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DESCRIPTIONS AND RECORDS OF NORTH AMERICAN HOPLITIS AND ANTHOCOPA¹

(Hymenoptera, Megachilidae)

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In the course of preparing a paper on the Californian species of certain megachilid bees in cooperation with Dr. P. D. Hurd, Jr., of the University of California, several new forms and new distributional records came to light. The present paper has been written in order to bring our knowledge of these recently revised groups up to date and to make certain records and new names available for use in the above mentioned work.

The specimens recorded and described below come from several sources. I am indebted to each of the following for the use of material under his care: Dr. John N. Belkin, University of California at Los Angeles [U. C. L. A.]; Dr. J. Bequaert, Museum of Comparative Zoology [M. C. Z.]; Dr. G. E. Bohart, Bureau of Entomology and Plant Quarantine, Logan, Utah [G. E. B.]; Dr. G. E. Butler, Jr., University of Arizona [U. A.]; Dr. P. D. Hurd, Jr., University of California [U. C., B.]; Dr. L. W. Quate, University of Nebraska [U. N.]; Dr. E. S. Ross, California Academy of Sciences [C. A. S.] and P. H. Timberlake, University of California, Riverside [U. C., R.]. The letters in brackets are used to identify these collections in the following pages.

Considerable material in the Snow Entomological Museum of the University of Kansas [K. U.], mostly collected by Dr. R. H. Beamer or under his direction, is here recorded for the first time.

HOPLITIS BULLIFACIES Michener

Hoplitis (Hoplitina) bullifacies Michener, 1947, Bull. Amer. Mus. Nat. Hist.; 89:274 (female, not male).

This species was described from a few specimens from Inyo County, California. The holotype is a female. The male available at the time was only tentatively associated with the females as it was taken in a different locality. A long series of both sexes now available from Big Pine Creek, Inyo County, CALIFORNIA, 7500 feet altitude, June 12 to 20, 1942 (R. M. Bohart) [G. E. B.] shows that this original association was incorrect. The male originally placed with *bullifacies* is another species, named below as *H.*

¹ Contribution number 868 from the Department of Entomology, University of Kansas.

(*Hoplitina*) *mazourka*. The proper male of *bullifacies* is described below:

Male: Length 5.5 to 6.0 mm. Black, metasomal terga one to four red, sometimes with inconspicuous middorsal black areas; fifth tergum red laterally; posterior margins of terga dark testaceous. Clypeus with a strong, shining, impunctate, median protuberance similar to that of female; clypeal margin shallowly concave medially, slightly produced and strongly crenulate sublaterally; inner orbits slightly converging below; antennal scape about four times as long as broad, pedicel much longer than broad, flagellum reaching middle of scutellum, segments all much longer than broad, first six subequal in length and slightly more than twice as long as broad, following segments successively shorter, the last the shortest segment of the flagellum; mandibular teeth subequal; maxillary palpi as in female. Middle coxae each with small shining ventral projection or tooth based of trochanter. Sixth metasomal tergum without lateral teeth; seventh tergum with broad dorsal concavity, apical margin with small apical notch (fig. 1). First metasomal sternum with strong protuberance, abruptly declivous posteriorly; second sternum with posterior margin broadly convex, fringed; third fringed, emarginate medially; fourth and fifth unfringed, slightly emarginate medially; sixth with deep median pit from which arises a short, blunt process bearing numerous short hairs; gonoforceps robust, median portions parallel-sided, apices tapering to blunt points, outer apical margins with long fringes.

***Hoplitis mazourka* Michener, new species**

Hoplitis (Hoplitina) bullifacies Michener, 1947, Bull. Amer. Mus. Nat. Hist.; 89:275 (male, not female).

This form, a member of the subgenus *Hoplitina*, is adequately described in the paper cited above. It differs from true male of *bullifacies*, described above, in having short antennae and dentate lateral margins of the sixth metasomal tergum, as well as in many other characters.

Holotype male: MAZOURKA CANYON, INYO MOUNTAINS, INYO COUNTY, CALIFORNIA, 7500 feet altitude, on *Cryptantha*, May 21, 1937 (C. D. Michener) [K. U.].

A second specimen of *H. mazourka* from Kramer Junction, San Bernardino County, California, April 20, 1953 (R. O. Schuster) [U. C., B.] has recently been received. It is not designated a paratype because of the darker margins of the metasomal terga and the absence of the weak median emargination of the seventh tergum but it seems certainly conspecific.

HOPLITIS TRUNCATA TRUNCATA (Cresson)

WYOMING: Newcastle, June (M. Cary) [U. N.]. SOUTH DAKOTA: Custer [U. N.]. NEBRASKA: Glen, Sioux County, 4000 feet altitude, August 20, 1906, on *Cleome* (H. S. Smith); War Bonnet Canyon, Sioux County, on *Pentstemon* (J. C. Crawford) [all U. N.].

HOPLITIS TRUNCATA MESCALERIUM (Cockerell)

COLORADO: Ute Creek, 9000 feet altitude, July 11 (R. W. Dawson) [U. N.]. ARIZONA: Williams, 7000 feet altitude, June 15, 1925 (A. A. Nichol) [U. A.]; White Mountains, June 19, 1950 (P. P. Cook) [K. U.]; Oak Creek Canyon, June 26, 1950 (L. D. Beamer) [K. U.].

