

BEES IN THE COLLECTION OF THE UNITED STATES NATIONAL MUSEUM.—4.¹

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In order to facilitate the study of bees, the writer has in preparation a catalogue of the known species, in which will be indicated as far as possible the principal collections in which specimens may be found. When in England during 1920 and 1921, I catalogued the species in the British Museum, the Hope Museum at Oxford, and the Entomological Department of the University of Cambridge. In the United States, I have catalogued the bees of the United States National Museum and the American Museum of Natural History. These various collections contain a very large number of species, and in many cases extensive series of forms not represented in all, if any, of the other museums. Plans are on foot to make exchanges, whereby the museums participating will be able to greatly increase the number of their species.

The British Museum contains the largest collection I have seen, beautifully arranged by the late Mr. Meade-Waldo. Oxford is surprisingly rich, but the W. Saunders collection, S. S. Saunders collection, Rothney collection, and many smaller lots are at present kept separate. The very rich Palaearctic collection of the Rev. F. D. Morice will go to Oxford. Through the kindness of Mr. Morice, I was able to examine his collection, and make many notes. The S. S. Saunders collection was carefully studied by Mr. Edward Saunders shortly before he died, and the species named according to the latest information. Many of the identifications, as they originally stood, were erroneous. At Oxford I found specimens of *Halictus* collected by Darwin on his famous voyage, in Australia and Tasmania. There also may be seen the types of the species collected by Wallace in the Malay Archipelago, including the gigantic *Megachile pluto* Smith. Through the kindness of Professor Poulton I was able not only to make many notes on the materials at Oxford, but a considerable series

¹ For previous papers in this series see Proc. U. S. Nat. Mus., vol. 39, 1911, pp. 635-658; vol. 40, 1911, pp. 241-264, and vol. 55, 1920, pp. 167-221.

will be sent to me for study. Mr. Waterston also promises to send many species from the British Museum, including numerous forms which Mr. Meade-Waldo intended to describe, and had carefully separated for the purpose. The collection at Cambridge is small, though there is a very fine British series from Doctor Perkins. There are about two dozen Cameron² types, but the general policy at Cambridge is to give holotypes to the British Museum.

The important Indian collection obtained by Colonel Nurse, containing many types, has gone to the British Museum; but there remained a very large duplicate series, which has been divided between Oxford, the United States National Museum, and the American Museum of Natural History. Comparing the British Museum collection with that of the United States National Museum, I have prepared some statistics, of which the following are samples:

Genus.	Species in B. M. (not U. S. N. M.).	Species in both museums.	Species in U. S. N. M. (not B. M.).
<i>Megachile</i>	350	112	119
<i>Stelis</i> (including <i>Chelynia</i>).....	13	6	21
<i>Croctsa</i>	40	15	5
<i>Nomada</i>	112	43	136
<i>Perdita</i>	2	30	84
<i>Melipona</i> (including <i>Trigona</i>).....	67	85	85
<i>Osmia</i>	101	46	86
<i>Coelioxys</i>	71	25	44

These figures include only determined species. Races are included. My own collection, which is very rich in species and types, will go to the United States National Museum. After examining various collections I am convinced that for a museum the system of cardboard trays used at Washington is vastly superior to any other and should be adopted as widely as possible.

BOMBUS ABBOTTI, new species.

Female.—Length about 17 mm., anterior wing 14.5 mm. A species of the *B. terrestris* group, with short malar space (broader than long) and entire mandibles. Black, with rather long abundant hair; ocelli small; third antennal joint rather long; clypeus polished, with very sparse punctures; hair of head entirely black; thorax with creamy-white hair, but a very broad black band between the wings; tegulae black; wings dilute brown; legs black, with mainly black hair, but on tarsi it is pale reddish, as also at apex of anterior and middle tibiae, while the long hairs fringing the hind tibiae are mixed

² Cameron labeled all the specimens of his new species "type," and distributed them to various museums. Hence one will find "types" of the same species in different collections, no holotypes being designated.

black and red; first two abdominal segments with very pale tawny yellow hair, overlapping the third; third with black hair; fourth to sixth with bright red; venter with much rusty-black hair.

Tagdumbash, Pamir, 13,000 feet, June 11, 1894 (W. L. Abbott).

Type.—Cat. No. 24879, U.S.N.M.

This could be confused with *B. bizonatus* Smith, but the malar space of the female is considerably shorter than in Smith's insect. The paler wings and longer third antennal joint readily separate it from *B. tunicatus* Smith. From *B. niveatus* Kreichbaumer it is known by the much shorter malar space. *B. alticola* Kriechbaumer looks like *abbotti*, but has a considerably longer malar space.

BOMBUS MASTRUCATUS STRAMINEUS Friese, 1909.

Female.—Pognor La, Rupshu, Ladak, 16,000 feet, July 22, 1897 (W. L. Abbott). There is apparently more white hair on the thorax posteriorly than in Friese's type. The mandibles are dentate.

BOMBUS TSCHITSCHERINII Radoszkowsky.

This is a close relative or subspecies of *B. melanurus* Lepeletier, with a broad black band between the wings. Dr. W. L. Abbott obtained it in two localities. (1) Tagdumbash, Pamir, 13,000 feet, June 14, 1894. Two females, of the full size of *melanurus*, but with the light pubescence dull creamy-white instead of yellow. (2) Ooti, Rupshu, Ladak, 15,500 feet, August 4, 1897. One female, hardly 20 mm. long, anterior wing 15.5 mm.; pale pubescence distinctly ochreous. Two distinct races appear to be indicated, but more material is desirable. Other species of *Bombus* reach very high altitudes in the Himalayan region: thus *B. rufofasciatus* Smith, 12,500 feet; *B. flavescens* Smith, over 10,000 feet; *B. miniatus* Bingham, over 10,000 feet; *B. flavothoracicus* Bingham, 12,500 feet; *B. waltoni* Cockerell, 15,000–16,000 feet.

