

REVISION OF THE PARASITIC CHALCIDOID FLIES OF THE
GENERA HOMALOTYLUS MAYR AND ISODROMUS HOW-
ARD, WITH DESCRIPTIONS OF TWO CLOSELY RELATED
GENERA.

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The genus *Homalotylus* was erected by Gustav Mayr¹ for three European species which had been retained previously in *Encyrtus*—namely, *E. flaminus*, *vinulus*, and *flaviceps*—all described by Dalman in 1820. A few months after Mayr's work appeared, Thomson² published his genus *Nobrimus*, based on the same three and a doubtful fourth species, *E. eytelweinii* Ratzburg, which Mayr had synonymized with *E. flaminus* Dalman. *Nobrimus* has been considered a synonym of *Homalotylus* by subsequent writers, and *Encyrtus flaminus* Dalman is hereby definitely selected as the type, the same species having been selected by Ashmead in 1900 as the type of *Homalotylus*. The genus *Mendozaniella* Brèthes³ is unquestionably another synonym of *Homalotylus*, as its type *M. mirabilis* Brèthes, agrees throughout in description and figure with the species of *Homalotylus* belonging to the *flaminus* group. The genus also has been redescribed by Girault⁴ under the name of *Hemaenasoidea*, the genotype species, *H. oculata*, being closely allied to *Homalotylus vicinus* Silvestri.

Of the eighteen species which have been described or subsequently placed under *Homalotylus* only twelve rightfully belong here as the genus is now restricted. *H. vinulus* (Dalman) and *flaviceps* (Dalman) belong to *Isodromus* Howard; *H. lachni* Ashmead was referred by its author to *Phaenodiscus* in 1887,⁵ but in reality belongs to the genus *Microterys* Thomson; *H. similis* Ashmead becomes the type of the new genus, *Anisotylus*, which the writer has ventured to separate from *Homalotylus*, because of several peculiarities; *H. bifasciatus* Ashmead was removed by its author to *Meromyzobia* in 1900; and finally *H. latipes* Girault differs so profoundly in having scattered pin-punctures on the body, foliate hind tibiae, and a three-jointed club, that there is much doubt whether it has any close relationship to *Homalotylus* at all.

¹ Verh. zool.-bot. Ges. Wien, vol. 25, Dec., 1875, or Jan., 1876, pp. 686, 752.

² Hymenoptera Scandinavia, vol. 4, 1876, pp. 116, 137.

³ Anal. Mus. Nac. Buenos Aires, vol. 24, 1913, p. 97, fig. 7.

⁴ Annals Entom. Soc. Amer., vol. 9, Sept., 1916, p. 307.

⁵ Trans. Amer. Entom. Soc., vol. 14, p. 190.

Of the twelve species remaining in the genus, *H. eytelweinii* (Ratzburg), *orci* Girault and *microgaster* Girault seem to be synonymous with *flaminius* (Dalman), and *H. obscurus* Howard in all probability is a synonym of *H. terminalis* (Say), thus leaving eight valid names of specific or subspecific rank, as the present or subsequent investigations may show. These in the order of their inception are as follows: *H. flaminius* (Dalman), *terminalis* (Say), *scymni* (Shimer), *alvatarsus* Gahan, *mirabilis* (Brèthes), *vicinus* Silvestri, *californicus* Girault, and *oculatus* (Girault). In the following pages a substantial addition is made to this list by the characterization of eight new species.

Genus HOMALOTYLUS Mayr.

- Homalotylus* MAYR, Verh. zool.-bot. Ges. Wien, vol. 25. 1876, pp. 686, 752.—ASHMEAD, Proc. U. S. Nat. Mus., vol. 22, 1900, pp. 337, 344, 377; Mem. Carnegie Mus., vol. 1. No. 4, 1904, pp. 301, 308.—SCHMIEDEKNECHT, Genera Insectorum, Fasc. 97, 1909, pp. 212, 219, 235, 263, 267, pl. 5, figs. 5-6.
Nobrimus THOMSON, Hymen. Scand., vol. 4, 1876, pp. 116, 137.
Mendozaeniella BRÈTHES, Anal. Mus. Nac. Buenos Aires, vol. 24, 1913, p. 97, fig. 7.
Hemaenasoidea GIRAULT, Annals Entom. Soc. Amer., vol. 9. 1916, p. 307.

Female.—Head subhemispherical, about as wide as the thorax, usually a little longer than wide, the thickness fronto-occipitally somewhat less than one-half the length; as seen from in front the outline is either nearly circular or broadly oval with the oral margin truncate, as seen from the side the curvature is nearly uniform from the vertex to clypeus although often more abrupt at either end; the occiput nearly flat or but slightly concave above, with the neck inserted near the middle; the vertex narrow at the posterior ocelli, the frons gradually increasing in width anteriorly, so that the anterior corners of the eyes are separated by a space twice or more greater than the width of the vertex; ocelli placed in an acute-angled or at most an equilateral triangle, the posterior pair almost touching the eye-margins; eyes large, narrowly oval, nearly or quite twice as long as wide, posteriorly nearly touching the occipital margin and strongly divergent anteriorly; cheeks short or about equal to one-half the width of the eyes; face short and broad, entirely without antennal scrobes, the antennae inserted rather far apart and close to the clypeal margin, the space between their sockets moderately convex yet never prominently elevated. Scape long and slender, about equal to the length of the head or a little more, the radicle joint about one sixth of the total length, the scape proper often slightly curved on the basal half, the dorsal side convex, the inferior surface flattened and grooved on the apical half or third for the reception of the pedicel, the inner, inferior margin at the apex often lamellately produced, but never more than slightly so; pedicel obovate, about equal to the first and a half or sometimes the whole of the second funicle joint combined; funicle six-jointed, cylindrical, never increas-

ing more than slightly in thickness distad, the joints usually nearly equal in length except that the first one is often a little the longest, the following most often but little or no longer than thick, and rarely more than a half longer than thick; club solid, and strongly obliquely truncate from apex to base through the shrinkage of the softer wall of the inner side (by the rotation of the flagellum the truncation, however, usually appears to be on the underside or even on the upperside), thus producing a very acuminate, conical effect; in at least two species (*affinis* and *brevicauda*) a slight trace of segmentation reappears as an atavistic character, in which case the club is broader across the base, less conical, and truncate only to about the basal third; in length the club nearly or quite equals the last three funicle joints combined. Mandibles rather short and robust, broad at apex and tridentate, the teeth short and rather blunt (*flaminivus* and allies), the two on dorsal or inner side separated by a shallow emargination only, or they may be considerably longer and more acute in varying degrees (species of the *vicinus* and *cockerelli* groups), the middle one sometimes a little longer than the other two. Palpi short, the maxillary pair four jointed, with the apical joint a little the longest and slenderest and the basal joint the shortest; the labial pair three jointed with the middle joint considerably shorter than the other two, or sometimes two jointed with the apical joint shorter than the basal.

Thorax rather short and robust, cylindrical, not at all depressed; pronotum short and arcuate, the mesoscutum twice as wide as long; axillae triangular, acutely meeting, their surfaces perfectly flush with the surface of the scutellum; the latter large, well elevated, triangular and rather acute at apex, the sides from base to apex abruptly declivous; propodeum narrow at the middle, gradually widening towards the sides, the spiracles small and oval, situated at the anterior lateral corners. Wings large, rather wide, reaching well beyond the apex of the abdomen; venation reaching about to the middle of the disk, marginal vein somewhat longer than thick; the stigmal slender and moderately long, nearly parallel with margin or at a very acute angle with the submarginal vein, not or but little enlarged at apex although not rarely attenuated towards the base; postmarginal well developed, tapering from a thick base to extreme tenuity at a point about opposite the end of the stigmal vein, sometimes appearing either somewhat shorter or somewhat longer than the stigmal; disk of the wing thickly ciliated, but not uniformly so as to appearance, the basal third of the disk having the cilia transparent, and a large oval area in the middle of the disk beyond the end of the stigmal vein with similar cilia (seen most advantageously in slide mounts of the wing); speculum (or oblique hairless streak) narrow but distinct, running from the base of the stigmal vein obliquely towards the opposite

margin but lost in the area of transparent cilia at about two-thirds of the distance across the disk. Legs, especially the middle and hind pairs, long and for the most part slender, the front and hind femora and the hind tibiae compressed and a little widened, the middle tibiae slender, cylindrical, but rather abruptly enlarged at the apex; front and hind tarsi slender, the joints of the front pair nearly equal, with the first joint but little longer than the following, the first joint of the hind pair about twice as long as any of the following joints, middle tarsi considerably thicker than the other pairs, the first joint nearly as long as the following joints combined, and with a row of fine, short, close set spines on each side beneath, the following joints gradually tapering so that the apical joint is no thicker than the same joint of the front or hind tarsi; middle tibial spur very long, and rather stout, about equal to the first tarsal joint in length; hind tibiae with but one small but distinct apical spur.

Abdomen about two-thirds as long as the thorax, depressed (if not distorted as sometimes happens), as broad as long or even wider, the sides nearly parallel as far as the tactile plates, and from that point bluntly rounded or very obtusely angled to the apex; the first tergite (not counting the propodeum) by far the longest or covering nearly one-half of the dorsal surface, the following one or two segments often concealed by it; the tactile plates situated at about a fifth of the distance from the apex to the base, the vibrissae unusually short and inconspicuous; on the venter the basal tergites nearly meet at the meson, the apical ones diverging towards the apex, leaving only the fifth ventrite plainly visible, the latter reaches to the apex and encloses the ovipositor but is not at all compressed except in distorted specimens that simulate the posture assumed during the process of oviposition; ovipositor in species of the *flaminus* group concealed or nearly so but in species allied to *vicinus* and *cockerelli* it is prominently protruded and slender.

Sculpture of the dorsal surface of the head very finely punctulate, the minute punctures being rounded and separated by slightly elevated interstices; face, frons, and to a less extent the vertex in all but two species (*vicinus* and *oculatus*) with more or less distinct, scattered, small, and shallow pin punctures; upper part of the occiput finely lineolate, either transversely or more or less rimosely or reticulately so in some species; pronotum and mesoscutum very finely scaly-reticulate with scattered setiferous punctures of great minuteness, the pleura with a similar but slightly coarser sculpture, the lines on the greater part of the mesopleura being longitudinally arranged; axillae and scutellum with a sculpture of the same type as that of the frons, but somewhat coarser, the interstices between the punctures more elevated, thus producing a much more opaque effect, and the pin punctures always absent; metapostnotum transversely lineolate

the propodeum nearly smooth; dorsum of the abdomen, especially at the first tergite, reticulately lineolate in varying degrees of coarseness, but always much more coarsely scaly than the mesoscutum.

Pubescence of the head and mesoscutum short and scattered, but rather prominent in the dark-colored species on account of its white color, that of the scutellum, however, often blackish (as in the *flaminus* group); the silvery white pubescence of the metapleura and upper surface of the hind coxae very thick, appressed, and practically concealing the underlying surface.

Coloration more or less metallic, greenish black predominating in the species of the *flaminus* group; in the other species the head and scutellum often orange yellow or orange brown; axillae and scutellum always much more opaque than the scutum; club of antennae always white, and the tegulae white with the apical margin more or less brown or blackish; wings always with a broad smoky band across the middle of the disk, the apex in some species also smoky but to a less degree.

Male.—The two sexes are so similar in almost all details that it is sometimes difficult to distinguish them. In species having an exerted ovipositor the males, of course, are distinguished at a glance, and in the other species they can generally be known by a prominent longitudinal fold along the meson of the venter. In three of the known species (*vicinus*, *africanus*, and *oculatus*) the scape of the male is prominently notched on the upper side just beyond the middle.

Type of genus.—*Encyrtus flaminus* Dalman. (Selected by Ashmead, 1900.)

The genus on the whole is correctly placed in Ashmead's tables, and for one who is familiar with their shortcomings it is easily identified. However, the term "lenticular" used in couplets 16 and 66¹ is undoubtedly inaccurate and misleading, as a menisciform shape is meant. As a matter of fact the head of *Homalotylus* is more nearly lenticular than it is in the *Bothriothorax* series of genera (although by no means menisciform), and this discrepancy in the tables probably led Brèthes to erect the genus *Mendozianella*. Schmiedeknecht² follows Ashmead in this error.

In Girault's tables³ *Homalotylus* is impossibly placed, as the club is not three-jointed but distinctly solid in almost all of the species. Both it and *Isodromus* Howard should run to *Isodromoides* Girault (on page 120); the latter genus, however, is apparently only superficially similar to these. Girault also uses the term "lenticular" or "convex-lens-shaped" in several places, but defines his meaning on page 183.³

¹ Mem. Carnegie Mus., vol. 1, No. 4, pp. 300, 306.

² Genera Insectorum, Fascicule 97.

³ Mem. Queensland Mus., vol. 4, pp. 120-128.

and it is possible that in such cases more or less interbreeding takes place, although this is not yet proved. Thus at Brownsville, Texas, at least four variations of *H. terminalis* (Say) have been discovered, all apparently from the same host, *Coleomegilla maculata fuscilabris* (Mulsant), and two of which are practically at either extremes of the colorational range of the species.

In this connection it would be well to note that all specimens of the same brood are practically identical in coloration, and this holds true also when the parasites are bred through several generations.

The writer's experience in this connection has not been so extensive as desirable, yet it is of considerable interest. In the summer of 1913 a brood of *H. californicus* Girault was reared at Salt Lake City, Utah, from a larva of *Adalia bipunctata* (Linnaeus), and the parasites were carried through several generations on the same host with the greatest ease. In the spring of 1915 a few specimens of *H. terminalis* (Say), belonging to a dark-colored variety, were collected at Brownsville, Texas, in a small plot of oats where the larvae of *Coleomegilla* had been abundant a short time previously. These were supplied with larvae of *Coleomegilla*, but failed to show any interest in them. Specimens reared a few weeks later from a larva of the same host collected near Brownsville behaved in the same manner and also refused to attack larvae of two or three other species of Coccinellids including *Cycloneda rubripennis* Casey and *Adalia bipunctata* (Linnaeus). This behavior seemed unaccountable, as usually *Homalotylus* females like all other Encyrtids handled by the writer have oviposited in captivity with much readiness when supplied with their customary host, yet it must be admitted that the parasites were not given a complete trial on account of the press of other work. In July of the same year (1915) a brood of *Homalotylus californicus* Girault was reared at Salt Lake City, Utah, from a larva that was considered at the time to belong probably to *Hippodamia convergens* Guérin, and a series of experiments was started with these females, which, although not complete, has more than the usual significance. Unfortunately no larvae of *Hippodamia convergens* were at hand for experimentation, but larvae of the following species were exposed to the parasites under close observation: *Hippodamia parenthesis* (Say), *Hippodamia lecontei* Mulsant, *Hippodamia 5-signata uteana* Casey, *Hippodamia 5-signata ambigua* LeConte (from Oregon stock), *Coccinella 5-notata* Kirby, *Coccinella 9-notata* Herbst, *Coccinella difficilis* Crotch, *Olla abdominalis* (Say) (from Texas stock), and *Naemia seriata* (Melsheimer) (from Texas stock). Of all these possible hosts only *Coccinella 5-notata* and *Coccinella difficilis* proved attractive to the parasites, and the larvae of these two species were immediately parasitized when exposed to the females. The larvae of the other species were either entirely disregarded, or rejected by

the females after being examined. A larva of *Naemia seriata*, however, that had been rejected on July 26 was attacked and parasitized on the following day, after it had been kept over night in a vial with larvae of *Coccinella 5-notata*, in the meantime evidently having absorbed some of the more attractive odor of the latter species. Another *Naemia* larva was rejected again, however, after being kept with larvae of this *Coccinella*.

Although the larvae of *Coccinella 5-notata* and *difficilis* were immediately attacked when exposed to the *Homalotylus*, the results of parasitism on the whole suggested the great probability that neither of these species was a customary host. Thus, out of the four larvae of *5-notata* which were parasitized only one produced *Homalotylus*, two transformed into beetles, and one died in the pupal stage and showed no sign of parasitism when dissected. Only two larvae of *difficilis* were used in the experiments, one dying in the larval stage, the other in the pupal stage, without signs of parasitism in either case. On the other hand, the single larva of *Naemia* which was parasitized produced *Homalotylus* in due time, but *Naemia* does not occur in Utah and the species succumbed more because of weak resistance perhaps than because of adaptation to it on the part of the parasite. A similar case was observed at Whittier, California, in the summer of 1912, when the same species of *Homalotylus* was reared from *Cheilomenes sexmaculatus* (Fabricius), an Indian species of Coccinellid, which the writer was attempting to establish in California at that time. Two parasitized larvae of this beetle were found on a walnut tree where the Coccinellids had been liberated previously and on which the larvae of *Olla abdominalis* were also abundant, the latter species probably serving as the usual host for the parasite.

These observations and experiments have led the writer to believe in the existence of physiological races as noted above. *Homalotylus* has been reared also from Chrysomelid larvae on at least two different occasions, once in Europe as recorded by Francis Walker, and once in North America by George Dimmock. In the light of the above experiments it does not seem probable that a *Homalotylus* coming from a Coccinellid host would attack or at least successfully parasitize a Chrysomelid larva, when even closely related species of Coccinellids may be rejected or found resistant to parasitism. The forms parasitizing Chrysomelids therefore are probably extreme physiological races, although in other respects they appear to be identical with the ordinary forms.

Because of the difficulty in deciding about the identity of colorational forms the writer resorted to a study of the male genitalia in the hope of finding useful contributory characters, but without satisfactory results. Although minute differences could be detected they did not seem to present enough constancy among themselves nor any

striking variation from the same parts in obviously distinct species belonging to other groups of *Homalotylus*.

The following key to the species of the *flaminius* group, although based entirely on the female sex, will be found equally useful to separate the males, on account of the close similarity between the sexes.

KEY TO THE SPECIES OF THE FLAMINIUS GROUP.

1. Distal half of funicle and the club white or yellowish white.....4.
 Funicle entirely blackish, except rarely the sixth joint, the club white.
 Head seen from in front noticeably longer than wide.....6.
 Head seen from in front not appreciably longer than wide.....3.
2. Head and thorax greenish black or more rarely bluish black.
 1. *flaminius* (Dalman).
 Head and most of thorax ferruginous or more or less miniacious, the mesoscutum black.....2. *mirabilis* (Brèthes).
3. Head yellowish brown, or if greenish with a bronzy luster.....3. *terminalis* (Say).
 Head dark green or greenish black, with a metallic greenish luster.
 4. *californicus* Girault.
4. Middle and hind tarsi white.....5.
 Middle tarsi yellowish white; the hind tarsi blackish brown.
 5. *mexicanus*, new species.
5. Mesoscutum and abdomen blackish brown; head and rest of body ferruginous; front and middle legs ferruginous, the hind legs dark brown.....6. *albitarsus* Gahan.
 Body brown, the head pale yellowish, the legs paler brown.....7. *scymni* (Shimer).

1. HOMALOTYLUS FLAMINIUS (Dalman).

Plate 38, figs. 2-4.

Encyrtus flaminus DALMAN, Svensk. Vet.-Akad. Handl., vol. 41, 1820, p. 340.

Encyrtus eytelweini RATZBURG, Ichn. der Forstins., vol. 1, 1844, p. 210.

Encyrtus apicalis RATZBURG, Ichn. der Forstins., vol. 3, 1848, p. 145 (not Dalman, 1820).

Homalotylus flaminus MAYR, Verh. zool.-bot. Ges. Wien, vol. 25, 1876, p. 753.—MASI, Boll. Portici Lab., vol. 1, 1907, p. 288, fig. 42-43.

Nobrimus flaminus THOMSON, Hymen. Scand., vol. 4, 1876, p. 138.

Nobrimus eytelweini THOMSON, Hymen. Scand., vol. 4, 1876, p. 139.

Homalotylus orci GIRAULT, New Javanese Hymenoptera, Washington, D. C., Mar., 1917, p. 3.

Homalotylus microgaster GIRAULT, Insec. Insc. Menst., vol. 5, Oct., 1917, p. 134.

