellum, bases of clavi, and embolia and outer portions of coria. Pale beyond and within this red area except for a pale spot at middle and another at outer angle of each apical corial margin. Veins of membrane tinged with reddish, the membrane pale but infumate. First antennal segment mostly red, the inner dorsal side more or less pale. Second segment often tinged with red basally and apically. Legs in great part pale but with the femora often vaguely embrowned or tinged with red subapically.

The male is considerably darker, the hemelytra entirely dark reddish brown except for narrowly pale inner margins and commissure of clavus, outer apical area of corium near cuneus, and cuneus except at inner base and at apex.

Size: female, length 3.3 mm., width (hemelytra) 1.2 mm.; male, length 3.4 mm., width (hemelytra slightly spread) 1.2 mm.

Holotype female, Piti, Sept. 21, on *Glochidion*, Swezey; allotype male, Piti, Aug. 13, on *Glochidion*, Swezey; 18 paratypes, Piti, same data as type except for two, Aug. 24, and one, Oct. 12; two paratypes, Upi Trail, May 5, Usinger; two specimens, Piti, Aug. 18, on *Glochidion*; one specimen, Nov. 21, on bamboo, Swezey.

*A. bifasciatus* will not run directly to any of the species in Knight's key and the situation is further complicated by the sexual dimorphism in color. The male genitalia are distinctive. Both *signatus* and *bifasciatus* have the frons convex and produced slightly between bases of antennae, a condition described by Knight in *nigribasicornis* and *rubroclavus* as "frons abrupt above base of tylus."

Study of the type shows that *Tichorhinus vitiensis* Kirkaldy (Linn. Soc. N. S. Wales, Proc. 33: 377, 1908) is an *Aretas*. I have seen undescribed species of *Aretas* from New Caledonia and Australia.

#### 80. *Halticus insularis*, new species.

Broadly oval, convex above, sparsely clothed with subappressed black hairs; head shining, the rest of dorsal surface dull.

Head directed downward, nearly as long to apex of tylus as broad across eyes, 23:24; tylus convex, subrounded at apex; labrum less than half as wide at base as greatest width of tylus, tapering apically, twice as long as wide. Disk of head highly polished, minutely rugose-punctate, feebly convex. Hind margin moderately arcuate, a little reflexed, overlapping anterior margins of pronotum. Rostrum stout, reaching to apices of hind coxae; proportion of segments 7:7:9:4. Antennae much longer than body, over three times as long as width of pronotum, 97:30, the second segment scarcely longer than length of costal margin of corium, 35:34; proportion of segments one to four as 8:35:25:29; first segment thickest, not reaching apex of head, with one or two long erect hairs beyond middle; remaining segments slender, cylindrical, covered with short, stiff, apically directed hairs.

Pronotum one fourth broader across humeri than head width including eyes, 30:24; twice as broad as long, and two thirds as wide at anterior margin as across humeri, sides straight, humeri briefly rounded, hind margin broadly rounded and very feebly concave in front of scutellum. Disk only feebly elevated, very minutely punctate or almost shagreened, obsolete, transversely rugose.

Scutellum a little less than twice as broad at base as long, 12:7, the disk similar to pronotal disk, feebly elevated basally and gradually depressed apically to acute angular apex.

Hemelytra strongly convex, the costal margins strongly arcuate, the cuneal fracture deep, surface of clavus, corium, and cuneus shagreened and pubescent. Membrane complete, surpassing tip of abdomen.

Under surface largely naked and shagreened on thoracic pleura and coxae, highly polished and pubescent on abdominal venter.

Legs shining and pubescent, the front and middle legs slender, the hind femora slightly over one third as thick as long, 11:29. Hind tarsi with first segment two thirds as long as second and third, which are subequal.

Color black with ferruginous eyes, brownish membrane becoming paler around apical margin. Antennae pale, testaceous, with infuscated apex of second segment, more or less on apical half of third segment and all of fourth except for pale base. Legs entirely pale except for fuscous claws and black basal half or two thirds of hind femora.

The male has even longer antennae, 3.5 times as long as width of pronotum, 99:28; with the second segment much longer than costal margin of corium, 37:30.

Size: 1.75 mm. long, 1 mm. wide across hemelytra.

Holotype female, Ritidian Point, June 2, Swezey; allotype male, Piti, Sept. 17, on pumpkin leaves, Swezey; 12 paratypes, same data as allotype; six paratypes, Piti, Sept. 14, on *Ipomoea* in a cornfield, Swezey; one paratype, same data as holotype; one paratype, Agana Swamp, May 4, on cucumber, Usinger; one paratype, Fullaway (1205).

Allied to *tibialis* Reuter which I have from Amboina and Macassar, collected by Muir. In *tibialis* the antennae are shorter, less than three times as long as width of pronotum across humeri, 87:30; all of the femora are black except at apices and the hind tibiae are broadly infuscated on basal half except at extreme base. *H. tibialis* has been reported from Africa, Ceylon, Java, and the Carolines. *H. minutus* Reuter from Ceylon, Singapore, and Cochin China is said to have the second antennal segment shorter, about as long as costal margin of corium, and the infuscated basal half of the hind tibiae is not mentioned by Distant (Fauna Brit. India, Rhynch. 2:480, 1904). Otherwise it seems to agree, except for its smaller size, with *tibialis*. Distant records *minutus* from *Ipomoea* in Ceylon, collected by Green, and Esaki records *tibialis* as injurious to beans in the Carolines.

#### SUBFAMILY PHYLINAE

#### Genus PSALLOPS, new genus

Elongate-oval, densely clothed with long, posteriorly directed, stiff hairs. Head almost entirely deflected, nearly vertical, eyes large, the interocular space narrower than width of an eye, surface of eyes subflattened, hind margins touching anterior margin of pronotum and extending ventrally where they practically touch front coxae. Vertex sharply margined posteriorly. Tylus scarcely elevated, not separated from frons. Rostrum very long, reaching to apical third of abdomen. Antennae inserted a little before inner apices of eyes, over half again as long as width of pronotum, the first segment half as long as head but exceeding apex of head, second three times as long as first, slightly and gradually increasing in thickness toward apex, third and fourth segments subequal, together a little shorter than second.

Pronotum a little shorter than head and over twice as broad as long, subflattened posteriorly with nearly straight hind margin, roundly deflected anterolaterally beneath the subflattened lobelike eyes, the front margin with a transverse, flattened fold at middle simulating a collar.

Mesoscutum broadly exposed, the width at base one third greater than combined lengths of mesoscutum and scutellum.

Hemelytra broad and long, completely covering the abdomen, the apex of cuneus exceeding tip of abdomen by half the length of cuneus. Clavus broad, subflattened, the commissure one third longer than combined lengths of mesoscutum and scutellum. Corium slightly less than half again as long as width of pronotum, the disk moderately convex, depressed along costal margin, the flattened area thus formed slightly widened posteriorly but only one sixth the total width of corium at posterior margin. Cuneus one third as long as corium. Membrane exceeding apices of cunei by less than the length of cuneus, broadly rounded posteriorly, the cells short, the inner apical angles rounded and the vein joining inner margin of cuneus just beyond middle.

