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Bees from the Caroline and Palau Islands and Yap[1]
(Hymenoptera, Apoidea)

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FOREWORD

The bees in the collection that formed the basis of this paper were procured by the Micronesian Expedition sent out under the auspices of Bernice P. Bishop Museum in cooperation with the Japanese Government, the Palau Tropical Biological Station, and Tohuku Imperial University.

The following species (except *Megachile semperi*) were obtained:

Megachilidae
1. Megachile palaonica, new species
2. Megachile semperi Friese
3. Megachile laticeps Smith
4. Lithurgus scabrosus (Smith)

Meliponidae
5. Trigona atomella Cockerell
6. Trigona valdezi Cockerell

Halictidae
7. Halictus palaonicus, new species
8. Halictus yapensis, new species

Hylaeidae
9. Hylaeus hirticaudus, new species

The types of the new species will be stored in Bernice P. Bishop Museum.—ELWOOD C. ZIMMERMAN.

INTRODUCTION

The bees of the Caroline and Palau Islands and Yap may be divided into four groups as follows:

[1] Micronesian Expedition Publication 2.

1. Endemic species, quite distinct, but related to species already known from the islands of the Pacific, though not to the species of the Hawaiian islands: *Megachile,* two species from Palau Islands; *Hylaeus,* one species from Palau Islands; *Halictus,* two species, both found in the Palaus and on Yap, which is at the western end of the Carolines, about 225 miles from the Palaus.

2. Species widely distributed in the Pacific, by what means it is not known: *Lithurgus scabrosus.* There is a distinct species of *Lithurgus* (*L. guamensis* Cockerell) on Guam, and another (*L. bractipes* Perkins and Cheesman) in Samoa. *L. albofimbriatus* Sichel[2], from Tahiti, is very close to *L. scabrosus,* but I think recognizable. Thus it would appear that from very ancient times these bees have been able to reach the islands.

3. Species identical with those of the Asiatic mainland, and presumably introduced by man: *Trigona,* two species.

4. Species known from the Philippine Islands and Guam, but apparently not present on Guam until recent years: *Megachile laticeps.*

MEGACHILIDAE

Megachile palaonica, new species.

Female (holotype): about 10 mm. long; black, including mandibles, antennae (except flagellum which is obscurely reddish beneath), tegulae, and legs; hair of head and thorax pale fulvous, brighter red in region about tegulae, paler on under side of head, but not white, a distinct band of hair between scutellum and mesonotum; head broad; eyes intense black; mandibles broad, obscurely quadridentate; sides of clypeus dull and densely punctured, but middle raised and polished; supraclypeal area with strong punctures, except along lower margin; mesonotum with dense very small punctures, disk shining, sides dull; axillae prominent, shining; scutellum somewhat swollen and shining in middle; wings dilute fuliginous; hind basitarsi broad; abdomen short, shining, first tergite with thin reddish hair; linear hair bands of tergites very weak and inconspicuous; ventral scopa black on the last three sternites and sides of the one before, otherwise bright red, the red invading middle of base of fourth sternite.

Variety *a*: about 11 mm. long; no hair band visible between mesonotum and scutellum, but the specimen is much denuded; second to fourth sternites with bright red scopa, some black at extreme sides of third and fourth; flagellum red beneath.

Male: about 9.5 mm. long; flagellum very long, black; lower half of clypeus with a dense beard of fulvous hair, upper half exposed, convex, shining and punctured; front and sides of face with abundant rufofulvous hair, vertex with thin black hair; a conspicuous hair band between mesonotum and scutellum; mesopleura and scutellum with hair all fulvous; front coxae shining, not spined;

[2] In the collection from Bishop Museum are three females of *Lithurgus albofimbriatus* Sichel from Arorangi, Rarotonga, Cook Islands. They were collected by G. P. Wilder and have the median groove on the scutellum distinct.

front tarsi simple except that the very short basitarsi are thick; tarsi reddened apically; hind tibiae, seen from the side, showing a white line along hind border; abdomen with narrow red hair bands, much weakened in middle; sixth tergite bright red, with short tomentum, the apical teeth wide apart.

Palau Islands, Ngardok: holotype, female, April 6, 1936 (collector, Z. Ono). Variety *a* a female from Babelthuap (Z. Ono); male from Imeungs, Galmiskan (Z. Ono).