Female.—Head subhemispherical, rather thin fronto-occipitally, about one-fifth longer than wide, as seen from the side the curvature nearly uniform from the oral to the vertical margin, thickest at or near the middle, the distance from the lower, inner corners of eyes to the antennal sockets being about equal to the distance from the lower, outer corners of eyes to the occipital margin; eyes moderate in size, elliptical in outline, fully twice as long as wide, strongly converging above so that the vertex is about one-half as wide as the face at the lower corners of eyes; ocelli in an acute-angled triangle, the lateral pair touching the eye-margin and nearly as far removed from the vertical margin as from the anterior ocellus; face hardly

protuberant between the antennal sockets, the rims of the latter flush with the surface of the face. Antennal scape linear with the lower margin slightly expanded as a narrow rim on the apical half, forming a slight groove on the exterior surface for the reception of the pedicel: the latter nearly as long as the first two funicle joints combined; funicle joints decreasing slightly in length distad, the first about one-half longer than thick, rarely but little longer than thick, the sixth as thick as long; club slightly longer than the last three funicle joints combined, hardly thicker and obliquely truncate beneath. Thorax, abdomen, and legs as described under the generic heading; the ovipositor not protruded. Forewing with a broad more densely ciliated cross-band across the middle of the disk, the basal area proximad of the cross-band with weaker, paler cilia, or in large part bare, and the apical part beyond the band moderately thickly ciliated but enclosing between itself and the cross-band an oval spot of much weaker, paler cilia, variable in size, but always well separated from either margin of wing, the speculum narrow but distinct, originating at the base of the stigmal vein and becoming lost at the middle of the disk in the bare area at base of wing. Head microscopically, punctulately shagreened, the punctures roundish, extremely close set and with slightly raised interspaces, the upper part of occiput similarly shagreened but rimosely, transversely striate with very fine raised lines instead of punctulate; face, frons, and vertex to much less degree also provided with shallow, rather small setigerous pin-punctures, which are scattered but rather numerous; pronotum and mesoscutum microscopically, closely reticulate, with numerous scattered, minute, setigerous punctures; axillae and scutellum sculptured like the fronto-vertex, but the microscopic punctures considerably deeper, producing a much more opaque effect, those on the axillae slightly larger, more oval, and transversely arranged; propleura, prepectal plates, tegulae, and anterior half of mesopleura like the scutum, but the reticulations considerably coarser, the posterior half of mesopleura becoming longitudinally striate; metanotum transversely and very finely aciculate, the propodeum nearly smooth; abdomen coarsely, longitudinally reticulate on the sides of the first tergite, transversely and more coarsely reticulate at the middle of the tergite, and becoming smooth on the anterior margin of the segment, the following segments especially the next two with a similar sculpture. Length, 1.21 to 2 mm.

Head dark olive green (R.)¹ with a strong but not brilliant metallic luster, rarely somewhat bluish black, the clypeal region up to the bases of the antennae somewhat brownish yellow; pronotum and mesoscutum greenish or more rarely bluish black with a metallic

¹ An "R." in this and the following descriptions implies that the color in question had been determined after comparison with Ridgway's color plates in *Color Standards and Nomenclature*, Washington, D. C., 1912.

luster; axillae and scutellum dull, opaque black except when viewed at a strongly oblique angle from the sides or in front when a metallic luster appears; metanotum, propodeum, and abdomen black with a bluish or greenish luster; sides and underparts of thorax usually shining brownish yellow, but not rarely becoming entirely metallic black, more greenish on the propleura and rather strongly bluish on the mesopleura, in the intermediate forms the dark coloration appearing first on the posterior half of the mesopleura; tegulae ivory white with their apical margin black. Antennae black with a slight bluish metallic luster on the scape and pedicel, the funicle duller, often slightly brownish, the sixth joint varying to paler, not infrequently becoming white or yellowish white like the club. Wings with a broad, brownish crossband across the middle, coterminous with the band of darker colored cilia described above, wider on the anterior margin, paler and narrower on the posterior margin, the apical margin of band itself slightly convex and originating at the apex of the stigmal vein. Legs variable, the front and hind tarsi brownish or blackish, the middle tarsi and spur white or yellowish white, except in the typical European form, which has the coloration of the middle and hind tarsi reversed; in the paler forms the front coxae and femora and the middle femora are yellowish brown, the remaining parts, except the tarsi as noted above, dark brown or blackish, often with a metallic luster on middle coxae and the hind femora; in the darker forms the legs become entirely black or blackish with a more or less distinct metallic luster, with the exception of the white middle tarsi and spurs. Vestiture of head consisting of white, scattered subappressed, short hairs most numerous on the face and especially around the antennal sockets; pronotum and mesoscutum with a similar white pubescence, the axillae and scutellum with a darker colored pubescence; metapleura densely white pubescent, the coxae of middle and hind legs similarly but considerably less densely pubescent.

Male.—Hardly differs from female, but the band on the wings is not so deeply stained and the size averages smaller. Length, 1.45 to 1.83 mm.

The following material all seems referable to *flaminius*:

Series 1. One female reared from material of *Pseudococcus citri* (Risso), probably issuing from a larva of *Exochomus quadripustulatus* (Linnaeus), Palermo, Sicily, June, 1914 (H. L. Viereck), California State Insectary No. 727B. Head metallic olive-green (R.), the upper parts of thorax and the abdomen black, the pronotum and mesoscutum with a greenish luster, the metanotum, propodeum, and abdomen with a slight bluish luster; oral margin of face, underparts of thorax and middle femora ochraceous tawny (R.); the front and middle coxae similar beneath, but metallic bluish above, the front femora

brownish, the rest of front legs and the hind legs brownish black with a slight bluish luster on the hind coxae and femora, the middle tibiae and spur dark brown, and middle tarsi white above but blackish beneath, the last two joints brownish even above. First funicle joint slightly longer than thick, the following joints subequal and about as long as thick; postmarginal vein about a fifth longer than the stigmal. Length, 1.72 mm.

Series 2. One female reared from material of *Saissetia oleae* (Bernard), actual host unknown, Cape Town, South Africa, March 15, 1907 (C. P. Lounsbury). Head invisible green (R.) with a metallic slightly bluish luster, pronotum and mesoscutum shining black, with a bluish green luster, axillae and scutellum opaque blackish, rest of thorax and the abdomen metallic blue-black; legs brownish black; the middle tibiae, front and hind tarsi and last two joints of middle tarsi more brownish; the coxae, femora, and hind tibiae with a bluish luster, the spur of middle tibiae and the first three joints of middle tarsi yellowish white. First funicle joint about a fourth longer than thick, the following joints gradually shortening, the sixth as thick as long; postmarginal vein slightly longer than the stigmal. Length, 2 mm.

Series 3. One female, Swatow, China (A. Koebele). Colored like the Cape Town female, but the head slightly more bluish in luster, the notum slightly more greenish, the mesopleura not as deeply blue-black, the middle femora with apical half on outer surface brownish yellow, only the last joint of middle tarsi brownish black and the last funicle joint brownish. First funicle joint about a sixth longer than thick and no longer than the second, the last two funicle joints no longer than third; the postmarginal vein a little shorter than the stigmal. Length, 1.85 mm.

Series 4. Eight females, two males, China (A. Koebele), Koebele's No. 1200. Head metallic olive green, the notum greenish black, otherwise like the Swatow specimen, but the legs slightly more brownish with a less distinct bluish luster, the middle femora with a narrow yellowish or whitish annulus near the base, and the funicle of antennae more brownish, the last joint becoming yellowish at apex. First funicle joint nearly twice as long as thick, distinctly longer than the second, the following joints shortening but the sixth still slightly longer than thick; the postmarginal vein a little shorter than the stigmal. Length of female, 1.94 to 1.98 mm.; length of male, 1.83 mm.

Series 5. One male, China (A. Koebele), Koebele's No. 1146. Head nearly sepia (R.) but darker with very little luster, the clypeal margin and a transverse spot above antennal sockets and between the lower corners of eyes cinnamon buff (R.), otherwise much like the preceding series except that the underparts of thorax, the abdomen, and legs are more brownish with but little or no bluish luster. First

funicle joint about a fourth longer than thick, following joints all shorter except the fourth, the sixth no longer than thick; the post-marginal vein nearly as long as the stigmal. Length, 1.45 mm.

Series 6. Four females, one male reared from larvae of *Coccinella repanda* Thunberg, Brisbane, Queensland, Australia, September, 1915 (J. C. Bridwell). Colored like series 4 (Koebele's No. 1200), but the head darker green, the funicle blackish except the last joint, which is brownish, and the middle femora a little darker brown. First funicle joint about a fourth longer than thick and a little longer than the second, the last four funicle joints about as long as thick; post-marginal vein slightly shorter than the stigmal. Length of female, 1.53 to 1.82 mm.; length of male, 1.49 mm.

Series 7. One female, one male reared from larva of *Coccinella kingi* MacLeay, Australia (A. Koebele), Koebele's No. 20. Head slightly bluish black with a weak luster, the postorbital region more greenish; notum of thorax dark greenish black, the underparts nearly bister (R.) with the posterior part of mesopleura nearly bluish black; abdomen bluish black; legs concolorous with pleura, the front femora, middle coxae and femora paler or about snuff brown (R.), the front coxae with a purplish luster beneath, middle tarsi except the last joint and the tibial spur yellowish white; scape bluish black, the pedicel and funicle brownish, the club yellowish white. First funicle joint a half longer than thick, the following joints gradually shortening, the sixth about as long as thick; postmarginal vein a little shorter than the stigmal. Length of female, 1.83 mm.; length of male, 1.67 mm.

Series 8. Two females reared from larva of *Verania frenata* (Erichson), Australia (A. Koebele), Koebele's No. 4. Colored practically as in the preceding series. Funicle joints all about equal and as long as thick, except that in one specimen the first joint seems a trifle longer than thick; postmarginal vein nearly as long as the stigmal. Length, 1.21 to 1.24 mm.

Series 9. One female, one male, reared from larvae of *Orcus australasiae* (Boisduval), Australia (A. Koebele), Koebele's No. 2. Colored very nearly as in series 4 (Koebele's No. 1200), but the sixth funicle joint entirely yellowish white and the middle femora a little more brownish. First funicle joint nearly a half longer than thick, the following joints shortening, the sixth about as long as thick; post-marginal vein a little shorter than the stigmal. Length of female, 1.89; length of male, 1.63 mm.

Series 10. Four females, one male reared from larvae of *Orcus chalybeus* (Boisduval), Australia (A. Koebele), Koebele's No. 1. One female like the preceding series, the rest similar but the underparts of thorax varying to cinnamon brown (R.), the middle femora

about buckthorn brown (R.), the middle tibiae a little darker, and the rest of the legs except the middle tarsi and spur brownish black with a slight bluish luster on the coxae. First funicle joint about a fourth longer than thick, the following joints about as long as thick; postmarginal vein a little shorter than the stigmal. Length of female, 1.74 to 1.88; length of male, 1.51 mm.

Series 11. Three females, one male reared from an *Orcus* species (the larval remains mounted with the parasites seem identical with those labeled *O. australasiae* under Koebele's No. 2), Australia (A. Koebele). Like the preceding series except that the underparts of the thorax and the front and middle coxae and femora are ochraceous tawny (R.), the middle tibiae cinnamon brown (R.), the front tibiae and tarsi a little darker, the hind legs blackish brown, and all the coxae with bluish luster; but in two of the females the front legs, except the coxae and underside of femora, and the middle tibiae are concolorous with the hind legs. First two funicle joints a little longer than thick, the following joints about as long as thick; the postmarginal vein about as long as the stigmal. Length of female, 1.77 to 1.86; length of male, 1.63 mm.

Series 12. Two females, two males reared from *Orcus nummularis* (Boisduval), Australia (A. Koebele), Koebele's No. 47. Practically identical with the darker specimens of the preceding series. Length of female, 1.60 to 1.73; length of male, 1.55 mm.

Series 13. Two females, one male reared (at Honolulu, Hawaii) from larva of *Orcus lafertei* Mulsant, Bundaberg, Queensland, December 16, 1904 (A. Koebele and R. C. L. Perkins). Much like the preceding series, but the coxae are more bluish metallic and the mesoplura have a bluish luster. First two funicle joints about a fourth longer than thick, the following joints gradually shortening, the sixth about as long as thick; the postmarginal vein nearly as long as the stigmal. Length of female, 1.83 to 1.93; length of male, 1.76 mm.

Series 14. Two females (cotypes of *H. microgaster* Girault), Australia (A. Koebele). Practically identical with series 9. Length, 1.60 mm.

Series 15. Two females (cotypes of *H. orci* Girault) reared from larva of *Orcus janthinus* Mulsant, Salatiga, Java. Colored much as in the preceding series, but the sixth funicle joint blackish. The first funicle joint about a half longer than thick, the following joints a little shorter but longer than thick; postmarginal vein about a third shorter than the stigmal.

In all or the Australian series the head is slightly longer compared with the width, the scape narrower than usual, much as in *terminalis* of North America, and the pubescence of the face seems slightly longer and more abundant.

Unfortunately the writer has been able to examine only one specimen of *flaminus* from Europe, so that the identity of *eytelweinii* (Ratzeburg) could not be investigated fully. Obviously the two forms are much alike, *flaminus* being described as having the middle tarsi black, the hind tarsi and middle tibial spur white, and *eytelweinii* as having the discoloration of the tarsi just reversed. Mayr considered them to be forms of one species, and apparently had examined intermediate specimens. The specimen in the hands of the writer may also be considered intermediate since the hind tarsi are black, the middle pair almost entirely blackish underneath, and the tibial spur dark brown or in part blackish. Nevertheless no such variation in the color of the tarsi has been observed in specimens from other parts of the world, the hind tarsi being uniformly dark and the middle pair white or pale yellowish in all specimens examined from such remotely separated regions as South Africa, China, and Australia.

Girault's species *orei* and *microgaster* can not be separated from *flaminus*, as they are based on too variable characters. The comparative lengths of pedicel and first two funicle joints, of the stigmal and postmarginal veins, and the slight variations in color noted above can not be relied upon to distinguish species in this group. In general it may be said that in very small specimens the first funicle joint is usually no longer than thick, and becomes gradually longer with increase in size.

Types.—Cat. No. 20674 (of *microgaster* Girault) and 20655 (of *orei* Girault), U.S.N.M.

Table of measurements of *flaminus*.

Series.	Locality.	Collector.	Length of body.	Width of meso-scutum.	Length of head.	Width of head.	Width of vertex.	Length of antenna.	Length of fore-wing.	Width of fore-wing.
1	Palermo, Sicily.	Viereck.....	mm. 1.72	mm. 0.63	mm. 0.60	mm. 0.55	mm. 0.115	mm. 1.32	mm. 1.54	mm. 0.58
2	Cape Town, South Africa.	Lounsbury.....	2.00	.69	.68	.62	.126	1.57	1.84	.71
3	Swatow, China.	Koebele.....	1.83	.64	.64	.59	.115	1.54	1.82	.70
4	China.	do.....	1.94	.70	.69	.60	.136	1.62	1.84	.71
6	Brisbane, Queensland.	Bridwell.....	1.82	.67	.68	.60	.141	1.45	1.78	.66
7	Australia.	Koebele.....	1.83	.66	.67	.61	.135	1.49	1.78	.66
8	do.	do.	1.21	.47	.43	.43	.103	.98	1.25	.47
9	do.	do.	1.89	.63	.68	.56	.122	1.45	1.73	.66
12	do.	do.	1.61	.58	.60	.51	.103	1.27	1.45	.56
13	Bundaberg, Queensland.	Koebele and Perkins.	1.83	.64	.67	.57	.122	1.40	1.67	.63

2. HOMALOTYLUS MIRABILIS (Brèthes).

Mendozaniella mirabilis BRÈTHES, Anal. Mus. Nac. Buenos Aires, vol. 24, May; 1913, p. 98, fig. 7.

This species is known to the writer only by description. In coloration it recalls certain forms of *terminalis* of North America, such as

series 9, described below, but the head is said to be one-sixth longer than wide, which would ally it more with the Old World forms of *flaminius*. It is recorded from Mendoza, Argentina.

3. HOMALOTYLUS TERMINALIS (Say).

Serlion terminalis SAY, Maclur. Lye. Phil., vol. 2, 1828, p. 80.

Scelio terminalis CRESSON, Syn. Hym. No. Amer., 1887, p. 248.

Homalotylus terminalis ASHMEAD, Proc. U. S. Nat. Mus., vol. 22, 1900, p. 378.

Homalotylus obscurus HOWARD, Bull. 5 (Old Series), Bur. Ent., U. S. Dept. Agric., 1885, p. 22.

Female.—In structural characters similar to *flaminius*, but the head averages slightly wider as compared with the length, as seen from the side a little thicker or fully as thick on the lower half, the space between the lower corners of eyes and the antennal sockets usually considerably less than the space between the lower, outer corners of eyes and the occipital margin. Sculpture and pubescence practically as in *flaminius*. Length, 1.33 to 2 mm.

Head and underparts of thorax brownish yellow, the head usually with a bronzy, more rarely with a greenish luster, the mesopleura often suffused with brown and with a metallic somewhat bluish luster; notum of thorax and the abdomen black, the scutum with a distinct greenish luster, the axillae and scutellum dull except when viewed at a very oblique angle from in front, the metanotum, propodeum, and abdomen usually with a bluish luster; or in paler variations the brownish yellow coloration may extend over all parts except the hind border of the pronotum, most of the mesoscutum and dorsum of abdomen; tegulae white, the posterior half brown or blackish, or in some cases nearly entirely white. Antennae dark brown or black, the club yellowish white. Legs variable, in darker specimens mostly dark brown or blackish with the middle femora brownish yellow, the tibial spur and middle tarsi yellowish white; in paler specimens only the hind tibiae and tarsi brown or blackish, and the front tibiae and tarsi usually pale brown. Wings banded practically as in *flaminius*.

Male.—Similar to the female, but with the wing markings less distinct. Length, 1.14 to 1.81 mm.

The following material has been examined:

Series 1. Two females (cotypes of *H. obscurus* Howard) reared from Coccinelline larvae, probably *Cycloneda*, Centerville, Florida, July 24 (H. G. Hubbard), Hubbard's No. 46, Insectary No. 2308. Head and underparts of thorax ochraceous orange (R.), the frontovertex and face with a weak bronzy luster, the vertex suffused with brown, the postorbital region with a greenish luster; notum of thorax black with a greenish luster, the scutellum more brownish, the lateral margins of pronotum and mesoscutum like underparts; abdomen rather bluish black with the base brownish, the venter about antique brown (R.) with a bronzy luster; antennae except club dark brown;

legs ochraceous orange, the front and middle coxae somewhat brownish, the middle tibiae pale brown especially distad, the front and hind tibiae and tarsi rather dark brown, the spur and middle tarsi yellowish white. First funicle joint about a third longer again than thick, the following joints gradually shortening, the sixth no longer than wide; the postmarginal vein slightly shorter than the stigmal. Length, 1.77 to 1.96 mm.

Series 2. Six females reared from a Coccinelline larva, Crescent City, Florida, May 25 (H. G. Hubbard), Hubbard's No. 157*b*. Similar to the preceding series, but the yellowish parts more suffused with brownish, the metallic luster stronger and present on the mesopleura, the notum entirely black, the venter of abdomen bronzy brownish black; legs darker, the coxae pale brownish with a purplish luster on the front pair, the middle tibiae brown, the front and hind femora a little darker brown, the front and hind tibiae and tarsi blackish brown. Length, 1.70 to 2 mm.

Series 3. Six females, one male reared from a *Cycloneda* larva, Lakeland, Florida (G. G. Ainslie), Webster No. 5252 I. Head about raw sienna (R.) with a strong bronzy luster, the dorsal orbits of eyes and the vertex metallic dark vinaceous purple (R.); propleura like the face, the mesopleura shining, slightly metallic antique brown (R.); the venter bronzy bluish black; antennae black, except the club; legs brownish black, the front coxae with a purplish luster, the front femora somewhat yellowish brown, the middle femora about raw sienna, with a narrow annulus of purer yellow near the base. Otherwise like series 2, except that the first funicle joint is about a fourth longer than thick. Length of female, 1.67 to 1.82; length of male, 1.63 mm.

Series 4. Four females, two males reared from a Coccinelline larva, Cayamas, Cuba (E. A. Schwarz). Head with a strong green luster largely concealing the yellowish brown ground color except on the face; antennae, thorax, and legs as in series 3, except that the luster of the mesopleura is more bluish, the front and middle coxae with a strong purplish luster, the front and middle femora a little more yellowish, the latter with the annulus near the base indistinct, the tegulae almost entirely white, with a faint brownish spot near the apical inner corner; venter of abdomen about raw umber (R.) or more antique brown (R.) toward the base, and with a bronzy luster. First funicle joint about a fourth longer than thick; the postmarginal vein nearly as long as the stigmal. Length of female, 1.57 to 1.64; length of male, 1.25 to 1.40 mm.