Under surface smooth, nearly naked anteriorly, clothed with fine hairs on abdomen. Legs moderately pubescent, the tibiae with fine erect spines. Femora partially collapsed in the only available specimen, but incrassate, the hind femora twice as long as greatest width near middle. Claws unclawed, pseudarolia absent, arolia short, inconspicuous, bristle-like.

Genotype: *Psallops oculatus*, new species.

*Psallops* is allied to *Psallus* and *Sthenarus* but is unique in possessing large, subflattened eyes, a strongly declivous head, sharply margined vertex posteriorly, a very long rostrum, and a vestiture of long, stiff, posteriorly directed and slightly curved hairs.

#### 81. *Psallops oculatus*, new species (fig. 23, a, b).

Head broader than long, 21:17; produced in front of eyes for a distance less than half as great as length of an eye, 5:12; eyes very large, wider than interocular space at narrowest point, 7:6; the narrowest point being at basal fifth of head before which inner margins of eyes gradually round to insertions of antennae near front margins, and behind which they abruptly diverge to hind margin. Upper surface of head finely granular, with stiff, erect hairs posteriorly, and finer, anteriorly directed hairs anteriorly. Rostrum reaching to apical third of abdomen, the first segment reaching to apical third of front coxae; proportion of segments 12:14:11:10. Proportion of antennal segments, 8:24:11:10; the first two segments finely pubescent, the last two with additional erect hairs.

Pronotum with callosities scarcely elevated. The entire pronotal disk covered with small elevations which are conspicuous only when the light casts a shadow, with backwardly directed, curved hairs arising from each, these hairs much longer individually than the distance between hairs.

Scutellum and hemelytra except costal margins less densely but just as conspicuously clothed with bristlelike hairs, the hairs arising from conspicuous elevations on clavus and corium. Pubescence of cuneus shorter and finer.

Color ferrugineous on head and pronotum, the eyes and pronotal disk and pubescence brown. Rostrum reddish at base, pale at middle and brown at apex. Antennae pale, ochraceous, the last two segments infuscated. Mesoscutum broadly brown at basal angles and at middle. Scutellum brown at middle of base, white elsewhere, tinged with red laterally at base. Clavus and corium white with brown elevations from which the pale fulvous hairs arise. Cuneus deep brown on basal half, then tinged with reddish, and white at apex. Membrane most densely clouded at base, veins posteriorly white. Under surface reddish with pale base and middle of abdomen. Ostiolar areas white. Legs white with red or

red-brown apically on front femora and on apical half of hind femora except for white extreme apices. Bristles of tibiae white.

Size: length 2.4 mm., width (hemelytra) 1 mm.

Holotype female, Machanao, June 4, on *Asplenium nidus*, Usinger.

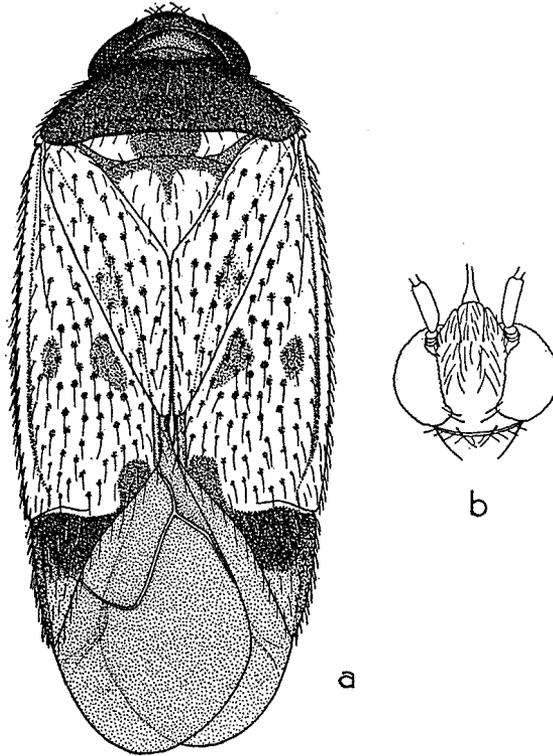


FIGURE 23.—*Psallops oculatus*: a, dorsal view of female showing form, color pattern, stiff hairs and elevations at bases of hairs of pronotum; b, front view of head to show shape of its upper surface.

## 82. *Campylomma breviceps*, new species (fig. 24, a).

Broadly oval, uniformly pale above with pale, subappressed pubescence.

Head relatively short, three fifths as long as broad across eyes, 15:25; the eyes half as wide as interocular space in the male, 6.5:12, 5.5:12 in the female; rostrum reaching apices of middle coxae, the segments subequal in length. Antennae about as long as distance from tip of tylus to apex of commissure of clavus, the second segment slightly shorter than width of head across eyes; proportion of segments 7:23:14:11.

Pronotum as long as head on median line and over twice as broad as long, 34:15; callosities very feebly elevated, disks of scutellum, clavus, corium and cuneus all moderately shining and clothed with subappressed pubescence similar to that of head and pronotum, the latter with an erect bristle on either side antero-laterally.

Color almost entirely pale, testaceous, the head ochraceous, the eyes light brown, the antennae pale with apex of last segment slightly infuscated, rostrum black at apex,

front and middle femora each with a black spot at inner ventral subapices, hind femora with a series of spots along hind margin, one of these very faint at middle of basal half, two very conspicuous and equally spaced near and beyond the middle, three smaller sub-apical spots laterally. Tibiae with black spines but without black spots. Membrane scarcely clouded, hyaline.

Size: male, length 2.7 mm., width (hemelytra) 1.1 mm.; female, length 2.3 mm., width (hemelytra) 1 mm.

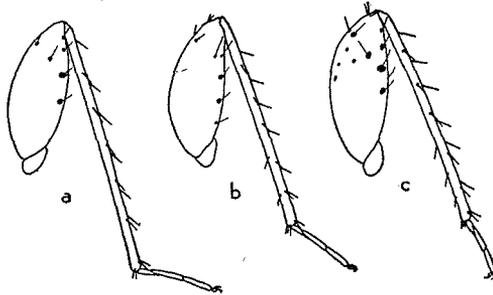


FIGURE 24.—*Campylomma* species, hind leg showing size and arrangement of spots and bristles on femur: a, *breviceps*; b, *pallida*; c, *brunneicollis*.

Holotype male, allotype female, and three paratypes, 2 miles south of Piti, April 30, on *Hibiscus tiliaceus*, Usinger; one specimen, Talofof, April 11, Bryan.

Related to *adamsoni*, *tahitica*, and *pallida*, but distinguished by the combination of characters: short head and pronotum, short rostrum, and spots on hind femora.

### 83. *Campylomma pallida*, new species (fig. 24, b).

Oval, shining, uniformly clothed with a pale, subappressed pubescence.

