Vol. XII January, 1936 No. 1

THE PAN-PACIFIC ENTOMOLOGIST

Published by the
Pacific Coast Entomological Society
in co-operation with
The California Academy of Sciences

CONTENTS

San Francisco, California
1936

THE PAN-PACIFIC ENTOMOLOGIST

Published quarterly in January, April, July and October by the Pacific Coast Entomological Society in co-operation with the California Academy of Sciences.

Domestic and foreign subscriptions $2.00 in advance. Subscriptions should be sent to the treasurer, E. R. Leach, Department of Entomology, California Academy of Sciences, Golden Gate Park, San Francisco, California. Make checks payable to the "Pan-Pacific Entomologist."

Manuscripts for publication and communications regarding non-receipt of numbers, change of address, requests for sample copies, etc., should be addressed to the editor, Mr. E. P. Van Duzee, California Academy of Sciences, Golden Gate Park, San Francisco, California. Advertisements will be accepted for the back cover pages. For rates address the editor or treasurer.

Twenty-five copies or more of author's extras will be furnished free on request. Additional copies will be supplied at cost of publication if a request is received with the manuscript.

Subscribers failing to receive their numbers will please notify the editor at as early a date as possible.

★ ★

★ ★

Published at the California Academy of Sciences, Golden Gate Park, San Francisco, California.

Entered as second-class matter, February 10, 1925, at the postoffice at San Francisco, California, under Act of August 24, 1912.

The Pan-Pacific Entomologist

Vol. XII. No. 1 January, 1936

NOTES ON TWO OXYBELID WASPS IN SAN FRANCISCO, CALIFORNIA

BY FRANCIS X. WILLIAMS

Honolulu, T. H.

OXYBELUS QUADRINOTATUS Say, var. MONTANUS Robertson (1889)

(Fig. 1, female)

This little sand wasp is still common and widely distributed in San Francisco, for it can withstand to a considerable degree the encroachments of civilization, accommodating itself to large gardens with sandy soil and sunny exposure and finding sufficient flies with which to provision its nest hole. The writer remembers it in the early nineties, when as a small boy he watched it nesting in the sandy backyard of the house tenanted by the large Williams family.

Oxybelus is a very sturdy roughly sculptured wasp some 5/8 millimeters long and the black color of which is relieved by pairs of whitish spots on the abdomen. The female digs moderately deep sloping burrows of several cells. She bites loose the sand which she scoops and brushes out with her strong legs so that a little heap of sand accumulates before the tunnel. The cells are stuffed with appropriate flies that have been rendered helpless, probably through stinging. The common housefly is often utilized by the wasp. I have also found an Anthomyid[1] stored in her burrow as well as two species of relatively large flies of the family Therevidæ.[2]

On leaving her burrow *Oxybelus* stoppers up the entrance with sand so that on her return laden with her fly victim, she may be obliged to search a bit to locate the plugged up tunnel which she immediately digs open. However, she never releases her hold on the limp and slightly twitching prey that protrudes well beyond her abdomen.

[1] *Helemyia fusciceps* Leth., probably. Unfortunately there were no males for absolute determination.

[2] *Thereva comata* Loew and *Thereva vanduzeei* Cole., I am indebted to Mr. E. P. Van Duzee of the California Academy of Sciences for these determinations.

The manner in which *Oxybelus* carries her prey has been observed by a number of competent entomologists, both in Europe and in the United States. It may vary with the species, or even at times, in the species. Observations on this phase of the wasp's activities are usually made when the burdened wasp is manouvering about her burrow. Dr. J. B. Parker's careful studies on *Oxybelus quadrinotatus* Say (Proc. Ent. Soc. Wash., XVII, 1915, pp. 74, 75, pl. XI, Fig. 9) show that this insect carries her prey impaled on her sting and that, at least when resting on the ground her six legs are free[3]. Regarding the San Franciscan *Oxybelus* I quote from Mr. C. L. Fox (Pan-Pacific Entomologist III, 1927, No. 4, p. 198): "In the backyard garden of my home in San Francisco I have been observing this quick fly-catching wasp. It was burrowing into the ground whilst, with its third pair of legs, it firmly grasped a stout fly (*Lucilia cæsar* L.). The victim was much larger, with its whole body projecting behind the little wasp, presenting a very curious appearance. . . . It is probably a western form of *O. quadrinotatus* Say." The present writer, using a method of observation employed also by other entomologists, i.e. that of clapping a small glass container over a burdened Oxybelus that is searching for her stoppered burrow, noticed that *O. quadrinotatus*, var. *montanus* at Lone Mountain, San Francisco, carried her prey headfirst on downbent sting that impaled it on the thorax. Then, all the wasp's legs were plainly seen to be free of the load but, presumably to secure a fresh hold on her prey she would grasp it with one or more pairs of legs, bend the tip of her body against the fly, in this case a therevid, and then impale it with her sting. Dr. Ch. Ferton (Ann. Soc. Ent. France, LXXI, 1902, pp. 516, 517), referring to *Oxybelus* 14-*notatus* Oliv. is in agreement with Shuckard and Gerstæcker, in stating that this little wasp, perhaps because of her small size, carries her prey clasped against her underside by means of her posterior legs and that she is thus able to easily enter her burrow that is left open on going to the chase. And Ferton found on the other hand that the species of *Oxybelus* that carry their prey by holding it with the sting and the two posterior feet, cover up their nest on going out, but having the two anterior pairs of

[3] Of interest in this connection is an observation by Dr. E. T. Nielson (Ent. Meddelelser, XVIII, 3, 1933, (p. 272), who found that *Crabo* (*Crossocerus*) *elongatulus* v.d. Linden carried her fly prey by means of both her sting and her legs.

legs free, are easily able to dig open the tunnel without loosing hold of their prey. In this case the fore part of the prey does not extend anterior to the base of the wasp's abdomen and thus little interferes with digging.

The cocoon of *Oxybelus* is stout and composed of agglutinized sand grains.

In San Francisco *Oxybelus* sometimes falls a victim to *Philanthus californicus* Cresson, a larger fossorial wasp that provisions her nest hole with various small wasps and with small bees.

I am indebted to Dr. V. S. L. Pate of Cornell University for determining these two wasps and for references and other data relating to the Oxybelidæ.

Belomicrus franciscus Pate

(Fig. 2, female, 2A, *Trichochrous antennatus*, its prey)

Belomicrus franciscus is a tiny and thickset wasp about 5 millimeters long that was described by Dr. V. S. L. Pate (Ent. News, XLIII, pp. 77-78, 1931) from specimens collected by the writer at Lone Mountain, San Francisco, California, in 1930. Since Dr. Pate states (l.c., p. 77) that: "Hitherto nothing has been known concerning the biology of any *Belomicrus* save a few scattered flower records" it may be of interest to present my fragmentary observations on *B. franciscus*, much as they were written down in 1930 and thus before the wasp's particular habitat had been greatly altered by the hand of man.

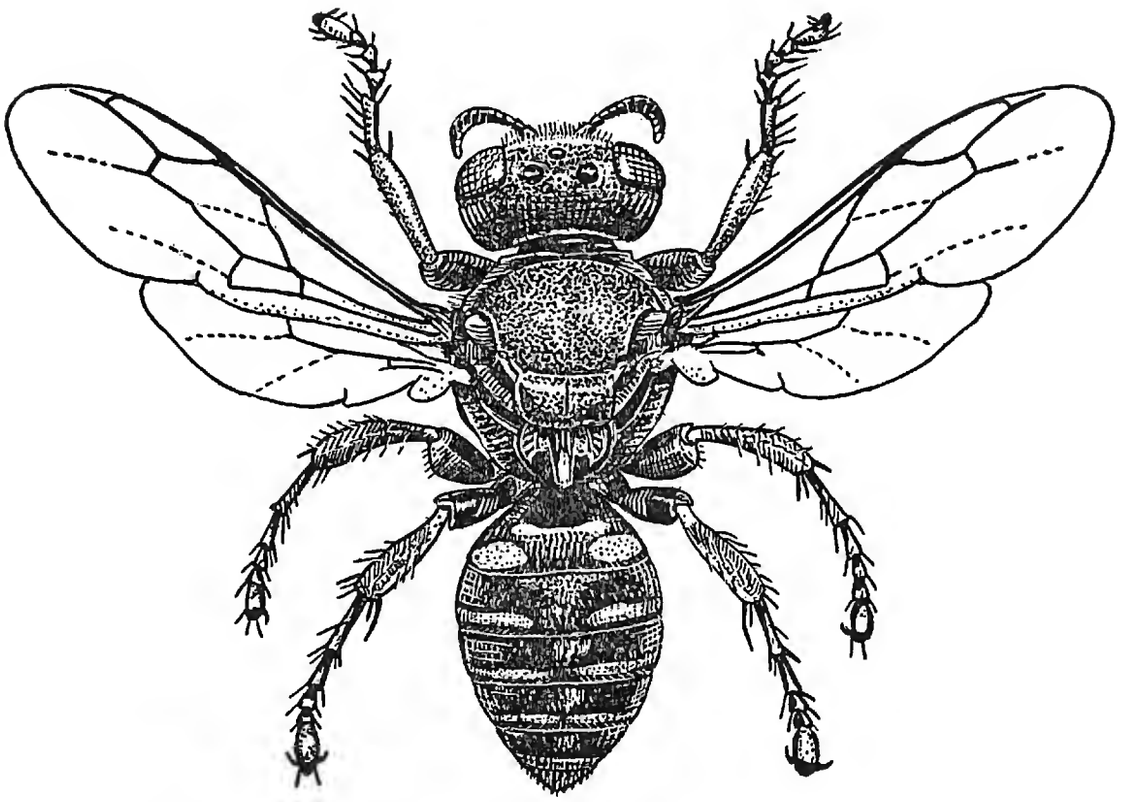
"Lone Mountain" known in the days of Spanish occupation as "El Divisadero" is a sand-covered hillock about 468 feet above sea level. It supports a variety of low vegetation and is relatively rich in wasp life. The east and southeast slopes appear most favorable for wasps and insects in general. *Belomicrus franciscus* is one of the more than 40 species of aculeate or stinging wasps still to be found in this oasis. It was not infrequently seen in late April and in May, 1930, sunning itself on a tiny path, patronizing the flowers of the little sand mat (*Panatacœna ramosissima* H. & A., Caryophyllaceæ), or engaged in nesting activities. Several females were observed in a small area excavating their burrows in the sand. Unlike *Oxybelus*, its larger relative, *Belomicrus* does not use her legs to throw the sand behind and out of her

burrow, although at the beginning of operations she may employ the forelegs a bit to help clear the nesting site. The hind portion of her cheeks, the underside of her mandibles and the fore coxæ and femora are provided with a rather sparse comb of long gently curved bristles that when used together constitute an effective *psammophore* or sand carrier. She first detaches the sand, probably with her jaws, and then, no doubt using her combs of bristles, grabs up a load of sand between mouth and chest and rises obliquely backwards with the load which she releases at the moment of swinging obliquely downwards to her burrow. The insect is so small and active however, that her exact *modus operandi* is difficult to follow. These flights, each of several inches, are repeated again and again so that *Belomicrus* is soon plunging out of sight into her deepening burrow. Note, however, that she always backs out of the burrow and maintains this backwards position, flying tail first obliquely upwards and returning headfirst obliquely downwards. Thus, the extracted sand is not heaped up at the mouth of the tunnel but is scattered from the air. Making a burrow sometimes requires part of at least two days, particularly when there is dull weather intervening. I was not successful in tracing the burrows through the sand; these cannot be deep and they probably have several cells each. When the wasp has finished excavating, at least for the time being, she issues headfirst from her burrow, as do other wasps under like circumstances.

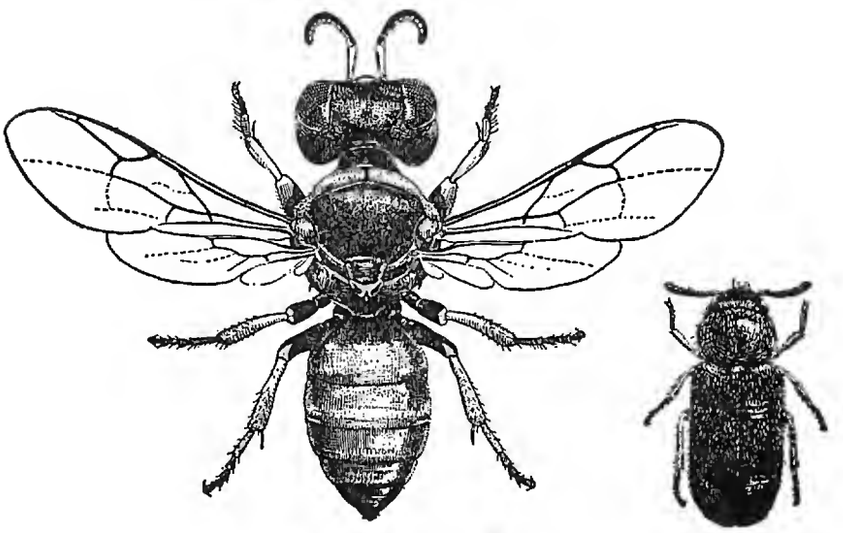
Belomicrus stores her burrow with *Trichochrous antennatus* Mots[4] (Melyridæ), a small beetle abundant on certain flowers, as Eschscholtzia (poppy) and some compositæ. Perhaps other species of the large genus *Trichochrous* are also used by our wasp. Several prey laden *Belomicrus* were noted as they halted for a rest some distance from their burrows, when, clasping the immobile beetle beneath their body they would lose balance and keel over on the sand. But after a brief rest the wasp flies to her open tunnel, which she enters without a pause.

By stopping up the burrow of a *Belomicrus* immediately after she had gone foraging, I was able to secure the returning wasp with her beetle prey, by placing a glass vial or a jelly tumbler over her while she vainly sought to locate the burrow, but main-

[4] Identified by Dr. F. E. Blaisdell, Sr.



1



2

A

taining the while her hold on the beetle. Since *Belomicrus* several times exceeds her prey in bulk, it follows that a number of beetles are stored in each cell as food for the wasp grub.

This wasp was not observed filling up her burrow after it has been provisioned. Doubtless, however, the legs would be employed here for scraping.

TWO WATER BEETLES THAT LAY THEIR EGGS IN THE FROTHY EGG MASSES OF A FROG OR TREE TOAD[1]

BY F. X. WILLIAMS

Honolulu, T. H.

During the wet season of 1934, at Escuintla, Guatemala, the writer on separate occasions gathered portions of masses of white froth in certain of the more or less shaded rain puddles by the roadside. These foamy masses formed a sort of wet float and protective covering for the large number of eggs imbedded in them, the whole being deposited by a certain amphibian, probably a tree toad.

They were sometimes fastened to objects in the puddles but were more common along the banks at the water line or, with receding waters, some little distance above them. When placed in a jar of water these masses usually yielded tadpoles within a day or two; these tadpoles soon sought the bottom remaining quiet there, although sometimes dashing about. In addition to tadpoles, however, portions of four different froth masses gathered on different dates produced a number of larvæ of a dytiscid beetle. These larvæ were about 5 mm. long, exclusive of appendages, at the start and much resembled those of our Hawaiian *Rhantus pacificus*, being similarly protected by dark chitinous plates, and were likewise graceful swimmers, though in no wise equalling the tadpoles in speed. For the most part they hung jaws agape, at the surface, breathing at the tail end of the body. But they quickly attacked the tadpoles, catching them suddenly

[1]Two species of Dytiscidæ are here involved. Young larvæ sent to the Bureau of Entomology, United States Department of Agriculture, Washington, D. C., were referred to the subfamily Colymbetinæ, *Rhantus* (Calidus F.?), while a large larva with a long tubiform terminal segment was referred to Colymbetinæ (near *Ilybius*).

in their sickle-like jaws, soon quieting their violent struggles, and sucking out the juices. They strove to gain the surface with their heavy prey so as to feed at leisure and to take in air at the same time. When one small dytiscid larva encountered another, they separated in a gingerly manner; half afraid, half belligerent. Neither really wanted to start anything. Nevertheless, sooner or later, one consumed the other until at last but a single larva remained. As the larva grows, it sheds its skin, so that eventually it is at least a half inch long.

A portion of one of the tree toad's egg-masses was dissected out and several dytiscid beetle eggs were found in the froth. In this manner the beetle larva is assured an abundance of food that will enable it to complete its transformation in a fair proportion of these often very temporary puddles.

TWO NEW DIKRANEURA FROM THE SOUTHWEST

BY R H. BEAMER*

Dikraneura mera Beamer, n. sp.

Resembling *D. maculata* Gill. but much smaller and orange markings of vertex and pronotum distinctly different. Length, 2 mm.

Vertex, long, bluntly angled, distinctly wider between eyes than median length. Head narrower than pronotum.

Color white with orange and bright red markings. Vertex with an orange inverted U-shaped spot surrounding apex, often with 3 white spots at base formed by very narrow orange marks. Pronotum with pair of orange, almost equilateral triangles, on disc, apices directed posteriorly. Scutellum with tip yellowish. Elytra spotted with orange and bright red dots. The former larger and fewer in number. Clavus with 3 orange spots in a curve from base to middle, smallest at base, apex with brighter red spot with smaller red dot between it and mesal spot. Corium with fifteen (more or less) small, round, bright red dots; scattered here and there from humeral angle to apex. Apex slightly infuscated.

Genitalia. Male plates broad at base, rapidly narrowed on basal half to less than half basal width, remainder with sides almost parallel, tips rounded. Pygofer with short sharp apical

*University of Kansas, Department of Entomology, Lawrence, Kansas.

spine projecting slightly dorsad. Aedeagus long and narrow, bent dorsally on basal fourth, narrowed to sharp apex on outer fourth.

Holotype, male, allotype, female, and numerous paratypes. San Diego, Calif. August 7, 1935, R. H. Beamer.

Dikraneura santana Beamer, n. sp.

Resembling *D. rubens* Beamer but easily separated from it by having a round black dot in the apex of the wing, by the much sharper vertex, and by being more nearly orange colored throughout. Length, 3 mm.

Vertex acute, less than a right angle, slightly longer mesally than width between eyes, disk almost flat, slightly concave next each eye.

General ground color semihyaline to yellowish white, markings orange. Vertex with lateral margins and median longitudinal stripe on basal half white. Pronotum with 3 dashes on anterior margin, median often continued almost to tip of scutellum. Elytra almost concolorous, clavus often with white vittæ on claval suture; corium with semihyaline median longitudinal dash more or less apparent and a round black spot on vein M3, near crossveins.

Genitalia. Aedeagus with long shaft evenly and slightly curved dorsally, with a pair of processes arising on dorsal side almost at base about one-third as long as shaft, diverging from each other and from the shaft on their outer half.

Holotype, male, allotype, female, 7 female and 3 male paratypes, Patagonia, Arizona, August 21, 1935, R. H. Beamer. Eleven females and 2 males, Santa Rita Mts., Arizona, July 17, 1934, R. H. and J. D. Beamer.

Types of both species in Snow Entomological Collection.

E. P. Van Duzee

Mr. E. P. Van Duzee, the editor of the Pan-Pacific Entomologist, was very ill during the time that this number was being printed. He is now on the road toward recovery.

A PRELIMINARY STUDY OF THE GENUS STYLOPS IN CALIFORNIA (PART I)

(Strepsiptera, Stylopidæ)

BY RICHARD M. BOHART

University of California, Davis

Genus *Stylops* Kirby

Stylops Kirby, 1802, Monographia Apum Angliæ, vol. 2.
Stylops Saunders, 1872, Trans. Ent. Soc. Lond., pp. 1-48.
Stylops Pierce, 1909, U. S. Nat. Mus., Bull. 66.
Neostylops Pierce, 1918, U. S. Nat. Mus., Proc. vol. 54.

Since the publication of several papers on Strepsiptera by W. D. Pierce, the taxonomy of the North American members of this interesting group of insects has been neglected. In the present paper an attempt is made to bring more nearly up to date one of the larger genera, *Stylops*.

The prominent generic characters of *Stylops* are: in the male, six-segmented antennæ with the third segment produced, four-segmented clawless tarsi, a large postlumbium, and a scutellum which is at least as long as the prescutum; in the female, five genital tubes, and a brood passage which extends to the sides of the head or almost so; and in the triungulinid, three ocelli, a body clothed with spines of two sizes, and two apical stylets.

Pierce, 1918, erected the genus *Neostylops* for species in which the scutellum does not separate the scutæ. Although of excellent specific value, this character is so completely unsupported by other distinctions in either sex that in the writer's opinion it is not deserving of generic rank.

In the matter of host specificity the writer has found that in many cases *Stylops* are parasitic upon two or more similar species of *Andrena*.

The worker in Strepsiptera is confronted with the great difficulty of obtaining material. Particularly is this true of the males, which furnish the best diagnostic characters. Females may be taken in considerable numbers by assiduous collecting but have relatively few specific characters. In the past three years the writer has been fortunate enough to examine about thirty male *Stylops* of half a dozen different species. The most definite and constant structure is the ædeagus which should be

removed and mounted on a slide for microscopic study. In addition the relative lengths of the six antennal segments and the shape of the metathoracic parts are of great determinative value.

The specific differences of female *Stylops* lie in the shape of the cephalothorax including its relative measurements, the mandibles, the shape of the basal band, and the general markings. Each of these is unfortunately subject to variation, and as a result, most species can be properly characterized only from a series of specimens.

A key to the males is given in the present paper which includes four new species. In a later paper (Part 2) a number of additional species will be described and a key to the females will be presented.

Types and paratypes are to be deposited in the California Academy of Sciences from which a number of Stylopized *Andrena* have been borrowed for study.

To date the male *Stylops* of only four species have been described from North America. Two of these, *childreni* Gray[1] and *solidulæ* Pierce[2] are unsatisfactorily described. Hence they are not included in the following key.

Partial Key to the Males of the Genus Stylops in North America

1. Scutellum reaching almost to the prescutum..... 2
... Scutellum with its anterior margin distinct, not reaching almost to the prescutum, but leaving a definite and depressed bridge between the scutæ..... 4
2. Apical process of ædeagus relatively long and slender; scutellum roughly wedge-shaped, not depresed or pedunculate anteriorly ..... *cuneiformis* Bohart
... Apical process of ædeagus relatively short and stout; scutellum pedunculate and strongly depressed anteriorly..... 3
3. Species very stout..... *timberlakei* Bohart
... Species slender..... *pacificus* Bohart
4. Prescutum about as long as the scutellum, broadly and sharply truncate behind..... *shannoni* Pierce
... Prescutum distinctly shorter than the scutellum..... 5
5. Apical margin of ædeagus less than one-half the length of the main axis; fourth antennal segment only slightly shorter than

[1] 1832, Cuvier's Animal Kingdom, Griffith edn., XV (Insects Vol. 2), p. 684, pl. 59.
[2] 1909, U. S. Natl. Mus., Bul. 66, p. 107.

the fifth and sixth together..... *medionitans* Pierce

... Apical margin of ædeagus two-thirds the length of the main axis; apical process very long, slender, and tapering; fourth antennal segment distinctly shorter than the fifth and sixth together 6

6. Fourth antennal segment shorter than the sixth; ædeagus narrowly incised behind the process..... *vandykei* Bohart

... Fourth antennal segment longer than the sixth; ædeagus not so incised..... *crawfordi* Pierce

Stylops vandykei Bohart, new species

(Figs. 7, 11, 14, 18, and 21)

This species is remarkable for its large size, particularly in the female, which may attain a length of nine mm. and a spiracular breadth of one and three-quarters mm. In the male the sixth antennal segment is longer than either the fourth or fifth. The scutæ are broadly connected and the scutellum is broadly flattened dorsally. The process of the ædeagus is elongate. The female possesses a prominent basal mandibular tubercle, a general convexity of cephalothoracic outline, and a straight anterior margin of the basal band.

Vandykei is the largest species of the genus thus far described. An extensive series of females has been studied and considerable variation exists in the size of the cephalothorax depending upon the size of the host.

Dr. E. C. Van Dyke collected the species many years ago in Berkeley and I take pleasure in naming it in his honor.

Male. Black, wing veins and abdomen fuscous, tibiæ and tarsi testaceous, wings milky. Head small, strongly depressed medially; eyes relatively small; mandibles slightly curved, obtusely pointed; antennal segments three to six with the length ratio 83:41:30:50 respectively. Metathorax consisting dorsally of two raised areas separated in the middle by the depressed postlumbium, compressed strongly at the sides in front of and behind the postlumbium; metaprescutum dorsally flattened and almost quadrangular; scutæ broadly connected by a depressed median area; scutellum large, flattened dorsally, and broadly rounded anteriorly; postlumbium almost triangular, about as wide as long; hypoepimera large, rounded laterally and flattened dorsally. Ædeagus bent at an acute angle, apical process very long, apical margin of ædeagus two-thirds the length of the main axis. Length excluding antennæ, 3.7 mm.; length of antennæ, 0.81 mm.; width of head, 0.82 mm.; length of elytra, 0.45 mm.; wing expanse, 7.7 mm.

Male puparium cap. Antennæ represented by a pair of oval rings separated from each other by three times their breadth; mandibles separated by twice their breadth; maxillæ separated by less than their breadth; eye sockets small, separated by three times their breadth.

Female. Cephalothorax almost evenly ferrugino-testaceous except for the fuscous basal band. Cephalothorax about as long as broad, apex rounded, lateral margins convex, slightly irregular and constricted at the base of the molars; base of head not broad (0.61 times width at spiracles), mouth hemispherical, each mandible with a stout blunt apical tooth and a prominent basal tubercle on the outer edge below the middle, mandible incurved between outer apex and basal tubercle; spiracles small and exceeding the margins; basal band short, three times as wide as long, straight along the anterior margin.[1] Width of cephalothorax at spiracles, 1.58 mm.; width at base of mandibles, 0.60 mm.; width at base of head, 0.97 mm.; width at base of cephalothorax, 1.27 mm.; length from front edge of spiracles to apex, 1.11 mm.; length of cephalothorax, 1.56 mm.

Triungulinid. Body oblong-ovate, widest at the middle; length of body excluding stylets, 0.247 mm.; length of stylets, 0.152 mm.; width of head, 0.049 mm.

Holotype. Male, Berkeley, California, March 12, 1935. Allotype. Female, Berkeley, California, February 11, 1934. Paratypes, two males and eight females. All type material collected in Berkeley by G. E. Bohart and the author.

Host. *Andrena perimelas* Ckll. (Berkeley) and *Andrena carliniformis* Ckll. (Klamath Lake, Oregon), (det. by P. H. Timberlake). *Perimelas* has been taken on both *Brassica* and *Ranunculus*.

Occurrence in California. The only Californian records are from the San Francisco Bay region where it occurs from the middle of February to the middle of April. Triungulinids appear upon the bees about the first of April.

STYLOPS MEDIONITANS Pierce

(Figs. 4, 8, 13, 17, and 19)

Stylops medionitans Pierce, 1918, Proc. U. S. Nat. Mus. Vol. 54, p. 450

This species has not been heretofore figured and the male is undescribed. The characteristic features in the male are the broadly connected scutæ, the relative lengths of the antennal

[1] Measurements adopted from Pierce, 1918, Proc. U. S. Nat. Mus. Vol. 54.

segments, and particularly the form of the ædeagus. The cephalothorax of the female is broad and blunt, typically rounded apically, and with the lateral margins straight for some distance behind the marginal spiracles. The mandibles are incurved below the outer apex.

Male. Black, abdomen fuscous, tarsi light, head broad; eyes large; antennal segments three to six with the length ratio 50:29:-15:19 respectively; second maxillary segment sharply pointed and almost as long as antennal segments three and four together. Prothorax half as wide as the head. Metaprescutum slightly wider than long, broadly rounded apically, distinctly separated from the prescutum by a depressed scutal area; postlumbium rounded behind, as wide as long; postscutellum about as wide as the rest of the metathorax. Ædeagus bent at right angles, with a moderately long, very slender process, which is curved at the base and produced backwards as a small distinct inner process. Length excluding antennæ, 3.07 mm.; length of antennæ, 0.69 mm.; width of head, 0.77 mm.; wing expanse, 5.9 mm.

Male puparium cap. Antennæ and maxillæ each represented by a pair of oval rings separated by three times their breadth, mandibles separated by twice their breadth, eye sockets large, separated by slightly more than two and one-half times their breadth.

Female. The following is quoted from the original description of Pierce: "Cephalothorax yellowish brown with dark basal band; rather broad and rounded; strongly constricted at the base; spiracles marginal, not prominent; mandibles dentate at the apex, strongly rounded at the outer apical angle and angulate on the side." From a study of a long series of specimens the following may be added. The cephalothorax is shovel-shaped in outline, being rather broadly rounded at the apex and sharply angled in back of the spiracles. The lateral margin is usually irregular. The mandibles are always at least slightly incurved below the outer apex and each typically bears a small stout apical tooth. The front margin of the basal band is straight or wavy, never convex. The spiracles are often large but flattened close to the margin, hence not prominent. The width at the spiracles averages about 0.85 mm.

Triungulinid. Not heretofore described. Length of body excluding stylets, 0.192 mm.; length of stylets, 0.08 mm.; width of head, 0.037 mm.

Host. *Andrena medionitens* Ckll. (det. by P. H. Timberlake), which is the type host as recorded by Pierce, and two other unidentified species.

Occurrence in California. The range probably covers the entire northern half of the state; records are from Tulare, Monterey,

San Mateo, Alameda, Sonoma, Nevada, Plumas, Mendocino, Trinity, and Humboldt counties from April to July. The only previous record is that of the type specimen which was taken June 24 at Florissant, Colorado.

Stylops timberlakei Bohart, new species

(Figs. 2, 6, 10, 16, and 22)

The male of this species is notable for its robust appearance, separated scutæ, pedunculate scutellum, and the peculiar form of its ædeagus. The important features of the female are the usually angled lateral margins, the rather even coloration, the irregular but not convex anterior margin of the basal band, the marginal spiracles, and the angulate mandibles which are incurved below the outer apex. The species is named in honor of Mr. P. H. Timberlake, who collected the type series and determined most of the *Andrena* hosts recorded in this paper.

Male. Black, abdomen fuscous, tarsi pale. Antennal segments three to six with the length ratio 49:29:15:16 respectively; mandibles apically enlarged and beveled. Prothorax half as wide as the head. Prescutum slightly broader than long, pentagonal, broadly truncate behind; scutellum anteriorly indistinctly margined, pedunculate, depressed, and completely separating the scutæ; postlumbium broadly rounded behind, broader than long; postscutellum longer than the rest of the metathorax. Ædeagus bent at an acute angle with a relatively short stout process. Length excluding the antennæ, 3.5 mm.; length of antennæ, 0.95 mm.; width of head, 0.95 mm.; wing expanse, 6.8 mm.

Male puparium cap. Antennæ separated by three times their breadth, eye sockets by three times their breadth, mandibles by one and one-half times their breadth, and maxillæ by almost twice their breadth.

Female. Cephalothorax ferrugino-testaceous, lighter toward the center in head and thoracic regions; basal band fusco-piceous. Cephalothorax about as broad as long, narrowly truncate, lateral margins angled at the base of the head and indented in front of the spiracles. Head medium broad at the base (.64 times the width at spiracles), mouth oblong-ovate, mandibles angled with an incurve below the outer apex, apical tooth stout and sharply pointed, basal tubercle wanting; spiracles exceeding the lateral margins but not prominent; basal band relatively narrow, slightly wavy along the anterior margin but not definitely convex. Width of cephalothorax, 1.0 mm.; width at base of mandibles, 0.41 mm.; width at base of head, 0.64 mm; width at base of cephalothorax,

0.75 mm.; length from front edge of spiracles to apex, 0.66 mm.; length of cephalothorax, 1.0 mm.

Holotype, male, Riverside, California, March 2, 1929. Allotype, female, Riverside, California, March 13, 1930. Paratypes, three females, Riverside, California. All type material was collected by Mr. P. H. Timberlake.

Host. *Andrena macrocephala* Ckll. (det. by P. H. Timberlake) on *Nemophila.*

Stylops pacificus Bohart, new species

(Figs. 1, 5, 9, 15, and 20)

The outstanding characteristics of *pacificus* are in the male; the slender form, the pedunculate scutellum which almost completely separates the scutæ, the long slender postscutellum, and the peculiar form of the ædeagus. The female can be separated from *californica* Pierce by its more narrow truncation, from *advarians* Pierce by the convex anterior margin of the basal band (not invariable), and from both of the above by the less prominent spiracles. Furthermore, it can be distinguished from *subcandidæ* Pierce and *timberlakei* by its spade-shaped cephalothorax and usually blunt mandibular tooth. The triungulinid is peculiar in having stylets only one-fifth as long as the rest of the body.

Male. Black, tarsi fuscous, wings milky with fuscous veins, abdominal segments whitish at the sides; body slender. Head large, more than twice as wide as long; eyes large; antennal segments three to six with the length ratio 83:44:26:29 respectively; mandibles slightly enlarged and beveled at the tips; second maxillary segment large, broad at the middle and beveled sharply to a point at the apex. Prothorax half as wide as the head. Metathorax very long, compressed laterally in front of and behind the postlumbium; prescutum about as long as broad, roughly five-sided; scutæ separated by deep sutures from the prescutum and by ridges from the postlumbium and postscutellum; scutellum slender, strongly convex posteriorly, depressed and very narrow in front, almost completely separating the scutæ; postlumbium rounded, about as wide as long; postscutellum slender, half the length of the entire metathorax, strongly convex posteriorly; hypœpimera flattened dorsally and separated from the postscutellum by deep sutures. Ædeagus bent at right angles, with a short, relatively stout apical

process. Length excluding the antennæ, 2.75 mm.; length of antennæ, 0.75 mm.; width of head, 0.85 mm.; wing expanse, 5.8 mm.

Male puparium cap. Antennæ and maxillæ each indicated by a pair of oval rings separated from each other by three times their breadth, mandibles separated by twice their breadth, eye sockets large, and separated from each other by twice their breadth.

Female. Cephalothorax ferrugino-testaceous at the sides, lighter at the center, the spiracular area shaded with minute fuliginous specks on a clear background, basal band fusco-piceous. Cephalothorax about as long as broad, truncation moderate in width and rounded at the edges, lateral margins indented in front of the spiracles, straight from spiracles to apex. Head medium broad at the base (0.66 times width at spiracles), mouth elliptical, mandibles with apical tooth small and blunt, basal tubercle lacking, outer margin rounded; spiracles exceeding the margins but not prominent; basal band with the anterior margin convex. Width of cephalothorax, 0.86 mm.; width at base of mandibles, 0.38 mm.; width at base of head, 0.57 mm.; width at base of cephalothorax, 0.66 mm.; length from front edge of spiracles to apex, 0.55 mm.; length of cephalothorax, 0.88 mm.

Triungulinid. Body long oval, stylets very short. Length of body excluding stylets, 0.163 mm.; length of stylets, 0.035 mm.; width of head, 0.034 mm.

Holotype, male, Berkeley, California, March 1, 1934. Allotype, female, Berkeley, California, March 19, 1935. Paratypes, three males and six females. All type material was collected in Berkeley by G. E. Bohart and the author.

Host. *Andrena complexa* Sm. (det. by P. H. Timberlake) and *Andrena* sp. undetermined, on *Ranunculus*.

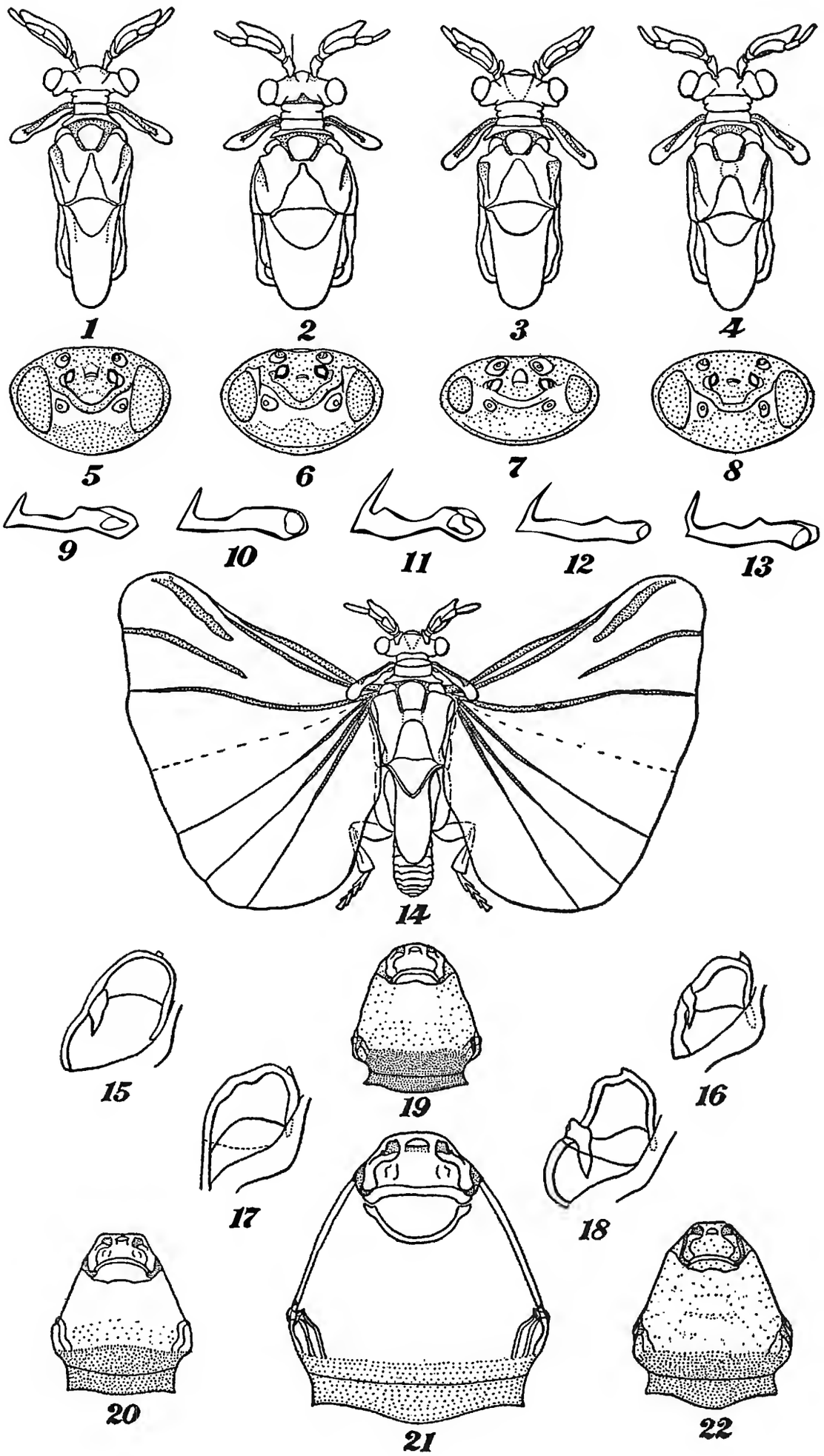
Occurrence in California: *Pacificus* probably occurs over a large portion of the state as records are from Alameda, Sonoma, Trinity, Calaveras, and Modoc counties.

Stylops cuneiformis Bohart, new species

(Figs. 8 and 12)

The species is characterized by the wedge-shaped male scutellum from which its name is derived, by the separated scutæ, and by the slender curved apical process of the ædeagus. The female is unknown. The writer is indebted to the California Academy of Sciences for the loan of the type specimens.

Male. Head, prothorax, mesothorax, and scutellum of metathorax black., otherwise fuscous except for the milky hind wings and pale tarsi. Head broad, strongly depressed medially; eyes


1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
19
16
17
18
20
21
22

large; antennal segments three to six with the length ratio 56:28:13:21 respectively; mandibles very long and slender. Prothorax half as wide as the head. Metaprescutum flattened dorsally and longer than wide (foreshortened in figure); scutellum wedge-shaped, flattened dorsally, only slightly depressed anteriorly, and almost completely separating the scutæ; scutæ strongly depressed at the sides; postlumbium wider than long, broadly rounded behind; postscutellum longer than the rest of the metathorax. Ædeagus bent at an acute angle with a slender curved apical process, apical margin of ædeagus about two-thirds the length of the main axis. Length excluding the antennæ, 2.5 mm.; length of antennæ, 0.61 mm.; width of head, 0.76 mm.; wing expanse, 6.5 mm.

Holotype, male, Coronado, California, March 1, 1891 (F. E. Blaisdell collector). Paratype, one male, same data as holotype.

Host. *Andrena* species undetermined.

Fig. 1. *Stylops pacificus*, male. (Hind wings and abdomen not shown.) Fig. 2. *Stylops timberlakei*, male. Fig. 3. *Stylops cuneiformis*, male. Fig. 4. *Stylops medionitans*, male. Fig. 5. *Stylops pacificus*, male puparium cap (end view). Fig. 6. *Stylops timberlakei*, male puparium cap. Fig. 7. *Stylops vandykei*, male puparium cap. Fig. 8. *Stylops medionitans*, male puparium cap. Fig. 9. *Stylops pacificus*, ædeagus. Fig. 10. *Stylops timberlakei*, ædeagus. Fig. 11. *Stylops vandykei*, ædeagus. Fig. 12. *Stylops cuneiformis*, ædeagus. Fig. 13. *Stylops medionitans*, ædeagus. Fig. 14. *Stylops vandykei*, male. Fig. 15. *Stylops pacificus*, female mandible. Fig. 16. *Stylops timberlakei*, female mandible. Fig. 17. *Stylops medionitans*, female mandible. Fig. 18. *Stylops vandykei*, female mandible. Fig. 19. *Stylops medionitans*, female cephalothorax. Fig. 20. *Stylops pacificus*, female cephalothorax. Fig. 21. *Stylops vandykei*, female cephalothorax. Fig. 22. *Stylops timberlakei*, female cephalothorax.

Say's Plant Bug, Chlorochroa sayi Stal., on Beets in California

According to the literature to date Say's plant bug, *Chlorochroa sayi* Stal., has not been recorded on beets. Several specimens of this species were collected at Hemet, California, June 19, 1935, on beet plants that were being grown for seed. At the time the specimens were collected the beet seeds or kernels had apparently attained the maximum size, although thy had not hardened sufficiently to harvest. The brood of adult bugs had infested the beet plants too late in the season to cause any apparent damage to the developing kernels.—H. L. McKenzie.

NEW SPECIES OF NORTH AMERICAN WEEVILS IN THE FAMILY CURCULIONIDÆ, SUBFAMILY BRACHYRHININÆ, IV

BY EDWIN C. VAN DYKE

University of California, Berkeley, California

Part 4, continued from Vol. XI, p. 96 Tribe Simoini (continued)

Genus **Anchitelus** Van Dyke, new genus

Short, robust, densely clothed with closely appressed scales and sparsely setose. Head stout, subcylindrical basally; eyes moderately convex, projecting but little beyond side margin; rostrum two-thirds width of head and somewhat shorter, separated above by a distinct dorsal impression, and widened apically; scrobes superior, widely open in front and convergent to middle of rostrum thence continued arcuately outwards almost to lower angle of eyes, the posterior portion also somewhat squamose; antennæ moderately robust, scape arcuate, gradually enlarged outwardly and reaching beyond front margin of prothorax, funicle 7-segmented, the first over twice as long as broad, more robust and slightly longer than second, segments 3-7 somewhat moniliform, club oval. Prothorax transverse, sides arcuate, postocular lobes and fimbriæ absent. Elytra elliptical, striæ well defined and with fine punctures. Legs stout, posterior tibiæ with two short fixed spurs at apices and cotyloid surface glabrous, third tarsal segment dilated and claws connate. First abdominal suture arcuate, second segment equal to the third and fourth combined.

Genotype: *Anchitelus alboviridis*, new species.

This genus is superficially somewhat like *Tricolepis* or perhaps more like *Peritelinus* because of its expanded rostrum, but it has two small fixed spurs to the hind tibiæ, lacking in that genus, therefore, would run closer to *Periteloides* according to Casey's key.[1] This last, however, not only does not resemble it but has short subapical scrobes whereas in *Anchitelus*, they are long, widely open in front much as in *Peritelinus* though continuing backwards and laterally almost to the lower angle of eye which is not the case in that genus. It should follow *Periteloides*.

Anchitelus alboviridis Van Dyke, new species

Rather small, compact, rufopiceous, with antennæ, tibiæ and tarsi rufous and body densely tesselated with small, light greenish-

[1] Anls. N. Y. Acad. Sci., Vol. IV (1888), p. 269.

white scales, feebly darker in two broad longitudinal lines on the pronotum and entire disk of elytra, and sparsely studded with short and fine setæ scattered over the pronotum and arranged in irregular rows on the elytral intervals. Head about two and a half times as long as broad, subcylindrical behind, and with parallel sides, eyes but feebly convex, not extending laterally beyond side margin of head; front flattened, with fine median groove extending forwards on the rostrum and with a few short, scattered setæ; rostrum broad, about as long as head, bulbous towards base and distinctly separated behind from the head by a transverse impression, rather broadly dilated at apex; scrobes superior in front, broadly open and convergent backwards, thence continued laterally in arched manner almost to lower margin of eye; antennæ moderately robust. Prothorax broadest at middle, base about one-fourth broader than apex, both transverse, disk rather finely, sparsely and irregularly punctured, a short seta, inclined forwards, arising from each puncture. Elytra two and three-fourths times as long as prothorax and about twice as broad, moderately convex, declivity arcuate but abrupt, striæ finely impressed and finely punctured, intervals feebly convex, the short, curved setæ inclined backwards. Beneath with scales somewhat more elongate than above and with numerous fine hairs mixed with them on the abdomen. Length, 4.75 mm., breadth, 2.25 mm.

Holotype (No. 4135, Mus. C.A.S., Ent.) and two paratypes collected near McKittrick, California, April 11, 1932, by E. P. Van Duzee.

Genus PERITELINUS Casey

KEY TO SPECIES

1. Little darker above than below, cinereous beneath; elytra oval, setæ moderately fine and generally uniseriately arranged on intervals; outer funicular segments somewhat transverse.....2
... Upper surface dark brown, undersurface much lighter, brown or cinereous; elytra elliptical, setæ coarser, closer and often irregularly biseriately placed on diskal intervals; outer funicular segments not transverse.....*erinaceus*
2. Pronotol punctures rather fine, setæ arising from them short but projecting well beyond the pits; disk of elytra as seen in profile somewhat flattened .....*variegatus*
... Pronotol punctures coarse, setæ arising from them squamiform and projecting little if at all from the pits; disk of elytra as seen in profile somewhat arcuate.....*oregonus*

Peritelinus erinaceus Van Dyke, new species

Somewhat elongate, brown above, pronotum often with a median

longitudinal line lighter, disk of elytra generally of a golden brown, sometimes clouded, and with an irregular dark brown margin; the setæ of entire upper surface of a more or less uniform type, short and club-like, inclined forward on the pronotum but erect on the head and elytra, and unicolorous with background. Head about a third longer than broad, slightly narrowed forwards, sides of rostrum continuous in same plane as sides of head, eyes moderately convex, front flattened, rostrum feebly sulcate in front, scrobes wide and pointing towards but not reaching eyes; scape arcuate, stout, not reaching front margin of prothorax, first funicular segment long, 2-7 gradually shorter, moniliform. Prothorax about a third broader than long, broadest at middle, apex narrower than base, sides moderately arcuate, disk somewhat flattened as viewed from side, rather finely, discretely punctured, the numerous short setæ arising from punctures. Elytra elliptical, two-sevenths longer than broad and two-fifths broader than prothorax, disk flattened from base to posterior third, declivity evenly rounded, striæ sharply impressed and finely, closely punctured, the punctures slightly elongate, intervals feebly convex, third, fourth and fifth often with two irregular rows of setæ, the rest generally with one. Underside with scales less imbricated than above and abdomen with a limited number of short and fine, much inclined hair. Legs robust and clothed with semierect squamose setæ as well as scales. Length, 5.75 mm., breadth, 2.5 mm.

Holotype (No. 4136, Mus. C.A.S., Ent.) and numerous designated paratypes from a series of over thirty specimens. The holotype was collected near Grass Valley, California, May 18, 1930, by E. P. Van Duzee. Other specimens are from Cordelia, Solano County; Pope Valley, Napa County; Sonora, Bear River and Columbia, Tuolumne County; Green Valley and Clarksville, El Dorado County, all from California and collected either by E. P. Van Duzee, H. H. Keifer or by me. The Green Valley specimens were beaten from Ceanothus shrubs and the Cordelia specimens from cherry by H. H. Keifer. They, however, feed on the most available shrubs within their territory.

This species with its numerous, short spines has a very characteristic appearance, quite suggestive of the larger *Encyllus vagans* Lec. It in general ranges throughout the Sierra foothills, the same territory where the more common *variegatus* is to be found.

Peritelinus oregonus Van Dyke, new species

Subglose, brown above, a median longitudinal line on the pro-

notum often lighter and the elytral disk generally clouded, often with an irregular transverse bar of lighter scales near the summit of the declivity, margined posteriorly with dark brown scales, the sides and undersides of a silvery white; the setæ only conspicuous on the elytra and there fine, short and sparse. Head about a third longer than broad and slightly cuneate as usual. Eyes rather small and but slightly convex, front flattened, rostrum feebly sulcate, a fine groove extending back on to the front, scrobes wide, less deep behind; scape arcuate, narrow basally, barely reaching front margin of prothorax, funicle as in preceding species except less robust and with several segments somewhat transverse. Prothorax about a fifth broader than long, broadest at middle, apex but slightly narrower than base, sides feebly arcuate, disk perceptibly arched when viewed laterally, coarsely discretely punctured, the equamose setæ arising from the punctures hardly projecting beyond their upper margins. Elytra oval, as broad as prothorax, disk arcuate as viewed laterally, declivity abrupt, setæ finely impressed, and finely, closely punctured, intervals flattened, each with a row of short, stiff, erect setæ. Abdomen sparsely squamose and pubescent. Legs moderately robust and clothed with scales and short, curved setæ. Length, 4.75 mm., breadth, 2.25 mm.

Holotype (No. 4137, Mus. C.A.S., Ent.) and seven paratypes, collected by me from oak, *Quercus garryana* Dougl., at Corvallis, Oregon, June 3, 1914. Several specimens from Klamath Falls, Oregon, collected July 9, 1934, and differing but little from the above, have been associated with the type set.

This species in size, shape and coloration much resembles the type species, *variegatus*, but can always be readily separated from that by the coarse pronotal punctures with the setæ short, squamose, and almost entirely enclosed within the punctures, in contrast to the small pronotal punctures and short but evidently exposed setæ of the other, as well as by the shorter and sparser elytral setæ. As I remember, the species was fairly common about Corvallis. It has long been known but generally confused with species in other genera particulary *Tricolepis simulator* Horn.

Genus Nemocestes Van Dyke, new name

Geoderces Horn, Proc. Am. Phil. Soc., XV (1876), pp. 70-71.

The genus *Geoderces* was established by George Horn in 1876, with *Trachyphlœus melanotrix* Kirby, designated as the genotype. Two species, *incomptus* Horn and what Horn took to be

melanotrix Kirby were placed in the genus. Unfortunately, Horn did not correctly identify Kirby's species, this being an entirely different weevil from what Horn believed. In 1932, I carefully examined Kirby's type of *Trachyphlœus melanotrix* which is preserved in the British Museum and is in good condition and found it to be none other than the well known and previously described *Phyxelis rigidus* (Say). To make doubly sure, I had Sir Guy Marshall, an acknowledged authority on the Rhynchophora, and Dr. K. G. Blair check my comparisons. A careful reading of Kirby's description will also show that it applies to *rigidus* and not to what Horn took it to be. That being the case, *incomptus* and what Horn considered as *melanotrix* are without a valid generic name and the latter also without a specific name. Much as I dislike to increase the synonomy, I feel that there is nothing else to do but to erect a new genus to replace *Geoderces* Horn and to give a specific name to Horn's (not Kirby's) *melanotrix*. The new name that I propose for the genus is *Nemocestes*, and it may be defined as follows:

Robust, afterbody subglobular, densely clothed with closely appressed scales and sparsely setose. Head stout; rostrum about as long as head, narrowed from in front of eyes to middle thence generally wider, feebly transversely impressed at base, moderately emarginate at apex, scrobes lateral, somewhat arcuate and directed towards but not reaching eyes; antennæ long, scape almost as long as funicle, reaching anterior margin of prothorax or beyond, funicle 7-segmented, first two segments moderately long, segments 3-7 elongate, obconical, gradually shorter, club elongate oval; eyes round, but moderately convex. Prothorax transverse, truncate at base and apex, with sides more or less arcuate and without postocular lobes or fimbriæ. Scutellum somewhat vertical, only visible when forebody is deflexed. Elytra oval or suboval, convex. Metasternum short, side pieces narrow, indistinct. Intercoxal process broad, truncate; second ventral segment separated from the first by a feebly arcuate suture. Tibiæ with very short mucro at tip, very minutely denticulate internally, and hind tibiæ with two short fixed spurs and cotyloid surface glabrous.

Genotype: *Nemocestes incomptus* (Horn).