Series 5. Thirty-eight females, 29 males reared from larvae of *Coleomegilla* and *Cycloneda*, Santiago de las Vegas, Cuba (George Dimmock), Dimmock Nos. 2226, 2230, 2235, and 2236. Practically the same as the preceding series, some of the specimens being a

little darker, with more green on the frontovertex, the front femora brownish, and the venter of abdomen more nearly black. The males in both series generally paler, with the yellowish brown ground color of head more evident, and the middle femora more yellowish, but the venter of abdomen darker or blackish. Length of female, 1.33 to 1.79; length of male, 1.14 to 1.48 mm.

Series 6. Eight females, six males reared from larva of *Coleomegilla* or collected on rubbish among oats, Brownsville, Texas, March to April, 1914 and 1915 (R. A. Vickery and P. H. Timberlake). Similar to series 3, but the head with a strong bronzy yellowish to distinctly greenish luster, strongest on the vertex; the underparts of thorax a little brighter or generally more nearly raw sienna (R.) and usually without a metallic luster, although shiny; the venter of abdomen brownish black with a bronzy or bluish luster; front and middle femora concolorous with the pleura, the middle pair without a basal annulus, front and middle coxae brownish with a purplish luster, and the last two joints of middle tarsi blackish instead of the apical one only. First funicle joint about a third longer than thick; the postmarginal vein about three-fourths as long as the stigmal. Length of female, 1.58 to 1.96; length of male, 1.40 to 1.81 mm.

Series 7. Two females reared from a *Coleomegilla* larva, Brownsville, Texas, June 10, 1915 (M. M. High). Like the preceding series but brighter in color, the head and underparts of thorax raw sienna (R.) with a slight greenish luster on the vertex only; venter of abdomen antique brown (R.), suffused with raw umber (R.) medially and toward the base; the front coxae and femora concolorous with the pleura, the middle femora concolorous and with a pale yellowish annulus near the base; the middle and hind coxae and hind femora about antique brown. Postmarginal vein about as long as the stigmal. Length, 1.90 to 1.95 mm.

Series 8. Three females, one male reared from a *Coleomegilla* larva, Brownsville, Texas, August 12, 1912 (E. G. Smyth), Webster No. 6422. Similar to series 1, but the frontovertex with a weak greenish luster, the notum of thorax blacker, with the greenish luster more distinct, the underparts of thorax and of abdomen raw sienna (R.) somewhat more brownish on the venter, the dorsum of abdomen bluish black, the base not paler but the apex yellowish brown, and the antennae and hind tibiae blacker. Length of female, 1.64 to 1.73; length of male, 1.40 mm.

Series 9. Seven females, one male reared from a *Coleomegilla* larva, Brownsville, Texas, July 24, 1912 (E. G. Smyth), Webster No. 6422. Head Kaiser brown (R.) but more yellowish on the occiput, the vertex slightly bronzy metallic; the underparts of the thorax and abdomen raw sienna (R.), shining but hardly metallic; the most of pronotum, the sides of mesocutum and posterior margin except

medially, the axillae and scutellum about antique brown (R.) with a bronzy luster; the collar of pronotum except the sides and the rest of the mesoscutum blackish with a green luster; the metanotum, propodeum and dorsum of abdomen black with a bluish or in part greenish luster, the apical tergite of the abdomen concolorous with the venter; legs as in series 1; the antennae similar, but the scape yellowish brown on the inner side of the basal half. First funicle joint about a third longer than thick; the postmarginal vein nearly a third shorter than the stigmal. Length of female, 1.63 to 1.75; length of male, 1.41 mm.

Series 10. One male reared from larva of *Anatis quindecimpunctata* (Olivier), Reading, Pennsylvania, July 29, 1886 (F. G. Dwight), Insectary No. 4570. Head and underparts of thorax raw sienna (R.), the vertex and occiput considerably darker, and a distinct greenish luster present on the frontovertex and postorbital region; the pronotum and mesonotum brownish black with a green luster, the declivous sides of the scutellum brownish yellow; metanotum and abdomen black with a bluish luster; antennae except club dark brown; legs concolorous with underparts, the hind coxae brown with a purplish luster, the hind tibiae and tarsi brown. First funicle joint about a fourth longer than thick; the postmarginal vein about as long as the stigmal. Length, 1.67 mm.

Say's brief description of *terminalis* applies only to *obscurus* Howard, as the characters, "head yellowish, antennae blackish, terminal joint white" effectually eliminate all other North American species or forms belonging to this group. The species seems to be fairly distinct from *flaminus* in the shape of the head, although merging with it in coloration through the subspecies *californicus* Girault. This considerably greater range in coloration of *terminalis* is characteristic of many North American Hymenoptera as compared with the corresponding species or genera of the Old World.

Type.—Cat No. 2648, U.S.N.M. of *obscurus* Howard).

Table of measurements of *terminalis*.

Series.	Locality.	Collector.	Length of body.	Width of mesoscutum.	Length of head.	Width of head.	Width of vertex.	Length of antenna.	Length of forewing.	Width of forewing.
			<i>mm.</i>	<i>mm.</i>	<i>mm.</i>	<i>mm.</i>	<i>mm.</i>	<i>mm.</i>	<i>mm.</i>	<i>mm.</i>
1	Centerville, Florida.	Hubbard....	1.96	.65	.63	.62	0.132	1.47	1.73	0.62
2	Crescent City, Florida.	.....do.....	1.70	.63	.63	.58	.122	1.45	1.69	.61
3	Lakeland, Florida...	Ainslie.....	1.81	.66	.66	.60	.130	1.44	1.70	.61
4	Cayamas, Cuba.	Schwarz....	1.64	.61	.61	.55	.120	1.34	1.56	.59
5	Santiago de las Vegas, Cuba.	Dimmock... 1.79	1.79	.61	.61	.57	.122	1.42	1.63	.61
6	Brownsville, Texas.	Timberlake.	1.73	.62	.63	.57	.125	1.42	1.78	.69
7	.....do.....	High.....	1.90	.63	.64	.59	.130	1.43	1.68	.62
8	.....do.....	Smyth.....	1.68	.55	.58	.54	.115	1.20	1.51	.56
9	.....do.....	.....do.....	1.72	.60	.60	.56	.127	1.34	1.53	.58

4. HOMALOTYLUS TERMINALIS CALIFORNICUS Girault.

Plate 38, fig. 1.

Homalotylus obscurus californicus GIRAULT, Ann. Entom. Soc. Amer., vol. 8, Oct., 1915, p. 274.

Homalotylus terminalis DIMMOCK, Proc. Entom. Soc. Wash., vol. 4, Mar., 1898, p. 149.—ASHMEAD (part), Proc. U. S. Nat. Mus., vol. 22, June, 1900, p. 378.

Female.—In structural characters, sculpture, and pubescence agreeing throughout with *terminalis* (Say), except that the head averages still wider as compared with the length and the antennal scape is slightly wider. Length, 1.28 to 2.26 mm.

Coloration as in *flaminius* (Dalman) and undergoing the same variations, except that the tibial spur and middle tarsi are always yellowish white, the hind tarsi always brown or blackish, and the luster apparently never bluish on the head and notum.

Male.—Like the female, except that the markings on the wings are paler and the size averages smaller. Length, 1.38 to 2.15 mm.

The following material has been examined:

Series 1. Sixteen females, two males (including four female cotypes) reared from a larva and pupa of *Cheilomenes sexmaculata* (Fabricius) (an oriental Coccinellid which was liberated in considerable numbers during 1912 in California), Whittier, California, July 12, 1912 (P. H. Timberlake). Head deep slate olive (R.) with a metallic luster, the oral margin brownish yellow; pronotum and mesonotum black with a greenish luster, underparts of thorax antique brown (R.), suffused with raw umber (R.) and with a bluish or purplish luster, especially on the posterior half of the mesopleura; antennae black, the scape slightly bluish metallic, the club and more or less of the sixth funicle joint in most of the specimens yellowish white; front and hind legs and middle coxae mostly brownish black with a bluish or purplish luster, especially on the coxae, the front femora considerably browner; middle femora about raw sienna (R.) and with a pale yellowish annulus near the base; middle tibiae dark brown, the spur and the middle tarsi except the last two joints yellowish white. Funicle unusually short, the joints subequal, the first joint in most of the specimens no longer than thick; the postmarginal vein about a fourth shorter than the stigmal. Length of female, 1.28 to 1.57; length of male, 1.38 mm.

Series 2. Six females, two males reared from larvae of *Adalia bipunctata* (Linnæus), Salt Lake City, Utah, August 17 to September 13, 1913 (P. H. Timberlake). Similar to the preceding series, but the head somewhat brighter green, the underparts of thorax purer antique brown (R.), being darker and metallic only on the posterior margin of the mesopleura; the last funicle joint slightly more brownish than the other joints, but not whitish; middle femora more

antique brown and without an annulus at the base, the front femora nearly concolorous with the middle pair, but darker on the inner surface with a purplish luster, the hind femora not so black or about concolorous with the middle tibiae. First funicle joint about a third longer than thick, the following joints shortening, so that the sixth is no longer than thick; the postmarginal vein as in the preceding series. Length of female, 1.57 to 1.89; length of male, 1.61 to 1.76 mm.

Series 3. Four males reared from larva of *Coccinella quinque-notata* Kirby, Salt Lake City, Utah, August 19, 1912 (P. H. Timberlake). Like the preceding series, but the last funicle joint is pale brownish, the middle femora more raw sienna (R.), the hind femora blacker, and the fourth joint of middle tarsi nearly white. First funicle joint but slightly longer than thick. Length, 1.40 to 1.50 mm.

Series 4. One female, Salt Lake City, Utah (C. N. Ainslie), Webster No. 5595. Coloration practically as in series 2, but the first funicle joint is only slightly longer than thick and the postmarginal vein is nearly as long as the stigmal. Length, 2.09 mm.

Series 5. Six females, two males reared from larvae of *Coccinella novemnotata* Herbst, Arlington, Massachusetts, August, 1885 (George Dimmock), Dimmock's No. 731c. Similar to series 2, but the oral margin of face and underparts of thorax slightly brighter or more nearly raw sienna (R.) suffused with antique brown (R.) and slightly metallic; abdomen with a stronger bluish green luster, still more greenish on the venter; the last funicle joint of male partly whitish; the front and middle femora raw sienna, the middle tibiae and hind legs browner, and only the last joint of middle tarsi blackish. First funicle joint nearly a half longer again than thick; the postmarginal vein nearly as long as the stigmal. Length of female, 1.66 to 2.03; length of male, 1.77 mm.

Series 6. Three females reared from larva of *Disonycha* species on willow, Springfield, Massachusetts (George Dimmock), Dimmock's No. 2206. Nearly identical with the preceding series, but the underparts of thorax darker or more antique brown (R.), the luster of mesopleura a little more distinct and the hind legs blacker. The postmarginal vein about a fourth shorter than the stigmal. Length, 1.99 to 2.06 mm.

Series 7. Three females, one male reared from a Coccinelline larva, probably Indiana or Ohio (Herbert Osborn). Like series 5 but not so dark, the raw sienna on oral margin extending upward on face above antennal sockets and with a bronzy luster; the underparts of thorax, front and middle coxae, and femora raw sienna (R.); the rest of legs except tibial spur and middle tarsi dark brown, the middle tibiae and hind femora more yellowish brown; last funicle joint in

one female partly whitish, and in the male yellowish white. First funicle joint about a fourth longer again than thick; the postmarginal vein a little shorter than the stigmal. Length of female, 1.66 to 1.67; length of male, 1.39 mm.

Series 8. Two females reared from a larva of *Coccinella novemnotata* Herbst, Cabin John Bridge, Maryland, June 25, 1900 (F. H. Chittenden). Nearly identical with series 5, but the abdomen with a bluish luster above, and a distinctly greenish luster on the venter. Length, 1.99 to 2.19 mm.

Series 9. Three females reared from a Coccinelline larva, Spartanburg, South Carolina, June 1, 1908 (G. G. Ainslie), Webster No. 4811-12. Like the preceding series but the head darker green, with the luster more bronzy green and becoming about taupe brown (R.) on the vertex in two of the specimens. The postmarginal vein about a fourth shorter than the stigmal. Length, 1.80 to 1.85 mm.

Series 10. Five females, one male reared from larva of *Hippodamia convergens* Guérin, June 28-29, 1896, Insectary No. 46⁰¹. Similar to series 7, but the mesopleura antique brown (R.) and the luster of venter more bluish in most of the specimens. First funicle joint about a half longer again than thick; the postmarginal vein about a fourth shorter than the stigmal. Length of female, 2.20 to 2.26; length of male, 2.15 mm.

Series 11. One female, Washington City. Practically identical with series 8. Length, 1.79 mm.

Series 12. One female, District of Columbia. Head about sea brown (R.) with a bronzy purplish luster, the postorbital region with a greenish luster; oral margin of face, the cheeks and lower half of occiput nearly raw sienna (R.); underparts of thorax antique brown (R.) with the posterior part of the mesopleura much darker and with a strong bluish or purplish luster; abdomen bluish black above, the venter greenish in luster; antennae blackish except the club; front and middle legs except the tibiae and tarsi antique brown, the front tibiae and tarsi and hind legs brownish black, the front tibiae and all the coxae with a purplish luster; middle tibiae dark brown: the tibial spur and middle tarsi except the last joint pale yellowish brown but probably more whitish in life. First funicle joint about a third longer again than thick; the postmarginal vein nearly as long as the stigmal. Length, 1.99 mm.

Californicus apparently intergrades through series 7 and 10 with *terminalis* (Say) and it seems best to consider it a subspecies. On the whole it occupies a more northern section of the country than *terminalis*, and has preserved the *flaminius* type of coloration.

Type.—Cat. No. 19338, U.S.N.M.

Table of measurements of *californicus*.

Series.	Locality.	Collector.	Length of body.	Width of mesoscutum.	Length of head.	Width of head.	Width of vertex.	Length of antenna.	Length of forewing.	Width of forewing.
1	Whittier, California.	Timberlake.	<i>mm.</i> 1.50	<i>mm.</i> 0.52	<i>mm.</i> 0.52	<i>mm.</i> 0.51	<i>mm.</i> 0.117	<i>mm.</i> 1.17	<i>mm.</i> 1.45	<i>mm.</i> 0.56
2	Salt Lake City, Utah.	.....do.....	1.89	.67	.67	.65	.138	1.50	1.83	.70
4	.....do.....	C. N. A. lle	2.09	.65	.64	.62	.144	1.48	1.82	.72
5	Arlington, Massachusetts.	Dimmock...	2.03	.73	.68	.68	.155	1.59	1.86	.70
6	Springfield, Massachusetts.	.....do.....	1.99	.73	.71	.69	.153	1.60	1.93	.74
7	Indiana (?).....	Osborn.....	1.75	.63	.60	.60	.134	1.32	1.64	.61
8	Cabin John Bridge, Maryland.	Chittenden..	2.19	.70	.70	.66	.145	1.59	1.87	.71
9	Spartanburg, South Carolina.	G. G. Atnslie	1.80	.68	.66	.62	.134	1.51	1.76	.65
10	Unknown.....	Unknown...	2.20	.71	.73	.67	.150	1.61	1.90	.71
12	District of Columbia.	.....do.....	1.99	.64	.64	.65	.152	1.53	1.76	.65

5. HOMALOTYLUS MEXICANUS, new species.

Plate 38, fig. 5.

Female.—Agreeing closely in structural characters with *flaminius* (Dalman) and *terminalis* (Say), the head more like the former species although not quite so long as compared with the width, and thickest fronto-occipitally just opposite the middle of the eyes. Antennal scape slender as in *terminalis*, the pedicel one-third longer again than the first funicle joint; funicle joints all longer than thick, the first joint fully twice as long as thick, the following three about a half longer again than thick, the last two slightly shorter than the preceding; club not quite as long as the three preceding joints combined. Postmarginal vein nearly as long as the stigmal. Length of body, 1.73; length of head, 0.585; width of head, 0.545; width of vertex, 0.129; length of eye, 0.47; width of eye, 0.26; length of antenna, 1.51; width of mesoscutum, 0.59; length of forewing, 1.49; width of forewing, 0.545 mm.

Head, underparts of thorax, most of pronotum, and venter of abdomen about raw sienna (R.), the frontovertex and face shiny with a slight bronzy luster, the postorbital region slightly greenish; collar of pronotum and mesoscutum brownish black with a slight greenish luster; axillae buckthorn brown (R.), the scutellum yellow ocher (R.); mesoscutum, propodeum, and dorsum of abdomen shining blackish brown; tegulae white with posterior margin blackish brown. Antenna brownish black, with the last two funicle joints and the club yellowish white. Front and middle coxae, femora and middle tibiae yellow ocher (R.), the coxae and front femora slightly suffused with brownish, the basal half of middle tibiae considerably more brownish; the front tibiae and tarsi, and hind coxae and femora on outer side rather pale yellowish brown; hind

legs otherwise dark brown; spur of middle tibiae yellowish white, the middle tarsi about warm buff (R.), the last joint blackish, and the fourth joint slightly brownish. Wings banded as in *flaminius* or *terminalis*. Pubescence of scutellum blackish, of the head, mesoscutum and metapleura silvery white.

Male.—Not known.

Described from two females (type and paratype) reared from material of *Ceroputo yuccae* (Coquillett) on agave, Guadalajara, Mexico, November 10, 14, 1894 (C. H. T. Townsend), Townsend No. 33, Insectary No. 5726⁰⁶. Both specimens have been partially eaten by museum pests and the head of the paratype is missing.

Type.—Cat. No. 22034, U.S.N.M.

6. HOMALOTYLUS ALBITARSUS Gahan.

Homalotylus albitarsus GAHAN, *Canad. Entom.*, vol. 42, June, 1910, p. 206.

Female.—Agreeing closely with other forms of the *flaminius* group, the head being slightly longer than wide, the vertex a little wider than in *mexicanus*, and the ocelli very nearly in an equilateral triangle. Antennal scape more flattened than in *mexicanus*, a little expanded toward the apex and grooved beneath; first funicle joint about two-thirds as long as the pedicel and nearly a half longer again than thick, the following joints slightly shorter than the first, and all except the sixth a trifle longer than thick. Stigmal and postmarginal veins nearly equal in length, the angle between them very acute, the stigmal slender and slightly enlarged at apex.

Sculpture and pubescence as in *mexicanus*, but the frontovertex more opaque and the postorbital region smooth. Length, 1.50 mm.

Head, pronotum, axillae and scutellum about amber brown (R.), the head being a little paler and with a slight greenish luster on postorbital region; the underparts of thorax somewhat more yellowish; mesoscutum and abdomen blackish brown, the scutum with a slight metallic luster, the first tergite of abdomen a little more yellowish. Antennae blackish brown, the fourth funicle joint fading into whitish on the inner side at apex, the following funicle joints and club white. Front coxae and femora, most of middle legs, hind coxae and lower margin narrowly of hind femora concolorous with the pleura; front tibiae and tarsi pale brown; most of hind femora and hind tibiae blackish brown; middle and hind tarsi white, with the last joint brownish; the spur of middle tibiae yellowish white. Wings banded as in other species of the *flaminius* group. Pubescence as in *mexicanus*.

Male.—Not known.

Redescribed from two females (type and paratype) reared from an unknown Coccinellid larva, Washington County, Maryland, August 2, 1898.

Type.—Cat. No. 13223, U.S.N.M.

7. HOMALOTYLUS SCYMNI (Shimer).

Eutelus ? *scymnae* SHIMER, Trans. Amer. Entom. Soc., vol. 2, Nov., 1869, p. 385.

This species remains unknown to the writer. The description suggests *albitarsus* Gahan, but there seems to be enough difference to avoid synonymizing the latter species at least for the present. Ashmead, however, synonymized the species with *terminalis* (Say), on apparently insufficient evidence. Doctor Shimer reared his specimen from the larva of a *Scymnus* species feeding on *Chermes pinicorticis* (Fitch), probably at Mount Carroll, Illinois.

VICINUS GROUP.

KEY TO THE SPECIES OF THE VICINUS GROUP.