Head much broader across eyes than long, 25:18; the interocular space wider than an eye, 11:7, male, 12:6, female, vertex without conspicuous punctures. Tylus and juga only moderately convex. Rostrum relatively long, distinctly surpassing hind coxae, reaching about to apices of hind trochanters, proportion of segments 10:12:8:12. Antennae about as long as head, pronotum, and scutellum, the second segment four fifths as long as head width including eyes in the male, three fourths as long as head width in the female; proportion of segments, male, 6:20:11:7; female, 6:18:11:7.

Pronotum one ninth shorter than head and slightly more than twice as broad across humeri as long, 33.5:16, the disk quite smooth, without conspicuously raised callosities.

Hemelytra subhyaline, the clavus, corium, and cuneus covered with the same type of hairs as head, pronotum, and scutellum.

Color entirely pale testaceous to ochraceous with brown eyes, faintly clouded membrane, brown apex of rostrum, several stiff black bristles at apices of femora, stiff black bristles on tibiae, and femoral spots as follows: one spot ventrally and subapically on front femora; one postero-ventrally and one postero-dorsally between middle and apex of intermediate femora; and four conspicuous spots postero-ventrally on hind femora, one of these subbasal and three near the middle. There are additional vague setigerous spots apically and dorsally but they are too poorly defined to describe.

Size: male, length 2.4 mm., width (hemelytra) 1 mm.; female, length 2.3 mm., width (hemelytra) 0.95 mm.

Holotype male, allotype female, and 12 paratypes, Tarague, May 17, on *Messerschmidia*, Usinger; one specimen, Ritidian Point, April 15, on ferns, Bryan.

Runs to *adamsoni* Knight in Knight's key to the Marquesan species (B. P. Bishop Mus., Bull. 142: 181, 1938) but with shorter second antennal segment and longer rostrum. *C. tahitica* Knight is another closely allied species which has a shorter rostrum, slightly different dots on hind femora, and, presumably, no dots on the front and middle femora, since they are not mentioned in the description.

**84. *Campylomma brunneicollis*, new species (fig. 24, c).**

Oval, more or less extensively brown colored with short pubescence at middle of head and long, subappressed pubescence elsewhere.

Head nearly half again as broad as long, 24:17, the anteocular portion very short, scarcely more than one third as long as an eye, 5:11 in the male, 4:11 in the female; eyes a little over half as wide as interocular space in the male, 6.5:11; half as wide in the female, 6:12. Disk with longer hairs anteriorly and long, stiff hairs near posterior margin, the middle with very short hairs; relatively smooth anteriorly and with a few punctures near hind margin, the entire disk shining. Rostrum reaching or slightly surpassing apices of hind coxae. Antennae as long as head, pronotum and scutellum together, the second segment much shorter than width of head, 20:24 in the male, 18:24 in the female; proportion of segments 5:20:12:8 in the male.

Pronotum shorter than head on median line, 15:17, over twice as broad as long, 33:15; disk obscurely punctate-rugose, not impressed or elevated near the callosities. Pubescence quite even and dense over entire disk. Scutellum, clavus, corium, and cuneus with somewhat longer, sparser, and more irregular pubescence.

Color predominantly dark brown on head and pronotum, the under surface of head and a band across hind margin of vertex ochraceous. Pronotum sometimes lighter brown anteriorly at middle. Eyes red or brown, antennae pale, rostrum pale with black apex, scutellum pale, ochraceous, more or less brown basally at middle. Clavus and base of corium white, apical half of corium more or less generally infuscated, especially on inner portion. Cuneus pale, hyaline. Membrane lightly embrowned medially. Under surface pale marked with brown on pro and mesopleura and laterally and apically on abdomen. Legs testaceous, the front and middle femora each with a subapical spot postero-ventrally and middle femora each with three spots along antero-ventral side in apical half and one subapical spot antero-dorsally, all but the basal of these spots setigerous. Hind femora with 11 prominent black spots in apical half and with the entire apical half sometimes lightly infuscated. Tibiae with long black spines, most of which arise from black spots.

Size: male, length 2.3 mm., width (hemelytra) 1 mm.; female, length 2.7 mm., width (hemelytra) 1.1 mm.

Holotype male, allotype female, and two paratypes, Mt. Tenjo, May 3, on *Scaevola koenigii*, Usinger; five paratypes, Mt. Alifan, May 21, on milkweed, Usinger; one paratype, Inarajan, May 7, Usinger, and one, Piti, April 30, Usinger.

The variation in color in this series is remarkable, one of the Mt. Alifan males having an entirely brown head except for the characteristic ochraceous base, entirely light brown scutellum, the clavus and corium brown except narrowly at base, and even the cuneus infuscated except basally and laterally.

The under surfaces of thorax and abdomen are entirely brown, the hind femora are entirely brown except for pale bases and apices, thus nearly obscuring the slightly darker black spots, and the antennae are pale but vaguely infuscated. Other specimens from Alifan appear to be perfectly typical, so I assume that this represents an extreme form of color variation. In some specimens the rostrum scarcely exceeds the apices of middle coxae but the condition of the specimen determines whether the rostrum is fully extended or not. I know of no close relatives of this distinctive species.

SUPERFAMILY CRYPTOSTEMMATOIDEA

FAMILY CRYPTOSTEMMATIDAE

Genus **NESONANNUS**, new genus

Elongate-oval, naked except for long antennal bristles. Head strongly declivous and pronotum moderately so. Ocelli distinct, contiguous to eyes. Eyes relatively small, scarcely longer than anteocular portion of head and about one third as wide as interocular space, overlapping anterior angles of pronotum, the first two segments short and stout, the last two long and slender and beset with several bristles which are longer than the segments.

Pronotum twice as broad as long, with a deep, transverse, arcuate impression at anterior fourth. Propleura moderately inflated beneath the eyes. Scutellum half as wide as pronotum and half as long as wide, the disk deeply, transversely impressed.

Hemelytra complete, membranous, extending well beyond apex of abdomen, costal margins very thick and without a fracture. Venation unique, with only two free veins in apex of wing, the third vein curving upward to join second and form a closed discal cell. Vein along hind margin of clavus not crossing clavus before apex.

Under surface largely obscured but with coxae apparently only moderately enlarged, legs relatively slender, the tibiae cylindrical and beset with very short, inconspicuous hairs. Tarsi 3-segmented, the clavus simple, without arolia. Male genital capsule asymmetrical, with a long slender black process crossing to the right side of capsule and then briefly bent posteriorly. In addition there is a broad, sickle-shaped organ on the right side of capsule which has a small, subapical, fingerlike process directed forward and to the left.

Genotype: *Nesonannus saileri*, new species.

*Nesonannus* clearly pertains to the Schizopterinae as defined by McAtee and Malloch [U. S. Nat. Mus., Proc. 67(13):3, 1925] but has a relatively larger scutellum, only two free veins in the apex of the hemelytron and a distinctive basal venation. R. I. Sailer kindly compared this specimen with the extensive material in his charge at the U. S. National Museum and found no close relatives.