BOMBUS ROBUSTUS HORTULANS Friese.

Female.—Banos, Ecuador (F. Campos). The type locality for *hortulans*.

BOMBUS ATRIPES Smith.

"S. W. pt. Hanan Prov., China" (L. R. Thompson). Four females. The province is marked "Honan" on my map. A magnificent species, colored in the manner of *Bombus morawitzi* Radoszkowski, but the wings are dark fuliginous (pale in *morawitzi*) and the malar space is much shorter. Smith described this and six other *Bombus* from Chusan, but they probably came from more than one locality, as he says: "Mr. Fortune informed me that all the *Bombi* were found on the top of hills in Chusan and adjoining mainland."

BOMBUS RUFOCOGNITUS, new species.

Female.—A species of the *B. mastrucatus* group, with short malar space (though not quite so short as in *mastrucatus*) and toothed mandibles. Length about 22 mm., anterior wing 18 mm.; head with black hair; ocelli small; clypeus convex, polished, dull at sides, very sparsely punctured; malar space broader than long, but not so short as in *B. laticeps* Friese; mandibles 5-dentate; thorax with bright fox-red hair, except a broad black band between the wings; tegulae piceous, reddish posteriorly; wings dark fuliginous; legs black (the hind tibiae and basitarsi obscurely reddish), with black hair, more or less red on femora beneath; first two abdominal segments with bright lemon-yellow hair, next two with black (but the yellow hair overlapping base of third), apex with bright red hair.

Suifu, Szechwan, China (Graham). Two females.

Type.—Cat. No. 24880, U.S.N.M.

The red hair of thorax, contrasting with the yellow of the base of the abdomen, is very remarkable. The species resembles *B. laticeps* Friese, but differs by the longer malar space, and two abdominal segments black-haired. It is easily distinguished from *B. alienus* Smith, by the dark wings. It is readily known from *B. braccatus* Friese by the red thoracic hair and shorter malar space.

Thirty-four forms of *Bombus* are known from China, not including three species and four varieties peculiar to Formosa. None of these is exactly identical with any of the 16 known from Japan or the 3 known from Sakhalin, but a few of the Chinese species occur in the Himalayas. Certain of the Chinese forms have been referred as subspecies or varieties to the European *B. lapidarius*, *hortorum*, *pratorum*, *mendax*, and *terrestris*, but they are at least distinctively colored. Japan contains endemic races of *B. hortorum*, *muscorum*, *silvarum*, *terrestris*, and *pratorum*, in addition to several peculiar species.

BOMBUS TETRACHROMUS Cockerell, 1909.

Bombus nursei, var. *tetrachromus* Friese,³ is evidently the same thing. The name *tetrachromus* would be the prior one for the species, but as Friese suggests, the *tetrachromus* form is perhaps specifically distinct from *nursei*.

BOMBUS BIZONATUS Smith, 1878.

Kuen Luen Mountains, near Kukiari, East Turkestan, 9,000 feet. July 30, 1894 (W. L. Abbott). One worker. I can not distinguish this in the worker from *B. silentoewi* Morawitz, from Pjatigorsk, N. Caucasus (Skoinikov), but in the female *bizonatus* has longer

³ Deutsch Ent. Zeit., 1918, p. 85.

wings, and seems to be separable. *B. bizonatus* has conspicuously paler wings than *B. tunicatus* Smith.

Another worker, collected at the same time and place, has the pale hair of thorax and abdomen creamy-white. It looks like *B. abbotti*, but the light hair of basal segments of abdomen is creamy-white instead of yellow, and the hair fringing the hind tibiae is all black. It is a pale form of *bizonatus*.

XYLOCOPA CHIONOTHORAX Cockerell, 1907.

Canton, China, May 18, 1918 (C. W. Howard). Three females. The upper basal edge of the first abdominal segment is rounded, not sharply truncate. The type was described from "China," without other details.

XYLOCOPA ORICHALCEA Lepelletier.

Suifu, Szechwan, China (Graham.)

XYLOCOPA MICANS Lepelletier.

Homestead, Florida, 12 1. 17. (C. A. Mosier.) Two females, one male.

XYLOCOPA TABANIFORMIS Smith.

Panamint Valley, California, April, 1891, (Koeble). Two males.

CENTRIS FLAVIFRONS Fabricius.

Four from Mazatlan and Rosario, Sinaloa, Mexico, presented by B. P. Clark. These are genuine *flavifrons*, not the variety *flavo-fasciata* which Friese records from Mexico.

CENTRIS DISCLUSA, new species.

Male.—Like *C. nigrofasciata* Friese, with very broad black thoracic band, but hair on hind tibiae and basitarsi long and black (largely tipped with white on basitarsi); tegument of abdomen entirely yellowish-green; second abdominal segment with a large chrome-yellow patch on each side.

Posoya, Ecuador (F. Campos R.). Two males.

Type.—Cat. No. 24881, U.S.N.M.

Unfortunately Friese describes only the females of his *C. nigrofasciata* and *C. buchwaldi*, to which *C. discusa* is closely allied. Both come from Guayaquil, whence I have a specimen of *nigrofasciata*. *C. discusa*, by the wholly green abdomen and dark hair on hind legs, should be nearest to *buchwaldi*, but the third abdominal segment has only very scanty short red hairs at apex, instead of being mainly red haired, and the yellow patches on second segment are lacking in *buchwaldi*. It therefore seems that a distinct race or species is indicated, but it is possible that we have the male of *buchwaldi*.

The clypeus (except a black band on each side, not reaching lateral corners), labrum and greater part of mandibles are cream color; there is a narrow transverse supraclypeal band; lateral face marks consisting of bands along the orbits, ending very acutely about level of antennae; scape cream color in front.