As Horn states, this genus "has nothing at all resembling it outside of our fauna." The large subglobular, somewhat flattened afterbody gives the species a peculiar facies, enabling them in most cases, to be quickly determined. The genus is dominant along the Pacific Coast of North America, with a few

wide ranging species but most are extremely local. Only one, *horni* (*melanotrix* Horn—not Kirby) is to be found entirely outside of the Pacific fauna. A number of undescribed species are known, most of which will be described in this paper, but others will be left for a later day with the hope that more specimens will be secured to give a better idea of the species. Several of the species are of considerable economic importance, especially in strawberry fields.

Key to Species

1. Larger species, 6 mm. or more in length.....2
... Smaller species, 5.5 mm. or less in length.....4
2. Antennal scape barely reaching back beyond front margin of prothorax; setæ of upper surface sparse, short, much inclined and somewhat curved .....*horni*
... Antennal scape reaching back well beyond front margin of prothorax; setæ of upper surface longer, at least one-half width of intervals, straight and more upright.....3
3. Setæ sparse, coarse and somewhat inclined; scaly vestiture variegated in color; afterbody quite globose.....*incomptus*
... Setæ dense, fine and vertical; scaly vestiture unicolorus brown; afterbody flattened above and somewhat straight and parallel at sides .....*longulus*
4. Prothorax widest near middle, pronotal punctures coarse; setæ moderately long, dense and suberect; color more or less uniform brown 5
... Prothorax widest behind middle, setæ rather short; color variable 6
5. Pronotal punctures numerous and close; elytra subelliptical, disk arcuate from base to apex; lighted markings vague..... *sordidus*
... Pronotal punctures coarse, moderately numerous but well spaced; elytra broad at humeri, with sides somewhat straight and feebly convergent backwards, disk flattened; distinct light markings near hind angles of prothorax and middle of femora ..... *montanus*
6. Pronotum coarsely, less closely, punctured; setæ fine and suberect; variegated color pattern, 4.5 mm. or less long; funcular segments 4-7 moniliform, about as broad as long; rostrum feebly expanded in front .....*puncticollis*
... Pronotum finely, rather closely punctured; setæ much inclined; 5 mm. or more long; funicular segments 4-5 longer than broad rostrum not perceptibly expanded apically.....7
7. Elytra with declivity arcuate and a prominent tubercle on fifth interval apically; first intervals with carinate callosities near scutellum; setæ rather short, fine and much inclined;

variegated color pattern ..... *tuberculatus*

... Elytra with declivity almost vertical and straight, apex of declivity overhanging; setæ short and closely appressed; color uniform brown ..... *koebeli*

Nemocestes incomptus (Horn)

This species is common and widely distributed along the Pacific Coast from British Columbia to middle California, ranging inland in the north generally as far as the Cascades, and more restricted to the immediate coast as it passes south. I have one specimen from Yellowstone Park. It varies in size from 6-9 mm., average 8 mm., and in color from gray through golden brown to dark brown. It may be irregularly maculated dark and light brown or more usually with the sides of the prothorax and sides and apex of elytra a lighter brown than the disk, the disk of the elytra being abruptly separated from the sides and apex by an irregular dark band. The setæ are quite variable as to length, robustness and color, likewise the basal segments of the antennal funicle are variable as to length, the second segment being always distinctly longer than the first. In this connection I will state that Horn was absolutely wrong in giving the "second joint shorter than the first." Mr. E. T. Cresson, Jr., has very carefully measured the segments of the type and paratype specimens in the Horn collection for me, and in all cases found the second segment the longer. I have examined hundreds of specimens including large numbers collected by me as well as big series submitted by Mr. J. Wilcox of Puyallup, Washington. At certain times of the year, the specimens become coated with mud.

Nemocestes **horni** Van Dyke, new name

This species, as stated previously, is the *Geoderces melanotrix* Horn but not the *Trachyphlœus melanotrix* Kirby as believed by Horn. The characters separating this species from the preceding are very feeble. I believe that it is but a subspecies at most of *incomptus*, but until we get larger series of specimens, especially from intermediate territory, will leave it as placed. My specimens are from Michigan. It has also been found in Canada and New York.

Nemocestes longulus Van Dyke, new species

Rather large and robust, somewhat elongate, piceous or reddish brown, densely clothed with closely appressed dark brown or golden brown scales except for a few lighter ones above the eyes, at sides of pronotum behind, and in a band at middle of femora, the upper surface also rather densely pilose, the hair fully as long as one-half the breadth of intervals, dark and upright. Head flattened above, interocular area broad; rostrum slightly longer than head, broad, in general feebly narrowed forward but with alæ expanded, antennal scape reaching back behind front margin of prothorax, second segment of funicle long and distinctly longer than first, the following much shorter, gradually broader but all longer than broad. Prothorax about a sixth broader than long, widest behind middle, gradually narrowed in front and rounded to base, disk rather coarsely and densely punctured. Elytra subelliptical, slightly less than twice as wide as prothorax, over one-fourth longer than broad, with sides more or less straight and parallel, disk somewhat flattened, striæ well defined and strial punctures distinct and closely placed, intervals flattened or feebly convex behind. Abdomen rather coarsely, irregularly punctured. Length, 6.5 mm., breadth, 3 mm.

Holotype (No. 4138, Mus. C.A.S., Ent.) and several designated paratypes from a series of over sixty specimens. These were taken at Saticoy, Ventura County, California, the type in June, 1924, others July 30, 1924, May 22, 1924, and so forth, and mostly by Mr. Stanley Flanders. Some were found feeding in strawberry patches.

This species is almost as large as the average *incomptus*, our largest species, but proportionally narrower and more elongate, of a more uniform color and with pile far more dense and erect.

Nemocestes sordidus Van Dyke, new species

Of moderate size, robust, piceous, antennæ and tarsi rufous, densely clothed with piceous or earthen colored scales with a few silvery scales at sides of prothorax near base, over eyes and at middle of femora, and moderately setose, the setæ one-half breadth of intervals, black and suberect. Head flattened above, interocular area broad; rostrum slightly longer than head, feebly narrowed forward, both head and rostrum rather coarsely punctured; antennal scape reaching back of front margin of prothorax, second funicular segment elongate, the following longer than broad and gradually broader. Prothorax barely broader than long, widest at middle, sides rather evenly arcuate, disk coarsely, moderately densely punctured. Elytra well rounded at humeri and apex,

feebly arcuate at sides, disk moderately convex, declivity well rounded, somewhat straight near apex, striæ well impressed and with moderate, somewhat closely placed punctures, intervals flat. Abdomen with punctures concealed by scales. Length, 5.5 mm., breadth, 2.5 mm.

Holotype (No. 4139, Mus. C.A.S., Ent.) and numerous designated paratypes from a series of thirty-four specimens, all collected near San Jose, California. The type is from a series taken August 1, 1931, others on various dates in June. Dr. L. M. Smith furnished most of the specimens which were taken in strawberry patches where they were doing considerable injury. A small series of slightly smaller individuals from Niles, California, July 20, 1921, and others collected by Albert Koebele, labeled Alameda County, California, I have associated with the preceding lot.

This species in color and general facies somewhat resembles *longulus*, but it is much smaller, less elongate, with the prothorax more evenly arcuate at sides and less narrowed forwards, the pronotum more coarsely and sparsely punctured and the sides of the elytra less parallel.

Nemocestes **montanus** Van Dyke, new species

In size and color similar to preceding but the setæ are shorter, sparser and more inclined. The head is more irregularly, sparsely punctured above, the rostrum more quadrate with sides parallel, eyes more convex and prominent, and the occipital region clothed with silvery scales which become quite noticeable when the head is flexed. The prothorax is about one-sixth broader than long, somewhat narrowed in front, disk coarsely, somewhat distinctly punctured. Elytra broad at humeri, with sides almost straight and parallel and apex well rounded, disk flattened, striæ finely impressed and moderately finely, closely punctured, the intervals flat. Abdomen coarsely, sparsely punctured in front. Length, 5 mm., breadth, 2.5 mm.

Holotype (No. 4140, Mus. C.A.S., Ent.) collected by myself at Fallen Leaf Lake, Lake Tahoe, California, June 23, 1915; paratype, also collected by me, at Carrville, Trinity County, California, June 31, 1913. Other specimens seen are: one from Tallac, California, July 17, 1915, two from Riverton, California, July 8, 1935, and one from Pacific House, El Dorado County, California, July 7, 1931, all in collection of E. C. Zimmerman; one

reared from roots of *Ribes* at Baxter, Placer County, California, by H. H. Kiefer; and a small series submitted by J. Wilcox and William W. Baker and collected at various places in western Washington such as: Spanway, September 15, 1933, Oak Point, October 11, 1933, Cle Elum, May 7, 1933, Easton, April 9, 1933, and Loveland, April 1, 1932. A series of mostly immature specimens taken from strawberries by J. Wilcox near Albany, Oregon, July 12, 1929, has also been tentatively placed with this species.

The quadrate rostrum, somewhat prominent eyes, coarse and well-spaced pronotal punctures, and straight sides and more or less flattened disk of elytra will generally define this species. The silvery scales of the occiput are also very noticeable in this species. Immature specimens are variegated in color but fully matured ones are characteristically dark brown.

NEMOCESTES PUNCTICOLLIS (Casey)

This species is much the smallest of the genus, and is readily separated from the others not only by its size but by the peculiarities of its funicular segments. It is, however, very similar in general appearance to the much more common *Geodercodes latipennis* Csy. and being found in the same locality, Monterey Bay and vicinity, is very apt to be mistaken for it.

Nemocestes tuberculatus Van Dyke, new species

Moderate in size, robust, reddish brown, densely clothed with golden brown scales mixed with patches of darker brown and cinerous scales and with setæ short, sparse, light in color and much inclined on the elytra. Head somewhat flattened above and coarsely, sparsely punctured; rostrum longer than head, narrowed forwards, feebly sulcate above and with a vague median carina; eyes moderately prominent; antennæ rufous with scape reaching behind front margin of prothorax. Prothorax fully a sixth wider than long, widest back of middle, gradually narrowed in front, disk distinctly yet moderately finely and somewhat abundantly punctured. Elytra almost a third longer than broad, with sides almost straight and divergent from base to humeri where widest, thence almost straight and feebly convergent backwards to sides of declivity where are situated the blunt tubercles, feebly sinuate within these and rounded to apex; disk moderately convex; striæ finely impressed and with fine, closely placed punctures, the intervals flattened in front, feebly convex behind, the sutural with an

elongate callosity in front near scutellum and the fifth with a blunt tubercle near summit of apical declivity. Beneath more sparsely squamose than usual, finely pilose and sparsely punctured. Length, 5 mm., breadth, 2.5 mm.

Holotype (No. 4141, Mus. C.A.S., Ent.) and numerous designated paratypes from a series of twenty-four specimens collected by me from beneath the old dead leaves of the redwood (*Sequoia sempervirens* Endl.) in Muir Woods, Marin County, California, August 30, 1909. There is also a large series in the Blaisdell collection taken at the same time and place, and two specimens collected by J. O. Martin, near Taylorville, Marin County, California, December 28, 1919.

This species is one of the most distinct in the genus, the light variegated color pattern, smooth parascutellar callosities, and apical tubercles readily defining it.

Nemocestes koebeli Van Dyke, new species

Of moderate size, unicolorous brown, densely clothed with closely appressed scales as usual and with short setæ, numerous and much inclined, hardly raised above the scaly vestiture. Head flattened above; sparsely punctured, rostrum longer than head, somewhat narrowed forward, eyes feebly convex, scape of antennæ reaching well back of front margin of prothorax. Prothorax over one-sixth broader than long, widest back of middle, gradually narrowed in front and transversely impressed before apex, disk rather finely, closely punctured, setæ short and much inclined. Elytra broadly rounded at humeri, sides almost straight to posterior third, thence rounded and feebly arcuate and rapidly convergent to apex; disk quite feebly arcuate in profile, summit of declivity overhanging, the declivity in profile almost straight and inclining forward to apex, striæ finely impressed and finely, closely punctured, intervals feebly convex at sides and apex, setæ, short, numerous and much inclined, projecting but little above the scaly vestiture, except on declivity. Beneath sparsely squamose, finely, sparsely pubescent, and but moderately punctate. Length, 5 mm., breadth, 2.5 mm.

Holotype (No. 4142, Mus. C.A.S., Ent.) and one paratype, collected by Albert Koebele in the Santa Cruz Mountains, California.

The outstanding characters of this species are its fine pronotal punctures, very short and closely appressed setæ and the odd shaped afterbody with the summit of the declivity extended well back of the sutural apex and the declivity itself straight and passing forwards.

Aragnomus setosus Van Dyke, new species

Moderately robust, densely clothed with closely appressed cinereous and brown scales, the latter massed on the front of head, median area of pronotum and disk of elytra, the head and pronotum also with numerous short, forward projecting setæ and the elytra with rows of long, erect, hair-like setæ. Head robust, sides straight and convergent forward, front continuous with rostrum without transverse impression, the rostrum, therefore, not sharply delimited, not dilated in front, a small fovea between the eyes, the eyes large but almost flat, scrobes dorsal, short, elliptical, directed toward eyes but well separated from them; antennæ rather long, scape arcuate, about reaching front margin of prothorax. Prothorax transverse, subcylindrical, one-third broader than long, two-thirds as long as head and rostrum, the broad diskal stripe often divided down the middle by a white line. Elytra elliptical, about a third longer than broad and two-fifths broader than prothorax, the declivity gradually rounded off, not abrupt, striæ finely impressed, intervals flat or feebly convex at sides and apex, and each with a single or occasionally a double row of rather long, erect, hair-like setæ. Legs robust. Beneath with numerous short, hook-like setæ in addition to the scaly vestiture. Length, 5.5 mm., breadth, 2.5 mm.

Holotype (No. 4143, Mus. C.A.S., Ent.) and numerous designated paratypes from a series of 47 specimens beaten by me from manzanita (*Arctostaphylos*) bushes on the hills near Columbia, Tuolumne County, California, June 4, 1931.

This species is much less robust than *griseus*, head more definitely cuneate, prothorax shorter, elytra less dilated and with declivity evenly arcuate, not abrupt, and the elytral setæ rather long and erect, not short and squamose. From *hispidulus* Csy., it differs by the rostrum not being dilated at apex, not impressed at base, the scape not extending beyond front margin of prothorax, the prothorax much shorter than head and rostrum together, the elytra not inflated and declivous at apex, and with rows of long setæ, not long scales, on the intervals. The color is variable, some specimens being almost uniformly gray, others with the elytral disk bounded by an irregular dark brown line, the diskal area itself but little darker than the rest of the insect.

The range of *Aragnomus griseus* Horn is mainly in the Great Basin, Nevada, western Colorado, northern Arizona. The type locality California must have referred to the arid area east of the Sierra Nevada mountains.

Genus Encyllus Horn

Key to Species

1. Larger species, 5.5-7.5 mm. in length, bicolored, second funicular segment from 3 to 4 times as long as broad, setæ of entire upper surface hispid, many times as long as broad and acute at apices ..... *vagans*
... Smaller species, 5 mm. or less in length, second funicular segment but little more than twice as long as broad, setæ of upper surface very short and robust, squamose or club-like and blunt at apices 2
2. Bicolored, three brown stripes on pronotum and numerous brown patch on elytra, erect setæ of upper surface club-like, several times as long as broad ..... *echinus*
... Unicolored, cinereous, erect setæ of upper surface peg-like or tubercular, but little longer than broad ..... *unicolor*

Eucyllus echinus Van Dyke, new species

Rather small, moderately robust and elongate, rufopiceous and densely clothed with gray and brown, closely appressed scales, the former generally distributed, the latter forming a median and two lateral stripes on the pronotum, a median diskal patch, an irregular zigzag line along the sides and a larger irregular V-like patch at the summit of the declivity of the elytra, and the entire upper surface studded with short, club-like setæ, several times as long as broad, irregularly placed on the head and pronotum but more or less arranged in single or irregular double rows along the intervals of the elytra. Head with front broad and flattened; rostrum about as long as head and not distinctly separated from the latter by a constriction, gradually narrowed forwards and broadly, shallowly sulcate above; eyes rather small and feebly convex; scrobes distinct, dilated behind and reaching eyes as in type species, antennæ moderately robust, scape feebly arcuate, reaching front margin of prothorax, first funicular segment robust, a bit more than twice as long as broad, second slightly longer and narrower, the following gradually shorter and broader, club oval. Prothorax hardly a third broader than long, base broadly arcuate, sides well rounded, apex feebly emarginate, disk distinctly but sparsely punctured with the setæ arising from them. Elytra subelliptical, over a third longer than broad and about a fourth broader than prothorax, striæ finely impressed with small, well spaced punctures, intervals convex, declivity abrupt but well rounded. Beneath with setæ more squamose and inclined. Length, 5 mm., width, 2.25 mm.

Holotype (No. 4144, Mus. C.A.S., Ent.) a unique, collected at Cave Creek, Maricopa County, Arizona, May, 1910, by J. I. Carlson.

This species looks superficially like a diminutive *vagans*. It differs materially, though, by having the funicle less twisted, the second funicular segment proportionally much shorter than in that species, the prothorax more broadly rounded at sides and the setæ denser, shorter, broader, and blunt.

Eucyllus unicolor Van Dyke, new species

Slightly less robust, but otherwise similar in shape to the preceding, the scaly vestiture of a uniform ashen color while the setæ are short stubs or tubercles, hardly longer than broad. The head characters are also similar except that the scrobes are wider and the antennæ a bit more robust, the scape in particular, which also reaches beyond the front margin of prothorax. The prothorax has the sides less broadly rounded while the elytra are narrower with the striæ deeper and with closer punctures. Length, 5.25 mm., breadth, 2.25 mm.

Holotype (No. 4145, Mus. C.A.S., Ent.) and one paratype. The first was collected in Utah in 1921, by C. A. Duncan, the paratype, slightly smaller, in the collection of E. C. Zimmerman, was collected by him at Westguard, California, September 3, 1931.

The color and type of setæ will enable this species to be readily separated.

Pioneer Entomologists

Two of our pioneer entomologists and great teachers of entomology celebrate their eightieth anniversaries this spring, Lawrence Bruner on March 2d, and Herbert Osborn on March 17th. The former, now living in Berkeley, won his spurs in the Great West, being Professor at the University of Nebraska; the latter now in Florida, being Professor of Entomology, first at Iowa, later at the Ohio State University.

THE SPECIES OF STENOMORPHUS (COLEOPTERA: CARABIDAE), WITH DATA ON HETEROGONY IN *S. CALIFORNICUS* (MÉN.)

BY P. J. DARLINGTON JR.

Museum of Comparative Zoölogy

This is an attempt to define as briefly and as accurately as possible the species of the New World genus *Stenomorphus*. For discussion of the relationships of the genus, see the generic references given below; for a full bibliography, see the *Junk Catalogue*.

Characters: Within the Harpalini, the genus is characterized by elongate form; short, smooth head, with two small, sharp foveæ between the eyes; mentum not toothed; subapical segment labial palpus plurisetose; and especially by the remarkable sexual characters: male prothorax relatively elongate; male middle femora angulate or denticulate on lower edge near apex (seen from in front); male front and sometimes middle tibiæ pubescent within; male front tarsi narrowly dilated, with first segment longer but not much wider than following, segments 2-4 (but not 1) biseriately squammulose below; male middle tarsi not squammulose; female front tarsi with first segment conspicuously enlarged, at least twice as wide as following.

The species can be classified satisfactorily only by a careful study of the male sexual characters. Females not directly associated with males can often be identified by general appearance and locality, plus the prothoracic and tibial measurements. A good deal of variation must be allowed for in both sexes.

The ratio of length to depth of prothorax (abbreviated below as "prothoracic L/D") varies in males of different *Stenomorphus* from about 1.45 to 2.10, and is much more useful in classification than the ratio of length to width ("prothoracic L/W"), which varies only from about 1.15 to 1.50. Length of prothorax is measured at middle; depth, along a line perpendicular to the dorsal surface and immediately before the front coxæ (Pl. 1, fig. 15). The specimen must be rotated on the long axis until the least depth is found. Width of head (across eyes) and of prothorax is, of course, the greatest width. Length of hind tibia is length from middle of apex of femur, when the tibia is at right angles to the femur; width of tibia is greatest width at

apex. Total length is to apex of elytra; width, greatest width of elytra. Measurements used in deriving ratios must be made carefully, with a properly equipped microscope.

Heterogony[1]: If the proportions of the male prothorax are to be used in classification, it is important to know whether there is heterogonic variation, *i. e.* whether the proportions of the prothorax depend upon the absolute size of the insect. Purely heterogonic characters are sometimes striking, as in the males of some Scarabæidæ, but they are of no more significance in taxonomy than mere variations in body size. On Plate 2A I have accordingly charted the L/D values against absolute length of prothorax for a series of males of *Stenomorphus californicus*. If the L/D value were strongly heterogonic, the points charted would fall into a fairly regular line ascending to the right. The actual results of the tabulation show that weak heterogony is probably present, but it certainly is not strong enough to forbid the use of the L/D value in distinguishing species of anything like similar size.

Genitalia: I have examined the male genitalia of several species. They show only slight specific differences, much less striking than the differences in the external sexual characters, and not of a sort likely to be useful.

Acknowledgments: This paper is based on material examined in or borrow from the United States National Museum, the British Museum, the American Museum of Natural History, the Philadelphia Academy of Natural Sciences, the California Academy of Sciences, Ohio State University, the Museum of Comparative Zoölogy, and the private collections of Mr. H. C. Fall and the writer. I am especially indebted to Mr. K. G. Blair, Dr. E. C. Van Dyke, Mr. L. L. Buchanan, and Mr. J. N. Knull for arranging loan of material

STENOMORPHUS Dej.

Dejean 1831, p. 696; G .Horn 1881, pp. 180, 183, Pl. 10, fig. 134; Tschitschérin 1900, pp. 343, 352: *Agaosoma* Ménétriés 1844, p. 63.

Genotypes: *angustatus* Dej. (*Stenomorphus*), *californicus* Mén. (*Agaosoma*); both haplotypes, by single reference.

[1] *Cf.* Julian S. Huxley, "Problems of Relative Growth" (Dial Press, 1932), especially p. 55.

Key to Species (♂ only)

1. Front femur ♂ dentate below near apex ..... 1. *dentifemoratus* Chd.
... Front femur ♂ not dentate 2
2. L/D ♂ prothorax 1.45-1.55 (rarely more); middle femur ♂ sinuate or obtusely angulate below near apex; outer edge middle tibia relatively densely spiny ..... 2. *convexior* Notm.
... L/D ♂ prothorax 1.6-2.1; middle femur ♂ acutely, rectangularly, or (rarely) somewhat obtusely dentate or angulate below near apex; outer edge middle tibia with fewer spines 3
3. Middle tibia ♂ densely pubescent within near apex 4
... Middle tibia ♂ not densely pubescent within 5
4. L/D ♂ prothorax 1.6-1.75 ..... 3. *penicillatus* n. sp.
... L/D ♂ prothorax 1.8-2.0 ..... 4. *sinaloæ* n. sp.
5. L/D ♂ prothorax 1.6-1.8 6
... L/D ♂ prothorax 1.8-2.1 8
6. L/W ♂ prothorax about 1.45; L/W hind tibia about 7.0; tooth ♂ middle femur reaching well beyond apex of femur; length (♂) 17 mm. ..... 5. *alius* n. sp.
... L/W ♂ prothorax about 1.2-1.35; L/W hind tibia about 5.5-6.0; tooth middle femur ♂ reaching about opposite apex femur; length 12.5 mm. or less 7
7. L/W ♂ prothorax 1.3-1.35; prothorax less dilated anteriorly; length 12-12.5 mm. ..... 6. *angustatus* Dej.
... L/W ♂ prothorax about 1.2; prothorax more dilated anteriorly; length 10.5 mm. ..... 7. *brasiliensis* n. sp.
8. Middle femur ♂ very finely notched below near apex; middle tibia ♂ straight ..... 8. *manni* Darl.
... Middle femur ♂ much more coarsely notched or dentate; middle tibia ♂ more or less distinctly arcuate ..... 9. *californicus* Mén.

1. Stenomorphus dentifemoratus Chd.

(Pl. I, figs. 1, 16, 17)

Chaudoir 1844, p. 478

Black; very slender, moderately convex; head distinctly more than three-fourths width prothorax, relatively wider than in most Stenomorphus; elytra deeply striate; L/W hind tibia 7-7.5. *Male* prothoracic L/D 1.9 or slightly less; front femur finely, acutely dentate below about one-fourth from apex; middle femur rather finely, acutely dentate below at apex; middle tibia arcuate, not densely pubescent within. *Female* prothoracic L/D 1.45-1.6. Measurements: male, 14-14.5 by 3.4-3.7; female, 14-15 by 3.9-4.2 mm.

Type: from the cold plateaux of Colombia; probably now in

Oberthür Collection (not seen). *Material seen*: Costa Rica: male, female, Escazu, 1,200 m.; male, San José; female, Chitaria, 600 m.; female, Tempirque, Guanacosta. It is impossible to be absolutely sure that these specimens represent Chaudoir's species, but they answer his brief diagnosis.

This is the only described *Stenomorphus* of which I have not seen either type material or topotypes.

2. Stenomorphus convexior Notman

(Pl. I, figs, 2, 3, 24, 25; Pl. 2B)

Notman 1922, p. 103

Black to rufescent; rather stout (in genus), moderately convex; head three-fourths or slightly more width prothorax; elytra moderately deeply striate; L/W hind tibia 5.5-6.0; middle tibia more densely spiny than in other Stenomorphus. *Male* prothoracic L/D 1.45-1.55 (rarely more); front femur simple; middle femur obtusely angulate or merely sinuate below near apex; middle tibia rather strongly arcuate, moderately (not very densely) pubescent within. *Female* prothoracic L/D 1.3-1.5. Measurements: male, 13-15.5 by 3.8-4.4; female, 11-14 by 3.5-4.2 mm.

Type: Tucson, Arizona, in collection Bureau of Plant Industry, Harrisburg, Pa. (not seen). *Material seen*: Arizona: 2 males, 4 females Tucson and vicinity; male, Mt. Mildred, Baboquivari Mts.; female "Ariz."; Mexico: State of Sinaloa, male, 2 females, Presidio R. near Union; 5 males, 10 females Vanadillo (spelled also Venedio); 4 males, 12 females, Mazatlan: State of Jalisco, 2 males, 1 female, Cocula; male, Guadalajara: State of Morelos, male, Cuernavaca. Also 3 females "Sonora or Sinaloa, in chicken crop, said to kill chickens."

I have examined also 2 males, 2 females (13-15 mm.) from Cuautla, Morelos, Mexico (Koebele Coll., Cal. Acad.) which agree with the preceding series except they are less stout, with male prothoracic L/D about 1.65. These probably represent a local or individual variation rather than a different species.

3. Stenomorphus penicillatus Darlington, n. sp.

(Pl. 1, figs. 4, 18, 19; Pl. 2B)

Black or piceous; moderately slender and convex; head three-fourths (±) width prothorax; elytra moderately deeply striate; L/W hind tibia 5.5-6.0. *Male* prothoracic L/D 1.6-1.75; front femur simple; middle femur strongly, rectangularly (±) angulate

or dentate below near apex; middle tibia arcuate, rather densely pubescent within in apical one-third or one-fourth. *Female* prothoracic L/D 1.35-1.45. Measurements: male, 15-17.5 by 4-4.5; female, 13-14.5 by 3.6-4.1 mm.

Types: Mexico. Holotype male (M. C. Z. No. 22112), Truqui, from the Leconte Collection: paratypes, Cuernavaca (2 males Höge Collection, B. M.; 1 male, 1 female, O. W. Bryant Collection, U. S. N. M.; 1 male, Koebele Collection, Cal. Acad.; 1 female Höge Collection, Am. Mus.); Colima Vulcano (1 male, 3 females, L. Conrad Collection, U. S. N. M.).

4. Stenomorphus sinaloæ Darlington, n. sp.

(Pl. 1, figs. 5, 22, 23; Pl. 2B)

Black or piceous; moderately slender and convex; head three-fourth (±) width prothorax; elytra moderately deeply striate; L/W hind tibia 6-6.5. *Male* prothoracic L/D 1.8-2.0; front femur simple; middle femur strongly, rectangularly or acutely dentate below near apex; middle tibia arcuate, densely pubescent within in apical one-third or more. *Female* prothoracic L/D 1.5-1.6. Measurements: male, 16-17 by about 4.5; female, 13.5-14 by about 4.5 mm.

Types: Mexico. Holotype male (U.S.N.M.) and 2 male, 3 female paratypes (pair in M. C. Z., No. 22113) all labeled merely "Sinaloa, Mex."

5. Stenomorphus alius Darlington, n. sp.

(Pl. 1, figs. 6, 18)

Black; moderately slender and convex; head slightly less than three-fourth width of prothorax; elytra rather deeply striate; L/W hind tibia about 7. *Male* prothoracic L/D 1.8; L/W 1.45; front femur subangulate below near apex, but not dentate; middle femur with strong, acute tooth below at apex, reaching beyond apex of femur; middle tibia faintly arcuate, not densely pubescent within. *Female* unknown. Measurements: male, 17 by 4.8 mm.

Type: Venezuela. Unique male (B. M.) without more exact locality, but labeled "3218" and "Bowring. 63, 47*".

6. Stenomorphus angustatus Dej.

(Pl. 1, figs. 7, 26, 27)

Dejean 1831, p. 697

Black or piceous; moderately slender and convex; head about three-fourth width of prothorax; elytra moderately deeply striate;

L/W hind tibia 5.5-6.0. *Male* prothoracic L/D 1.7-1.75 (±); L/W 1.3-1.35 (±); front femur simple; middle femur moderately strongly, acutely dentate, tooth reaching about opposite apex of femur; middle tibia arcuate, not densely pubescent within. *Female* prothoracic L/D 1.5 (±); L/W 1.1-1.2. Measurements: male, 12.5-13 by 3.6; female 11-14 by 3.2-4.0 mm.

Type: neighborhood of Cartagena (Colombia); probably now in Oberthür Collection (not seen). The type was a single female (supposed by Dejean to be a male), about 10.7 mm. long. *Material seen*: 1 male, 2 females from type locality, "1103", "Bowring. 63-47*"; 1 male, 1 female Caracas (Venezuela), "6112a" and "6112b" (all B. M.).

7. Stenomorphus brasiliensis Darlington, n. sp.

(Pl. 1, figs. 8, 20, 21)

Piceous; less elongate than usual, moderately convex; head about three-fourth width prothorax; elytra moderately deeply striate; L/W hind tibia about 6. *Male* prothoracic L/D about 1.6; L/W about 1.2; front femur simple; middle femur moderately, acutely dentate below, tooth reaching about opposite apex of femur; middle tibia faintly arcuate, not densely pubescent within. *Female* prothoracic L/D between 1.4 and 1.45; L/W between 1.05 and 1.1. Measurements: male, 10.5 by 3.1; female, 11 by 3.4 mm.

Types: Brazil. Holotype male and paratype female from the Thomson Collection, "77-15 k." (both B. M.).

8. Stenomorphus manni Darl.

(Pl. 1, figs. 9, 29, 30)
Darlington 1934, p. 102

Rufo-piceous to black; slender, moderately convex; head usually less than three-fourth width prothorax; elytra moderately deeply striate; L/W hind tibia about 7 or more. *Male* prothoracic L/D 2 or slightly less; L/W 1.4 (±); front femur simple; middle femur finely notched at lower apical angle; middle tibia straight or even a little recurved, not densely pubescent within. *Female* prothoracic L/D 1.6 (±); L/W 1.1 (±). Measurements: male, 12.5-15.5 by 3.3-3.8; female, 9-12.5 by 2.7-3.7 mm

Types: Manneville, Haiti (M. C. Z., 1 paratype now in U. S. N. M.). *Additional material*: good series, virtual topotypes, Douillard (near Port-au-Prince), Haiti, E. M. Ducasse collector.

9. Stenomorphus californicus (Mén.)

(Pl. 1, figs. 10-14, 31-39; Pl. 2A, 2B)

Ménétriés 1844, p. 63 (Agosoma); *rufipes* Leconte 1859, p. 59; *batesi* Casey 1914, p. 168; *scolopax* Casey 1914, p. 169; *arcuatus* Casey 1924, p. 122; *parallelus* Casey 1924, p. 122.

Rufous to piceous or (more rarely) black; elongate, moderately convex, but less so than other species; head three-fourth or less width prothorax; elytra with striæ somewhat variably impressed, usually shallower than in other species; L/W hind tibia 6-7.5, tibia less strongly ridged or grooved than usual in genus. *Male* prothoracic L/D 1.8 (very rarely a little less)—2.1; L/W 1.15-1.4; length prothorax/length elytra about 0.50 to just over 0.60; front femur simple or (very rarely) faintly subangulate below near apex; middle femur with moderate, acute, rectangular, or (rarely) obtuse tooth below near apex; middle tibia more or less arcuate, not densely pubescent within. *Female* prothoracic L/D 1.6-1.75 (±); L/W 1.05-1.15 (±).

Measurements: male, 9-17 by 2.6-4.5; female, 9.5-13 by 2.8-4.0 mm. (extremes rare).

Types: *californicus*, from California, no more exact locality (cotypes in M. C. Z. and probably Leningrad Museum); *rufipes*, (eastern) United States-Mexico boundary, Berlandiére coll. (type in M. C. Z.); *batesi*, Guanajuato, central Mexico (type in B. M.); *scolopax*, Ft. Worth, Texas (types in U. S. N M.); *parallelus*, McPherson, Kansas (type in U. S. N. M.); *arcuatus*, Dallas, Texas (type in U. S. N. M.).

Material seen: Including the types (I have examined all those listed above except the Leningrad cotypes), I have seen a very large series of this species from Missouri, Kansas, Oklahoma, Louisiana, Texas (including SW Texas and Brownsville) and Mexico. The Mexican specimens I have seen are 1 female, Victoria; 1 female, Hildago; 1 male Tejupilco, SW State of Mexico; 1 male (type *batesi*) Guanajuato; 1 female Cocula, Jalisco; 1 female Las Parras (inland from Loreto—W. M. Mann), Baja California. The species is sometimes common at light in Texas, especially near Brownsville.

Discussion: Dr. Van Dyke writes me that he has never seen a *Stenomorphus* from the State of California and doubts if the genus occurs there, and Horn long ago made a similar statement (1882, p. IV). There are, however, two specimens in the Leconte Collection (M. C. Z.) which purport to be Californian. One,

although without locality label, bears a penciled label, "*californicus* Mén. Type !". It is evident from Ménétriés' original description (and from Chaudoir, 1844, 478) that he had more than one specimen, and Leconte is known to have exchanged extensively with Russian coleopterists, so there is no reason to doubt that this really is a cotype of *californicus*. It is a large male, about 13.5 mm. long(Ménétriés' specimens were "7-8 lignes"), but within the range of eastern specimens of the species. The second specimen is labeled "*Agaosoma californicum*, Berl. Mus. Ménét". It is undoubtedly the specimen referred to by Leconte (1860, p. 28, Pl. 1, figs. 5, 5a) as from "Sacramento? California", collected by Woznessensky, who seems to have been a reputable source of Californian material. It is a very large male (17 mm.), but otherwise does not differ significantly from eastern males. I have seen a single (also very large) female specimen, which seems unquestionably to be *californicus*, from Lower California (U. S. N. M.), and the species ranges to the Pacific on the mainland of Mexico. I see no reason to doubt, therefore, that, if Ménétriés' types did not come actually from the State of California, they came from the peninsula.

Casey's *Stenomorphus batesi* was based on the figure of "*rufipes*" in the Biologia (Bates 1882, Pl. 3, fig. 22). I have before me, borrowed from the British Museum, the male from Guanajuato, central Mexico, from which the figure was made, and which is therefore the type of Casey's species. The figure is very inaccurate. In the figure the prothorax is about 0.64 times long as elytra, in the specimen it is about 0.55; in the figure the prothoracic L/W is about 1.7, in the specimen it is 1.37. The specimen is certainly of maximum narrowness for *californicus*, as is the male from Tejupilco, but I do not believe these specimens can represent more than a minor local variation, of no significance unless it proves constant in large series.

Leconte's female type of *rufipes*, Casey's male and 3 female types of *scolopax*, the female type of *parallelus*, and the male (called female by Casey) type of *arcuatus* are all more or less normal eastern specimens of the present species.

In spite of much variation even in single localities (Pl. 2A) and more over its entire range (specimens from "California" run very large; those from central Mexico very narrow), *cali-*

fornicus can easily be recognized by the usually rufescent color, somewhat depressed form, and usually relatively shallow elytral striæ, as well as by measurements and sexual characters.

Bibliography

Bates 1882, Biologia Centrali-Americana, Coleop., Vol. 1, part 1.
Casey 1914, Memoirs, 5.
1924, Memoirs, 11.
Chaudoir 1844, Bull. Soc. Nat. Moscow, 17, part 3.
Darlington 1934, Psyche, 41.
Dejean 1831, Species Gén. Coléop., 5.
Horn, G. 1881, Trans. American Ent. Soc., 9.
1882, op. cit., 10.
Leconte 1859, Proc. Acad. Nat. Sci. Philadelphia, for 1858.
1860, Exp. & Surv. Mississippi to Pacific, Zool., part 3, No. 1.
Ménétriés 1844, Bull. Acad. Sci. St. Petersburg, 2.
Notman 1922, Bull. Brooklyn Ent. Soc., 17.
Tschitschérin 1900, Horæ Soc. Ent. Rossicæ, 34.

Explanation of Plates

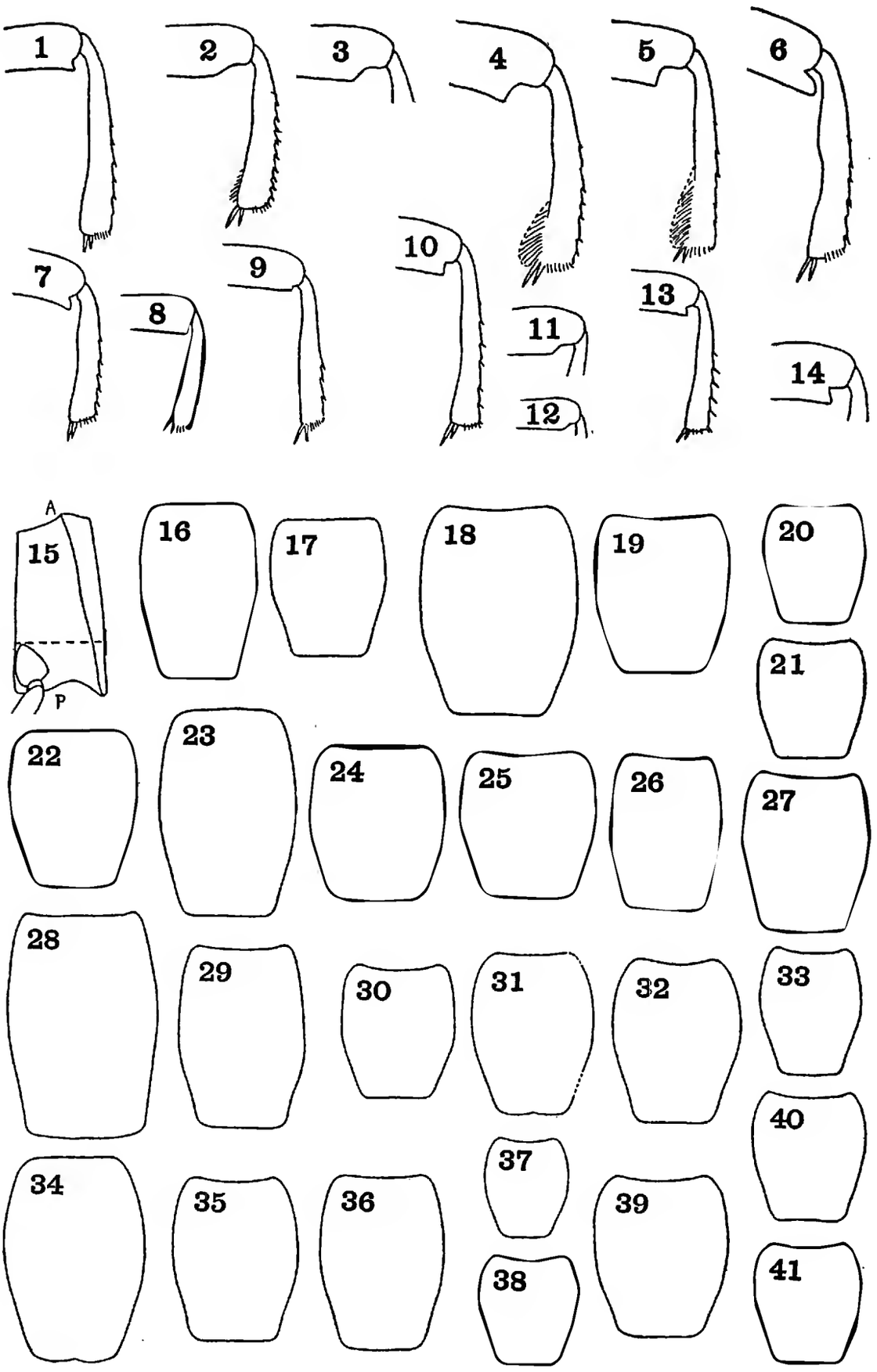
Plate I

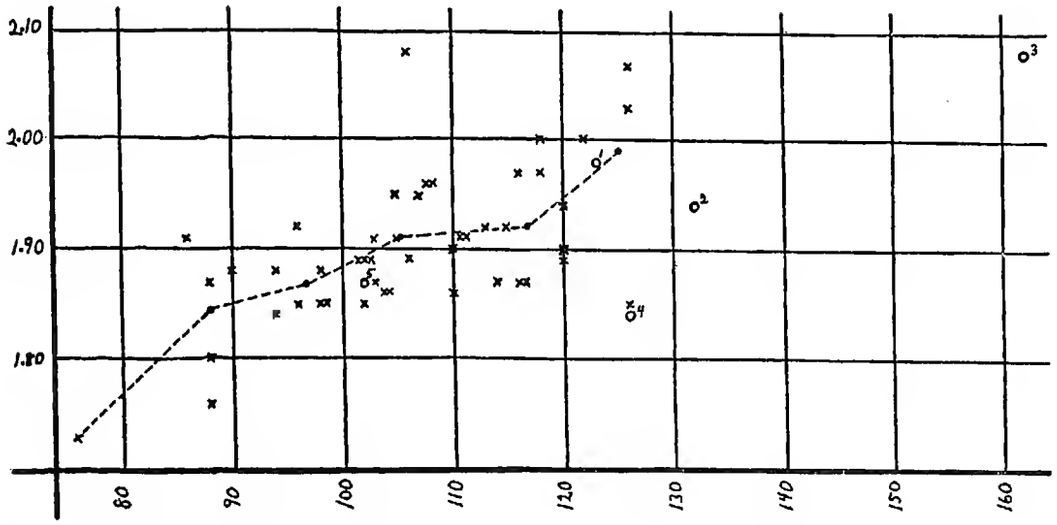
Figs. 1-14, camera-lucida outlines of middle legs (tibia and apex of femur, seen from in front) of Stenomorphus males:

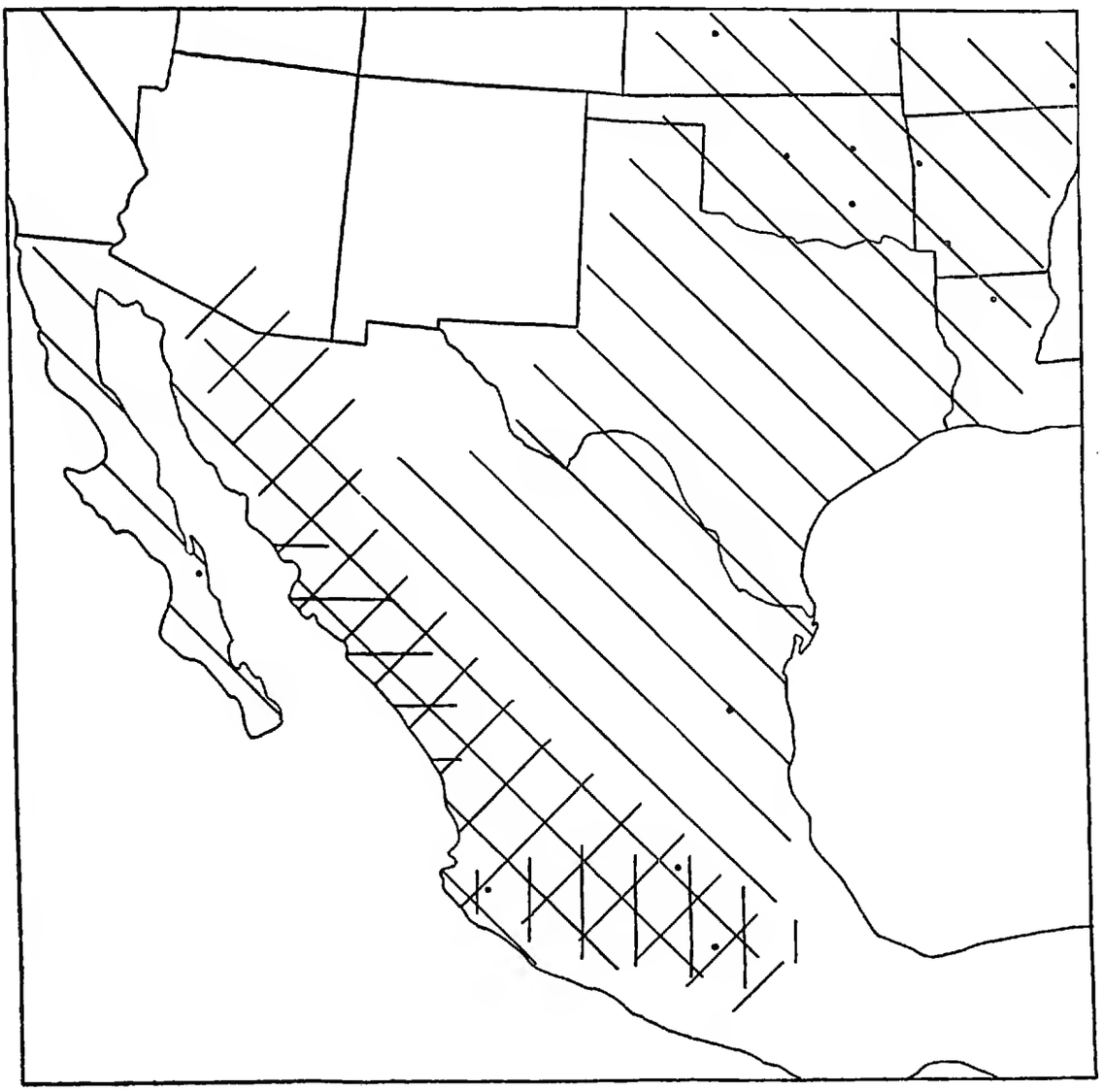
1. *dentifemoratus* Chd., Escazu, Costa Rica (B. M.); 2. *convexior* Notm., St. Xavier Msn., Tucson, Arizona (Cal. Acad.); 3. same, Venedios, Sinaloa, Mexico (Cal. Acad.); 4. *penicillatus* Darl., type; 5. *sinaloæ* Darl., paratype (U. S. N. M.); 6. *alius* Darl., type; 7. *angustatus* Dej., Cartagena (B M.); 8. *brasiliensis* Darl., type; 9. *manni* Darl., type; 10. *californicus* (Mén.), type *scolopax*; 11. same, cotype *californicus;* 12. same, Brownsville Texas (smallest male, U. S. N. M.); 13. same, type *arcuatus*; 14. same, (? California) (big Leconte male).

Fig. 15, prothorax of male *Stenomorphus manni* Darl., from left side, to show (broken line) method of measuring depth.

Figs. 16-41, camera-lucida outlines of prothoraces of Stenomorphus: 16. *dentifemoratus* Chd., male, Escazu, Costa Rica (B. M.); 17. same, female, Escazu, Costa Rica (B. M.); 18. *penicillatus* Darl., male, type; 19, same, female, Cuernavaca, Mexico (B. M.); 20. *brasiliensis* Darl., male, type;. 21. same, female, paratype; 22. *sinaloæ* Darl., female, paratype (U. S. N. M.); 23. same, male, paratype (U. S. N. M.); 24. *convexior* Notm., male, St. Xavier Msn., Tucson, Arizona (Cal. Acad..); 25. same, female, St. Xavier Msn., Tucson, Arizona (Cal. Acad.); 26. *angustatus* Dej., male, Cartagena (B. M.); 27. same, female, Cartegena (B.


1
2
3
4
5
6
7
8
9
10
11
12
13
14
A
15
P
16
17
18
19
20
21
22
23
24
25
26
27
28
29
30
31
32
33
34
35
36
37
38
39
40
41


2.10
2.00
1.90
1.80
80
90
100
110
120
130
140
150
160
O3
O2
O4



M.); 28. *alius* Darl., male, type; 29. *manni* Darl., male, type; 30. same, female, paratype (M. C. Z.); 31. *californicus* (Mén.) male, cotype; 32. same, male, Brownsville, Texas (M. C. Z.); 33, same, male, type *arcuatus*; 34. same, male (? California) (big Leconte male); 35. same, male, type *scolopax;* 36. same, male, type *batesi*; 37. same, male, Brownsville, Texas (smallest male, U. S. N. M.); 38. same, female, type *rufipes*; 39. same, female, Las Parras, Baja Calfiornia (U. S. N. M.); 40. same, female, paratype *scolopax*; 41. same, female, type *parallelus*.

PLATE II

A (*above*). Variation and heterogony in prothoraces of males of *Stenomorphus californicus* (Mén.) (*cf.* ante). Abscissæ: lengths of prothorax in units of about 1/30 mm. (153 of my units = 5 mm.). *Ordinates*:ratios of length over depth (L/D) of prothorax, measurements being to nearest 1/30 mm. Points plotted as "x" = specimens from Brownsville, Texas (14 specimens from collection Ohio State University; 9, U. S. N. M.; 24, P. J. Darlington Jr.). Dotted line connects averages for groups 81-90, 91-100, etc. The main graph has been limited to Brownsville specimens, to avoid introducing geographical variation, but a few other specimens have been added for comparison, each plotted as "o". They are 1 (? California) (cotype *californicus*); 2, Guanajuato, Mexico (type *batesi*); 3, (? California) (big Leconte male); 4, Ft. Worth, Texas (type *scolopax*); 5, Dallas, Texas (type *arcuatus*). The "o's" have been omitted in computing averages.

B (*below*). Approximate known ranges of *Stenomorphus* in North America:

\\\ *californicus* (Mén.). Dots represent extreme localities for this species; localities not of special interest are omitted.

/// *convexior* Notm.

||| *penicillatus* Darl.

= *sinaloæ* Darl.

SWARMING OF *Haltica bimarginata* SAY

This common alder flea beetle has been reported to be swarming in enormous numbers this spring. On March first, I noticed very large numbers assembling in sheltered areas on Mt. St. Helena. They were acting much as does our common ladybeetle, *Hippodamia convergens* Muls., under similar circumstances.—E. C. Van Dyke.

A REVISION OF THE GENUS MACROPOGON MOTSCH[1]

BY RALPH HOPPING
Vernon, B. C.

Large collections of the species of the genus *Macropogon* have proved that the keys of Horn[2] and Brown[3] were based more or less on sexual characters. The antennæ in the males are slightly more slender than in the females, except in the new species herein described under the name *sequoiæ*, where the antennæ of both sexes are notably slender. In *testaceipennis* Horn and *piceus* Lec. the antennæ have segments 2-3-4 very short in the male, about as long as wide, while the females have 3 and 4 longer than wide, but in both sexes of *sequoiæ* 3 and 4 are much longer than wide. In all species segments 2, 3 and 4 combined are longer than 5 in the female, and shorter than 5 in the males.

Probably the most definite sexual difference is in the prothorax. In the males it is inflated behind the middle, sometimes almost forming lateral tubercles, and compressed before the middle so that the lateral margin is strongly sinuate and the pronotum more or less flattened. In the females the margin is nearly straight or arcuate and the pronotum quite convex.

On the pronotum of all species are more or less polished areas which if examined closely are parts of a broken heart-shaped outline. In *piceus* this outline is generally quite perfect while in the other species it is more or less indistinct.

Through the kindness of Mr. K. G. Blair of the British museum I am able to append M. Pic's description of *Macropogon rubricollis*.

Key to the Species

A. Antennæ very slender, segments 3 and 4 longer than 2 in both sexes, color rufous brown.....1. *sequoiæ* n. sp.

AA. Antennæ comparatively stouter, segments 2-3-4 approximately as long as wide in the males, 3 and 4 much longer than 2 in the females; color black or bicolored.

B. Vestiture of the elytra and prothorax dense and long; elytra never entirely uniform in color, generally distinctly bicolored.....2. *testaceipennis* Horn

BB. Vestiture of elytra and prothorax shorter and sparser, color of elytra black.....3. *piceus* Lec.

---

[1] Contribution from the Entomological Branch, Ottawa.
[2] 1880, Trans. Am. Ent. Soc., VIII, p. 77.
[3] 1929, Can. Ent., Vol. LXI, Dec., p. 273.