This species has not previously been known west of central Colorado and New Mexico.

All of the specimens of the species *truncata* recorded above from Colorado, Wyoming, South Dakota, and Nebraska exhibit characters intermediate between the two subspecies. The Colorado specimen (a single female) is nearer to *mescalerium* while those from Wyoming, South Dakota, and Nebraska are nearer to *truncata*.

HOPLITIS PRODUCTA INTERIOR Michener

COLORADO: Artesia, Moffat County, on *Helianthus petiolaris*, July 23, 1950 (C. D. Michener) [K. U.]. WYOMING: Laramie, some on *Pentstemon angustifolium*, June 9, 1952 (R. H. Beamer, L. D. Beamer, W. E. LeBerge) [K. U.]. UTAH: Park City, June 11, 1952 (A. E. Wolf, C. H. Winer) [K. U.].

HOPLITIS GRINNELLI GRINNELLI (Cockerell)

BAJA CALIFORNIA: El Mayor, April, 1939 (C. D. Michener) [K. U.]. NEVADA: Twenty-two miles south of Las Vegas, on *Sphaeralcea ambigua*, April 3, 1953 (J. W. MacSwain) [U. C., B.].

HOPLITIS GRINNELLI SEPTENTRIONALIS Michener

IDAHO: Cub River Canyon, Franklin County, on *Pentstemon cyananthus*, June 1, 1948 (G. E. Bohart) [G. E. B.]. UTAH: Logan, on *Phacelia linearis*, June 4, 1948 (G. E. Bohart) [G. E. B.].

HOPLITIS UVULALIS (Cockerell)

IDAHO: Willow Flat, Franklin County, July 27, 1950 (C. D. Michener) [K. U.]. This is a new state record.

HOPLITIS HYPOCRITA (Cockerell)

ARIZONA: Santa Catalina Mountains, March 13, 1938 (R. H. Crandall); Sabino Canyon, February 24, 1938 (R. H. Crandall) [all U. A.].

HOPLITIS ALBIFRONS ARGENTIFRONS (Cresson)

NEBRASKA: War Bonnet Canyon, Sioux County, July 21, 1901 (M. Cary); Badlands north of Monroe Canyon, Sioux County, on *Astragalus*, June 24, 1901 (M. Cary) [all U. N.].

This is the first record of this form east of the Rocky Mountain states.

HOPLITIS LAEVIBULLATA (Michener), new combination

Anthocopa (Eremosmia) laevibullata Michener, 1943, Ann. Ent. Soc. Amer., 36:68 (female).

Hoplitis (Acrosmia) perissocera Michener, 1947, Bull. Amer. Mus. Nat. Hist., 89:299 (male) (**new synonym**).

Both sexes of this species were collected in numbers at Pinecrest, Tuolumne County, CALIFORNIA, July 16, 1952, on a low growing *Nemophila* (R. Snelling, J. I. Stage). (An additional specimen from the same locality was collected on June 29, by J. I. Stage). The association of sexes indicated by the above synonymy is thus established.

A female specimen previously recorded from Hanna, UTAH, July 14, 1949 (R. H. Beamer) [K. U.] and another from Logan, Utah, June 16, 1947 (G. E. Bohart) [G. E. B.] differ from California material in having the clypeal truncation wider, about equal in width to the distance from the end of the truncation to the lateral angle of the clypeus.

The subgenus *Acrosmia* is more similar to *Anthocopa* than is any other American group of *Hoplitis*. It has the robust body form typical of *Anthocopa*, particularly in the female. The first metasomal tergum has the anterior surface flat, not convex as in most *Hoplitis*. However, there is a distinct longitudinal sulcus in this surface, as in *Hoplitis*. Other features suggesting placement in *Hoplitis* are the absence of carinae on the rear coxae and the presence of a tooth (weak and blunt) on each side of the sixth metasomal tergum of the male. In addition to *H. laevibullata* this subgenus contains *H. plagiostoma* Michener and the new species, *rufina*, described below.

HOPLITIS PLAGIOSTOMA Michener

The following record, based on a single male, is the second known locality for this species. OREGON: Fish Lake, Steens Mountains, 7000 feet altitude, July 11, 1927 (H. A. Scullen) [U. C., R.].

***Hoplitis rufina* Michener, new species**

This is a species of the subgenus *Acrosmia* which differs from the other known species by the red abdomen. In the deeply emarginate seventh metasomal tergum of the male this species most nearly resembles *H. laevibullata* (Michener) but it differs from that form morphologically in the rounded median apical projection of the seventh sternum. The female differs from that of *laevibullata* not only in color but in the punctate clypeal swelling, the longer

clypeal truncation demarked by distinct angles, and other characters.