**85. *Nesonannus saileri*, new species.**

Head half again as broad as long, 26:17; convex above, the surface naked and finely granular. Tylus distinctly set apart by a suture, even at base, parallel-sided, convex, and polished, with two erect bristles on either side. Eyes small, about as long as anteocular portion of head and about one third as wide as interocular space, 5:16. Ocelli distinct, one fifth as wide as an eye, widely separated from each other, being contiguous

to inner margins of compound eyes. Antennal proportions 3:5:14:17, the first two segments with short sparse hairs, the third segment with several bristles as long as the segment, inserted near base; fourth segment with several bristles longer than the segment. Rostrum and thoracic sterna obscured in the unique type.

Pronotum feebly convex, the surface finely shagreened, humeral angles narrowly rounded, hind margin feebly concave. Scutellum with sides concavely sinuate before middle, convex beyond middle and abruptly narrowed and briefly, roundly produced at apex.

Hemelytra less than twice as long as width of pronotum, 70:40; costal margin thicker than hind femur, deeply impressed along inner margin; terminating along embolar suture and curving upward at end of thickened costa to form a long, narrow cell. A small cell beneath this beyond middle and two larger discal cells beyond basal discal cell and between R+M and Cu. Apical area with two free veins reaching apical margin and a third innermost vein curved outward to enclose a large discal cell.

Color rather uniform fulvous above with the membranous areas of hemelytra paler, the under surface and appendages fulvo-testaceous. Eyes and ocelli tinged with reddish.

Length (measured from above in a single plane) 1.43 mm.; width (pronotum) 0.66 mm.

Holotype male, Barrigada, on hau, July 22, Swezey.

This is the first schizopterid to be recorded from an oceanic island in the Pacific but I have seen another species (apparently not congeneric) from Fiji. I take pleasure in dedicating this species to Dr. R. I. Sailer, hemipterist at the U. S. National Museum, whose generous assistance has greatly facilitated my recent work.

#### SUPERFAMILY GERROIDEA

#### FAMILY MESOVELIIDAE

86. *Mesovelgia orientalis* Kirkaldy, Mus. Civ. Stor. Nat. Genova, Ann. II, 20: 808, 1901. (See figure 25, *b*.)

Two specimens, Agana Swamp, May 2, Usinger; seven specimens, Agana Swamp, May 4, Usinger; all apterous. The May 2 specimens are darker in color than the others. These agree well with a specimen collected by me at Montalban, Luzon, Philippine Islands, July 14, 1936, and with two specimens before me from Garoet, Java, collected by Linsley. The middle femora have a row of short spines on the under side and the eighth abdominal segment in the male has a clump of short spines on the middle of the ventral surface and a clump of long hairs on either side. The second segment of the hind tarsi is longer than the third, the rostrum scarcely reaches to the level of the front margins of the hind coxae and the last two antennal segments are subequal (or the last slightly longer) and less than twice as long as the second segment. The apical arm of the male clasper is shorter and broader basally and thus appears subtriangular, rather than long and tapering as figured by Lundblad (Arch. Hydrobiol. Suppl. 12: 187, 1933), but the form of these claspers is known to vary within wide limits (Usinger, Brooklyn Ent. Soc., Bull. 37: 177-178, 1943) so a new species does not seem to be justified. The claspers are long and taper-

ing and bent apically in both the Philippine and Javanese specimens, but slight variations in form are apparent. *M. orientalis* is known elsewhere from India and Ceylon through the East Indies to New Guinea, the Philippines, and Formosa. It was considered as a synonym of *vittigera* Horvath by Horvath in his monograph (Hist.-Nat. Mus. Nat. Hung., Ann. 13: 550, 1915) but was resurrected by the same author in 1924 (op. cit., 21: 35, 1924).

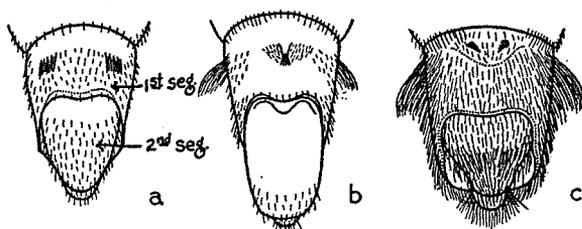


FIGURE 25.—*Mesovelia* species, details of ventral surface of first genital segment: *a*, *pacifica*; *b*, *orientalis*; *c*, *mulsanti*.

### 87. *Mesovelia pacifica*, new species (fig. 25, *a*).

Elongate, slender, the head slightly longer than broad across eyes, eyes sinuate at inner posterior margins, anterior angles of pronotum only briefly rounded, mesonotum less than twice as long as metanotum at middle, hind femora without spines beneath, first genital segment in male without spines or processes but with 6 to 8 stiff black bristles on either side of middle, the bases of these bristles concealed when the genital segment is retracted in its normal position. Male genital claspers abruptly bent at basal third, directed forward and tapering apically. Second segment of posterior tarsi distinctly longer than third.

Male: head longer than broad across eyes, 23:20; the eyes half the width of interocular space, sinuate on inner posterior margins. Rostrum reaching almost to apices of hind coxae. Antennae almost as long as body, 84:86; first segment only about two thirds as long as head, 18:23; proportion of segments 18:13:27:26.

Pronotum one third as long on median line as head, 7:21; three times as broad as long, 21:7; hind margin feebly but distinctly sinuate; anterior angles briefly rounded. Mesonotum a little longer at middle than pronotum, 9:7, the hind margin curved forward sublaterally. Metanotum over half as long as mesonotum, 5.5:9, the hind margin nearly straight.

Abdomen only moderately expanded, the connexival plates a little over one third as wide as dorsal abdominal disk at the same level, the connexivum only moderately reflexed, the entire abdomen slightly narrower at widest part than greatest width of thorax.

First genital segment almost as long above as broad at base, 10:12, less than half as long beneath as broad, 5:12; with 6 to 8 stiff black bristles on either side of middle ventrally, the bristles covered basally by the preceding segment. Claspers very broad and abruptly but roundly bent subbasally, slender and tapering to acute apex on apical half.

Legs simple, the femora without distinct spines on under surface. Second segment of hind tarsi longer than third, 23:20.

Female similar to male in most body proportions but relatively broader, the abdomen in particular broader, the greatest width across connexival margins one sixth greater than width of thorax, 31:26.

Color yellowish or greenish ochraceous with variable brown markings. Palest specimens with a brown stripe on either side of middle of metanotum, brown on all of second tergite, the middle of third and the middle of fourth tergites, and with brown dorsal abdominal sutures. Connexival plates pale with narrowly brown lateral edges. Eyes

brownish. Antennae more or less infuscated, especially apically. Abdominal venter with a sublateral longitudinal line. Rostrum brown at apex. Legs pale brown especially at joints. Erect bristles of legs brown. Darkest specimens almost entirely brown above, pale only on anterior portion of pronotum, middle of mesonotum and metanotum, laterally on fourth and generally on seventh tergite, posteriorly on eighth tergite and on middle of connexival plates. Under surface testaceous at middle, brownish laterally. Legs pale basally, brownish elsewhere.