CENTRIS POECILA SEGREGATA Crawford.

Female.—Cayuga, Guatemala, June, 1915 (Wm. Schaus). The wings are dilute fuliginous.

CENTRIS TRIGONOIDES Lepeletier.

San Salvador (S. Calderon). Five males. This agrees with Lepeletier's description, noteworthy points being the dark legs (with tarsi chestnut red), the greatly swollen hind femora, and the white face markings. In the long spines on the hind trochanters and the color of the antennae it agrees with *C. dentipes* Smith. The hind tibiae have black hair on outer side, and their femora a good deal of black hair beneath. The eyes are rather pale purplish red; in male *tarsata* Smith, from Guatemala, they are green. The eyes are also green (with dark margins) in *C. totonaca* Cresson.

MESONYCHIUM DECORATUM Smith.

Cayuga, Guatemala, May (Schaus and Barnes); Posoya, Ecuador (F. Campos R.).

EUGLOSSA (GLOSSURA) IGNITA Smith.

Males from Cayuga, Guatemala, September, 1915 (Wm. Schaus), and Colombia (Baker collection). The latter is unusual in having the scape dark, with a small yellow spot, and the mesothorax more or less coppery.

EUGLOSSA (GLOSSURA) PILIVENTRIS IMPERIALIS, new subspecies.

Female.—Rich green, but when seen from a direction opposite the light appearing brilliant purple; on the abdomen the broad hind margin of the first segment is especially purple.

Rio Trinidad, Panama, March 16-23, 1912 (August Busck). Four females, quite uniform in their beautiful coloration.

Type.—Cat. No. 24882, U.S.N.M.

EUGLOSSA VARIABILIS Friese.

Male.—Alhajuelo, Canal Zone, Panama, May 28, 1912 (A. Busck). This species is a little larger than *E. cordata*, and more shining, but it is possible that Ducke is correct in regarding it as a form of *cordata*.

EUGLOSSA VARIABILIS MIXTA Friese.

Female.—Rio Trinidad, Panama, March 19, 1912 (A. Busck).

EUGLOSSA CYANURA Cockerell.

Female.—San Remo, Ecuador, 30 meters altitude (F. Campos R.). Looks like *E. variabilis*, but the black spot on scutellum is very much larger, and the labrum is shorter. The specimen has the mesothorax brassy; the abdomen is emerald green in some lights and deep purple-blue in others.⁴

EUGLOSSA CORDATA (Linnaeus).

This species is very variable and it is possible that several races may be distinguished when adequate field studies and collections are made.

Ancon, Canal Zone, Panama (A. H. Jennings); Taboga Island, Panama, June 13, 1911, and February 24, 1912 (Busck); Alhajuelo, Canal Zone, Panama, May 28, 1912 (Busck); Experiment Station, Matico Hernandez, near Panama City (H. Pittier); Paraiso, Canal Zone, Panama, January 17, 1911 (Busck); Cayuga, Guatemala, June, 1915 (Wm. Schaus); Aquinares, Costa Rica, February, 1921 (A. Alfaro); Cayenne (Wm. Schaus); Cumaragua, Venezuela (B. J. Blanco). A male from Taboga Island, carries a pair of orchid pollinia on its back, so apparently the males may assist in pollinating orchids.

ANTHOPHORA ABJUNCTA, new species.

Female.—Very close to *A. acervorum pennata* (Lepeletier), but third antennal joint shorter (about 0.65 mm.; *pennata* about 0.95 mm.) and more robust; hair of thorax above bright fox-red, without and black intermixed; hair on first abdominal segment exactly as in *pennata*, but on others (dorsally) black or dark brown, with thin bands of long pale fulvous hair; hair on outer side of hind tibiae and basitarsi dark reddish grading into black. It is distinguished from *A. retusa* Linnaeus by the red (not green) eyes, and the first recurrent nervure joining the second submarginal cell far beyond the middle. Face without light markings; hair of head black, grayish on lower part of cheeks; venter of thorax with whitish hair, but sides mainly with bright fox-red; tegulae clear ferruginous; wings dusky; small joints of tarsi dull red; spurs red.

Suifu, Szechwan, China (Graham).

Type.—Cat. No. 24883, U.S.N.M.

The clypeus is dull, and wholly without a median keel (such as occurs in *A. agama* Radoszkowski). This is the sixteenth species of *Anthophora* from China.

⁴ *Male*.—I have recently identified three males from Ancon, Panama Canal Zone, as this species. They have the scape largely pale beneath and the sides of the face narrowly white.—S. A. ROHWER.

TRIGONA HEIDERI Friese.

Manaos, Brazil (Miss H. B. Merrill).

TRIGONA LONGIPES Smith.

Manaos, Brazil (Miss H. B. Merrill.)

TRIGONA WILLIANA Friese.

British Guiana, May 21, 1901 (R. J. Crew); Rio Mato, Caura district, Venezuela, October, 1909 (M. A. Carriker). One Rio Mato specimen bears an additional label: "Taken on trunk of a tree in forest on some gum, where there were many dead ones, covered with white mould."

TRIGONA PECTORALIS Dalla Torre.

San Salvador (S. Calderon).

TRIGONA MELLICOLOR Packard.

Lagunita de Area, Venezuela, 2,000 feet (M. A. Carriker). Belongs to subgenus *Oxytrigona* Cockerell.

TRIGONA CUPIRA Smith.

C. Bolivar, Venezuela, on *Convolvulus* (M. A. Carriker).

TRIGONA RUFICRUS CORVINA Cockerell.

Four workers from banana flowers, Punta de Pena, Panama, August 6, 1906 (R. E. B. McKenney).⁵

TRIGONA PALLIDA Latreille.