1. Macropogon sequoiæ Hopping, n. sp.

Length, male, 5-6 mm., female, 6 to 7.5 mm. Color rufous brown throughout with elytra slightly darker than the rest of the body.

Holotype, male. Head with front with medium sized punctures well separated; antennæ very slender, segment 2 short, as wide as long, segments 3 and 4 longer than wide, segment 5 longer than 2-3-4 combined. Prothorax enlarged laterally behind the middle, constricted before the middle and comparatively flat on the disc of the pronotum; punctures of the disc of medium size and sparse; pronotum with a shallow basal transverse impression. Elytra with striæ scarcely at all impressed and strial punctation well separated, of medium size, becoming slightly smaller toward the apices; strial intervals with irregular polished points slightly raised above the surface. Vestiture golden and rather sparse. Prosternum with strongly carinate margin, brown with flavous interior area sparsely tuberculate.

Allotype, female. Differs from the male in the shape of the prothorax, pronotum more convex with lateral margins nearly straight, and generally more robust with antennæ slightly shorter.

Holotype, bearing the label "VII-15, Kaweah Cal." No. 3980, in the Canadian National Collection. Allotype, bearing the same label, in the author's collection. Paratypes: 12 males, 8 females. Six males and 5 females bearing the same label as the types, one male bearing the label "Kaweah, Tulare Co., Calif. V-1934" and 5 males and 3 females bearing the label "Sequoia National Park, Cal.," and the dates May and August 1930 and 1931.

The entire series was sent me by Mr. F. T. Scott of Visalia, California, and Mr. Roy Wagner of Fresno, California. Paratypes are in the collections of the above, the Academy of Sciences of San Francisco, the Canadian National Collection and of the author.

M. sequoiæ can easily be separated from any other known species by the slender antennæ, segments 3 and 4 the same in both sexes, the slender tarsi, and the reddish brown color.

Forty specimens have been examined all from the same general locality, the Kaweah River, Tulare Co., California. Those labelled "Sequoia National Park" are from a slightly higher elevation than those labelled "Kaweah" but in the same general location.

2. Macropogon testaceipennis Mots.

Macropogon rubricollis Pic. 1927, Melanges Exot., Ent. L. p. 34.
Macropogon cribricollis Brown. 1929, Can. Ent., Dec., vol. LXI, p. 274.

Length, male, 4.5-7 mm.; female, 6-8 mm. The elytra of this species are very variable in color. In typical specimens the testaceous elytra have the suture black with apical marginal black band. This coloring is more or less indefinite and merges to all black with humeri rufous. Specimens with elytra entirely rufous except sutural black band are not uncommon. M. Pic's *rubricollis* seems to be such a specimen.

The antennæ are stout in the females, more slender in the males. In the male segments 2 to 4 are about as long as wide, with the 5th longer than 2, 3, and 4 combined. In the female segments 3 and 4 are longer than wide and 2 to 4 combined are longer than the 5th. The prothorax in the males is constricted before the middle, while that of the female is straight or evenly arcuate, and more convex than in the male. This difference in the prothorax between the sexes is also constant in the other species.

The punctation of the prothorax is moderate compared with *piceus* and comparatively dense while the interspaces at the base of the elytra are very wide with striæ more deeply impressed and strial punctures large.

In the 70 specimens before me it is noticeable that specimens captured in March or April are generally light colored and those taken in late June or July are mostly black with rufous humeri. This would indicate that they become darker as the season advances, which is not uncommon in some species of coleoptera.

Large series taken at the same time and place also indicate that males predominate over the females in the early spring and vice versa later in the summer.

Although more commonly taken in the Sierra Nevada Mts. it has been found from San Diego to British Columbia in the coast region. Dr. Horn's specimens were from Mariposa, California, as was also *rubricollis* Pic.

3. MACROPOGON PICEUS Lec.

1861, Proc. Acad. Nat. Sci. Phila., p. 362.

Macropogon rufipes Horn, 1880, Trans. Amer. Ent. Soc., VIII, p. 79.

Macropogon dubius Brown, 1929, Can. Ent., Dec. vol. LXI, p. 273.

Length, male, 5-6 mm., female, 6-7 mm. This species is generally piceus in color although the legs and antennæ are sometimes reddish brown, and more or less shining. The synonomy is almost entirely due to the difference in sexual characters as explained in the introduction.

Twenty-five specimens have been examined from British Columbia, Alberta, Quebec, New Brunswick, and New Hampshire. Horn gives Oregon, Montana and Illinois, and the Leng Check List Michigan.

MACROPOGON RUBRICOLLIS Pic.

"Angustatus, nitidus, grisea pubescens, ruber, infra corpore pro parte elytrisque nigropiceis; antennis sat gracilibus; capite thoraceque fortiter, parum dense, punctatis, illo breve, antice paulo attenuato; elytris thorace sat latioribus, longissimis, apices attenuatis, striatis, striis distincte punctatis. Long. 8 mm. Amerique S[1e]. Mariposa.

Espece tres distincte par ses elytres tres long, conjointement a sa Coloration en majeure partie rougeatre."

The above description of M. Pic's *M. rubricollis* is given as it is difficult to obtain the publication and it may be useful to future workers. Mr. H. C. Fall has already relegated *M. dubius* Br. and *M. cribricollis* Br. to the synonmy[4] and a very careful comparison of specimens of the latter from B.C. and specimens of *testaceipennis* from California have failed to establish any specific difference.

Mr. W. J. Brown very kindly loaned me a paratype of his *cribricollis* and eastern specimens of what was known as *pallipes* at the same time expressing his belief that it was the same as *piceus*. I am also indebted to Mr. H. C. Fall for comparisons and to Messrs. Roy Wagner, G. Stace Smith, F. T. Scott and Hugh B. Leech for their entire collections of the genus *Macropogon*.

[4] 1934, Pan-Pac. Ent., Vol. X, Oct., p. 172.

Vol. XII April, 1936 No. 2

THE PAN-PACIFIC ENTOMOLOGIST

Published by the
Pacific Coast Entomological Society
in co-operation with
The California Academy of Sciences

CONTENTS

San Francisco, California
1936

THE PAN-PACIFIC ENTOMOLOGIST

Published quarterly in January, April, July and October by the Pacific Coast Entomological Society in co-operation with the California Academy of Sciences.

Domestic and foreign subscriptions $2.00 in advance. Subscriptions should be sent to the treasurer, E. R. Leach, Department of Entomology, California Academy of Sciences, Golden Gate Park, San Francisco, California. Make checks payable to the "Pan-Pacific Entomologist."

Manuscripts for publication and communications regarding non-receipt of numbers, change of address, requests for sample copies, etc., should be addressed to the editor, Mr. E. P. Van Duzee, California Academy of Sciences, Golden Gate Park, San Francisco, California. Advertisements will be accepted for the back cover pages. For rates address the editor or treasurer.

Twenty-five copies or more of author's extras will be furnished free on request. Additional copies will be supplied at cost of publication if a request is received with the manuscript.

Subscribers failing to receive their numbers will please notify the editor at as early a date as possible.

★ ★

★ ★

Published at the California Academy of Sciences, Golden Gate Park, San Francisco, California.

Entered as second-class matter, February 10, 1925, at the postoffice at San Francisco, California, under Act of August 24, 1912.

The Pan-Pacific Entomologist

VOL. XII, No. 2 April, 1936

INSECT COLLECTING IN CALIFORNIA—II. FOOTHILL REGIONS

BY E. G. LINSLEY and R. L. USINGER

Oakland, California

MT. DIABLO

Mt. Diablo is one of the higher peaks of the Coast Range Mountains of California, attaining an elevation of 3848 feet. Geologically it forms with Mt. St. Helena and Mt. Hamilton a series of "islands" originating as fault blocks. The lower slopes of the mountain are characteristically Upper Sonoran Life Zone, changing into the Transition as one approaches the summit. It is on these lower slopes that we concentrate our efforts, since their fauna is similar to that of the entire dry foothill area surrounding the great central valley of California. Mrs. F. M. Abernathy has very kindly offered to illustrate this series of articles and has very ably executed the two plates[1] accompanying the present number.

The lower slopes of Mt. Diablo are characterized by a Pine-Oak forest, a stream bank association, and chaparral formation. The Pine-Oak forest contains *Pinus sabiniana* with its gray foliage and divided trunk, the squat, bushy *Juniperus californicus*, and several kinds of oaks, *Quercus agrifolia*, *Q. dumosa*, and *Q. douglasi*. Scattered alder trees, *Alnus rhombifolia*, walnut, *Juglans californica*, and buckeye, *Æsculus californica*, make up the stream bank association. The chaparral formation includes the shrubs *Artemesia californica*, poison oak, *Rhus diversiloba*, chamise, *Adenostoma fasciculatum*, and coffee-berry, *Rhamnus californicus*.

In the early part of May the sun has not yet dried out the exposed slopes and the insect fauna still flourishes. Our car rolls swiftly to Clayton as we approach the mountain from the northeast. A side road conducts us into the midst of the Digger Pine belt and leaving our car we make our way up the hillside.

[1] Plate I, illustrating some insects of Marin County pertains to the first of this series: Pan-Pac. Ent. X, pp. 102-106, 1934.

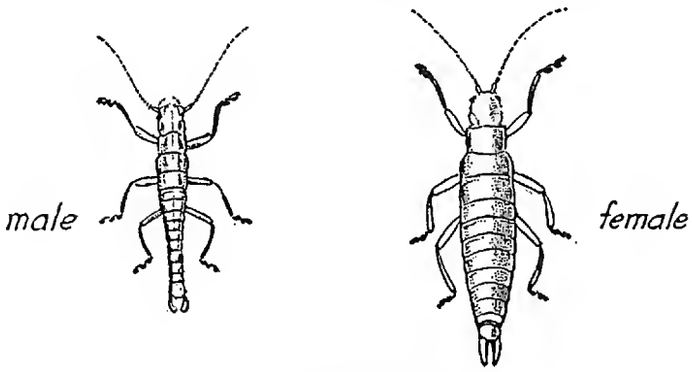
The first insects which we encounter are some small Tineid moths, *Adela flammeusella* (see figure), flying about a shrubby composite, *Stenotopsis linearifolius*. The males of this species have antennæ at least four times as long as the body and the larvæ live in flowers or seeds, pupating in a case made of two flat, oval pieces of leaf. The flower-loving buprestids, *Acmæodera connexa*, are also abundant, and we note with interest their singular method of flying. Because of their firmly united wing covers they find it difficult to take off directly and, consequently, glide from the flowers when disturbed, taking flight in mid-air. Other visitors to the plant include a small but strikingly marked noctuid moth, *Melicleptria pulchripennis*, two species of syrphid flies, *Syrphus americanus* and *Lasiophthicus pyrasti*, and countless small black melyrid beetles, *Listrus* spp.

Scorpion flies, *Apterobittacus apterus* (see figure), are discovered in the grass nearby. Except for their long probosces they might easily be mistaken for wingless crane-flies. A quick sweep of the net and we capture the common brown skipper, *Erynnis propertius*. Well concealed by its drab coloration the large gray lubber grasshopper, *Dracotettix plutonis californicus* (see figure), reveals its presence by its short, clumsy hops. As is usual in this group the females are brachypterous but in this species we note that the male is also flightless.

Rolling over stones we discover the characteristic webbing of the small, apterous embiid, *Embia californica*, which, curiously enough, is spun with the glands in the greatly enlarged tarsi of the fore-legs. We also uncover colonies of the subterranean termite, *Reticulitermes hesperus*, and occasional large, bluish gray scophilid centipedes.

Butterflies are not uncommon, but we capture only the very widely distributed Acmon Blue, *Plebejus acmon*, a common hair-streak, *Incisalia iroides*, and a small, silver spotted skipper, *Hesperia juba*.

Vigorously applying makeshift clubs to the foliage of the oaks we dislodge a myriad insect population including numerous small, orange plant bugs, *Gerhardiella delicata*, large arboreal camel crickets, *Gammarotettix bilobatus*, and a single example of the mantispid, *Climaciella brunnea occidentis*, whose larvæ are parasitic on the eggs of *Lycosa* spiders. This mantis-

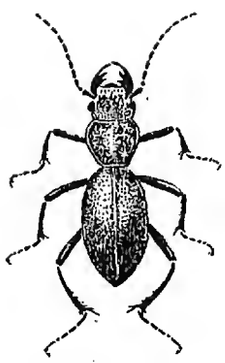


Timema californica

adult

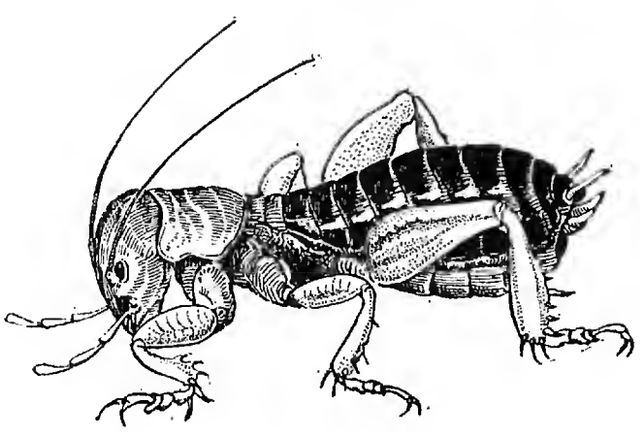
larva

Raphidia oblita



Omus californicus

Dascillus davidsoni



F.Abernathy

Stenopelmatus longispina

PLATE I

like neuropteron is truly an entomological monstrosity, recalling the proverbial "humbug" used perennially by students in unsuccessful attempts to befuddle their professors.

On the trunk of a dying oak we find the ball-like fungus, *Polyporus rheades,* a natural free lunch counter for many denizens of the insect world. We break this open and rudely intrude upon the privacy of *Cis* beetles and lepidopterous larvæ. These latter prove to be young of the fungus moth, *Tinea defectella.* Here we also capture the rare, gray and black longicorn, *Brothylus conspersus*, which vainly seeks seclusion in a crevice of the bark.

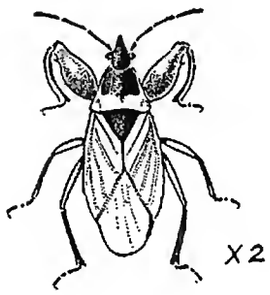
Passing through the oak trees we find ourselves in a broad clearing surrounded by Digger Pines. Breathing in a dense cloud of pollen and acquiring hands full of pitch we beat the lower branches of these trees, unloosening hundreds of bark psocids, *Peripsocus californicus* from the twigs, and small, dark weevils *Rhinomacer comptus*, from the male blossoms. The tips of the branches harbor metallic *Scythropus* weevils which feed upon the needles, and colonies of flat bugs, *Aradus cinnamomeus*, which are unique among this large, cosmopolitan and otherwise fungophagous group, in feeding upon tender shoots rather than fungi. More rarely we capture the pale, bark-colored cerambycid, *Poliœnus albidus*, which bores in the dead twigs and is apt to be overlooked among the rubbish in the beating sheet.

An examination of the persistent cones reveals a few scurrying silverfish and, of more interest to us, nymphs and adults of a curious lygæid bug, *Gastrodes conicola* (see figure), which hides in the cones during the day, coming out only at night to suck the juices of the foliage.

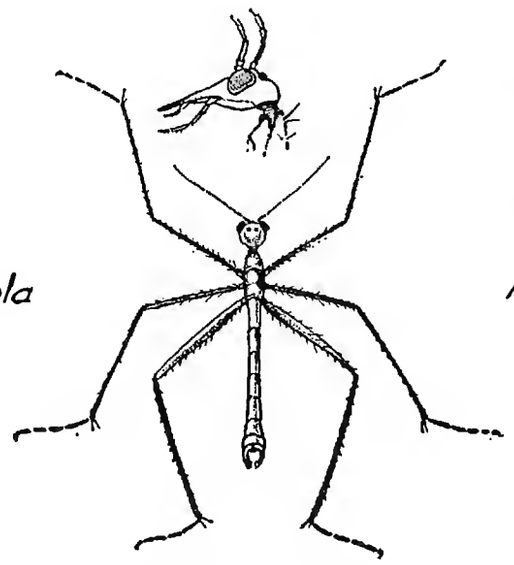
Resting in the sun on the topmost branches of young trees we find two metallic wood-borers, the placid buprestid, *Chrysophana placida*, and the obscure black *Melanophila californica.*

In the center of a large field we come upon a colony of the beautiful checkered beetle, *Aulicus terrestris* (see figure). This elegant clerid, unlike most of its forest-loving relatives, is found only in company with the lubber grasshopper, *Esselenia vanduzeei* (see figure), whose eggs are a plentiful and fresh source of nourishment for the elongate pink larvæ. The adult beetles,

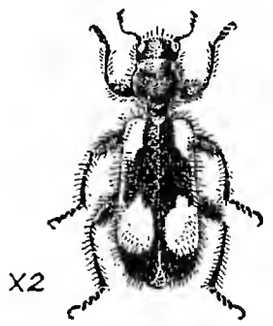
Adela flammsusella



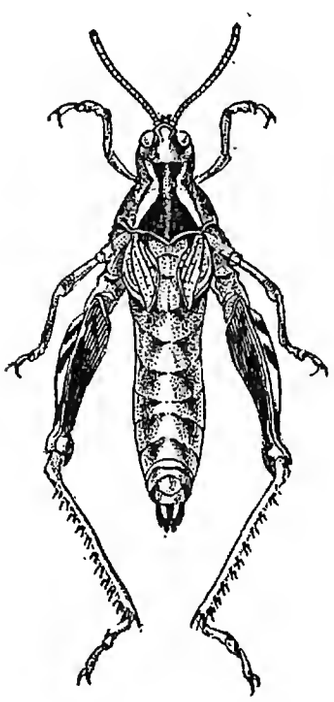
Gastrodes conicola



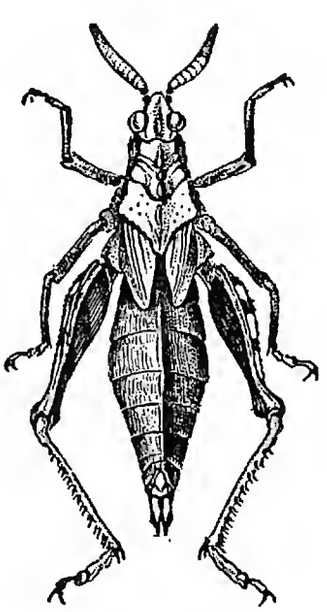
Apterobittacus apterus



Aulicus terrestris



Esselenia vanduzeei



Dracotettix plutonis
var. californicus

PLATE II

however, preferring a somewhat heavier diet, feed upon hairless caterpillars and we find many females feeding upon army worms and geometrid larvæ. The voracious females eat until they are scarcely able to fly and it is only in this engorged state that the discriminating males may be attracted.

On an exposed, moist bank, we encounter a group of dark bluish bees, *Osmia lignaria*, digging into the soft earth and gathering mud with which to line their nests.

As the day draws to a close, we regretfully turn back to the car. Out bottles are full but our work has scarcely started as the material all awaits mounting and study during many hours to come.

Pope Valley

Another type of Upper Sonoran fauna is found on a few scattered serpentine ridges in Central California. These are distinguished by the presence of the Sargent Cypress, *Cupressus sargentii*, and its various varieties. The most easily accessible localities where this flora, with its specialized fauna, may be found are Pope Valley in Napa County, the lower slopes of Mt. St. Helena, Cypress Ridge near Fairfax in Marin County, and Cedar Mountain Ridge in the Livermore Hills of Alameda County. A visit to Pope Valley gives us an opportunity to study this fauna more closely. The Sargent Cypress is a shrub-like tree from five to fifteen feet high, with a dusty-looking, bluish green, aromatic foliage.

On the foliage thin, transparent scales, *Aonidia shastæ* may be observed. These resemble small drops of resin. Near the tips of the branches are found white cocoons of the golden-black microlepidopteron, *Argyresthia franciscella*, the larvæ of which mine the leaflets causing them to fall. Beating discloses a host of extremely local species. The leaves harbor the brilliantly metallic leaf beetle, *Colaspis oregonus*, dark round lygæids, *Ischnorrhynchus obovatus*, whose congeners are typically found on alders, and large numbers of sawfly larvæ.

More rarely we capture the large, mottled, gray and black shield bug, *Tetyra robusta*, the sordid stink bug, *Banassa sordida*, and a red and blue œdemerid, *Copodita bicolor*. This latter we find also in *Calochortus* flowers which it visits in search of pollen.

Three species of long-horns are found on the dead branches. The beautiful blue and red *Semanotus cupressi* occurs on storm broken branches which are still hanging on the tree, whereas the obscure *Atimia helenæ* and the slender black *Vandykea tuberculata* bore in the dead lower limbs.

An oval emergence hole near the base of a living tree indicates the presence of the iridescent bronze and black buprestid, *Trachykele hartmanni.* Prompted by this clue we cut into the trunk and are fortunate enough to capture a mature specimen of this much sought-after prize, in its pupal cell. This genus is remarkable for the jewel-like brilliancy of some of its species, all of which are restricted to America and to cupressine trees.

The loosened bark exposes the characteristically hook-shaped, crenulate engravings of a cypress barkbeetle, *Phlœosinus variolatus*, which, in Marin County, is preyed upon by a red and black clerid, *Enoclerus cupressi.* Within the green, peltate cones we find reddish or greenish larvæ of the eucosmid moth, *Carpocapsa cupressina*, thus completing our brief survey of the interesting fauna of Pope Valley.

Pupation of Haltica bimarginata Say

The recent note by Dr. Van Dyke in the Pan-Pacific Entomologist concerning the swarming of the alder flea beetle prompts another note on the biology of this common beetle. In the Spring of 1934 near Tanforan, California, the larvæ of this beetle was observed boring into a semi-rotten willow limb. Upon chopping into the limb to a depth of two inches many pupal cells were found containing pupæ and freshly transformed adults. As stated in different bulletins and text books this beetle has been known to pupate only in the ground.—P. C. Ting.

Dikraneura ægra New Name

Through the kindness of W. L. McAtee attention was called to the fact that the name *Dikraneura mera* Beamer, Pan-Pacific Ent., Vol. XII, p. 7, 1936, is preoccupied. I therefore, propose the name ***Dikraneura ægra*** for this species.—R. H. Beamer.

SOME BEES OF THE GENUS ASHMEADIELLA

BY CHARLES D. MICHENER

Pasadena, California

In the present paper I have considered two groups of *Ashmeadiella*: first, those with the margin of the clypeus of the female dentate or toothed; and second, those in which the body is black, but the legs at least partly red. The latter group is apparently confined to desert areas, and the species have more abundant pale pubescence than is found in most other forms. I also include descriptions of five new species not belonging to either of these groups.

I wish to thank Prof. T. D. A. Cockerell for the use of his collection and for many helpful suggestions.

Ashmeadiella timberlakei Michener, n. sp.

Female (type): Length 6 mm.; facial line distinctly longer than transfacial; inner orbits about parallel within, slightly divergent below upper margin of clypeus; lower margin of clypeus trilobed, the median lobe largest and notched in the middle; mandibles black, three toothed, the inner tooth broad with an oblique edge; antennæ black, the under side of flagellum more or less brownish; clypeus shiny with rather large punctures; rest of head and dorsum of thorax slightly shiny or dullish, with rather small close punctures, those of vertex about the same size as those of anterior part of scutum, but rest of scutum with somewhat larger punctures; pleura more shiny, with better separated punctures than those of dorsum of thorax; legs black, the hind femora and area on inner side of hind tibiæ red; tegulæ testaceous, or black in front; wings slightly gray; abdomen black, the sides of tergites one to five red, the red more and more restricted posteriorly, leaving anteriorly only a rather narrow black band which ends at the upper edge of the basal concavity of first tergite; punctures of dorsum of second and third tergites rather small, not dense, those of first tergite a little finer, those of last three tergites and sides of second and third somewhat larger and denser; pubescence dull white, abundant on sides of face, around antennæ, on cheeks, forming a narrow line above tegulæ and on posterior edge of scutum, not forming spots of hair at anterior edge of scutum, rather long on pleura (especially around edges) and on scutellum (especially posteriorly), and forming narrow bands on tergites one to five; apex of abdomen with some hair between the bands; scopa dull white.

Male: Length 5-5.5 mm.; similar to female but red of abdo-

men a little more extensive, at the sides reaching to the lateral teeth of apex of abdomen; clypeus normal, dullish, with rather small close punctures; apex of abdomen with four red teeth, the lateral ones very broad, the lateral edge of sixth tergite convex; median teeth about parallel sided, longer than basal width; mandibles with a faint red band near apex; face duller than vertex, the change occurring just below the level of anterior ocellus; pubescence sparser than in female; posterior margins of tergites reddish; black band up center of abdomen extending onto basal concavity.

California: Altadena (type locality), May 12 and 13, 1934, and June 1, 1935, one on *Lotus scoparius*; La Crescenta, May 5, 1934, on *Lotus scoparius*; Crystal Lake, San Gabriel Mountains, July 7, 1934, on *Verbena prostrata* (all Michener, Coll.).

The apical teeth of the male abdomen are sometimes evenly spaced, at other times the lateral spaces are much narrower than the median one. The lateral teeth appear wider than in the figure if the view is somewhat from the side.

The nearest relative of this species is *A. clypeodentata* Mich. These species differ in the form of the clypeus of the female, etc. The male *A. timberlakei* resembles *A. howardi* Ckll. in the broad lateral apical teeth of the abdomen, but *howardi* has the hind legs black, etc.

Named after Mr. P. H. Timberlake, in recognition of his extensive studies of California bees.

Ashmeadiella clypeodentata Michener, n. sp.

Female: Length 6 mm.; facial line hardly longer than transfacial; inner orbits about parallel, their lower parts a little divergent; lower margin of clypeus trilobed, but quite different from that of *A. timberlakei* (see figure); mandibles black; flagellum faintly brownish beneath; clypeus rather shiny, with moderate sized, not dense, punctures; rest of head and thorax slightly shiny, with rather small dense punctures, those of anterior part of scutum a little finer than those of rest of scutum; punctures of pleura not so dense as those of scutum; legs very dark brown, nearly black, the claw joints of tarsi faintly rufescent; tegulæ dark reddish; wings clear; abdomen black, with rather small sparse punctures, coarser on center of second tergite than on third, finer and closer on first tergite, closer on apical tergites and sides of others; pubescence rather abundant, white, grayish on scutellum and around antennæ, dense on sides of face, around antennæ, and on cheeks; pubescence abundant but not so dense

on pleura (especially edges), on edges of clypeus, on scutellum, on edges of scutum, and on legs; no spots of pubescence on anterior part of scutum; abdominal bands rather narrow, the first widened at sides; last tergite with quite a little light hair; scopa nearly white.

Puerto Refugio, Angel de la Guarda Island, Gulf of California, May 1, 1921 (Van Duzee). This is the cotype of *A. crassa* Ckll., but the clypeal structure is so entirely different from that described for *crassa* that the two are certainly different species. Differs from *A. timberlakei* Mich. by lack of red, different clypeal structure, etc.

The type is in the collection of the California Academy of Sciences (C.A.S., Ent. No. 4164).

Ashmeadiella hæmatopoda Cockerell

Female: A large part of face covered with white pubescence; pleura covered with hair; band on first tergite widened at sides; fore femora entirely red; upper part of pleura red in one specimen; facial line hardly longer than transfacial; vertex dullish with rather small, close punctures, closer than those of scutum; clypeus truncate, as usual in the genus.

Male: Much like the female but punctation of vertex not quite so close, a little coarser than that of scutum; posterior margins of tergites reddish; pubescence more dense, entirely covering face and pleura and forming a broad band around scutum; teeth of abdomen usually red, the laterals slender and pointed, longer than basal width, the median ones long and parallel sided, more than twice as long as basal width.

Palm Springs, Riverside County, California, August 29, 1934, on *Petalonyx thurberi* (Michener, Coll.).

The females apparently have more red on fore legs and more hair on face than the type (which I have not seen). This may indicate a distinct species or subspecies.

This species is variable in size. One female is hardly 5 mm. long, while all the others are between 6.5 and 7 mm. Males are a little over 5 mm., a little over 6 mm., or about 7 mm. in length.

Ashmeadiella bigeloviæ (Cockerell)

A. rufipes Titus is probably a synonym. The fore legs of the female vary from black to largely reddish in specimens from the same locality, so this cannot be a specific character. *A.*

rufipes is larger, but this is a variable character (see notes under *A. hæmatopoda*). It is possible that *rufipes* is distinct, but I am certain that my California specimens are the same as the New Mexico ones.

Female: Length 6 mm.; facial line a little longer than transfacial; eyes only slightly converging below; clypeus coarsely and closely punctate, shiny, the apex truncate; vertex and scutum shiny, with rather large, fairly dense punctures; apical tergite thinly covered with white pubescence.

Male: Length nearly 5 to nearly 6 mm.; facial line a little longer than transfacial; face covered with white pubescence; vertex and scutum shiny, with moderate sized or rather large well separated punctures; tegulæ reddish or nearly black; wings clear; abdomen with moderate sized well separated punctures on first few segments, those of posterior segments a little closer; median teeth of apex of abdomen translucent, about one and one-half times as long as wide; lateral teeth shorter and rather slender and pointed.

California: Palm Springs, Riverside County, August 28, 1934, on *Petalonyx thurberi* (Michener, Coll.); Hodge, Mojave Desert, September 14, 1935, on *Cleomella obtusifolia* (Michener, Coll.); Victorville, September 14, 1935, on *Cleomella obtusifolia* (Michener, Coll.); Helendale, Mojave Desert, September 14, 1935, on *Cleomella obtusifolia* (Michener, Coll.).

Arizona: Florence Junction, June 15, 1934 (M. & H. James).

I have also seen one of the original New Mexico specimens.

Ashmeadiella rhodopus Michener, n. sp.

Male (type): Length nearly 6 mm.; facial line slightly shorter than transfacial; face entirely covered with white hairs; antennæ nearly black; mandibles black with a broad red band before apex; vertex and scutum shiny with moderate sized, not very dense, punctures; tegulæ testaceous; wings clear; legs as in A. *bigeloviæ*; abdomen similar to that of *bigeloviæ* but punctures much finer; extreme sides of first tergite red; pubescence a little more abundant than in *bigeloviæ*; lateral teeth of apex of abdomen red, a little longer than basal width; median teeth about parallel sided, not twice as long as basal width.

Female: Length 6.5 mm.; similar to male but clypeus not covered with pubescence, its punctures moderate sized and elongate; sides of first tergite not reddish; anterior margin of scutum with a pair of hair spots. (In the male these are connected by a broad band of pubescence, so that they do not show as spots.)

Monserrate Island, Gulf of California (type locality), June 13, 1921 (Van Duzee); Angeles Bay, Gulf of California, June 17, 1921 (Van Duzee).

This is the *A. rufipes* of Cockerell, 1924. Probably other locality records for *rufipes*, given in the same paper, really refer to *rhodopus*. *A. rhodopus* differs from *A. bigeloviæ* by the longer teeth of the male abdomen, and the finer punctation, the clypeus of the female being dull and finely punctate, compared with the coarsely punctate clypeus of *bigeloviæ*. I have not seen specimens in which the fore legs are black as in some *A. bigeloviæ*.

The type is in the collection of the California Academy of Sciences. (C.A.S., Ent. No. 4165).

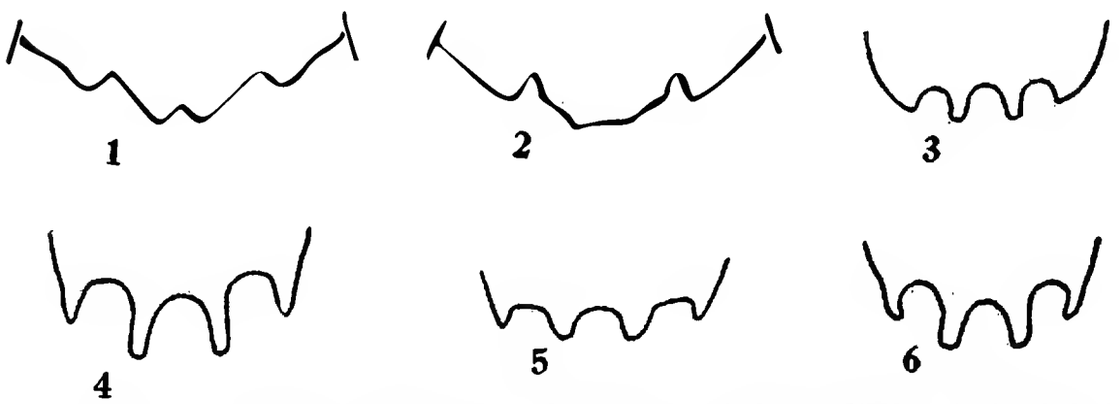


Fig. 1, anterior margin of clypeus of *Ashmeadiella timberlakei* Mich., ♀; fig. 2, same of *A. clypeodentata* Mich., ♀; fig. 3, Apex of abdomen of *A. timberlakei* Mich., ♂; fig. 4, same of *A. hæmatopoda* Ckll., ♂; fig. 5, same of *A. bigeloviæ* (Ckll.), ♂; fig. 6, same of *A. rhodopus* Mich., ♂.

Ashmeadiella lateralis Michener, n. sp.

Male: Length 5.5 mm.; quite similar to *A. timberlakei* Mich., but punctation of face a little coarser and not showing a distinct sudden change to the coarser punctation of vertex; face wider, the facial line slightly shorter than transfacial; scutum not so finely punctate anteriorly; red markings all dark red, not bright as in *A. timberlakei*; hind femora red, and apices of middle femora red beneath; red of abdomen restricted, not extending onto sixth segment, and gradually shading into the black; teeth of apex of abdomen black, or the laterals faintly reddish, the median ones broader at bases, more pointed at tips, more triangular, than in *A. timberlakei*; front of scutum with two small hair spots.

Holotype: Eagle Rock Hills, Los Angeles County, California, April 14, 1933, on *Rhamnus crocea* (Michener, Coll.).

Differs from *A. howardi* Ckll. by the color of the red markings, the shape of the median apical teeth of the abdomen, etc.

Ashmeadiella maxima Michener, n. sp.

Female: Length 8 to 9 mm.; very robust species; facial line considerably shorter than transfacial; eyes converging below; clypeus truncate at apex as usual in this genus; mandibles and antennæ black; vertex and scutum rather finely punctate, the vertex a very little more closely so than scutum, the latter not closely punctate, especially in center; clypeus closely punctate, the punctures a little coarser than those of vertex; punctures of pleura closer than those of scutum but about the same size; tegulæ black or slightly brownish; legs black; wings very slightly grayish; abdomen rather finely and closely punctate, on dorsum more finely so than on scutum; the first tergite not appreciably more finely punctate than second and third, the third shinier and more coarsely punctate than second; laterally and to some extent posteriorly the punctures are coarser than on dorsum of first few tergites; pubescence quite abundant, dull white, covering face nearly to ocelli (that of clypeus dull in most lights and not obscuring surface), abundant on cheeks, pleura (especially around edges), scutellum (especially posteriorly), anterior margin of scutum, and sides of scutum above tegulæ; anterior margin of scutum with two small spots of hair; abdominal bands conspicuous, white, that of first segment widened at sides; clypeus with brushes of orange hair below the margin; ventral scopa pale yellowish white.

Male: Length nearly 7 mm.; similar to female; face densely covered with white pubescence; transfacial line not so much longer than facial; abdomen nearly as coarsely and closely punctate as the scutum, the first tergite a little more finely punctate than second, the third more shiny and more coarsely punctate than second; teeth at apex of abdomen black, the laterals rather broad, the median ones a little longer, narrowed apically but not pointed, somewhat widened at base; claw joints of tarsi slightly rufescent.

Holotype female and a paratype of each sex: Devils River, Texas, May 6 and 7, 1907, on *Marilaunidium origanifolium* and *Gaillardia pulchella* (F. C. Bishopp, Coll.).

The holotype is in Prof. T. D. A. Cockrell's collection.

The apex of the male abdomen is much like that of *A. californica* (Ashm.) but the median apical teeth are a little shorter. The large size and broad face of the female are very distinctive. The closest relative is *A. submaxima* Mich. (to be described else-

where) which has the punctation of the vertex (male) coarser than that of the scutum.

Ashmeadiella cockerelli Michener, n. sp.

Male: Length nearly 5 mm.; form robust; eyes slightly convergent below except for their lower ends; antennæ black, the flagellum very faintly dusky brown beneath; mandibles with a faint subapical red band; face dull, finely and closely punctate, especially at anterior margin of clypeus; vertex rather shiny, more coarsely but quite closely punctate; scutum anteriorly very finely and closely punctate, medially and posteriorly a very little more finely punctate than vertex; abdomen finely but not very sparsely punctate, the punctures considerably finer than those of vertex; apical teeth of abdomen black, short, the median ones much broadened at base and triangular; tegulæ black, their outer margins dark testaceous; legs black, the claw joints of tarsi dull brown; wings slightly dusky; pubescence dull white, not very abundant, present on sides of face, anterior margin of clypeus, pronotum, front and sides of scutum, scutellum, and pleura, but nowhere except on sides of face and margin of clypeus dense enough to obscure surface; abdomen with inconspicuous hair bands, and some hair between bands apically; hair on under sides of tarsi reddish.

Holotype: Altadena, California, May 12, 1935 (Michener), in Michener Collection.

Distinguished from all other known species except *A. timberlakei* Mich. by the very finely punctate anterior third or fourth of scutum, contrasting with the vertex and rest of scutum. *A. timberlakei* is a species with red markings and broad lateral apical abdominal teeth. *A. aridula* is a much more coarsely punctate species.

Ashmeadiella florissantensis Michener, n. sp.

Male: Length 5.5 to 6 mm.; facial line about equal to transfacial; inner orbits slightly convergent below; mandibles black; antennæ black, the under side of the flagellum obscurely dusky; head somewhat shining, with rather small close punctures; most of punctures of scutum larger and better separated, the scutum strongly shining; legs black, the claw joints of tarsi rufescent; wings slightly grayish; punctures of abdomen fine, even finer than those of head, especially fine but not very sparse on dorsum of first two or three tergites, closer and a little coarser posteriorly and laterally, where the punctures are like those of pleura and cheeks, but finer than those of vertex; apex of abdomen with the usual four teeth, the lateral ones rather broad, the median about

twice as long as basal width, slender; pubescence rather sparse, abundant and covering the surface on sides of face and anterior margin of clypeus, copious but not covering the surface around bases of antennæ, on cheeks, edges of pleura and sides of scutum; posterior edge of scutellum with a fringe of very long hairs; abdominal bands narrow, not very conspicuous; pubescence dull white slightly ochraceous on scutellum and around bases of antennæ.

Female: Length nearly 6 mm.; facial line a little longer than transfacial; eyes nearly parallel within; clypeus with rather large, not very close, punctures, its apex truncate as usual in this genus; vertex and scutum shining with moderate sized, not very close, punctures, those of vertex a very little finer than those of scutum; punctures in front of ocelli finer than those behind them; punctures of abdomen finer than in the male, exceedingly fine and rather sparse on dorsum of first three tergites, a little coarser on third than on second; pubescence similar to that of male but a little more abundant, that of dorsum of thorax faintly yellowish or ochraceous; clypeus and apex of abdomen with some very faintly ochraceous hair; scopa yellowish white.

Holotype male and paratypes: Florissant, Colorado, June 1 to 23, one on *Potentilla* and one on *Senecio* (Rohwer). (These have been recorded as *A. cactorum* (Ckll.). Paratypes: Meeker, Colorado, about 40° 2′N., 107° 55′W., 6200 feet elevation, July 20-21, 1919 (F4391B); South Fork, Colorado, June 17, 1919, about 37° 40′N, 106° 38′ W., 8200 feet elevation (F4356); Ouray, Colorado, July 11-14, 1919, about 38° 1′N., 107° 40′W., 8500 feet elevation (F4378D).

The type is in Prof. T. D. A. Cockrell's Collection.

This species is similar to *A. coloradensis* Ckll., especially in the female, but the male has much longer median apical teeth and the female is more robust, with a larger head than *A. coloradensis*. This species is also similar to *A. californica* (Ashm.), but is usually smaller, with a more coarsely and sparsely punctate clypeus in the female, etc.

Ashmeadiella altadenæ Michener, n. sp.

Male: Length nearly 5 mm.; somewhat similar to *A. aridula* Ckll. but pubescence more abundant and browner, mandibles with their middle halves reddish; tegulæ dark brown; under side of flagellum brown; pubescence, in addition to covering scutellum and forming a margin around scutum, forms four short longitudinal lines on anterior part of scutum; pleura and cheeks quite densely covered with pubescence; tarsi brown; body more finely punctate

than in *aridula*, the vertex and scutum with rather small punctures, those of vertex close, those of scutum sparser, the scutum appearing shinier than the vertex; first few tergites with both basal and apical hair bands; apex of abdomen with the lateral teeth slender and pointed, the median ones rather long, parallel sided, subtruncate at apices, about one and one-half times as long as basal width or a little longer; second abscissa of cubital vein shorter than usual in the genus; abdomen finely and not very sparsely punctate, more finely so than vertex and scutum.

Holotype: Altadena, California, May 12, 1934 (Michener), in Michener Collection.

Differs from *A. californica* (Ashm.) by smaller size, more finely punctate vertex and scutum, broader median apical teeth of abdomen, and broader, though pointed, stipites. No other known species has the median apical teeth of the abdomen as in this one.

Book Notice

Musgrave, Anthony. Bibliography of Australian Entomology 1775-1930 with bibliographical notes on authors and collectors. Royal Zoological Society of New South Wales. 380 pages. Sept. 1932.

To the American worker in most fields of Entomology the insect fauna of Australia is exceedingly remote and yet this bibliography contains much of interest to any entomologist. The literature of Australian Entomology is scattered in many publications that have appeared in Europe and the United States as well as in Australia and in its preparation almost every distinguished entomologist since the time of Linnæus has participated. Consequently the biographical notes in this compilation include almost a roster of the more active systematic entomologists of Europe and America. The historical notes on early voyages and explorations are of value to anyone interested in the history of scientific exploration.

The volume is an exceedingly important addition to our bibliographic lists. The form in which it is presented is excellent and the proof reading has evidently been most carefully done. Its author has accomplished what must have been an extremely laborious task in most excellent fashion.—G. F. Ferris.

NEW CALIFORNIA APHIDIDÆ

BY E. O. ESSIG

The Adenocaulon Aphid

Macrosiphum adenocaulonæ Essig, n. sp.

This large shining dark-red, greenish-maroon, or almost black aphid is singular in its habit of feeding on the glandular flower stems of *Adenocaulon bicolor* Hooker and assuming the grotesque attitude of clinging head down to the stems by means of the rostrum and forelegs and with the abdomen, and hind legs and middle legs suspended in air at a considerable angle to the plant. (See figure 1). The first specimens were discovered on plants growing in the redwood forest along the California State Redwood Highway near Pepperwood, Humboldt County, California, June 17, 1936 by one of my students Olive P. McGinnis. A large series of specimens were taken at this locality, but the species was not observed elsewhere in the county. On August 9, 11, 1935, I took a large series of adult apterous females on the same host plant growing on the floor of the yellow pine forest at Jack's Camp, Meadow Valley, Plumas County, California, at an elevation of about 4,000 feet.

Winged viviparous female. Shining maroon or reddish, often with a tinge of olive-green. The head, antennæ, thorax, apices of the femora and tibiæ, and the cornicles dusky to black; cauda concolorous with the body or somewhat paler. Spines rather conspicuous on the antennæ, legs, and cauda. Antennæ only slightly longer than the body; length of segments: I, 0.15 mm.; II, 0.07 mm.; III, 0.80 mm.; IV, 0.65 mm.; V, 0.55 mm.; VI, 0.95 mm. (base, 0.17 mm.; unguis, 0.78 mm.); total 3.17 mm. There is a wide variation in the total lengths of the antennæ in different individuals, but the comparative lengths of the various segments approximate the above measurements. Secondary circular sensoria occur only on III and vary from 20 to 36 for 36 antennæ examined: the average is about 26. The rostrum extends to the third coxæ and is characterized by having IV long and slender (0.17 mm.) and V very minute. Cornicles dusky, sub-cylindrical, tapering slightly apically, somewhat recurved, strongly imbricated, and reticulated throughout the apical third as illustrated; length 0.9 to 1 mm. Cauda long, slender, and with numerous hairs or spines; length 0.40 mm., or slightly less than half the length of the cornicles. Length of body, including cauda, 3 mm.; width 1.10 mm.; length of forewing 4 mm.

Apterous viviparous female. Shining reddish or olivaceous throughout with the head and antennæ dusky and the apices of the tibiæ, the tarsi, and cornicles dusky or black; the cauda frequently paler than the body. Lengths of the antennal segments: I, 0.15 mm.; II, 0.07 mm.; III, 0.82 mm.; IV, 0.59 mm.; V, 0.54 mm.; VI, 0.97 mm. (base, 0.18 mm.; unguis, 0.79 mm.); total 3.14 mm. The circular secondary sensoria are distributed over III, excepting the extreme base and the apical third, and vary in

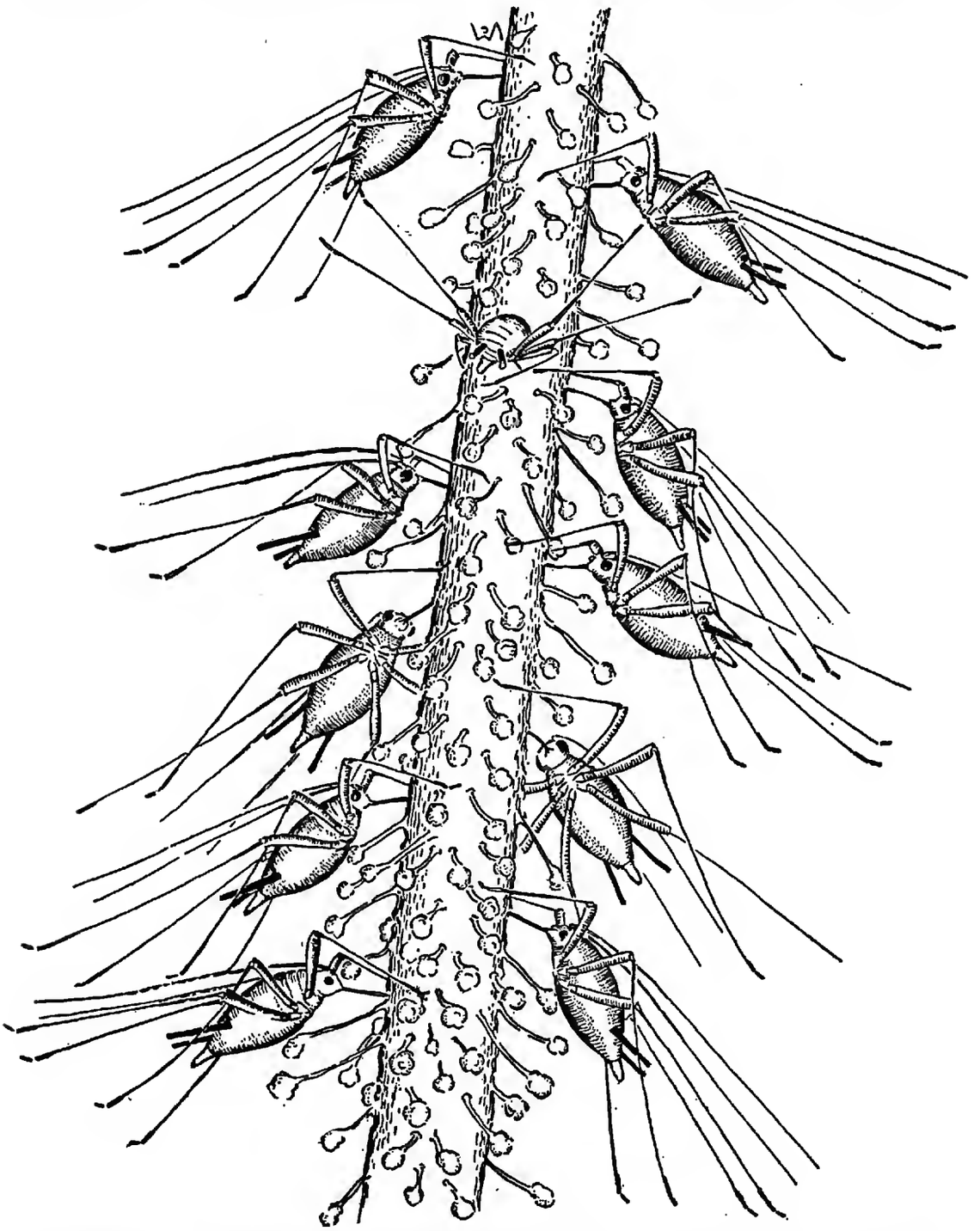


Fig. 1. *Macrosiphum adenocaulonæ* n. sp. feeding on the flower stem of *Adenocaulon bicolor* Hooker, showing characteristic attitude. (Drawing by Virginia McPheter.)

number from 11 to 18 with an average of 13. The cornicles are similar to those of the winged forms, but are larger and usually more recurved; length 1 mm. The length of the cauda is 0.47 mm.; length of the body, including the cauda, 3.8 mm., width 1.5 mm.

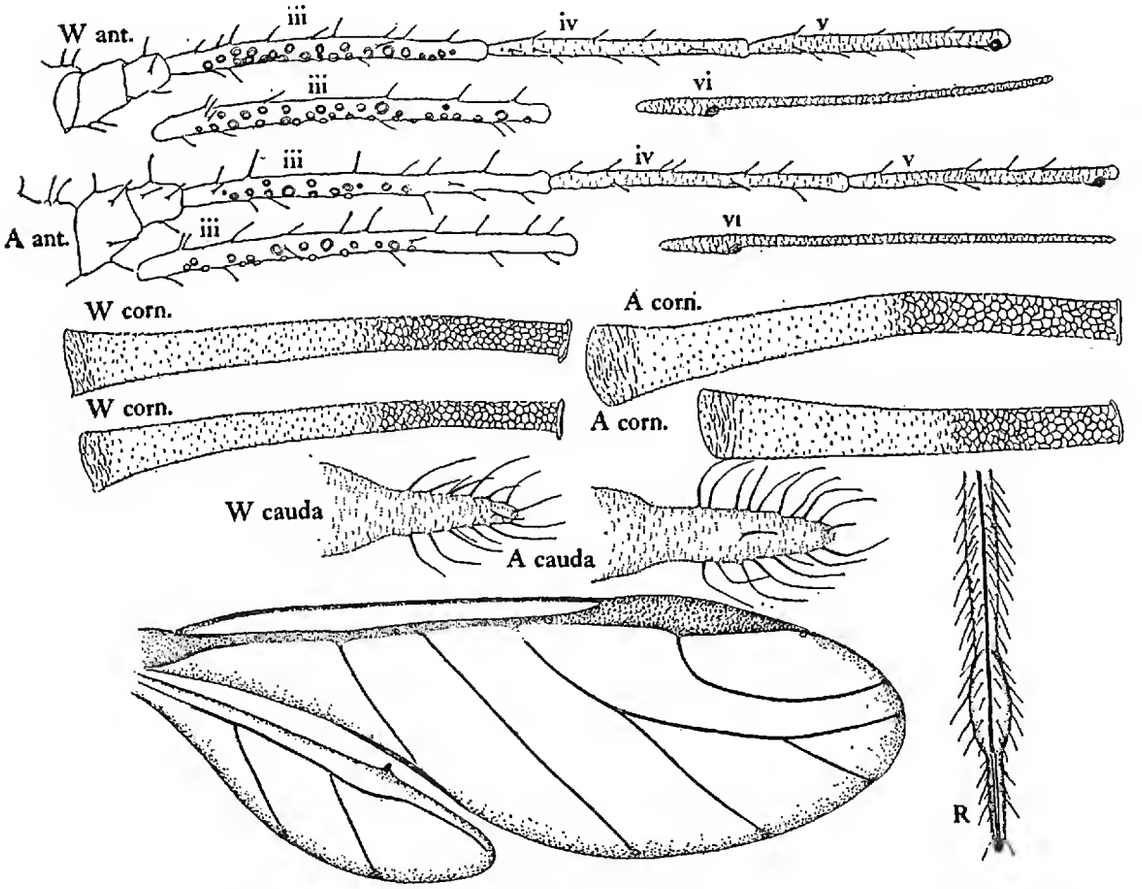


Fig. 2. *Macrosiphum adenocaulonæ* n. sp. Important anatomical parts all drawn to scale. A, apterous female; R, rostrum; W, winged female. (Drawings by Virginia McPheter.)

This species is closely related to *Macrosiphum longirostris* Gillette and Palmer and *M. rudbeckiæ* (Fitch). From the former it is distinguished by the paler color, fewer secondary sensoria on antennal segment III of both the alate and apterous forms, more and longer caudal spines, and by the wholly darker cornicles. From the latter it differs in having fewer secondary sensoria, narrower cornicles, much slenderer apical segments of the rostrum, and much less pigmentation of the appendages.