Size: male, length 2.25 mm., width (abdomen) 0.6 mm.; female, length 2.6 mm., width (abdomen) 0.8 mm.

Holotype male, allotype female, and three paratypes, all apterous, Mt. Chachao, May 16, Usinger.

Runs to *thermalis* in Horvath's key (Hist.-Nat. Mus. Nat. Hung., Ann. 13: 544, 1915) but lacks the two subbasal black tubercles of the first genital segment of that European species. *M. orientalis* Kirkaldy is superficially quite similar but has a distinct median tubercle on the first genital segment. The present species differs from *indica* Horvath, in which the second segment of the hind tarsus is shorter than the third and the eyes are not sinuate at inner bases, and in which no mention is made of the black bristles found in *pacifica* on the first genital segment. *M. hungerfordi* Hale from Australia is larger and has "two elevated tufts of brownish-black spines on the venter of the first genital segment" (Hale, South Austr. Mus., Rec. 3: 200, 1926) as in *mulsanti*, *thermalis*, and *subvittata*. The spines that comprise these "tufts" are very short and dense in contrast to the long, posteriorly directed bristles of *pacifica*.

The only other *Mesovelia* reported from an oceanic island in the Pacific is *mulsanti* White (fig. 25, c), a common species in taro patches in the lowlands of the Hawaiian Islands. This was doubtless introduced quite recently from America. I have seen a Fijian *Mesovelia* in the recent collection of E. C. Zimmerman and New Caledonia specimens in the collections of F. X. Williams.

#### FAMILY GERRIDAE

##### SUBFAMILY GERRINAE

#### 88. *Limnogonus fossarum* (Fabricius).

*Cimex fossarum* Fabricius, Syst. Ent., 727, 1775.

Two specimens, Inarajan, May 7, Usinger; two specimens, stream mouth south of Agat, June 19, Usinger; one specimen, Fullaway (1191); all specimens macropterous.

These agree perfectly with Esaki's figures [Ins. Samoa 2(2): 70, 1928] and Lundblad's excellent description and figures (Arch. Hydrobiol. Suppl. 12: 374, 1933). Specimens are before me from Java, the Philippines, and Fiji. It has been reported elsewhere from India, Ceylon, China, Formosa, Sumatra, and Celebes, and Esaki collected both macropterous and brachypterous specimens on Saipan.

In addition to the above-mentioned macropterous specimens from Guam, five brachypterous specimens from Agana Swamp, May 4, Usinger, and one brachypterous specimen from south of Facpi Point, May 28, Usinger, agree in genital characters and hence have been placed here. The occurrence of brachypterous specimens resembling *fossarum* is suggestive of the situation in Samoa, where *L. pacificus* Esaki was described from an exclusively brachypterous series and differentiated from *fossarum* only by minor genitalic characters.

The Guam series agrees with *fossarum* rather than *pacificus*, though some variation is exhibited, particularly in the shape of the posterior ventral margin of the sixth abdominal segment in the male and in the degree to which the sternite of the last abdominal segment is reflexed dorsally.

#### 89. *Limnogonus luctuosus* (Montrouzier).

*Gerris luctuosa* Montrouzier, Soc. Linn. Lyon, Ann. (n. s.) 11: 242, 1864.

Three macropterous females, Agana Swamp, May 4, Usinger. These are slightly smaller, 7.75 mm., than female examples from Tahiti and have the yellow lateral lines of the sides of the mesothorax as in Lundblad's figure 2, *b* (B. P. Bishop Mus., Bull. 113: 124, 1934), but not constricted near the middle and with the truncated end connected at its upper angle to an additional pale spot behind the black-rimmed spiracular slit. In other respects these Guam specimens agree with Lundblad's revised description (Arch. Hydrobiol., Suppl. 12: 380, 1933). Known elsewhere from New Caledonia, New Hebrides, Samoa, Tahiti, Raiatea, Murray, and Caroline Islands.

#### 90. *Limnogonus lundbladi*, new species (fig. 26).

Relatively short and stout, dorsally humped at middle in apterous forms, with tremendously enlarged male genital segments and strongly, acutely produced last abdominal segment ventrally in female.

Apterous male: head two thirds as long as broad across eyes, the eyes large, two thirds as wide as interocular space, distinctly roundly emarginate on inner margins posteriorly. Rostrum reaching well onto mesosternum, the third segment reaching about to level of hind margins of front trochanters. Antennae almost as long as body, 99:108; proportion of segments one to four as 31:21:20:27.

Pronotum relatively short and strongly convex, widest anteriorly and rounded anterolaterally, narrowed at about middle and thence gradually rounding to rounded apex; the ratio of subbasal width to width at middle to length as 25:22:42. Disk slightly depressed either side of middle anteriorly and feebly at about the middle. Metanotum and abdominal tergites strongly declivent, bounded laterally by strongly reflexed connexiva, the connexiva joining sinuate metathoracic carinae basally, strongly dilated at base of abdomen and arcuately converging posteriorly, about twice as wide at level of second visible abdominal segment as at apex of seventh. Basal abdominal tergites short, one fourth or less the length of seventh tergite at middle.

Under surface strongly convex, depressed between meso and metasterna. Metasternum almost as long at middle as the first five visible abdominal ventrites together, 7:9, sixth visible ventrite (actually the seventh abdominal segment as counted dorsally) about half as long as the previous abdominal segments together, 5:9, deeply concave posteriorly.

Eighth and ninth abdominal segments (genital segments) together almost as long ventrally as meso and metasterna together, 30:33, the eighth segment triangularly produced beneath ninth at middle, the apex subrounded, the length on median line slightly

over half the length of ninth segment, 11:19. Ninth segment strongly convex, three fourths as broad at base as long on median line, 15:19, abruptly compressed on either side before middle to half the basal width and then subparallel to rounded apex. Eighth tergite about half as long as seventh but wider and distinctly roundly emarginate at middle of hind margin. Ninth tergite about as long as seventh but much narrower, broadest and feebly convex at base, tapering and rounded apically.

Legs relatively short and stout, front femora about as long as pronotum and about one fifth as thick at middle as long, arcuate along dorsal side and concave on basal half beneath; front tibiae scarcely shorter, 43:40, slightly curved; tarsi about one third as long as tibiae, the basal segment approximately half as long as apical segment, 9:19. Middle legs with femur, tibia, and first and second tarsal segments as 87:78:34:8. Hind legs, 94:56:11:7.

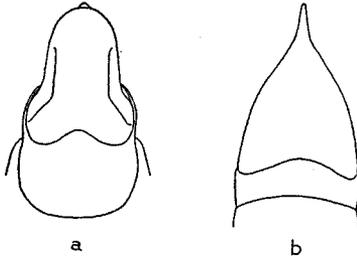


FIGURE 26.—*Limnogonus lundbladi*, ventral view (diagrammatic) of genital segments: a, male; b, female.