Female: Length 7 mm. (varying to 6 mm. among paratypes). Black with mandibles apically and under surfaces of flagella slightly brownish, tergulae brown, metasomal terga red except that sixth is black and extreme sides of fifth are infuscated (subapical dark band on fifth in specimen from Oregon). Wings brown, veins and stigma brownish black. Pubescence white, rather sparse, not forming bands on metasomal terga except laterally on first; sixth tergum with pale hairs scattered over surface. Head about as long as broad, inner orbits slightly converging below; clypeal truncation slightly broader than distance from end of truncation to lateral angle of clypeus, ends of truncation each demarked by distinct, slightly produced angle and middle of truncation also slightly produced so that the clypeal margin has three feeble projections (fig. 3); upper three-fourths of clypeus strongly convex; clypeus coarsely punctate, the punctures longitudinally elongate, especially anteriorly, wide smooth interspaces between punctures on median portion of convexity; remainder of head finely punctured, particularly finely and closely so on frons; median ocellus twice as far from antennal bases as from posterior margin of vertex; distance between posterior ocelli equal to distance from one of them to eye margin and to posterior margin of vertex; mandibular teeth equidistant; maxillary palpi five segmented, third segment much longer than the others, which are subequal in length. Mesonotum and scutellum slightly more coarsely punctate than vertex; mesepisterna more coarsely so than scutum; enclosure of propodeum granular throughout. Hind tibial spurs pale brown, curved apically. Abdomen with punctures shallow, mostly separated by several diameters, but fully as large as those of mesoscutum; surface between punctures shining but minutely roughened, particularly on posterior margins of the terga where punctures are weak and inconspicuous.

Male: Length 6 mm. Coloration similar to female but antennal flagella paler brown except for dark last segment; tegulae nearly black; fifth and sixth metasomal terga black except for reddish translucent apices, seventh black. Pubescence sparse and pale as in female except that face is largely covered with long white hair (largely worn off in allotype). Head much broader than long, finely and densely punctate except for hypostomal and lower genal areas where punctures are widely separated; inner orbits parallel; clypeus scarcely extending below lower ends of eyes, margin shining and impunctate, median portion made crenulate by five small convexities of which the median is broadest; median crenulate portion of margin exceeding lateral portions; antennal scape over four times as long as broad; last flagellar segment longer and broader than others, produced to one side to form a pointed process shorter than in *laevibullata* (process narrowly rounded in Utah specimen); first flagellar segment next in length, longer than broad; second and following segments about as broad as long; flagellar segments two to six with some long hairs on lower margin (short, few, perhaps worn or broken in allotype, long and curved as in other *Acrosmia* in specimen from Utah). Thoracic and abdominal sculpturing much as in female. Sixth metasomal tergum with a tooth at each side, seventh strongly

bilobed, lobes narrower than emargination between them, the latter deeper than a semicircle; exposed sterna as in *laevibullata* but sixth metasomal sternum with median process rounded, apparently not constricted basally.

Of the six known specimens of this species, no two have been collected at the same place. As indicated below, some of the specimens are not included among the paratypes because they are from remote localities and exhibit minor differences from the type series as indicated in parentheses in the description above.

Holotype female: MADERA COUNTY, CALIFORNIA, 3000 feet altitude, May 27, 1938 (R. M. Bohart) [C. A. S.]. *Allotype* male: Big Pine Creek, Inyo County, California, 7500 feet altitude, June 12, 1942 (R. M. Bohart) [C. A. S.]. One female paratype: Pine Flat, Tulare County, on *Viola purpurea*, May 3, 1947 (P. H. Timberlake) [U. C., R.].

Three additional specimens are from the following localities: CALIFORNIA: Tetley Park, San Bernardino Mountains, on *Nemophila*, May 23, 1936 (E. G. Linsley) [U. C., B.]. OREGON: Camp Abbot, Deschutes County, June 4, 1944 (P. A. Arnaud). UTAH: Logan Canyon, May 27, 1938 (Bischoff) [G. E. B.].

HOPLITIS BISCUTELLAE (Cockerell)

NEVADA: Twenty-two miles south of Las Vegas, on compositae and *Sphaeralcea ambigua*, April 3, 1953 (J. W. MacSwain); six miles south of Las Vegas, April 6, 1953 (R. F. Smith, J. Linsley) [all U. C., B.]. UTAH: Zion National Park [G. E. B.]. These are new state records.

ANTHOCOPA ELONGATA (Michener)

MONTANA: Lake St. Marys, Glacier National Park, June 1, 1938 (E. C. Van Dyke) [K. U.]. WASHINGTON: Sunrise, Mount Ranier, July 11, 1934 (O. Bryant) [C. A. S.]. These are new state records.

Anthocopa anthodyta bequaerti Michener, new subspecies

This form is distinguishable from typical *anthodyta* from California by the shape of the seventh metasomal tergum in the male, which has large lateral lobes, as long as the median spine of this tergum. The lateral margins of the tergum are slightly more convex than usual in typical *anthodyta*. In other respects, including the medially narrowed mandibles of the female and the long white apical fringe on the fourth metasomal sternum of the males, *bequaerti* resembles *anthodyta*.

Holotype male, *allotype* female, and two paratypes of each sex. BOX CANYON, SANTA RITA MOUNTAINS, ARIZONA, on red *Pent-*

stemon, April 23, 1949 (J. Bequaert) [M. C. Z.]. A pair of paratypes is in the Snow Entomological Museum.