Although many other kinds of plants were growing in the immediate vicinity of those infested with *Macrosiphum adenocaulonæ* n. sp., the aphid appeared to restrict its feeding to *Adenocaulon bicolor* Hooker.

These descriptions have been drawn from a large series of alate and apterous specimens consisting of 23 slides from Humboldt County and 11 slides from Plumas County, California, all of which are designated as cotypes and are in the author's collection.

Macrosiphum scoliopi Essig, n. sp.

(Figure 3)

Winged viviparous female. White to very pale yellow with a considerable portion of the body marked dusky or black as follows: head and antennæ dusky; prothorax dusky with a black longitudinal vitta on each side; legs mostly dusky with the bases of the femora and tibiæ paler and the tarsi dusky to black; meso-

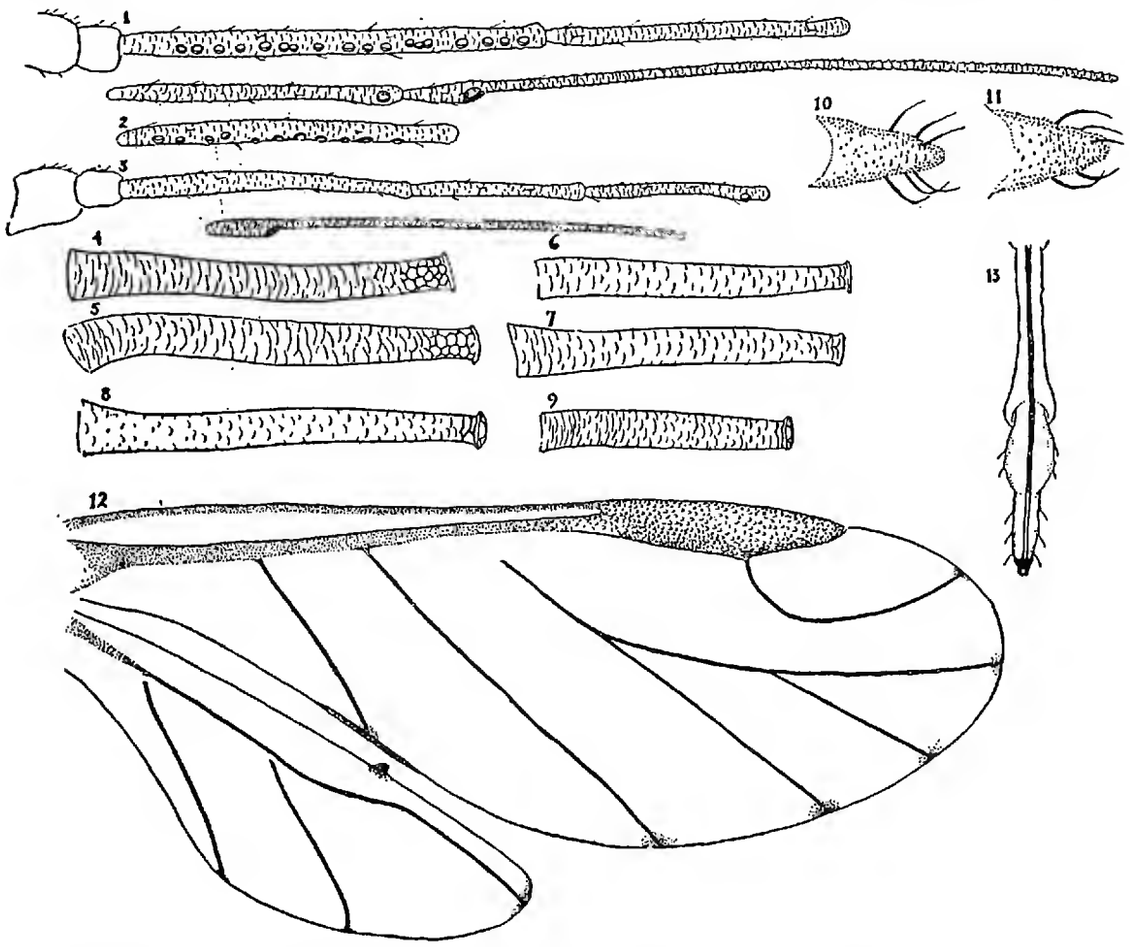


Fig. 3. *Macrosiphum scoliopi* Essig, n. sp. Winged viviparous female: 1, antenna; 2, antennal segment III; 4, and 5, cornicles; 10, cauda; 12, wings; 13, rostrum. Apterous female: 3, antenna; 6, and 7, cornicles; 11, cauda. 8, cornicle of winged form of *Macrosiphum aucubæ* Bartholomew, and 9, cornicle of winged form of *Myzus circumflexus* (Buckton), two similar species, shown for comparison. (Drawing by Virginia McPheter.)

and metathorax dusky; abdomen with a large indefinite median black dorsal patch and two rather narrow transverse black areas in front and one or two behind the median patch; cauda, anal plate, and cornicles dusky to black. On the vertex of the head is a pair of small, clear tubercles which resemble, in mounted specimens, very small ocelli. Frontal tubercles well-formed and almost perpendicular on the inner margins. Antennæ slightly longer than the body; the lengths of the segments as follows: I, 0.09 mm.; II, 0.06 mm.; III, 0.47 mm.; IV, 0.39 mm.; V, 0.34 mm.; VI, 0.97 mm. (base, 0.15 mm.; unguis, 0.82 mm.); total 2.32 mm. From 11 to 18, or an average of 14, circular secondary sensoria occur usually in a row throughout the length of III, excepting the extreme basal and apical areas. No secondary sensoria occur on other segments. Rostrum reaching to the second coxæ, length 0.65 mm. Wings with noticeably dark veins and stigma. Cornicles cylindrical with somewhat wider bases and slight constrictions throughout the apical fifth of each; the constricted areas being plainly reticulated, whereas the remaining portions are imbricated; length 0.55 mm. Cauda fairly slender and tapering, with six pairs of long hairs; length 0.2 mm. Length of body 2 mm.; width 0.9 mm., length of forewing 3.3 mm.

Apterous viviparous female. Pale-yellow or whitish throughout and robust; the epidermis finely wrinkled. Frontal tubercles prominent with numerous capitate hairs. Antennæ with tip of segment V and all of VI dark; length of segments: I, 0.10 mm.; II, 0.07 mm.; III, 0.40 mm.; IV, 0.31 mm.; V, 0.28 mm.; VI, 0.82 mm. (base, 0.13 mm.; unguis, 0.69 mm.); total 1.98 mm.; without secondary sensoria. Tarsi black. Cornicles somewhat more tapering than in the alate form, otherwise similar as to the apical constrictions and reticulations; length 0.58 mm. Cauda conical 0.17 mm. long. Length of body 2 mm., greatest width 1 mm.

Specimens of this aphid were first taken by the writer on the leaves of the showy lily, *Lilium speciosum* Thunb. *rubrum* Hort., at Oakland, California, July 25, 1916. Since they were confused with the common lily aphid, *Myzus circumflexus* (Buckton), only three alate and two apterous individuals were preserved on a single slide. The species was again collected by me on the undersides of the small native liliaceous plant, *Scoliopus bigelovii* Torrey, growing on the shady bank of Eel River at Fort Seward, Humboldt County, California, May 30 to June 5, 1935. Since the leaves of these plants were normally drying at this early season the aphid must have been migrating to other hosts, which were not discovered before leaving the locality on

June 23d, although a diligent search was made for additional host plants.

This new species was described from 7 alates and 28 apterous individuals mounted on 8 slides, which are designated as cotypes and are in the author's collection.

Macrosiphum scoliopi n. sp. is most likely to be confused with *Macrosiphum aucubæ* Bartholomew and *Myzus circumflexus* (Buckton), from which it is readily distinguished by the cornicles. See figure 3.

The Water Cress Aphid

Myzus langei Essig, n. sp.

(Figure 4)

The individuals are pinkish or green with dusky to black markings.

Winged viviparous female. Mostly black with variable amounts of pink or green background. The head, antennæ, tips of femora and tibiæ, tarsi, and thorax mostly black or dusky; the abdomen with lateral spots, dorsal markings and transverse dorsal areas, and a large median dorsal patch, black; cornicles, cauda, and anal plate black. Antennæ as long as or slightly longer than the body; lengths of segments: I, 0.08 mm.; II, 0.06 mm.; III, 0.43 mm.; IV, 0.27 mm.; V, 0.21 mm.; VI, 0.57 mm. (base, 0.12 mm.; unguis, 0.45 mm.); total 1.62 mm. Circular secondary sensoria rather large, distributed throughout III, excepting the extreme base; varying in number from 5 to 9 with an average of 7 for fourteen individual aphids. Rostrum pale, extending midway between the second and third coxæ. Cornicles cylindrical; straight or somewhat recurved; constricted near the apices to form conspicuous flanged openings; imbricated and without reticulations; length 0.38 mm. Cauda conical; with few rather inconspicuous hairs; 0.13 mm. long. Length of body 1.5 mm.; width 0.7 mm.; length of forewing 2.8 mm.

Apterous viviparous female. Robust with rather faint dark patches along the sides and on the dorsum behind the cornicles. Frontal tubercles gibbous and finely serrated. Antennæ shorter than the body; segments V and VI dusky; without secondary sensoria; length of segments: I, 0.08 mm.; II, 0.05 mm.; III, 0.25 mm.; IV, 0.17 mm.; V, 0.13 mm.; VI, 0.34 mm. (base, 0.08 mm.; unguis, 0.26 mm.); total 1.02 mm. Tarsi dusky. Rostrum pale, extending just beyond the second coxæ. Cornicles similar to those

[1] *Macrosiphum aucubæ* Bartholomew is apparently a synonym of *Myzus pseudosolani* (Theobald).

of the alate forms; dusky to black throughout the apical half or third; 0.42 mm. long. Cauda conical; black; 0.12 mm. long. Anal plate black. Length of body 1.7 mm.; width 1 mm.

This aphid appears to have no closely related species in this region. It somewhat resembles *Myzus leucorcrini* Gillette and Palmer, but lacks the clouded wing veins and the median constrictions of the cornicles of the latter.

Myzus langei n. sp. was taken on the undersides of the leaves of water cress, *Rorippa nasturtium-aquaticum* (Linn.) (*Radicula*), growing in the run-off of a small spring to the left of the foot of the Priest Grade, Big Oak Flat Highway, on the way to the Yosemite Valley, in the Sierra Foothills not far from Sonora, California, April 20, 1935, by one of my students, W. H.

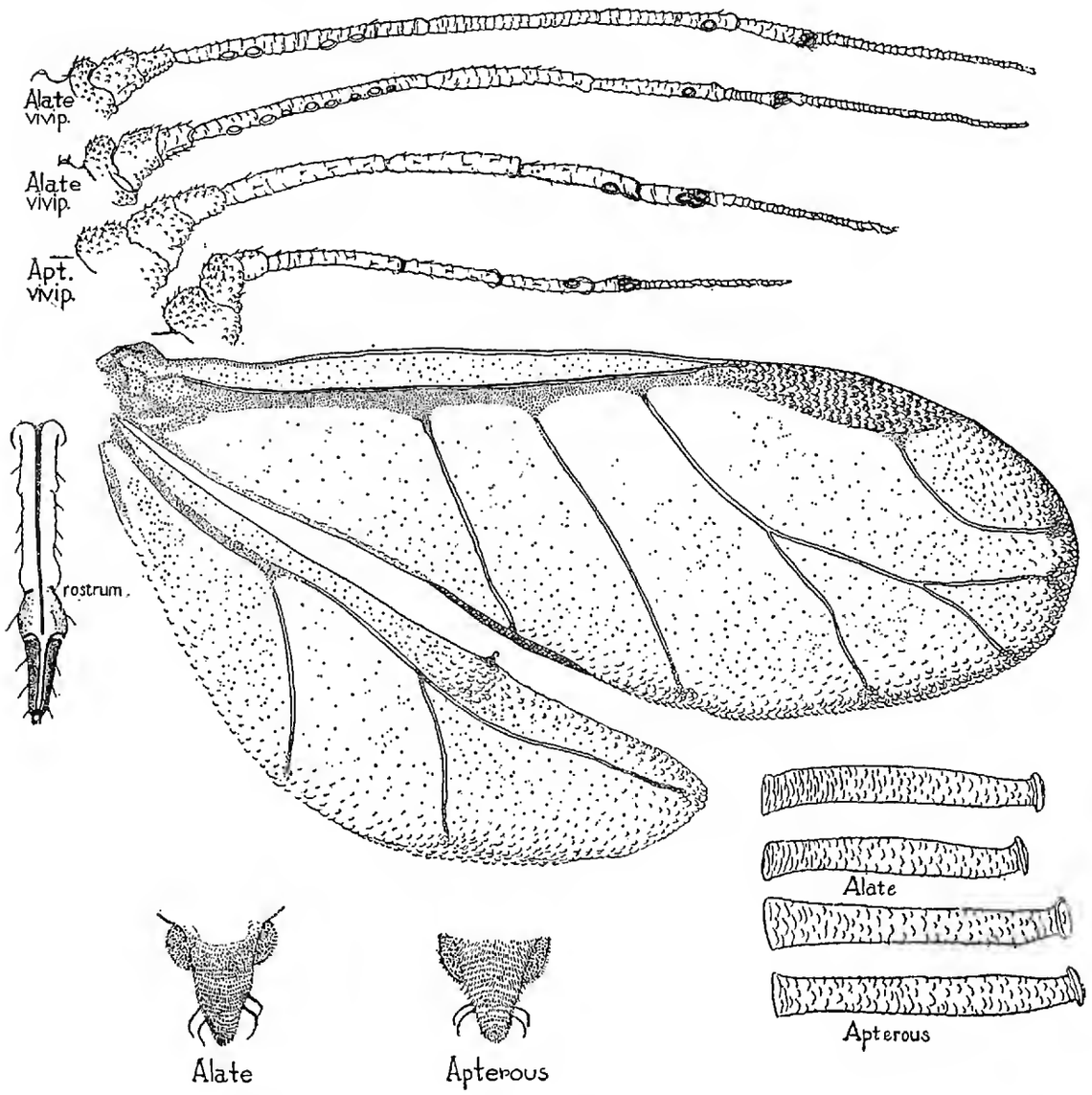


Fig. 4. *Myzus langei* n. sp. Various parts of alate and apterous females drawn to scale.

Lange, for whom it is named. Associated with it were a few specimens of *Rhopalosiphum nymphaeæ* (Linn.).

Described from 15 winged and as many apterous females designated as cotypes and mounted on five slides in the author's collection.

The Onion Aphid

Dr. R. Takahashi has called my attention to the fact that the onion aphid, *Micromyzus alliumcepa* Essig, described as a new species in the Pan-Pacific Entomologist XI; 157-160, 1935, is synonymous with his *Micromyzus formosanus*, described as *Fullawayella formosana* Takahashi in Aphididæ of Formosa, Pt. 1, p. 29, 1921 and again referred to in Pt. 2, p. 33, 89, 1923; Pt. 3, p. 107, 1924; Pt. 6, p. 75, 1931. I have examined specimens received from him and agree with his opinion.—E. O. Essig.

Future Address for Professor Essig

E. O. Essig, University of California, Berkeley, will be on sabbatical leave from July 1, 1936, to June 30, 1937. From July 1st to September 1st, 1936, and from March 1st to June 1st, 1937, his address will be Cambridge University, Cambridge, England. During the period from September 1, 1936, to March 1, 1937, his address will be the National Museum du Congo, Tervueren, Belgium.—E. O. Essig.

NEW SPECIES OF NORTH AMERICAN WEEVILS IN THE FAMILY CURCULIONIDÆ, SUBFAMILY BRACHYRHININÆ, V.

BY EDWIN C. VAN DYKE

University of California, Berkeley, California

(Part 5, continued from Vol. XII, p. 32)

This paper is a supplement and contains descriptions of a few species which because of certain peculiarities were set aside for further study or of species which have been but recently acquired.

Tribe Tripiphorini

Cimbocera cazieri Van Dyke, new species

Oblong, robust, black, appendages somewhat rufous, densely clothed with rather large, imbricated, gray and light brown scales, the latter only on upper surface and forming a median and lateral vittæ on the pronotum and irregular patches scattered over the elytra; sparsely setose, the setæ short and fine, irregularly disposed over the head and pronotum and serially arranged on the elytral intervals, generally in single rows but here and there as at sides somewhat double. Head convex, deeply transversely impressed between the eyes; rostrum slightly longer than head, somewhat narrower than interocular region, strongly convex, with fine median groove and flattened apically; eyes large, feebly convex; scrobes broad and deep, arched and pointed towards but not quite reaching lower margin of eyes; antennæ robust, scape clavate, feebly arcuate and reaching hind margin of eyes, first funicular segment about three times as long as broad, second almost twice as long, following moniliform, sixth and seventh strongly transverse and latter rather close to club and with similar golden pile. Prothorax one-sixth broader than long, base transverse, apex broadly arcuate, post ocular lobes and fimbriæ absent, broadest in front of middle, sides well rounded, disk convex, slightly transversely impressed before apex, and somewhat rugose and tuberculate. Elytra about a fourth longer than broad, well rounded near base and at apex, disk somewhat flattened, declivity abrupt but arcuate at summit, striæ finely impressed and finely, sparsely pilose, the scales large and imbricated, the first and second ventral segments slightly concave. Length 7 mm., breadth 3.25 mm.

Holotype (No. 4166, C.A.S., Ent.) and paratypes from a series of thirteen specimens collected by M. A. Cazier at Baker, San Bernardino County, California, March 27, 1935, and now

in the collections of Mr. Cazier, F. R. Platt and the California Academy of Sciences.

This species simulates *cinera* in general size and shape, in having the setæ short and sparse and the scales large and imbricated and should follow it in my key.[1] It differs by having head and rostrum strongly convex, separated by a deep transverse impression, not flattened as in *cinerea*, by having the seventh funicular segment less closely applied to the antennal club, the disk of the pronotum more or less tuberculate, and the elytra more elongate, less elliptical, and the striæ more finely, sharply impressed and not concealed by the scaly vestiture. The long hairy pile and tesselated arrangement of scales will separate the other species. Though this species lacks both post ocular lobes and fimbriæ, I believe that it should be placed in *Cimbocera*. It is, however, the most divergent of our known species.

Genus **Miloderoides** Van Dyke, new genus

Of moderate size, elongate, robust, more or less densely clothed with closely appressed imbricated scales and with long erect pile. Head with transverse impression at base of rostrum, eyes moderately convex and prominent, rostrum slightly longer than head and suddenly narrower from in front of eyes, depressed and feebly emarginate in front; scrobes lateral, broad and deep, arcuate, extending beneath and towards but not reaching lower angle of eyes; antennæ robust, scape reaching middle of eyes, clavate and feebly arched, funicle robust and somewhat longer, first segment clavate, at least twice as long as broad, second to sixth moniliform, outermost somewhat transverse, seventh cuneate and closely applied to base of club. Prothorax slightly broader than long with sides well rounded, disk finely punctured but punctures generally concealed by scales, post ocular lobes absent but fimbriæ distinct. Elytra subelliptical, striæ fine and finely punctured but to a great extent concealed by scaly vestiture. Beneath with first and second ventral segments broad, the suture between arcuate. Legs stout, tibiæ but moderately expanded apically, corbels open, anterior and middle mucronate within; third tarsal segment greatly expanded, lobed and provided with a lunate papillose area at apices of the lobes, the other tarsal segments entirely setose beneath or with but a tuft of pile at the apices of segments at the most, and squamose; claws free.

Genotype: *Miloderoides maculatus*, new species.

[1] Pan-Pac. Ent. XI, p. 1-2.

This genus is established for the reception of two species of weevils, *Miloderoides maculatus* and *argenteus* (Van Dyke), the latter recently described in the genus *Miloderes*. A critical study of the type species of *Miloderes*, *setosus* Casey, but recently acquired, has convinced me that my two species are not congeneric with it but belong to another entity which is allied to *Miloderes*, *Lepidopus* and *Cimbocera*, forming a group characterized among other things by having the seventh funicular segment of the antennæ close to the club, the post ocular lobes very much reduced or absent, the fimbriæ also reduced or even absent, and the tarsal segments entirely or to a great extent setose and squamose beneath. I believe that they are derived from primitive *Mimetes* stock and that as they drifted eastwardly into the arid lands of the Great Basin to which they are now confined, they acquired in the process of their evolution, scales and rigid setæ in place of the papillose pads to the soles of their tarsi, and were thus better enabled to fit into their desert environment. *Miloderoides* is closest to *Mimetes*, having the same widely dilated third tarsal segment but with the papillose pad reduced to a simple marginal patch at the apices of the lobes. The post ocular lobes are also entirely eliminated in this genus though the fimbriæ remain. *Lepidopus* also has the third tarsal segment dilated and bilobed, but it is entirely setose beneath as are the other tarsal segments. Here the third tarsal expansion is somewhat less than in the preceding genus. The fimbriæ as well as the post ocular lobes also have disappeared, the eyes are somewhat flatter and the seventh funicular segment of the antennæ much more closely attached to the club. *Cimbocera* has the third tarsal segment hardly more developed than the second and all are setose beneath. The post ocular lobes are feeble but generally evident here and the fimbriæ are also present in most cases. *Miloderes* the most divergent member of the quartet, has the third tarsal segment somewhat broader than the second though it as well as the others is setose beneath. In addition, it has the head very much expanded and with the rostrum not distinctly separated either dorsally by a transverse impression or laterally by sudden narrowing in front of the eyes as is the case in the others, the eyes much more flattened, and the tibiæ very robust with the apices greatly enlarged to fit them

for a more fossorial existence. The post ocular lobes are present here though feeble and the fimbriæ are well developed. The elytra have entirely lost their striæ, a unique character in the group.

Miloderoides maculatus Van Dyke, new species

Of moderate size, black, densely clothed with white and dark brown, rather large, more or less imbricated scales, the brown scales scattered over the pronotum and concentrated in rather large macules here and there on the elytra, the scales beneath uniformly white, upper surface also furnished in addition with long, fine, yellowish white, erect pile. Head barely longer than prothorax, front flattened, granulose, transverse impression at base of rostrum feeble, rostrum somewhat arched, broad, with fine median groove; eyes prominent; scrobes deep and arcuate, passing beneath almost to lower margin of eyes, scape reaching middle of eye, funicular segments in the main transverse and close together, the seventh close to club and generally of same brown color. Prothorax subglobular, just perceptibly broader than long, base transverse, apex feebly lobed, latter about a third narrower than former, sides broadly and evenly rounded, post ocular lobes absent but fimbriæ quite evident; disk convex, feeble transverse impression forward, scales and pile well marked. Elytra elliptical, considerably less than three times as long as broad, striæ and strial punctures concealed by scales but well defined when denuded; disk quite convex and densely squamose and pilose. Beneath densely clothed with large, pearly white, imbricated scales and with a few fine, short, much inclined hairs. Length 6 mm., breadth 2.5 mm.

Holotype (No. 4167, Mus. C.A.S., Ent.) and several designated paratypes from a series of seventeen specimens collected by M. C. Lane at Parma, Idaho, April 28, 1932, and kindly submitted for study by J. Wilcox of Puyallup, Washington. Most of the specimens will remain with the latter.

This species differs from *argenteus* (Van Dyke) in having the rostrum much narrower than head, the transverse impression at base deeper and the rostrum itself more arcuate, the eyes more protruding, prothorax narrower and somewhat globular, not transverse, scaly vestiture more contrasting in color, and the pile somewhat longer, less dense and a bit lighter in color.

Genus Lepidopus Van Dyke, new genus

Rather small, moderately robust, densely clothed with some-

what circular, closely appressed scales, both above and beneath and sparsely pubescent. Head moderately elongate, flattened above, separated from rostrum by a feeble transverse impression; rostrum as long as head, broad, longer than broad, scrobes deep, arcuate, passing beneath to a point just in front of eyes; antennæ moderate in length, scape feebly clavate, reaching eyes or beyond, funicle 7-segmented, first segment elongate, robust and clavate, following gradually shorter and broader, seventh very close to club; eyes moderate in size, flattened and coarsely granular; mentum broad, truncated in front, concealing maxillæ. Prothorax somewhat broader than long, rounded at sides and rather suddenly narrowed in front, without post ocular lobes and fimbriæ. Elytra elliptical, as broad at base as base of prothorax, humeri well rounded, striæ fine and finely punctured, intervals flat. Beneath with anterior coxæ approximate, median narrowly separated and hind broadly separated, first ventral suture arcuate, second segment equal to two following. Legs robust, of moderate length, front and middle tibiæ feebly mucronate at apices, front not dentate within, hind with corbels open and apices oblique; tarsi with third segment somewhat larger than second and bilobed and all segments setose and squamose beneath, not papillose, tarsal claws divergent.

Genotype: *Lepidopus nevadicus*, new species.

This genus is no doubt related to *Miloderoides* but differs from that by lacking the post orbital fimbriæ and in having the tarsi entirely setose beneath. From *Miloderes*, it differs by having no fimbriæ, a much more dilated third tarsal segment and different type of head and legs, and from *Cimbocera* chiefly by having the third tarsal segment dilated, and neither post ocular lobes nor fimbriæ.

Lepidopus nevadicus Van Dyke, new species

Moderately elongate, elliptical, black, densely clothed with gray opalescent scales and sparsely pubescent. Upper surface of both head and rostrum flattened, the scales approximate and arranged in a tessellated manner, short semierect setæ projecting here and there, a fine longitudinal impression extending from between the eyes to a point midway between insertion of antennæ; interocular space broad, but little less than total width of head, a shallow transverse impression between head and rostrum; rostrum broad and with parallel sides; scape reaching eyes. Prothorax about one-seventh broader than long, base feebly lobed, apex truncate, slightly convex above, with scales as on the head, the setæ on disk short but those at sides long and erect. Elytra two-sevenths longer than broad, disk rather flattened, with squamœ some-

what larger than on pronotum, less bead-like and feebly imbricated, the setæ fulvous, short and sparse above, rather long on sides and declivity and arranged in rows along the middle of the interval, declivity evenly rounded. Beneath densely squamose and sparsely, finely setose, the setæ inclined and only noticeable when viewed from the side. Legs moderately stout. Length 5 mm., breadth 2.5 mm.

Holotype (No. 4168, Mus. C.A.S., Ent.), a unique collected near Goldfield, Esmeralda County, Nevada, December 28, 1907, by F. W. Nunenmacher. It has long remained as an enigma in my collection.

Lepidopus parvulus Van Dyke, new species

Small, ovate, black, antennæ and legs somewhat rufous, densely clothed with closely appressed cinereous scales and with a vague vitta of light brown scales on each side of pronotum and extending backwards from the humeri of the elytra, and sparsely, finely pubescent. Upper surface of both front and rostrum flattened and continuous except for a feeble depression at base of rostrum, the scales dense and tessellated, a finely impressed longitudinal line between the eyes, rostrum with straight and parallel sides, eyes much flattened; scape reaching front margin of prothorax. Prothorax but slightly broader than long, base and apex both feebly arcuate, sides broadly rounded at middle and much narrowed in front and behind; disk moderately convex, with tessellated scales and a few short, scattered setæ. Elytra ovate, almost a fourth longer than broad, disk moderately convex, with scales denser, more approximate than on head and pronotum, but apparently not overlapping, and with scattered setæ, more evident and erect on declivity, striæ fine and finely punctured, intervals flat. Beneath with squamæ dense but less approximate than on elytra and very finely, sparsely pubescent. Legs moderately stout. Length 3.75 mm., breadth 1.5 mm.

Holotype (No. 4169, Mus. C.A.S., Ent.), a specimen collected at Parma, Idaho, April 1, 1931, by H. P. Lanchester and referrred to me for description by Dr. F. E. Blaisdell. Four other specimens from the same locality and collector as well as thirteen specimens collected at the same place, April 28, 1932, by M. C. Lane and submitted by J. Wilcox of Puyallup, Washington, have been studied. Certain of these will be designated as paratypes. It is evidently rather a common species in southwestern Idaho.

The small size, shorter and more ovate form, distinctly sepa-

rates this species from *nevadica*, and these features in connection with its generally silvery color and generic characters should enable it to be recognized.

Parataxia uniformis Van Dyke, new species

Moderate in size, narrow, elongate, black or dark piceous, antennæ and tarsi rufopiceous, densely clothed with very closely applied scales which are of the general body color and arranged in a tessellated manner; the setæ rather dense, of moderate and uniform length, slightly over one-half width of intervals, gray, erect on elytra, shorter and more inclined on pronotum. Head slightly longer than prothorax, somewhat flattened in front, densely squamose and quite pilose; rostrum well separated, gradually wider forwards, feebly arched above and sulcate apically Prothorax one-fifth wider than long, base and apex transverse, sides rounded, disk convex and very coarsely, irregularly punctured and rugose, with a short median groove near base. Elytra two and a half times as long as prothorax and about two-fifths longer than broad, base transverse, subcarinate, basal angles prominent and right angled, disk convex, declivity evenly rounded, striæ well impressed with coarse, closely placed punctures, deeper laterally. Beneath squamose, finely, sparsely pubescent, first and second ventral segments feebly concave at middle. Length 8 mm., breadth 3.25 mm.

Holotype (No. 4170, Mus. C.A.S., Ent.) and paratypes from a series of twelve specimens collected by Frank H. Parker in the White Mountains of Arizona, July 6, 1933. Another specimen from the Cumbres Pass, Colorado, altitude 10,000 feet, was collected by me, July 22, 1935.

This species is best defined by its uniform black color and gray pile of uniform length. The larger size, color of scales and tessellated arrangement of same will separate it from *brevipilis*, while the type of pile will readily enable it to be separated from the other species. It is closest to *rugicollis* in appearance, but the latter has a much broader rostrum, broader elytral intervals, long fulvous pile of variable length, more elongate punctures and the elytra more gradually arcuate to apex. This species also simulates *Melanolemma montana* but the lack of pile and absence of sharply defined basal angles of elytra will separate the latter.

Panscopus coloradensis Van Dyke, new species

Similar in size, color pattern and general appearance to *Panscopus schwarzi* Buch. of the Wasatch Mountains of Utah but differs in having the prothorax proportionately wider, the median longitudinal groove of the pronotum less pronounced, the alternate intervals of elytra less elevated and the reclinate scales on them very much finer, more acute at apices and a bit more erect.

Holotype (No. 4171, Mus. C.A.S., Ent.) and numerous designated paratypes from a series of about a hundred specimens collected by me on the Cumbres Pass, Colorado, altitude 10,000 feet, June 12, 1935.

This species is very close indeed to *schwarzi* but the type of setæ is constant in my large series of specimens and different from that of the ten specimens of *schwarzi* which I possess. Material from intermediate territory may possibly run them together.

Tribe Hormorini

This tribe I am establishing. It will contain the two genera *Hormorus* Horn and *Agasphærops* Horn, originally placed by Horn[2] in his Group IV, Hormori, as well as one new genus, *Lupinocolus*. In characterizing the group, Horn says "second abdominal segment but little longer than the third and separated from the first by a straight suture" * * * "The open posterior corbels and the straight first abdominal suture would seem to place the two genera here included in Lacordaires *Blosyrides* with which, however, they have but little in common." These statements are unfortunate and misleading. In both *Hormorus* and *Agasphærops*, the second abdominal segment is about equal to the two following united. Horn correctly states this in describing the characters of the two genera. In *Blosyrus* Schr., the second abdominal segment is narrow like the third and fourth, a most unusual character in the Rhynchophora. This character as also the other features of *Blosyrus* separate it very widely from the Hormorini. Pierce in 1913, apparently upon the strength of Horn's remarks and probably without carefully examining the characters themselves, suppressed Horn's group Hormori and placed the genera therein included in his newly

[2] The Rhynchophora of America North of Mexico, by J. L. Le Conte and G. H. Horn, Proc. Am. Phil. Soc., XV, No. 96, 1876, p. 23.

created tribe Blosyrini. As much as the Old World *Blosyrus* is undoubtedly the type genus and as I have previously stated, very widely separated in every regard from the two American genera, I am removing these two from the Blosyrini of Pierce and placing them in the tribe Hormorini, a practical equivalent of Horn's group Hormori. The tribe is apparently rather close to the Epicærini, differing only as to minor features such as in having more oblique eyes, more robust antennæ with scape distinctly clavate, outer funicular segments moniliform and club conical and hind corbels widely open on inner side. Sharp in defining the Epicærina, the equivalent of the Epicerini, in the "Biologia Centrali-Americana," states that "This group includes all the apterous Otiorhynchinæ of our region that have no ocular lobes to the thorax, and in which the scrobes, whether definite or indefinite, are entirely lateral, with their lower border arcuate to a greater or less extent, and the claws are free. These characters are strictly diagnostic, and in addition it may be added that the scape of the antenna is always moderate in thickness, never incrassate, never extremely slender. The corbels of the hind tibiæ vary much, but it may be considered as a character of the group that they are cavernous or subcavernous, the tip of the tibia never being extremely slender, as is the normal condition in the Sciaphilina." The major features of the Hormorini are in agreement with the above but the antennæ and corbels of hind tibiæ are not as given above. In addition I might say that the two tribes have a different origin, the Epicærini being entirely Neotropical whereas the Hormorinio are Nearctic.

Genus **Lupinocolus** Van Dyke, new genus

Moderately elongate, subcylindrical, subglabrous, and somewhat shining, the body vestiture of scattered, elongate scales, the antennæ and legs sparsely pilose. Head globose posteriorly, eyes moderately prominent and laterally protruding in front, the rostrum almost twice as long as head, broad, gradually widening forwards from the eyes, apex triangularly incised and with raised margins to incisure, the mandibular supports to the deciduous cusps prominent, scrobes lateral, broad and directed towards lower angle of eyes, the alæ prominent and concealing scrobes from above; antennæ robust, scape clavate, reaching hind margin of eyes, funicle 7-segmented, first twice as long as broad, second somewhat shorter and narrower, following moniliform and gradu-

ally broader, 5-7 transverse, club conical; submentum broad, feebly depressed. Prothorax subcylindrical, narrowed in front, without post ocular lobes or fimbriæ. Elytra elliptical, slightly broader at base than base of prothorax, humeri feebly prominent. Front coxæ contiguous, middle slightly separated and hind rather widely separated, mesosternal side-pieces unequal, meta-episternum to a great extent concealed by elytra, second abdominal segment separated from first by a feeble arcuate suture and about as broad as the two following segments united. Legs of moderate length, middle and hind tibiæ mucronate within at apex, corbels of hind tibiæ open, third tarsal segments dilated, lobed and papillose beneath, the claws free.

Genotype: *Lupinocolus blaisdelli*, new species.

Lupinocolus blaisdelli Van Dyke, new species

Rather small, rufopiceous, antennæ, tibiæ and tarsi rufous. Head sparsely punctured and minutely alutaceous, a small scale projecting from each puncture, rostrum coarsely punctured and with erect scale-like setæ above, depressed in front between the alæ, eyes coarsely granular and placed near sides of rostrum and globose head. Prothorax about one-sixth longer than broad, very coarsely, closely and regularly punctured and with elongate, squamose setæ arising from the punctures, much inclined on disk but vertical at sides. Scutellum small but prominent. Elytra over one-third longer than broad, striæ hardly impressed but strial punctures coarse, elongate and regularly arranged, intervals flat, the general surface sparsely clothed with elongate, white and brown scales, more densely assembled in two oblique bands, at middle and at summit of apical declivity, also more numerous on apical declivity itself. Beneath coarsely, rather closely punctured and with coarse, much inclined setæ arising from each puncture. Length 4.5 mm., breadth 1.75 mm.

Holotype (No. 4172, Mus. C.A.S., Ent.) and five paratypes, collected by Dr. F. E. Blaisdell in Hope Valley, El Dorado County, California in July. Three other specimens in Dr. Blaisdell's collection were from Tallac, El Dorado County, California, in July. Other specimens seen are one from Carson City, Nevada, June 26, 1929, collected by E. P. Van Duzee and three collected by E. C. Zimmerman at Echo Lake near Lake Tahoe, California, July 16, 1933, on wild onion plants. The Blaisdell specimens were all taken on a species of lupine.

This insect is somewhat suggestive of *Barypithes* but is a bit larger, also has a more elongate and cylindrical prothorax and longer head and of course, different generic characters.

Tribe Sciaphilini

Mitostylus elongatus Van Dyke, new species

Elongate, very narrow, piceous, legs rufopiceous, basal segments of antennæ rufous at base; general surface more or less densely clothed with pearly white scales, readily removed. Head flattened above and with a few, coarse punctures on both front and rostrum, sides parallel, eyes prominent, projecting laterally; rostrum almost as long as head, as wide as interocular area, with median carina and parallel sides; antennæ long and delicate, scape reaching front margin of prothorax, club elongate fusiform. Prothorax cylindrical, as long as broad and as long as head, base truncate, apex feebly lobed, sides somewhat arcuate, narrowed in front and constricted near base, hind angles rectangular, disk coarsely, rather closely and irregularly punctured. Elytra elongate elliptical, almost twice as long as broad, humeri absent, sides rather feebly arcuate; disk finely striato-punctate, intervals flat. Beneath with sculpturing concealed by scales. Length 4.5 mm., breadth 1.5 mm.

Holotype (No. 4173, Mus. C.A.S., Ent.), a unique collected by J. O. Martin at Encino, Texas, May 28, 1932.

This species is distinguished by being of about the same size as *tenuis* Horn but proportionately narrower, with scales of a uniform pearly white, without setæ, the head not cuneate as in *tenuis* or *setosus* but both head proper and rostrum with straight, parallel sides, the eyes even more prominent than in *setosus*, and the head and pronotum coarsely and irregularly punctured.

Tribe Trigonoscutini

Trigonoscuta imbricata Van Dyke, new species

Similar to *pilosa* in size and general appearance but differing by having the scales more or less overlapping or imbricated whereas tessellated in others; by having the elytral striæ evidently impressed and with distinct though shallow strial punctures, especially on disk, both somewhat obsolete in other; the prothorax generally widest in front of middle, at middle or behind in *pilosa*; and the rostrum feebly more convex, the funicle generally more robust, the apices of tibiæ less expanded and the pile slightly longer. Length 7 mm., breadth 3.5 m.

Holotype (No. 4174, Mus, C.A.S., Ent.) and three paratypes collected at Whitewater, Riverside County, California, April 1, 1927, by Thomas Craig and by him presented to the California

Academy of Sciences. A considerably larger specimen, probably a female, collected at Yuma, Arizona, March 18, 1912, by J. R. Slevin, is of the same species. I have seen numerous other specimens from the same general territory.

This species has been known for some time but thought to be but an inland race of the well known seacoast *pilosa*. It is, however, readily separated from that by the imbricated or "chaffy" type of scales and by the more or less well defined elytral striæ.

Tribe Calyptillini

Genus **Stereogaster** Van Dyke, new genus

Small, globose, partially clothed with small, closely appressed and well separated circular scales above and sparsely pilose. Rostrum robust, about a third longer than head, as wide at base as interocular area and with parallel sides, feebly expanded in front, apex truncate, and with well defined transverse impression at base; scrobes deep, arcuate, passing rapidly beneath and ending near lower margin of eyes, antennæ rather short, scape suddenly clavate, about reaching eyes, funicle 7-segmented, first two segments elongate, 3-7 moniliform, gradually broader, club fusiform; eyes prominent, coarsely faceted; submentum narrowed and elongate and sides of maxillæ quite visible. Prothorax transverse, globose, base and apex feebly arcuate, apex narrower, sides well rounded, without post ocular lobes and fimbriæ. Elytra globose, broadly rounded in humeral area, without striæ or strial punctures. Underside moderately clothed with stellate scales and sparse fine pile; metasternum short, metaëpisternum long and narrow, intercoxal process broad, lobed, first and second abdominal segments connate with suture obliterated at middle, third and fourth narrow and of equal width, the fifth three times as long as either third or fourth. Legs short, femora robust, tibiæ rather strongly dilated apically, front and middle mucronate at tip, the femora not dentate within, hind tibiæ with corbels open and broadly truncate on outer side at apex; tarsi short, first segment suddenly enlarged apically, second equal to apical enlargement of first, third broader and bilobed and fourth elongate and with divergent claws, all setose beneath.

Genotype: *Stereogaster globosa*, new species.

This genus agrees with *Calyptillus* as represented by *Calyptillus cryptops* Horn, the genotype and only species so far listed in the tribe, by having the maxillæ visible at the sides of the submentum, the legs fossorial with the tibiæ rather strongly

dilated apically, the tarsi setose beneath and the claws divergent. From this tribe as defined by Pierce (1913), it diverges by having the third tarsal segment slightly broader than the preceding, a character which would throw it into the Trigonoscutini from which it differs greatly in mouth characters. To me the width of the third tarsal segment does not seem in itself of sufficient importance to be considered a dominant tribal character. I would, therefore, enlarge the confines of the Calyptillini so as to include *Stereogaster*. The most outstanding peculiarity of the genus is the complete anchylosis of the first and second abdominal segments, as complete as in most Buprestidæ. Other important characters are the type of vestiture and the absence of striæ and strial punctures.

Stereogaster globosa Van Dyke, new species

Piceous, legs and antennæ rufous (perhaps due to recent emergence). Head coarsely, closely punctured above, with a circular scale in each puncture, sparsely pilose, especially near eyes, and with fine linear groove at middle of front. Prothorax less than a third wider than long, constricted in front and with a complete transverse impression at constriction, disk coarsely, cribrately yet shallowly punctured and with a circular scale in each puncture as on head, and sparsely pilose. Elytra one-third longer than broad, over one-fourth broader than prothorax, broadly rounded at shoulders, feebly arcuate at sides and well rounded to apex; disk evenly convex, without striæ, vaguely punctured, and with the closely appressed, circular scales scattered over the surface almost as regularly as they are on the head and pronotum, and with a few scattered hairs. Beneath shallowly though more or less evidently punctured. Length 4.25 mm., breadth 2 mm.

Holotype (No. 4175, Mus. C.A.S., Ent.), a unique collected by me from beneath a stone on the hills southwest of Los Banos, Merced County, California, February 24, 1935. The specimen had no doubt but recently emerged, for the deciduous cusps to the mandibles were still adherent at the time of capture.

NEW STRATIOMYIDÆ IN THE COLLECTION OF THE CALIFORNIA ACADEMY OF SCIENCES

BY MAURICE T. JAMES

Colorado State College

Unless otherwise indicated, the types of the species described in this paper are in the collection of the California Academy of Sciences.

Anoamyia javana James, n. sp.

Two female specimens from Java are apparently congeneric with *Anoamyia heinrichiana* Lindner, the only described species in this genus; but they can readily be separated from *heinrichiana* by the much shorter face and the smaller amount of pubescence on the arista. In *heinrichiana*, the distance from the base of the antennæ to the apex of the facial prominence (according to Lindner's figure) is greater than the combined lengths of the first and second antennal segments; in *javana* the reverse is true. In *heinrichiana* the arista is plumose to the tip; in *javana* the plumosity is confined to the basal third, with a few scattering hairs extending to its middle, and with a single terminal hair. Otherwise, the antennal structure and facial profile are in full agreement with Lindner's figure.

Female. Wholly black; the thorax, abdomen, and femora with purplish reflections. Front and vertex shining; a prominent tuft of silvery pile on the upper third of the front some distance below the ocelli; two similar tufts, closely approximate, placed in a horizontal row above the antennæ; the face, cheeks, proboscis and occipital orbits with considerable silvery erect pile, the latter, especially above, densely clothed in addition, with concolorous appressed pile. Proboscis somewhat brownish, rather than black. Eyes densely black-pilose in front, silvery-pilose along the sides and behind. Pile of first and second antennal segments and of arista black; the first segment twice as long as the second; the following three segments fused into an oval-shaped flagellum, which is longer than the first and second segments combined and considerably thicker, devoid of pile but golden-brown pollinose in certain lights; arista apical, three-segmented, the basal two segments very short, the whole approximately the length of the flagellum. Thorax with long but rather sparse black pile dorsally; under this pile, two rows of dense silvery pile extend from the anterior margin of the thorax to the base of the scutellar spines;

some similar pile around the wing bases and lateral spines. Pleura wholly silvery-haired. Spines of scutellum 1.5 times as long as the scutellum; the lateral spines somewhat shorter than the scutellum. Scutellar spines sparsely black-haired; a tuft of long silvery hair between them. Abdomen with paired spots of silvery hair on the second segment, a trace at the apex of the third, a larger spot at the apex of the fourth, and a prominent oval patch on the median third of the fifth; the lateral margins and venter also with silvery hair; otherwise black-pilose. Legs with silvery pile which becomes golden on the tarsi. Pulvilli and halteres yellow. Wings strongly infumated, almost black, except the costal and axillary cells, which are subhyaline. Length, 13 mm.; to tip of wings, 16 mm.; greatest width (on abdomen), 4 mm.

Holotype, female, No. 4119 Calif. Acad. Sci., Ent.; Soekaboemi, Java, May, 1925 (C. F. Patterson).

Paratype; female, same place, date and collector.

Euparyphus pardalinus James, n. sp.

Female. Front and vertex black; a yellow spot on each side of the front, almost but not quite touching the eyes; face black in the middle but with broad yellow occular orbits; an extensive yellow transverse area at the base of the antennæ, extending from eye to eye, broadly connected with the facial orbits and sometimes narrowly so with the frontal spots, but divided medially by a narrow black streak which runs between the antennæ, and connects the frontal and facial spots. Occipital orbits yellow, narrowly separated from the inner facial orbits by a black spot on the cheeks, and narrowly broken by a black band above, so that there appears to be an isolated yellow spot on each side of the ocellar triangle. Eyes bare. Pile of head sparse, yellow to white, with an area of silvery appressed pile on the lower facial orbits. Antennal segments distinct; ratio approximately 5:4:2:2:2:3:2:4; first and second yellow, the remainder black. Thorax black, with considerable white appressed and semi-appressed pile; dorsum with paired narrow median stripes which expand knob-like to twice their width anteriorly, are briefly interrupted at the suture, and extend from one-half to two-fifths the distance from the suture to the scutellum. A small spot on each postalar callus and the entire scutellum yellow; spines yellow, tipped with black; the spines bow outward and are separated at their base by somewhat less than their length. Pleuræ each with a stripe extending from the humerus to, and expanding at, the wing base; sternopleura with yellow margin above. Abdomen with moderately broad yellow margins which run in at the apices of segment four and sometimes of three, in the form of lateral spots; segment five yellow on its apical half. Venter black. Legs, except coxæ, yellow, the

apical tarsomeres somewhat darkened. Wings hyaline, veins yellow; the branches of the media weak and evanescent far before the posterior margin; vein R4 wanting; cell R3 no longer than the stigma, which is well-developed. Length, 4 mm.

Male. Similar to the female; the head is wholly black, the dorsal vittæ of the thorax are lacking, there are no yellow margins on abdominal segments one and two, the scutellum is narrowly black basally, and the pile of the entire body is longer. The eyes are very narrowly separated. Differs otherwise only sexually.

Holotype, female, No. 4120, Calif. Acad. Sci., Ent.; Olancha, Inyo Co., Calif., June 8, 1929 (E. P. Van Duzee). Allotype, male, No. 4121, same data. Paratypes: two males, Lone Pine, Inyo Co., Calif., June 8, 1929 (R. L. Usinger); female, St. George, Utah, May 27, 1919.

The Utah paratype has almost ivory-white markings on the head, thorax, and abdomen, and the pattern of black on the head is somewhat different, though of the same general type, as the holotype.

Euparyphus sabroskyi James, n. sp.

Male. Close to the preceding species; the antennæ shorter, being approximately the length of the head, whereas in *pardalinus* they are a third again as long as the head; there is a white subtrapezoidal marking just under the antennæ; the markings of the thorax and abdomen are white (possibly variable); the venter is marked with white as follows: the extreme apex of segment one, medially; a trapezoidal marking occupying the median half of segment two, from base to apex; the apical margin of segments three and four; almost all of segment five; and the lateral margins of segments two-five inclusive. Otherwise as in *pardalinus*. Length, 4.5 mm.

Holotype, male, Saline Co., Kansas, June 7, 1933 (C. W. Sabrosky). Temporarily in the author's collection.

The two species above described, together with *E. quadrimaculatus* Cresson, form a natural group of species which shows affinities with *Aochletus*. The venation, with the weak posterior veins and the broad, short cell R3, is quite of the *Aochletus* type. The antennæ are of the *Euparyphus* type, though those of *E. sabroskyi* suggest *Aochletus*. *Euparyphus brevicornis* Loew is a typical *Aochletus*, being closely related to the genotype, *A. cinctus* O. S.

Euparyphus vanduzeei James, n. sp.

A handsome little species; the great amount of yellow on the abdomen makes it easy to recognize. Its affinities seem to be with *stigmaticalis* Lw., *limbrocutris* Adams, etc.

Female. Head yellow; a pair of pale orange-brown spots on the front above the antennæ, and sometimes a tinge of orange on the vertex; occiput in center black, the broad orbits wholly yellow. Facial orbits, cheeks, and lower occipital orbits with dense appressed silvery pile. Antennal segments quite distinct; first and second yellow, black above, the remaining segments black (partly yellow in the paratype); ratio approximately 4:4:3:2:2:4:4:6. Thorax yellow; a broad black median band extending the entire length; this becomes constricted behind the suture, but broadens out to run along almost the entire base of the scutellum; a narrow black band, completely surrounded by yellow, on each side of this, and vestiges of an oval black spot above each wing base. Mesopleura, metapleura, and pteropleura yellow; a prominent whitish (in contrast to the yellow) spot on each sternopleuron; sternites black, varied with yellow; metascutellum and metanotum black. Scutellum yellow; the spines black-tipped, separated at their base by somewhat less than their length. Abdomen yellow; a black triangular basal spot on each of segments two, three, four, and five; that on segment two about as large as the dorsal area of the scutellum; those on three and four much smaller; that on five a mere speck. Venter wholly yellow. Pile of thorax and abdomen yellow. Legs yellow; anterior tarsi black; the apical two or three of the middle and hind tarsomeres blackish. Wings hyaline, veins pale yellow. Length, 4 mm.

Holotype, female, No. 4122 Calif. Acad. Sci., Ent.; Sparks, Nevada, June 28, 1927 (E. P. Van Duzee). Paratype, female, same data. Named in honor of the collector.

Euparyphus flaviventris James, n. sp.

Related to *major* Hine and *pretiosus* Banks; it may readily be distinguished from the former species by the coloration of the venter, from the latter by the coloration of the face and the femora.

Female. Head yellow; the vertex black, black-pilose; a black stripe extending from the vertex to the oral margin, where it broadens out and extends onto the cheeks; usually a yellow rounded spot on each cheek, wholly enclosed by the black; the median black band of the front broadens out just above the base of the antennæ and is narrowly interrupted below. Antennæ black. Eyes

with short black pile. Occipital orbits yellow, silvery pollinose below. Markings of thorax and abdominal tergites as in *major*: the mid-dorsal vittæ extend some distance beyond the suture, and the arcuate markings of the third and fourth abdominal segments almost meet their fellows; the venter, however, is wholly yellow, sometimes discolored, at most very narrowly black basally. Wings hyaline, veins yellow; membrane yellowish near the strong veins. Femora black, broadly yellow apically and basally; sometimes mostly yellow; legs otherwise yellow. Length, 10 mm.

Holotpye, female, No. 4123 Calif. Acad. Sci., Ent.; Lake City, Modoc Co., Calif., July 30, 1922 (C. L. Fox).

Paratypes: female, Buck Creek, Modoc Co., Calif., July 21, 1922 (C. L. Fox); female, Davis Creek, Modoc Co., Calif., July 16, 1922 (C. L. Fox); female, Grass Lake, Tahoe, Calif., June 24, 1915 (E. P. Van Duzee).

Additions to the List of California Thysanoptera

Since the list of the California Thysanoptera was prepared (Pan-Pac. Ent. II, No. 4, 1935), several new species have been described by Mr. Moulton. They are as follows: *Frankliniella insignis, citri, yuccæ, obscura, venusta, conspicua,* and *Chirothrips secalis* (see pages 170-174, l.c.). We are now able to record *Limothrips cerealium* (Haliday) from southern California and also two new genera, *Leucothrips* and *Bregmatothrips*, from this state; *Leucothrips piercei* (Morgan) from Shafter and a new, undescribed *Bregmatothrips* from Buck's Lake (Plumas County). *Oligothrips oreios* Moulton was unintentionally omitted.—Stanley F. Bailey, University of California.

A Correction

Galley proofs of two papers and all page proofs, of Vol. XII, No. 1, of this journal and three of the notes were very kindly attended to by the Publication Committee during my illness. Unfortunately two errors crept into the note at the bottom of page 32: Professor Osborn's birthday was March 19th, not the 17th, and his permanent address is still Ohio State University. He spends a portion only of his winters in Florida.—E. P. Van Duzee.

DESCRIPTIONS AND RECORDS OF CALIFORNIAN MUTILLIDÆ*

BY CLARENCE E. MICKEL

(*University of Minnesota*)

Commander C. H. Dammers has sent me a series of Mutillidæ most of which were collected by himself in Riverside county, California. Three new species and one species known heretofore only from the holotype were represented in the material. The descriptions of the new species and the most important of the records follow:

Genus DASYMUTILLA Ashmead.