Body surface not conspicuously shining except anteriorly on pronotum, eyes, and posterior abdominal tergites. Pubescence inconspicuous and typical of the genus but with silver hairs confined to dorso-lateral areas of acetabula and the genital segments with a dense, erect, brown pubescence, especially ventrally.

Color dark brown to black above with head ochraceous at base and longitudinally sublaterally. Pronotum entirely surrounded with ochraceous, most broadly anterolaterally with a longitudinal ochraceous stripe at middle and a pale spot on either side of middle anteriorly. Abdominal tergites with a pale longitudinal line at middle, starting just behind metatergum and ending at middle of seventh abdominal segment. Middle connexival segments tinged with ochraceous sublaterally. Ventral and lateral surfaces largely pale with brown as follows: on prothorax behind eyes; mesothorax along upper margins of pleurites; at middle of pleurites anteriorly; at base of pleural suture; laterally at apex of acetabulum, and surrounding spiracular opening; metathorax surrounding pleurites and laterally on apical half of acetabulum; abdomen sublaterally beneath hind acetabula and coxae; and eighth sternite at apex and ninth laterally and apically. Antennae and middle and hind legs rather uniformly infuscated, rostrum pale with brown middle of front portion of third segment and black apex. Front femora pale with broad brown areas, tibiae brownish with more or less pale bases and apices, tarsi pale brownish.

Size: length, 5.25 mm., width (middle acetabula) 2.1 mm.

Apterous female: very similar to male but with front legs straighter and more slender, the femora distinctly shorter than pronotum, 37:42; proportion of segments 37:37:4:9. Venter evenly convex, not depressed at base of metasternum, metasternum about twice as long as the first five visible abdominal segments together, the fifth (actually the sixth) with posterior margin feebly, broadly, roundly produced, the seventh segment long, strongly, acutely produced at middle apically, the length on median line almost as great as the remaining abdominal segments together, 23:24, the ventral spine thus formed greatly exceeding female genital segments which are relatively short and rounded and visible only from above.

Size: length, 5.67 mm., width (middle acetabula) 2 mm.

Macropterous male: similar to apterous male but with pronotum widest across humeri, the proportion of width to length, 33:51, the disk more convex than in related species. Hemelytra complete, exceeding tip of abdomen, the veins black and membranous areas grayish. Mesothorax with a yellow lateral line on either side suggestive of *fossarum* but not tapering so conspicuously.

Size: length 6.8 mm., width (middle acetabula) 2.3 mm.

Holotype male, allotype female, male paramorphotype, and nine apterous paratypes, Mt. Chachao, May 16, Usinger; one apterous paratype, headwaters of Talofofu River, June 17, Usinger.

This species was found only on the inland streams in the mountains of Guam. It is entirely distinct from any *Limnogonus* known to me though it might be considered as a member of the *fossarum* group, judging by the lateral thoracic stripes of the macropterous form. The short, stout body form approaches that of *boninensis* Matsumura (see figure in Iconographia Insectorum Japonicorum, 1946, 1932) but is shorter and more humped. The genitalia are entirely distinct.

This species is dedicated to Dr. O. Lundblad of the Naturhistoriska Riksmuseet in Stockholm who has given us a sound basis for the taxonomy of *Limnogonus*.

#### SUBFAMILY HALOBATINAE

##### 91. *Halobates mariannarum* Esaki, Tenthredo 1: 357, 1937.

Thirteen specimens, Piti, May 12, Usinger; 50 specimens, Piti, May 22, Usinger; four specimens, Tumon Beach, May 30, Usinger; one specimen, Tumon, April 22, Bryan.

Described from the nearby island of Rota.

#### FAMILY VELIIDAE

##### SUBFAMILY VELIINAE

##### 92. *Microvelia douglasi* Scott, Ann. Mag. Nat. Hist. IV, 14: 448, 1874; Lundblad, Arch. Hydrobiol., Suppl. 12: 347, 1933 (complete synonymy). *Microvelia samoana* Esaki, Ins. Samoa 2(2): 67, 1928.

Macropterous male and apterous female, Merizo, June 11, Usinger; apterous male and apterous female, Mt. Chachao, May 16, Usinger; apterous female, Agana Swamp, May 4, Usinger.

These specimens fall well within the range of variation described by Lundblad. The last antennal segment is slightly shorter than the preceding two, as in the type of *samoana*, and the right genital clasper in the male is obliquely and a little roundly truncate at the tip. *M. douglasi* is also known from India, Ceylon, Sumatra, Samoa, and Japan, and doubtfully from Java and the Seychelles.

93. *Microvelia diluta* Distant, Ann. Mag. Nat. Hist. VIII, 3: 500, 1909; Lundblad, Arch. Hydrobiol., Suppl. 12: 307, 1933; Esaki, Tenthredo 1: 351, 1937.

Fifty-seven apterous specimens, Upi Trail, May 5, Usinger; eight apterous specimens, Mt. Chachao, May 16, Usinger; one specimen, apterous, head waters of Talofoto River, June 17, Usinger.

The extraordinary sexual dimorphism was noted by Lundblad who also remarked on the occurrence of the small males in copulation with the females in his series of preserved specimens. Esaki (Tenthredo 1: 352, 1937) apparently overlooked this characteristic of *diluta* in his discussion of *Microvelia notophora* from the Carolines, for he stresses the "unique" habit of males habitually riding on the backs of the larger females and does not compare his new species with *diluta*. He reports the capture of a macropterous female of *diluta* at light on Saipan. Most of the Guam specimens were collected together, the small male clasped to the back of the female by means of his legs. None of these pairs was actually in copulation. *M. notophora* differs from *diluta* in that only the fore tibiae possess an apical comb and this comb is nearly one third the length of the tibia. *Notophora* differs further, according to Esaki's description, in the very short pronotum which is only about one third as long as the mesonotum. The size of apterous males and females of *notophora* is about as in *diluta* but the Guam males differ from this, being slightly larger, 1.4-1.5 mm. *M. diluta* Distant is known elsewhere from India, Ceylon, Sumatra, and Saipan.

#### SUBFAMILY HALOVELIINAE

94. *Halovelis marianarum*, new species (fig. 27).

Male: rather evenly oval in outline. Pubescence very dense, brown to gray. Body subflattened beneath and only feebly convex above.

Head a little broader across eyes than long, 20:17; produced in front of eyes for a distance greater than length of an eye, 8:7; eyes small, about one fourth as wide as interocular space, 3.5:13. Vertex rather strongly convex. Rostrum slightly exceeding apices of front coxae. Antennae about two thirds as long as body, 38:58; proportion of segments one to four as 12:8:8:10.

Pronotum less than one third as long as head, 5:17; broader laterally, the posterior suture slightly sinuate at middle and distinctly sinuate sublaterally. Meso and metanota together as long as their width measured between impressed lines within lateral carinae.