The variety *a* may be a distinct race, but there is only one partly denuded specimen. This differs from *M. calens* Cockerell in the male in the red hair of the face, in the upper half of the clypeus being exposed, in the fifth tergite not being covered with red hair; it differs in the female in the large amount of black in the ventral scopa, in the red hair of the front and sides of the face, and in the conspicuously punctured supraclypeal area. *M. shortlandi* Cockerell, female, from the Solomon Islands is conspicuously larger and more robust with white hair on the face. *M. doanei* Cockerell; the male differs at first sight in having the fifth tergite covered with red tomentum. The arrangement of the hair on the male clypeus is like that in many species of the subgenus *Eumegachile*. It also recalls such species as *M. shauinslandi* Alfken and *M. cincturata* Cockerell.

Megachile semperi Friese.

Recorded from the Palau Islands. K. Yasumatsu (Mushi, 8:95, 1935) records it from Tinian Island, Marianas Islands, and figures the nest. The female is 11-12 mm. long, sparsely fulvous haired, tergites 2 to 5 fringed with white, wings yellowish, ventral scopa whitish, black brown on end of fifth sternite and all of sixth. Friese records it "von den Karolinen (Yap)." In the Berlin Museum are two females collected by Semper in the Palau Islands.

Megachile laticeps Smith.

The female has beautiful metallic (green and purple) colors on the abdomen, and was described, from the Philippines, as *M. metallescens* Cockerell. The ventral scopa is white, black at the end. The face and front are clothed with red hair. The male abdomen is black. One specimen from the Palau Islands, April 8, 1936, is a remarkable bilateral gynandromorph. The abdomen above is metallic on one side, black on the other; and beneath the metallic (female) side there is a ventral scopa; the hind leg on one side is male, on the other female; the flagellum is long on the male side, shorter on the female.

Palau Islands, April 8, 1936, female and gynandromorph (Z. Ono).

Truk Islands, Dublon: January 5, 1936, male (Z. Ono); same locality, December 26, 1935, male (Z. Ono).

Lithurgus scabrosus (Smith).

All the specimens taken are females. Palau Islands: four from Babelthuap, Ngeremlengui, April 23, 24, 1936; eight from Palau Islands, April 5, 1936; Palau Islands: one from Babelthuap, Ngardmau, May 1, 1936 and one from Melekeiok, April 6. Ponape: Pounaran, Nipeip, February 27, and Ponape March 6, white hair at sides of thorax conspicuous anteriorly; two from Yap, May 21, Imeungs and Galmiskan; and the following variations: 1. Very small, length about 10.5 mm.; scutellum anteriorly shallowly depressed in middle (Yap, May 21, 1936). 2. Small, length nearly 11 mm. but robust; scutellum depressed in middle; second and third tergites partly reddish (Anguar). 3. Length about 12 mm., long and narrow, with long parallel-sided abdomen, which is 3.7 mm. broad and is without hair bands; scutellum feebly depressed in middle; wings short (Ponape, March 6, 1936). (All collected by Z. Ono.)

These seem to be all one species, but the male might show different characters. This is not the New Hebrides form *L. scabrosus froggatti* (Cockerell), which has the tuft of hair behind the wings dark fuscous, and the sixth tergite with a rather conspicuous patch of dark red hair.

MELIPONIDAE

Trigona atomella Cockerell.

Palau: 52 specimens from Ngeremlengui, Ogiwal, and Melekeiok on Babelthuap (Z. Ono). Collected on Palau Islands in 1934 by T. Uchida (see Yasumatsu, Mushi, 8:94, 1935).

Trigona valdezi Cockerell.

Truk: Six from Tarik Island, January 4, 1936 and one from Dublon Island December 20, 1935. Known from Singapore, Siam, and Cambodia. The wings seem a little darker than usual.

HALICTIDAE

Halictus palaonicus, new species.

Female (holotype): 7 to 8 mm. long, anterior wing 5 mm.; head rather broad; clypeus black or partly green, sparsely punctured; supraclypeal area

purplish, impunctate on disk, around the margins golden with microscopical lineolation; rest of head black or very dark green; mandibles red subapically; scape very long; flagellum obscurely reddish beneath; mesonotum and scutellum polished, blue green varying to olive green; other parts of thorax darker; area of metathorax rather short, truncate behind, with oblique striae; posterior truncation dull; tegulae small, red; wings hyaline, faintly dusky, iridescent; stigma reddish brown, not very dark; nervures brown, outer intercubitus and recurrent veins evanescent; third cubital cell narrow, joined by second recurrent nervure some distance from base; legs black, the tarsi rufescent at end; hind spur with four very oblique strong spines, and its upper edge feebly serrate; abdomen very dark greenish, the first tergite shining and evidently metallic, the others dull and almost black; hair bands hardly developed, though in some specimens a very slender band of light hair can be seen along the margins of the tergites; venter with a scopa consisting of dense bands of long, appressed, light hair on sternites 2 to 4.