***Anthocopa arizonensis* Michener, new species**

This species of the subgenus *Atoposmia* is closely related to *A. anthodyta* Michener but differs by the largely ferruginous tegulae, the ferruginous tibial spurs, and the more coarsely punctured posterior part of the abdomen.

Female: Length 7 mm. Agrees with the description of *A. anthodyta* (Michener, 1943) and with specimens of that species except in the following particulars: Clypeus distinctly red along anterior margin, its surface more convex than in *anthodyta*, the punctures medially separated by a little shining ground, a longitudinal median raised line (more noticeable in some paratypes than in holotype) present; mandibles much narrowed medially but not quite so much so as in *anthodyta*, so that length along lower margin is slightly less than four times shortest breadth; distance from subapical inner swelling to apex of third tooth much less than shortest width of mandibles. Tegulae ferruginous, dusky or black anteriorly; tibial spurs ferruginous. Abdomen with posterior margins of terga broadly translucent brown; punctures of abdomen unusually coarse, those of center of second tergum separated by one to two puncture widths, those of centers of third, fourth and fifth terga closer, many of them fully as large as largest punctures of mesoscutum.

Holotype female: GRAND CANYON, ARIZONA, June 7, 1940 (R. M. Bohart) [C. A. S.]. One female paratype, same data, 7000 feet altitude [U. C. L. A.]; one female paratype, same data, June 5, 1940 [K. U.]. One female paratype: Jacob Lake, Arizona, 8000 feet altitude, June 13, 1940 (R. M. Bohart) [U. C. L. A.].

ANTHOCOPA ABJECTA (Cresson)

Osmia abjecta Cresson, 1878, Trans. Amer. Ent. Soc., 7:103.

Hoplitis mesae Cockerell, 1930, Amer. Mus. Novitates, 397:2 (**new synonym**).

Anthocopa nigrior Michener, 1943, Ann. Ent. Soc. Amer., 36:54 (female, not male) (**new synonym**).

Larger series of *abjecta* than were available in 1943 show that the female described as *nigrior* is indistinguishable from individuals in Utah and Colorado populations of *abjecta*. The male described under *nigrior* is quite different from the male of *abjecta* and probably represents a distinct species whose female is unknown. It was unfortunate that it was associated with *nigrior* since it was not collected with the female specimens assigned to that species.

A re-study of the type of *mesae*, kindly lent for examination by Dr. M. A. Cazier of the American Museum of Natural History, shows that it is the male of *abjecta*, as was suggested earlier

(Michener, 1943). The dark pubescence is nearly all worn off of the legs and abdomen, but is still recognizable.

Male: Agrees with description of male of *alta* (Michener, 1943) except that distance between posterior ocelli is often equal to distance to posterior margin of vertex and to distance from ocelli to eye margin. Pubescence of head and thorax entirely pale as in *alta* but legs with pubescence largely black or fuscous; abdomen with much fuscous hair, the pale bands inconspicuous, sometimes visible only on first tergum, in other individuals evident on first four terga.

UTAH: Park City, on *Pentstemon moffatti*, June 11, 1952 (A. E. Wolf, W. E. LaBerge, Cheng Liang) [K. U.]; twenty miles east of Salt Lake City, June 11, 1952 (Cheng Liang) [K. U.]; Allen Canyon, July 3, 1950 (G. F. Knowlton, S. L. Wood) [G. E. B.]. COLORADO: Monarch Pass, July 5, 1949 (R. H. Beamer) [K. U.]; Trout Creek Pass, July 5, 1949 (J. R. White) [K. U.]; Science Lodge, west Boulder County, July 6, 1939 (U. N. Lanham) [K. U.]; Beaver Reservoir, on *Penstemon alpinus*, July 1, 1939 (P. H. Timberlake) [U. C., R.].

Anthocopa hebitis Michener, new species

This species, a member of the subgenus *Atoposmia*, is related to *A. pycnognatha* Michener with which it agrees in the short maxillary palpi and the ferruginous tegulae and tibial spurs. It differs from *pycnognatha* and from all other *Atoposmia* in the exceedingly fine and close punctuation of the face, vertex and dorsum of the thorax, there being no interspaces between punctures. It also differs from all other *Atoposmia* in the hind basitarsi; in the female they are finely and closely punctured, dull, and almost 2.3 times as long as broad. In the male they are somewhat less dull, 2.5 times long as broad. In all other species the hind basitarsi are shining, rather coarsely punctured, and comparable ratios are 2.5 to 3.0 for females, 3.0 to 4.0 for males. In the male of *hebitis* the lateral margins of the sixth metasomal tergum are relatively straight, not convex as in *pycnognatha*.