1. Head longer than wide, oval in outline.....2
 Head seen from in front hardly longer than wide, or nearly circular in outline; head and scutellum orange rufous, the mesoscutum greenish black, legs dark, blackish brown, the hind tarsi and three middle joints of middle tarsi white. 8. *quaylei*, new species.
2. Head and body not entirely black.....3
 Head and body black with green and bluish luster, legs black, the hind tarsi, and the three middle joints of the middle tarsi white, antennae black, the club and more or less of the preceding joint white.....9. *africanus*, new species.
3. Head and scutellum cadmium yellow, the mesoscutum and abdomen greenish black; front legs and middle tibiae pale brown, the middle femora, middle and hind tarsi whitish, the hind femora and tibiae blackish, antennae black, the club and last three or four funicle joints yellowish white. 10. *oculatus* (Girault).
 General color more or less dark castaneous, the mesoscutum blackish with a greenish luster, the scutellum opaque black; legs castaneous with front and middle coxae, base of front and middle femora, and the hind legs blackish, middle tibial spur yellowish white, the three middle joints of middle tarsi and the hind tarsi except apical joint white, the lower margin of hind femora distally pale yellowish; antennae black or blackish, the club white.....11. *vicinus* Silvestri.

8. HOMALOTYLUS QUAYLEI, new species.

Plate 39, fig. 9.

Female.—Head in frontal view very nearly circular in outline, being a trifle longer than wide; the dorsal orbits of eyes strongly converging posteriorly so that the width of the vertex at the posterior ocelli is less than half that of the face at the lower corners of eyes; ocelli placed in a strongly acute-angled triangle, the posterior pair about one-third nearer the occipital margin than to the median ocellus; eyes slightly longer than in *H. flaminus*, and the head in side view somewhat thicker, being thickest below the middle instead of at the middle; face slightly protuberant between the bases of the antennae (the latter broken off in the unique type). Mandibles with moderately long teeth, the middle one slightly longer than the ventral and less acute, the inner or dorsal tooth shortest, distinctly not forming a subtruncate edge with the middle tooth, as the emar-

gination between them is distinct. Thorax and abdomen normal for genus, the ovipositor prominently protruded, the exerted portion about equal to one half the length of abdomen. Wings much as in *H. flaminus*, the subbasal area of hyaline cilia much narrower, the dark area at extreme base larger, the median fascia broader, its apical margin extending considerably beyond the apex of the venation and distinctly transversely truncate; the oval hyaline area reaching nearly to either margin of wing, the apical area of dark cilia only about a third wider again than the preceding hyaline spot instead of about twice as wide as in *H. flaminus*; the postmarginal almost as long as the stigmal vein. In other structural respects and in regard to the sculpture practically as in *H. flaminus*, except that the punctures on the front are rather less numerous and not so distinctly impressed. Length of body, 1.76; length of head, 0.59; width of head, 0.545; width of vertex, 0.103; length of eye, 0.51; width of eye, 0.265; width of mesoscutum, 0.60; length of forewing, 1.41; width of forewing, 0.535; length of ovipositor, 0.305 mm.

Head, pronotum, axillae, and scutellum orange rufous (R.), the vertex dusky and together with the frons slightly greenish metallic, the head otherwise mostly bronzy in luster, the pronotum narrowly greenish black along its posterior margin, mesoscutum distinctly greenish black with a strong luster; metanotum, propodeum, and abdomen slightly bluish black, the dorsum of abdomen with an iridescent luster; propleura, sternum, prepectal plates and anterior margin of mesopleura concolorous with pronotum but slightly more yellowish, the mesopleura otherwise shining clove brown (R.); tegulae white with the posterior margin dark brown. Antennae (according to field notes of Prof. H. J. Quayle) black or brownish black with the last funicle joint and club white. Legs rather dark or bluish brown, the front coxae and femora concolorous with propleura, the femora being a little dusker, middle femora paler brown with a tinge of yellowish, the middle tibial spurs dilutely brownish, second and fourth joint of middle tarsi and the apex of the first joint yellowish white; hind femora with a bluish luster and a narrow streak of yellow on their posterior margin except on the basal third, the hind tibiae more nearly black, the hind tarsi yellowish white except the last joint and the extreme base of the first joint. The broad fascia of wings deeply pigmented, as also the triangular dark spot at base; the apex of disk beyond the oval hyaline spot slightly pigmented but more evidently so than in other species. Exserted part of ovipositor yellowish, the apex becoming dusky. Pubescence on head whitish, on mesoscutum pale brownish, on scutellum black, and on the metapleura silvery white.

Described from one female reared from citrus mealy bug material (*Pseudococcus citri* Risso), in August, 1913, Sicily, Italy (H. J.

Quayle), Quayle's No. 9. The specimen without doubt issued from an unnoticed Coccinellid host.

Type.—Cat. No. 22035, U.S.N.M.

9. *ROMALOTYLUS AFRICANUS*, new species.

Female.—Head shaped nearly as in *H. flaminus*, but a little narrower, being distinctly although but little longer than wide, the sides more convex; as seen from in front appearing broadly oval; eyes proportionately longer than wide as compared with *H. flaminus*; the dorsal orbits strongly converging posteriorly, so that the vertex at the posterior ocelli is considerably less than half of the width of the space between the lower corners of eyes; ocelli in a very acute-angled triangle, the posterior pair touching the eye-margin, and nearly as far removed (about four-fifths as far) from the occipital margin as from the median ocellus; face slightly protuberant between the bases of the antennae. Scape linear, compressed, not at all dilated; pedicel as long as the first and three-fourths of the second funicle joint combined; funicle joints decreasing slightly in length distad, the first about one-half longer again than wide, the sixth about one-fourth longer again than wide; club equal to the last three funicle joints combined. Mandibular dentition as in *H. quaylei*. Thorax and abdomen practically as in *H. flaminus* but less robust and the ovipositor protruded for a length about equal to one-half that of abdomen. Wings rather small and narrow, only one-third of forewing projecting beyond apex of abdomen, otherwise very nearly as in *H. quaylei* except that the subapical oval hyaline spot is somewhat smaller and not quite so close to apex of disk; the postmarginal vein equal to the stigmal in length. Otherwise in regard to structural characters like *H. flaminus*; sculpture the same except the frontovertex of head is noticeably more shining, and the pin-punctures are rather smaller and sparser, but distinct. Length of body, 1.72 (to 2.23); length of head, 0.59; width of head, 0.52; width of vertex, 0.101; length of eye, 0.505; width of eye, 0.244; length of antennae, 1.35; width of mesoscutum, 0.545; length of forewing, 1.34; width of forewing, 0.47; length of ovipositor, 0.30 mm.

Head metallic, shiny, dark cress green (R.); the face and oral margin sometimes suffused with yellowish brown in certain lights; thorax and abdomen bluish black, the pronotum and mesoscutum greenish black, all parts except the axillae and scutellum more or less metallic shining, the dorsum of abdomen iridescent metallic, the pleura and sternum of thorax in some specimens appearing slightly suffused with yellowish brown in bright light; tegulae white with the posterior margin blackish. Antennae black, becoming duller distad, the last funicle joint varying from blackish to yellowish white like the club. Legs black with a slight bluish luster on the coxae and

femora, the middle tibial spur pale brownish; the front tarsi blackish brown, middle pair yellowish white on third and fourth joint, sometimes also on the second and even on apex of first, otherwise blackish brown, hind pair yellowish white except on last joint and first extreme base of the first joint. Wings banded as in *H. quaylei* except as otherwise noted above. Exserted part of ovipositor sheaths pale brown. Pubescence on head whitish, on metapleura and hind coxae silvery white, and on the notum of thorax blackish and inconspicuous.

Male.—Similar to the female, except that the scape has a shallow notch just beyond the middle on the upper side. Length of body, 1.68 mm.

Described from five females, two males (type, allotype, and paratypes *a* to *e*) reared from *Pseudococcus* material, undoubtedly from a Coccinellid larva, Cape Town, South Africa. (Labeled, "bred from *Dactylopius* or Coccinellid".) The manuscript name applied by Dr. Ashmead has been adopted for this species.

Type.—Cat. No. 22036, U.S.N.M.

10. HOMALOTYLUS OCLATUS (Girault).

Plate 39, fig. 10.

Hemaenasoidea oculata GIRAULT, Annals Entom. Soc. Amer., vol. 9, Oct., 1916, p. 308.

Female.—Head shaped as in *H. africanus* yet distinctly more narrowly oval in outline as viewed from in front, being about one-fifth longer than wide; convergence of dorsal orbits and position of ocelli as in *H. africanus*; face slightly protuberant between antennal bases. Scape linear and compressed, not dilated; pedicel as long as the first and three-fourths of the second funicle joint; first funicle joint nearly a half longer again than thick, the rest gradually shortening, the sixth only a little longer than thick; club about equal to the last three funicle joints combined; mandibular dentition approximately as in *H. africanus*. Thorax and abdomen of normal structure, the ovipositor protruded for a length about equal to one-half that of abdomen. Wings practically as in *H. africanus*, except that the medial cross-band is a trifle wider and reaches slightly farther beyond apex of venation, the subapical hyaline oval spot rather small and about equal to one-half or a little less than half the width of the intervening space to apex of disk; the postmarginal vein equal to the stigmal vein. In other structural details similar to *H. flaminus*, *quaylei*, etc.; the sculpture on the head, axillae and scutellum considerably finer and more alutaceous, the pin punctures on head evanescent and hardly evident without the closest scrutiny; sculpture of the other parts of the body not differing noticeably from that of *H. flaminus*, although finer on abdomen. Length of body, (1.48 to) 1.65; length of head, 0.57; width of head, 0.48; width of vertex, 0.096; length of eye, 0.48;

width of eye, 0.235; length of antenna, 1.19; width of mesoscutum, 0.54; length of forewing, 1.43; width of forewing, 0.535; length of ovipositor, 0.30 mm.

Scutellum and most of prothorax cadmium yellow (R.), the head somewhat paler or light cadmium yellow (R.) suffused with deeper yellow or brownish at the vertex; pronotum, except on the sides, and the mesoscutum greenish black, with a metallic luster, axillae dark reddish brown or more or less brown medially, otherwise like scutellum, metanotum and propodeum purer shining black; anterior corner of mesopleura cadmium yellow shading gradually into blackish brown on the remaining part which is shining but hardly metallic; tegulae white with the posterior margin broadly dark brown; abdomen black, appearing slightly bluish in certain lights, or iridescent metallic in others, the venter duller and more brownish; ovipositor sheaths pale cadmium yellow with apex blackish brown. Antennae blackish brown shading into yellowish white or pale yellow on distal half of flagellum, the last three funicle joints pale and the preceding joint also in some specimens. All the coxae dark brown or blackish brown, the front pair somewhat suffused with brownish yellow; front femora brownish yellow, the tibiae and tarsi brownish black; middle legs (except coxae) yellowish white with the tibiae pale brown, darker along upper margin; hind femora blackish brown with the lower margin narrowly yellowish, or entirely brownish yellow, darker at base and more yellowish toward apex and along inferior margin, the tibiae blackish, and the hind tarsi yellowish white with the last joint somewhat brownish. Wings banded as in *H. flaminus* except as noted above. Pubescence on head very fine, and silky, whitish in color; on the pronotum and scutum rather abundant, conspicuous, silvery white in color, on the scutellum appearing whitish in certain lights, but in others blackish, the apex furnished with about three or four longer hairs on each side, which are suberect and inclined inward to inclose a quadrate bare spot; metapleura and hind coxae furnished with usual appressed silvery white pubescence.

Male.—Similar to the female except that the scape has a rather deep, rounded notch or emargination just beyond the middle on the upper margin. The coloration of the single specimen is slightly paler than in any of the females, as the axillae are practically entirely concolorous with the scutellum, the mesopleura more brownish, and the middle tibiae yellow instead of pale brown. Length of body, 1.57 mm.

Redescribed from three females and one male reared from larvae of *Scymnus bipunctatus* Kugelann, Manila, Philippine Islands (H. S. Smith and D. T. Fullaway). The host may not be correctly de-

terminated, but is a common species at Manila and has been introduced thence to California as an enemy of *Pseudococcus citri* (Risso).

The type female of *Hemaenasoidea oculata* Girault also examined.

This species is most closely related to *H. vicinus* Silvestri and the male has a peculiar notch on the upper margin of the scape as in that species, although rather better developed.

Type.—Cat. No. 19949, U.S.N.M.

II. HOMALOTYLUS VICINUS Silvestri.

Homalotylus vicinus SILVESTRI, Boll. Portici Lab., vol. 9, Feb., 1915, p. 293 figs. 50-51.

This species has not been seen by the writer. It was reared by Silvestri from the larva of a Scymnine, *Nephus vetustus* Weise, at Nefasit, Eritrea, Africa.

COCKERELLI GROUP.

KEY TO THE SPECIES OF THE COCKERELLI GROUP.

1. Head dark colored, diamine brown or raw umber, with a distinct metallic luster. 4
 Head brownish yellow with the metallic luster weak or absent. 2
2. Frontoververtex with an evanescent metallic luster; pubescence of scutellum dark colored; ovipositor not over a third as long as the abdomen. 3
 Frontoververtex not at all metallic; scutellum with a pale pubescence; ovipositor over one-half as long as the abdomen; head and underparts of thorax ochraceous orange, the scutellum and axillae cadmium yellow, the mesoscutum dark brown to blackish with a greenish luster centrally; antennae black, the club and preceding joint white; front and middle legs and hind tarsi pale yellowish, hind legs otherwise dark brown or blackish except base of femora and the coxae. 12. *cockerelli*, new species.
3. Ovipositor about one-third as long as abdomen; coloration nearly as in *cockerelli*; antennae black, the club white; legs dark brown or blackish with the coxae, front and middle femora yellowish, the spur of middle tibiae and the middle tarsi yellowish white. 13. *affinis*, new species.
 Ovipositor about one-fourth as long as abdomen; coloration nearly as in the two preceding species; antennae black with club and preceding joint white, legs paler than in *affinis*, the hind tibiae only remaining dark brown. 14. *brevicauda*, new species.
4. Ovipositor fully one-half as long as abdomen; front moderately punctate; teeth of mandibles short; head raw umber with a strong bronzy metallic luster, mesoscutum metallic greenish black, the scutellum yellowish; front and hind legs dark brown or blackish, the front tarsi pale brown; middle legs and also sometimes the front femora brownish yellow, the tibiae paler apically, the spur and tarsi, except last joint, pale yellowish; antennae black, the last funicle joint and club white. 15. *hyperaspidis*, new species.
 Ovipositor about one-third as long as abdomen; front unusually thickly punctate; teeth of mandibles rather long; head diamine brown, the metallic luster not strong, thorax as in *hyperaspidis* but the scutellum more ferruginous; front and hind legs dark brown with a strong metallic purplish luster on front femora, middle legs yellowish brown, the tibial spur and tarsi pale yellowish; antennae black, the last two funicle joints and club yellowish white. 16. *punctifrons*, new species.

12. HOMALOTYLUS COCKERELLI, new species.

Plate 39, fig. 6.

Female.—Head in general shape much as in *H. flaminus*, being a trifle (about one-thirteenth by measurement) longer than wide, and widest across the middle of the eyes; dorsal orbits not strongly convergent behind, the width of vertex at the posterior ocelli being a little more than half the distance between the lower corners of eyes; ocelli in an equilateral triangle or nearly so, the posterior pair in smaller specimens about one-third more farther apart than distance from either to the anterior ocellus, or to the occipital margin, or in larger specimens (with the vertex proportionately narrower) the posterior pair are a little closer together than space to anterior ocellus, and to the same degrees farther from the occipital margin, ocellar angle about 60° to 75° ; the occipital margin more rounded than in *H. flaminus*; eyes shaped about as in *flaminus* but slightly wider below the middle; the face slightly protuberant between the antennal sockets. Antennal scape linear, compressed; the pedicel as long as the first funicle joint and three fourths of the second joint combined; the first funicle joint about twice as long as thick, the following joints becoming gradually a little shorter but hardly thicker, the sixth being about a third longer than thick; club nearly as long as the three preceding joints combined. Mandibles with three short subequal blunt teeth, the middle one slightly longer. Thoracic and abdominal structure not deviating from the usual type, the ovipositor protruded for a length about equal to one-half to two-thirds of the length of the abdomen, dependent upon how much the latter is contracted. Wings similar to those of *H. flaminus*, the medial cross-band of dark colored cilia a little wider, its basal margin much less oblique, and the apical margin straight instead of a little convex, the subapical oval spot of transparent cilia large, reaching nearly to either margin, its width nearly equal to the apical area of dark colored cilia; stigmal vein distinctly narrowed at its middle, the apex thus appearing more triangular than in *flaminus*, the postmarginal vein equal in length to the stigmal. Sculpture much as in *flaminus* but considerably finer, somewhat so on the head and especially so on the axillae and scutellum which are entirely opaque alutaceous, the reticulations of the first tergite of abdomen all a little longer than wide, and their longer axes all running longitudinally except across the base of the tergite and not at all coarser at the middle; pin-punctures on head rather numerous but very small and shallow. Length of body (1.15 to 1.83), 1.73; length of head, 0.565; width of head, 0.535; width of vertex, 0.160; length of eye, 0.41; width of eye, 0.24; length of antenna, 1.39; width of mesoscutum, 0.55; length of forewing, 1.52; width of forewing, 0.56; length of ovipositor, 0.405 mm.

Head ochraceous orange (R.), the cheeks and postorbital area of head with a trace of greenish luster; pronotum and mesoscutum dark brown or less suffused with black especially on the middle of the scutum, sometimes entirely brownish, or entirely blackish with a slight greenish metallic luster; axillae and scutellum cadmium yellow (R.), tegulae white with the apical margin dark gray or blackish, metanotum, propodeum, and metapleura shining brownish black; pleura and under parts of thorax about concolorous with the head, the posterior part of mesopleura sometimes suffused with brownish; abdomen mostly like head and pleura but more shining, the venter dusky apically and the apical half of dorsum blackish, the luster especially strong on the dorsum and somewhat iridescent, ovipositor concolorous with the apical fourth blackish. Antennae black, the scape brownish, especially on the upper side and toward the base, the fifth funicle joint changing to whitish at the apex, the sixth joint and club yellowish white. Legs concolorous with pleura of thorax, the middle coxae blackish, the hind femora most often suffused with blackish on apical half of outer surface and along the dorsal margin of the inner surface, the hind tibiae blackish brown; middle tibiae, especially apically, the spur and the middle and hind tarsi considerably paler yellow, the last joint of all tarsi dark brown or blackish. Wings banded as in *flaminius* except as noted above. Pubescence of head and thorax entirely whitish, most prominent on the dark colored mesoscutum and pronotum, the metapleura and hind coxae densely silvery white pubescent; the scutellum in addition has two short black bristles on each side at the apex.

Male.—Entirely similar to the female in structural and coloration characters, but averaging slightly smaller in size. Length of body, 1.07 to 1.51 mm.

Described from ten females, five males (type, allotype, paratypes *a-m*) reared from the larvae of *Hyperaspis trimaculata* (Linnaeus) associated with *Dactylopius confusus* Cockerell, on *Opuntia* or collected at *Dactylopius* colonies on *Opuntia*, Brownsville, Texas, January 20 to July 8, 1915 (P. H. Timberlake).

The following material also examined: A large series collected or reared with the types, January 20 to July 8, 1915; two females reared July 4, 1915, from a single host of the same species, collected at San Antonio, Texas, January 9; four females, one male, reared from a Coccinellid larva associated with *Dactylopius* species (the host larva probably the same as above), Guanajuato, Mexico, Insectary No. 5859^a (U.S.D.A.); six females, two males, reared from *Dactylopius confusus* material, Point Isabel, Texas (C. H. T. Townsend), Townsend No. 650; six females, two males, reared from *Dactylopius* material, La Puerta, Tamaulipas, Mexico (C. H. T. Townsend),

Townsend No. 650. The last two series labeled "from (or on) *Coccus cacti*," the first record undoubtedly referring to *D. confusus* and the second probably so.

The name adopted for this species is one used by Dr. L. O. Howard in manuscript.

Type.—Cat. No. 22037, U.S.N.M.

13. HOMALOTYLUS AFFINIS, new species.

Plate 39, fig. 8.