Male: about 6.5 mm. long, much more slender than female; head very broad; supraclypeal area polished, olive green; small joints of tarsi rufous; area of metathorax large, strongly striate or fluted; abdomen rather broad for a male, feebly metallic.

Palau: holotype female from Melekeiok, Babelthuap, April 6, 1936; another female from the same place April 7. One female from Babelthuap has an olive-green mesonotum, and the scutellum is blue green. Ten females and ten males labeled Palau April 5. Seven females and one male from Yap. (All collected by Z. Ono.)

Halictus yapensis, new species.

Female (holotype): 4.5-5 mm. long; head and thorax dark olive green, somewhat shining but not polished, except a band along inner orbits; head broad and short; labrum and mandibles pale red; antennae red, flagellum darkened above at base, scape with basal half darkened above; supraclypeal area prominent, the disk shining; clypeus dull, but when seen from above the upper margin is shining; mesonotum and scutellum very finely punctured and microscopically lineolate; area of metathorax very large, semicircular in outline, dull, with the apical margin shining; the microscope shows a unique sculpture: the base irregularly reticulate, and from this extending very obliquely outward are very fine, more or less broken plicae, while the marginal area is excessively finely lineolate and tessellate; apical truncation shining; tegulae light red; wings hyaline; stigma rather dark brown, nervures very pale, outer intercubitus and recurrent nervures obsolescent; third cubital cell very short; second cubital receiving recurrent nervure at extreme apical corner; legs light ferruginous; hind spur with about three long oblique spines; abdomen with a broad base, shining, the first three tergites dark basally, with the hind margins very broadly red, the remaining tergites red, the fourth with a greenish suffusion across the middle (or the whole abdomen may be dark with the margins of the tergites broadly reddish); venter with a pale scopa on sternites 2 to 5, the longer hairs curled.

Male: about 4.5 mm. long, very slender; clypeus polished; antennae black, flagellum very long; abdomen black, hind legs mostly darkened. The scutellum appears brassy, contrasting with the dull green mesonotum.

Yap, type locality, four females and 15 males; one specimen is dated May 21, 1936. Also collected in Palau Islands, at Melekeiok, Babelthuap, April 11, 1936. (All collected by Z. Ono.)

This is an isolated species, somewhat allied to *H. palaonicus,* but much smaller, with quite different metathorax and abdomen. The male differs from the male of *H. palaonicus* in that it is much smaller, in the longer and more slender antennae, and in the dull mesonotum.

KEY TO FEMALES OF HALICTUS RELATED TO H. PALAONICUS

1. Area of metathorax long, produced apically, dull and plicate basally, shining apically (Guam).....**H. saffordi** Cockerell
   Area of metathorax shorter, broadly truncate posteriorly..... 2
2. Area finely reticulate (Guam).....**H. swezeyi** Cockerell
   Area very obliquely and strongly striate, the striae or plicae meeting on the middle and so forming broad arches (Palau).....
   .....**H. palaonicus** Cockerell

Halictus yapensis may be easily distinguished from the species separated in the key by its small size and mostly red abdomen.

HYLAEIDAE

Hylaeus hirticaudus, new species.

Male: about 6 mm. long; rather slender; black, with very bright yellow marks as follows: lower part of the long clypeus (the upper margin of the yellow rounded), lateral face marks extending along orbits more than half way up sides of front (upper part slender), scape in front, upper border of prothorax (interrupted in middle), tubercles, scutellum (with a median notch in front), and postscutellum (the yellow area of the last as large as that of scutellum and separated from it by a black line); head broad, orbits converging below; mandibles and labrum dark (with no yellow); mesonotum shining, with strong grooves and punctures; area of metathorax very short, with strong rugae; tegulae dark brown with pallid margin; wings hyaline, faintly dusky, stigma and nervures dark brown; first recurrent nervure joining first cubital cell near apical corner; femora black, but tibiae and tarsi dusky reddish, the front tibiae with a yellow stripe; abdomen shining black, the tip with long hairs.

Palau: holotype male, April 5, 1936 (Z. Ono), unique. A very distinct species in some ways allied to such Australian species as *H. simillimus* (Smith), but easily known by the peculiar face markings. The structure of the end of the abdomen resembles that of *P. guamensis* Cockerell, with the same dark hairs.