Female: Length 7 mm. Pubescence pale brownish, yellow on under surfaces of tarsi, whitish on sides of head and thorax. Punctuation of head and thorax fine and close, no interspace between punctures in most areas; punctures of clypeus scarcely coarser than those of frons, those of mesoscutum somewhat coarser than those of vertex; anterior ocellus somewhat behind midpoint between posterior edge of vertex and antennal bases; distance between posterior ocelli slightly shorter than distance from one of them to eye margin, more distinctly shorter than distance to posterior margin of vertex; pubescence of genal areas abundant, depressed, and directed forward; punctuation of genal areas particularly fine and close; clypeal truncation

about as long as distance from its rounded end to lateral angle of clypeus; mandibles slightly less than three times as long as shortest breadth, tridentate, subapical dorsal swelling rounded, distant from apex of third tooth by about one-third shortest breadth of mandibles; maxillary palpi little more than half as long as first segment of labial palpi, five-segmented but last segment short and exceedingly minute, third segment longer than the others, first, second and fourth subequal in length. Dorsum of thorax finely and closely punctured but somewhat more coarsely so than vertex; mesepisterna more coarsely punctured than mesoscutum, punctures slightly separated by shining ground; enclosure of propodeum somewhat roughened above; tegulae reddish brown, infuscated anteriorly; hind tibial spurs reddish brown, somewhat curved apically; hind basitarsi dull, minutely punctured, parallel-sided basally, tapering apically, 2.3 times as long as broad. Abdomen strongly punctured, the coarser punctures of sides of terga coarser than those of any part of thorax, punctures of middorsal parts of first three metasomal terga separated by less than a puncture width in most places and extending almost to posterior margins of terga; punctures of fourth tergum closer than those of preceding terga; punctures of fifth and sixth terga finer and about as close as possible; scopa yellowish white, short, hairs of second sternum not much longer than length of exposed portion of sternum; apical pubescent bands of terga broken medially on first three terga.

Male: Length 9 mm. Similar to female in appearance and punctuation. Clypeus but little more finely punctured than rest of head; distance between posterior ocelli equal to distance from one of them to eye margin and to distance to posterior margin of vertex; clypeal truncation slightly produced, demarked by distinct angles, much longer than distance from end of truncation to lateral angle of clypeus; margin of truncation slightly crenulate, narrowly impunctate. Punctuation of mesoscutum scarcely coarser than that of vertex. Third metasomal sternum with conspicuous, broad, fringed emargination; sixth tergum with strong tooth at each side, the apex of which is distinctly acute, laterally this tergum not strongly convex; seventh tergum with median tooth slightly exceeding the distinct lateral lobes; posterior margins of terga much more broadly reddish brown than in female.

Holotype female: MINERAL KING, TULARE COUNTY, CALIFORNIA, July 31, 1935 (G. E. Bohart). This specimen is being deposited at Dr. Bohart's request in the California Academy of Sciences.

Because it was not collected at the same place, the male specimen, from Huntington Lake, Fresno County, California, August, 1917 (I. McCracken) [C. A. S.] has not been designated as an allotype.

***Anthocopa rubrella macswaini* Michener, new subspecies**

Female: Length 5 mm. (varying to 4 mm. among paratypes). Agrees with typical *rubrella* Michener (from Texas) but is smaller (*rubrella* ranges from 5.6 to 7 mm. in length), with the median pair of small lobes on the clypeal margin broader, each consistently half as wide as the lateral apical lobes formed by the ends of the clypeal truncation.

Male: Length 5 mm. (varying to 4 mm. among paratypes). Agrees with typical *rubrella* except for smaller size.

Holotype female, *allotype* male, and two female and eight male paratypes: TWO MILES SOUTH OF BAKER, SAN BERNARDINO COUNTY, CALIFORNIA, April 4, 1953 (J. W. MacSwain [U. C., B.]). One male paratype: seven miles north of Vidal Junction, San Bernardino County, California, April 3, 1951 (P. D. Hurd) [U. C., B.].

The holotype and allotype are placed in the Snow Entomological Museum, University of Kansas.

A single male from twenty-two miles south of Las Vegas, Nevada, April 3, 1953 (J. W. MacSwain) [U. C., B.] is referred to this subspecies.

A single male, large enough to be typical *rubrella*, is from San Carlos Bay, SONORA, MEXICO, on *Dalea*, April 8, 1952 (L. D. Anderson) [U. C., R.].

***Anthocopa rubrella rubrior* Michener, new subspecies**

Female: Length 5 mm. (varying to 4.5 mm. among paratypes). Agrees with typical *rubrella* Michener (from Texas) except for the smaller size, the broader median lobes of the clypeal margin (each of which is nearly as wide as the lateral apical lobes formed by the ends of the clypeal truncation), and the larger amount of red coloration, as follows: mandibles except bases and apices, apical margin of clypeus, tegulae, posterior lobes of pronotum (black in some paratypes), posterior femora (largely black in some paratypes), inner surfaces of posterior tibiae (black in some paratypes), and entire metasoma, infuscated on sixth tergum and sternum. (In some paratypes middorsal areas on fourth and fifth terga, basal portion of sixth tergum and entire fifth and sixth sterna black). The pubescence seems denser and whiter than that of either *rubrella* proper or *macswaini*.

Male: Length 5.5 mm. (varying to 5 mm. among paratypes). Agrees with typical *rubrella* except in coloration, which is as in the female.