Male genital claspers long, extending upward beyond upper apex of genital segments and there crossing, beyond which they are curved and tapering. Clearly visible from above and behind.

Front legs relatively short, the femora as long as head, one fourth as thick at middle as long, tibiae scarcely shorter than femora, 16:17, enlarged apically and bearing a prominent comb on under side, the comb slightly exceeding apex of tibia and longer than basal portion of tibia before comb, 27:23. Tarsus scarcely half the length of tibia, 7.5:16; first segment narrow at base, a little widened apically, the second enlarged, over three times as long as first, 18:5. Middle legs long, the femora three fourths as long as body, 42:58; tibiae scarcely shorter than femora, 41:42; tarsus about two thirds as long as

tibia, 28:41; the first segment only slightly longer than second, 15:13. Hind legs proportioned as follows, 23:18:3.5:5.

Female: much larger and more robust; proportions of head and antennae as in the male. Thorax strongly convex above connexiva, much more strongly elevated than in the male, nearly vertical. Rostrum slightly shorter, reaching to apices of front coxae. Antennae a little more than half as long as body, 46:87. Proportions of front femora, tibiae, and first and second tarsal segments, 25:22:2:8.5; intermediate legs, 62:60:25:19; posterior legs, 33:27:5:8.

Color of male brown anteriorly and ventrally, the appendages shining, brownish black. Coxae, trochanters, and middle of venter paler brown. Base of vertex brownish ochraceous at middle. Female with base of head ochraceous.

Size: male, length 1.5 mm., width 1 mm.; female, length 2.25 mm., width 1.2 mm.

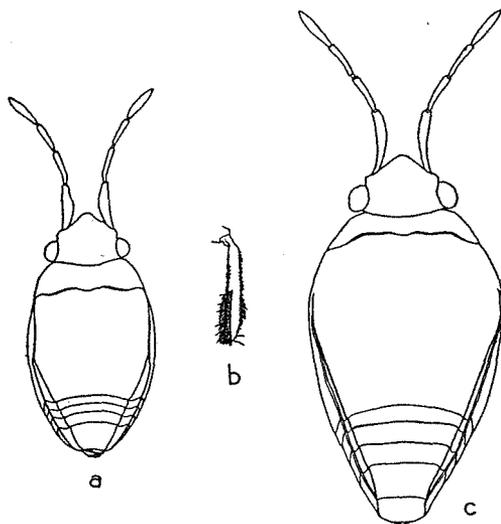


FIGURE 27.—*Halovelia marianarum*: a, dorsal view of male; b, detailed enlargement of inner face of front tibia showing tibial comb occupying slightly more than apical half of tibia; c, dorsal view of female.

Holotype male, allotype female, and 35 paratypes, Finile, May 28, Usinger; nine paratypes, Asanite Bay, June 25, Usinger. Found near the rocky coral shore, usually within or around 3- or 4-foot coves or embayments. They occur singly or in threes and fours rather than in large numbers. Several pairs were captured in copulation.

Esaki (*Tenthredo* 1: 355, 1937) records his New Guinean species *bergrothi* from the Carolines and from the coast of Rota Island, only a few miles away from Guam. It seems unlikely that two closely related but distinct species of marine insects, one of them presumably widespread, would occur so close together in the Marianas Islands, but my specimens do not agree with Esaki's original description of *bergrothi* (*Hist.-Nat. Mus. Nat. Hung.*, Ann. 23: 161, figs. 12, c-e, 1926). *H. bergrothi* was captured "on the surface of a few cup-

fuls of rain-water, which was accumulated on a very thick root of a tree which laid about a half meter high from the earth in the half-dark shade of a dense wood", on Seleo, a coral island near New Guinea. I have seen a closely related species from Fiji.

In Esaki's key (op. cit., p. 164) *marianarum* runs to *papuensis* but the head is much longer than broad between the eyes. It may be that the first dichotomy should read "Head nearly as long as broad across eyes." In any case, *marianarum* is closest to *bergrothi*, agreeing with that species in the subequal second and third antennal segments and in the strongly convex mesonotum. *Bergrothi* differs, according to Esaki's description and figures, in the longer meso and metanota, front tarsus not shorter than half the length of tibia, first segment of middle tarsi one and one half times as long as second, and hind tarsus slightly longer than half the length of tibia. The male of *bergrothi* is longer and more slender (1.8 mm. by 0.8 mm.), and the female is considerably longer and slightly broader (2.7 mm. by 1.3 mm.).

Hale (South Austr. Mus., Rec. 3: 204, 1926) calls attention to the remarkable anterior tibial comb which occupies three sevenths of the length of the anterior tibia in *maritima* Bergroth. Although Esaki quotes Hale's work he ignored this important character in his description.

I consider that the subfamily Haloveliinae Esaki belongs in the Veliidae where Bergroth (Ent. Mo. Mag. II, 4: 277, 1893) originally placed it and where Hale also placed it. The lateral thoracic scent glands of the Veliidae are distinct and functional (judging by small globules of hardened exudate at the openings in some specimens) in *Halovelia*, whereas gerrids have a single scent-gland opening (omphalium) at the middle of the metasternum.

#### SUPERFAMILY LEPTOPODOIDEA

##### FAMILY SALDIDAE

#### 95. *Saldula balnearum* (Bergroth).

*Acanthia balnearum* Bergroth, Philippine Jour. Sci. 13D: 123, 1918.

Four adults and one nymph, Mt. Chachao, May 16, Usinger.

The males are 3 mm. in length, the females 4 mm. These specimens are similar in color and agree fairly well with the description of Bergroth's species from Los Banos, although he describes the male as larger than the female. A detailed comparison is impossible because I have no specimens of the Philippine species.

#### 96. *Saldula marianarum*, new species.

Body oval in form and shining above on head and thorax, rather dull on hemelytra.

Head half again as broad across eyes as long in front view, the eyes large but less than twice as broad as narrowest portion of interocular space, 13:8; clypeus over twice as long as broad, 9:4, broadest and rounded posteriorly; transverse lobes at base of

clypeus wider than base of clypeus, 5:4, and half as long as wide. Front shining and densely, finely punctate, pubescent, and longitudinally sulcate in front of elevated ocellar area. Ocelli much closer to each other than to eyes, the distance between ocelli being less than the diameter of an ocellus. Vertex behind ocelli narrowly shining at base of head and polished on inner emarginations of eyes, elsewhere dulled by dense granulate punctures. Rostrum reaching apices of hind coxae. Antennae about as long as head, pronotum, and scutellum as measured from above; proportion of segments one to four as 12:16:16:16.

Pronotum one fifth wider across humeri than width of head across eyes, 42:35; a little over one third as long on median line as broad, 15:42; front lobe strongly elevated, transverse, foveate at middle, not quite reaching lateral margins, surrounded by an impressed row of punctures; surface less densely pubescent on elevated area than on posterior lobe and lateral margins, these last nearly straight anteriorly, rounded posteriorly, with a distinct submarginal impression extending to middle of humeral area. Hind margin rather broadly, evenly, arcuately concave in front of scutellum.