Female.—Very similar to *H. cockerelli*, but differing as follows: Head about one-fourteenth longer than wide, the width of the vertex at the posterior ocelli proportionately wider in comparison with the width of head, but practically the same in comparison with the width of frons at the lower corners of eyes, being almost exactly one-sixth more than half that width; the posterior ocelli somewhat farther apart than distance from either to the median ocellus, the ocellar angle about 75° ; eyes slightly smaller or narrower than in *cockerelli*, being hardly wider on the lower half than above. Antennae similar, the pedicel as long as the first funicle joint, together with three-fifths of the second; first funicle joint one-fourth longer than thick, the following becoming slightly shorter and thicker, the sixth about as long as thick; club as long as the last three funicle joints combined, the under side obliquely truncate on the apical two-thirds, rather indistinctly three-jointed, the sutures being visible under high magnification. Mandibles practically the same. Thoracic and abdominal structure as in *cockerelli*, except that the ovipositor is much more shortly protruded, being about only one-fourth as long as the abdomen. Wings with the ciliary bands practically the same, the subapical hyaline spot a little smaller; the stigmal vein less constricted toward the base, the apex appearing less enlarged; the postmarginal subequal to the stigmal. Sculpture of the head considerably more evident than in *cockerelli*, the punctures hardly larger except possibly on the vertex, but more deeply impressed, the pin punctures rather more numerous; axillae and scutellum with evident punctulate sculpture about as in *flaminivius*; the first tergite of the abdomen with the reticulations much longitudinally narrowed on the sides, becoming gradually transversely lengthened across the base, and a little coarser and more equilateral on the medio-apical part; sculpture otherwise of the usual type. Length of body (1.39 to) 1.70; length of head, 0.587; width of head, 0.538; width of vertex, 0.185; length of eye, 0.434; width of eye, 0.230; length of antennae, 1.26; width of mesoscutum, 0.540; length of forewing, 1.32; width of forewing, 0.500; length of ovipositor, 0.227 mm.

Head nearly Mars yellow (R.), the clypeal margin more yellowish, the frontovertex more brownish with an obscure bronzy metallic

luster; mesoscutum and posterior margin of pronotum shining Sudan brown (R.) appearing darker in some lights and with a slight greenish luster; axillae and scutellum cadmium yellow (R.), the former sometimes more brownish; tegulae white, with the posterior margin brown; metanotum and propodeum shining reddish black; underparts of thorax about concolorous with the head, or somewhat more yellow, the posterior part of mesopleura appearing slightly brownish; center of abdomen brownish yellow, the dorsum Sudan brown (R.), but darker apically (in one specimen, paratype *a*, the basal half of the dorsum is brownish yellow like the center); ovipositor brownish yellow, becoming blackish on the apical third. Antennal scape brownish, the pedicel and funicle black, the club yellowish white. Legs at base concolorous with underparts of thorax, the front tibiae brownish, the front tarsi dark brown, middle tibiae dark brown with apex more yellowish, the spur yellowish white, the middle tarsi pale yellowish, the last one or two joints dark brown; hind legs with the coxae concolorous with the posterior part of the mesopleura, the femora shading into brownish on the apical half, the tibiae and tarsi brownish black. Wings banded as in *cockerelli* except as noted above. Pubescence of head, pronotum, and mesoscutum white, that of scutellum black; the thick, appressed pubescence of metapleura and hind coxae silvery white.

Described from three females (type and paratypes *a-b*) reared from larvae of *Hyperaspis osculans* LeConte, in colonies of *Dactylopius confusus* Cockerell, Uplands, California, June and October, 1914 (C. P. Clausen), Clausen's No. 8.

Type.—Cat. No. 22038, U.S.N.M.

14. HOMALOTYLUS BREVICAUDA, new species.

Plate 40, fig. 13.

Female.—Differs from *H. affinis* in the following respects: Head practically as wide as long, and almost perfectly circular in outline when viewed from in front, the width of the vertex at the posterior ocelli narrower than in *affinis* in comparison with the width of head and a trifle less than one-half the distance between the lower corners of eyes; ocelli in an equilateral triangle, or nearly so, the posterior pair about equidistant from the occipital margin and the median ocellus; eyes a little wider in proportion to their length than in *affinis*, and widest at the middle. Antennal scape slightly dilated on the lower, inner margin of the apical half; pedicel as long as the first funicle joint, together with four-fifths of the second; first five funicle joints practically equal in length, being very slightly longer than wide, the sixth slightly shorter than the others and about as long as wide, and no wider than the first; club indistinctly sutured, the underside obliquely truncate to the apex of the first joint, the

length almost equal to the last three funicle joints combined. Thoracic and abdominal structure as in *affinis*, except that the ovipositor is slightly shorter. Wings practically as in *affinis* with the subapical hyaline spot very slightly larger. Middle tibial spur noticeably longer than the first tarsal joint (not or hardly longer in other species). Sculpture practically the same as in *affinis* throughout. Length of body, (1.40 to) 1.83; length of head, 0.62; width of head, 0.62; width of vertex, 0.169; length of eye, 0.47; width of eye, 0.28; length of antennae, 1.46; width of mesoscutum, 0.62; length of forewing, 1.51; width of forewing, 0.57; length of ovipositor, 0.19 mm.

Coloration entirely like that of *affinis* except for the following particulars: Funicle more brownish black, the last joint white like the club; legs paler, the front tibiae with hardly more brown than the front femora, the front tarsi pale brown, the middle tibiae only slightly brownish toward the base, the hind femora very slightly brownish, the hind tibiae dark brown, the hind tarsi paler brown or even yellowish brown; abdomen sometimes suffused with yellowish at the base of the dorsum and becoming almost blackish toward the apex, the ovipositor sheaths hardly darker at the apex.

Male.—Entirely similar to the female. Length, 1.44 mm.

Described from four females, one male (type, allotype, and paratypes *a-c*), reared from a Scymnine larva associated with an *Orthezia* species on *Hymenoclea monogyra*, Ignacio, Durango, Mexico, October 12, 1894 (C. H. T. Townsend), Insectary No. 6448°. Three other specimens of uncertain sex from the same series but much eaten by pests may be considered metatypes.

Type.—Cat. No. 22039, U.S.N.M.

15. HOMALOTYLUS HYPERASPIDIS, new species.

Plate 39, fig. 7.

Female.—Head nearly circular in outline when viewed from in front, being very slightly longer than wide, the width of the vertex at the posterior ocelli a little over one-half the width of the frons at the lower corners of eyes, the ocelli very nearly in an equilateral triangle, the median ocellus being a trifle farther from either of the posterior pair than the distance between the latter which are situated at the usual distance from the occipital margin; eyes noticeably wider across the lower half. Antennal scape as long as the first funicle joint together with one-half of the second; the first funicle joint nearly one-half longer again than thick, the following joints nearly equal and a little longer than thick; club as long as the last two funicle joints together with two-thirds of the fourth joint, solid and strongly obliquely truncate on the inner side to or nearly to the base. Mandibles with three short, rather blunt, and nearly equal teeth. Thorax and abdomen of the usual structure, the ovipositor

protruded for a length fully equal to one-half that of the abdomen or a little more. Wings with median cross-band somewhat convex on its apical margin, the subapical hyaline area reaching nearly to either margin of wing and about one-fourth narrower than the apical area of dark colored cilia; postmarginal vein about as long as the stigmal, unusually thickened proximad and completely obliterating the space between its own base and that of the stigmal vein, so that without careful examination the marginal vein appears to be fully thrice as long as thick, or much longer than it actually is, stigmal vein very slender but becoming somewhat enlarged at apex. Sculpture about as in *H. cockerelli* except that the pin punctures of the head are larger and deeper, the reticulations on the first tergite of abdomen a little coarser than in *cockerelli*, but much finer than in *flaminus*, being longitudinally lengthened on the sides, transversely lengthened toward the base, and becoming no larger and mostly pentagonal at the middle of the posterior margin, the extreme base of the tergite remaining smooth. Length of body, (1.50 to) 1.76; length of head, 0.587; width of head, 0.571; length of eye, 0.448; width of eye, 0.258; width of vertex, 0.176; length of antenna, 0.46; width of mesoscutum, 0.575; length of forewing, 1.51; width of forewing, 0.552; length of ovipositor, 0.394 mm.

Head antique brown (R.) with a rather pronounced bronzy luster on face and frontovertex and a greenish luster on the cheeks and postorbital region; pronotum and mesoscutum metallic greenish black, the axillae dull antique brown, the scutellum deep chrome (R.), the metanotum and propodeum shining brownish black, tegulae white with the posterior margin blackish, underparts of thorax antique brown; abdomen shining blackish brown with a strong green and iridescent luster especially at the base, the venter suffused with antique brown but much darker at the sides, the ovipositor sheaths brown at the base and blackish on the apical third. Antennae black, with the sixth funicle joint and club yellowish white. Legs raw sienna (R.) with the coxae, front tibiae and hind femora raw umber (R.), the hind tibiae blackish, the middle tibiae somewhat dark brownish at base and becoming pale orange yellow (R.) at apex, the spur and the middle tarsi a little paler, the last joint of all tarsi blackish. Wings banded with fuscous as in other species with the peculiarities noted above. Pubescence of head and mesoscutum whitish, of the scutellum blackish, and that of the metapleura silvery white.

Male.—Entirely similar to the female throughout. Length, 1.40 mm.

Described from four females, one male (type, allotype, and paratypes *a-c*) reared from larvae and pupae of *Hyperaspis undulata* (Say), Murray, Utah, July 12–29, 1913, and spring of 1914, the

atter from a single larva collected Sept. 22, 1913 (L. P. Rockwood), Salt Lake Laboratory No. 1551; and one female (paratype *d*), Los Angeles County, California (D. W. Coquillett).

Type.—Cat. No. 22040, U.S.N.M.

16. HOMALOTYLUS PUNCTIFRONS, new species.

Female.—Closely related to *H. hyperaspidis* and differing structurally as follows: Head barely longer than wide and except for the broadly truncated oral margin appearing circular in outline when viewed from in front, width of the vertex at the posterior ocelli noticeably more than one-half the width of the frons at the lower corners of eyes, both of these spaces being greater than in *hyperaspidis*; ocelli nearly in an equilateral triangle, the median ocellus being slightly closer to either of the posterior pair than the distance between the latter; eyes considerably narrower than in *hyperaspidis* and hardly perceptibly narrower on the lower half. Antennal scape noticeably slenderer than in *hyperaspidis* and barely expanded apically on the inner margin; pedicel as long as the first funicle joint together with one-half of the second; all the funicle joints longer than thick, the first nearly twice as long as thick, the following gradually shortening, the sixth about one-fourth longer than thick; club (broken off at apex) probably about as long as the last two funicle joints together with one-half of the fourth joint. Mandibles with the three teeth considerably longer and sharper than in *hyperaspidis* (or other species), the inner or dorsal tooth being much shorter than the other two. Ovipositor slightly shorter than in *hyperaspidis*, being nearly one-half as long as abdomen. Wings poorly preserved in the unique type, but enough remains to show that they are of the usual type, the ciliary banding apparently much as in *hyperaspidis*; the postmarginal vein thickened at the base as in that species, but the stigmal considerably shorter and not nearly so slender, being noticeably shorter than the postmarginal with the thickened apical part nearly as long as the slender basal part. Sculpture throughout much as in *hyperaspidis* but the pin-punctures on the head considerably more numerous, the minute punctation of the scutellum rather finer and hardly evident under a magnification of 65 diameters; the reticulations of the first abdominal tergite much less lengthened on the sides and more transversely lengthened at the middle of the posterior margin, and the smooth or nearly insculptate area across the base a little wider. Length of body, 1.75; length of head, 0.601; width of head, 0.582; width of vertex, 0.188; length of eye, 0.467; width of eye, 0.237; length of antenna (estimated in part, the tip of the club being broken off), 1.51; width of mesoscutum, 0.559; length of ovipositor, 0.244 mm.

Head liver brown (R.), the metallic luster weak and indeterminate, cheeks, postorbital region and occiput raw umber (R.) with a slight greenish luster, the oral margin of face raw sienna (R.); pronotum, mesoscutum, metanotum, and propodeum shining blackish, the luster of the scutum hardly greenish, scutellum antique brown (R.), the axillae much darker brown, tegulae white with a large triangular brown mark on the posterior margin; underparts of thorax raw sienna, the upper part of mesopleura suffused with brown and with a slight suggestion of purple; abdomen shining blackish with a greenish luster, the venter and apex of dorsum more brownish; ovipositor sheaths blackish brown with the basal third pale yellowish brown. Antennae black with the last two funicle joints and the club yellowish white. Legs blackish brown, the front and hind coxae and front femora somewhat purplish; the middle femora and apex of middle tibiae much paler or about antique brown (R.) the middle tarsi and tibial spur pale orange yellow (R.), the last tarsal joint blackish. Wings banded apparently as in *hyperaspidis*. Pubescence as in *hyperaspidis*, except that that of the scutellum is more abundant and whitish.

Described from one female (type), Jacksonville, Florida, presumably collected by W. H. Ashmead.

Type.—Cat. No. 22041, U.S.N.M.

ANISOTYLUS, new genus.

Female.—Head moderately thick fronto-occipitally, the face somewhat inflexed, as seen from the side the outline of the dorsal part convex, the facial outline straight, the two meeting each other roughly in an angle of somewhat more than 90° ; seen from in front the outline of the dorsal part of head circular, the effect broken below by the moderately converging cheeks and the transversely arched and broad oral margin; the frontovertex moderately narrow, the length being nearly thrice the width, the dorsal orbits slightly diverging anteriorly; ocelli in an acute-angled triangle, the posterior pair almost touching the eye margins; eyes nearly twice as long as wide, the dorsal orbits convex, the ventral nearly straight, the longer axis much more nearly parallel with plane of the frontovertex than of either the face or occiput; the latter but slightly concave with the neck inserted near the center; cheeks somewhat shorter than the width of the eyes; the face with slightly impressed linear scrobes which converge above in an acute angle but do not quite meet. Antennae inserted rather far apart, close to the clypeal margin, in structure the same as in *Homalotylus*, the club solid. Labrum usually well exposed, the margin convex. Mandibles thick at the base and tapering to the moderately narrow, bidentate apex, the teeth being rather short and not very acute, and on the side of the inner or dorsal tooth is a slight trace or rudiment of a third tooth.

Labial palpi with three joints; the maxillary with four joints, the two basal ones subequal, the apical one about twice as long, the third a little shorter than the apical. Thorax, legs, and abdomen practically as in *Homalotylus*, the ovipositor not protruded. Wings differing in having the stigmal and postmarginal veins meeting in a much less acute angle, the postmarginal only about one-half as long as the stigmal, which is noticeably shorter than in *Homalotylus*; the basal and subapical areas of paler-colored cilia present, the integumentary fuscous spot beneath the stigmal vein reaching but little more than halfway across the disk of the wing.

Male.—Similar throughout to the female.

Anisotylus presents a combination of the characters of *Homalotylus* Mayr and *Isodromus* Howard. In the shape of the head it is like the latter; in the structure of the thorax and abdomen it is not unlike *Homalotylus*, and in the venation of the wings it is intermediate between the two. The bidentate mandibles, in which it differs from either, by no means indicate relationship with the Ectromatini, as the genus is unmistakably closely allied to *Homalotylus*. The sculpture and pubescence in character and arrangement are of the same type as in *Homalotylus*. The species so far as known are parasitic in the larvae of *Scymnus* and *Hyperaspis*.

Type of genus.—*Homalotylus similis* Ashmead.

KEY TO THE SPECIES AND SUBSPECIES OF ANISOTYLUS.

1. Distal half of flagellum yellowish white..... 3
 Flagellum entirely black or dark brown.
 Mesoscutum metallic greenish black..... 2
 Mesoscutum and abdomen metallic purplish black; the frontovertex and scutellum Sanford's brown; rest of head and underparts of thorax brownish yellow..... 1. *similis* (Ashmead)
2. Frontovertex, axillae, and scutellum zinc orange; the rest of head and underparts of thorax brownish yellow; the abdomen bronzy black above, the venter more or less yellowish..... 2. *similis texanus*, new subspecies.
 Frontovertex ochraceous orange; the rest of head and underparts of thorax a little paler yellow; the abdomen and the entire notum of thorax, except rarely the scutellum, greenish black..... 3. *similis utahensis*, new subspecies.
3. Head, underparts of thorax, venter, and legs except hind tibiae yellow, the notum of thorax and dorsum of abdomen greenish black.. 4. *pallentipes*, new species.

1. ANISOTYLUS SIMILIS (Ashmead).

Homalotylus similis ASHMEAD, Trans. Amer. Entom. Soc., vol. 14, Nov., 1887, p. 190.

Female.—Head slightly longer than wide, the frontovertex about twice as long as the width at the ocelli, the latter in an acute-angled triangle, with the space between the posterior pair about equal to three-fourths of the space between either and the anterior ocellus. Scape increasing slightly in width from the base toward the apex, being somewhat expanded along the inner ventral margin; pedicel

nearly equal in length to the first two funicle joints; the funicle joints increasing slightly in thickness and less distinctly in length distad, the sixth, however, distinctly longer than the fifth, and all a little wider than long; club nearly as long as the last three preceding joints combined, solid and obliquely truncate from the apex nearly to the base on the inner side. Thorax and abdominal structure practically as in *Homalotylus flaminus*, the ovipositor not protruded. Wings with cilia on basal third of disk, and those in an oval spot in the middle of the disk just distad and below the apex of the stigmal vein, transparent and weaker; the speculum as in the species of *Homalotylus*; stigmal vein rather thick, only slightly enlarged at apex, and forming an angle of about 45° with the postmarginal, which is about one-half as long or a trifle more. Head finely punctulate, a trifle more coarsely so than in *H. flaminus*, the pin punctures few, very shallow, and evanescent; mesoscutum finely scaly-reticulate, the mesopleura finely reticulate, with the reticulations arranged in longitudinal lines, especially on the posterior half; axillae and scutellum opaquely punctulate, the punctures finer and more closely set than those on the head; side pieces of the metascutum transversely aciculate; first abdominal tergite scaly-reticulate on the posterior half and entirely smooth across the base, the reticulations at the sides hardly larger than those on the mesoscutum, but gradually becoming medially much larger and transversely lengthened except at the posterior margin. Pubescence on face, cheeks, and mesoscutum whitish, that on the face and cheeks not very thick; the metapleura and hind coxae with an appressed silvery white pubescence as in the species of *Homalotylus*. Length of body, 1.65; length of head, 0.59; width of head, 0.56; width of vertex, 0.141; length of eye, 0.43; width of eye, 0.28; length of antennae, 1.02; width of mesoscutum, 0.59; length of forewing, 1.41; width of forewing, 0.56 mm.

Frontovertex of head and the scutellum Sanford's brown (R.), the rest of the head, the pronotum and underparts of thorax similar but a little more yellowish, the postorbital region of head with a slight greenish luster, the center of the occiput and concealed part of pronotum blackish; the axillae considerably darker than the scutellum or about auburn (R.), and with a purplish luster in a strongly oblique view; tegulae white, with the apex pale brown; mesoscutum and abdomen blackish with a strong metallic purplish luster, the metanotum, propodeum, and metapleura similar but with a weaker luster. Antennal scape concolorous with face, but darker at apex, the pedicel and flagellum darker brown, the club paler brown, especially along the truncated margin. Legs concolorous, with underparts of thorax, front and middle tibiae, and the hind femora a little more brownish; the hind tibiae blackish brown; the middle tibial spur, first joint of middle tarsi and the hind tarsi, except the last two joints,

yellowish white. Wings hyaline, with a roundish, fuscous spot beneath the apex of the venation and reaching about two-thirds of the way across the disk.

Male.—Not known.

Redescribed from one female, Biscayne, Florida, May 17 (E. A. Schwarz), which had been compared with Ashmead's type female from Jacksonville, Florida, and found identical.

Type.—Cat. No. 4745, U.S.N.M.

2. *ANISOTYLUS SIMILIS TEXANUS*, new subspecies.

Female.—Practically identical with *A. similis* (Ashmead) in all structural characters. Length of body, (1.62 to 1.80) 1.72; length of head, 0.63; width of head, 0.59; width of vertex, 0.15; length of eye, 0.45; width of eye, 0.29; length of antenna, 1.07; width of mesoscutum, 0.63; length of forewing, 1.57; width of forewing, 0.58 mm.