Holotype female, *allotype* male and one male paratype: HOPKINS WELL, RIVERSIDE COUNTY, CALIFORNIA, April 29, 1952 (J. G. Rozen) [U. C., B.]. One female paratype: twenty-four miles south of Indio, California, on *Dalea mollis*, March 25, 1933 (P. H. Timberlake) [U. C., R.]. One female paratype: eighteen miles west of Blythe, California, on *Dalea mollis*, April 30, 1952 (P. H. Timberlake) [U. C., R.]. One female paratype: Anza State Park, San Diego County, California, April 23, 1951 (R. C. Bechtel) [U. C., D.]. One male paratype: Borego, San Diego County, California, May 2, 1952 (J. G. Rozen) [U. C., B.].

The holotype and allotype are placed in the Snow Entomological Museum, University of Kansas.

This subspecies is much more different from the Texan *rubrella* than is *macswaini* from San Bernardino County. The latter is intermediate in certain respects. Nonetheless it is possible that *rubrior*

represents a different species but this probably will not be clear unless *rubrior* and *macswaini* are found to occur in the same area.

***Anthocopa hurdiana* Michener, new species**

This form is similar to *A. rubrella macswaini*, differing in the simple truncate clypeal margin of the female, the less convex and less shining upper part of the clypeus of the female, the slightly narrower genal areas of the female, the position of the ocelli slightly nearer to the posterior edge of the vertex in the female, and the slightly narrower head in the male.

Female: Length 5 mm. Agrees with the description of *A. rubrella* (Michener, 1949) except as follows: Clypeus truncate, truncation shorter than distance from its end to lateral angle of clypeus; upper two-thirds of clypeus less convex, its punctures rather close, much larger than those elsewhere on head; median ocellus about twice as far from antennal bases as from posterior edge of vertex; distance between posterior ocelli equal to distance from one of them to eye margin, much greater than distance to posterior edge of vertex; genal areas about half as wide as eye, seen from side. Tegulae brown, infuscated anteriorly; punctuation of mesoscutum like that of vertex, that of mesepisterna slightly sparser. Second metasomal tergum with black spot dorsally, third largely black dorsally.

Male: Length 5 mm. Differs from the description of *A. rubrella* as follows: Inner margins of eyes distinctly converging below.

Holotype female, *allotype* male, and one female paratype: SURPRISE CANYON, INYO COUNTY, CALIFORNIA, on *Dalea fremontii*, April 28, 1953 (P. D. Hurd) [U. C., B.]. The holotype and allotype are in the Snow Entomological Museum, University of Kansas.

***Anthocopa namatophila* Michener, new species**

This small black species is a member of the subgenus *Phaeosmia*, in so far as can be determined from the female alone. In size and in the presence of an apical flange, not hidden by a subapical fascia, on the sixth tergum, this species resembles *A. rubrella* Michener, *maryae* Michener and *hurdiana* Michener. It differs from the first two by the unmodified clypeal margin.

Females: Length 5 mm. Pubescence white, brushes of hair under margin of clypeus short but rather broad and orange, mandibles with some orange hair on outer surfaces but not forming a definite brush. Inner margins of eyes slightly converging below; anterior margin of clypeus produced to a broadly rounded truncation with rounded ends, length of truncation about equal to distance from end of truncation to lateral angle of clypeus, produced anterior marginal area of clypeus not directed forward; head rather finely punctured, punctures not widely separated, those of clypeus coarser than on rest of head; upper two-thirds of clypeus but little more strongly convex than lower third of clypeus and slightly more coarsely punctured than lower third; lower third with punctures exceedingly close except for the narrow impunc-

tate apical margin of truncation; anterior margin of clypeus rather broadly red; anterior ocellus twice as far from antennal bases as from posterior edge of vertex; distance between posterior ocelli about equal to distance from one of them to eye margin, nearly twice distance from one of them to posterior margin of vertex; mandibles red except basally, subapical inner swelling rather high and obliquely truncate distally, apex of median mandibular tooth about equidistant between apices of upper and lower teeth; maxillary palpi short, five-segmented, second and third segments subequal and longer than any of the others; first segment of labial palpus about half as long as second. Thorax about as coarsely punctate as head, disc of mesoscutum with punctures slightly more widely separated than those of vertex; mesepisternum with punctures slightly finer than those of mesoscutum, more widely separated than and slightly coarser than those of genal areas; upper portion of enclosure of propodeum slightly roughened, lower portion shining; tegulae testaceous, infuscated anteriorly; hind tibial spurs testaceous, slightly curved at apices; wings faintly dusky. Abdomen distinctly punctured; punctures of central portion of second tergum slightly finer than those of mesoscutum, separated by about a puncture width; posterior margins of terga broadly brownish with a distinct impunctate zone along the margin proper in front of which is a region of fine punctation; posterior margins of terga with bands of white pubescence which are not dense enough to obscure the brownish margins of the terga; sixth tergum without a subapical band of hairs but with scattered distinct white hairs over entire surface and with a brownish flange along posterior margin; scopa white.

Holotype female and three female paratypes: SEVEN AND ONE-HALF MILES SOUTH OF TWENTY-NINE PALMS, CALIFORNIA, on *Nama demissum*, May 7, 1949 (P. H. Timberlake) [U. C., R.].