La Chorrera, Panama, April 12, 1912 (Busck). I found what is presumably Latreille's type in the Museum at Oxford. It is much broken, with no head. Thorax, abdomen, and hind legs light rufotestaceous. No doubt the species which I have known as *pallida*. The specimen is labeled in Latreille's writing.

TRIGONA MEADE-WALDOI Cockerell.

Joazeine, Bahia, Brazil, August 5, 1915 (P. G. Russell).

TRIGONA SEVOCANS, new species.

Worker.—Length about 7 mm., anterior 7 mm.; clear yellowish-fulvous, with the head mainly black, a large rounded black or piceous patch on lower part of mesopleura, mesothorax black with the anterior corners broadly and lateral margins narrowly yellow; broad

⁵ In the Oxford Museum I found *T. ruficrus* (*Apis ruficrus* Latreille), labeled in Latreille's writing. I noted: Wings fuliginous, paler apically; hair on head and thorax above black; hind tibiae and tarsi red; sides of face gray-pruinose; cheeks pale gray-pollinose; mesothorax shining; robust species. This is the species generally known under this name.

apical half of hind tibiae and nearly all of their basitarsi black; tegulae pale fulvous; wings dusky (not whitened apically) with dull ferruginous stigma and nervures. Eyes pale ochreous; head broad, the black parts covered with fine pale brown tomentum, appearing whitish in certain lights; scape entirely yellow in front; face entirely pale yellow up to level of antennae, including the triangular supraclypeal area, lateral face-marks sending a slender line up orbital margins, clypeus without markings; labrum and the simple mandibles yellow; thorax quite densely covered with pale fulvous hair; hind tibiae not exceptionally broad for the genus, fringed in front with sparse long red hairs, but behind with largely dark ones; abdomen narrow, parallel-sided, entirely clear red.

Manaos, Brazil (Miss H. B. Merrill).

Type.—Cat. No. 24877, U.S.N.M.

In my manuscript key to *Trigona* this runs to *T. goettei* Friese, but that has the abdomen brownish apically, and appears to be distinct. It is actually very close to *T. dorsalis* Smith, 1854, but is larger, with the wings not reddened, and the sides of the clypeus straighter. The upper edge of the lateral face marks is gently concave.

TRIGONA SUFFRAGATA, new species.

Worker.—Length about 9 mm., anterior wing 9 mm.; clear red, with the wings dilute ferruginous, the apical margin broadly faintly dusky. No black on thorax, abdomen or legs, but head black, with the face cream color to above level of antennae, and a pair of oval testaceous marks on middle of front. Labrum cream color; mandibles with a large inner tooth, the apical margin and tooth dark; malar space distinct: scape cream color in front, flagellum ferruginous beneath; eyes pale purplish-gray; cheeks covered with pale tomentum. Abdomen parallel-sided, compressed.

Five from Colombia (Harry Sargent).

Type.—Cat. No. 24876, U.S.N.M.

Runs in my table to *T. willioni* Friese, but is paler, with differently colored head. The hind tibia also is long, and much more slender basally. It is much larger than *T. mellica* Smith, and differs from that also in the shape of the hind tibia.

NANNOTRIGONA, new genus.

Small black species with very coarsely rugose thorax, and the scutellum elongate, produced into two sharp angles or teeth.

Type.—*Nannotrigona testaceicornis* = (*Melipona testaceicornis* Lepeletier: *Trigona punctata* Smith; *T. perilampoides* Cresson).

NANNOTRIGONA TESTACEICORNIS (Lepeletier).

Lepeletier must have had the common species usually known under *punctata*, *mellaria*, or *perilampoides*, but he erroneously describes

the abdomen as "nigro subvillosum." In the United States National Museum are specimens exhibiting a good deal of variation, as follows:

Apical teeth of scutellum little produced, and end of scutellum (not teeth only) fulvous right across; abdomen appearing pale-banded.

Izamal, Mexico (Gaumer).

Light color at end of scutellum confined to the teeth, or almost so.

Outer face of hind basitarsi dark.....Para, Brazil.

Outer face of hind basitarsi longitudinally bicolored, black and fulvous.

Guayaquil, Ecuador (Buchwald);

Costa Rica (Crawford);

Izamal, Yucatan (Gaumer);

Mexico (Baker collection);

El Rancho, Guatemala (C. C. Deam);

Piura, Peru.

These are certainly only one species, I think. The following appears to represent a good local race.

NANNOTRIGONA TESTACEICORNIS TRISTELLA, new subspecies.

Margins of mesothorax, axillae, and scutellum entirely black.

Four from Lagunita de Aroa, Venezuela, 2,000 feet (M. A. Carriker).

Type.—Cat. No. 24878, U.S.N.M.

MELIPONA FAVOSA (Fabricius).

This was described by Fabricius in 1798 and by Latreille in 1802. In the Oxford Museum I found a specimen labeled by Latreille. It is a *Melipona* with strongly orange-tinted wings; thorax with fox-red hair; clypeus light ferruginous, with two broad dark reddish bars, not reaching upper end, the distance between them less than the width of either; a small semicircular supraclypeal mark; flagellum bright ferruginous beneath; face on each side of clypeus obscure testaceous. Another specimen (not labeled by Latreille) has the supraclypeal mark transversely kidney-shaped.

DOERINGIELLA BIZONATA Holmberg.

Two males from La Rioja, Argentina, donated by B. P. Clark, are smaller than usual, but I think can only be referred to this species.

NOMIA STRIGATA RIDLEYI (Cockerell).

Female.—Canton, China (C. W. Howard). New to China. This is the seventh *Nomia* from China, but doubtless many more occur, as no less than 13 have been described as new from Formosa, while 2 of the mainland species (*thoracica* and *punctulata*) also occur there. Japan has only one recorded genuine *Nomia*, the *N. japonica* of Smith being (according to Meade-Waldo) an *Andrena*.