Group FULVOHIRTA Mickel.

Dasymutilla albiceris Mickel, n. sp.

Female. Black, except the front, vertex, dorsum of thorax, second tergite exclusive of antero-lateral areas and narrow anterior margin, tergites three to five, anterior margin of pygidial tergite, and lateral portions of distal fringes of sternites two to four, all with long, erect and appressed, white pubescence slightly tinged with yellow; head narrower than the thorax; antennal scrobes carinate above; thorax as broad as long; scutellar scale absent; first abdominal segment short, subsessile; pygidial area very large, strongly convex, granulate. Length, 14 mm.

Head black, clothed with sparse, long, black pubescence, except the front and vertex with long, erect and appressed, white pubescence slightly tinged with yellow; mandibles slender, edentate at the tip and with an indistinct tooth within, remote from the tip; clypeus with long, erect, dense black hairs borne on the sinuate clypeal ridge; antennal tubercles contiguous; scape obscurely punctured and black-pubescent; first segment of flagellum a little less than twice as long as the second; antennal scrobes carinate above, the carina extending two-thirds of the distance from the antennal tubercles to the inner eye margins; front and vertex densely, confluently punctate; genæ moderately punctate, not nearly as coarsely punctate as the front and vertex; eyes moderate in size; relative widths of head and thorax, 5.5:7.4.

Thorax black, clothed with long, sparse, black pubescence, except the dorsum of thorax with long, erect and appressed, white pubescence slightly tinged with yellow; thorax as broad as long; humeral angles subangulate, not prominent; scutellar scale entirely

*Paper No. 1400 of the Scientific Journal Series of the Minnesota Agricultural Experiment Station.

absent; propleuræ with large, more or less separated punctures, the anterior margin defined by a carina; mesopleuræ elevated along the dorso-ventral midline, strongly, closely punctured on the elevated area, the punctures separated on the anterior and posterior areas of the mesopleuræ; metapleuræ glabrous, with scattered punctures, the latter larger and closer ventrally; posterior face of propodeum with very large, close punctures, appearing almost reticulate, this sculpturing extending on to sides of propodeum, the anterior area of the latter glabrous and with a few scattered punctures.

Abdomen black, with sparse, long, black pubescence except all the tergites excluding the first, the large antero-lateral areas of the second, narrow anterior margin of the second, and the lateral thirds of the distal fringes of sternites two to four, with long, appressed and erect, white pubescence slightly tinged with yellow; first segment short, subsessile, clothed with long, erect, black pubescence; second tergite coarsely, confluently punctate except the large, antero-lateral areas with moderate, mostly separated punctures; felt lines black; sculpturing of tergites three to five obscured by the pubescence; pygidial area very large, strongly convex and finely granulate; first sternite with a median, longitudinal carina on the anterior two-thirds; second sternite with moderately large, more or less confluent punctures; sculpturing of sternites three to five obscured by the pubescence; posterior margin of last sternite broadly and deeply emarginate thus forming a rounded notch in which lies the sting, the lateral angles formed by the emargination very prominent.

Legs entirely black, thickly clothed with very long, erect, black hairs; calcaria black.

Holotype. Female, Valle de la Trinidad, Lower California, July, 1927 (L. M. Huey), in University of Minnesota collection. Paratypes. Two females, same data.

Related to *fulvohirta* Cresson in having the same form of head, thorax, first abdominal segment and last abdominal sternite; differs in its larger size, white pubescence not only above but on the fringes of the sternites laterally and in the sculpture of the pygidium. Superficially it resembles *sackenii* but differs greatly in the form of thorax from that species.

Group sparsa Mickel

Dasymutilla atricauda Mickel, n. sp.

Female. Black, dorsum of thorax, second abdominal tergite except anterior and lateral margins, and third tergite, except lateral margins, clothed with thick, erect and recumbent orange-

yellow pubescence; head approximately the width of the thorax; scutellar scale absent; pygidial area finely, longitudinally rugose. Length, 10 mm.

Head black, clothed with black pubescence, except the vertex with a few scattered, erect, orange-yellow hairs; mandibles slender edentate at the apex and with a small tooth within remote from the apex; antennal tubercles approximate but slightly separated; scape obscurely punctured above and sparsely black pubescent; first segment of flagellum one and one-half times as long as the second; antenal scrobes not carinate above; front and vertex with moderate, shallow, more or less separated punctures; genæ much less coarsely punctured than the front and vertex; eyes moderate in size, the distance between the posterior margin of the eyes and the postero-lateral angles approximately equal to one-half the greatest diameter of the eyes; relative widths of head and thorax, 4.0:4.1.

Thorax black, clothed with black pubescence, except the dorsum with thick, erect and recumbent, orange-yellow pubescence; thorax narrower posteriorly than anteriorly, the relative widths at humeral angles, at widest point, and at posterior margin of dorsum, 3.7:4.1:2.8; pronotal and mesonotal areas densely, confluently punctate, becoming reticulate on the dorsum and posterior face of propodeum; propleura with scattered, weak punctures, the anterior margin defined by a distinct carina; mesopleuræ closely punctate medially along the dorso-ventral line, anteriorly and posteriorly with scattered small punctures; metapleuræ closely punctate ventrally; sides of propodeum obscurely reticulate and with a few scattered punctures anteriorly, the posterior half distinctly reticulate.

Abdomen black, clothed with black pubescence except the dorsum of the second tergite exclusive of the anterior and lateral margins, the third tergite exclusive of the lateral margins, with thick, erect and recumbent, orange-yellow pubescence; fourth tergite also with a few, erect, orange-yellow hairs medially; first segment short, nodose, densely, deeply punctate; second tergite with dense, confluent punctures, the lateral and anterior margins less coarsely punctate; tergites three to five with small, distinct punctures; pygidium finely, longitudinally rugose on a granulate ground; first sternite with a median, longitudinal carina, the latter in profile emarginate medially; second sternite with moderate punctures more or less separated.

Legs black, clothed with black pubescence; calcaria black.

Holotype. Female, Blythe, California, October 16, 1934 (C. Dammers), in University of Minnesota collection. Paratypes. Three females, Blythe, California, October 16, 1934 (C. Dammers).

Related to *stevensi* Mickel but differs from that species in

having the antennal scrobes not carinate above, much less orange-yellow pubescence on the head, the orange-yellow pubescence on the thorax and abdomen thicker and more erect, the black pubescence of the terminal abdominal tergites, and the less coarse sculpture of the pygidium. Superficially it resembles *arenivaga* but differs distinctly from that species and its relatives by the smaller eyes, the antennal scrobes not carinate, the absence of the scutellar scale and other characters.

Group occidentalis Mickel

Dasymutilla mimula Mickel

1928. *Dasymutilla mimula* Mickel, Bull. 143, U. S. National Museum, p. 255, pl. 4, fig. 26, male.

Ten males of this species were collected at Blythe, California, July 30, 1935 by Mr. C. M. Dammers. Heretofore the species has been known only from the holotype which bears a locality label "California."

Group obscura Mickel

Dasymutilla heliophila (Cockerell)

1900. *Sphærophthalma heliophila* Cockerell, Entomologist, vol. 33, p. 65, female.

Three females of this attractive species were taken by Mr. Dammers at Blythe, California, October 16, 1934.

Dasymutilla dammersi Mickel, n. sp.

Female. Ferruginous; head clothed with long, appressed, pale glittering pubescence, dense on the front, vertex and behind the eyes, the posterior half of the vertex with long, erect, thick, pale glittering hairs, the latter forming a transverse, conspicuous tuft; dorsum of thorax clothed with thick, appressed, pale glittering pubescence; second tergite with a pair of yellow, parenthesis-shaped marks surrounding an anterior black pubescent spot, the marks twice as broad posteriorly as anteriorly and approaching one another posteriorly on the midline; antennal scrobes with a moderate carina above; postero-lateral angles of head rounded, not at all carinate; pygidium granular. Length, 8 mm.

Head ferruginous, clothed with pubescence as described above; mandibles long, slender, edentate, and with a small tooth within, remote from the apex; clypeus divided by a transverse, sinuate

carina; antennal tubercles approximate; scape obscurely punctate, clothed with sparse, pale glittering hairs; first segment of flagellum one and one-half times as long as the second; antennal scrobes with a moderate, distinct carina above; puncturation concealed by the pubescence; head slightly broader than the thorax, relative widths, 3.6:3.2.

Thorax ferruginous, pyriform, clothed with pale, glittering pubescence, sparse on the pleural areas, thick and appressed on the dorsum, and dorsal and posterior faces of propodeum; humeral angles subangulate, not prominent; thorax much narrower posteriorly than anteriorly; scutellar scale absent; dorsum with dense, shallow, confluent punctures; dorsal and posterior faces of propodeum shallowly reticulate; propleuræ defined anteriorly by a carina, shagreened, without distinct punctures; mesopleuræ anteriorly, finely punctate, posteriorly coarsely, shallowly punctate; metapleuræ and sides of propodeum shagreened.

Abdomen ferruginous, the second tergite with yellow integumental markings as described above; first segment strongly nodose; first tergite with a median, elongate spot of dense, appressed, pale glittering pubescence extending to the posterior margin; second tergite with large, separated punctures, sparse anteriorly, close posteriorly, except those beneath the anterior black-pubescent spot, contiguous; posterior half of lateral margins and lateral sixths of posterior margin of second tergite with dense, appressed, pale glittering pubescence, the remainder of the posterior margin with a band of black pubescence, slightly broader medially than laterally; third tergite with a median and lateral spots of pale glittering pubescence separated by spots of fuscous pubescence, the latter spots not conspicuous; fourth tergite clothed with pale glittering pubescence, thickest medially; fifth tergite with small, lateral spots of blackish pubescence, the remainder with pale glittering pubescence, thickest medially; pygidial tergite laterally with blackish pubescence; pygidium granulate; first sternite with a low, blunt, longitudinal carina; second sternite with large, sparse punctures; tergites two to four, each with a thin, distal fringe of pale glittering pubescence; remaining sternites with thin blackish pubescence.

Legs ferruginous; apices of middle and hind femora squarely truncate, the apices expanded each side, the expanded, truncated areas sulcate; calcaria pale.

Holotype. Female, Palm Springs, California, August 9, 1934 (C. M. Dammers), in University of Minnesota collection. Paratypes. Female, Palm Springs, California, July 20, 1934 (C. M. Dammers); female, Palm Springs, California, August 28, 1934 (C. M. Dammers).

This beautiful and striking species is readily recognized by

the dense, erect, pale pubescence on the posterior part of the head forming a conspicuous tuft. It is apparently most closely related to *heliophila* (Cockerell) since the antennal scrobes are carinate and the postero-lateral angles of the head are not carinate. The thick pale pubescence on the dorsum of the thorax and the yellow, integumental markings of the second tergite are also characteristic. One paratype measures 9 mm. in length, the other 11 mm.

I take pleasure in dedicating this striking species to Mr. C. M. Dammers who has collected some very interesting Mutillid material in Southern California.

A Bermuda Grass Diaspine Scale New to California

Specimens of the Bermuda grass Odonaspis, *Odonaspis ruthæ* Kot., collected at Riverside, California, have been in the University of California Citrus Experiment Station collection since 1924. The specimens were collected by Mr. J. C. Chamberlin on August 10, 1924, underground on the stems of Bermuda grass, *Cynodon dactylon*. Apparently the scale does not attack the roots of this grass but confines its feeding to the stem only. Since 1924 specimens of this species of scale have been sent to the Experiment Station for identification, thus it is apparently quite generally spread throughout southern California.

This scale insect was first described by Kotinsky in 1915 from specimens taken on Bermuda grass in Hawaii. It appears that Bermuda grass is the only grass in Hawaii that is suitable for the lawn, and is the only grass used for that purpose. It is also well adapted for grazing purposes, especially on the low lands, hence the insect's destructive operation is of some economic importance.

This scale is similar to *Odonaspis graminis* Bremner (the root scale of California), but may be distinguished from it by the presence of circumgenital gland openings which are absent in the latter species. It most closely resembles a species described from lower California; namely, *Odonaspis litorosa* Ferris, from which it differs chiefly by the presence of only a single pair of paraphyses, whereas *O. litorosa* possesses a second pair.

Odonaspis ruthæ Kot. is known to occur in California, Louisiana, Ceylon, Florida, and Hawaii.—Howard L. McKenzie.

Vol. XII July, 1936 No. 3

THE PAN-PACIFIC ENTOMOLOGIST

Published by the
Pacific Coast Entomological Society
in co-operation with
The California Academy of Sciences

CONTENTS

San Francisco, California
1936

THE PAN-PACIFIC ENTOMOLOGIST

Published quarterly in January, April, July and October by the Pacific Coast Entomological Society in co-operation with the California Academy of Sciences.

Domestic and foreign subscriptions $2.00 in advance. Subscriptions should be sent to the treasurer, E. R. Leach, Department of Entomology, California Academy of Sciences, Golden Gate Park, San Francisco, California. Make checks payable to the "Pan-Pacific Entomologist."

Manuscripts for publication and communications regarding non-receipt of numbers, change of address, requests for sample copies, etc., should be addressed to the editor, Mr. E. P. Van Duzee, California Academy of Sciences, Golden Gate Park, San Francisco, California. Advertisements will be accepted for the back cover pages. For rates address the editor or treasurer.

Twenty-five copies or more of author's extras will be furnished free on request. Additional copies will be supplied at cost of publication if a request is received with the manuscript.

Subscribers failing to receive their numbers will please notify the editor at as early a date as possible.

★ ★

★ ★

Published at the California Academy of Sciences, Golden Gate Park, San Francisco, California.

Entered as second-class matter, February 10, 1925, at the postoffice at San Francisco, California, under Act of August 24, 1912.

The Pan-Pacific Entomologist

Vol. XII, No. 3 July, 1936

OUR KNOWLEDGE OF CALIFORNIA THYSANOPTERA PREVIOUS TO 1900

BY STANLEY F. BAILEY
University of California, Davis, California

Previous to the beginning of the twentieth century very little was known of this order of insects. Not only was this true in California but in North American as a whole. The systematic framework of the order was largely built in Europe by Linné, Haliday, Amyot and Serville, etc. Our early knowledge of the biology and anatomy was obtained by Buffa, Bohls, Jordan, and Garman. The monograph of Uzel[1] in 1895 brought together practically all the known facts of the order up to that time. In North America, Pergande, Fitch, Osborn, Beach, and Quaintance were some of the first to study thrips. Following the appearance of Hinds' monograph in 1902[2] and the forcibly generated interest in thrips as agricultural pests, many workers turned their attention to the Thysanoptera. Chief among these have been Hood, Moulton, and Watson.

We owe to the pear thrips, and its sudden appearance as an economic pest about 1902, the initial stimulus to the study of this group of insects in California. Miss S. M. Daniel, Dudley Moulton, D. L. Crawford, P. R. Jones, S. W. Foster, J. R. Horton, and H. M. Russell have been the chief contributors to our knowledge of the thrips of this state. Before the publication of Daniel (1904)[3], only four species were known from California: namely, *Thrips tabaci* Lind., *Heliothrips hæmorrhoidalis* (Bouché), and the two species described by Pergande (1895), *Frankliniella occidentalis* (Perg.) and *Hercothrips fasciatus* (Perg.)

The earliest published reference known to the writer indicating the presence of thrips in California is in 1882. This reference is found in the Pacific Rural Press, Vol. 24, page 156, in an article entitled "New Leaf Insects," which is here quoted in part:

[1] Uzel, H., Königgratz, (Published privately), 1895.
[2] Hinds, W. E., Proc. U. S. Nat. Mus. 26:79-242, 1902.
[3] Daniel, S. M., Ent. News, 15:293-297, 1904.

"The leaves received from Vacaville were infested with a species of thrip. Mr. Cook visited the section week before last and procured specimens of the species in all stages of its existance, larva, pupa, and perfect insect, which are mounted for microscopic use. The larva has the appearance of a small louse, with elongated abdomen, color primrose yellow, with a transverse orange color bar at base and a similar bar at tip of abdomen; the antennæ are five jointed, and the length of larva one-thirtieth of an inch. This insect is active in the pupa state, therefore the transformation is incomplete. The adult, or perfect insect, color brownish-black, with a brown transverse bar on prothorax, and two yellowish bands across the wings, antennæ eight or nine jointed, length of insect one-twenty-eighth of an inch." This thrips was collected by Matthew Cooke from Vaca and Pleasant valleys (Solano County) on pear, peach, plum, almond, beans, and sunflowers. The above-mentioned article also stated that "This species, in all probability, belongs to the genus *Melanthrips,* which means black thrips. Leaves received from Mr. Grooves, of Chico, were infested—also with thrips."

The following year (1883) Matthew Cooke's "Injurious Insects" was published and on pages 122-123 the same infestation was again discussed as follows:

"Last year, 1882, the owners of a great number of orchards complained that the leaves of the pear, peach, and plum trees were attacked by some insect or disease which caused them to wither and fall off. On examination they were found to be infested by a species of *Thrips* not heretofore noticed on fruit trees in this state.

"The leaves infested by these insects appeared marked all over their surface with minute black dots, either caused by the bite of these minute insects or were their excrements. Many of the branches, especially on the lower part of the tree, were denuded of their foliage."

The larva was described as one twenty-sixth of an inch in length and of a primrose-yellow color, with narrow, transverse orange markings. The adult was described as being one twenty-second of an inch in length, with a black body and black wings which have a silvery fringe and a transverse yellowish bar across the base.

The Second Biennial Report of the State Board of Horticulture of California, for 1885-86, contains three references to thrips. The first (page 354) by Klee is given in full below:

"Pleasant Valley (Solano County). The red mite, or spider, is abundant, and associated with it is often found a thrip, and without the statement of Mr. Thurber, an experienced horticulturist, to the contrary, I should certainly consider this latter very objectionable. According to this gentleman, this thrips has been known in this country for many years, without visibly affecting the fruits." And on page 399 (anonymous) is found the second reference:

"In several localities where hot, dry weather prevails, this insignificant looking little insect affects the foliage quite seriously, although in Pleasant and Vaca valleys, where it is mostly found, its presence is not greatly noticed. The remedies against this insect are sulphur washes, similar to those used against the red spider. The insect is generally spread with hothouse plants, and people receiving these should scrutinize them closely before setting them out in the garden. The general effect of the thrips is to wither the leaves, those affected showing its presence by their pale, blotched appearance."

From personal observations of the thrips' problem for a number of years in the districts referred to above, there can be no doubt that the species of thrips that Cooke observed was the bean thrips, *Hercothrips fasciatus* (Pergande), not described until 1895. In this non-irrigated locality, damage to pears (and other crops) from the bean thrips usually appears in mid-summer at the time red spider injury becomes evident. Another reason for this belief is that its general appearance is similar to that of the greenhouse infesting species which was becoming known to most entomologists and horticulturists at that time. However, the larva of *Heliothrips hæmorrhoidalis* (Bouché) are without colored markings and as far as is known, the greenhouse thrips has never been taken in this locality. The other species that often prove injurious in this section of Solano County, *Tæniothrips inconsequens* (Uzel), *Frankliniella occidentalis* (Perg.), and *F. moultoni* Hood, appear in the early spring, affect the buds and flowers, rarely blotch the leaves, and would not be associated with red spiders.

The third reference is that of Pohndorff: who wrote(page 533) in a memoir on olive growing that "*Thrips physaphus* (Linné), an insect of dirty white wings, is a pest probably analogous to the thrip that troubles our grapevine." As far as is known to the writer, *Thrips physaphus* has never been recorded from California and because of many early ambiguous references to "thrip" when meaning leaf-hoppers, it is impossible to know to what insect Pohndorff referred.

Riley and Howard (1891) published in Insect Life, vol. 4, nos. 1 and 2, page 79, in Extracts from Correspondence, a letter of June 8, 1891, from D. W. Coquillet of Los Angeles. The letter, with the reply is quoted below:

"I mail you today specimens of a thrips that is very injurious to the leaves of potato plants in various portions of Los Angeles County. I find them only on the underside of the leaves, and when numerous they cause the part of the leaf which they attack to wither and finally die. I saw one field of about 100 acres of potatoes of which a large percentage of the plants had been seriously injured by these pests; I also found them in large numbers on onions, and this species may prove to be the same as the one I sent you specimens of from onions last year. Besides potatoes and onions I also found them in large numbers on a plant commonly known as "Tumble-weed"; on this they were even more numerous than on the potatoes. I would be glad to receive the name of this thrips and to learn whether or not it is an introduced species. I am now carrying on a series of experiments against it with paris green and whale-oil soap and will report results.

"Reply—This is the same species which you sent last year upon onion, and is a new species of the true genus Thrips. (June 17, 1891.)"

Four years later Theodor Pergande described this species as *Euthrips occidentalis*,* in Insect Life, vol. 7, page 392, and Hinds (1902) redescribed it in full.

An undescribed species of thrips found on orange trees in Los Angeles was reported by C. V. Riley in 1892, Insect Life, vol. 5, No. 1, page 18. Unless specimens from this collection are still deposited in the National Museum or elsewhere, and

* Type now in National Museum, Washington, D. C.

can be examined, there is no way of knowing what species was concerned in this case.

Many early references in economic entomology record *Frankliniella tritici* (Fitch) from the Pacific Coast but present authorities are inclined to refer all such reports to *F. occidentalis* (Perg.) While the paper of Daniel first records H. *hæmorrhoidalis* from California in 1904, the writer believes that this species had been in the state for about ten years previous. About fifty years ago, the greenhouse thrips, one of the first species recognized as of economic importance in North America, was referred to as the "black fly" or "black thrip." Among its many greenhouse, ornamental, and exotic host plants is listed laurustine, an imported shrub (*Virburnum tinus*). The writer has observed this thrips injuring various plants outdoors in California from San Diego to Napa counties. With the above facts in mind, the citing of a portion of a report on Entomology and Quarantine by Alexander Craw in 1894 entitled "Black Thrip" leaves but little doubt that the species referred to was *Heliothrips hæmorrhoidalis.* The quotation from the Fourth Biennial Report of the State Board of Horticulture of California for 1893-94, page 87, is given below:

"A minute, narrow, black, six-legged insect, with four narrow, transparent wings bordered with light silvery hairs.

"This is an old and well-known pest of hot house plants. Occasionally it is found on laurestines, fuchsias, and other outdoor ornamental trees or shrubs in this state, but I can find no record of it as a pest on citrus trees. The past winter, however, I received specimens of oranges and orange leaves from San Diego County that were completely covered with light-colored young and fully developed black insects, together with the small, dark blotches that indicate the presence of this pest. The fruit had changed to a dull gray color that would ruin its commercial value. The leaves were also affected in a similar manner. This discoloration was caused by the bite of the thrips, for although they are classed with the order Hemiptera, they are provided with bristle-like mandibles, with which they tear the epidermis of the leaf or fruit. A careful examination of orange blossoms and other sweet-smelling flowers will reveal the presence of delicate but very active, yellowish insects. These are *Thrips tritici,* and will

give an idea of the appearance of the other, except in color. But the black thrips are slightly larger and more sluggish in their movements."

Thrips and leafhoppers, years ago, were referred to indescriminately as "thrip" and much confusion often resulted in attempting to distinguish between these two groups of pests. Professor C. W. Woodworth was one of the first to call attention to this ambiguous terminology at the 16th State Fruit Growers' Convention, San José, Nov. 15-18, 1892. His statement, published in the Fourth Biennial Report of the State Board of Horticulture of California for 1893-94, page 140, is as follows:

"Finally, I wish to speak of a little insect known as the thrip. There are two classes of insects which commonly receive this name. The false thrips of the grape and other plants is a leafhopper of the family *Jassidæ* . . . .The true thrips is a smaller insect and belongs to the *Thripidæ*. I learn that they have long been observed in the State doing a good deal of injury . . . The past season they were very bad on pear, prune, and almond in some parts of the State."

Attention should be called to the fact that in 1892, according to Professor Woodworth's statement, thrips were known to damage pear, prune and almond in *some* sections. It is unfortunate that these localities were not designated. If they had been, we might be able to either refer this report to the bean thrips or more accurately fix the first appearance of the pear thrips in California, which was undoubtedly previous to 1902.

Heretofore, the first published record of the bean thrips was considered to be that in Insect Life, vol. 7, page 391, 1895, when it was reported as collected in Yuba County, in November, 1894, by G. W. Harney. Pergande described it as *Heliothrips fasciata** at that time and it was later (1902) fully redescribed by Hinds.

In the same paper Pergande wrote concerning the onion thrips "The notes of the Department of Agriculture regarding this species (*Thrips tabaci* Lind.) show that it was received during 1889 and 1891 from Mr. Coquillett, from Los Angeles, Cal., where it was very injurious to the onions in that section of the State." This appears to be the first published record of the onion thrips in California but it doubtless was brought in many years

* Type now in National Museum, Washington, D. C.

previous on onion bulbs since this cosmopolitan thrips is commonly found everywhere on onions, both in the field and in storage.

We may then sum up this account of the early history of thrips in California by saying that their potential importance as crop pests was first observed in 1882 and that previous to 1900 only four species were recorded from this greatly diversified agricultural area. Of these four species, two (*T. tabaci* and *H. hæmorrhoidalis*) were doubtless introduced, and two (*F. occidentalis* and *H. fasciatus*) were native.

Early References to California Thrips

1882. Pacific Rural Press, 24:156, Sept. 2.
1883. Cooke, Matthew. Injurious Insects, H. S. Crocker and Co., Sacramento, pp. 122-123.
1887. Klee, W. G. Second Bien. Rpt. State Bd. Hort., State of Calif., for 1885-86, p. 354.
——. Anonymous. Ibid., p. 399.
——. Pohndorff, F. Ibid., p. 533.
1891. Riley, C. V., and Howard, L. O. Insect Life, 4:79.
1892. Riley, C. V. Insect Life, 5:18.
1894. Craw, Alexander. Fourth Bien. Rpt. State Bd. Hort., State of Calif., for 1893-94, pp. 87-88.
——. Woodworth, C. W. Trans. 16th State Fruit Growers' Conven., San Jose, Nov. 15-18, 1892. Pub. in Fourth Bien. Rpt. State Bd. Hort., State of Calif., for 1893-94, p. 140.
1895. Pergande, T. Insect Life, 7:391-392, 394.

A Cactus Destroyer

A small moth identified as *Dyotopasta yumælla* Kearf., (*Tineidæ*), by H. H. Keifer, was found to be killing many clumps of a small more or less spineless species of cactus, probably *Opuntia basilaris* Engelm., in the Walker Pass Region of Kern County, California. During the early part of April, 1936, I found the main trunks of many plants thoroughly honeycombed by the larvæ which were numerous and which had reduced the tissues to a liquid and putrid condition, with the result that the plants were rapidly wilting.—Edwin C. Van Dyke.

Weevil Larvæ Annoying to Householders

A. E. Michelbacher reports that during the early part of April, 1936, numerous larvæ and recently developed adults of a poplar weevil, tentatively identified as *Dorytomus nubiculinus*

Casey, were dropping from a large poplar tree on to a house in Sacramento and worming their way into the rooms through the cracks surrounding the screens, much to the annoyance of the owners. This weevil is rather uncommon in this state, having been found previously only at Sacramento and in the mountains of northern Trinity County.—Edwin C. Van Dyke.

NEW THYSANOPTERA BELONGING TO THE GENUS *THRIPS* Linn.

BY DUDLEY MOULTON

This paper includes the description of nine new species and one new variety of the genus *Thrips* Linn., from various places in North America.

The genus may be defined by the following characters: Antenna with seven segments, forked sense cones on segments three and four. Maxilliary palpus with three segments. Interocellar spines usually present although sometimes very small; a series of small spines behind each eye but without any one well defined postocular spine. Pronotum without spines at the anterior angles but with a pair at each posterior angle. Wings usually fully developed, with two longitudinal veins; anterior vein not regularly set with spines but the posterior vein has regularly placed spines over its entire length.

All types are in the author's collection.

Thrips dianthi Moulton, new species

Female holotype: Color uniformly light yellow including legs and wings. First antennal segment concolorous with head, segments II to VII almost uniformly brown, with II slightly darker and III somewhat lighter in basal half. Prominent body spines light brownish. Ocellar crescents light brown.

Total body length 1.17 mm.; head length .10 mm., width .15 mm.; length of fore wing .70 mm. Antennal segments, length (width) II, 33; III, 46 (16); IV, 43; V, 36; VI, 46; VII, 16 microns. Length of spines on posterior angles of prothorax 33; on ninth abdominal segment, outer, 93, inner 76; on tenth 83 microns. Fore vein of fore wing with 4-5 distal spines, hind vein with 13-15 spines. Comb on eighth abdominal segment complete.

This species is very similar to *Thrips tabaci* Lind. but easily separated by the one outstanding character, the series of five short stout spines of about equal length on either side along posterior margin of prothorax.

Type material: Female holotype taken on *Dianthus plumaris*,

June 3, 1927, by M. H. Ruhman. Type in author's collection. (Moulton No. 2047).

Type locality: Vernon, British Columbia.

Thrips mucidus Moulton, new species

Female holotype: Uniformly clear whitish yellow including legs and wings. First antennal segment whitish, II concolorous with head, III light grayish, IV to VII uniformly dark grayish brown. Ocellar crescents orange. Prominent body spines light brown.

Total body length 1.05 mm.; head, length .08 mm., width .133 mm. Antennal segments, length (width) III, 46 (20); IV, 40; V, 33; VI, 46; VII, 16 microns. Length of spines: on posterior angles of prothorax, outer 30, inner 33 microns; on ninth abdominal segment outer 86, inner 73; on tenth 83 microns. Length of fore wing .60 mm. Fore vein of fore wing with three distal spines, hind vein with 10-11 spines. Comb on eighth abdominal segment complete.

This species may be compared with *conferticornis* Priesner, also found in leaf mould but is easily separated by its much shorter terminal body spines.

Type material: Female holotype taken from apple leaf mould, July 3, 1929, by Leroy Childs. Type in author's collection, No. 3598.

Type locality: Hood River, Oregon.

Thrips gracilis Moulton, new species

Female holotype: Uniformly clear whitish yellow including legs, wings and first and second antennal segments; third segment likewise whitish yellow in basal half but slightly shaded with gray in outer half; IV and V lighter in basal half, light brownish gray in outer half, VI and VII gray brown. Ocellar crescents orange; body spines light yellowish brown.

Total body length 1.45 mm.; head, length .102 mm., width .147 mm. Antennal segments, length (width) II, 33 (23); III, 63 (16); IV, 50 (16); V, 43; VI, 56; VII, 20; total 294 microns. Length of spines: on posterior angles of prothorax outer 73, inner 83, on ninth abdominal segment outer, 150, inner 133, on tenth segment 130 microns. Length of fore wing .80 mm. Fore vein of fore wing with two distal spines, hind vein with 10 spines. Comb on eighth abdominal segment fully developed.

This species may be compared with *flavus* Schr. but separated by its more slender third antennal segment, being four times longer than wide while in *flavus* it is only three times longer, by the lesser number of spines on hind vein of fore wing, ten as

compared with 13-15 in *flavus*, and the two distal spines on fore vein as compared with three in *flavus*.

Type material: Female holotype and three female paratypes, taken on *Lathyrus venosus*, May 22, 1929 by R. M. White. Types in author's collection, No. 3726.

Type locality: Aweme, Manitoba, Canada.

Thrips gramineæ Moulton, new species

Female holotype: Color uniformly yellowish brown including all segments of antenna and legs, except tips of tibiæ and all tarsi which are brownish yellow. Wings uniformly light brownish yellow. Ocellar crescents orange, spines dark brown.

Total body length 1.04 mm.; head, length .106 mm., width .14 mm. Antennal segments, length (width) III, 43 (20); IV, 40; V, 36; VI, 46; VII, 16 microns. Spines on posterior angles of prothorax, outer 60, inner 66, on posterior angles of ninth abdominal segment 110, inner median 106, on tenth 110 microns.

Fore vein of fore wing with three distal spines, hind vein with 11-12 spines. Median spines on metanotum placed 10 microns from anterior margin and 10 microns apart. Comb on eighth abdominal segment fully developed, but more or less irregular.

This species has the general appearance of *fuscipennis* but is separated by the fully developed comb.

Type material: Female holotype taken on grass, May 1, 1928. Type in author's collection, No. 2729.

Type locality: Calaveras Valley, Alameda County, California.

Thrips lathyri Moulton, new species

Female holotype: Color head clear yellow, shaded in front and behind and darkened at the sides, thorax brownish yellow, abdomen brown; antennal segments I, II, V and VI dark brown with II lighter at tip, III yellow, slightly clouded at tip, IV and V yellow in basal half, brown distally; legs yellow with femora brownish; wings clear; Ocellar crescent orange; spines on prothorax clear yellow, those at tip of abdomen light brownish yellow.

Total body length 1.17 mm.; head length, .117 mm., width .138 mm. Antennal segments, length (width) III, 50 (20); IV, 43; V, 36; VI, 50; VII, 16 microns. Spines on posterior angles of prothorax, outer 23, inner 26-30 microns; on posterior angles of ninth abdominal segment 70, inner median 50, on tenth segment 76 microns.

Back of head without transverse striations; posterior margin of prothorax with four spines on each side inward from angle spines. Comb on eighth abdominal segment wanting; median spines on

metanotum placed 13 microns from anterior margin and 12 microns apart; fore vein of fore wing with three distal spines, hind vein with 12-13 spines.

This species is closely related to *discolor* Hal. but separated by its more uniform color and shorter thoracic spines.

Type material: Female holotype taken on *Lathyrus* sp., May 14, 1926 (G. W. Goldsmith). Type in author's collection, No. 1161.

Type locality: Colorado Springs, Colorado.

Thrips anemonensis Moulton, new species

Female holotype: Color blackish brown; antennal segments I, II, V, VII dark brown, III brownish yellow, IV somewhat darker; all femora and middle and hind tibiæ, except at tips, blackish brown, fore tibiæ and all tarsi light yellowish brown; wings light brown, lighter in basal quarter, body spines blackish brown.

Total body length 1.4 mm.; head, length .10 mm.; width .15 mm. Antennal segments, length (width) III, 53 (23); IV, 46 (20); V, 36; VI, 50; VII 20 microns. Spines on posterior angles of prothorax, outer 73, inner 76, on posterior angles of ninth abdominal segment 133, median dorsal 106, on tenth segment 116 microns.

Posterior margin of prothorax with fore spines on either side inside of the angle spines; median spines on metanotum placed rather close to anterior margin, 7-10 microns and 23 microns apart. Comb on eighth abdominal segment wanting in the middle. Fore vein of fore wing with three distal spines hind vein with eleven spines.

This species has the general appearance of *magnus* Moulton but is separated by the lighter third and fourth antennal segments and the position of the metanotal spines which are much closer to the anterior margin, also by the eight spines on posterior margin of prothorax. These two latter characters also serve to separate it from *madronei* Moulton.

Type material: Female holotype taken on *Anemone patens*, May 11, 1928 (A. B. Bird). Type in author's collection, No. 3029.

Type locality: Birtle, Manitoba, Canada.

Thrips frosti Moulton, new species

Female holotype: Deep brown, head and thorax lighter, mostly orange yellow clouded with brown and darkened especially at the sides; thorax also with areas of red pigment; antennal segments I, II, VI and VII dark brown, III-V clear yellow except tip of V which is rather abruptly brown; legs brown with most of fore

tibiæ and tips of middle and hind tibiæ, also all tarsi, clear yellow; wings uniformly brown; ocellar crescents orange-red; body spines dark brown.

Total body length 1.1 mm.; head, length, .113 mm., width .133 mm. Antennal segments, length (width) III, 43 (20); IV, 40; V, 33; VI. 50; VII, 16 microns. Spines on posterior angles of prothorax, outer 66, inner 70; on posterior angles of ninth abdominal segment, 110, inner median 90, on tenth 100 microns.

Back of head with distinct transverse striations; posterior margin of prothorax with three spines on each side inward from angle spines, the innermost pair strong and fully twice longer than the others; median spines on metanotum placed about thirteen microns from anterior margin and thirteen microns apart. Comb on eighth abdominal segment complete. Fore vein of fore wing with 3-4 distal spines; hind vein with 10-11 spines. This species may be separated from *fuscus*, to which it is most closely related, by the clear yellow tarsi and tips of all tibiæ, and the clear yellow fourth antennal segments, which are clouded brownish in *fuscus*.

The male allotype is colored as in the female but somewhat lighter and the wings are clearer near the base. The clear oval areas on abdominal tergites two to six are small and oval, the first 30 and the last 23 microns in width.

Type material: Female holotype, male allotype, one male and four female paratypes, taken by sweeping, August 17, 1929 (C. A. Frost). Types in author's collection, No. 3787.

Type locality: Sherborn, Massachusetts.

Thrips fuscus Moulton, new species

Female holotype: Color uniformly deep brown including legs except fore tibiæ and all tarsi which are yellowish brown; antennal segments I, II, VI and VII deep brown, III and IV mostly yellow but clouded brownish, IV somewhat darker than III, V mostly brown but lighter in basal third; wings uniformly brown; body spines dark brown.

Total body length: 1.33 mm.; head, length .123 mm., width .17 mm. Antennal segments, length (width) III, 50 (23); IV, 46; V, 33; VI, 46; VII, 20 microns. Spines on posterior angles of prothorax, outer 70 inner 80, on posterior angles of ninth abdominal segment 133, inner median 120, on tenth segment 103 microns.

Head slightly broadened behind, cheeks almost straight; posterior margin of prothorax usually with three spines on either side inside of angle spines; median spines on metanotum placed close to anterior margin and 23 microns apart. Comb on eighth abdominal segment broken in the middle. Fore vein of fore wing with three distal spines, hind vein with 12-13.

The male allotype is colored almost like the female. The transparent areas on sternites are very small, about ten microns in width and more round than oval.

This species may be separated from *frosti* by the uniformly brown middle and hind tibiæ and in the male by the small roundish transparent areas on the sternites, which are much smaller and not oval as in *frosti*.

Type material: Female holotype, male allotype, one male and two female paratypes, Idaho.

Thrips herricki var. impatientis Moulton, new variety

Female holotype: Colored as in the species.

Total body length 1.25 mm.; head, length .113 mm., width. 15 mm. Antennal segments, length (width) III, 53 (18); IV, 50; V, 40; VI, 56; VII, 16 microns. Spines on posterior angles of prothorax, outer, 73, inner, 90, on posterior angles of ninth abdominal segment 116, inner median 86, on tenth segment 103 microns.

Spines on metanotum placed 10-13 microns from anterior margin and 16-20 microns apart. Comb on eighth abdominal segment complete; Fore vein of fore wing with three distal spines, hind vein with 10-12 spines.

This variety is separated from the species by the shorter third antennal segment, 53 as compared with 60 microns, the shorter spines on posterior angles of prothorax, 73-80 as compared with 90-96, and the shorter spines at tip of abdomen.

Type material: Female holotype and two female paratypes taken on Jewel Weed, September 3, 1927 (L. Blevins) at Atwater Ill. (No. 2315) and one paratype, taken by sweeping August 17, 1929 (C. A. Frost) at Sherborn, Massachusetts (No. 3787).

Thrips taraxaci Moulton, new species

Female holotype: Color blackish brown including all femora, middle and hind tibiæ and first two antennal segments, third antennal segment brownish yellow, IV somewhat darker, V to VII dark brown; fore tibiæ and all tarsi brownish yellow; wings uniformly brown; ocellar crescents deep orange; body spines dark brown.

Total body length 1.27 mm., head length .106 mm., width .16 mm. Antennal segments, length (width) III, 46 (21); IV, 46; V, 36; VI, 53; VII, 16 microns. Spines on posterior angles of prothorax, outer 76, inner 76, on posterior angles of ninth abdominal segment 140, median dorsal 133, on tenth segment 133 microns.

Head 1.5 wider than long, transverse striations on back of

head distinct. Posterior margin of prothorax with three spines on either side, inside from angle spines; median spines on metanotum placed near anterior margin, only 10 microns away but 20 microns apart. Comb on eighth abdominal segment complete but sparce and irregular. Fore vein of fore wing with three distal spines, hind vein with 14-15 spines.

This species is separated from *magnus* Moulton by its smaller size, shorter third antennal segment and the complete comb on eighth abdominal segment.

Male allotype is colored as in female but all antennal segments are noticeably lighter. The light colored depressions on sternites two to six are large and transverse, the first 73 by 20 microns, and the last is only slightly smaller.

Type material: Female holotype, male allotype, and two female paratypes taken on yellow dandelion, June 12, 1932. Types in author's collection, Nos. 4917 and 1521.

Type locality: Bozeman, Montana. One paratype from Midday Valley, British Columbia. (N. L. Cutler).

A Note on the Occurrence of Hesperorhipis albofasciatus Fall (Buprestidæ)

The minute and interesting buprestid *Hesperorhipis albofasciatus* was described by Dr. Fall[1] from a unique example beaten from mistletoe at Fort Tejon, California, by Mr. A. C. Davis. Although Mr. Davis made repeated attempts to obtain additional specimens and others, including the writer, have sought for the species at the type locality, to the best of my knowledge it has not been taken since. It therefore seems of interest to record a second specimen of this remarkable species which was captured by Mr. P. J. Timberlake, of the Citrus Experiment Station at Riverside. Mr. Timberlake's example was taken on the Mt. Baldy Trail, near Camp Baldy, in Los Angeles Co., Calif., at an altitude of approximately 4700 feet, August 23, 1920. The beetle was beaten from *Ceanothus*, which may well be its host plant and which might account for the fact that it has not been taken again on mistletoe.—E. Gorton Linsley.

[1] Fall, H. C., 1930, Pan-Pacific Entomologist 7:75.

THE PACIFICUS GROUP OF COSSONUS (COLEOPTERA: CURCULIONIDÆ)

BY L. L BUCHANAN

Bureau of Entomology and Plant Quarantine, United States Department of Agriculture, Washington, D. C.

For many years the name *Cossonus subareatus* Boheman has been applied in American literature to long-beaked specimens from northern and mid-western parts of the United States. Boheman's original description, however, calls for a species from Philadelphia, of the size and shape of *cylindricus*, having the rostrum short, thick and half again as long as the head; pronotum lightly convex and with a sparsely punctulate plaga each side. These and other statements in the description fit *platalea* Say in a general way, though nothing is said of a pronotal flattening, a characteristic feature of Say's species. The allocation is doubtful, but at present it seems best to place *subareatus* Boh. as a synonym of *platalea* Say. At any rate, it is clear that Boheman's description cannot apply to any of the three forms here treated.

Besides *pacificus* Van Dyke, the long-beaked specimens at hand (*subareatus* of American authors; not Boheman, Gen. et sp. Curc., VIII, 2, 1845, p. 266) represent two species, both apparently undescribed. One is closely related to, and perhaps only an American subspecies of, the European *parallelepipedus* Hbst.; the other is a near ally of *pacificus*.

Key to species of pacificus group.

1. Rostrum relatively long, slender, and strongly widened apically, the rostral length (from front margin of eye to apex of mandible) 3 to 4 times greater than the least rostral width, the latter about five-eighths that of the greatest width; basal margin of pronotum truncate or fully bisinuate; at least hind tibia of ♂ thickest (dorso-ventrally) at about basal two-fifths, where the lower edge in profile is convex and broadly rounded to subangulate, the edge from there to apex with a conspicuous fringe of golden hairs; hind tibia of ♀ moderately to strongly sinuate along lower edge and with a sparse fringe.....2

—. Rostrum shorter and stouter, its length less than three, and sometimes less than two, times greater than its least width, the latter usually more than five-eighths that of the greatest width; basal margin of pronotum feebly to strongly bisinuate; hind tibia, ♂ and ♀, as thick or thicker at apex than elsewhere, slender (as in *platalea*) to shorter and thicker (as in *corti-*

cola), subevenly and gradually thickened from base to apex, or with the lower edge feebly to moderately sinuate, this edge usually with only the normal clothing of scattered hairs (in *lupini* with a sparse fringe) ..... *rest of the genus.*

2. Pronotum feebly convex (often sub-planate medio-basally), finely alutaceous, punctures subevenly distributed, those each side of median line toward base only slightly to moderately larger, basal margin usually truncate or nearly so; rostrum longer and more slender, the apical dilation (from its beginning to mandibular apex) usually at least as long as broad; base of abdomen (♂) densely pilose. Southern Canada and Northern United States ..... *americanus*, new species.

—. Pronotum flattened and polished on disk, minutely alutaceous laterally, punctures conspicuously uneven in size and distribution, basal margin feebly bisinuate; rostrum stouter, the apical dilation quadrangular or slightly transverse; base of abdomen (♂) not pilose 3

3. Length, 4-6.5 mm.; color usually black; anterior femur more strongly clavate; posterior tibia (♂) abruptly and strongly thickened at about basal third, the lower edge from there to apex with a dense fringe of long, golden hairs some of which are at least one-fourth as long as the tibia, the fringe extending on to basal two or three segments of tarsus. California to British Columbia, east to Quebec; also Arizona and Colorado ..... *pacificus* Van Dyke

—. Length, 4-5.4 mm.; elytra reddish; ♂ tibia similarly but more feebly thickened, the hairs of the fringe much shorter. Kansas, Missouri, Dakota ..... *rufipennis*, new species

Cossonus americanus Buchanan, new species
(*subareatus* authors [part], not Boheman)

Length, 4.5-6.5 mm.; width, 1.3-2 mm. Black or piceous-black, the antennæ, legs, and apex of rostrum more or less reddish, the elytra sometimes obscure rufous laterally; occasionally the body is reddish-brown throughout. Head, rostrum, and pronotum finely alutaceous, moderately shiny. Rostrum (from front edge of eye to apex of mandibles) about two-thirds as long as prothorax, dilated apical portion distinctly shorter than basal portion. Middle and hind tibiæ of ♂ rather abruptly thickened at about basal three-sevenths, the hairs of the fringe rather long on hind tibia (shorter than in *pacificus*, longer than in *rufipennis*); lower edge of ♂ femora fringed with inclined, golden hairs in basal half, the fringe densest on hind femur, sparse to obsolescent on front femur.

Head sparsely punctulate, frontal puncture distinct, eye lightly convex. Rostrum feebly arcuate, in side view subcontinuous with front, rather strongly tapering from base to middle, then feebly so to apex, side before eye somewhat unevenly and closely punc-

tate and with very fine, sparse, prostrate, transversely directed, pale hairs; rostrum above narrowest at about basal third, the dilated apical portion two-thirds or more as wide as the width of head across eyes, punctures fine, sparse to rather close, finer toward apex. First segment of funicle longer than the second, which is longer than the third, the distal segments widened, the seventh strongly transverse. Prothorax about as long as wide, subapical constriction usually rather deep, sides usually with a slight constriction near base, thence rounded divergent to widest point about basal third, then feebly convergent and rounded (or nearly straight) to about apical third; pronotum with a narrow, smooth, median line from base to middle or beyond, the line sometimes feebly raised, especially basally, punctures rather small, not dense, some of them longitudinally elliptical, those in basal half along each side of median line and along side margins more or less distinctly larger than those between. Elytra averaging about one-fifth or one-sixth wider than prothorax, base subtruncate or faintly bisinuate, serial punctures small, narrower than intervals, the latter lightly convex and each with a row of minute punctures. Beneath finely alutaceous; ♂ with first sternite broadly, the second more narrowly, impressed, the impression densely and finely punctate and clothed with long, inclined, golden hairs.

Type locality: Duparquet, Quebec, Canada, July 3, 1935, *Populus balsamifera*, G. Stace Smith.

Other localities: Michigan (Escanaba, Marquette, and Whitefish Point, Hubbard and Schwarz collection; "Mic. & "Mich"., Casey collection); Wisconsin (Bayfield, Wickham); Colorado (Buena Vista, July 1-6, 1896, 7,900-8,000 ft., H. F. Wickham; Ouray, July 1-15, 1897, 7,500-8,000 ft., H. F. Wickham); Washington (Hoquiam, *Picea sitchensis*, Burke, Hopk. 2037a); California (Fieldbrook, May 26, 1903, H. S. Barber; Lake Tahoe, Casey Coll.)

Type, ♂, 51384, U. S. National Museum. Paratypes returned to Mr. G. Stace Smith.

Described from 68 specimens of which 49 were collected at the type locality by Mr. Smith. The females outnumber the males by about 3 to 1. Distinctive characters are the long rostrum, finely alutaceous derm (except on elytra), relatively fine, sparse, and subeven pronotal punctures, and the male sexual characters.

At favorable angles the alutaceous sculpture of the pronotal derm is perceptible at about 20x, at which magnification the pronotum of all other North American species appears polished.

The hair fringe on male femora, and the hairy area at base of male abdomen, also are unique characters among the species of this fauna. Differs from the European *parallelepipedus* Hbst. in having the dorsal punctures slightly coarser, the rostrum still more feebly arcuate, and the tibiæ rather more strongly thickened. The genitalia of one male of each form has been examined; in *parallelepipedus*, the median lobe is parallel-sided basally and very broadly rounded at apex, while in *americanus* the median lobe is somewhat narrowed basally and more narrowly rounded at apex.

The two California specimens have the pronotum more convex and more strongly rounded at sides than is normal, and one of them (from Fieldbrook) is unusually large (6.5 mm. long). In a few specimens the elytra are narrower, being only about one-eighth wider than the prothorax.

Cossonus pacificus Van Dyke

Of this species, the National Museum collection contains specimens from Tallac, California (type locality); "Cal."; Ashford and Skokomish River, Washington ("W. T."=Washington); Creston, B. C.; Duparquet, Quebec; Ouray, Colorado; Utah; Arizona. Host trees are given as *Populus tremuloides* (Tallac specimens), *Populus trichocarpa* (Ashford specimens) and *Populus* (Duparquet specimens). At its thickest point at about basal third, the ♂ hind tibia is twice as thick as at base. The dense hair fringe on the ♂ hind tibia is divided, or broadly parted, longitudinally at its midde, giving the appearance of a double fringe. The lower edge of the hind femur of the ♂ is feebly transversely impressed at about the middle, showing as a shallow emargnation in profile view. Of the 27 specimens seen four are males.

Cossonus rufipennis Buchanan, new species
(*subareatus* authors [part], not Boheman)

Length, 4.2-5.4 mm.; width, 1.3-1.5 mm. Blackish, polished, the elytra, legs, antennæ, and apex of rostrum reddish. Disk of pronotum flat. Hind tibia of ♂ thickened at about basal two-fifths, the lower edge from there to apex with a fringe of golden hair; ♂ middle tibia and ♀ hind tibia sinuate, the fringe formed by shorter hairs.

Head very sparsely punctulate on vertex, sparsely and finely punctate on front, frontal puncture distinct, eyes lightly convex. Rostrum, from front edge of eye to apex about four-sevenths as long as pronotum, in side view feebly arcuate, subcontinuous with front, slightly to scarcely tapering from base to middle, more strongly tapering apically, above finely and rather sparsely punctate, the punctures finer and usually denser on the dilated apical portion which is slightly transverse and shorter than the stem of the rostrum; side of rostrum with punctures and pubescence a little finer and sparser than in *americanus*. Antenna about as in *americanus*. Prothorax subquadrate, widest behind middle, rather deeply and abruptly constricted near apex, slightly so near base, sides converging and nearly straight from about basal to apical third; disk of pronotum with a large, longitudinally ovate polished flattening, broader at base, where it covers one-half to two-thirds the pronotal width, reaching from base nearly or quite to apical collar, the derm laterad of this area minutely alutaceous; median smooth line reaching from base to near apex, the line with vague or sinuous outlines, much wider at and behind middle, narrower in apical half and usually narrowed again at base; the punctures each side of median line extremely coarse, especially toward base, the punctures along side margins moderate in size, the punctures between (i.e., in a broad longitudinal area opposite third and fourth elytral intervals) abruptly very fine and sparse in about basal third, becoming gradually coarser anteriorly. Elytra feebly bisinuate at base, about one-sixth wider than prothorax, serial punctures coarse but well separated, in places almost or quite as wide as an interval, the intervals faintly convex on disk, more strongly so on apical declivity, each minutely, uniseriately punctate. First and second sternites coarsely punctate, the punctures denser at sides, fifth sternite sparsely and more finely punctate.

Type, male, 51385, U. S. National Museum.

Type locality: Salina, Kansas.

Other localities: "Kans."; "Ks." (Casey coll.); "Dak."; St. Joseph, Missouri.

Thirteen specimens (♂ & ♀), one of them without locality label.

Very close to *pacificus* Van Dyke, the two sometimes scarcely distinguishable in the female sex. In general, *pacificus* is larger, the elytra usually black or piceous-black, the pronotum less flattened, the pronotal punctures each side of median line (also those in serial rows of elytra) a little smaller, the sides of the prothorax a trifle more rounded-convergent forward, the rostrum above a little more strongly punctate, the anterior femur more

abruptly clavate. In the absence of males, the reddish elytra and the habitat will perhaps make *rufipennis* identifiable in most cases. In *rufipennis* the lower edge of the fore femur in profile is broadly rounded at the summit of the femoral swelling, whereas in *pacificus* the swelling is more abruptly formed, its summit in profile more narrowly rounded to almost angulate.