Frontovertex about zinc orange (R.), the ocellar region infuscated, or even metallic greenish as in paratype *a*, the rest of the head brownish yellow, but considerably purer yellow at the scrobes of the face; the scutellum and axillae like the frontovertex but a little more brownish, the axillae especially brownish medially, and sometimes metallic greenish as in paratype *a*; most of the pronotum and the underparts of thorax brownish yellow practically concolorous with the head; posterior margin of pronotum and the mesoscutum greenish black with a metallic luster, the posterior corners of the scutum more or less brownish along the margin; tegulae white with the posterior margin brown; metanotum, propodeum, metapleura, and dorsum of abdomen shining blackish brown and with a slight bronzy luster on the abdomen especially at the base, the apex of the last tergite yellowish; venter of abdomen brownish yellow with a bronzy luster and more infuscated medially. Antennal scape yellowish brown, the pedicel a little darker, the flagellum brownish black. Legs brownish yellow, the front and middle tibiae a little more brownish, the hind tibiae blackish brown, the middle tarsi, spur and the hind tarsi yellowish white except the blackish apical joint of the middle pair and the two dusky apical joints of the hind pair. Wings as in *A. similis* (Ashmead).

Male.—Not known.

Described from three females (type and paratypes *a* to *b*), the type collected on sorghum heads, San Antonio, Texas, June 27, 1908 (C. N. Ainslie), Webster No. 5009; paratype *a* reared from a pupa of *Hyperaspis bigeminata* Randall, Austin, Texas, May 25, 1917 (Carl Hartmann), Hartmann's No. 63; paratype *b* reared from an undetermined Coccinellid larva, Brownsville, Texas (C. H. T. Townsend), Townsend's No. 645.

Type.—Cat. No. 22042, U.S.N.M.

3. ANISOTYLUS SIMILIS UTAHENSIS, new subspecies.

Plate 40, fig. 11.

Female.—Entirely similar to *A. similis* (Ashmead) in structural characters. Length of body, (1.35 to 2.03) 1.77; length of head, 0.63; width of head, 0.62; width of vertex, 0.155; length of eye, 0.47; width of eye, 0.30; length of antenna, 1.13; width of mesoscutum, 0.655; length of forewing, 1.57; width of forewing, 0.63 mm.

Frontovertex ochraceous orange (R.), the rest of the head and underparts of thorax a little paler, the scrobes of the face purer yellow, the ocellar region of vertex suffused with metallic dark green, the postorbital region with a slight greenish metallic luster, the center of the occiput and posterior margin of mesopleura dusky; entire upper parts of thorax including pronotum, the metapleura, and abdomen metallic blackish green, the axillae and scutellum opaque in most aspects, the pronotum with a faint ochraceous transverse line just before the posterior margin, the scutellum in two paratypes, *a* and *b*, more or less dusky ochraceous orange, in one distinctly so only at the sides, in the other entirely so except at the base; tegulae white with the apical margin broadly brown. Antennae brownish black, the scape on the upper side more brownish, often pale brown. Front and middle coxae and front femora very nearly concolorous with underparts of thorax, front tibiae and tarsi and the middle and hind femora a little more brownish, sometimes distinctly so, the middle tibiae and hind tibiae and tarsi blackish brown, the latter more brownish underneath; hind coxae varying from dusky yellow to more or less blackish with a greenish metallic luster, the middle tarsi and spur yellowish white with the last two joints of the tarsi dusky. Wings as in *A. similis* (Ashmead).

Male.—Entirely similar to the female, although the head is somewhat purer yellow in color. Length, 1.27 to 1.69 mm.

Described from 10 females, five males (type, allotype, and paratypes *a* to *m*), selected from a large series reared from larvae of *Scymnus americanus* Mulsant and *Scymnus lacustris* LeConte, Murray and Salt Lake City, Utah, May to September during the seasons of 1913 to 1915 (P. H. Timberlake).

At first sight this form looks distinct enough to bear specific rank, but in the absence of any structural characters to separate it from *A. similis* (Ashmead) it seems best to consider it a geographical race of that species. The rare individual variation with the orange-colored scutellum is strikingly similar to *A. similis texanus*, and gives additional weight to the belief that the three forms are geographical variants of one species.

Type.—Cat. No. 22043, U.S.N.M.

4. ANISOTYLUS PALLENTIPES, new species.

Plate 40, fig. 12.

Female.—In structure very close to *A. similis* (Ashmead), but the following differences may be noted: Head very slightly longer in proportion to the width, the vertex somewhat narrower and the ocelli in a more acute triangle, the distance between the posterior pair being about three-fifths of the distance between either and the median ocellus; antennae a little longer and slenderer, the first three funicle joints being a little longer than thick, the sixth a trifle wider than long; subapical spot of transparent cilia on the forewing unusually small and evanescent, situated near the middle of the disk and roundish in shape; the postmarginal vein a little shorter and more spur like; sculpture throughout a little finer, especially on head, the pin-punctures of the head entirely effaced; pubescence the same, except that the eyes bear a few extremely short, scattered hairs. Length of body, 1.50; length of head, 0.58; width of head, 0.53; width of vertex, 0.117; length of eye, 0.43; width of eye, 0.27; length of antenna, 1.12; width of mesoscutum, 0.59; length of forewing, 1.46; width of forewing, 0.60 mm.

Head light cadmium yellow (R.), becoming a little darker on the frontovertex, the region around the posterior ocelli suffused with blackish, center of occiput and concealed part of pronotum black; the propleura, prepectal plate, and anterior margin of mesopleura pale lemon yellow (R.), this color ascending onto pronotum as a narrow, transverse preapical line, on posterior lateral margins of mesoscutum and the base of the axillae; the rest of mesopleura ochraceous orange (R.); posterior margin of pronotum narrowly, mesoscutum except the lateral posterior margin, most of axillae and the scutellum greenish black with a strong metallic luster, the axillae and scutellum opaque, however, in most aspects; metanotum, propodeum, and metapleura brownish black, somewhat shining but not metallic; tegulae white, with the posterior margin broadly brown; dorsum of abdomen blackish with a slight greenish luster at the base, the venter brownish yellow. Antennal scape and pedicel yellowish brown on the upper side, much darker beneath, the first three funicle joints blackish brown, the fourth joint very pale brownish, following joints and club maize yellow (R.). Front legs buff yellow (R.), the tarsi brownish; the middle and hind legs similar, but the middle femora and hind coxae and femora slightly paler, the hind tibiae pale brown; the middle tarsi and spur maize yellow, the last tarsal joint brownish at apex, the hind tarsi with the two basal joints maize yellow, and the apical joints pale brownish. Wings with a median smoky cross band beneath the stigmal and apex of the submarginal vein, extending across the disk but interrupted by a narrow longi-

tudinal hyaline line some distance from the posterior margin, the cut-off portion narrower and somewhat less deeply pigmented.

Male.—Not known.

Described from one female (type). Oracle, Arizona, May 7 (Hubbard and Schwarz).

Type.—Cat. No. 22044, U.S.N.M.

Genus ISODROMUS Howard.

Isodromus HOWARD, Rep. Entom., U. S. Dept. Agric., for 1886, 1887, p. 488, pl. 3, fig. 1.

Paratameostigma GIRAULT, Annals Entom. Soc. Amer., vol. 8, Oct., 1915, p. 275

This genus is similar to *Homalotylus* in general structure, but differs in details as follows:

Female.—Head thicker fronto-occipitally, not subhemispherical as the face is distinctly inflexed; a little wider than the mesoscutum, as wide as long or a little wider than long, as seen from in front the outline circular above, but below the cheeks converge in a straight line to a slight extent and the oral margin is broadly truncate; as seen from the side the outline is subtriangular, the outline of vertex rounded, the dorsal side of head being strongly convex, its plane meeting the plane of the face at somewhat more than a right angle as in *iceryae* or in a strongly obtuse angle as in *niger*; occiput slightly more concave above than in *Homalotylus* but yet only moderately so, the vertico-occipital margin rather sharp; frontovertex moderately wide, the dorsal orbits of eyes only slightly or hardly perceptibly diverging anteriorly; ocelli in an equilateral or a somewhat more acute-angled triangle, the posterior pair touching or nearly touching the eye-margins; eyes shorter than in *Homalotylus* or considerably less than twice as long as wide, their long axis parallel with the plane of frontovertex, the postorbital space on the sides of head remaining broad as in *Homalotylus*, and posteriorly the eyes meet or almost meet the vertico-occipital margin; cheeks about as long as the width of the eyes as in *iceryae* or about two-thirds or three-fourths as long as in most species; face about as wide as long, the scrobes in the form of distinct and narrow furrows, converging above but not meeting, the space between the antennal sockets slightly convex but not prominently elevated. Antennae inserted as in *Homalotylus* shorter and somewhat more robust; scape of the same shape but shorter, the radicle joint about an eighth or tenth of the total length; pedicel as long as the first two funicle joints combined; funicle cylindrical, increasing slightly in thickness distad, the basal joints about as long as thick, the apical ones somewhat wider than long; club wider across the base than apex of funicle, as long or a little longer than the last three funicle joints combined, and obliquely truncate on the inner side to the basal third or fourth. Mandibles robust,

broad at apex, with three short, equal or nearly equal teeth, of which the lower two are acute, and the upper or inner one is much rounded at apex. Palpi short, the maxillary pair four-jointed, with the basal joint very short, the second about twice as long, the third and fourth increasing still more in length, the fourth being about twice as long as the second and slenderer; labial pair three-jointed, with the middle joint as long as thick, the other two subequal and a little longer.

Thorax rather more robust than in *Homalotylus*, but not differing much in structure except that the axillae meet broadly at their tips and are not infrequently slightly elevated above the surface of the scutellum; the latter more to much more convex and slopes downward more toward the sides and especially toward the apex, the margin, however, from base to apex generally well elevated and abruptly declivous; propodeum the same except that it is declivous or slopes downward from in front toward the abdomen, instead of being flat as in *Homalotylus*; mesepimeron visible as a very narrow sclerite along the posterior margin of the mesopleura. Legs about the same, except that the middle tibial spur is rather shorter, or about three-fourths as long as the first tarsal joint. Wings of the same comparative length but averaging a little wider than in *Homalotylus*; marginal vein always punctiform, the stigmal sometimes originating just before the submarginal vein reaches the costal margin, moderately long, straight and forming a right angle with the postmarginal as in *iceryae* or somewhat less than a right angle as in most of the species, postmarginal short and spur-like as in *iceryae* or nearly one-half as long as the stigmal as in *vinulus* and *puncticeps*; the disk ciliated about as in *Homalotylus* except that the subapical spot of transparent cilia is absent, the speculum indistinct except in *axillaria*, *puncticeps*, and *atriventris*, and the basal third of disk is usually bare or nearly so instead of being covered with transparent cilia; hind wings a little wider, the costal cell being wider and not so attenuated near the hooklets.

Abdomen narrower than in *Homalotylus*, about two-thirds as long as the thorax in most species or a little more and always longer than wide, with the base broad, the sides parallel or subparallel and the apex nearly truncate, or the base narrower and the sides more or less convex as in *vinulus*, *puncticeps*, and *atriventris*; first tergite reaching about one-third to nearly one-half of the distance from base to apex, the seventh tergite ranking next in length; tactile plates situated a little nearer to the middle than to the apex of abdomen, the vibrissae considerably longer and more conspicuous than in *Homalotylus* and reaching to the apex: structure of venter hardly differing from *Homalotylus*, the ovipositor enclosed by the fifth ventrite and not distinctly protruded in the known species.

Sculpture of the head finely punctulate, very minutely and alutaceously so in *iceryae* and *axillaris*, but more distinctly so in other species, especially in *niger*, the postorbital region and occiput smooth or with indistinct sculpture except in *niger*, which has a reticulate sculpture on the postorbital region, and a fingerprint-like sculpture on the occiput; frontovertex with small, shallow pin-punctures more or less regularly arranged in several rows but sometimes absent as in *iceryae*; pronotum and mesoscutum finely scaly-reticulate as in *Homalotylus*, the axillae and scutellum with a similar, but generally coarser and more deeply impressed sculpture than the scutum, and not opaquely punctulate as in *Homalotylus*; pleura and dorsum of abdomen sculptured as in *Homalotylus*, but the reticulation on the abdomen generally much more uniform in size and regular in shape.

Pubescence throughout as in *Homalotylus*, the mesepimera being silvery pubescent like the metapleura. Coloration black, or black variegated with yellow, brown or orange ferruginous, often shiny, but never distinctly metallic.

Male.—Hardly differing from the female except in the primary sexual characters.

Type of genus.—*Isodromus iceryae* Howard.

The species so far as known all parasitize Chrysopid larvae and issue from the cocoons of their hosts. At least two species, *iceryae* and *niger*, are also known to attack Hemerobiids.

Of the species belonging to *Isodromus*, *intermedius* (Boheman) was synonymized by Thomson with *vinulus* (Dalman), *chrysopae* (Ashmead) is here synonymized with *puncticeps* (Howard), and two recent species of Girault, *pulcher* and *nigriaxillae* appear to be nothing but color variations of *iceryae* Howard, differing only in the extension of the yellow markings. For the latter species Girault needlessly erected the genus *Parataneostigma* and incomprehensibly placed it among the Tanaostigmatini. The species belonging here were included by Mayr in *Homalotylus*, and by Thomson in *Nobrimus*.

Isodromus abnormicornis Girault¹ does not conform with *Isodromus* in several particulars, and should be placed in the new genus, *Brethesia*, described below.

KEY TO THE SPECIES OF ISODROMUS.

1. Wings with a large brown spot beneath the stigmal vein..... 4
- Wings without a large brown spot on the disk.
- General color black or blackish brown variegated with yellow or mostly yellow... 2
- Head and body entirely black, except that the face and frons in the male are yellow; antennae dark brown, front and middle legs brownish yellow, the hind legs brown, the middle and hind tarsi and middle tibial spur yellowish white.
1. *niger* Ashmead.

¹ Insec. Insc. Menst., vol. 4, Jan., 1917, p. 118.

2. Hind tibiae unicolorous and not annulated with black..... 3
 Hind tibiae yellow with two black or blackish brown annuli; head and body yellow; the center of occiput, pronotum except the collar, anterior half of mesoscutum, axillae, generally most of scutellum except apex, metanotum, propodeum, dorsum of abdomen except the base and a spot behind the tactile plates, and a spot on each side of venter near the middle shining black or blackish brown; scape and pedicel yellow, the flagellum more brownish..... 2
 2. *iceryae* Howard.
3. Shining blackish brown, but the head, collar of pronotum, hind border of mesoscutum, axillae, anterior half of pleura and the legs except the hind tibiae yellow, the latter blackish; antennae yellow, with the club pale brown..... 3
 3. *flaviceps* (Dalman).
 General color wax yellow but the frontovertex, most of mesoscutum and the scutellum in the female pale ochraceous orange; hidden part of pronotum, axillae, propodeum and most of dorsum of abdomen brownish black; legs yellow, the tibiae a little darker, the tarsi more whitish; scape and pedicel yellow, the flagellum brownish yellow..... 4. *axillaris*, new species.
4. Head and thorax mostly orange ferruginous..... 5
 General color blackish brown, but the head and mesopleura more brownish, the collar of pronotum whitish, the posterior corners of mesoscutum yellow; legs dark brown, the front tibiae paler, the front and middle femora and tibial spur brownish yellow; antennae brown..... 5. *vinulus* (Dalman).
 General color orange ferruginous but the metanotum, propodeum, abdomen, hind tibiae, and all tarsi in large part dark brown or brownish black; the brown spot on wings restricted; frontovertex hardly over two and a half times longer than wide; axillae elevated above level of scutellum... 6. *atriventris* Ashmead.
 Color similar but the mesoscutum sometimes brownish except at the posterior corners and only the dorsum of abdomen blackish brown; the brown spot on wings extending across the disk; frontovertex about three times as long as wide; axillae hardly elevated, and the scutellum generally much less convex..... 7
 7. *puncticeps* (Howard).

1. ISODROMUS NIGER Ashmead.

Plate 41, fig. 19.

Isodromus niger ASHMEAD, Proc. U. S. Nat. Mus., vol. 22, 1900, p. 379.

Female.—Head only moderately thick fronto-occipitally, the planes of the frontovertex and face meeting in an obtuse angle, the dorsal surface not much shorter than the facial surface in side view; frontovertex rather narrow but short or about two and one-half times longer than wide, the dorsal orbits slightly convex so that the frontovertex is narrowest just before the median ocellus; ocelli forming an angle of somewhat less than 60°, the posterior pair almost touching the eye margins, the median ocellus situated a little behind the middle of the frontovertex; antennal sockets rather close together, the distance between them equaling their length, their inner rims nearly parallel; scrobes distinct, reaching well above a line connecting the lower corners of eyes. Antennae short, the scape subcylindrical, somewhat thicker on apical half and with a pedicellar furrow on the underside near apex; pedicel as long as the first two funicle joints combined; funicle joints increasing somewhat in width distad, all

but the first distinctly wider than long; club showing a trace of segmentation, obliquely truncate to the basal fourth, wider at base than the last funicle joint, and as long as the last three funicle joints and one-half of the third combined. Mandibles with three short teeth, the lower two acute, and the upper or inner one blunt. Axillae slightly elevated above the scutellum; the latter moderately convex, sloping toward the sides and apex, and with a median impressed line for a short distance at the base. Wings broad, basal area of wing with a few scattered cilia, the speculum indistinct; stigmal vein forming somewhat less than a right angle with the postmarginal and originating before the submarginal quite reaches the costal margin, postmarginal vein about a third as long as the stigmal. Abdomen narrow, about a half longer again than wide and two-thirds as long as the thorax or a little more, the sides subparallel or but slightly curved, the base rather broad, the apex truncate; tactile plates situated a little less than halfway from the middle to the apex; the ovipositor concealed. Sculpture more prominent than in other species of the genera, but of the same character; the frontovertex with about six rows of small, shallow but distinct pin-punctures, the postorbital region finely reticulate, the occiput with a fine fingerprint-like lineolate sculpture; mesoscutum with fine but distinct reticulations, the axillae and scutellum with the reticulations not much coarser but much more deeply impressed and generally lengthened or otherwise irregular surrounding the impressed line at the base of the scutellum; the first tergite of abdomen with the reticulations comparatively coarse, but nearly as delicately impressed as those of the scutum, and uniform in shape and size from base to apex. Pubescence white and prominent on head, pronotum, mesoscutum and especially on metapleura and hind coxae, but more scattered and less prominent on the axillae and scutellum and somewhat darker in color. Length of body, 2.02 (to 2.39); length of head, 0.72; width of head, 0.685; width of vertex, 0.195; length of eye, 0.51; width of eye, 0.32; length of antenna, 1.04; width of mesoscutum, 0.74; length of forewing, 1.82; width of forewing, 0.73 mm.

Coloration rather shiny but not metallic black; tegulae white, with the outer, apical corner broadly blackish. Scape brown, the pedicel and flagellum blackish brown. Legs brownish yellow, the middle and hind coxae mostly blackish, the middle femora darker brown, the hind tibiae especially on the upper side brownish black, middle and hind tarsi and tibial spur yellowish white, with the last joint of the tarsi brown. Wings hyaline, with yellowish veins.

Male.—Much like the female except that the abdomen is much shorter or about as long as wide; face, frons, and a greater part of the cheeks primuline yellow (R.), the postorbital region dark brown, the vertex blackish; legs brighter, purer yellow, the middle femora not

brown as in the female, the hind tibiae hardly darker; the pedicel and flagellum hardly darker than the scape. Length, 1.57 to 1.98 mm.

The following material has been examined: One female (type), Washington City (W. H. Ashmead); two females reared from material of *Porthetria dispar* (Linnaeus), Massachusetts, November, 1894 (C. H. Fernald); one female, Forest Hills, Massachusetts, July, 1911 (C. T. Brues); nine females, six males, reared from *Chrysopa* cocoons, Murray and Salt Lake City, Utah, September 2-18, 1913 (P. H. Timberlake); one female, one male, reared from a *Chrysopa* cocoon, Sacramento, California, August 24, 1912, California State Insectary No. 25; one female reared from material of *Chilocorus similis*, Rossi, Island of Formosa, 1916 (C. P. Clausen); and one female reared from a Hemerobiid, Duarte, California, September 12, 1916 (J. R. Horton), Horton's No. 38.

Type.—Cat. No. 4747, U.S.N.M.

2. ISODROMUS ICERYAE Howard.

Plate 40, fig. 15.