ANDRENA NIPPONICA, new name.

Andrena japonica Alfken, not of Smith. For its characters, in relation to the other Japanese species, see *Annals and Magazine of Natural History* for February, 1913 (p. 190).

MEGACHILE STRUPIGERA, new species.

Female.—Length 12mm.; black, slender, parallel-sided, very coarsely punctured, ventral scopa with thickened straplike hairs; clypeus densely rugose, without a smooth line; face and front covered with short red hair; cheeks with very large punctures, and a prominent longitudinal keel posteriorly; antennae entirely black; vertex with scanty red hair; mesothorax and scutellum very densely and coarsely punctured, with short inconspicuous dark hairs; prothorax and tubercles, and a small tuft beneath wings, with bright ferruginous hair; pleura and metathorax with thin white hair; base of metathorax with a narrow transverse channel, crossed by small ridges; tegulae deep red, black basally; wings hyaline at base, beyond that dark fuliginous, splendidly purple-iridescent; legs black, with scanty whitish hair; spurs black; abdomen shining black, not metallic, with large punctures; first four segments with transversely elongated lateral white hair-patches; fifth with a very narrow white marginal band, interrupted in middle; ventral scopa white, black on last segment and apex of penultimate.

Canton, China (C. W. Howard).

Type.—Cat. No. 24884, U.S.N.M.

Closely allied to *M. thoracica* Smith, from Java, but easily separated by the red hair of face and front.

MEGACHILE LATICEPS Smith.

Meade-Waldo in 1914 published the opinion that *M. caecina* Cameron, *M. borneana* Cameron, and *M. varidens* Cameron, all from Sarawak, were identical with the Philippine Island *M. laticeps*. On examining the types in the British Museum, I found that this was not the case. *M. laticeps* has white hair bands at sides of abdominal segments 2 to 4, but fulvous on the first. *M. varidens* has bright fulvous on 1 to 3, and no evident band on 4. *M. varidens* has a dull very densely punctured scutellum, but *laticeps* has it more shining, the punctures not so dense. *M. laticeps* has a broader face and vertex.

M. caecina has red hair on face and thorax; scutellum shining anteriorly. It is in bad condition, but is not *varidens*. *M. borneana* is also different; it has much black hair on thorax above, white at sides and posteriorly; face and front with pale fulvous hair; apex of male abdomen (keel of sixth segment) broadly rounded and emarginate.

EXAERETE NITIDA (Perly).

Friese (1912) has considered this a synonym of *E. dentata* (Linnaeus), but a specimen from F. Smith's collection is separable by the coarsely, confluent punctured areas on mesothorax. Another specimen of *E. nitida* as thus interpreted was recently shown to me by Mr. L. O. Jackson. It was obtained at Jurujuba, State of Rio de Janeiro, Brazil. January 6, 1920 (E. G. Holt).

PROSOPIS LIGULA (Strand).

Female.—Canton, China (C. W. Howard). Strand described this as a variety of *P. transversicostata* Strand, from Formosa, but it is probably a distinct species. I have no Formosan material, but the specimen from Canton agrees with the description. Related species occur from Japan to Burma. There are nine species of *Prosopis* (*sens. lat.*) recorded from Japan, seven forms from Formosa, but only three from China. Evidently there is a considerable series of Chinese species not yet known to science.

SPHECODES HOWARDI, new species.

Female.—Length 9 mm. or slightly over; black, including antennae and legs, but first three abdominal segments entirely bright chestnut-red, the apical ones black; wings hyaline basally, but otherwise fuliginous, with splendid purple iridescence; head broad, transversely oval; sides of face with abundant pure white hair; clypeus very short, transverse, not hairy, densely and coarsely punctured, without a median groove; mandibles black, faintly reddish subapically, with an inner tooth; front rugose; thorax with very scanty white hair, mainly on prothorax and pleura; mesothorax with dense extremely coarse punctures, but on disk there are some shining areas between the punctures; scutellum coarsely, irregularly, not densely punctured; area of metathorax with a coarsely cancellate sculpture; tegulae black, with a light spot on outer side; second submarginal very narrow, third broad above; abdomen shining, with scanty very weak and minute punctures, apex with short black hair; spurs red.

Canton, China (C. W. Howard).

Type.—Cat. No. 24885, U.S.N.M.

Related to the Indian *S. fumipennis* Smith, but smaller; also allied to *S. formosanus* Cockerell, from Formosa, and *S. turneri* Cockerell, from Assam. *S. japonicus* Cockerell, from Japan, is also of the same group.

SPHECODES GRAHAMI, new species.

Female.—Of the same size as *S. howardi*, and superficially appearing the same, but differing thus: Apical half of mandibles (which are toothed) dark red; clypeus more finely punctured, with

a distinct median depression or groove (compare the Indian *S. apicatus* Smith); punctures of mesothorax smaller and more sparse, with much shining surface showing; area of metathorax longer, more coarsely and irregularly reticulate; wings, while dusky, not nearly so dark, and without the fine purple iridescence; abdomen with much longer, pale hair in apical region; red of under side of abdomen much darker; stigma larger. The abdomen is almost entirely impunctate. The tegulae are without the light spot on outer side.

Snifu, Szechwan, China (Graham).

Type.—Cat. No. 24886, U.S.N.M.

These two species are easily known from the Chinese *S. kershawi* Perkins (from Macao) by the entirely red base of abdomen; but the female of *kershawi* is unknown, and may well have the base of abdomen all red. By the color of the wings, *kershawi* would fall next to *S. grahami*.

SPHECODES IGNITUS, new species.