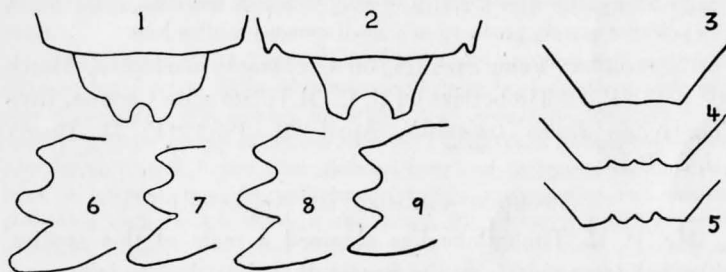
***Anthocopa segregata* Michener, new species**

Anthocopa robustula, Michener, 1943, Ann. Ent. Soc. Amer., 36:71 (Kearsarge record only).

Specimens of this species have been confused in collections with *A. robustula* (Cockerell). They differ particularly in the coarser punctation of the upper, convex part of the clypeus of the female, this region being conspicuously more coarsely punctured than any other part of the head. Also the subapical swelling of the inner margin of the mandible is weak and gently rounded, not strong and truncated apically as in *robustula*. The species is also close to *A. hypostomalis* Michener but differs in having the hypostomal carinae low with the longitudinal portions longer than the transverse portions.

Female: Length 8 mm. (paratype 7 mm.) Pubescence white, brushes of hair under margin of clypeus broad, rather long, orange; mandibles without brushes of orange hair on other surfaces. Inner margins of eyes very slightly diverging below; anterior margin of clypeus produced to a broadly rounded truncation with rounded ends, length of truncation about equal to distance from end of truncation to lateral angle of clypeus, produced portion of clypeus

not directed anteriorly; head finely punctate except for clypeus which has punctures much coarser than those elsewhere; upper two-thirds of clypeus distinctly convex, its punctures separated by one-third a puncture width; lower flat portion of clypeus with punctures slightly elongated, similarly separated; margin of clypeus impunctate, rather irregularly roughened; punctures of rest of head but little separated; anterior ocellus slightly behind midpoint between antennal bases and posterior edge of vertex; distance from posterior ocellus to eye margin very slightly greater than distance between posterior ocelli and about equal to distance from one of them to posterior margin of vertex; mandible slightly reddish throughout, subapical inner swelling low and rounded, apex of median tooth about midway between apices of first and third teeth, narrowest portion of mandible slightly more than one-fourth as long as mandible measured along lower margin; maxillary palpi five-segmented, second and third segments subequal and longer than others. Punctures of thorax coarser than those of top of head, those of



EXPLANATION OF FIGURES

1., Posterior end of abdomen of male of *Hoplitis bullifacies*. 2, Same, *Hoplitis rufina*. 3, Outline of clypeus of female, *Hoplitis rufina*. 4, Same, *Anthocopa rubrella rubrior*. 5, Same, *Anthocopa rubrella macswaini*. 6, Apex of mandible, *Anthocopa segregata*, female. 7, Same, *Anthocopa mirabilis*, male. 8, Same, *Anthocopa namatophila*, female. 9, Same, *Hoplitis rufina*, female.

mesoscutum and mesepisterna separated by about one-fourth a puncture width or slightly more; enclosure of propodeum roughened and dull laterally but smooth to upper margin medially; tegulae testaceous; hind tibial spurs bent apically, testaceous; wings nearly clear. Abdomen distinctly punctured but punctures much smaller than those of thorax, those of center of second tergum separated by two to three puncture widths; posterior margins of terga translucent brownish, very narrowly impunctate, with broad bands of white pubescence; entire sixth tergum with scattered white hairs; scopa white.

Holotype female: MAZOURKA CANYON, INYO MOUNTAINS, INYO COUNTY, CALIFORNIA, on *Parosela fremontii*, May 25, 1937 (C. D. Michener) [K. U.]. *Paratype* female: near Kearsarge, Inyo County, May 25, 1937 (E. C. Van Dyke) [C. A. S.].

ANTHOCOPA HYPOSTOMALIS Michener

The male of this species is here described for the first time.

Male: Length 7 mm. Similar in appearance to female. Pubescence largely white, that of dorsum of head and thorax yellowish. Inner margins of eyes distinctly diverging below; clypeus much more finely and closely punctured than rest of head, densely covered with white pubescence which obscures surface; anterior margin of truncation shining and crenulate; area behind ocelli not more coarsely punctate than rest of head; mandibles broader at level of apex of inner tooth than medially. Tegulae reddish testaceous; upper part of enclosure of propodeum smooth medially. Abdominal punctation somewhat coarser than in female but finer than that of a mesoscutum; sixth metasomal tergum with posterior margin truncated medially, the truncation continuous with the convex lateral margins, with no emarginations or teeth or lobes laterally and no projecting flange medially; seventh tergum with posterior margin slightly and broadly emarginate medially, scarcely exposed beyond sixth; second and following sterna brown rather than black; second large, its margin narrowly truncate medially; third with posterior margin broadly emarginate with a fringe of long yellowish hairs medially; fourth with posterior margin produced to a small rounded median lobe.