Isodromus iceryae HOWARD, Rep. Ent., U. S. Dept. Agric., for 1886, 1887, p. 488, pl. 3, fig. 1.

Isodromus pulcher GIRAULT, Descriptiones Stellarum Novarum, Washington, D. C., May, 1917, p. 16.

Paralaneostigma nigriacillae GIRAULT, Annals. Ent. Soc. Amer., vol. 8, Oct., 1915, p. 275.

Female.—Head a little thicker than in *niger*, the planes of the frontovertex and face meeting in an angle of but little more than 90°; frontovertex about two and one-half times longer than wide, the dorsal orbits of eyes parallel; ocelli very nearly in an equilateral triangle, the posterior pair about one-fourth of their own diameter from the eye margins, the median ocellus considerably behind the middle of the frontovertex; antennal sockets farther apart than in *niger*, the distance between them being about one and a half times their length, their inner rims nearly parallel; scrobes distinct and reaching above a line drawn between the lower corners of the eyes. Antennae rather shorter than in *niger*, the scape practically the same, the pedicel longer or equal to a little more than the first two funicle joints combined; all the funicle joints wider than long, increasing gradually in width distad, the first joint somewhat smaller than the second and about one-half as wide as the sixth, which is twice as wide as long; club without trace of segmentation, obliquely truncate nearly to the base, and as long as the last four funicle joints combined. Mandibles with three short, equal teeth, the lower two acute, the upper one blunt. Axillae but slightly elevated above the scutellum; the latter rather flat on the basal half, but more sloping towards the sides and apex, the base with a trace of a median impressed line. Wings broad, the basal area with a row of dark-colored cilia next to

the submarginal vein, and an oblique double row or band of similar cilia originating at the bend of the submarginal vein, the speculum indistinct; stigmal vein forming a right angle with the postmarginal vein, and originating distinctly before the submarginal reaches the costal margin; postmarginal vein short and thick at base. Abdomen about two-thirds as long as the thorax, the base broad, the sides nearly parallel, and the apex subtruncate; tactile plates situated but little beyond the middle; the ovipositor barely protruded. Head microscopically and alutaceously punctulate, the frontovertex without pin-punctures, the postorbital region and occiput nearly smooth; mesoscutum very finely reticulate, the axillae and scutellum more coarsely scaly-reticulate, but the reticulations hardly more deeply impressed than on the scutum; the first tergite of abdomen with the reticulations nearly uniform but fading out across the base, otherwise as in *niger*. Pubescence of head very fine and inconspicuous, that of mesoscutum coarser, white and rather prominent but much less so than in *niger*; the scutellum with only a few, hardly visible, dark-colored hairs; the metapleura and hind coxae with the usual, dense, appressed pubescence. Length of body, (1.77 to 2.11); length of head, 0.73; width of head, 0.75; width of vertex, 0.226; length of eye, 0.53; width of eye, 0.38; length of antenna, 1.11; width of mesoscutum, 0.78; length of forewing, 1.94; width of forewing, 0.81; exerted part of ovipositor, 0.06 mm.

General color strontian yellow (R.) but the head often more primuline yellow (R.), the posterior part of mesopleura a little brownish; center of occiput, pronotum except a narrow band along the posterior margin, a lenticular mark on the anterior half of mesoscutum, the axillae, most of scutellum except the apex and often a pale yellowish spot low down on the sides just before the middle, metanotum, propodeum, and most of the dorsum of abdomen except across the base, and a spot on each side just behind the tactile plates black or blackish; most of venter brownish except at base and with a blackish spot on each side near the middle, the exposed part of ovipositor yellowish; tegulae pale yellowish white, with the apical margin broadly brownish. Scape and pedicel uncolorous with face, the funicle pale brown and the club a little darker. Legs strontian yellow, the upper, inner margin of the hind femora on the apical half, the knee joint, a broad annulus just beyond the middle and a narrower one near base of the hind tibiae, and the last joint of all tarsi brownish black. Wings entirely hyaline except for a small brownish area along the lower margin of the stigmal vein, which is hardly wider than the vein itself.

Male.—Entirely similar to the female, but the abdomen is a little smaller, more ovate in shape, and the black spot on each side of venter is nearly absent. Length, 1.66 to 1.85 mm.

Redescribed from the following material which had been compared previously with Howard's type: Three females, two males, reared from a *Chrysopa* cocoon, Pasadena, California, August 7, 1915 (E. J. Branigan), California State Insectary No. 2011; one female collected on *Citrus*, San Diego, California, September 14, 1911 (P. H. Timberlake); and one female, Washington City, January, 1898 (August Busck). Howard¹ also records this species from Kirkwood, Missouri, and Amitilla, Florida, in both cases from *Chrysopa* cocoons. Essig² records the rearing of *iceryae* in California from the cocoons of *Symphorobius angustus* Banks.

The type of *I. pulcher* Girault, a female reared from material of *Saissetia oleae* (Bernard), Claremont, California, October, 1909 (C. F. Baker), is mounted on a slide and can not be studied to advantage, but it appears to differ from *iceryae* only in the extension of the yellow coloration. The scutellum is entirely yellow except for a narrow blackish cross-band just before the apex, and the abdomen has more yellow at the base, and the yellow spot at the tactile plates is larger.

The type of *Parataneostigma nigriaxillae* Girault, a female from Mitla, Mexico (L. O. Howard) agrees with the type of *pulcher* except that the cross-band near apex of the scutellum is less distinct.

Types.—Cat. No. 1491 (of *iceryae* Howard), 19339 (of *nigriaxillae* Girault), and 19794 (of *pulcher* Girault), U.S.N.M.

3. ISODROMUS FLAVICEPS (Dalman).

Encyrtus flaviceps DALMAN, Svensk. Vet.-Akad. Handl., vol. 41, 1820, p. 348.

Homalotylus flaviceps MAYR, Verh. zool.-bot. Ges. Wien, vol. 25, 1876, p. 754.

Nobrimus flaviceps THOMSON, Hym. Skand., vol. 4, 1876, p. 140.

This species has not been seen by the writer. It seems to be rare, as the only recorded specimen is Dalman's type, collected by Zetterstedt at Lärketorp, Sweden, about 100 years ago. In coloration, at least, it must be similar to the common North American species, *iceryae* Howard.

4. ISODROMUS AXILLARIS, new species.

Female.—Head hardly longer than wide, not quite so thick fronto-occipitally as in *iceryae*, but thicker than in *niger*, the planes of the frontovertex and face meeting in an angle of considerably more than 90°; frontovertex about two and a half times longer than wide, the dorsal orbits of eyes perceptibly but not greatly diverging anteriorly; the ocelli in an equilateral triangle, the posterior pair almost touching the eye margins, and removed twice their own diameter from the occipital margin, the median ocellus considerably behind

¹Proc. Ent. Soc. Washington, vol. 2, 1891, p. 124.

²Inj. and Benef. Ins. Calif., Monthly Bulletin, vol. 2, 1913, p. 151.

the middle of the frontovertex; eyes moderately wide, slightly the widest just before the middle, the facial end rather less bluntly rounded than the occipital end instead of being broadly rounded as in *iceryae*; antennal sockets about as in *iceryae*, the scrobes distinct but not deep and reaching a little above the lower corners of eyes. Antennal scape a little shorter than the eyes, slightly expanded below and widest at the middle, somewhat grooved beneath at apex, and rather strongly curved before the middle; pedicel somewhat longer than the first two funicle joints combined; funicle joints nearly equal in length, the first as long as wide, the following gradually widening so that the sixth is twice as wide as the first; club solid, obliquely truncate to the basal fourth, and nearly as long as the last four funicle joints combined. Mandibles the same as in *iceryae*. Thorax and abdomen also similar except that the ovipositor is rather more protruded. Wings as in *iceryae* except that there are several more rows of cilia on the basal third of disk and the speculum is more distinct. Sculpture as in *iceryae*, although somewhat finer; the pubescence similar. Length of body, 1.70; length of head, 0.61; width of head, 0.60; width of vertex, 0.174; length of eye, 0.44; width of eye, 0.27; length of antenna, 0.95; width of mesoscutum, 0.62; length of forewing, 1.70; width of forewing, 0.66; length of ovipositor, 0.12 mm.

Frontovertex, mesoscutum except behind the parapsidal lines on each posterior corner, and the scutellum pale ochraceous orange (R.), the rest of head, sides, and anterior margin of pronotal collar, posterior corners of mesoscutum and underparts of thorax wax yellow (R.); apex of mandibles, the hidden part of pronotum, the axillae, propodeum, and most of dorsum of abdomen brownish black, collar of pronotum transparent whitish, separated from the blackish area of the concealed part by a narrow yellow band as noted above, and apparently overlying a blackish, concealed area on the anterior margin of mesoscutum; tegulae pale yellowish with the posterior margin brown; metanotum, first tergite of abdomen except median part of the posterior margin, most of the last tergite, ovipositor sheaths and the venter about yellow ocher (R.), the venter a little more brownish towards the apex in the paratype. Scape and pedicel about concolorous with the face, the flagellum pale yellowish brown. Legs wax yellow, the tibiae somewhat darker, or nearly yellow ocher (R.); the middle tibial spur and tarsi a little more whitish, with the apical joint of the tarsi brownish; knee-joint of the hind legs brownish black. Wings entirely hyaline, the veins pale brown.

Male.—Similar to the female, but the yellow parts all about strontian yellow (R.), the frontovertex, mesoscutum, and scutellum concolorous; the scutellum with a pale brownish spot on the disk

just before the apex; the venter of abdomen brownish except at base and on the lateral margins near apex. Length, 1.36 mm.

Described from two females, one male (type, allotype, and paratype), China, probably from one of the southeastern provinces (A. Koebele), Koebele's No. 1553.

Type.—Cat. No. 22045, U.S.N.M.

5. ISODROMUS VINULUS (Dalman).

Plate 41, fig. 17.

Encyrtus vinulus DALMAN, Svensk. Vet.-Akad. Handl., vol. 41, 1820, p. 349.

Homalotylus vinulus MAYR, Verh. zool.-bot. Ges. Wien, vol. 25, 1876, p. 753.

Nobrinus vinulus THOMSON, Hym. Skand., vol. 4, 1876, p. 140.

Female.—Head in general shape very nearly as in *niger*, but the frontovertex broader, being about twice as long as wide, the dorsal orbits of eyes slightly diverging anteriorly; ocelli nearly in an equilateral triangle, the posterior pair almost touching the eye margins, and the median one slightly behind the middle of the frontovertex; antennal sockets situated farther apart than in *niger*, their inner rims strongly convergent above, the distance between their lower corners being about twice their length and between the upper corners about one-half longer again than their length; scrobes faint and hardly reaching a line drawn between the lower corners of the eyes. Antennae considerably longer than in *iceryae* or *niger*, the scape being fully as long as the eyes and the flagellum proportionately as long; scape a little curved near the base, subcylindrical, the inner lower margin slightly expanded, and the underside excavated at apex as usual; pedicel as long as the first two funicle joints combined; funicle joints all nearly equal in length, the first slightly longer than thick, the second and third about as long as thick, and the sixth considerably wider than long and about one-half wider again than the first joint; club solid, obliquely truncate nearly to the base, and as long as the funicle lacking the first and one-half of the second joint. Mandibles with the three teeth rather short and acute, but longer than in *niger* or *iceryae*. Axillae and scutellum practically as in *niger*. Wings unusually narrow, their basal third bare of cilia, the speculum distinct for a short distance and running nearly parallel with the submarginal vein; stigmal vein forming a rather acute angle with the postmarginal and joining the submarginal just before the latter reaches the costal margin; postmarginal vein well developed and nearly one-half as long as the stigmal. Abdomen a little longer than wide and about two-thirds as long as the thorax, the sides subparallel for a short distance, but the base and apex well rounded; tactile plates situated about half way between the middle and the apex, the vibrissae reaching well beyond the apex; the ovipositor barely visible. Head finely punctulate nearly as distinctly as in *niger*, the

pin-punctures few, scattered, and shallow; mesoscutum finely reticulate with the reticulations somewhat lengthened transversely along the anterior margin; reticulations of the axillae and scutellum not much coarser but more deeply impressed than those on the scutum; reticulations on the first tergite of abdomen except across the base fine and uniform and but little coarser than those on the scutum. Head with a very fine and not prominent pubescence, the thorax apparently nearly bare, except for the usual appressed pubescence on the metapleura and hind coxae. Length of body, (2.22 to) 2.26; length of head, 0.73; width of head, 0.73; width of vertex, 0.235; length of eye, 0.49; width of eye, 0.29; length of antenna, 1.29; width of mesoscutum, 0.71; length of fore-wing, 2.00; width of fore-wing, 0.705 mm.

Head auburn (R.), the occiput more blackish, the vertex sometimes along the orbits opposite the median ocellus and the dorsal occipital margin suffused with yellowish; thorax and abdomen nearly black, the mesopleura, however, with a distinct brown tinge; prepectal plates transparent whitish, the collar of pronotum broadly whitish changing to yellowish on the propleura; posterior lateral corners of the mesoscutum primuline yellow (R.) with the anterior margin of the markings convex; tegulae white, with the apical, outer corner fuscous. Antennae nearly uniformly brown, or about bister (R.), the pedicel a little more yellowish, and the base of the scape more nearly concolorous with the face. Front coxae and tarsi, middle coxae, and hind legs blackish brown or about concolorous with the mesopleura; the middle tibiae and tarsi a little paler, especially beneath; front tibiae pale brown, the front and middle femora yellowish brown, and the tibial spur a little more yellowish. Wings with a large brown spot beneath and beyond the stigmal vein, and becoming fainter as it approaches the opposite margin.

Redescribed from two females from Sweden (C. H. Boheman).

6. ISODROMUS ATRIVENTRIS Ashmead.

Plate 41. fig. 16.

Encyrtus puncticeps HOWARD (part), Bull. 5 (old series), Bur. Ent., U. S. Dept. Agric., 1885, p. 14.

Isodromus atriventris ASHMEAD, Proc. U. S. Nat. Mus., vol. 22, 1900, p. 379.

Female.—Head somewhat wider than long, a little thicker fronto-occipitally than in *niger*; in side view the facial and dorsal surfaces about equal in length, their planes meeting in a little more than a right angle; the dorsal surface a little less convex than in *niger*; frontovertex nearly two and a half times as long as wide, the ocelli very nearly in an equilateral triangle, the posterior pair almost touching the eye margins, the median one situated a little behind the center of the frontovertex, the dorsal orbits of the eyes very slightly divergent

anteriorly; antennal sockets situated a little farther apart than their own length, their inner rims nearly parallel or only slightly convergent above; scrobes somewhat longer than in *vinulus* and more deeply impressed, reaching to a line drawn between the lower corners of the eyes. Antennae about as long as in *vinulus*; scape as long as the eyes, moderately curved a little below the middle, somewhat thicker distad, and furrowed beneath the apex as usual; pedicel as long as the first two funicle joints; funicle joints about equal in length, except that the third is a trifle longer, increasing a little in width distad, the first three about as long as wide, the last three wider than long, the sixth being about a third wider again than the first; club solid, obliquely truncate to about the basal third, and slightly longer than the last four funicle joints combined. Mandibles with the teeth comparatively long, the lower two acute and the upper one rather blunt. Thorax unusually convex, the axillae well elevated above the scutellum, the latter very high and convex, being rounded from the median line of base toward the sides and apex and abruptly declivous at the margins and without the median impressed line at the base. Wings moderately wide, their basal third bare, the speculum distinct for a short distance and forming a slight angle with the submarginal vein or a right angle with the stigmal vein; the latter a little more curved at the base than in *puncticeps*, forming an acute angle with the postmarginal and joining the marginal at the costal margin; postmarginal vein about a third as long as the stigmal but spurlike. Abdomen about a third longer again than wide, about three-fourths as long as the thorax, broadly oval in shape, both the base and apex being well rounded; the tactile plates situated somewhat less than halfway from the middle to the apex, the vibrissae reaching about to the apex; the ovipositor not protruded. Sculpture very similar to *vinulus*, with the pin-punctures on the head more distinct but not prominent, the reticulations of mesoscutum uniform and those on the first tergite of abdomen a little coarser and very delicately impressed. Face and mesoscutum with a fine, whitish pubescence neither very thick nor prominent, the axillae and scutellum with a more scattered, similar pubescence, the metapleura and hind coxae with the usual appressed hairs. Length of body, (2 to) 2.28; length of head, 0.73; width of head, 0.76; width of vertex, 0.223; length of eye, 0.53; width of eye, 0.33; length of antenna, 1.33; width of mesoscutum, 0.71; length of forewing, 2.10; width of forewing, 0.79 mm.

Frontovertex and mesonotum intermediate between xanthine orange and Mars yellow (R.), the face, cheeks, postorbital region, occiput, and underparts of thorax ochraceous orange (R.); the collar of pronotum nearly transparent or probably whitish in life, the inner half of the axillae more or less blackish, the median part of

the scutellum suffused with dark brown or blackish toward the base; inner half of tegulae white, outer half blackish; the propodeum and metanotum blackish brown, the abdomen entirely black. Scape concolorous with the base, pedicel a little darker, the funicle rather dark brown and the club still darker. Legs ochraceous orange, the front tibiae and tarsi rather dark brown, the hind tibiae and rest of tarsi brownish black, except that the first joint of the middle tarsi is somewhat yellowish; the middle tibiae somewhat brownish above and at the apex, the spur pale yellowish. Wings with a roundish spot beneath the stigmal vein, not extending over halfway across the disk.

Male.—Not known.

Redescribed from one female (type), Ottawa, Quebec (W. H. Harrington); one female (cotype of *Encyrtus puncticeps* Howard), Arlington, Virginia, September, 1881 (L. O. Howard); and one female captured at flowers of *Polygonum*, Melrose Highlands, Massachusetts, September 3, 1909 (P. H. Timberlake).

Type.—Cat. No. 4748, U.S.N.M.

7. ISODROMUS PUNCTICEPS (Howard).

Plate 41, fig. 18.

Encyrtus puncticeps HOWARD, Bull. 5 (Old Series), Bur. Ent., U. S. Dept. Agric., 1885, p. 14.

Isodromus puncticeps ASHMEAD, Proc. U. S. Nat. Mus., vol. 22, 1900, p. 379.

Aphyus chrysopae ASHMEAD, Entom. Amer., vol. 4, 1888, p. 15.

Isodromus chrysopae HOWARD, Proc. U. S. Nat. Mus., vol. 21, 1898, p. 240.

Female.—Head a little longer than wide, about as thick as in *niger*; the dorsal surface considerably shorter than the facial surface in side view, their planes meeting in an angle of somewhat more than 90°, the dorsal aspect moderately convex or about as in *atriventris*; the frontovertex rather narrow, about three times as long as wide, the ocelli in a somewhat more acute angle than that of an equilateral triangle, the posterior pair close to the eye margins, the anterior one considerably behind the center of the frontovertex, the dorsal orbits of eyes subparallel; antennal sockets situated about one and a half times their own length apart, their inner rims about parallel; the scrobes long, distinct, and reaching well upward between the eyes. Antennae shorter than in *atriventris*, the scape considerably shorter than the eyes, and reaching but little beyond the plane of the frontovertex, subcylindrical, a little thicker at the middle, slightly curved but hardly furrowed at apex beneath; pedicel about equal to the first two together with one-half of the third funicle joint; funicle joints nearly equal in length, the first one slightly longer than thick, the following increasingly wider, the sixth considerably wider than long

and nearly twice as wide as the first joint; club solid, obliquely truncate from apex to basal third, as long as the last four funicle joints combined. Mandibles about as in *atriventris*. Thorax moderately convex, the axillae nearly level with the scutellum, the disk of the latter moderately convex, abruptly rounded and declivous at the sides and apex. Wings very nearly as in *atriventris*, the speculum a little more distinct and nearly parallel with the apical part of the submarginal; the submarginal slightly angulate at the distal fourth and somewhat thicker at the angle; the stigmal vein less curved at base and thinner. Abdomen narrower than thorax and about two-thirds as long, the sides subparallel, the base somewhat narrowed and the apex well rounded; the ovipositor slightly protruded. Sculpture as in *atriventris*, except that the face has finely impressed, fingerprint-like, transverse aciculations, the frontovertex with the pin-punctures more numerous and distinct, and the axillae and scutellum with a much more deeply impressed or roughened sculpture, the surface, therefore, being much less shining; on the axillae the sculpture is subreticulate, but that of the scutellum, on the whole, is more of the fingerprint type, with the aciculations close-set and longitudinally arranged. Face, cheeks and mesoscutum with a whitish pubescence, thicker on the head but more prominent on the thorax; the metapleura and hind coxae with the usual appressed silvery white pubescence. Length of body, 1.91 (to 2.20); length of head, 0.65; width of head, 0.60; width of vertex, 0.159; length of eye, 0.46; width of eye, 0.29; length of antenna, 0.96; width of mesoscutum, 0.585; length of forewing, 1.70; width of forewing, 0.63; length of exerted part of ovipositor, 0.094 mm.