TWO NEW LEAFHOPPERS FROM TROPICAL AMERICA

BY P. W. OMAN*

The two Cicadellidæ here described are of unusual interest in that they represent groups not heretofore known to occur in America. Both appear to have their nearest allies in the Oriental Region, but neither can be associated satisfactorily with any described species. Thanks are due to Mr. C. H. Ballou of San José, Costa Rica, and Dr. W. A. Hoffman of San Juan, Puerto Rico, for sending the specimens upon which the descriptions are based.

Neonirvana Oman, new genus

Medium sized leafhoppers, approximately 5-7 mm. in length, somewhat flattened dorso-ventrally, related to *Nirvana* Kirkaldy and *Ophiuchus* Distant[1] in general form and structure of the head, but differing from both in the absence of a median carina on the front and in the presence of a closed anteapical cell in the fore wing. Resembling *Nirvana* in the structure of the face, but with the head broader, especially anteriorly. Much like *Ophiuchus* in the structure of the crown but with the face less flattened.

Crown nearly flat, anterior margin slightly elevated, entire anterior and lateral margins of crown separated from front by a distinct carina which extends to eyes laterally. Median length of crown slightly greater than greatest width. Ocelli situated near lateral margins of crown, some distance in front of inner margins of eyes (Fig. 1, A). Face broad and slightly convex, antennal pits and facial sclerites typical of the subfamily. Lateral pronotal carinæ distinct, posterior margin of pronotum shallowly and

---

*Bureau of Entomology and Plant Quarantine
United States Department of Agriculture, Washington, D. C.

[1] The writer has not examined the genotype of either *Nirvana* or *Ophiuchus*, but accepts Baker's characterization of the two genera (see Philippine Jour. Sci., vol. 23, p. 345-405, 1923).

broadly excavated. Fore wing comparatively broad but extending well beyond tip of abdomen; appendix absent or extremely small; venation obscure, but with a row of shallow pits along each side of the veins except apically, these pits usually set with very fine setæ. Claval veins apparently united distally; corium with outer anteapical cell present but short and rhomboidal in shape; apical vein separating second and third apical cells forked just before apex of wing to form an additional small V-shaped apical cell, at the base of which the wing membrane thickens to form a small, round, shining, black spot. Hind wing with venation typical, having four apical cells. Slight sexual dimorphism apparent in length of head.

Type of the genus, *Neonirvana hyalina*, new species.

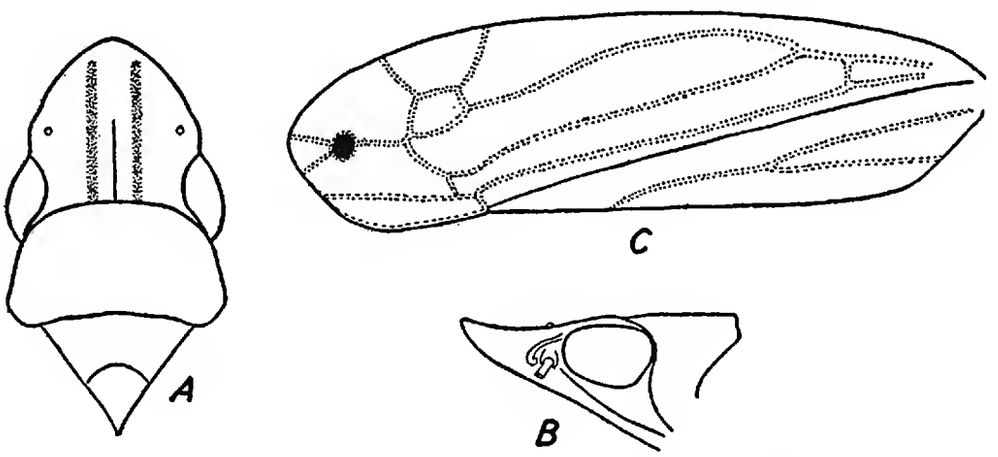


Figure 1. *Neonirvana hyalina*, n. sp. A, dorsal view of head and thorax; B, lateral view of head; C, left fore wing.

Neonirvana hyalina Oman, new species
(Fig. 1, A,B,C)

General color pale green to pale yellow with whitish markings on pronotum and scutellum. Fore wings greenish to yellowish subhyaline. Length of male 5.5 mm., of female 6.75 mm.

Crown without definite markings except for a pair of narrow, longitudinal, yellowish-green to orange yellow vittæ each side of median line and for similarly colored but indefinite areas along lateral margins. Longitudinal vittæ nearer to median line than to eyes and extending from base nearly to apex of crown. Face and entire venter greenish-white to yellowish-white, sometimes tinged with yellow. Pronotum with white lateral margins, usually a pair of faint whitish spots anteriorly near median line, and faint traces of longitudinal vittæ continuous with those on crown. Scutellum with a pair of median white areas anterior to transverse suture. Inner apical cell of fore wing hyaline, outer apical margin of fore wing bordered with smoky brown.

Male valve minute; male plates unusually long, slender basally and with ventral margins set with stout setæ, distally much broadened and almost membranous, with the broadened portion normally held nearly vertically, apices broadly rounded and margins of submembranous portions set with very fine setæ, these long and filamentous below, shorter above. Styles slender and simple, apices curved laterally and terminating in sharp points which are faintly embrowned. Last ventral segment of female with a very faint median carina, the posterior margin triangularly produced, the blunt apex with a shallow median notch. Ovipositor sheath slightly exceeding pygofer in length, pygofer sparsely set with stout setæ apically and along ovipositor sheath.

Holotype male, allotype female, and 3 female paratypes from San Pedro de Montes de Oca, Costa Rica, January 31, 1936, C. H. Ballou (C. R. 355). Also 1 female paratype from Orosi, Costa Rica, September 13, 1935, C. H. Ballou. Types in collection of United States National Museum, Cat. No. 51617.

The foregoing genus conforms in all respects with the group characters given by Baker, 1923, for *Nirvana* and allies, which he treats as a family with rank equal to Bythoscopidæ, Koebeliidæ, etc. While it is debatable whether these groups are of family or of subfamily rank, the writer considers the comparative evaluation satisfactory.

Krisna insularis Oman, new species

Closely related to *K. strigicollis* Spinola, to which it runs in Baker's key to the genus[2] and with which it agrees in general size and coloration. Differing from *strigicollis* in being smaller than the average size for that species and in having a slightly wider head and more slender form. Length of male 9.75 mm.

Head nearly as wide as pronotum, anterior margin of crown broadly rounded, median length of crown about one-half the width between eyes. Face as in *strigicollis*, but margin between crown and face thinner than in that species and only the upper of the transverse carinæ distinct for entire width of crown. Ocelli large. Antennæ short, as in *strigicollis*. Transverse rugæ on pronotum less distinct than in *strigicollis*, and pronotum only slightly wider posteriorly than next the eyes. Fore wing more slender than that of *strigicollis*, more tapered distally, and with appendix much narrower and less membranous. Inner apical cell of fore wing very narrow and elongate as in *strigicollis*, remainder of apical portion of fore wing coarsely reticulately veined. Legs, particularly the

[2] Philippine Jour. Sci., vol. 15, p. 213, 1919.

hind tarsi, more slender than in even smaller specimens of *strigicollis*, and hind tarsi without stout spines except in distal combs.

Color pale virescent to pale stramineus, probably vividly virescent in life. Eyes and small areas around ocelli red or brown, anterior tibiæ and tips of all tarsi tinged with reddish.

Male valve very large and rounded posteriorly, almost completely covering the small, finger-like plates which are set with fine, filamentous setæ. Styles extending slightly beyond plates, terminating in curved, upturned points, and each with a blunt, tooth-like projection on the ventral side a short distance before apex.

Holotype male from Luqillo National Forest, Puerto Rico, Sept. 9, 1935, W. A. Hoffman. One male paratype labeled El Yunque, P. R., 2800 ft., Feb. 25-27, 1900, C. W. Richmond. Types in collection of United States National Museum, Cat. No. 51618.

The writer has at hand for comparison types or authentically determined material of most of the species of the genus *Krisna*, but the species described above appears to be quite distinct from any previously named, although it is possible that this represents one of the variations now included as synonyms of *strigicollis*. In addition to the specific characters indicated above, *insularis* possesses all the higher group characters listed for *Krisna* by Baker, 1919, in his review of the genus, to which workers are referred for generic characters, synonymy, and distribution.

Hibernation in the Cerambycidæ

The statement frequently appears in the literature pertaining to the habits and biology of the Cerambycidæ that "no species are known to hibernate as adults except in the pupal cell." In Southern California, a number of species including *Ipochus fasciatus* very frequently pass the winter in the adult stage. In the foothills of Los Angeles County this latter species may be found all during the winter months. In cold spells the beetles occur under loose bark or secreted in the dried and curled up leaves of the native black walnut, *Juglans californica*, and other host plants. On warm days they come forth and feed upon the bark or crawl about over the tree. Likewise Mr. K. D. Sloop has reported taking *Saperda horni* Joutel and *Synaphæta guexi* LeConte rather abundantly in the winter months on *Salix* in Orange County.—E. Gorton Linsley.

Note Regarding Eschatomoxys wagneri Blaisdell

In the Pan-Pacific Entomologist, Vol. XI, No. 3, 1935, I described the above remarkable Tenebrionid from a unique. A second specimen has been discovered in the collection of Mr. P. H. Timberlake of Riverside, California. I am indebted to Mr. Fred R. Platt for the following data regarding the specimen: It was collected in Painted Canyon, Riverside County, California on April 18, 1925, by Mr. Timberlake. Its appendages are partly imperfect, both antenna however being intact. The insect evidently was dead when found.—F. E. Blaisdell, Sr.

A NEW SPECIES OF MAYFLY FROM CALIFORNIA

(Ephemerida: Bætidæ)

BY W. M. UPHOLT
Berkeley, California

Callibætis hebes Upholt sp. nov.

Length: Body 7½-10 mm.; wing 7½-10 mm.; caudal filaments 15-20 mm.

Male dark brown, female pale tan; cross veins of fore wing few in number; marginal intercalaries paired; wing of male clear to deeply pigmented in stigmatic area and in spots along costal margin.

Male: Head and thorax blackish-brown; pale areas on pleura especially around margins; pale streaks along thoracic folds; fore legs dark brown; femur paler at tip; middle and hind legs pale tan; joints dark brown; legs with faint dark stipling.

Wings hyaline (see figure 1); cross veins moderately abundant (45 to 60 behind Radius 1); marginal intercalaries paired, some of them transparent, white, and very difficult to see; longitudinal veins dark brown except where cross veins intersect them; cross veins white except for a few dark brown ones in the apical region; cross veins of the basal half of the costal cell white and fragmentary; costal brace pale; costal angulation of hind wing rather obtuse (about 120 degree angle); cross veins numerous (about 25); three longitudinal veins; several short intercalaries between second and third.

Abdominal tergites reddish-tan with six dark brown longitudinal streaks, two on the margin and four evenly spaced over the dorsum. Considerable dark brown spotting especially laterally, gradually becoming thicker anteriorly. Two median longitudinal streaks, interrupted at the posterior margins of tergites 7 to 9. In some specimens the brown spotting and streaks become so general

as to give the abdomen the appearance of being solidly dark brown. Dark brown stippling on sternites more sparse and more evenly spaced; two rows of dark brown longitudinal streaks at anterior margin of each sternite, grading from mere spots, widely separated on sternite 1 to streaks over half the length of sternite 8 and rather close together, reduced to short dashes again in sternite 9. Forceps mottled smoky-brown. Caudal filaments white; incisures blackish-brown.

Female: Head and thorax pale tan, margins of thoracic nota darker reddish-brown; scutellum yellow. Hind legs pale, spotted with dark brown. An irregular row of round brown spots along femora.

Wings hyaline; cross veins fewer than in male (35 to 45 behind Radius 1). Costa extending around outer margin of wing, brown at ends of major convex veins and white at end of major concave veins. Fore wing irregularly mottled with reddish-brown along the costal border. Costal brace pale medially and dark at each end; numerous brown triangles extending from costa into costal cell, in some cases forming a band from costa to subcosta; bands thicker and more irregular toward apex. Six irregular clouds extending between subcosta and Radius 2, two middle ones much the largest. Clouding in right and left wings differing in more minute details and showing considerable variation among different specimens. Hind wings similar to male but with fewer crossveins. The basal pigmentation does not extend into costal angulation as in *Callibætis hageni* Eaton, (see fig. 2).

Abdomen pale smoky grey; tergites 1, 3, 4, 7, and 8, largely dark brown, others with two brown spots on anterior margin, and sparsely speckled with brown. Sternites sparsely speckled with brown, each sternite with a pair of larger brown spots located medianly. Caudal filaments smoky brown, darker distally with blackish-brown incisures; alternate joinings wider at the base. Coloration of abdomen more reddish-brown and with less distinct markings in those dried specimens in which the abdomen contains eggs.

Male subimago: Wings uniformly smoky grey, cross veins not margined with white as in *Callibætis hageni* Eaton. Outer and anal margins short-fringed.

Mature nymph: Somewhat smaller than in *C. hageni* Eaton (9-10 mm.) but very similar in mouthparts and gills. Femora differ in having no median line or preapical brown band as in *C. hageni.*

Holotype: Male. Body 9; wing 9½ mm. Alpine Dam, Marin Co., Calif., October 6, 1935. (No. 4197 in California Academy of Sciences).

Allotype: Female. Abdomen shrunken; wing 9 mm. Same data as holotype. (No. 4198 in California Academy of Sciences).

Paratypes: 63 ♂ imagos, 5 ♀ imagos, 1 ♂ subimago, 5 nymphs, same data as holotype; 3 ♂ imagos, 2 ♀ imagos, Strawberry Canyon, Berkeley, Calif., October 7-8, 1935.

The male imago is separable from *Callibœtis hageni* Eaton by its smaller size and paler sternites, as well as in the general coloration of its abdomen which is too variable to be a reliable characteristic.

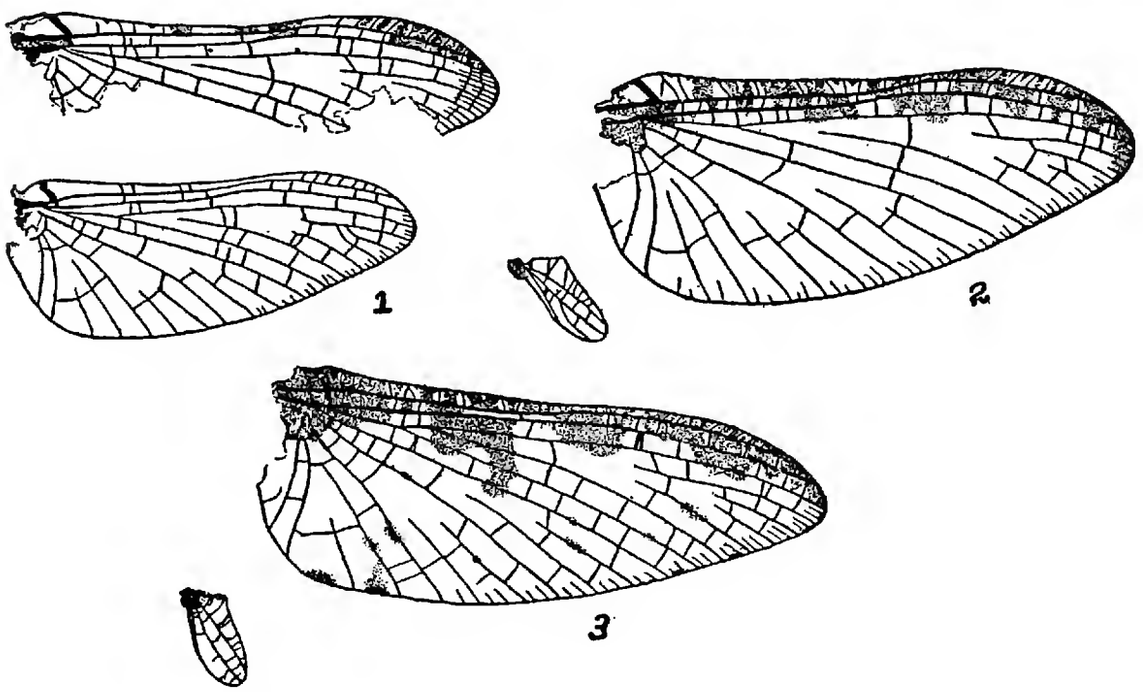


Figure 1. *Callibætis hebes*, n. sp. Fore wing of male imago; fig. 2, *same*, wings of female imago; fig. 3, *Callibætis hageni* Eaton, wings of female imago.

The female imago is readily separable from *C. hageni* by its smaller size, the reduced pigmentation along the costal border of wings, and the complete absence of pigmentation in basal costal space and on the disc of fore wing (See figures 2 and 3.) Coloration of body is also different being more like *C. pacificus* Seemann, though I do not like to rely upon this character since it is so difficult to describe accurately.

This species is named *hebes* in reference to its faint cross veins and marginal intercalaries which are easily overlooked because of this characteristic.

NOTES ON CICINDELA PLUTONICA CASEY WITH DESCRIPTION OF A NEW SUBSPECIES

BY MONT A. CAZIER

The accumulation of a number of specimens of *Cicindela plutonica* Csy. of both sexes, has made it possible for me to study the species and a limited number of its variations and to conclude that it is a valid species. Dr. Walther Horn (Genera Insectorum, fasc. 82c, p. 376) places this species as a subspecies of *Cicindela tranquebarica* Hbst. and lists it following the subspecies *sierra* Leng. It is my opinion that *C. plutonica* is a valid species and should be placed in the phylogenetic scheme following *C. tranquebarica* Hbst. and its subspecies, and preceding *C. longilabris* Say as listed by C. W. Leng (1920). In what is to follow I will substantiate my conclusion with the evidence before me.

When T. L. Casey described the species in 1897 he had one male specimen on which he based his description. Since that time several females have been taken which show that the species exhibits a remarkable degree of sexual dimorphism. This feature supported by the structural differences, to be pointed out later, along with its ecological peculiarities show that the species is of specific value.

CICINDELA PLUTONICA Casey

(Ann. N. Y. Acad. Sci., IX, p. 296, 1897)

Male. Form nearly as in *C. tranquebarica* subsp. *sierra* Leng, but more elongate; rugosity of head, prothorax and elytra much less granulate; labrum shorter and more flattened with the median lobe much less pronounced, pale in color with fine dark apical margin, imperfectly three toothed. Head similar to subsp. *sierra* but with the rugosity reduced. Elytra more elongate and parallel with distinct subsutural row of foveæ, interhumeral impression at base deep; sculpturing less granulate than in *sierra*. Elytral markings consist of an indication of the transverse portion of the middle band and a subsutural remnant of the apical lunule. Color black. Length 13-13.5 mm.; width 4.5-5.2 mm.

Female. Form parallel and elongate as in male but more robust, and distinctly convex. Labrum varying as to color but distinctly three toothed, longer and more pointed in median portion. Elytral markings in the two specimens before me consists of a subsutural remnant of the apical lunule; sculpturing same as in male. Length 15.5-16 mm.; width 5.5-6 mm.

Habitat Summit, Calif. and Placer Co., Calif., June 25, 1898,

4 males (Koebele); Alpine, Oregon, June 27, 1892, in the C. W. Leng colletcion, 1 female; Alpine Co., Calif., July 1934 by J. E. Blum, 1 female; Nevada.

The distribution of this species is alpine, it occurs from 9,000 to 10,000 feet on the rocky hillsides in the vicinity of the snow pools. It is very wary and fast in flight, its dark color making it very difficult to distinguish from the black mountain soil.

From the above description it is evident that the male, although superficially similar, is distinct from that of *C. sierra* in most of its basic characters and the female, being very convex and parallel, could not possibly be associated with any member of the *tranquebarica* group. These structural facts supported by the distinct ecological differences that exist, in that *sierra* occurs in the high valleys along the grassy stream banks at 6,000 to 8,000 feet whereas *plutonica* occurs on the rocky hillsides about the snow pools from 9,000 to 10,000 feet, lead me to regard *C. plutonica* as a distinct species.

This species can be associated with *C. longilabris* subsp. *montana* Lec. in that the female is convex, labrum long and pointed as in the members of the *longilabris* group and the two species occupy very similar ecological habitats. J. E. Blum collected several specimens of the subsp. *montana* Lec. in the same locality with *C. plutonica* in July 1934, in Alpine Co., California.

Cicindela plutonica leachi Cazier, new subspecies

Female. Form as in the female of *C. plutonica* but more convex. Color green with purple reflections, shiny; underside brilliant green. Elytral markings lacking. Labrum longer, more pointed in the median portion, distinctly three toothed, brownish black to black in color. Sculpturing of head, prothorax and elytra more reduced than in *plutonica*. Length 15 mm.; width 6 mm.

Habitat. Occurs at high elevations, 9,000 to 10,000 feet, in the Warner Mts., Modoc Co., Calif. (June 29, 1931). Holotype female in the author's collection.

It is with great pleasure that I dedicate this distinct subspecies to Mr. E. R. Leach who very kindly presented the specimen to me for study. I am greatly indebted to Mr. J. E. Blum and Mr. E. R. Leach for specimens and notes and more especially to Dr. E. C. Van Dyke for his valuable assistance and constructive criticisms.

A TROPICAL TERMITE IN CALIFORNIA

BY S. F. LIGHT
University of California, Berkeley, California

Not long ago a student, recently returned from a stay of several years in Lima, Peru, brought me a letter file containing living termites. They were in a piece of wood, 12x2x¼ inches, not in contact with any other wood of the file. Here the young colony, consisting of about a dozen nymphs and the royal pair, was flourishing after a six weeks sojourn in Berkeley.

Similar introductions from South America, Mexico, the Orient, and especially from the Philippines and Hawaii must have occurred many times. There seems no reason to believe, however, that any such exotic species have become established. One may suppose this failure on the part of introduced species to become established here to be due to the lack of a combination of high humidity and high temperature presumably necessary to bring about swarming and the establishment of new colonies.

The species proved to be *Kalotermes* (*Cryptotermes*) *brevis* (Walker) a termite distributed widely throughout the West Indies, Mexico and Central America and known to be present at least as far south as British Guiana on the east coast of South America. This is the first report from the west coast of South America. The student's description of the damage suffered in Lima from house termites leads me to believe that *Cr. brevis* is well established there and will be found still farther south.

Cr. brevis is a "powder post termite" living in dry wood without ground connections. It is a "house termite" confining its activities largely if not entirely to manufactured wood and other cellulose-containing materials. In certain regions as in Colima, Mexico (Light, 1933) it does a great deal of minor damage to furniture, stored goods, etc. Its ability to live in very thin pieces of hard, relatively dry wood increases the range of its destructiveness as does its tendency to extend its workings into cellulose materials such as books and dry goods left on the wood in which it makes its colony headquarters. This ability to thrive in small pieces of wood, such as those in packing cases etc. makes for its wide dispersal. Fuller's (1921) *Cryptotermes pseudobrevis* found in a box in South Africa is almost certainly this species. It seems possible also that a more complete knowledge of the range of

variation in the species may show *Cryptotermes piceatus* Snyder from Hawaii, the Marquesas and Hongkong as also *Cr. darwini* Light from the Galapagos Islands to be conspecific with *Cr. brevis* (Walker).

AN ANNOTATED LIST OF THE *LEPTURINI* OF OREGON

BY M. F. CANOVA
U. S. Bureau of Entomology

The following list of the members of this tribe of the family *Cerambycidæ* contains host records and points of collection of the several species known to occur within the State, together with authorities for each. Although the following list is probably incomplete in some respects, it is hoped that it may be of service as a ready reference to students of the *Coleoptera.* In this paper, the classification follows Swaine and Hopping '28, the species are, however given in alphabetical arrangement under the several genera.

The writer is indebted to Dr. W. J. Chamberlin, Associate Professor of Entomology, Oregon State College, who very kindly made his personal collection of *Coleoptera* available for study, as well as the collection of the Oregon State College. He gave further much valuable help in the compiling of the data which follows.

Genus ACMÆOPS Lec., 1850

A. atra (Lec.) 1850; Oregon (Leng).

A. basalis (Lec.); Warner Mts., Lake County, Oregon (Chamberlin).

A. directa Newman; Washington (probably Oregon); *Liriodendron, Castanea* (Craighead).

A. longicornis var. Kby.; Steens Mts., Oregon (Scullen).

A. mollipilosa (Lec.) 1860; Oregon (Leng).

A. pratensis (Laich.) 1781-84; Oregon (Leng); Warner Mts., Lake County, Oregon; and Sparta, Oregon (Chamberlin).

Acmaeops proteus (Kby.); Whitman Nat'l. Forest; Melhorns Mill, near Halfway, Baker County, Oregon (Chamberlin).

A. subaena (Lec.); Klamath County, Oregon (Chamberlin).

A. subpilosa Lec.; Corvallis, Oregon (Moore, G. F. Moznette, Schwarz, Farrell, J. C. Bridwell, A. L. Lovett); Condon, Oregon and Soap Cr., Benton County, Oregon (J. C. Bridwell).

A. subpilosa coloradensis Csy.; Corvallis, Oregon (Chamberlin).

A. tumida (Lec.) 1857; Corvallis, Ore. (Schwarz); Klamath Falls, Oregon (Chamberlin).

Genus ALOSTERNA Mulsant, 1863

A. keeni Csy., 1913; California, Oregon, British Columbia (Swaine and Hopping); " . . . variety of *A. rubida* Lec." (Van Dyke); " . . . this species . . . .. has red and more sparsely punctured elytra, etc.," (Sw. & H.).

A. rubida Lec., 1873; California, Oregon (Swain and Hopping); Pamelia Lake, Mt. Jefferson, Oregon, altitude of 3000 ft. (J. C. Bridwell); "Probably breeds in Coniferae" (Van Dyke).

Genus ANOPLODERA Mulsant, 1840

A. amabilis Lec., 1857; Pamelia Lake, Mt. Jefferson, Oregon (J. C. Bridwell); in *Pinus ponderosa* (Hopping).

A. aspera Lec., 1873; in *Betula* (Craighead).

A. barberi Fall, 1907; in dead *Picea sitkensis* (Essig).

A. behrensii Lec., 1873; Mary's Peak, Oregon (Gentner, Lovett); Newport, Oregon (R. E. Dimick); Mt. Jefferson, Oregon (J. C. Bridwell); in *Pseudotsuga taxifolia* and *Picea sitkensis* (Van Dyke).

A. brevicornis Lec., 1873; California (Swaine and Hopping); Oregon (W. J. Chamberlin); in *Abies magnifica* (Blaisdell); in *Pinus ponderosa* and *Abies concolor* (Chamberlin).

A. canadensis Oliv., 1795; Blue Mts., and Hood River, Oregon (Childs); Corvallis, Oregon (Buchanan); Santiam Nat'l. Forest, and Corvallis, and Linn County, Oregon (Chamberlin); in *Abies grandis, Pinus,* and *Tsuga* (Chamberlin); in *Pinus contorta, Tsuga heterophylla* (Craighead); in *Picea* (Felt); in *Pinus strobus* (Swaine).

A. carbonata Lec., 1860; 'Wash. Terr." (Swaine and Hopping); probably Oregon; *Populus trichocarpus* (Sw. & Hopping).

A. chrysocoma Kby., 1837; Whitman Nat'l. Forest, and Klamath Falls, and Melhorn's Hill, near Halfway, Baker County, Oregon (Chamberlin); Crater Lake Nat'l Park (Lovett); Wallowa Lake at 4500-5500 ft., and Aneroid Lake at 7500 ft., and Anthony Lake at 7100 ft. (Scullen); Corvallis, Oregon (H. Richmond); in *Pinus flexilis, P. ponderosa* (Craighead); in *Pinus contorta,* and Alder (Chamberlin); from Waldport, Oregon (Don Mote).

A. convexa Lec., 1850; Cascade Mts., Marion County, Oregon; and Sub-Alpine regions, Mt. Jefferson, Oregon (Bridwell); Three Sisters at 6500 ft.; and Wallowa Lake, Oregon at 6400 ft. (Scullen); Crater Lake Nat'l. Park (Lovett); Hood River, Oregon (Childs).

A. crassicornis Lec., 1875; Blue Mts., Oregon (Swaine & Hopping).

A. crassipes Lec., 1857; California (Craighead); Baker; and Blue Mts.; and Gold Beach, Oregon (McGinnis); Gold Hill; and Austin; and Anthony Lake Road, Baker County, Oregon (Scullen); Newport (Dimick); Mary's Peak, Oregon (Lovett); Sumpter, Oregon (H. F. Wilson); Hood River, Oregon (Childs); in *Pinus* (Craighead); Laurel, *Pinus ponderosa, Sequoia sempervirens,* "more generally in broad-leaf trees," (Chamberlin).

A. dehiscens Lec., 1859; Corvallis, and Three Sisters, Oregon (Scullen); in *Pinus ponderosa* (Chamberlin).

A. dolorosa Lec., 1861; Rainier; and Detroit; and Pamelia Lake, Mt. Jefferson; and Kings Valley, Oregon (Bridwell); Gold Beach, Oregon (McGinnis); in *Pseudotsuga taxifolia* (Chamberlin).

A grossa Lec., 1874; California (Swaine and Hopping); Oregon (Chamberlin); in *Pinus ponderosa* (Chamberlin).

A. impura Lec., 1857; sapwood of dead *Sequoia sempervirens* in California; in *Libocedrus decurrens* (Chamberlin).

A. insignis Fall, 1907; in *Pinus* and *Pseudotsuga* (Chamberlin); "Doubtful if in Oregon, probably confused with *A. valida* Lec.," (Van Dyke); "Easily distinguished by its rounded elytral apices," (from *A. valida*) . . . . . "Apparently very local in distribution," (recorded from Monterey, California) by (Swaine and Hopping).

A. instabilis Hald., 1847; *Pinus ponderosa* (Hopping); *Pinus* (Van Dyke).

A. knulli Sw. & Hopping 1928; "Wash. Terr." (Swaine and Hopping); probably occurs in Oregon also.

A. laeta Lec., 1857; Alpine; and Roseburg, Oregon (Scullen); Sauvies Island, Oregon (Farrell); Corvallis, Oregon (Chamberlin, Wilbur); Newberg, Oregon (Fendall); in *Quercus* (Downes); "Live and other oaks," (Essig).

A. laetifica Lec., 1859 Corvallis; and Sexton Mt., Josephine County, Oregon (Scullen); upper Alsea River; and Corvallis, Ore. (Bridwell); Sparta; and Baker County, Oregon; and Klamath County, Oregon (Chamberlin); in *Pinus* (Van Dyke); in *P. ponderosa* and *P. contorta* (Chamberlin).

A. matthewsii Lec., 1869; "Dead sapwood of Redwood, Cedar, and similar conifers" (Essig).

A. nigrella Say 1825; Joseph, Oregon (Burke); Mt. Jefferson, Oregon (Lovett); Grant County, Oregon (Chamberlin); in *Pinus contorta, Larix occidentalis* (Chamberlin); *P. contorta, Picea, Pseudotsuga* (Craighead).

A. nigrolineata Bland., 1865, Santiam Nat'l. Forest, Oregon (Chamberlin); Hood River, Oregon (Childs).

A. proxima Say 1823; Corvallis, and Wickham, Oregon (Laura Hill; Nellie Naill).

A. sanguinea Lec.; Pamelia Lake, Mt. Jefferson, Oregon at 3000 ft.; and Cascade Mts., Marion County, Oregon (Bridwell); Grant County, Oregon (Chamberlin); in *Pinus ponderosa* (Hopping).

A. sexmaculata Lnn., 1758; Cascade Mts., Marion County, Oregon (Bridwell); in *Pseudotsuga taxifolia, Abies* (Chamberlin).

A. tibialis Lec., 1850; Mt. Jefferson, Oregon (Lovett); Sumpter, Oregon(Wilson); Pamelia Lake, Oregon (Bridwell); Grant County, Oregon (Chamberlin); in *Larix occidentalis, Picea engelmani, Umbelliferae* (Chamberlin).

A. tribalteata Lec., 1874; Hope Mts., British Columbia, California; Nevada; Idaho (Swaine and Hopping); Oregon Mt., Josephine County, Oregon (Scullen).

A. valida Lec., 1857; Santiam Nat'l. Forest, Oregon (Chamberlin); Pamelia Lake, Mt. Jefferson, Oregon (Bridwell); Douglas County, Oregon; in *Pinus ponderosa, Tsuga mertensiana, Abies* (Craighead); *Pseudotsuga taxifolia* and *Pinus* (Van Dyke); *Tsuga mertensiana* (Chamberlin).

A. vexatrix Mann., 1853; Corvallis; Upper Alsea River; Mill Creek Moraine; Mt. Jefferson; base of Mary's Peak; Oregon (Schwarz, J. C. Bridwell, and others); Brookings, Oregon (Scullen); Rock Creek Valley, Benton County, Oregon (Bridwell); "Probably *Coniferae*-feeding," (Van Dyke).

Genus ANTHOPHILAX Lec., 1850

A. mirificus Bland., 1865; Oregon (Leng).

A. nigrolineatus Van D., 1917; Oregon (Leng).

Genus CENTRODERA Lec., 1850

C. nevadica Lec.; Nevada, California, Southern California; (Swaine and Hopping); "From Northern California, so probably in Southern Oregon," (Van Dyke); in *Pinus ponderosa* (Van Dyke).

C. oculata Csy.; California (Leng; Craighead; Swaine & Hopping); probably occurs in Oregon.

C. spurca (Lec.); Junction City, Oregon (Ethel Harpole); Corvallis, Oregon (Sprague; Schwarz; Brown; Woods; Chamberlin); Alsea, Ore. (Rosendorf); Minam Nat'l. Forest, Oregon—20 miles northwest of Bly, Oregon (Johnson); *Pseudotsuga taxifolia* (Essig; Chamberlin).

Genus EVODINUS Lec., 1850

E. monticola (Rand.) 1838; Mary's Peak, Oregon (Moznette); Pamelia Lake at 3000 ft. and Mt. Jefferson, Oregon (Bridwell); in *Abies* (Van Dyke).

E. vancouveri Csy., 1913; Probably occurs in Oregon (Leng).

Genus GAUROTES Lec., 1850

G. cressoni Bland., 1864; Colorado, Nevada, Northern California (Leng); Corvallis, Oregon (Scullen; Mallett); Ontario, Oregon (Mallett); in *Abies, Pseudotsuga taxifolia* (Van Dyke).

G. lecontei Csy., 1913; Oregon (Leng).

Genus GRAMMOPTERA Serville, 1835

G. filicornis Csy., 1913; Colorado, New Mexico, British Columbia, Washington (Swaine & Hopping); Hood River, Oregon, and Corvallis, Oregon (Moznette; Wilson); "Adults on wild geranium and rose," (Swaine & Hopping); "Probably breeds in *Coniferae*," (Van Dyke).

G. molybdica Lec., 1850; Oakridge, Oregon (Chamberlin); "Adults on blossoms of *Ceanothus divaricatus*," (Swaine and Hopping).

G. rhodopus Lec., 1874; "Cala." (Swaine & Hopping); probably occurs in Oregon; "Probably breeds in *Coniferae*," (Van Dyke).

G. sp. ?; (in Chamberlin collection); Crater Lake Nat'l. Park, Oregon at 6600 ft. (F. Lyle Wynd).

G. subargentata Kby., 1837; Steens Mts., Harney County, Oregon (Chamberlin); Corvallis, Oregon (Moznette); in *Quercus densiflora* and other oaks (Essig); "Probably breeds in *Coniferae* (Van Dyke).

Genus LEPTACMÆOPS Csy., 1913

L. alticola Csy., 1913; Oregon (Leng).

L. longicornis Kby.; Buck Mt., Oregon; and Corvallis, Oregon (in Oregon State College collection); Steens Mts., Harney County, Oregon; and near Crane, Oregon (Chamberlin).

L. lupina (Lec.) 1860; Oregon (Leng).

L. militaris (Lec.) 1850; Oregon (Leng).

Genus LEPTALIA Lec., 1873

L. fuscicollis (Lec.) 1857; California, Vancouver (Leng); probably occurs in Oregon.

L. macilenta (Mann.) 1853; McKenzie Bridge, Oregon (Chamberlin); from branch of Oregon Alder (Chamberlin).

Genus LEPTURA Linn., 1758

L. anthracina Lec., 1875; Oregon, Nevada, California (Swaine and Hopping); "Probably breeds in *Coniferae*" (Van Dyke).

L. obliterata Hald., 1847; Cascadia, Oregon (Scullen); Mt. Jefferson, Oregon (Chamberlin; Bridwell); Newport, Oregon (Dimick); Mary's Peak, Oregon (Mote; Lovett); Santiam Nat'l. Forest, Oregon (Chamberlin); Blue Mts.; and near Halfway, Baker County, Oregon (Gentner; Chamberlin); Rickreall (Allen);

in *Abies nobilis* (Chamberlin); *Abies, Picea engelmanni, Tsuga mertensiana, Pseudotsuga taxifolia* (Craighead); *Pinus ponderosa* (Hopping); *Pinus murrayana* (Craighead); sapwood of *Sequoia sempervirens, Pseudotsuga taxifolia,* and other conifers (Essig).

L. plagifera Lec., 1875; Grant County; and near LaGrande; and Klamath County; and Sumpter, Oregon (Chamberlin); in *Pinus contorta* (Chamberlin); *Pinus ponderosa* (Craighead; Hopping).

L. propinqua Bland., 1865; Colorado, New Mexico, Utah, California, Washington, Oregon, British Columbia, Nevada, Arizona, Idaho (Leng); "Sierra Nevada and Rocky Mountain species," (Swaine & Hopping); McKenzie Bridge; & Blue Mts. at 7100-7850 ft.; & Cascadia; & Mt. Hood at 6000 ft.; & Mary's Peak, Oregon (Scullen); Sparta, & near Halfway, Baker County, Oregon (Chamberlin); Mt. Jefferson, Oregon (Lovett); Sumpter, Oregon (Wilson); in *Picea engelmanni* (Craighead); *Pinus monticola* and *P. contorta* (Herbert); *Abies* (Van Dyke).

Genus Ophistomis (Lec.)

O. delicata (Lec.); Sexton Mt., Josephine County, Oregon; and Grave Creek, Josephine County, Oregon (Scullen).

Genus Pachyta Dej., 1821

P. armata Lec., 1873; Three Sisters, Oregon (Scullen); Cascade Mts., Marion County, Oregon, at 6000-8000 ft.; & Pamelia Lake, Mt. Jefferson, Oregon, at 3000 ft. (Bridwell); Santiam Nat'l. Forest, Oregon (Chamberlin); Mt. Jefferson; & Anna Creek, Klamath County, Oregon (Lovett); Crater Lake, Oregon (Van Dyke); in *Tsuga mertensiana* (Chamberlin).

P. liturata Kby., 1837; Melhorn's Mill, near Halfway, Baker County, Oregon (Chamberlin); in dead firs and *Pseudotsuga taxifolia* (at high altitudes—Essig); *Abies grandis* (Chamberlin).

Genus Pidonia Muls., 1863

P. gnathoides Lec., 1874; Corvallis, Oregon (Wilson); "Undoubtedly breeds in conifers," (Van Dyke).

P. scripta Lec., 1869; Corvallis, Oregon (Laura Hill; Bridwell); Mary's Peak, Oregon (Chamberlin); Summit, Benton County, Oregon (Scullen); in *Pseudotsuga taxifolia* (Chamberlin).

Genus Piodes Lec., 1850

P. coriacea Lec., 1850; Oregon (Leng).

Genus Stenocorus Geoffroy, 1762

S. lineatum Olivier; Whitman Nat'l. Forest; & Mary's Peak, Oregon (Moznette); Santiam Nat'l. Forest; & Grant County, Ore-

gon (Chamberlin); Corvallis, Oregon (Childs; Reynolds); in *Pinus ponderosa, P. Jeffreyi, P. radiata, P. sabiniana,* and "Works under bark of all dead conifers except the *Cupresinae,*" (Chamberlin).

Genus Toxotus Dej., 1821

T. brevicollis Csy.; Steens Mts., Oregon (Chamberlin); Corvallis, and Woodburn, Oregon (Moznette).

T. flavolineatus Lec., 1854; Vancouver; California (Leng); probably in Oregon also.

T. oregonensis Csy., 1913; Oregon (Leng).

T. vestitus Hald., 1847; Corvallis, Oregon (Totten; Bridwell); LaGrande, Oregon (Reynolds); Woodburn, Oregon (Moznette); Valley, Alsea Mt., Benton County, Oregon (Bridwell); also specimens from Hillsboro, Silver Cr., and Rock Cr., Oregon; (in Oregon State College collection).

T. virgatus Lec., 1874; Oregon (Leng).

Genus Typocerus Lec., 1850

T. balteatus Horn, 1878; "Northwest Territories." (Sw. & Hopping); probably in Oregon.

Genus Xylosteus Frivoldszky, 1838

X. ornatus Lec.; "Found in Lassen County, California, close to Oregon border," (Van Dyke); probably occurs in Oregon also; host probably *Abies* (Van Dyke).

Bibliography

Bradley, J. C.; 1930; "A Manual of the Genera of Beetles of America North of Mexico."

Craighead, F. C.; 1932; Can. Depart. Ag. Bul. No. 27, n. ser., Tech., "North American Cerambycid Larvae."

Essig, E. O.; 1926; "Ins. Wn. N. Amer.", pp. 448-462.

Garnet, R. T.; 1918; Can. Ent.; L; 172, 205, 248, 281; "Annot. List Cerambycidae of California."

Jour. N. Y. Ent. Soc., XXV; 38; (Keys, etc.), "Synopsis of Anthophilax of N. Amer."

Leconte, J. L.; 1858; "Pacific Coast RR. Survey—Insects—Coleoptera." No. 1; p. 23.

Leconte, J. L. and Horn, G. H.; 1883; "Class. Coleop. N. Amer."; Smith. Misc. Coll. 507; pp. 312-313.

Leng, Chas. W.; 1920; "Cat. Coleop. Amer. N. Mex."

Leng, Chas. W.; 1927; "Supp. to Cat. Coleop. Amer. N. Mex."

Swaine and Hopping; 1928; "Lepturini of Amer. N. of Mex."

BEES FROM NORTHERN CALIFORNIA

BY T. D. A. COCKERELL

That part of California which lies north of San Francisco and west of the Sacramento Valley is a region of extraordinary interest for the biologist, containing a fauna and flora which is in many ways unique and suggestive of vast antiquity. In particular, it is the home of the redwood, which formerly was widespread over the Northern Hemisphere, but now makes its last stand in California. My wife and I visited this region April, 1935, in company with Mr. Edward P. Van Duzee, to whom we are more indebted than we can well express. We obtained a rather large collection of bees, many of them new to science. The flowers visited were noted in most cases, and for the identification of the plants, we are indebted to Miss Alice Eastwood.

The present paper represents a first contribution to the knowledge of the bee fauna of this region. The bees of Oregon and Washington on the one hand, and of California south of San Francisco Bay on the other, have been rather extensively though still very incompletely investigated. Those of the coast region of northern California have been neglected, except for a certain number of records scattered through the literature, perhaps fairly numerous should they be assembled. In the present contribution some records are given of specimens collected years ago, now in the collection of the California Academy. All the holotypes of the species now described will be placed in the Academy. It is hoped that in course of time this bee fauna will become sufficiently well known to justify a summary and critical discussion. Indeed, the whole biota of the redwood country and adjacent regions should be dealt with in a similar manner, and should eventually form the subject of an extremely interesting book.

Many of the bees not listed here have been studied by Mr. Chas. Michener, who will report upon them.

MEGACHILIDÆ

Raphidostoma Cockerell, gen. nov. (Osmiinæ)

Small bees somewhat related to *Chelostoma* Latr., but easily distinguished by the characters of the labial palpi, the antennæ, and the abdomen.

Male. Maxillary palpi three-jointed, the basal joint small and short; labial palpi very long, the first two joints very broad, with a minutely reticulate surface, the second joint about twice as long as the first; two slender apical joints, the last a little longer than the penultimate, both directed sideways from the end of the second joint. (In *Chelostoma florisomne* L., there seems to be only one small apical joint, but there are really two, only the penultimate one is in a line with the second joint); tongue long and slender, a little exceeding the labial palpi; mandibles bidentate; malar space linear; clypeus simple, covered with a dense beard; antennæ very long and slender, the flagellum quite simple; mesothorax and scutellum finely and closely punctured; area of metathorax short; stigma of moderate size (about as in *Chelostoma minutum* Crawford); basal nervure meeting nervulus; second cubital cell not very long (very long in *C. florisomne*), receiving the first recurrent nervure at a distance from base about equal to half intercubitus, and the second nearer apex; marginal cell long, obtuse at end; legs slender, simple; claws cleft, pulvilli distinct; abdomen strongly convex, oval, first tergite broadly cup-shaped, with a short petiole, the basal portion bounded by a slender rim; apical tergites turned downward, the apex broadly rounded and simple; venter flattened, without any tooth or process, but with much white hair. Type *R. ceanothi* sp. n.

Raphidostoma ceanothi Cockerell, sp. n.

Male. Length about 5.5 mm.; black, the head large, globose, with prominent eyes; face with very long white hair, that on front and vertex flavescent; cheeks broadly rounded, with thin white hair; vertex finely punctured; ocelli rather large; mesothorax finely and densely punctured, only moderately shining, scutellum similarly punctured; area of metathorax dull, with a shining rim; wings greyish hyaline (not reddish as in *Chelostoma minutum*), nervures brown, stigma dark reddish; legs black, with scanty white hair; thorax dorsally with very long erect yellowish hairs, only noticeable in certain lights; abdomen shining, finely punctured, without bands, the tergites with very short thin hair, the venter with abundant long white hair.

Underwood's Cabins, Redwood Highway, at *Ceanothus cuneatus* (Hooker). This is the type, but a second specimen was obtained by H. H. Keifer at Mill Valley, Marin Co., March 15, 1925. There is also one from Yorkville, Mendocino Co., May 1, 1924 (E. P. Van Duzee.)

Osmia lignaria Say.

Meyer's auto camp, five at *Lupinus arboreus* Sims, variety; Perrott Grove, west boundary, one at *Rubus*. Also one at Chico, April 13. All females.

Andrenidæ

Andrena ablusula Cockerell, sp. n.

Female. Length 8.5-9.5 mm., anterior wing 8; rather slender, head and thorax appearing black, but sides of face evidently or obscurely green, mesothorax and scutellum with a faint greenish tint, the almost yellowish-green scutellum contrasting with the blue-black metathorax; mandibles, antennæ and tegulæ black, or the tegulæ with a brownish mark; legs black; abdomen dark olive green, the margins of the tergites very narrowly whitish. Hair of head and thorax long and erect, pale and dull, slightly flavescent, light red on mesothorax and scutellum; legs with pale hair, reddish on inner side of tarsi, black below hind knees; tergites 2 to 4 with very thin, weak, but evident, white hair-bands, broadly interrupted in middle; hair at apex of abdomen soot-color. Process of labrum rather narrowly truncate; third antennal joint slender, about as long as next two combined; facial quadrangle much broader than long; facial foveæ black (the outer part pale reddish, seen from above), not broad, about a third as broad as distance between eyes and antennæ, ending below at about level of antennæ, separated from orbits only by a line; clypeus sparsely but distinctly punctured, appearing dull seen from in front, but seen from below the lower half is polished, and there is a polished line along upper edge; mesothorax dull, with weak widely separated punctures; scutellum a little shining anteriorly; area of metathorax dull and granular; wings long, dusky hyaline, distinctly darker at apex; stigma large, uniform dark red; nervures rather light brown; basal nervure meeting nervulus; second cubital cell receiving recurrent nervure well beyond middle; first intercubitus not near stigma; hind tibiæ long and slender; hind basitarsi longer than the other joints together; tibial scopa long and loose, the hairs simple, but hairs on hind margin of tibia more or less branched; spurs almost colorless; abdomen shining, without distinct punctures, bases of tergites 2 to 4 dull; second tergite depressed fully a third; venter polished, greenish, the sternites with more or less evident depressions or pits.

Underwoods (type locality), at *Ceanothus cuneatus* (Hooker), 1 female (Cockerell); Garberville, Humboldt Co., April 19, at *Cercocarpus betuloides* Nuttall, 2 females (Cockerell). In Viereck's table of northwestern species, it runs out next to *A.*

piperi Viereck, which is smaller, and quite different. In other tables it goes near *A. subtrita* Ckll. and *A. coloradino* Vier. & Ckll., but it is not much like either. It differs from *A. candida* Sm., by the black metathorax, green abdomen, and feeble bands.

In Perkins' table (1919) it runs to 17, and agrees in having the first tergite rugulose (actually minutely tessellate) between the punctures, and the abdominal bands formed only on the hind margins of the apical depressions of tergites. This places it in the vicinity of *A. ovatula* Kirby, *A. wilkella* Kirby and *A. similis* Smith (subgenus *Tœniandrena* of Hedicke), but it differs by the metallic color, and is less robust, being shaped about as in the males of this group.

Andrena angustella Cockerell, sp. n.

Male. Length about 8 mm., anterior wing slightly over 7; black, with narrow fusiform abdomen, regularly and conspicuously narrowed basally; clypeus with a very large, polished, pale yellow patch, leaving the lateral and upper margins broadly black, the yellow also slightly notched on each side, and deeply and broadly notched above in middle; hair of head and thorax erect, very long, dorsally pale red (some black hairs about ocelli), pale red also on face, but black at extreme sides, dull white on cheeks and lower part of pleura; head extremely broad; malar space very small; cheeks shining, greatly broadened, with a prominent but obtuse angle above on level of middle of eye; mandibles with no basal tooth, but bidentate; process of labrum bidentate; front dull, with a shining band next to orbits; cheeks at top highly polished, abruptly contrasting with the entirely dull vertex, which is broad and flat; antennæ entirely black, flagellum very long, shining; third antennal joint dull black, about as long as fourth; thorax small; mesothorax entirely dull, with a shining median line; scutellum large, with two slightly shining swellings in front; postscutellum with a little pit in middle of upper border; area of metathorax entirely dull, without evident sculpture; tegulæ black; wings faintly dusky; stigma large, clear pale amber; nervures pale; basal nervure meeting nervulus; second cubital cell conspicuously narrowed above, receiving recurrent nervure about middle; first intercubitus not near to stigma; legs slender and black, with pale hair (creamy white on inner side of tarsi), last tarsal joint pale red; spurs white; abdomen with first tergite dull, hardly shining (microscopically striate and tessellate, with scattered very long hairs); second rather more shining, very feebly depressed about one-fourth; remaining tergites polished; tergites 2 to 5 with thin, weak, slightly fulvescent hair-bands, hair at apex pale fulvescent; apical

plate (eighth sternite) very broadly truncate, slightly emarginate, in the style of *A. wheeleri* Graenicher.

Underwoods (Redwood Highway) at *Fragaria*, latter half of April, 1 male (Cockerell).

Variety a. Hair of head and thorax above white; light hair of face white or yellowish white; clypeal mark only feebly notched in middle above; the slender abdominal bands white; Garberville, April 19, at *Cercocarpus betuloides* Nuttall, 1 male (Cockerell); eight miles north of Ukiah, April 21, at *Ranunculus occidentalis* Nuttall, 1 male (Cockerell). The clypeal mark recalls that *A. bradleyi* Viereck and *A. saccharina* Ckll. & Rohwer, but these have the malar space large. There is some resemblance to the Californian *A. macrocephala* Ckll., which has a broader, though fusiform, abdomen. The position of the tubercle of labrum suggests *A. marginata* (Fabricius).

Andrena anisochlora Cockerell, sp. n.

Female. Length about 9 mm., anterior wing 7; head (with mandibles and antennæ), thorax and legs black, abdomen broad and shining, obscure dark green, the depressed portions of the tergites black, with a linear pallid margin; third antennal joint longer than next two together on upper side, but not on lower; face very broad (width about 2 mm.); hair of head long and black, except yellowish white on occiput; process of labrum truncate; malar space evident but very short; facial foveæ black, narrow, separated from eye by a shining line, ending below at about level of antennæ; clypeus entirely dull, the surface microscopically transversely striate; thorax with long dull whitish hair, faintly creamy dorsally, but with no black; mesothorax dull, scutellum a little shining anteriorly; area of metathorax dull, the whole metathorax with long erect hair; mesopleura strongly convex, but rounded, not submarginate, below; tegulæ small, very dark brown; wings hyaline, faintly dusky; stigma red, rather narrow; nervures dark brown; basal nervure falling short of nervulus; second cubital cell nearly square, receiving recurrent nervure a little beyond middle; first intercubitus not near to stigma; legs with pale hair; hind tibial scopa large and compact, the hairs simple but with a granular appearance, on under side straight; hind basitarsi broad; first tergite polished on disc, but microscopically tessellate, without a differentiated apical depression; second tergite depressed less than a third; no hair-bands; hair at apex pale sooty.