Male.—Length a little over 8 mm.; robust; head broad, black, with the clypeus and mandibles dark red; antennae black, the flagellar joints strongly nodose; third antennal joint perceptibly longer than second, but not nearly twice as long, fourth as long as second and third combined; face and front with much white hair; clypeus finely rugose and dull; process of labrum broad, entire, dark; vertex with a very large oval dark reddish tubercle, behind middle ocellus; prothorax (except tubercles), mesothorax, scutellum, and mesopleura, all dark red, postscutellum and metathorax black; mesothorax coarsely and confluent punctured, scutellum with strong scattered punctures; metathorax very coarsely sculptured, the area scarcely defined, coarsely irregularly reticulate, with shining pits; tegulae pale brown, translucent, darker posteriorly; wings deep fuliginous, with the base hyaline; legs black, with the anterior tibiae clear red except the outer face, small joints of tarsi reddish; abdomen polished, with very fine sparse punctures, first two segments and base of third dark red, the rest black, a moderate constriction between first and second segments.

Ocala, Florida, October 24, 1919. Collector not given on label.

Type.—Cat. No. 24887, U.S.N.M.

Related to *S. heraclei* Roberston, but very distinct by the red parts of thorax, etc.

AUGOCHLORA FLORALIA Smith.

Female.—Described from the W. W. Saunders collection, in which I found it. Hind spur pectinate; abdominal segments not vibrissate. The British Museum has no specimens.

AUGOCHLORA LACUSTRIS, new species.

Female.—Length about 10.5 mm.; head and thorax emerald green, abdomen peacock green; hind spur pectinate; abdominal segments not evidently vibrissate, the very fine and short hairs along margins not true vibrissae; flagellum obscure reddish beneath; femora and tibiae green, tarsi rufopiceous, not metallic; wings strongly dusky, stigma dull reddish; second submarginal broad, square; first recurrent meeting second transverse cubitus. Very close to *A. sumptuosa* Smith (which I have from S. Florida, collected by Robertson), but larger, with a good deal of black hair on outer side of hind tibiae; area of metathorax longer, rounded instead of truncate behind; middle of scutellum polished, with sparse punctures; nervures fuscous; clypeus polished and sparsely punctured in middle. The broad abdomen has the same peculiar texture as in *sumptuosa*.

Lakeland, Florida, November 8, 1911 (F. 1753).

Type.—Cat. No. 24888, U.S.N.M.

AUGOCHLORA FLORIDICA, new species.

Male.—Length 11–11.3 mm.; brilliant bluish-green, the abdomen shining, with splendid purple tints, especially the apical half, the hind margins of segments not black; antennae entirely black; mandibles dark reddish on outer side; femora and tibiae green, tarsi becoming rufescent; wings dilute fuliginous; stigma ferruginous, nervures fuscous; first recurrent joining third submarginal near base. Face and front hoary with dull whitish hair; mandibles with a green patch at base; clypeus polished, convex, with strong separate punctures; emargination of eyes shallow; angles of prothorax very distinct; mesothorax densely and quite coarsely punctured; scutellum with a pair of impunctate spots, but these are microscopically roughened; area of metathorax well defined, truncate posteriorly, its surface with weak flexuous rugae; tegulae entirely green; punctures of abdomen very distinct, but not dense; venter rufo-piceous, with strong purple luster on second and third segments; margin of third segment with a median point, that of fourth with a strongly produced median angle, on each side of which the margin is concave. Tongue hardly 1 mm. long.

Monticello, Florida, October 4 to 8, 1914, three males (3625, 3623, 3627).

Type.—Cat. No. 24889, U.S.N.M.

The form and coloration suggest the West Indian *A. piscatoria* Cockerell, but the structure of the abdominal venter is quite different. We are also reminded of the Cuban *A. magnifica* Cresson, but that has hyaline wings and brownish tegulae.

AUGOCHLORA ANONYMA, new species.

Female.—Length about 8.3 mm.; splendid rich purple throughout, on the legs as far as the base of the basitarsi; hind spur with five long spines; flagellum very obscurely reddish beneath, more distinctly at apex; tarsi dull reddish; tegulae purple, with a dark red spot on outer side; wings dusky hyaline, stigma and nervures ferruginous; first recurrent reaching basal end of third submarginal. Mandibles obscurely reddened in middle and with a purple spot at base; mesothorax dullish, rugose; area of metathorax without rugae; abdomen broad and shining, sparsely and indistinctly punctured, the segments not vibrissate, surface thinly hairy; venter with last two segments dark reddish, the others steel blue.

No Name Key, Florida, March, 1898, three females (G. N. Collins and C. L. Pollard).

Type.—Cat. No. 24890, U.S.N.M.

Very distinct by the magnificent purple color, combined with the pectinate hind spur. It belongs to the group *Sericei*, but will not run in Vachal's key, because the hind margins of the abdominal segments are concolorous, metallic, and yet there is a transverse groove behind the ocelli.

AUGOCHLORA MOSIERI, new species.

Female.—A little smaller than *A. anonyma*, but with exactly the same purple color, so that at first I thought it identical, until I noticed that it belonged to the group *Oxystoglossi*, with the hind spur not pectinate, and the basal area of metathorax presented strong wavy rugae. Antennae black; mandibles strongly bidentate, chestnut-red in middle; eyes very strongly emarginate; mesothorax dullish without strong punctures; anterior angles of prothorax moderate; wings dark fuliginous, stigma black; knees, tibiae at apex, and tarsi chestnut-red; venter of abdomen piceous, not metallic, the apical segment highly polished; tegulae dark rufous with a metallic spot. The hind margins of the abdominal segments are very narrowly black, as in *A. alcyone* Smith from S. Domingo.

Homestead, Florida, December 1, 17 (C. A. Mosier).

Type.—Cat. No. 24891, U.S.N.M.

AUGOCHLORA PALMARUM, new species.