Scutellum moderately convex, about as broad as long, a little less than two thirds as broad as pronotum, 26:42; the surface granulate-punctate anteriorly and rugosely punctate posteriorly, pubescent, transversely arcuately impressed before middle and feebly depressed before apex.

Hemelytra complete, the membrane greatly exceeding tip of abdomen, with four complete cells, the innermost being longest but only moderately produced beyond base of second cell. Clavus and corium rather densely, evenly pubescent, the veins of corium poorly defined but visible, the inner vein forked to form a cell at apex and connected at apical third to median vein.

Under surface covered with a rather long, silky pubescence except for glabrous area on inner propleuron and front acetabulum laterally. Last two segments of hind tarsi subequal in length.

Color black on head and thorax, the clypeus, paraclypeal and basal lobes, a spot on either side of ocelli and ocelli ochraceous. Eyes ferruginous. Clavus black with a white spot subapically and brownish apex. Corium entirely pale, ochraceous with a light brownish cast on inner half, spotted with white subbasally, at middle, and near the apex, exocorium generally whitish, slightly embrowned near middle and subapically, embolar area entirely pale, subhyaline. Membrane obscurely pale with brown veins and fuscous at base and near the middle. Pubescence golden on pronotum and scutellum and with a few golden hairs on clavi. The remaining pubescence black. Under surface of head and thorax black, of abdomen brown with lighter hind margins of segments. Labrum, tips of bucculae and rostrum ochraceous to fulvous. First two antennal segments pale, the apical segments black. Coxae brown with the remainder of legs pale, testaceous except for brown tibial and tarsal spines, extreme apices of tibiae and apices of tarsi.

Size: length 2.65 mm.; width (hemelytra) 1.25 mm.

Holotype male, Agana Swamp, May 4, Usinger.

*S. balnearum* differs in its larger size, black corium with white spots and white embolium, distinct corial veins, feebly sinuate basal emargination of pronotum, broader vertex, pubescent propleura and sides of front acetabula, and longer second antennal segment.

None of the Guam species appears to be related to the Hawaiian *saldids* or to *saldids* which are before me from the Society Islands, these mid-Pacific species having greatly reduced membranal venation.

#### 97. *Saldula swezeyi*, new species.

Elongate-oval, moderately convex above, the entire surface clothed with short, fine, backwardly directed hairs.

Head broader than long, 21.5:16; subtriangular, the antecular portion only half as long as an eye, gradually tapering to broad, blunt apex; eyes about two thirds as wide as interocular space, 6.25:9; ocelli prominent, located at middle of interocular space, as far apart as distance from ocelli to eyes; surface rather dull, finely punctate, and pubescent posteriorly, more polished anteriorly, with the clypeus glabrous. Antennae less than twice as long as width of pronotum, 53:34; segments of nearly uniform thickness except for the considerably thicker first segment; proportion of segments, 8:17:14:14.

Pronotum over three times as broad as long on median line, 34:10; disk subdepressed laterally, with a moderately elevated callus at middle curving forward behind eyes and enclosing a small anterior, median, transverse impression; anterior angles concealed from above by the overlapping eyes, sides arcuate, hind margin broadly, shallowly concave.

Scutellum a little broader than long, 25:21; elevated basally, depressed behind middle at an inverted V-shaped impression.

Hemelytra complete, long, exceeding tip of abdomen; commissure of clavus three fifths as long as scutellum; veins of corium poorly defined but present; costal margin arcuate at base, scarcely sinuate at basal third and gradually arcuate apically; membrane four fifths as long as corium, with three long, complete, closed cells, the veins with occasional erect hairs and outer portion of membrane outside of cells and beyond corium pubescent.

Under surface finely pubescent. Details of rostrum concealed, but its apex reaching distinctly beyond hind coxae.

Color dark brownish black, the coria each with a broad sinuous white fascia joining at base of membrane, extending briefly along claval suture, then laterally to embolar suture to basal third. Outer apex of corium with a white area. Under surface and appendages paler brown, the tibiae and tarsi testaceous.

Size: length 3.66 mm.; width (pronotum) 1.13 mm., (hemelytra) 1.3 mm.

Holotype female, Tarague, April 19, 1936, E. H. Bryan, Jr.

This distinctively marked species is relatively more slender than the other Guam species and does not resemble any other Oriental saldid known to me.

#### SUPERFAMILY NOTONECTOIDEA

#### FAMILY NOTONECTIDAE

98. *Anisops cleopatra* Distant, in Sarasin and Roux, Nova Caled., Zool. 1 (4): 386, pl. 11, fig. 8, 1914.

Nine specimens, Mt. Chachao, May 16, Usinger.

These specimens are slightly over 5 mm. in length and agree in general with Lundblad's description (Arch. Hydrobiol., Suppl. 12: 171, 1933). However, the front legs of the male differ in detail from those figured, the tarsi having a few short, stiff spines in a row on inner surface. These are not shown in Lundblad's figures of *A. cleopatra*. Also the combs at the bases of the front tibiae are nearly at right angles to the outer margins of the tibiae. Fijian specimens before me agree with Lundblad's figures in these respects but have a row of spines on the inner ridge which extends along tibia from the comb. The front femora and tibiae are slightly more robust in the Guam males.

Differences in detail between Javan, Sumatran, New Caledonian, and Samoan specimens led Lundblad to consider this as a single variable species to be separated later, if the differences appeared to be constant, into several closely

related species forming the "cleopatra-Gruppe." I am in no position to take such a step at this time but it is noteworthy that the two forms studied here from Fiji and Guam are quite constant within each series and differ in the above mentioned points from other forms thus far described.

*Anisops hyperion* Kirkaldy was reported from the Marianas Islands (Paris Museum) and from Fiji (Hamburg Museum) by Kirkaldy with some doubt, the type of *hyperion* being from Australia. Hale (South Austr. Mus., Rec. 2: 403, 1923) has redescribed *hyperion* and has shown that the pronotum of the male is nearly as long as broad, thus excluding the present material. Furthermore, *hyperion* is a larger species, though size is a somewhat variable character.

99. *Anisops nasuta* Fieber (under *A. niveus* Fabricius), Rhynchotographieen. Abh. Bohm. Ges. Wiss. V, 7: 484, sep. 60, 1851.

Eight specimens, Inarajan, May 7, Usinger.

The single male in the present series agrees perfectly with Lundblad's description and figures (Arch. Hydrobiol., Suppl. 12: 168, 1933). The distinctly produced vertex in the male will distinguish this from other Oceanian species. I collected a second species with produced vertex in the Philippines which is smaller, and has much stouter and differently formed front tibiae. *A. nasuta* has been reported from India, Ceylon, Java, Sumatra, Celebes, New Guinea, Australia, Samoa, Formosa, and China.