Mark West Springs, April 23, 1 female (W. P. Cockerell). On the hind legs, and sides of metathorax, it carries a large amount of pale pink pollen. The flower visited was *Montia gypsophil-*

oides (Fischer & Meyer). By the structure of the thorax, this has some affinity with the subgenus *Gonandrena.* It possibly has a light clypeus in the male, in the manner of *A. unicula* Ckll. The black hair on face suggests *A. nigrocærulea* Ckll., but that has black hair on pleura and is otherwise different. *A. amplificata* Ckll. is rather similar, but *A. anisochlora* is smaller and quite different by the dull clypeus. There are several points of resemblance to the European *A. lapponica* Zett., noticeably the covering of erect hairs on metathorax. It should therefore fall in strictly typical Andrena (subg. *Hoplandrena* Perez)

ANDRENA AURICOMA Smith

Yorkville, Mendocino Co., May 17, 1928. 1 female (Van Duzee)

ANDRENA CANDIDA Smith

Kearney Mesa, near San Diego, at flowers of *Phacelia parryi* Torrey, 3 females, March 17, 1935 (W. P. Cockerell, B. A. Henderson); Garberville, Humboldt Co., April 19, at *Cercocarpus betuloides* Nuttall, 1 female (Cockerell).

It is extraordinary that this species should visit such different flowers, in such totally diverse environments. A female was also taken at Chico, April 13, (Cockerell).

ANDRENA CARLINIFORMIS Viereck & Cockerell

Inverness, May 21, 1910, 1 female (E. C. Van Dyke). It differs from the type by having no white hair in middle of metathorax, and outer intercubitus without a distinct double curve; it thus approaches *A. perimelas* Ckll., which may not be a distinct species.

ANDRENA CEANOTHINA Cockerell, sp. n.

Female. Length about 10 mm., anterior wing 7.7 mm., black, including antennæ, mandibles, legs and tegulæ; third antennal joint about as long as next two together on lower side; process of labrum broadly truncate, with a pit or depression in the middle, facial foveæ very broad, black, ending obtusely below at about level of antennæ; face broader than long, but not excessively broad; clypeus convex, polished, with very strong but well separated punctures; vertex dull; hair of head long, pale fulvous, a little brown behind

ocelli; hair of thorax above long, deep fox-red, on pleura and metathorax dull whitish; mesothorax dull, scutellum shining anteriorly, without bosses; area of metathorax entirely dull and without evident sculpture; wings hyaline, a little dusky, the outer margins darker; stigma and nervures dilute sepia, the stigma with a dark margin; basal nervure meeting nervulus; second cubital cell large and square, receiving recurrent nervure a little beyond middle; legs with whitish hair, but black on the copious hind tibial scopa behind, the hairs of scopa simple; hind basitarsi rather broad; spurs brown; abdomen dullish, with extremely minute punctures; second tergite depressed a little more than a third; tergites 2 to 4 with rather broad bands of yellowish white hair, that on second weak in middle; hair of fifth tergite dark grey; venter finely but distinctly punctured, not polished, the hair dull whitish.

Underwood's Cabins, Redwood Highway, at *Ceanothus cuneatus* (Hooker), 1 female, last half of April (Cockerell). In appearance, this is so similar to *A. lupini* Ckll., that I had at first considered it identical. Nevertheless, it is not a *Pterandrena*, and is probably not very closely related. It may be compared with the Rocky Mountain *A. vierecki* Ckll., which is smaller, with facial foveæ light brown, and the hind tibial scopa, while mainly simple, showing plumose hairs posteriorly toward apex. There is a strong resemblance to *A. opaciventris* Ckll., which has greyish-brown facial foveæ, and paler hair at end of abdomen. (In *A. opaciventris* the fulvous hair bands are on tergites 2 to 4, not 3 to 5, as stated).

A male taken at the same time and place, but at *Ceanothus foliosus* Parry, appears to belong to *A. ceanothina,* although the abdomen lacks hair-bands, and the wings are clear hyaline, only a little dusky at apex. It is about 9 mm. long, with very broad face, the clypeus with a large beard of pale fulvescent hair, but abundant long black hair at sides of face; cheeks rounded, quite ordinary; flagellum very long, black; mesothorax with pale reddish hair, brighter red on scutellum; spurs very pale reddish; first and second tergites dull; traces of bands at extreme sides of second and third tergites; hair at apex of abdomen pale fulvous. It is easily known from *A. ribifloris* Vier. & Ckll., and related species, by the dull second tergite. A second male, agreeing with the above, is from Mill Valley, Marin Co., Feb. 28, 1926 (Van Duzee).

Andrena cercocarpi Cockerell, sp. n.

Female. Length about 7.5 mm., anterior wing 5; hind tibial scopa simple; third antennal joint about as long as next two together. A small black species, flying with *A. orthocarpi* Ckll, and exceedingly like it in most respects, but differing thus: flagellum red beneath; mesopleura convex, ordinary; wings greyish; stigma narrower, with a dark border; second cubital cell receiving recurrent nervure well beyond middle; abdomen dull, hair-bands creamy-white; depression of second tergite very short, less than one-fifth; whole surface of tergites, under microscope, showing an excessively minute but very sharply defined tessellation. The hair on inner side of hind basitarsi is creamy white.

The dusky stigma, reddish facial foveæ, and short depression of second tergite readily separate it from *A. nasonii* Rob.

Garberville, April 19, at *Cercocarpus betuloides*, 1 female (Cockerell).

Andrena complexa Viereck

Mark West Springs, April 23, at *Ranunculus*, 6 females. They agree with one from Corvallis, Oregon, April 22, determined by Viereck. This is a topotype.

The following notes were made at the Citrus Experiment Station at Riverside:

Andrena cærulea acrypta Viereck, female, head and thorax with much erect long dull white hair; flagellum dusky reddish beneath; mesothorax dull; stigma large, light reddish with dark margin; basal nervure meeting nervulus or barely short of it; second cubital cell very broad, with parallel sides, receiving recurrent nervure before middle; middle basitarsi very broad; head and thorax blue, abdomen olive green; second tergite in middle depressed rather over a third; abdomen shining, very finely punctured, hair at apex dark brown. Timberlake notes that it has a plumose scopa.

This is from a cotype. Compared with *A. complexa* in the collection (det. Viereck, but not cotype), I thought it was the same species. Viereck (in litt.) long ago stated that *A. acrypta* and *A. erigenoides* were identical with *A. cærulea* Smith, although in his table the latter was said to have the abdomen black. I have a female labelled *A. erigenoides*, I believe determined by Viereck, from Victoria, B. C., May 27, 1916 (R. C. Treherne), and it has

the abdomen olive green. It is exceedingly like *A. complexa*, but can be distinguished by the abundant black hair on upper half of pleura.

The following notes on a female (det. Timberlake) labelled *A. cærulea complexa* were also made at the Citrus Experiment Station. The specimen is from Berkeley, California. Dark green; stigma dusky reddish with dark margin, second cubital cell receiving recurrent nervure about middle; facial foveæ black, rather narrow, well separated from eye; clypeus black, entirely dull; mesothorax and scutellum dull, scutellum a little shining anteriorly. There was also a male; tergites subfasciate at sides, and much black hair at sides of face.

Whether this series represents a single variable species (*A. cærulea* Smith), or a group of closely allied species, cannot at present be determined.

Andrena supervirens Cockerell, 1924, is identical with *A. complexa.*

Since writing the above, I have received a long series of female *A. complexa* from the California Academy, with the following data:

Mark West Springs, April 23, at *Ranunculus*, seven (Van Duzee); Yorkville, April 24 and May 17, six (Van Duzee) Meyers, five miles north of Miranda, April 18 at *Ranunculus*, two (Van Duzee); Point Reyes, March 22, one (H. H. Keifer); Muir Woods, May 4, (Van Dyke); Yolanda, March (C. L. Fox); Fairfax, April 13 (Van Duzee); Ross, Marin Co., March 31 (Van Duzee); Fort Baker, March 15, (C. L. Fox).

Andrena epileuca Cockerell

Garberville, at *Cercocarpus betuloides* Nuttall, one male.

Andrena erecta Viereck

Meyer's auto camp, at *Lupinus arboreus* Sims, variety, 1 female. Agrees with a paratype from Victoria, B. C., June 10, 1923, (K. F. Auden).

Andrena fulvihirta Viereck and Cockerell

Underwoods, at *Ceanothus cuneatus* (Hooker), April, one female. (Cockerell). This differs a little from the Colorado type

in that the basal nervure falls a little short of nervulus, and the second cubital cell receives recurrent nervure very slightly beyond middle, but I cannot venture to separate it. The hair of thorax above (especially the scutellum) is very bright red. It is easily known from *A. vierecki* Ckll. by the polished abdomen. It is close to *A. physariæ* Ckll., but less robust, wings not darkened at apex, nervures darker, abdominal hair-bands redder, and clypeus more coarsely punctured, with a median ridge. The facial foveæ appear pale reddish seen from above, but seen from in front they look black, overlapped by spreading fulvous hairs.

ANDRENA (TRACHANDRENA) LIMAREA Viereck

Near Prairie Creek, Humboldt Co., April 16, 1 male (Cockerell). Compared with a specimen from Washington State, the hind basitarsi are shorter with white instead of fulvescent hair on inner side.

Andrena (Pterandrena) lupini Cockerell, sp. n.

Female. Length about 11.5 mm., anterior wing nearly 9; black, including mandibles, legs and antennæ, tegulæ very faintly brownish; eyes pure black; face and top of head with long fulvous hair, on cheeks paler, the long hairs overlapping ocelli sometimes dark; third antennal joint about as long as next three together; malar space very short; process of labrum forming a low triangle, with a nipple-like summit; face exceedingly broad (over 2 mm. between orbits), the facial foveæ black, very broad, separated only by a line from orbits, ending very obtusely a little below level of antennæ; clypeus broad, convex, shining, with thinly scattered weak punctures, and no median ridge; mesothorax and scutellum covered with long fox-red hair, the surface dull, the scutellum with a pair of somewhat shining prominences; area of metathorax entirely dull, without evident sculpture; hair of pleura and metathorax pale, slightly flavescent; wings dusky; stigma long, pale dull red, nervures dark brown; basal nervure meeting nervulus; second cubital cell large, receiving recurrent nervure distinctly beyond middle; legs with pale hair, light red on inner side of tarsi, middle femora with a brush of stiff red hair beneath, hind tibial scopa strongly plumose; hind basitarsi long and slender; spurs very pale flavescent; abdomen shining but not polished, covered with extremely minute punctures, second tergite depressed less than a third; tergites 2 to 4 with entire, not very broad, bands

of appressed fulvescent hair; fringe of fifth tergite pale brownish grey (dilute chocolate); venter polished, with thin white(slightly yellowish) hair-bands.

Meyer's auto camp, Humboldt Co., at *Lupinus arboreus* Sims, variety, 3 females, last half of April, 1935 (Cockerell). Superficially very like *A. ceanothina* Ckll., but at once separated by the weak sculpture of the clypeus. In my key to species with red hair on scutellum, it runs near *A. pronitens* Ckll., which is much smaller, with a highly polished clypeus, and white hair at end of abdomen.

ANDRENA MANITOUENSIS (Viereck and Cockerell)

Meyer's auto camp, Humboldt Co., at *Salix*, one male. This species was described (1914) from Colorado, as a subspecies of *A. washingtoni* Cockerell. It was originally found on Ribes, but I do not at present know how to separate the Californian insect. The head seen from in front is very like that of *A. monogonoparia* Viereck, from Nevada, but that species has different wings, no red hair on thorax, and dull second tergite. At Underwoods, at *Ceanothus cuneatus*, I took a smaller male which I had at first separated as distinct but it seems to have no specific characters. This specimen, compared with a Colorado *A. bisalicis* Viereck, differs by the more dusky wings, with darker stigma, dark tegulæ, and hind margins of tergites not pale. Compared with *A. fernaldiella* Vier. & Ckll. it differs by the long white beard on clypeus, the stouter, black flagellum, dark marginal stigma and larger abdomen.

ANDRENA MICRANTHOPHILA Cockerell

Ross, Marin Co., April 28, 1918, 1 female (Van Duzee).

Andrena (Micrandrena) microchlora subalia
Cockerell, subsp. n.

Female. Length about 6.5 mm., anterior wing 5; head and thorax dark olive green, the clypeus black with a rosy tint at upper end, the metathorax very dark bluish green; head broad, the facial quadrangle conspicuously broader than long; mandibles and antennæ black; facial foveæ narrow, their pubescence white, the lower end narrow, at about lower level of antennal sockets; clypeus dull, with scattered punctures, the surface finely transversely stri-

ate (as seen under microscope); process of labrum large, truncate, the sides abruptly descending; third antennal joint near as long as next three combined, the fourth being very short, wider than long; head and thorax with thin dull white hair; mesothorax and scutellum somewhat shining but not polished; area of metathorax dull and granular; tegulæ almost black, with only a faint brown tinge; wings hyaline, slightly dusky, stigma dusky red, nervures brown; basal nervure falling short of nervulus; second cubital cell broad, receiving recurrent nervure about middle; first intercubitus almost touching stigma; legs black, with white hair, only faintly yellowish on inner side of tarsi; hind basitarsus rather broad; tibial scopa short; abdomen olive green, shining; tergites 2 to 4 with narrow white hair-bands, interrupted on first two; hair at apex mostly pale, but more or less brownish or sooty in middle; second tergite depressed about or nearly a third.

Near Lower Lake, at yellow umbellifer (type locality), 2 females (Cockerell); eight miles north of Ukiah, at *Ceanothus cuneatus*, 4 females (W. P. Cockerell); Burns Valley, at *Rhus*, 1 female (W. P. Cockerell); Underwoods, at *Ceanothus cuneatus*, 1 female (Cockerell). All in last half of April. Nearest to *A. microchlora* Ckll., from Colorado, but the face is considerably broader (though variable), and the margins of the tergites are less evidently pallid. The resemblance is so close that I give the Californian insect only subspecific rank. The male of *A. microchlora* has the clypeus yellow, with two black dots.

Andrena (Micrandrena) nitidicornis Cockerell, sp. n.

Male. Length about 5.7 mm., anterior wing 4.4; head, thorax and abdomen very dark green, mandibles, antennæ, tegulæ and legs black; clypeus with a large transverse cream-colored patch, shaped like an inverted tea-cup, with a transverse black bar on its disc, leaving the upper and lateral margins of clypeus broadly dark; facial quadrangle broader than long; anterior orbits with a shining margin; clypeus shining, front dull; clypeus with a long white beard, and long white hair on cheeks, but hair of head otherwise black or blackish; third antennal joint about as long as fourth; flagellum long, shining, moniliform; cheeks flattened, moderately broad, not angular; hair of thorax long and white, dull fulvescent on scutellum; mesothorax dull, moderately shining on disc. Scutellum more shining; wings hyaline, faintly dusky; stigma large, very dark brown, nearly black; nervures brown; basal nervure falling far short of nervulus; second cubital cell large, receiving recurrent nervure a little before middle; first intercubitus

reaching stigma; legs with pale hair, spurs brown; abdomen dullish dark green, hind margins of tergites narrowly more or less reddish; hair-bands rudimentary: apex with white hair.

Garberville, Humboldt Co., April 19, at *Cercocarpus betuloides*, 1 male (Cockerell). Easily known from *A. microchlora* Ckll. by the restricted clypeal mark, the dark stigma and the position of the first recurrent nervure. Also the joints of the flagellum are very much longer than in *A. microchlora*. It is possible, but I think not probable, that this is the male of *A. chlorogaster* Viereck, insufficiently described from Oregon.

ANDRENA (PLATANDRENA) NUDISCOPA Viereck

Meyer's auto camp, Humboldt Co., at *Salix*, April, 1 female (W. P. Cockerell); eight miles north of Ukiah, at *Ceanothus cuneatus* (Hooker) April 21, 1 female (W. P. Cockerell). Compared with a specimen of *A. nudiscopa* determined by Viereck, from Fort Collins, Colo., June 12, 1900 (Gillette), the Californian specimens differ by the black flagellum and tegulæ. The species was described from Corvallis, Oregon, April, May and June. Viereck (in litt.) stated that his *A. angustitarsata* was the same species; if this is the case, that name has a month's priority. *A. angustitarsata* came from Washington State, *A. mustelicolor huardi* Viereck is very closely allied, but has the hind basitarsi shorter and broader, and the broad facial foveæ entirely white-haired. Malloch remarks (in litt.) that various species have the cuneate type of hind tibiæ considered distinctive of *Platandrena*, and cites as examples *A. wheeleri* Graen., *A. fragariana* Graen. and *A. ziziæformis* Ckll., the last two pertaining to the group *Micrandrena* Ashmead. A European species with this character is *A. dorsata* Kirby, placed by Hedicke in the subgenus *Simandrena* Pérez.

At the Citrus Experiment Station, I found *A. angustitarsata* from Corvallis, determined by Timberlake. I noted: facial foveæ white, rather broad; clypeus very finely punctured, not ridged; occiput with long white hair; scutellum with yellowish hair; tegulæ posteriorly red, and rather produced (approaching the condition seen in *A. harveyi* Vier.) wings brownish hyaline; second cubital cell narrowing above, receiving recurrent nervure

before middle; stigma large and red; abdomen perfectly dull, with interrupted white hair-bands.

Andrena (Platandrena) opacibasis Cockerell, sp. n.

Female. Length about 8.5 mm., anterior wing 6.6; black, with entire pure white hair-bands on tergites 2 to 4; hair on fifth dark sooty-brown; antennæ and tegulæ black; facial foveæ broad, white, the upper part brown; process of labrum obtusely rounded; third antennal joint about as long as next two together. The hair of head and thorax is dull white, very faintly fulvescent dorsally, evidently brown just behind ocelli; labrum highly polished; clypeus entirely dull, excessively minutely punctured, with no smooth line or ridge; front dull, with a shining median line; mesothorax dull, but scutellum shining on disc, somewhat bigibbous; area of metathorax entirely dull; sides of metathorax regularly fringed with very long curved hairs; wings faintly brownish, stigma large and red, nervures brown; basal nervure falling short of nervulus (meeting in *A. nudiscopa*); second cubital cell moderately broad, receiving recurrent nervure in middle; legs with mainly white hair, pale reddish on inner side of tarsi and a pale red band on hind tibiæ posteriorly; spurs whitish; hind tibiæ cuneate (but not excessively broad at end), much broader than the basitarsi; hair of hind tibiæ mostly simple, but dense and plumose posteriorly (in *A. nudiscopa* the hairs on anterior face are long, curved at end, with a few slender branches); first tergite dull, with a short marginal band of white hair at each side; the other tergites somewhat shining, but not at all polished, with only scattered, excessively minute, piliferous punctures; second tergite in middle depressed about a third; the pure white hair-bands are dense, and narrower than in *A. nudiscopa;* venter shining, without much hair.

Near Lower Lake, April, at yellow umbelliferous flowers, 1 female (Cockerell.) The locality is north of San Francisco. This species is so like *A. nudiscopa* Viereck, that I did not separate it at first. The most obvious characters are the narrow addominal bands, and the dark sooty hair at end of abdomen. The hind tibia is distinctly less broadened at end. The dull first tergite readily separates it from *A. pallidiscopa* Viereck and *A. solidaginis* Rob. *A. opacissima* Ckll., from Idaho, differs by the very long hair of cheeks, broad second cubital cell receiving recurrent nervure before middle, and broader abdominal bands. It visits *Salix.* I refer this species to *Platandrena,* because it is obviously closely allied to the members of that group; but the

hind tibiæ are hardly cuneate enough to fit the diagnosis. They are about 560 microns wide at end, the basitarsi being 352 wide near base.

ANDRENA OPACIVENTRIS Cockerell

Meyers, 5 miles north of Miranda, Humboldt Co., April 18, 1935, at *Vaccinium ovatum* Pursh., 1 female (Van Duzee).

Andrena (Platandrena) orthocarpi Cockerell, sp n.

Female. Length about 7.5 mm., anterior wing 5; black, without any green tint, the antennæ, mandibles, tegulæ and legs black; hair of head and thorax dull white, not dense, very faintly fulvescent on scutellum; metathorax exposed in middle and base, on each side, abruptly limited, a dense scopa of long curled white hairs, used to carry pollen; facial quadrangle much broader than long; process of labrum short and broad; third antennal joint about as long as next two together; clypeus and supraclypeal area dull and rugulose, the microscope showing large piliferous punctures on clypeus; facial foveæ rather broad but very indistinct, brownish, appearing black in some lights; mesothorax and scutellum dull, a little shining but not polished on disc; scutellum slightly depressed in middle; postscutellum large; base of metathorax entirely dull, without evident sculpture; mesopleura shining, flattened, more or less concave, its lower part with a very strong transverse ridge; wings dusky hyaline, faintly reddish; stigma large, clear light red; nervures pale; basal nervure meeting nervulus; second cubital cell rather small or narrow, receiving recurrent nervure about middle; first intercubitus not close to stigma; legs with pale hair, distinctly red on inner side of tarsi; floccus on hind trochanters very well developed; spurs very pale; hind tibiæ very broad at end, twice as broad as basitarsi; tibial scopa dull white, the hairs simple; abdomen broad, shining, tergites 2 to 4 with well defined pure white hair-bands, very broadly interrupted on second and narrowly on third; hair at apex light grey; second tergite in middle depressed rather more than a third, but the depression very weak, third depressed about a third; margins of tergites very narrowly pallid; surface of abdomen, as seen under microscope, with a very minute weak reticulation.

Garberville, Humboldt Co., April 19, 4 females (Cockerell). The type and one other at *Orthocarpus faucibarbatus* Gray.*, one at *Cercocarpus betuloides*, one at *Blennosperma californicum*

*Jepson says of this: "Corolla sulphur yellow or pinkish white or white." The plants at Garberville had the lip bright yellow, or the whole flower white, or all the corolla yellow. No doubt these forms are Mendelian alternates.

Torrey & Gray, the last growing in a marshy place by the creek. One specimen, with a dusky stigma, is from Perrott Grove, on the introduced *Brassica campestris* L. This is closely allied to *A. nasonii* Robertson (type of subgenus *Platandrena* Viereck), having the same sort of mesopleura. It is, however, easily separated by the facial foveæ and more shining abdomen.

ANDRENA PRONITENS Cockerell

Garberville, at *Cercocarpus betuloides*, 2 females, April 19 (Cockerell). The hair of the abdominal bands is distinctly longer than in the type from Colorado, and the first tergite is more shining. The tibial scopa is plumose.

Andrena ripariella Cockerell, sp. n.

Male. Length about 7.5 mm., anterior wings 6.2; black including mandibles, antennæ (flagellum very faintly brownish), tegulæ and legs; third antennal joint a little longer than fourth; mandibles bidentate; process of labrum narrow, shallowly emarginate, the apical part broadly thickened; flagellum long and thick, submoniliform; cheeks broad but rounded; facial quadrangle conspicuously broader than long; clypeus very coarsely and strongly punctured; hair of face and front long and black, a little light hair between antennæ; long white hair on middle of vertex and lower part of cheeks, but cheeks otherwise with black hair: hair of thorax very long, black at sides and mainly so on scutellum, on mesothorax white mixed with black, on metathorax black in middle but white at sides, white in region of axillæ; mesothorax dullish, with weak punctures, moderately shining, but not polished in middle; scutellum shining in middle, bigibbous; area of metathorax granular and dull; wings brownish hyaline; stigma very large, very dark reddish-brown; nervures rather pale brown; basal nervure falling a little short of nervulus; second cubital cell contracted above, receiving recurrent nervure at about beginning of last third; legs with whitish hair, the long hair on front femora behind blackish; hair on inner side of tarsi only slightly flavescent; spurs dull white; abdomen shining, with excessively minute punctures; pure white hair-bands, broadly interrupted in middle, on tergites 2 to 4; apex with sooty hair; second tergite depressed about one fourth, the apical depression very narrow.

Meyer's auto camp, Humboldt Co., latter half of April, one resting on a bank (W. P. Cockerell). Very close to the Rocky Mountain *A. nigrihirta* (Ashmead), but clypeus more coarsely

punctured, wings darker, stigma and nervures much darker, and abdomen with interrupted white bands. The head seen from in front looks just like that of *A. nigrihirta*. *A. micranthophila* Ckll., has the hair of face all black, but thorax above with red hair, and abdomen without bands. In the Californian fauna, *A. knuthiana* Ckll. is similar, but has the apical depression of second tergite much larger, stigma redder and third cubital cell very broad above. In the table of British species by Perkins (1919) it runs nearest to *A. gwynana* Kirby, but there are no black hairs projecting beneath third antennal joint. The head, seen from in front looks like that of *A. gwynana*, but the coarsely punctured glistening clypeus of *A. ripariella* is quite different. *A. gwynana* is said to be the true *A. bicolor* (Fabr.) and is the type of Hedicke's subgenus *Euandrena*.

Andrena semotula Cockerell, sp. n.

Male. Length about 6.5 mm., anterior wing 5; black, the head and thorax with long spreading white hair, sides of face and front with black hair; in region of antennæ and on thorax above the hair has a faint, scarcely noticeable yellowish tint; process of labrum broad and truncate, the thickened apex appearing binodose; mandibles simple; antennæ entirely black, the flagellum very long, moniliform; third antennal joint shorter than fourth; clypeus with a white beard, which is rather short and not brilliant; surface of clypeus moderately shining, finely punctured, with no smooth line, an obtuse ridge crosses the clypeus below the middle; cheeks rounded, with long white hair below, posterior orbits shining; facial quadrangle conspicuously broader than long; mesothorax dull, moderately shining on disc, but not polished; scutellum shining on disc, not bigibbous; area of metathorax dull and granular; when the thorax is seen from the side the metathorax appears dull, but a shining band extends along its lower border; tegulæ shining black; wings hyaline; stigma large, dark reddish (more distinctly red in specimens from Underwoods); nervures brown; basal nervure falling short of nervulus; second cubital cell broad (variable, from broader than high to higher than broad), receiving recurrent nervure about middle; first intercubitus not far from stigma; legs slender, with white hair, very pale yellowish on inner side of tarsi; spurs light red; abdomen polished, but second tergite dullish except the apical depression, and distinctly though sparsely punctured, depression occupying less than a third; thin inconspicuous white hair-bands at sides only of tergites 2 to 4 and fifth with a very thin fringe right across; apex with white hair; extreme apex (eighth ventral plate) truncate, distinctly subemarginate, with a

long fringe of curved hairs on each side, the style much as in *A. braunsiana* Friese.

Eight miles north of Ukiah, April 21, 1935, at *Ceanothus cuneatus* (Hooker), 1 male collected by W. P. Cockerell. Also from Underwoods, 3 males, at *C. cuneatus* and *C. foliosus* Parry (Ckll.) and from Meyer's auto camp, Humboldt Co., at *Salix*, 4 males (W. P. Cockerell). Related to *A. candidiformis* Vier. & Ckll., and *A. subcandida* Viereck, (det. Vier.) the three being separable thus:

Stigma dark brown or reddish; flagellum shining black..... ..... *semotula* Ckll.
Stigma pale reddish; flagellum brown beneath.....1
1. Second cubital cell broad, its upper basal corner near stigma; basal nervure falling short of nervulus.....*candidiformis* V. & C.
—. Second cubital cell narrow, its upper basal corner separated from stigma by a distance about equal to side of second cubital on marginal; basal nervure meeting nervulus..... ..... *subcandida* Viereck

The *A. candidiformis* before me was determined by Viereck, and is labelled "Colo. 2112, Gillette." It is one of the original specimens. The *A. subcandida*, also determined by Viereck, is from Florissant, Colorado, at *Ribes vallicola* Greene (more correctly *R. inermis* Rydbg., var. *vallicola*), June 11, 1907 (S. A. Rohwer). As *A. subcandida* was based on the female from Seattle and Vancouver I., and was said to have the abdomen with metallic colors and the stigma dark, it is practically certain that Viereck's identification of the Florissant insect is incorrect.

In Perkins' Key *A. semotula* runs nearest to *A. spinigera* Kirby, but that is a very much larger and quite different insect. The short third antennal joint and flagellum shining beneath in the male are characters of the subgenus *Hoplandrena* Perez, which is known by various species, from England to Japan.

Andrena (Micrandrena) solutula Cockerell, sp. n.

Female. Length about 6.8 mm., anterior wing 5.6; head and thorax black with faint, hardly recognizable, suggestions of greenish or brassy, the mesothorax essentially black; hair of head and thorax thin and whitish; mandibles black; flagellum obscurely brownish beneath; third antennal joint about as long as next two together, the fourth about as long as fifth; process of labrum broad and low, rounded; clypeus dull, with scattered minute punctures on

a minutely tessellate surface; supraclypeal area shining when seen from below; facial foveæ black (somewhat brownish seen from above), very short, ending broadly well above level of antennæ; mesothorax and scutellum a little shining, not polished; area of metathorax dull, showing a V-shaped impression; tegulæ black or faintly brownish; wings hyaline, slightly dusky; stigma red, very large; nervures pale brown; basal nervure falling far short of nervulus; second cubital cell large, receiving recurrent nervure almost or quite at end; first intercubitus almost reaching stigma; legs black, with whitish hair; abdomen dark green, shining, the hair-bands extremely weak and hardly noticeable; hair at apex sooty.

Petrified Forest, Sonoma Co., April 23, (type locality), at *Ceanothus foliosus*, 5 females (Cockerell); Underwood's, at *Ceanothus cuneatus*, 1 female (Cockerell).

At first sight this looks like *A. microchlora subalia* Ckll., but the black mesothorax and different venation at once separate it.

Andrena transnigra Viereck

Yorkville, Mendocino Co., May 8, 1935, 1 female (Van Duzee).

Andrena vandykei Cockerell, sp. n.

Male. Length about 7 mm., anterior wing 5.7; black, the legs and abdomen slightly brownish, mandibles faintly reddish apically; flagellum long, moniliform, obscure reddish brown; tegulæ shining, very dark brown; clypeus very short and broad, with a transverse broad light yellow band which does not nearly reach lateral corners; hair of head and thorax long and spreading, not dense, dull whitish on cheeks and sides of thorax and behind ocelli, largely greyish on thorax above, greyish black on face and front; wings long, hyaline, very faintly dusky apically; stigma very large, dusky red, nervures brown; basal nervure falling short of nervulus; second cubital cell large, approximately square, receiving recurrent nervure not far from end, its upper basal corner near to stigma; third cubital cell rather short, receiving recurrent nervure very near end. Head very large, extremely broad; front and vertex dull, but clypeus, sides of face and cheeks shining, the clypeus with small sparse piliferous punctures; malar space short but evident, shining, its lower end with a long slender spine; mandibles excessively long, curved, scimitar-like, without any inner tooth, the extreme base beneath produced into an angle; cheeks very broad, convex, the broadest part much above middle of eye; process of labrum very large, very broadly truncate, the margin slightly

undulate, the width of the structure almost as great as the distance between antennæ; third antennal joint longer than the short fourth but not quite as long as fourth and fifth combined; thorax small, moderately shining dorsally; area of metathorax dull, a little shining laterally, without evident sculpture (the microscope shows a minutely tessellate surface); abdomen fusiform, shining, without hair-bands, margins of tergites pallescent, second tergite with no distinct apical depression; venter with thin short white hair.

Cypress Ridge, Marin Co., April 6, 1921, 1 male (E. C. Van Dyke). A very distinct species, probably forming a new subgenus. *A. perarmata* Ckll. and *A. fulva* Schr., which present some points of similarity, have the large tooth beneath the head on the mandibles. The nearest relative is undoubtedly *A. timberlakei* Ckll., from Riverside, which is much smaller, and has a yellow clypeus. I have regarded *A. timberlakei* as belonging to the subgenus *Micrandrena*, and *A. vandykei* does have the venation of that group.

Andrena viridinitens Cockerell, sp. n.

Female. Length about 11 mm., anterior wing 10; head, thorax and legs black, abdomen shining dark olive green; flagellum slightly reddened at apex; tegulæ rather large, very dark brown; head and thorax with abundant long rather dull white hair; third antennal joint about as long as next two together, not nearly as long as next three; process of labrum very broad, rounded, slightly truncate; facial foveæ broad, with thin white hair, going below level of antennæ, separated from orbits by a rather broad punctured band; face much broader than long; clypeus shining, with distinct well separated punctures, somewhat flattened in middle, with no median ridge; cheeks very broad and rounded; mesothorax entirely dull in front, but the disc polished and shining, with few weak punctures; scutellum highly polished, with a median groove, sparsely and weakly punctured; area of metathorax dull and granular; wings hyaline, slightly reddish, with the outer margin distinctly dusky; stigma large, clear red with a dark margin; nervures reddish brown; basal nervure meeting nervulus; second cubital cell receiving recurrent nervure at or slightly beyond middle; legs with mostly white hair, pale fulvous on inner side of tarsi, black below hind knee-plate; hind tibial scopa simple, the hair on outer face and under side extremely long, appearing silvery; hind basitarsi rather broad, as seen from in front showing a bright red fringe on inner side; abdomen polished, without evident punctures; first tergite dull and obscurely purplish in middle; second tergite depressed more than a third, but not nearly half; no hair-bands,

but large loose patches of long pure white hair at sides of tergites 2 to 5; apex with orange-fulvous hair; sternites fringed with very long white hairs.

Meyer's auto camp, Humboldt Co., last half of April, at flowers of *Salix*, 2 females (Cockerell). In Viereck's table of northwestern species this runs to *A. seminigra* Viereck, from Corvallis, Oregon, said to be 12 mm. long, with gray pubescence, the abdomen nearly bare and with steel blue reflection. Among the species known to me, it most suggests *A. subtilis* Smith, from Vancouver I. I examined the type of *A. subtilis*; it has strongly fulvous hair on thorax; stigma narrow, dark red-brown; fovea pale red, and other characters readily separating it from *A. viridinitens*. Viereck sent me a specimen of *A. seminigra* ,and on comparing it with Smith's type, it was exactly the same.

Andrena w-scripta Viereck

Near Lower Lake, at *Rhus*, 1 female. This is conspecific with one from Stanford University, March 28, 1916 (R. Stinchfield), determined by Viereck, but it differs by the black tegulæ and the darker grey-brown hair at end of abdomen. Viereck describes "anal fimbria dark brown."

Andrena zygadeni Cockerell

Fairfax, Marin Co., April 12, 1925, 1 female (C. L. Fox); Lagunitas, Marin Co., April 7, 1907, 1 male (E. C. Van Dyke). The male has the hair of the abdominal bands much shorter than usual, but it may be abraded.

Diandrena chalybioides (Viereck)

Meyers, Humboldt Co., April 18, 1935, at *Ranunculus*, 1 female (Van Duzee). The process of labrum is narrow, strongly emarginate at end. At the Citrus Experiment Station I saw a cotype female from Corvallis, and noted: large, dull green with much erect dull whitish hair; long black hair at sides of face; stigma red. It is easily known from *A. parachalybea* Vier. by the broader, dull green abdomen.

Diandrena marinensis Cockerell, sp. n.

Male. Length about 6 mm., anterior wing 5 mm.; robust for a male, dark blue, the head and thorax dull, abdomen moderately

shining, hind margin of tergites dark brown; hair of head, thorax and legs very long and pure white, no black hair at sides of face; mandibles reddened at apex; flagellum long and thick, red beneath; wings hyaline; stigma large, dark reddish; nervures pale reddish; basal nervure meeting nervulus; legs black; tegulæ black; abdomen with thin white hair at sides and on apical part.

Compared with *D. puthua* Ckll. (from Pasadena) it differs by the entirely dull dark blue metathorax (base of metathorax shining on *D. puthua*); dull, dark blue mesothorax and scutellum; larger scutellum; lack of a shining spot above eyes; dull first tergite(polished in *D. puthua*); blue instead of dark green abdomen; and first recurrent nervure much more distant from first intercubitus.

Compared with *D. beatula* Ckll. (taken by Timberlake at Riverside on *Baeria gracilis*), it differs by being considerably larger, with black tegulæ, dull first tergite, and other characters.

Fort Baker, Marin Co., March 15, 1925, 2 males (C. L. Fox) California Academy of Sciences.

Diandrena parachalybea (Viereck)

Fort Baker, Marin Co., March 15, 1925, two males (C. L. Fox).

Diandrena perchalybea (Viereck)

Female from Fort Baker. Length about 10 mm., anterior wing 7.4; dull bluish green, flagellum ferruginous beneath except at base; facial quadrangle broader than long, mandibles bidentate, the inner tooth very short and obtuse; process of labrum emarginate; face with long black hair, on cheeks and top of head it is rather paler, distinctly greyish; thorax above entirely dull; area of metathorax granular, with close fine parallel plicæ at extreme base only; hair of thorax rather dilute black at sides but dorsally sordid whitish; tegulæ shining black; wings hyaline, very faintly brownish, stigma ferruginous, nervures reddish; basal nervure falling far short of nervulus, recurrent nervures very far from base and apex of the very long second cubital cell; legs black, with long pale hair, the hind femora green behind; spurs of hind tibiæ red, very long and slender; abdomen dull blue-green, without bands, but thin whitish hair at sides, and apex with pale grey hair; venter with long whitish hair.

The male has a dense pure white beard of clypeus, but long black hair at sides of face, and the long stout flagellum is black.

Fort Baker, Marin Co., March 15, 1925, 1 female, 4 males (C. L. Fox); Muir Woods, Marin Co., April 23, 1911, 1 female (Van Dyke); Mt. Tamalpais, Marin Co., April 28, 1907, 1 male (Van Dyke).

In Proc. Calif. Acad. Sci., Sec. 4, XIV, 1925, p. 187, I gave a brief account of supposed male *D. perchalybea* collected by F. E. Blaisdell at Mokelumne Hill. In 1926 Viereck described *D. cuneilabris*, female, from the same place and collector. I infer that the male probably belonged to *D. cuneilabris*.

Diandrena purdyi Cockerell, sp. n.

Eight miles north of Ukiah, at *Ranunculus occidentalis* Nuttall, April 21, I took a male which I had considered referable to *D. perchalybea* until I saw the males of that species from Fort Baker and Mt. Tamalpais. It has the antennæ entirely black, the abdomen blue-green, the basal half of area of metathorax with strong plicæ. It differs from *D. perchalybea* thus:

Middle of face shining steel blue, with slight greenish tints; stigma very dark, almost black; basal nervure falling a little short of nervulus; plicæ at base of metathorax very distinct, the intervals shining; abdomen narrower, steel blue, faintly greenish, hind margins of tergites concolorous.....*purdyi* Ckll.

Middle of face green, stigma red; basal nervure more remote from nervulus; plicæ at base of metathorax indistinct, the whole area dull; abdomen broader, distinctly green, with hind margins of tergites more or less evidently brown.....*perchalybea* Vier.

In both, there is long black hair at sides of face. The length is about 7 mm.

D. nothocalaidis Ckll. from Colorado, is exceedingly similar to the Californian insect now described, and does have the base of metathorax with distinct plicæ with the surface shining. It is at first difficult to see where there is any difference, but *D. nothocalaidis* has the stigma much lighter and redder, the nervures paler, and the abdomen more shining.

D. cyanosoma Ckll. from Claremont, is also related and agrees in the dark stigma. The abdomen is considerably duller, and the metathorax is different; the middle of the face is dull green, and the flagellum is shorter, not so moniliform, and reddish beneath. The species is named after Carl Purdy, the distinguished botanist of Ukiah.

HALICTIDÆ

Halictus allonotus Cockerell, sp. n.

Female. Length about 8 mm., anterior wing 6.3; robust, black, including mandibles; antennæ and legs; head and thorax with scanty fulvescent hair, long and abundant on mesopleura and dense on tubercles; head ordinary; clypeus highly polished, with sparse small punctures, and a row of large punctures above lower margin; supraclypeal area convex, smooth and polished; front distinctly shining; sides of vertex polished; mesothorax flattened, very highly polished, with scattered weak punctures; scutellum shining, with small punctures; area of metathorax crescentic, glistening, with about twenty irregular wrinkled anastomosing raised lines, about the middle forming an open irregular network; posterior truncation with sharp raised lateral margins, which at the top fork widely, one branch extending mesad behind the area but the two do not meet in the middle, the distance between their ends being greater than the length of either branch; sides of metathorax dullish; tegulæ brown with hyaline margins, not punctured; wings reddish hyaline, stigma large, amber-color, nervures very pale; second cubital cell large and square, receiving recurrent nervure at apical corner; second and third intercubital nervures slender, the first stout; third cubital cell short; legs with fulvescent hair, middle tibiæ with a stiff red brush on inner side; hind spur with five short oblique well spaced stout teeth, the first pointed, the others obtuse; abdomen stout and convex, shining, the first tergite extremely brilliant, without evident punctures; third and fourth tergites with pale linear bands on extreme margins; tergites 2 to 4 with rather poorly developed hair-bands at base; apex with whitish hair.

Garberville, Humboldt Co., April 19, 1935, at *Cercocarpus betuloides*, 1 female (Cockerell). A remarkable species, known by its flattened highly polished mesothorax. There is some affinity with *H. truncatus* Rob., which has a normal though shining mesothorax, and much more coarsely sculptured area of metathorax.

HALICTUS COOLEYI Crawford

Garberville, April 19, very abundant on *Cercocarpus betuloides*, also several at *Orthocarpus faucibarbatus* Gray; Underwoods, five at *Ceanothus cuneatus*; Meyers, at *Lupinus arboreus*, var., three; Perrott Grove, at *Brassica campestris*, one (Cockerell). All females.

I had at first referred most of them to *H. robustus* Crawford, which I have from Riverside, March 16, at *Cryptantha intermedia*

(Gray), collected by Timberlake. They all have the appreciably smaller size of *H. cooleyi*, but I find the punctures on first tergite to be variable and the hind spur also variable, but usually showing very distinct oblique teeth or spines after the manner of *H. cooleyi*. The two species are certainly very much alike, and the variable series from northern California shows a certain amount of intergradation.

According to Crawford's table in Canadian Entomologist, Sept. 1906, the teeth of hind spur on *H. cooleyi* are not oblique, but they are distinctly so in a cotype from Corvallis.

Halictus cyanurus Cockerell, sp. n.

Female. Length about 5.3 mm., anterior wing 4.2; head and thorax dark olive green, abdomen dark blue; moderately robust, with thin and scanty dull white hair, the abdomen hairy at sides and toward apex, but the tergites with no uniform covering of tomentum; head rather broad and short; mandibles reddened apically, labrum black; clypeus shining brassy, sparsely punctured, with a black margin (seen under microscope both clypeus and supraclypeal area show only very minute, widely spaced punctures); front dull, with minute excessively dense punctures; vertex shining; mesothorax dull (a little shining but not at all polished) with very fine not very dense punctures; scutellum shining, with a median depression; area of metathorax crescentic, appearing rough and dull under a lens, the microscope shows strong plicæ, irregular in middle, and the area is truncate apically in middle; posterior truncation not very sharply defined at sides; tegulæ black, strongly punctured; wings hyaline, with extremely pale stigma and nervures; first recurrent nervure meeting second intercubitus; legs black, with dull whitish hair; hind spur with three stout blunt spines, and a fourth rudimentary; abdomen shining, but not polished, margins of tergites dark reddish; first tergite without evident punctures; venter not metallic.

Garberville, Humboldt Co., April 19, 1935, at *Cercocarpus betuloides*, 1 female (Cockerell). Compared with *H. pavoninus* Ellis, this differs at once by the dark, punctured tegulæ, a character which relates it to *H. helianthi* Ckll. which has a black abdomen. *H. lazulis* Ellis has the face narrower, area of metathorax blue, and different tegulæ. *H. cœruleus* Rob. is much larger and brighter blue. *H. sedi* Sandh. has a green abdomen and a greener, more shining mesothorax.

HALICTUS EURYCEPS Ellis

Eureka, April 17, 4 females; Mather Grove, April 18, 1 female (Cockerell). Compared with the type from Beulah, New Mexico, the Eureka specimens differ by the black tegulæ, the wings not reddish, and the stigma pale and much less orange. The Mather Grove one has reddish wings and a narrower face. In all the disc of the mesothorax is highly polished. I find that *H. euryceps* is variable and it does not seem practical to separate a Californian race.

These bees are decidedly *H. euryceps* rather than *H. zophops* Ellis, but the two are very close. I separated them as follows:

Abdomen broader at base; area of metathorax sculptured nearly all over.....*zophops* Ellis.

Abdomen narrower at base; area of metathorax with plicæ largely confined to basal part.....*euryceps* Ellis.

Other characters are cited by Mrs. Ellis, but I do not find the abdomen of *H. zophops* to be appreciably metallic. The table given by Miss Sandhouse is misleading, as the anterior wing of both species is less than 6 mm. long.

HALICTUS FARINOSUS Smith

Yorkville, Mendocino Co., 4 females, April 24, 1928. One female May 17, 1929 (Van Duzee); Lagunitas, July 15, 1928, 1 female (Van Duzee); Inverness, May 22, 1910, 1 female (Van Dyke).

Halictus lupinelli Cockerell, sp. n.

Female. Length about 9 mm., anterior wing 7.2; black, robust, the margins of first four tergites with narrow, very distinct, pure white dense hair-bands, that on first failing in middle; no basal bands; hair at apex pale grey. This falls with *H. lerouxii* Lep. in all our tables, but is smaller, the tegulæ black or nearly so, the second cubital cell high and narrow, receiving recurrent nervure slightly beyond middle (cell large and nervure received near end in *lerouxii*), wings clear, hardly reddish. The hind spur, as in *H. lerouxii*, has strong teeth on basal half, but those on apical half are broad and low, equilateral, so that the spur may be said to be coarsely undulate. The legs are black; the hind basitarsus, as in *H. lerouxii*, having a copper-red brush at end. The hair of head and thorax above is entirely dull white, not fulvescent, perhaps

with a very faint creamy tint, that on mesothorax seems a little longer than in *H. lerouxii*. Lepeletier describes *H. lerouxii* as having red hair at end of abdomen.

Garberville, at flowers of small lupine (*Lupinus bicolor* Lindley) in meadow by river, 1 female (Cockerell). I thought this might possibly be a species found in the Palearctic region, but I cannot match it. It is very different from *H. lerouxii ruborum* Ckll., described from Seattle.

Another female, about 10.5 mm. long, comes from Hopland, May 9, 1926 (Van Duzee). It has the second cubital cell as in *H. lerouxii*, with the recurrent nervure not far from the end, and is intermediate beween the type of *H. lupinelli* and *H. lerouxii*. But the dense very white abdominal bands in *H. lupinelli* are much narrower than in *H. lerouxii* from Illinois and Kansas, so I think there are two species involved. In any event *H. lupinelli* is a valid subspecies.

Halictus nigrescens Crawford

Female about 6 mm. long (Crawford's original description says about 6.5 mm., but in his table he says less than 6 mm.), anterior wing 4.5; mesothorax with fine distinct punctures on a minutely lineolate surface, appearing dull, slightly shining, though the scutellum is polished; area of metathorax very large, covered with fine irregular raised lines; hind spur with three long oblique spines and three short rounded ones, the last quite rudimentary; tegulæ not punctured; first tergite with scattered extremely weak punctures, only seen under microscope; fourth and fifth tergites pruinose pubescent.

From Crawford's account, and especially his table, I should have remained in doubt as to the species, but I have a couple from Riverside, March 1 and 2, at *Eschscholtzia californica*, collected and determined by Timberlake. The insect is considerably less robust than *H. cordleyi* Crawford, near to which it runs in the table.

Garberville, April 19, many at *Cercocarpus betuloides*, and six at *Orthocarpus faucibarbatus* Gray (Cockerell); Underwoods, six at *Ceanothus cuneatus*.

Halictus orthocarpi Cockerell, sp. n.

Female. Length about 8.5 mm., anterior wing 6.7; black, robust, the mandibles, antennæ and legs black; tegulæ very dark brown,

impunctuate; hair of head and thorax thin and dull whitish; face rather broad (2 mm. between orbits); clypeus with the upper part dull and finely punctured, the lower part shining and coarsely punctured; supraclypeal are only moderately shining; front densely punctured, and more or less striate; vertex shining right across; mesothorax shining, but hardly polished, the scutellum polished, but with many fine punctures of different sizes; area of metathorax rough and dullish, quite large, under a lens showing fine dense striation, the microscope showing numerous rather weak anastomosing rugæ; posterior truncation dull, distinctly defined all around, with a deep median pit; wings hyaline, faintly dusky; stigma large, pale dull amber; nervures very pale, outer recurrent and intercubitus very weak; second cubital cell conspicuously narrowed above, receiving recurrent nervure a moderate distance from end; legs with dull white hair, hind basitarsi with a copper-red brush at end; hind spur with five short oblique stout teeth, the last two rudimentary; abdomen broad, shining, the first tergite very brilliant, without evident punctures under a lens, but the microscope shows scattered excessively minute punctures; hind margins of tergites very narrowly whitish; tergites with thin poorly developed basal bands of white hair, largely hidden, and distinct traces of thin apical bands at sides, and on fifth tergite right across, but not easily seen; apex with white hair.

Garberville, at *Orthocarpus faucibarbatus*, 4 females, April (Cockerell). Resembles *H. galpinsiæ* Ckll. and *H. aberrans* Crawf., but the area of metathorax is quite different. The area of metathorax is much more finely sculptured than in *H. punctiferus* (Ckll.) In Crawford's key (1907) the position is a little ambiguous as there are traces of apical bands on tergites and the hind spur is rather intermediate between the two categories given, but it really should go to 42, and as the wings are not perfectly clear, and the wrinkles of area reach apex, on to 44. The mesothorax has rather close strong punctures, with very minute ones between, and excessively fine lineolation on anterior part, so the insect would run to *H. cooleyi* Crawf., from which it is easily known by the abdominal characters.

Halictus pilosellus Cockerell, sp. n.

Female. Length about 5 mm., anterior wing 4; robust, shining yellowish-green, including abdomen; mandibles and labrum dark red; apical part of flagellum light ferruginous beneath; tegulæ pellucid testaceous, not punctured; wings clear hyaline, stigma and nervures very pale; legs black, hind knees, tibiæ at extreme apex and base of basitarsi, red; a copper-red brush at end of hind

basitarsi; hind spur with four long blunt spines and a fifth rudimentary; hind margins of second and following tergites pallid; tergites 3 to 5 entirely covered with dull white tomentum, first and second with such tomentum at sides and second also at base, but much narrowed in middle, the exposed parts of these tergites brilliantly polished. Face of moderate width; clypeus projecting, shining, brassy, but the apical margin broadly black; supraclypeal area highly polished; front entirely dull; hair of head and thorax above short, faintly yellowish; mesothorax shining, polished on disc, median groove distinct; scutellum shining; area of metathorax crescentic, rather short, appearing rugose under a lens, with a thick shining posterior margin, the microscope shows about eighteen fine wrinkled rugæ with a little smooth space at middle of base; the first recurrent nervure meets the second intercubitus.

Garberville, Humboldt Co., April 19, 1935, at *Cercocarpus betuloides*, 1 female (Cockerell). Compared with *H. pruinosus* Rob., it is considerably smaller and the head is shorter. The structure agrees better with the blue-green *H. pruinosiformis* Crawford. *H. pilosus* Smith is larger, with dull mesothorax. I was at first inclined to refer this to *H. actinosus* Sandh., but that is distinctly larger with various small differences, and Miss Sandhouse compares her species with some which are not the nearest relatives to ours. In the table in Proc. U. S. Nat. Mus., Vol. 65, Art. 19, p. 2, at 17, the expression "wings not thus clear, stigma darker" is misleading, since some of the species falling in this division have the stigma exceedingly pale (e.g. *H. lazulis* Ellis).

Halictus tracyi Cockerell, sp. n.

Female. Length about 6.7 mm., anterior wing 5.6; robust, with broad convex, shining abdomen; black, including mandibles, antennæ, legs, and the shining impunctate tegulæ; hair of head and thorax scanty, dull whitish, with a faint yellowish tinge dorsally; legs with white hair, pale yellowish on inner side of tarsi; abdomen with dull white hair at apex, and thin hair at sides, but no hair-bands or spots; facial quadrangle longer than broad; clypeus prominent, shining, with large punctures; supraclypeal area polished but punctured; front dull, shining along orbits; vertex on each side of ocelli dull, except a polished area next to ocelli; mesothorax strongly and closely punctured, shining but not polished, the median groove very strong; scutellum polished, slightly depressed in middle; area of metathorax very large, dull, with fine irregular anastomosing raised lines (as seen under microscope), no regular parallel plicæ; area behind with an obtuse shining border; truncation of metathorax not sharply defined above; mesopleura convex,

posteriorly shining; wings hyaline, a little dusky, the stigma very dark brown, nervures brown; basal nervure falling short of nervulus; second cubital cell very broad, receiving recurrent nervure near end; outer intercubitus in middle much more slender than the others; hind spur strongly pectinate, with six oblique spines; abdomen polished; first tergite with widely spaced excessively minute punctures.

Eureka (type locality), Humboldt Co., April 17, 1935, 13 females (Cockerell); Garberville, April 19, at *Cercocarpus betuloides*, 1 female; Perrott Grove, three females at *Brassica campestris;* Mather Grove April 18, at *Oxalis*, a species with pink flowers, 1 female (W. P. Cockerell); Meyers, at *Lupinus arboreus* var. 1 female (Cockerell). Named after Joseph Tracy, the skilled botanist of Eureka, who guided us to the spot where the bees were found. In Crawford's table (1907) it goes to *H. divergens* Lovell, but is easily known from that and related species by the lack of hair-patches on abdomen. It is larger and more robust than *H. vaporellus* Ckll., with darker stigma and broader head. The hind spur separates it from *H. inconditus* Ckll. and *H. supranitens* Ckll. At Eureka they were found nesting, and also in numbers at flowers of *Claytonia sibirica* (L.) The nests were in earth on the base of a fallen tree.