Female.—(Type). Length 8 to 9 mm.; bluish-green, the clypeus and supraclypeal area yellow-green, contrasting with front and sides of face; antennae black; tegulae rufo-piceous; first recurrent meeting second transverse cubitus; legs piceous, anterior femora steel-blue behind, anterior and posterior (but not middle) coxae green; hind spur not pectinate; abdomen shining, hind margins of seg-

ments very narrowly blackened; no vibrissae; venter piceous, faintly greenish on fourth segment. Eyes deeply emarginate; mandibles dark; clypeus strongly rather closely punctured; mesothorax and scutellum dullish, rugose; anterior angles of prothorax obtuse; area of metathorax rather poorly defined, rugose, with fine striae laterally; hair of hind tibiae entirely pale; abdomen without distinct punctures.

Male.—Length about 7.5 mm.; more slender; eyes strongly converging below; mesothorax with disk polished and shining; area of metathorax with very distinct striae; all the femora metallic; ventral segments 3 to 5 strongly blue-green except broad hind margins, their margins simple, but last ventral with a weak longitudinal carina. The wings are fuliginous.

Palm Beach, Florida, 3 females, 1 male, from the C. F. Baker collection.

Type.—Cat. No. 24892, U.S.N.M.

Belongs to the group *Oxystoglossi*, and is especially distinguished by the dark wings, whereby it is easily known from the Floridian *A. matilda* Robertson, *A. austrina* Robertson and *A. festiva* Smith. The head is much broader than in *A. cyaneoviridis* Ashmead, from St. Vincent.

NOMADA ALBOFASCIATA Smith.

Male.—Oxbow, Saskatchewan, May, 1907 (F. Knab).

NOMADA MODESTA Cresson.

Female.—Form with yellow mark on mesopleura broken into two spots.

Virginia Beach, Virginia, August 11, 1913 (F. Knab).

NOMADA MEXICANA Cresson.

Cresson described the female. A male from Mexico (Baker collection 1785) is referred here with confidence. It differs from the female thus: Clypeus with a large pale yellow triangular patch, occupying most of its surface; posterior orbits entirely black; metathorax without spots, mesopleura with only one spot, a large one on its posterior part; abdominal venter dark, without markings. The apical plate of abdomen is entire, very obtuse, surrounded by dark bristles.

NOMADA (HOLONOMADA) SUFFOSSA, new species.

Male.—Length about 12 mm.; large and robust; black, with chrome-yellow markings and red legs; readily known by the greatly swollen, oval scape of antennae. Head broad, facial quadrangle about square; mandibles massive, simple, the very broad base yellow, the middle red, the apex black; the following are yellow, labrum,

clypeus, two spots in supraclypeal region, entire sides of face (except black areas below antennae) up to antennae and pointed projection beyond along orbits; cheeks entirely black; scape red laterally and on inner face; third antennal joint clear red, contrasting with the thick dark flagellum, but joints 4 and 5 are red beneath; joint 3 much longer than 4; mesothorax black, entirely dull without evident punctures, but under a microscope it is seen to be so closely punctured as to be minutely cancellate; scutellum with two very large yellow spots, postscutellum with an interrupted band; the following are yellow, upper border of prothorax (not reaching tubercles), tubercles, subtriangular mark on mesopleura, nearly all of tegulae, marks on middle and hind coxae, pair of large transverse marks on first abdominal segment, bands (broad at sides, narrow in middle) on segments 2 to 4, and broad nearly even band on fifth segment, as well as four spots on venter; metathorax entirely black, with pale hair; wings strongly reddened, stigma rather small, bright ferruginous, nervures dilute brown; basal nervure meeting transverse median; first recurrent joining second submarginal about middle; anterior femora at base, and the others in large part, black; hind tibiae and basitarsi with some blackish; hind basitarsi thickened; abdomen extremely densely and minutely punctured; apical plate entire.

Mexico (C. F. Baker collection. 2320).

Type.—Cat. No. 24893 U.S.N.M.

Very distinct from the previously described Mexican or Central American species. In my key to the Rocky Mountain species it runs nearest to *N. superba* Cresson, from which it is known by the bare (instead of copiously hairy) mesothorax and pleura, and many other characters.

PERDITA SPHAERALCEAE ALTICOLA Cockerell.

Female.—Pecos, New Mexico, August 17 (Wilmatte P. Cockerell).

PERDITA RUFICAUDA Cockerell.

I described (1916) only the female. A female and two males were collected by Dr. L. O. Howard at La Mesa, San Diego County, California, April 21, 1898. They differ a little from the type in that the head is dark or bluish, not green. The male runs near *P. chamaesara-chae* Cockerell in my tables; it has the face marks lemon yellow, and runs out because the dog-ear marks are present, but there is no supraclypeal mark. The abdomen is entirely clear red.

PERDITA ZEBRATA Cresson.

Female.—Helena, Montana, August 9, 1919. Collector unknown. Described from Colorado.

PERDITA SEMICAERULEA Cockerell.

Five females; Sanderson, Texas. May 9, 1912 (J. S. Mitchell). These are identical with the typical insect of New Mexico.

PERDITA MACROSTOMA, new species.

Male.—(Type). Length a little over 6 mm.; robust, with extremely broad head, the eyes diverging below; head and thorax with thin but conspicuous dull white hairs; head dark blue, the front dull, cheeks shining; cheeks unarmed; clypeus extremely broad and low, with lateral extensions to base of the simple mandibles; clypeus (except a pair of dots), labrum, mandibles (except apically), minute supra-clypeal line and small dog-ear marks, and lateral face marks, all cream color; lateral marks transversely cuneiform, with the apex (mesad) obtuse, and the lower outer angle acute; scape cream color in front, black behind; flagellum clear ferruginous beneath, dark brown above; mesothorax shining dark bluish green, metathorax blue, pleura blue; no light markings on thorax; tegulae pale testaceous; wings perfectly clear, margin of stigma and nervures dilute sepia; stigma large; marginal cell oblique at end; legs brown-black, with anterior knees, tibiae and basitarsi in front pale reddish-cream; anterior tarsi and middle and hind knees more or less pale; abdomen ferruginous, polished, the apex broadly bilobed; color of abdomen ferruginous, the first segment brown except apically, the second and third with indistinct, suffused, yellowish bands, and all the segments with suggestions of dusky sub-lateral spots.