CALIFORNIA: Palm Springs, on *Cryptantha barbiger*a, March 30, 1945 (P. H. Timberlake) [U. C., R.]; Surprise Canyon, Inyo County, on *Dalea fremontii*, April 28, 1953 (P. D. Hurd) [U. C., B.].

ANTHOCOPA HEMIZONIAE (Cockerell)

Mr. P. H. Timberlake has obtained a male of this species, hitherto known only from the female. It is described as follows:

Male: Length 9 mm. Similar in appearance to female but pubescence even yellower, particularly that of dorsum of thorax; pubescence of face dense, largely covering surface, yellowish white in color. Inner orbits slightly converging below; head very finely and closely punctured, clypeus more finely so than rest of head; anterior margin of clypeus broadly impunctate with several irregular strong nodules; area behind ocelli not more closely or sparsely punctate than rest of head; mandibles not narrowed apically, breadth at apex of inner tooth equal to breadth near middle. Thorax little if any more coarsely punctate than head; hind tibial spurs slender and brown. Punctures of anterior metasomal terga slightly coarser than those of mesoscutum, separated by about half a puncture width; punctation of posterior terga progressively finer; sixth metasomal tergum medially truncate, this region with a projecting dark brownish flange lateral to which are shallow emarginations separating the truncation from the low, obtuse, rounded, lateral lobes; seventh tergum obtusely angulate medially, sides straight; second metasomal sternum large, its margin rounded, neither truncate nor emarginate but median portion somewhat produced posteriorly, therefore strongly rounded; third sternum with posterior margin nearly straight except for large median emargination filled with long yellowish hairs; posterior margin of fourth sternum broadly rounded.

CALIFORNIA: Gavilan, on *Helianthus gracilentus*, June 9, 1950 (P. H. Timberlake) [U. C., R.].

ANTHOCOPA MALLOGNATHA Michener

NEVADA: Twenty-two miles south of Las Vegas, April 4, 1953, on composite (J. W. MacSwain, E. G. Linsley) [U. C., B.]; six miles south of Las Vegas, April 6, 1953 (Ray F. Smith) [U. C., B.].

***Anthocopa mirifica* Michener, new species**

Anthocopa mortua, Michener, 1943, Ann. Ent. Soc. Amer., 36:78 (female, not male).

The female associated with the male *mortua* in 1943 proves to be quite unrelated to *mortua*, and is here renamed. It is described in the reference cited above. The most distinctive features of *mirifica* are the short clypeal truncation of the female, shorter than the distance from the end of the truncation to the lateral angle of the clypeus, and the short, robust, but tridentate mandibles of the male.

Male: Length 6.6 to 7 mm. Pubescence white, not obscuring surface of clypeus; inner orbits distinctly converging below; head rather coarsely and closely punctate, clypeus more finely and more closely so, particularly anteriorly; anterior margin of clypeus narrowly impunctate, truncation rounded laterally and much longer than distance from end of truncation to lateral angle of clypeus, medially with broad shallow emargination and median projecting tooth; mandibles short and robust, not narrowed medially, apices tridentate, distance from apex of lower tooth to middle tooth greater than distance from apex of middle tooth to upper tooth. Mesoscutum with punctation little if any coarser than that of vertex; mesepisterna with punctures similar to those of mesoscutum and genal areas; outer and posterior portions of tegulae brown; upper portion of enclosure of propodeum roughened. Metasomal punctation dorsally about as coarse as that of mesoscutum but punctures more widely separated although in most areas separated by no more than a puncture width, laterally punctures even coarser than those of mesoscutum; first five metasomal terga provided with apical bands of white pubescence; sixth tergum broadly truncate posteriorly with no distinct sub-lateral angles and without a projecting flange; seventh tergum broadly rounded posteriorly; second sternum large, posterior margin distinctly emarginate medially; third sternum broadly emarginate posteriorly, the emargination completely filled with a very long, yellowish fringe; fourth sternum with margin slightly produced and rounded medially; genital coxopodite robust although tapering to slender apex, hairs visible from above short but under surfaces subapically with rather long hairs.

Since the males associated with *mirifica* were not collected with females, they are not designated as types.

Holotype female: MAZOURKA CANYON, INYO MOUNTAINS, INYO COUNTY, CALIFORNIA, May 25, 1937 (N. W. Frazier) [K. U.]. One female paratype from each of the following localities, all in CALIFORNIA: near Darwin Falls, Argus Mountains, Inyo County, May

30, 1937 (C. D. Michener) [K. U.]; Westgard Pass, Inyo County, June 15, 1937, on *Encelia farinosa* (C. D. Michener) [K. U.]; Box Canyon, on *Chaenactis carphoclinia*, April 21, 1952 (P. H. Timberlake) [U. C. R.]. Eighteen female paratypes from seven miles west of Westgard Pass, Inyo County, California, some on *Encelia farinosa*, June 26, 1953 (J. W. MacSwain, N. Nakakihara, D. D. Linsdale) [U. C., B.].

Males are from Surprise Canyon, Panamint Mountains, Inyo County, California, on *Chaenactis brachypappa*, April 28 and 29, 1953 (P. D. Hurd) [U. C., B.] and (P. H. Timberlake) [U. C., R.].

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