General color intermediate between orange and Mars yellow (R.), the face, cheeks, postorbital region, most of occiput and prothorax, the pleura and base of abdomen often a little paler and more yellowish; mesoscutum in front of the curved parapsidal lines often darker or about Sudan brown (R.) or becoming even darker medially and anteriorly; collar of pronotum transparent whitish or yellowish along the posterior margin; tegulae white with the apical half pale brown; metanotum, propodeum and most of the dorsum of abdomen brownish black; venter of abdomen like thorax, or sometimes rather dark brown except toward the base and medially; the ovipositor yellow. Antennae concolorous with face, the club and sometimes the funicle rather dark brown. Legs concolorous with pleura or sometimes paler yellow, the front and middle tibiae pale brown, the middle pair sometimes dark brown; hind femora on the upper margin of the inner surface, and the hind tibiae brown to blackish brown; tibial spur yellowish, the tarsi yellowish white with the apical joint dark brown.

Wings with a brownish spot beneath the stigmal vein, becoming fainter as it reaches the opposite margin.

Male.—Not known.

Redescribed from one female (type), Arlington, Virginia, September, 1881 (L. O. Howard); one female (type of *Aphycus chrysopae* Ashmead) reared from a *Chrysopa* cocoon, Jacksonville, Florida (W. H. Ashmead); two females. District of Columbia, one dated August 26, 1890: and one female reared from material of an Aphidid on elm, Yolo County, California (California State Insectary). The latter specimen has darker legs and venter than eastern specimens.

Type.—Cat. No. 2635, U.S.N.M.

BRETHESIA, new genus.

Most closely related to *Isodromus* Howard, but easily recognized by the small eyes, broad frontovertex, and the long face and cheeks. The genus is named after Jean Brèthes, in recognition of his work on South American Hymenoptera.

Female.—Head about as broad as the thorax, rather thin fronto-occipitally, thickest and widest at the lower corners of the eyes, sub-hemispherical in shape with the face slightly inflexed and considerably lengthened or somewhat subrostriform; in side view the planes of the frons and face meet in a very oblique angle, in front view the outline of the upper part of the head well rounded, but from the lower corners of the eyes the cheeks rapidly converge toward the rather narrow oral margin; frontovertex broad or about one-half as wide as the head yet a little longer than wide, and forming with the eyes a strongly convex surface; the large ocelli in an obtuse-angled triangle, the posterior pair a little less than their own diameter from the eye margins and about thrice as far removed from the occipital margin, the median ocellus a little behind the center of the frontovertex; occiput rather deeply concave, the neck inserted near the center, the vertical margin sharp; eyes unusually small as compared with *Isodromus* or *Homalotylus*, their length about one-half more than their width and but little more than the width of the vertex or the length of the cheeks, wider on their anterior half, their long axis about parallel with the plane of the frons, and their dorsal orbits parallel or hardly perceptibly diverging anteriorly; postorbital region rather wide as in *Isodromus* or *Homalotylus*; face strongly convex from side to side, the antennal sockets situated about one-half more than their own length apart and about their own length from the oral margins, their inner rims parallel; the scrobes distinct, forming deep, triangular shaped grooves as wide below as the sockets, but tapering and converging above although not quite meeting; both the

sockets and scrobes separated by a broad ridge well rounded from side to side but entirely plane longitudinally. Antennae short, cylindrical, somewhat clavate, in general structure similar to *Homalotylus* or *Isodromus*: the scape cylindrical, very slightly curved, and excluding the radicle joint about as long as the eyes; pedicel obconical, and a little longer than the first two funicle joints combined; funicle cylindrical but increasing slightly in thickness distad, the first joint unusually short, nearly twice as wide as long, hardly over a third as long as the second and narrower, the next four joints longer than wide, the second and third but slightly so, the fourth about one-third longer than wide, the fifth wider but no longer than the fourth, the sixth hardly longer than wide and about as long as the preceding joint: club considerably wider than the funicle, with three distinct joints, the first of which is shortest, the apical one obliquely truncate from apex to its base on the inner side, the truncation reaching to the middle of the club. Mandibles rather short and very broad at apex with three long, acute, somewhat diverging and incurved teeth of which the middle one is considerably the longest.

Thorax throughout nearly as in *Isodromus*, but not so convex, the mesoscutum, axillæ, and scutellum lying in one plane as in *Homalotylus*, the scutellum flat across the disk, its margins much elevated and abruptly declivous. Legs as in *Homalotylus* or *Isodromus*, the middle tibial spur slender and as long as the first tarsal joint, which is nearly as long as the following joints combined. Fore-wings about as in *Isodromus*, the basal third bare of cilia excepting a row next to the submarginal vein and one obliquely transverse row; speculum distinct, reaching from the stigmal vein obliquely half way across the disk: submarginal vein attaining the margin before the middle of the disk, the marginal punctiform, the stigmal moderately long and very slightly enlarged at apex, the postmarginal about one-third as long and forming an acute angle with the stigmal. Hind-wings as in *Isodromus*, except that the costal cell becomes very attenuated before reaching the hooklets.

Abdomen depressed, broadly ovate in shape, widest at the middle, slightly narrowing toward the base and more rapidly toward the rather acute apex, and a little over one-half as long as the thorax; the tactile plates situated just behind the middle, the vibrissae nearly reaching to the apex; the venter moderately convex from side to side, or as in some specimens the ventrites may be compressed into a sharp longitudinal fold especially toward the base, the fifth ventrite reaching nearly to the apex and enclosing the ovipositor which barely protrudes.

Frontovertex and face rather coarsely, hexagonally punctato-reticulate, with the sculpture delicately impressed; the cheeks, postorbital region and occiput nearly smooth; the mesoscutum microscopically reticulate, the axillae and scutellum with a similar but much coarser reticulation; pleura rather coarsely reticulate, with the aciculations mainly continuous and longitudinal, the prepectal plates, however, scaly-reticulate; abdomen uniformly reticulate except at the apex, and across the base of the first tergite, the reticulations of about the same size as those of the scutellum but more delicately impressed.

Pubescence on face and mesoscutum very fine, rather scattered, whitish in color but not conspicuous; the metapleura concealed by a dense, appressed, silvery white pubescence, the hind coxae with a few scattered hairs of the same character.

Male.—According to Girault's description of *abnormicornis* the male is similar structurally, except that the antennae are less clavate, with the funicle filiform, the last five joints being subequal and all a half longer than wide.

Type of genus.—*Brethesia latifrons*, new species.

1. BRETHESIA LATIFRONS, new species.

Plate 40, fig. 14.

Female.—Length of body, (1.08 to) 1.21; length of head, 0.45; width of head, 0.39; width of vertex, 0.192; length of eye, 0.244; width of eye, 0.176; length of antenna, 0.705; width of mesoscutum, 0.415; length of forewing, 0.11; width of forewing, 0.42 mm.

Frontovertex and mesoscutum ochraceous orange (R.), the face, cheeks, occiput, and anterior half of underparts of thorax mustard yellow (R.); most of pronotum similar but suffused with pale brownish; axillae and scutellum with an ochraceous orange ground color but suffused with brownish, the apical half of the scutellum becoming still darker brown; metanotum, propodeum, and posterior half of the mesopleura chestnut brown (R.) but appearing more blackish in some lights; tegulae mustard yellow with the apical margin slightly brownish; dorsum of abdomen rather shiny black, with most of the first tergite primuline yellow (R.), a minute dot behind the tactile plates and another at the apex ochraceous orange; venter mostly ochraceous orange but paler medially toward the base, and invaded by the black of the dorsum in two areas on each side, the first pair just before the tactile plates and well separated medially, the second pair just before the apex and nearly meeting, the black marks on each side being narrowly separated by the ochraceous orange, the extension of which produces the dot on the dorsum behind the tactile plates. Antennae nearly concolorous with the face or slightly paler. Legs mustard yellow with the front tibiae on their upper surface and

the front tarsi slightly brownish, the hind coxae and femora paler or about Naples yellow (R.), the hind tibiae blackish brown, the tibial spur and middle and hind tarsi yellowish white, the last joint of the tarsi being tipped with brownish. Wings with a faint brownish spot beneath the stigmal vein, becoming hardly perceptible before reaching the opposite margin.

Male.—Not known.

Described from four females (type and paratypes *a* to *c*) reared from material of *Icerya purchasi* Maskell, Mendoza, Argentina (Carlos Reed). The actual host was perhaps a Chrysopid or Hemerobiid predaceous on the *Icerya*. The specimens are poorly preserved as two of the paratypes have lost the abdomen, and the antennae are missing in all except the type.

Type.—Cat. No. 22046, U.S.N.M.

2. BRETHESIA ABNORMICORNIS (Girault.)

Isodromus abnormicornis GIRAULT, Insec. Insc. Menst., vol. 4, Jan., 1917, p. 118.

This species has not been seen by the writer, but seems to be closely allied to *latifrons*. According to the original description the fronto-vertex is moderately wide, the second funicle joint subequal to the pedicel, the last funicle joint distinctly wider than long, the propodeum with three widely separated caninae, and the postmarginal vein only somewhat shorter than the stigmal. The coloration is similar, but the pronotum more blackish, the mesopleura entirely black, and the abdomen except at the base solidly black. The types were reared from material of *Icerya brasiliensis* Hempel, Sao Paulo, Brazil (A. Hempel).

Type.—Cat. No. 20606, U.S.N.M.

EXPLANATION OF PLATES.

PLATE 38.

Forewings of female.

- FIG. 1. *Homalotylus terminalis californicus*. Salt Lake City, Utah.
 2. *H. flaminius*. Cape Town, South Africa.
 3. *H. flaminius*. Brisbane, Queensland.
 4. *H. flaminius*. Palermo, Sicily.
 5. *H. mexicanus*. Guadalajara, Mexico.

PLATE 39.

Forewings of female.

- FIG. 6. *H. cockereli*. Brownsville, Texas.
 7. *H. hyperaspidis*. Murray, Utah.
 8. *H. affinis*. Uplands, California.
 9. *H. quaylei*. Sicily.
 10. *H. oculatus*. Manila, Philippine Islands.

PLATE 40.

Forewings of female.

- FIG. 11. *Anisotylus similis utahensis*. Salt Lake City, Utah.
12. *A. pallentipes*. Oracle, Arizona.
13. *Homalotylus brevicauda*. Ignacio, Mexico.
14. *Brethesia latifrons*. Mendoza, Argentina.
15. *Isodromus iceryae*. San Diego, California.

PLATE 41.

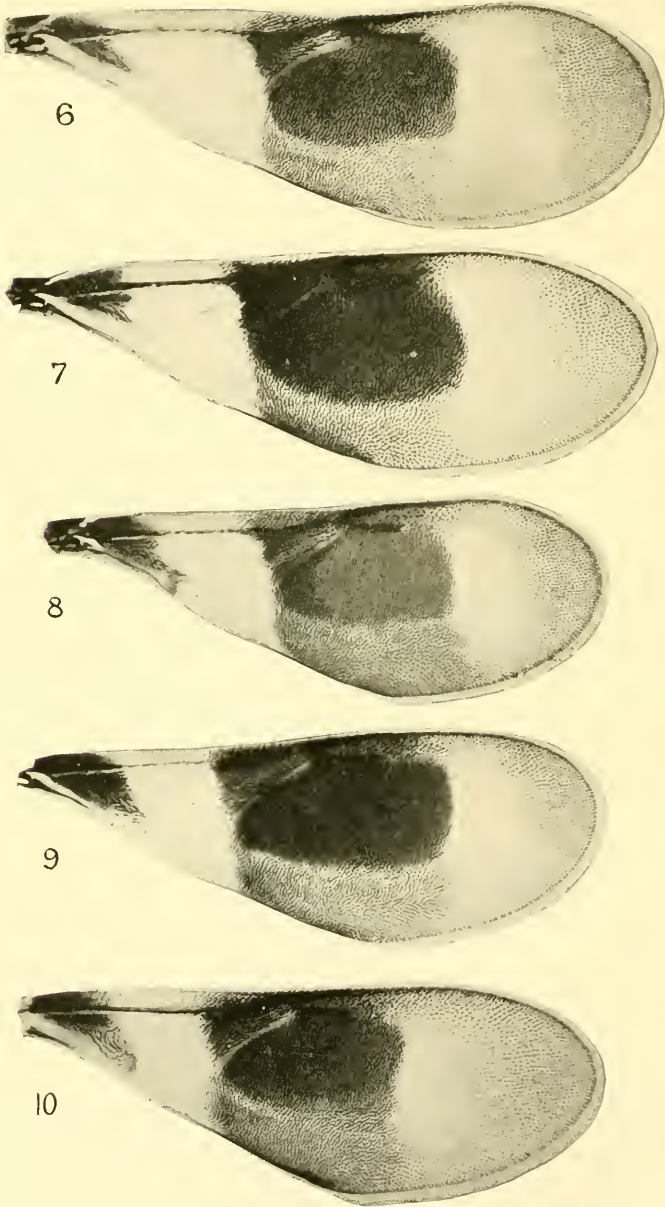
Forewings of female.

- FIG. 16. *I. atriventris*. Melrose Highlands, Massachusetts.
17. *I. vinulus*. Sweden.
18. *I. puncticeps*. District of Columbia.
19. *I. niger*. Murray, Utah.



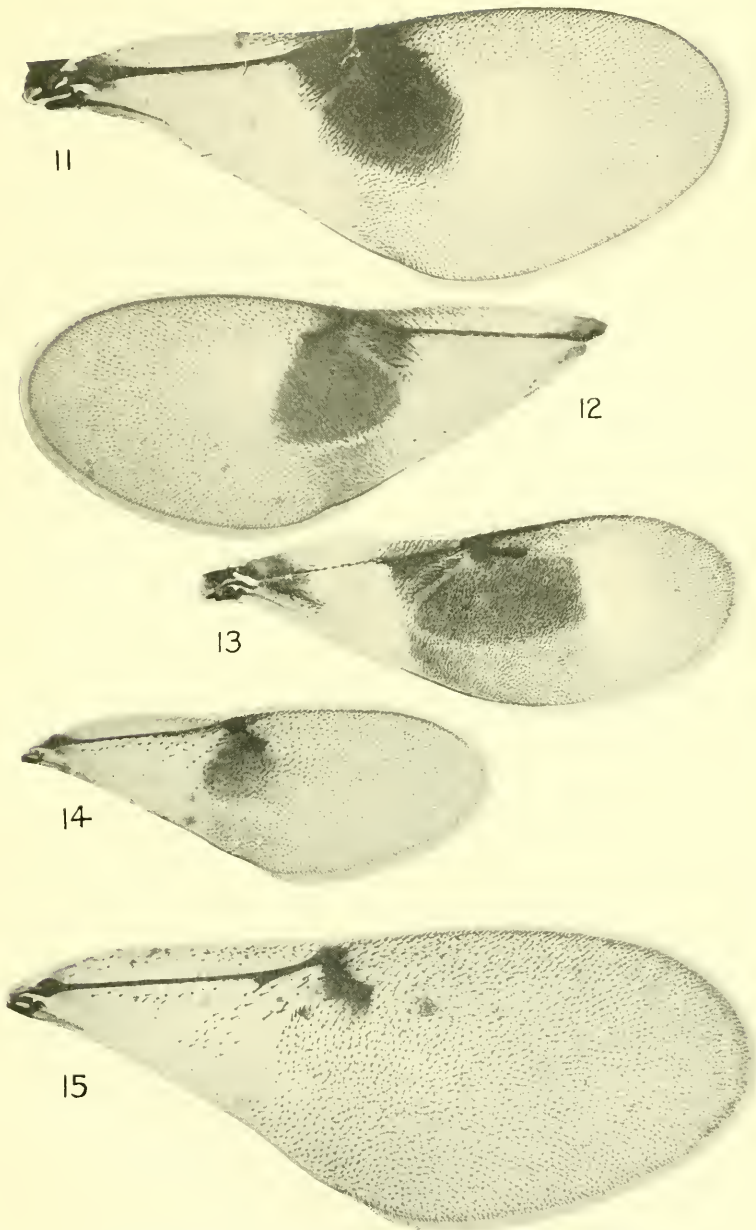
FOREWINGS OF FEMALE PARASITIC CHALCIDOID FLIES

FOR EXPLANATION OF PLATE SEE PAGE 193



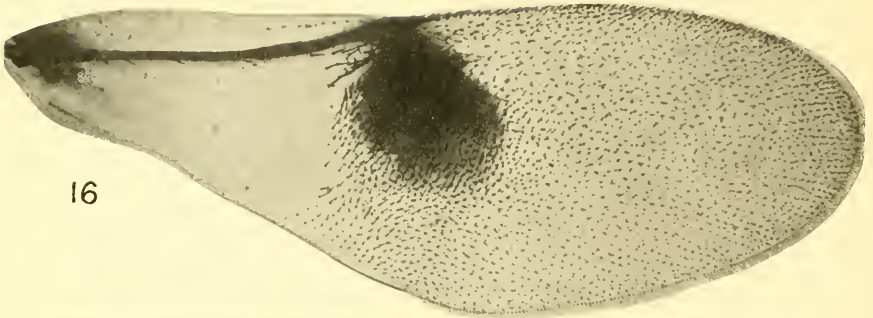
FOREWINGS OF FEMALE PARASITIC CHALCIDOID FLIES

FOR EXPLANATION OF PLATE SEE PAGE 193

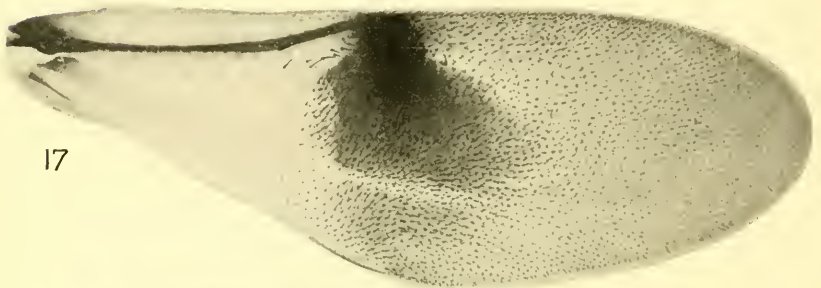


FOREWINGS OF FEMALE PARASITIC CHALCIDOID FLIES

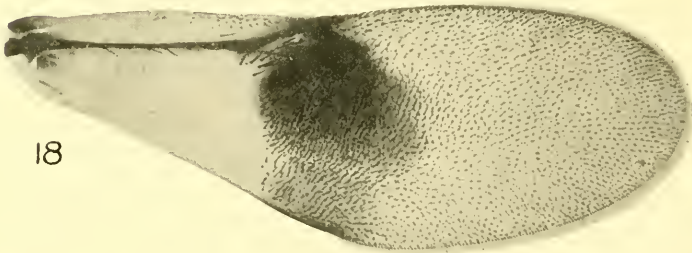
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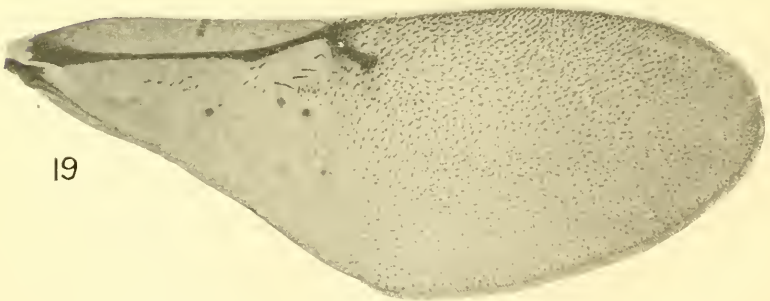
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18



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FOREWINGS OF FEMALE PARASITIC CHALCIDOID FLIES

FOR EXPLANATION OF PLATE SEE PAGE 194