Female.—Length about 7 mm., differing at once from the male in that the abdomen is dark brown, with narrowly interrupted cream-colored bands on segments 2 to 5, those on 2 and 3 produced downward (caudad) at base, becoming pistol-shaped, but not united; head not nearly so broad as in male; mandibles rufo-testaceous, dark at apex; labrum and clypeus reddish-brown, the latter with a plow-shaped cream-colored mark at each side; no supra-clypeal or dog-ear marks, but transverse lateral marks, concave above; scape black; flagellum pale rufo-testaceous beneath.

Los Angeles County, California, May, four of each sex (Coquillett).

Type.—Cat. No. 24894, U.S.N.M.

In my key ⁶ the male runs to 7, except for the simple mandibles; it falls nearest to *P. latior* Cockerell, which also has the abdomen differently colored in the sexes, but differs at once by the large stigma. The female runs to *P. verbesinae* Cockerell, but the head and wings are quite different. There is some resemblance to *P. aureovittata* Cockerell, but that differs greatly in the marking of the abdomen.

⁶ Proc. Phila. Acad. Nat. Sci., 1896, p. 45.

The female sometimes has a light median spot on the upper part of the clypeus.

PERDITA DINOGNATHA, new species.

Male.—Length about or nearly 5 mm.; very broad; head extremely broad, dull dark olive-green, orbits diverging below; pubescence on head and thorax dull white, thin and rather short, but distinct; mandibles very long and curved, simple, rufo-testaceous, with dark apex; labrum pale; clypeus broad and low, forming an arched band, entirely pale reddish-testaceous; a minute transverse mark beneath each eye, but no other lateral marks; no dog-ear or supraclypeal marks, but a faint pale supraclypeal shade; cheeks simple; antennae black; thorax black, with the metathorax dark blue; mesothorax dull; tegulae testaceous; wings milky hyaline; stigma narrow-lanceolate, pale yellowish-testaceous, nervures very pale; legs black, the tarsi becoming reddish, anterior tibiae pallid in front; abdomen very broad, shining dark reddish-brown, without markings.

San Diego County, California, April (Coquillett).

Type.—Cat. No. 24895, U.S.N.M.

In my key runs to 52, but runs out on account of the lack of lateral face marks. The stigma recalls that of *P. latior*. The abdomen is redder than that of *P. grandiceps* Cockerell.

PERDITA HAPLURA, new species.

Female.—Length about 5 mm., robust, with broad abdomen; pleura with much white hair, but mesothorax nearly bare; head transverse, but not remarkably broad, orbits converging below; color of head dark bluish-green, most evident on front, which is shining but not polished; no face markings, clypeus and supraclypeal region black; mandibles with a conspicuous red subapical spot; scape black, reddish at extreme base; mesothorax dullish, black, anteriorly strongly brassy; pleura, scutellum and postscutellum black, but metathorax steel-blue or slightly greenish-blue; tegulae testaceous; wings milky-hyaline, stigma and nervures reddish-white; stigma lanceolate, marginal cell very oblique at apex; legs black, anterior knees dark reddish; abdomen dullish black, faintly aeneous at bases of segments, hind margins of segments colorless.

Sanderson, Texas, May 9, 1912 (J. S. Mitchell).

Type.—Cat. No. 24896, U.S.N.M.

Evidently related to *P. texana* (Cresson), but separable by the metallic colors on head and thorax. The male probably has a rufous abdomen.

PERDITA LUCIAE Cockerell.

Male.—Tacna, Arizona (H. G. Hubbard). Named after Miss Lucy Howard.

PERDITA INTERSERTA, new species.

Female.—Length about or hardly 6 mm.; head and thorax shining green, the former bluish-green, the latter yellowish-green; head ordinary; mandibles (except reddish apex), labrum, clypeus, large supraclypeal mark (notched above) and lateral marks pale yellow, but no dog-ear marks or yellow on cheeks; lateral marks shaped like a gloved hand with index finger pointed upward; scape yellow, with a dark apical spot behind; eyes green, blackish at lower end; mesothorax polished, with thin hair; neck entirely yellow, with a yellow line to the similarly colored tubercles; tegulae hyaline with a yellow spot; wings perfectly clear; stigma well developed, very pale orange, nervures very pale; legs yellow, with the hind tibiae dark brown, and their tarsi brownish; abdomen light yellow, with four broad dark brown bands, each covering the apex of a segment and the base of the one beyond; venter yellow.

Los Angeles County, California (Coquillett).

Type.—Cat. No. 24897, U.S.N.M.

No date or plant-record, but it will probably be found on one of the native compositae. In my key it runs to *P. rectangulata* Cockerell, differing at once by the shining thorax. It is close to *P. townsendi* Cockerell, but smaller, with dark hind tibiae and other differences. It is even closer to *P. stottleri* Cockerell, differing by the entirely yellow neck, mainly yellow first abdominal segment, etc.

PERDITA EXCLAMANS Cockerell.

Male.—San Diego County, California, April (Coquillett). It differs a little from New Mexico specimens, having the yellow on pleura divided into two areas, and the fourth broad yellow band on abdomen interrupted. Possibly a distinct race is indicated.

PERDITA QUADRANGULARIS Cockerell.

Male.—Sanderson, Texas, May 9, 1912 (J. S. Mitchell). Described from New Mexico.