Panurgidae

Panurginus melanocephalus Cockerell

Mark West Spring, April 23, two females at *Ranunculus.*

This was printed (Pan. Pac. Ent. Oct. 1926, p. 80) as *Panurgus melanocephalus,* but my manuscript had it *Panurginus. P. morrisoni* Crawford (also taken at *Ranunculus* flowers) is evidently the same. Crawford's paper is dated Dec. 1926, and was actually published in January 1927.

Panurginus nigrellus Crawford

Garberville, April, at *Cercocarpus betuloides* Nuttall; eight miles north of Ukiah, April 21, at *Ranunculus occidentalis* Nuttall; Petrified Forest, Sonoma Co., April 23, at *Ceanothus foliosus* Parry. All females. Crawford defines this species on male characters alone, and records numerous males from the region around Stanford University. The females differ from *P. atriceps* (Cresson), as I understand it, by the short, dusky wings, and the black

or practically black tegulæ (Cresson says of *P. atriceps* "tegulæ dull testaceous").

ANTHOPHORIDÆ

ANTHOPHORA CALIFORNICA Cresson

Mt. Diablo, nesting in bank, 6 females; 1 male, at *Salvia mellifera* Greene. They were not observed to make the usual structures at the entrance to the nests.

ANTHOPHORA IGNAVA Cresson

Garberville, four females at *Cercocarpus betuloides* Nuttall, and two (W. P. C.) at *Lupinus albifrons* Bentham. This species was described from Nevada, but is supposed to be the female of *A. pacifica* Cresson taken by Hy. Edwards in California. A related form from Mesa Verde, Colorado, was described in 1930 as *A. subignava* Cockerell. This last is more robust, with white hair on thorax above. *A. ignava* from Yakima, Washington, differs from the Garberville series by the pea-green instead of black or practically black eyes, and the tegulæ rufous with a dark base, instead of practically black. A male *A. pacifica* from Mill Valley, Calif. (Van Duzee) certainly appears to be the male of the Garberville insect.

Mr. E. T. Cresson Jr., has kindly given me this information about the Cresson series of this species:

"Our series of this species, all females of course, are three from Nevada, two from California, two from Oregon. The color of the eyes is apparently somewhat greenish; that of the tegulæ is black to slightly reddish. They agree in all these respects with our specimens of *A. pacifica*, as well as in the color of the pile on the legs. I would say that the two series are conspecific, as you suggest." (litt. July 11, 1935).

Mr. P. H. Timberlake writes (litt. July 18, 1935) that there is no doubt that *A. ignava* is the female of *A. pacifica*.

ANTHOPHORA INFERNALIS Dalla Torre

Garberville, at flowers of *Lupinus albifrons* Bentham, 1 female (W. P. C.). Timberlake writes (in litt.) that this is a melanic variety of *A. pacifica* Cresson, occurring only in the female. It seems to be the only form of the female that occurs in Southern California.

ANTHOPHORA SIMILLIMA Cresson

Mark West Springs, April 23, 1 male, at *Cynoglossum grande* Douglas.

EMPHOROPSIS DEPRESSA (Fowler)

Garberville, 1 female, at *Cercocarpus betuloides* Nuttall.

EMPHOROPSIS MURIHIRTA Cockerell

Garberville, at *Lupinus albifrons* Bentham (W. P. C.), 1 female. Meyer's auto camp, Humboldt Co., 3 females at *Lupinus arboreus* Sims. variety, and 1 female at *Lathyrus vestitus* Nuttall.

BOMBIDÆ

BOMBUS CALIFORNICUS Smith

Mt. Diablo, one female at *Salvia mellifera* Greene.

BOMBUS EDWARDSII Cresson (*fernaldi* Franklin)

North of Laytonville (W. P. C.), workers at *Lupinus* and *Trifolium;* Garberville, workers at *Lupinus albifrons* Bentham, *L. bicolor* Lindley, *Sisyrinchium,* and *Cercocarpus betuloides* Nuttall; eight miles north of Ukiah (W. P. C.), at *Ceanothus cuneatus* (Hooker); Myers' auto camp, at *Lupinus arboreus* Sims, variety. Only workers were taken.

BOMBUS VOSNESENSKII Radoszkowski

Underwood's cabins, one female at *Ceanothus foliosus* Parry; north of Laytonville, one worker at *Pedicularis densiflora* Bentham; Myers' auto camp, one worker on *Lupinus arboreus* Sims, variety.

HYLÆIDÆ

HYLÆUS CRESSONI (Cockerell)

Petrified Forest, at *Ceanothus foliosus,* April 23, 1 male (Cockerell); Garberville, April 19, at *Cercocarpus betuloides* 1 male (Cockerell).

HYLÆUS NUNENMACHERI (Bridwell)

Petrified Forest, Sonoma Co., April 23, 1 male (Ckll.) It was at flowers of *Ceanothus foliosus* Parry. A male was also taken on Ceanothus at Mark West Springs, April 23, (Van Duzee).

Vol. XII October, 1936 No. 4

THE PAN-PACIFIC ENTOMOLOGIST

Published by the
Pacific Coast Entomological Society
in co-operation with
The California Academy of Sciences

CONTENTS

San Francisco, California
1936

THE PAN-PACIFIC ENTOMOLOGIST

Published quarterly in January, April, July and October by the Pacific Coast Entomological Society in co-operation with the California Academy of Sciences.

Domestic and foreign subscriptions $2.00 in advance. Subscriptions should be sent to the treasurer, E. R. Leach, Department of Entomology, California Academy of Sciences, Golden Gate Park, San Francisco, California. Make checks payable to the "Pan-Pacific Entomologist."

Manuscripts for publication and communications regarding non-receipt of numbers, change of address, requests for sample copies, etc., should be addressed to the editor, Mr. E. P. Van Duzee, California Academy of Sciences, Golden Gate Park, San Francisco, California. Advertisements will be accepted for the back cover pages. For rates address the editor or treasurer.

Twenty-five copies or more of author's extras will be furnished free on request. Additional copies will be supplied at cost of publication if a request is received with the manuscript.

Subscribers failing to receive their numbers will please notify the editor at as early a date as possible.

★ ★

★ ★

Published at the California Academy of Sciences, Golden Gate Park, San Francisco, California.

Entered as second-class matter, February 10, 1925, at the postoffice at San Francisco, California, under Act of August 24, 1912.

The Pan-Pacific Entomologist

VOL. XII, No. 4 October, 1936

ON CERTAIN HALICTIDÆ FROM NORTHERN CALIFORNIA

BY CHARLES D. MICHENER

University of California

This paper is a supplement to Prof. T. D. A. Cockerell's recently published article on "Bees from Northern California" (Pan-Pac. Ent., XII, pages 133-164). The specimens studied were almost entirely from the collection of the California Academy of Sciences, and were turned over to me for study by Prof. Cockerell, to whom I wish to express my gratitude for many kindnesses extended to me.

Halictus (Evylæus) sequoiæ Michener, n. sp.

Female: Length 6½ to nearly 7 mm.; black; head rather elongate, the facial line distinctly longer than transfacial; clypeus with fairly numerous coarse punctures; rest of face, especially front, rather dull with fine close punctures; scutum and scutellum with abundant, rather small punctures; tegulæ black, brownish posteriorly, not distinctly punctured; pleura with rather fine irregular punctures; wings quite dusky, the veins and stigma black; enclosure of propodeum short, hardly longer than postscutellum, distinctly shorter than scutellum, with rather strong longitudinal striæ, some of the median ones somewhat irregular, the rather extensive ground between the striæ roughened; posterior face of propodeum not bounded by a carina; inner spur of hind tibiæ with about seven oblique rather pointed teeth, the apical ones small, the basal one largest but hardly longer than basal width; abdomen broad, without bands, the posterior margin of tergites broadly but very faintly brownish, the pygidial area reddish apically; first tergite practically impunctate and very shiny (finely punctate laterally); second strongly contrasting with the first, the basal portion quite dull with punctures; remaining tergites like the second but with more punctures apically, fewer basally, that is, more evenly punctured; pubescence pale, present on legs, face, cheeks, forming a line around posterior edge of prothorax down to and including the tubercles; pleura, postscutellum and rest of thorax, with more or less copious pubescence; second and following tergites, except median dorsum of second, with some appressed pubescence.

Holotype (C.A.S. Ent., No. 4199) and paratypes, Ross, Marin County, April 28, 1918 (Van Duzee). Paratypes, Mark West Springs, on *Nemophila tricolor*, April 23, 1935 (Van Duzee); Myers, five miles north of Miranda, Humboldt County, April 18, 1935 (Van Duzee); Yorkville, Mendocino County, on white *Gilia*, May 8, 1935 (Van Duzee); Fairfax, Marin County, April 12, 1925 (C. L. Fox).

One specimen from Mark West Springs has a more shiny scutum than the others, but is probably only a variety.

Superficially similar species, such as *tracyi* Ckll. and *inconditus* Ckll. have the enclosure of the propodeum longer, about as long as scutellum. *H. kincaidii* Ckll. is a much more coarsely rugose species.

Halictus (Evylæus) humboldtensis Michener, n. sp.

Female: Black, with the abdomen largely red. Length nearly 7 mm.; transfacial line a little longer than facial; clypeus shiny with moderate sized punctures; rest of face, especially front, rather dull with very fine close punctures; mandibles reddish in the middle; scutum and scutellum brilliantly shining, with rather small, not close, punctures; postscutellum dull; pleura slightly shining, finely punctate; enclosure of propodeum coarsely reticulate, with longitudinal striæ laterally, the posterior margin smooth and shining; posterior face of propodeum not bounded by a carina; inner spur of hind tibia with about five teeth, the longest ones in the middle; abdomen very finely and obscurely punctate, the first tergite practically impunctate; first tergite black at the sides, strongly infuscated with black except for the apical margin; second and third tergites with rather large black spots at the sides basally; fourth tergite very short, only about one-third as long as third (probably abnormally retracted), yellowish red, infuscated at the sides; fifth and sixth tergites black, the fifth slightly reddish basally and apically; pubescence sparse and pale, not forming abdominal bands, moderately copious as usual on head and thorax; wings slightly dusky, the stigma very dark brown.

Holotype (C.A.S. Ent., No. 4200), Garberville, Humboldt County, April 19, 1935 (Van Duzee).

Differs from *H. ovaliceps* Ckll. by shape of head, from *H. arizonensis* Cwfd. by black tubercles, clypeus, legs, etc., from *H. aspilurus* Ckll. by black apex of abdomen, and apparently by more sparsely punctate scutum. Evidently closest to the latter species.

Halictus (Evylæus) mendocinensis Michener, n. sp.

Female: Length 7 mm.; black; facial line about equal to transfacial; clypeus apically shiny with rather coarse punctures but basally with fine punctures like those of rest of face; front rather dull, with small dense punctures; scutum and scutellum with rather small not dense punctures, the ground between shining, but not brilliantly so; pleura rather dull; enclosure of propodeum about as long as scutellum, truncated posteriorly, with fine, somewhat irregular longitudinal rugæ; posterior face of propodeum shiny, bounded by a rather fine carina which nearly vanishes at the sides above; wings brownish, the veins and stigma rather pale brown; inner spur of hind tibia with five or six teeth, the basal one longest and slender; tegulæ dark piceous, not large or punctured; under side of flagellum obscurely brownish; small joints of tarsi somewhat brown; first tergite polished, with only a few exceedingly minute punctures; following tergites less brilliantly shining, with small, much separated, punctures; posterior margin of tergites broadly but very obscurely brownish; pubescence pale, rather copious on head and thorax, less so on abdomen, not forming abdominal bands, practically absent on dorsal and posterior surfaces of propodeum.

Holotype (C.A.S. Ent., No. 4201) and one paratype, Yorkville, Mendocino County, May 1, 1924 (Van Duzee); paratype, Mill Valley, Marin County, June 21, 1931 (L. S. Slevin).

The sculpture of the enclosure of the propodeum reminds one of *H. allonotus* Ckll. but the striæ are even further apart. Perhaps closest to *H. foxii* Rob., *synthyridis* Ckll., *niger* Vier., *vaporellus* Ckll., etc., but in all of these the striæ of enclosure of propodeum are close, as in most species of the genus.

Halictus (Chloralictus) marinensis Michener, n. sp.

Female: Length 5 to 6 mm.; head and thorax blue, abdomen black; head fairly long, the facial line distinctly longer than transfacial; clypeus shining, with rather coarse punctures; supraclypeal area shining and nearly impunctate below medially; rest of face dullish, very finely and closely punctate and slightly lineolate; scutum partly lineolate, with moderate sized, not close, punctures; scutellum with punctures fine and close near midline; pleura dull, granulate; enclosure of propodeum with about twenty fairly widely separated radiating rugæ, the median ones not usually reaching to posterior edge of enclosure, the ground between the rugæ slightly transversely lineolate; tegulæ nearly black, broadly rounded or slightly truncate posteriorly, with a few tiny punctures; flagellum dull brown beneath except at base;

anterior margin of clypeus black; wings rather dark brown, the veins and stigma very dark brown; legs black; abdomen shining black, the posterior margin of the tergites faintly brownish, the tergites not or hardly punctured, not lineolate (there are apparently a few excessively minute punctures on base of second tergite, and perhaps a few on third tergite); pubescence sparse, pale, copious on legs, forming a margin around tubercles, fairly copious on pleura, not at all abundant on abdomen.

Holotype (C.A.S. Ent., No. 4202) and paratypes, Lagunitas, Marin County, August 7, 1921 (Van Duzee).

This species has the darkest wings of any *Chloralictus* known to me except *H. hemimelas* Ckll., which has distinct punctures on the abdomen and a very different enclosure of propodeum. *H. viridatulus* Ckll. has a similar enclosure to *marinensis*, but the abdomen is somewhat lineolate, tergites four to six have considerable appressed pubescence, etc.

Halictus farinosus Smith

Males: Mount Hermon, Santa Cruz County, July 7 to 30, 1922 (F. E. Blaisdell).

Halictus nigrescens Crawford

Females: Myers, five miles north of Miranda, Humboldt County, April 18, 1935 (Van Duzee); Cypress Ridge, Marin County, May 7, 1922 (Van Dyke); Cummings, Mendocino County, April 20, 1935, on *Ceanothus* (Van Duzee); Mount Tamalpais, Marin County, April 6, 1913 (Van Dyke); Mill Valley, Marin County, February 21, 1926 (Van Duzee); Mesa Grande, Sonoma County, July 14, 1908 (Blaisdell); Fairfax, May 9, 1920 (Van Duzee).

Halictus kincaidii Cockerell

Females: Klamath, Del Norte County, July 18, 1934 (Van Dyke); Mesa Grande, Sonoma County, July 10, 1908 (Blaisdell).

Halictus trizonatus Cresson

Both sexes: Mount Hermon, Santa Cruz County, July 7 to 30, 1922 (Blaisdell).

HALICTUS TITUSI Crawford

Females: Lagunitas, July 15, 1918 (Van Duzee); Muir Woods Redwood Cñ.), Marin Conuty, May 17, 1908 (Van Dyke).

HALICTUS ALLONOTUS Cockerell

Females: Ukiah, May 7, 1930 (G. Linsley); Marin County, March 22, 1925 (C. L. Fox); Myers, five miles north of Miranda, Humboldt County, on *Ceanothus* (Van Duzee); Lagunitas, Marin County, August 7, 1921 (Van Duzee).

HALICTUS OLYMPIÆ Cockerell

Females: Fairfax, May 11, 1919 (Van Duzee); Mill Valley, June 7, 1915 (Van Duzee).

HALICTUS ROBUSTUS Crawford

Female: Yorkville, Mendocino County, April 24, 1928 (Van Duzee). Close to *cooleyi* but larger, punctures of first tergite distinctly coarser than those of second (same as those of second in *cooleyi*).

HALICTUS COOLEYI Crawford

Females: Ross, Marin County, March 31, 1918 (Van Duzee); Cummings, Mendocino County, March 20, 1935, on *Ceanothus* (Van Duzee).

Male: Lane's Redwood Flat, Mendocino County, July 20, 1934 (Van Duzee).

HALICTUS MELILOTI Cockerell

Females: Fort Baker, Marin County (C. L. Fox); Yorkville, Mendocino County, April 30, 1924, and April 24, 1928 (Van Duzee); Mill Valley, Marin County, February 18, 1923 (Van Duzee); Lagunitas, Marin County, August 7, 1921 (Van Duzee); Ben Bow Club, Humboldt County, April 19, 1935, on *Myosotis* (Van Duzee); Myers, five miles north of Miranda, Humboldt County, April 18, 1935, on *Ranunculus* (Van Duzee); Sears Point, Marin County, May 28, 1931 (Van Duzee); Ross, Marin County, April 28, 1918 (Van Duzee).

HALICTUS LIGATUS Say

Females: Mark West Springs, April 23, 1935, on *Nemophila*

tricolor (Van Duzee); Cazadero, September 3, 1918 (Van Duzee).

Halictus euryceps Ellis

Some individuals from Eureka (Van Duzee) are nearly like the type, others have the striæ on enclosure of propodeum few and broadly separated. There are apparently all intergradations between these forms.

Halictus helianthi Cockerell

Female: Mount Tamalpais, Marin County, April 6, 1913 (Van Dyke).

Halictus lerouxi Lepeletier

Female: Guerneville, Sonoma County, May 31, 1910 (Van Dyke).

Male: Mesa Grande, Sonoma County, July 17, 1908 (Blaisdell).

Halictus lerouxi lupinelli (Cockerell)

Females: Lagunitas, July 15, 1918 (Van Duzee); Muir Woods (Redwood Cñ.), Marin County, May 17, 1908 (Van Dyke); Fort Baker, Marin County, March 15, 1925 (C. L. Fox); Orick, Humboldt County, July 5, 1931 (Van Dyke); Mill Valley, Marin County, May 24, 1924 (C. L. Fox); Yorkville, Mendocino County, April 24, 1928 (Van Duzee).

Males: Lagunitas and Orick, same data as above.

Both sexes differ from *lerouxi* by slightly smaller size. Females from the type locality show narrow bands as in the type, but specimens from other localities show various intergradations with ordinary *lerouxi*. Crawford (Viereck et al, Synop. Bees Ore., Wash., B. C., and Vancouver) notes great variation in size and in width of abdominal bands.

Halictus tracyi Cockerell

Some specimens from northern California agree with *inconditus* Ckll. in the coarse sculpture of the enclosure of the propodeum, but resemble *tracyi* in the nearly black antennæ (flagellum strongly brown beneath in *inconditus*) and in the grayish wings (brownish in *inconditus*). Apparently these Cali-

fornia forms are only distinct varieties, as numerous specimens of both types as well as forms with finer sculpture than typical *tracyi* have the same data and many specimens are intermediate between these forms. I am inclined to believe that we have *inconditus* divided into two subspecies, the northern typical form and the southern *tracyi*. For the present, however, *tracyi* may be considered as a distinct species. The variations of *tracyi* are greater than those commonly considered of specific value.

Females: Lagunitas, Marin County, July 4, 1909 (Van Dyke); Mill Valley, Marin County, April 19, 1925 (C. L. Fox); Yorkville, Mendocino County, May 8, 1935, on white *Ceanothus* (Van Duzee).

Male: Similar to the female, having the same variable sculpture of enclosure of propodeum, but differing from female by the usual sexual characters. Head elongate, the clypeus much produced with an apical dull yellow band; flagellum long, the under side brown or sometimes the apical third nearly black; mandibles black, the apices ferruginous, sometimes a yellow area basad to the ferruginous apex; tarsi vary from dull yellow to nearly black.

Lagunitas, August 7, 1921 (Van Duzee); Weott, Humboldt County, July 13, 1929 (Van Dyke).

HALICTUS ORTHOCARPI Cockerell

Numerous females from Garberville, Humboldt County, California (Van Duzee).

Male: Similar to female except for the usual sexual characters; flagellum very long, red beneath except for the last one or two joints; face very long and rather narrow, the clypeus produced, its apical half yellow; tarsi yellow; fore tibiæ yellow at base and apex, with a yellowish line on anterior side of one of them; middle tibiæ yellow, infuscated exteriorly except at base or (on other side) black, yellow at base and apex; hind tibiæ black.

Lagunitas, Marin County, August 7, 1921 (Van Duzee).

This specimen shows a peculiar asymetry in the markings on the legs.

AUGOCHLORA POMONIELLA Cockerell

Female: Ben Bow Club, Humboldt County, April 19, 1935 (Van Duzee).

AGAPOSTEMON CALIFORNICUS Crawford

Female: Eureka, Humboldt County, April 17, 1935, on Salmon Berry (Van Duzee).

THE SAWFLY GENUS *EMPRIA* IN NORTH AMERICA

(Hymenoptera, Tenthredinidæ)

BY HERBERT H. ROSS

Illinois State Natural History Survey, Urbana, Ill.

The genus *Empria* is one of the sawfly groups which apparently has no reliable external characters for classifying the species. A study of the saws and male genitalia, however, has disclosed remarkable differences which afford a stable basis for separating the forms of the nearctic species.

In the past over seventy nearctic species have been placed in the genus. Of these three, *cavata* MacGillivray, *cetaria* MacGillivray, and *columna* MacGillivray, belong to the genus *Ametastegia*. The remainder have been condensed to seven, including one new to science. They were originally based on slight differences in color, sculpture of head, shape of sheath, proportions of antennæ, and sundry other characters. Most of the species were based on one or a few specimens. During the spring of 1930 Dr. T. H. Frison and myself obtained several hundred specimens of two species, *maculata* and *obscurata*, from several localities in Illinois. These series showed that almost every external difference previously used was subject to considerable variation and that the only reliable ones were the characters of the internal genitalia. This conclusion has been substantiated by a study of more than 600 specimens from almost all parts of North America. I have examined the genitalia of every type involved in this paper except those of *multicolor* (Norton), *superba* (Prov.), and *hullensis* (Prov.).

When the Eurasian species of *Empria* are studied on the basis of these characters, a few of the names used in this paper

may have to be changed. At present, however, determination of Eurasian species is too arbitrary to be relied upon.

Empria Lepeletier

Key to Nearctic Species

1. Males (apical sternite not incised) 2
... Females (apical sternites divided by a sheath) 7
2. Mesopleuræ with a large yellow mark ..... *multicolor*
... Mesopleuræ black 3
3. Apex of penis valve produced into a long slender filament, fig. 15 ..... *improba*
... Apex of penis valve without a long slender filament, figs. 11-14 4
4. Penis valve without a single, conspicuous tooth or tooth-like process at or near apex, fig. 16 ..... *coryli*
... Penis valve with a conspicuous tooth, figs. 12, 13, or a tooth-like process, fig. 14, at or near apex 5
5. Apex of penis valve curled over and hood-like, forming a tooth-like process, fig. 14 ..... *maculata*
... Apex of penis valve not curled over; with a tooth on the dorsal side below apex, figs. 12-13 6
6. Tooth of penis valve short as in fig. 12 ..... *obscurata*
... Tooth of penis valve long as in fig. 13 ..... *ignota*
7. Mesopleuræ with a light area or stripe 8
... Mesopleuræ black 9
8. Clypeus deeply incised, fig. 9, and yellow ..... *multicolor*
... Clypeus only slightly incised and black ..... *coryli*
9. Lancet of saw with large, sharp lobes on apical portion and with no well differentiated lobes on basal portion, fig. 1 ..... *maculata*
... Lancet with lobes forming a regular series increasing in size from apex to base, fig. 2 10
10. Lobes of lancet, fig. 8, with basal portion long and rounded, and separated from the small apical teeth by a small depression ..... *improba*
... Lobes of lancet, fig. 6, with basal portion not distinctly set off from apical portion 11
11. Basal lobes of lancet, fig. 6, with base large and globular, with few apical teeth ..... *ignota*
... Basal lobes of lancet with base smaller, fig. 5, sometimes scarcely produced, fig. 3 12
12. Segments of lancet separated by rows of small setæ, fig. 2 ..... *obscurata*
... Segments of lancet not separated by rows of small setæ, fig. 3 ..... *nordica*

Subgenus Empria Lepeletier

Synonyms: *Pœcilostoma* Dahlbom, *Pœcilosoma* Thomson, *Pœcilostomidea* Ashmead, *Tetratneura* Ashmead, *Triempria* Enslin.

Six species are placed in this subgenus, which is characterized by the totally black orbits, and a median keel on the clypeus.

Empria obscurata (Cresson)

Selandria obscurata Cresson, Trans. Am. Ent. Soc., vol. 8, Jan., 1880, p. 15, male, female.

Pœcilosoma punctulata Weldon, Can. Ent., vol. 39, Sept. 16, 1907, p. 304, male, female. *New syn.*

Empria affinis female, *Empria caudelli* female, *Empria arizonensis* female, Rohwer, Can. Ent., vol. 42, May 7, 1910, pp. 173-174. *New syn.*

Empria cava female, *Empria cauduca* female, MacGillivray, Can. Ent., vol. 43, Sept. 6, 1911, pp. 306-309. *New syn.*

Empria capillata female, *Empria condita* female, *Empria contorta* female, *Empria conferta* female, *Empria concreta* female, *Empria conciliata* female, *Empria concisa* female, MacGillivray, Can. Ent., vol. 43, Oct. 4, 1911, pp. 341-346. *New syn.*

Empria costata MacGillivray, Can Ent., vol. 46, Mar. 13, 1914, p. 103, female. *New syn.*

Empria fragariæ Rohwer, Jl. Econ. Ent., vol. 7, Dec., 1914, p. 479. *New syn.*

Empria cista female, *Empria cistula* female, MacGillvray, Univ. Ill. Bull., vol. 20, no. 50, Aug. 13, 1923, p. 16. *New syn.*

Distribution. Alta., Ariz., B. C., Calif., Colo., Conn., Ia., Ida., Ill., Ind., Man., Mass., Mont., N. J., Northwest Terr., N. Y., Ore., Sask., Wash.,

Empria ignota (Norton)

Selandria ignotus Norton, Trans. Am. Ent. Soc., vol. 1, 1867, p. 257, female.

Monostegia kincaidii MacGillivray, Can. Ent., vol. 25, Oct. 5, 1893, p. 239, female. *New syn.*

Empria calda female, *Empria cata* male, *Empria castigata* female, *Empria casca* male, *Empria evecta* female, MacGillivray, Can. Ent., vol. 43, Sept. 6, 1911, pp. 307-310. *New syn.*

Empria confirmata female, *Empria concitata* male, *Empria culpata* female, MacGillivray, Can. Ent., vol. 43, Oct. 4, 1911, pp. 341-343. *New syn.*

Empria cerina MacGillivray, Psyche, vol. 28, April, 1921, p. 34, male, female. *New syn.*

Empria cirrha female, *Empria cithara* female, MacGillivray, Univ. Ill. Bull., vol. 20, no. 50, Aug. 13, 1923, p. 16, 17. *New syn.*

Distribution. Alta., B. C., Conn., Man., Mass., Mich., N. B., N. J., N. H., N. Y., Ont., Ore., Pa., Que., Sask., Wash.

Empria nordica new species

Indistinguishable externally from specimens of *ignota* and *obscurata* in which the sheath is curled and narrowed at apex. Differs in structure of saw as explained in key.

Female. Length 5.5 mm. Color black, with paired opalescent areas on abdominal tergites 2-6, the extreme apical margin of the abdominal segments white and the following parts whitish or straw-colored: postero-lateral margin of pronotum, tegulæ, labrum, indefinite area at apex of femora, front and middle tibiæ except apex, and extreme base of hind tibiæ; remainder of tibiæ and tarsi varying shades of brown. Wings barely infuscated, venation brown.

Structure. Typical of subgenus. Clypeus, fig. 10, moderately incised, with a median keel produced beyond apex to form a small tooth. Antennæ short and stout. Ridges of head rounded and dull with shagreening. Thorax shining. Tarsal claws with a minute inner tooth near middle.

Sheath long and tapering to a narrow, rounded apex, clothed with sparse setæ. Cerci short, one-fourth length of sheath. Saw with 17 discernible segments in the lance, 16 in the lancet. Lance with sutures straight at apex, becoming curved towards base. Lancet, fig. 3, with ducts wide and shallow, their anterior margin sinuate; segments at base of saw set off by fine creases, those at apex only by the ventral lobes; ventral lobes long and scarcely raised, divided into 6-10 fine teeth, which decrease in number towards the base of the saw.

Holotype. Female; Aweme, Manitoba, Canada, June 1, 1912, Norman Criddle. In the collection of the Illinois State Natural History Survey.

Paratype. Female; Hay River, Northwest Territory, Canada, May 16, 1927, R. H. Bedford. Deposited in the Canadian National Museum.

Empria improba (Cresson)

Emphytus improbus Cresson, Trans. Am. Ent. Soc., vol. 8, Jan., 1880, p. 11, female.

Empria salicis Rohwer, Can. Ent., vol. 42, May 7, 1910, p. 174, male, female. *New syn.*

Empria contexta MacGillivray, Can. Ent., vol. 43, Oct. 4, 1911, p. 345, female. *New syn.*

Distribution. Alta., B. C., Colo., Man., Me.

Empria coryli (Dyar)

Harpiphorus maculatus var. *coryli* Dyar, Jl. N. Y. Ent. Soc., vol. 5, Dec., 1897, p. 194.

Empria mellipes Rohwer, Can. Ent., vol. 42, May 7, 1910, p. 175, female. *New syn.*

Empria caetrata MacGillivray, Can. Ent., vol. 43, Sept. 6, 1911, p. 305, female. *New syn.*

The lancet of the saw, not mentioned in the key, has the ventral lobes raised and pointed basally and bearing no teeth, fig. 4. The segments are separated by a single row of short spines, directed basally; these rows run completely across the lancet on the basal segments but diminish apically until at the apex they form a narrow brush just above the ventral margin.

Distribution. Ill., Mo., N. Y., Wis.

Empria maculata (Norton)

Emphytus maculatus Norton, Proc. Bost. Soc. Nat. Hist., vol. 8, 1861, p. 157, male, female.

Pœcilostoma convexa MacGillivray, Can. Ent., vol. 41, Nov. 1, 1909, p. 402, female. *New syn.*

Empria distincta female, *Empria submaculata* female, *Empria melanostoma* male, female, Rohwer, Can. Ent., vol. 42, May 7, 1910, pp. 173-175. *New syn.*

Monosoma maura Rohwer, Proc. U. S. Natl. Mus., vol. 38, June 6, 1910, p. 204, female. *New syn.*

Empria callosa female, *Empria celsa* female, *Empria callida* female, *Empria caprina,* male, female, *Empria casta* female, *Empria celebrata* female, *Empria captiosa* female, *Empria cæca* female, *Empria cariosa* female, *Empria candidula* female, *Empria canora* female, *Empria cauta* female, MacGillivray, Can. Ent., vol. 43, Sept. 6, 1911, pp. 305-311. *New syn.*

Empria condensa female, *Empria cumulata* female, *Empria curata* female, *Empria cuneata* female, *Empria cupida* female, MacGillivray, Can. Ent., vol. 43, Oct. 4, 1911, pp. 342-346. *New syn.*

Empria schwarzi Rohwer, Proc. U. S. Natl. Mus., vol. 41, Oct. 14, 1911, p. 398, female. *New syn.*

Empria cadurca MacGillivray, Can. Ent., vol. 55, July 6, 1923, p. 158, male, female. *New syn.*

Distribution. Alaska, B. C., Calif., Conn., D. C., Ia., Ill., Ind., L. I., Maine, Man., Mass., Md., Minn., Mont., N. B., N. C., N. H., N. J., N. Y., Ohio, Ont., Ore., Pa., Que., R. I., Tex., Va., W. Va., Wis.

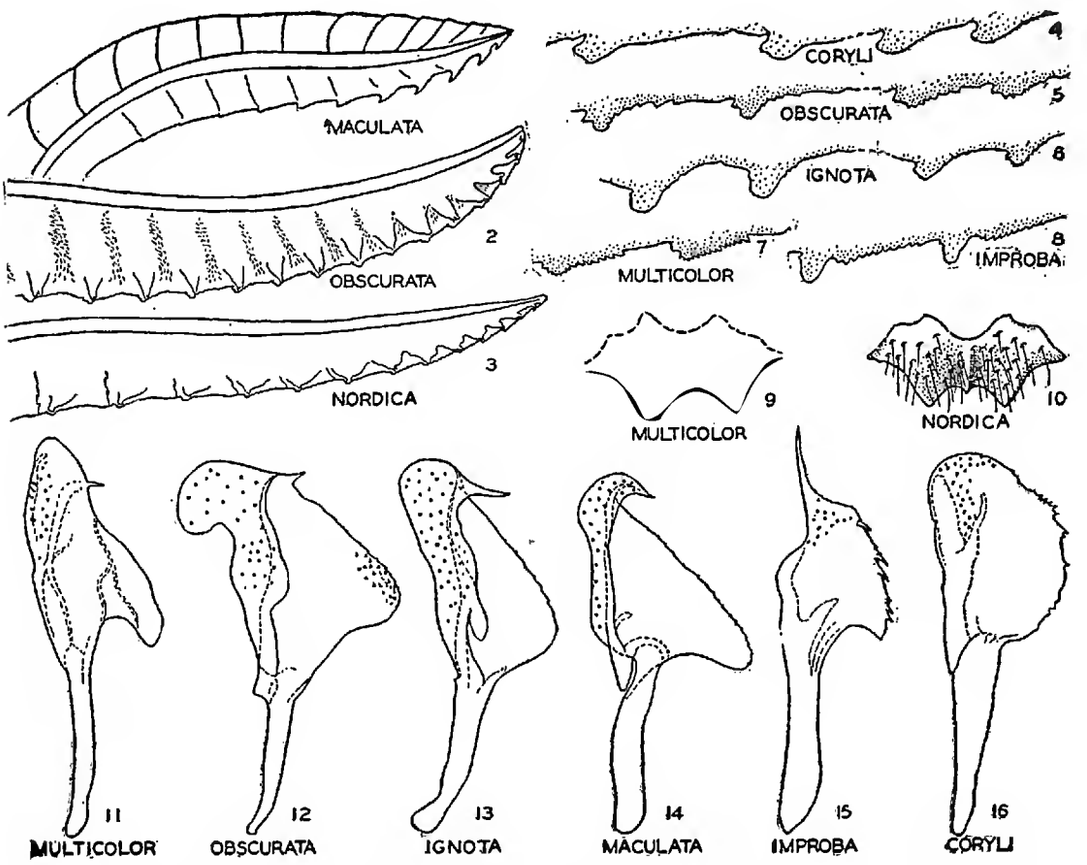


Plate I. Parts of *Empria*. Figs. 1-8, Saws and their parts. Figs. 9-10, Clypei. Figs. 11-16, Penis valves.

Subgenus Parataxonus MacGillivray

New synonym: *Leucempria* Enslin.

Contains only a single nearctic species, characterized by the yellow inner orbits, and the long flat clypeus.

Empria multicolor (Norton)

Strongylogaster multicolor Norton, Proc. Bost. Soc. Nat. Hist., vol. 9, 1862, p. 120, male, female.

Emphytus hullensis Provancher, Add. et Correc. au vol. II, Faune Ent. du Can., Dec., 1885, p. 25, male. *New syn.*

Eriocampa superba Provancher, Add. et Correc. au vol. II, Faune Ent. du Can., July, 1888, p. 351, female. *New syn.*

Empria carbasea MacGillivray, Can. Ent., vol. 43, Oct. 4, 1911, p. 341, female. *New syn.*

Aphilodyctium maculatum Rohwer, Proc. U. S. Natl. Mus., vol. 41, Oct. 14, 1911, p. 408, female. *New syn.*

Aphilodyctium multicolor erythrogastrum Rohwer, Proc. U. S. Natl. Mus., vol. 41, Oct. 14, 1911, male, female. *New syn.*

This species varies considerably in color; the ground color of the abdomen ranges from yellowish rufous to dark brown, the legs may be entirely pale yellow or have the apices of the femora black or blackish and the posterior orbits may be entirely yellow or mostly black. The penis valve, fig. 11, is slender, with a small subapical tooth. The saw has 30 segments in the lance and 24 in the lancet, a much higher number than in *Empria s. st.* The ventral lobes of the lancet have no definite basal process but are studded with 14-20 small teeth, fig. 7.

Distribution. Alta., Calif., Ga., Mass., Md., Me., N. C., Nev., N. H., N. J., N. Y., Ohio, Ont., Ore., Pa., Que., Va., Wash., Wis., W. Va.

Another Destructive Death Watch Beetle

Some time ago Mr. Roy Campbell of Alhambra sent me some specimens of an anobid beetle which had thoroughly honeycombed the woodwork of an old Spanish bureau. I soon ran it down to *Thaptor oblongus* Gorh. but not being satisfied with Gorham's description sent specimens to my good friend, Dr. Blair of the British Museum. He pronounced my material identical with the type even stating that the type had the elytra definitely punctate which was contrary to Gorham's statement.

Thaptor Gorh. is, however, a synonym of *Eupactus* Lec. Champion's efforts to validate *Thaptor* at a later date, by restricting it to a limited number of species including *oblongus*, seems to me rather a poor effort, seeing that these species only differ from the others in minor regards. *Colymmaderus* Solier which has priority over both names, was based upon a Chilean species which has antennal characters, as shown by his detailed illustration, that are not at all congeneric with them. The species should, therefore, be known as *Eupactus* (*Thaptor*) *oblongus* (Gorh.).

The beetle is undoubtedly very destructive to woodwork in Mexico and would no doubt prove equally destructive along our southern border of it should ever become established there.—Edwin C. Van Dyke.

ON CERTAIN SPECIES OF CANTHARIS (TELEPHORUS)

(Coleoptera)

BY H. C. FALL

Tyngsboro, Mass.

Cantharis perpallens Fall, n. sp.

This is the form which in my "Coleoptera of Southern California" (Occ. Papers, Calif. Acad. Sci. VIII, 1901, p. 122) I referred with some doubt to the *larvalis* of Le Conte, which later on this author concluded, and I think correctly, to be only a pale form of *notatus*. Since then I have carefully compared my Pomona—Pasadena species with the type of *larvalis* and find it to be quite distinct therefrom.

Perpallens is entirely yellowish testaceous, length 8 to 9 mm., width 2¼ to 2½ mm.; ungual formation the same as in *larvalis* (=*notatus*), viz—inner claw of front tarsus of male cleft at tip, with its outer portion obtuse, almost malformed; all the other claws simple; in female all claws simple. It differs from *larvalis* by its larger eyes (♂), prothorax more gradually rounded at front angles, these being practically obliterated, entirely pale coloration (body beneath and occipital spots dark in *larvalis*), basal joint of front tarsus in male less dilated, 2nd and 3rd joints evidently longer than wide (2nd scarcely, 3rd not longer than wide in *larvalis*), elytra scarcely tuberculate, the erect hairs shorter and pallid.

Not rare at Pomona and Pasadena, California, in May and June by beating willows.

In the table of *Telephorus* of LeConte's Synopsis of the Lampyridæ of the United States (1881), four species—*divisus*, *notatus*, *lautus* and *ochropus*—are included in Section "E," which is characterized by the "anterior claws of all the tarsi toothed at base, cleft at tip, elytra sparsely tuberculate." As no distinction between male and female is mentioned, the implication is that these characters apply to both sexes. As a matter of fact *divisus* alone of the four species mentioned conforms to this diagnosis. In the other three species all the tarsal claws are simple in the female, and in the males of *notatus* and *ochropus* at least only the anterior protarsal claw is cleft. *Lautus* was described from a unique female with yellow legs; the dark legged males later associated by LeConte with the type

probably do not belong there and I have not yet definitely identified males of this species. There is no very definite tooth at the base of the claws in any of these three species.

Cantharis lecontei Fall, new name
(*C.* (*Telephorus*) *collaris* || *Lec.*)

This is given as a variety of *impressus* (=*tuberculatus*) in LeConte's last table (1881), and is so placed in his box. The type is a female from Illinois and there is a second example, also a female, from Missouri. Two females from Southern Pines, North Carolina, and a pair (♂ ♀) from Natick, Mass. in my collection seem almost certainly to be the same as the LeConte type, and if so *collaris* cannot possibly be a variety of *impressus*, for in this latter the antennæ of the male are subserrate and fully two-thirds as long as the body, while in my Natick male they are much shorter and not in the least serrate.

In the Leng list *collaris* is made to appear synonymous with *armiger* Coup. This cannot be true if, as has long been supposed, *armiger* is specifically the same as *impressus*, nor do the original descriptions warrant such association. Just why *tuberculatus* was selected as the proper name of this species in the Leng list is not clear to me. The description of *impressus* takes page precedence over *tuberculatus* in LeConte's 1851 paper and he recognizes this fact in his 1881 Synopsis.

In his early paper on the North American Lampyridæ (1851) LeConte briefly described numerous species of *Telephorus*, among them *T. pusillus* based on a single New York specimen which he said much resembled *T. rectus* Melsh. though much smaller. In his later Synopsis of this family (1881) LeConte referred this species to *rectus* as a synonym, and then inadvertently used the same name, *pusillus*, for a different species which he described as new from Virginia and Georgia. The name of this later *pusillus* must therefore be changed.

Some years ago I received from Mr. J. W. Green of Easton, Pennsylvania, a series of *Cantharis* of the type of LeConte's 1881 *pusillus*. Mr. Green had given his ample material very careful study, including examination of genitalia, and believed four distinct species were involved, but it was impossible for him to determine which was the true *pusillus* of LeConte as they all keyed to that species in LeConte's table. I have in turn

carefully studied the specimens sent me and am inclined to think Mr. Green was correct in his conclusions. The following tabular statement may enable the student to separate the four species in question. They are all small slender species, piceous, with mouth, base of antennæ, prothorax, legs, and the lateral and sutural margins of the elytra pale yellow.

1. Protarsal claws of male rather widely cleft; muzzle shorter in front of eyes; prothorax in the male usually entirely yellow or at most with a narrow median posteriorly abbreviated darker shade; in the female often with narrow median dark vitta. (Pa.; Conn.) ..... *imbecillis* Lec.
... Protarsal claws of male finely narrowly cleft; muzzle appreciably longer before the eyes, more noticeably so as a rule in the female; prothorax entirely yellow in both sexes; average size a little smaller 2
2. Antennæ slightly more slender, distinctly longer than half the body in both sexes, the median joints more than three times as long as wide in the male and fully three times as long as wide in the female 3
... Antennæ slightly less slender and preceptibly shorter, especially in the female, in which they are not appreciably longer than half the body, the median joints scarcely more than twice as long as wide in the female and rather less than three times as long as wide in the male; claws nearly as in *mollis*, (N. J.) ..... *mimus* n. sp.
3. Protarsal claws of male narrowly cleft, the inner part however, distinctly separated from the outer and perceptibly shorter; superior plate of genital armature of male very slightly sinuate at middle of apex. (Pa.; Mass.; N. H.; Conn.; N. Y.) (*pusillus* Lec. 1881, not 1851) ..... *mollis* new name
... Protarsal claws of male still more finely cleft, the inner part approximate to the outer at tip and scarcely shorter; middle and hind claws similarly more finely cleft than in the preceding; superior plate of male genital armor rather deeply emarginate ..... *greeni* n. sp.

CANTHARIS (TELEPHORUS) IMBECILLUS Lec.

This species is represented in the Leconte collection by a female specimen bearing the name label and therefore to be considered the type. It carries an orange disk locality label (Southern States) but no locality is named in the description. *Imbecillis* has been referred by LeConte as a synonym of *scitulus* and the type so stands in his collection. This I am sure is an error. The prothorax in *imbecillis* is distinctly smaller and

less transverse than in *scitulus* but is quite the same in type as that in LeConte's 1881 *pusillus*. Moreover in *scitulus* all the ventral segments are in part testaceous, the claws are more narrowly cleft in the male, the head is more widely pale in front and the antennæ are less slender. That my Pennsylvania and Conneticut specimens are the true *imbecillis* is not absolutely certain but the probability that they are so is great. In LeConte's brief description the knees are said to be infuscate. They are lightly so in the type but I have not observed this in any other specimen. In the thirteen examples before me the length (head deflexed) varies from 4.5 to 6 mm.

Localities represented are: Pennsylvania, Montrose and Wind Gap (J. W. Green), N. Bloomfield (Champlain); Connecticut (Cornwall, K. F. Chamberlain).

Cantharis mimus Fall, n. sp.

Of this species I have but a single pair bearing label Chatsworth N. J., VIII-4-28 (J. W. Green). Length 3.9 mm. (♂), 4.75 (♀).

Aside from the antennal character given in the table, a possible significant feature in both these examples is the very wide pale sutural stripe, this being at base fully twice as wide and at apex fully one-half wider than the adjacent dark stripe. This of course may not prove constant in series. In the male the ventral apex and in the female the apices of the last four segments are pale. The male of the above pair is taken as the type.

Cantharis mollis Fall, new name

(*pusillus* Lec 1881, not *pusillus* Lec. 1851)

A common species from the New England States to Virginia and perhaps further south. Its western limits are uncertain. It is on Dury's Cincinnatti list but not on Wickham's Iowa list. LeConte's type is a male from Virginia and with it is placed a female from the same state.

The claws of the male are finely cleft but the inner portion is distinctly separated from the outer at the tips. This character makes separation from *imbecillis* and *greeni* rather easy, but in *mimus* the slightly shorter and less slender antennæ will have to be relied upon. In the 42 examples before me

the length ranges from 4.2 mm. to 5.8 mm., the greater number being around 5 mm.

The following specific localities are represented in my series. New Hampshire (Mt. Washington, Center Harbor, Farmington); Massachusetts (Tyngsboro, Lowell, Sherborn, Pepperell, Marion, Mt. Holyoke); Connecticut (Cornwall); New York (Peekskill); Pennsylvania (Effort and Lake Pocono, J. W. Green); Maryland (Mountain Lake Park). Dates of capture range from May 31 to September 14.

Cantharis greeni Fall, n. sp.

The very finely cleft tarsal claws of the male constitute the chief diagnostic character of this species, and one which with but little experience is easily appreciated. The two parts of the claw are more nearly of equal length than usual and though not in actual contact at tip are closely approximate. The pale sutural stripe of the elytra is nearly as wide as in *mimus* and varies but little in the series at hand. Length 4 to 5.3 mm.

West Virginia (Williamson, VII-9-30, 8 exs., J. W. Green; Fairmont, 2 exs., P. N. Musgrave).

The type is a male from Williamson.

A Correction

On page 29 of this volume change the name *Nemocestes koebeli* to *Nemocestes koebelei*.—E. C. Van Dyke.

Notes on Eleodes letcheri and rileyi

In 1902 the writer collected *Eleodes letcheri* at Verdi, Nevada. This has remained the only known habitat of the species until recently when John E. Blum discovered it at Tetonia, Idaho. Tetonia also yielded *Eleodes rileyi* Casey whose author gave Arizona as the type locality. In Bul. 63, U. S. Natl. Mus. the writer mentions *rileyi* as possibly occurring in Idaho.—F. E. Blaisdell.

STUDIES IN THE MELYRIDÆ, No. 11

(Coleoptera)

BY FRANK E. BLAISDELL, SR.*

The known species of *Listrus* number 65, many new ones are coming to hand, to be described when more time can be given to their careful differentiation. I have already suggested rules and the *modus operandi* for their proper study[1]. The three new species described below are distinctly different from any heretofore published:

Listrus minimus Blaisdell, new species

Form small, oblong-subovate, slightly robust, about two and one-half times as long as wide, widest at about posterior third of the elytra. Antennæ moderate in length, attaining the posterior fifth of the pronotum, somewhat dissimilar in the sexes. Color black, basal two or three segments of the antennæ pale, femora testaceous to testaceo-piceous; tibiæ and tarsi also pale to slightly suffused with fuscous. Luster dull. Pubescence unicolorous throughout, cinereous to slightly yellowish; short, recumbent and moderately dense but not obscuring the general surface; lateral pronotal fimbriæ very short.

Head transverse before the post-ocular line, widest across the eyes and there twice as wide as long; sides not prominent, rapidly converging anteriorly, antennal insertions somewhat visible from above; epistoma truncate at apex, angles rounded. Frons feebly convex, without impressions, sutures slightly evident, finely punctate, punctures separated by a distance equal to one to two times their diameters. Eyes rather large, facets comparatively small, numerous, interstices evidently not setose. Antennal segments quite equal in width, second oval (*vide infra* under the sexes).

Pronotum widest slightly behind the middle, two-fifths wider than long; apex broadly arcuate and almost continuously so with the sides, the latter strongly arcuate behind the middle, feebly arcuate and more convergent anteriorly than posteriorly, apical angles sometimes feebly evident; base broadly arcuate and continuously so with the sides, angles absent; lateral margins finely denticulate. Disk strongly convex from side to side, rather declivous antero-laterally, slightly and broadly impressed postero-laterally in the submarginal area; punctures small, rather dense and separated by a distance equal to one to two times their diameters. Base and apex quite equal in width.

* Stanford Medical School and Associate in Research, California Academy of Sciences, San Francisco, California.

[1] Stanford Univ. Publ., Biol. Sci's, I, No. 3, 1921, p. 140.

Elytra oblong-oval, one-half longer than wide, two and one-half times as long as the pronotum; base feebly emarginate, humeri rounded, slightly tumid; sides nearly parallel, slightly divergent to posterior third, thence broadly arcuate and gradually convergent to the rounded apex, the latter feebly emarginate at the suture and the angles narrowly rounded, margins finely denticulate. Disk moderately convex in the central area, sides precipitous in basal one-half, gradually and arcuately so toward and on the apical declivity; punctures slightly larger than on pronotum and similarly spaced. Scutellum small and subtruncate at apex.

Abdomen feebly convex, ventral segments two, three and four short and quite equal in length. Legs relatively moderate in length and stoutness.

Male. Somewhat narrower. Antennæ slightly stouter than in the female; third segment small and obconical, fourth and fifth scarcely subtriangular; sixth to the tenth inclusive oval to subquadrate, as long as wide and slightly increasing in width; eleventh elongate obovate, widest at base and narrowing to apex. Fifth ventral abdominal segment subtruncate at apex.

Female. Slightly broader. Antennæ as long as width of pronotum, slender, last three segments slightly stouter; third slender and widest at apex, the latter noticeably oblique; segments four to ten inclusive rounded and submoniliform, as long as wide. Fifth ventral segment arcuate at apex.

Measurements. (Types.) Length 2 mm.; width 0.8-0.9 mm.

Holotype, female (No. 4129), and allotype, male (4130), in the author's collection, Museum of the California Academy of Sciences, collected by Mr. O. N. Sanford in the vicinity of San Diego, California, during May, about 1882. Four paratypes in the author's collection. The species was submitted to Thos. Casey and pronounced a new species. None have come to hand in recent years.

Minimus is the smallest known species of *Listrus* and easily recognized by the uniform color of the pubescence, without maculation; the pronotum is transverse with angles broadly rounded. This species is smaller and less robust than *gentryi* described below.

Listrus gentryi Blaisdell, new species

Form small and robust, less than two and one-third times as long as wide. Color black; mouth-parts piceous, basal three or four segments of antennæ testaceous, distal segments nigro-piceous;

legs rufous. Pubescence dense, not completely obscuring the surface; hairs moderately short, slender and closely recumbent, plumbeo-cinereous in color, with blackish hairs forming macules as follows: A small one on the humeral angles; an oval one on each elytron just before the junction of basal and middle thirds and nearer the suture than the lateral margins; a marginal semi-oval macule at middle; a transverse fascia beginning at margins and interrupted at suture, the inner half of each lateral moiety enlarged and oval in form, just laterad to which, at middle of the anterior margin, a short narrow process extends forward for a short distance; a small, oval macule is also present just behind the middle of each elytron a short distance from the suture, basad and mesad to the apex of the fascial process.

Female. Head about twice as wide as long before the post-ocular line, sides rather rapidly converging and almost straight to the truncate epistomal apex; frons feebly convex and rather coarsely punctate, antennæ subequal in length to that of the pronotum and about attaining its base; slender and slightly incrassate distally, second segment suboval, third slender obconico-cylindrical, fourth and fifth triangular, both slightly prominent anteriorly, fifth the larger; segments six to ten inclusive quite equal in length, subtriangularly oval and about as wide as long, eleventh elongate oval, as long as the ninth and tenth taken together, nearly twice as long as wide.

Pronotum about one-third wider than long, widest at middle where the sides are obtusely subangulate, thence the latter are convergent, straight to feebly and broadly subsinuate both anteriorly and posteriorly, margins distinctly serrulate; fimbriæ pale, short and recurved; apex transverse in feeble circular arc, angles obtuse and not in the least prominent; base broadly and moderately feebly arcuate, slightly wider than the apex, angles very obtuse, disk moderately convex and finely punctate, punctures well separated.

Elytra oblong, one-half longer than wide, less than two and one-half times as long as the pronotum, gradually and slightly widening toward apical fourth, thence broadly and arcuately convergent, continuously so with the apex, margins distinctly denticulate; base wider than the pronotum, humeri well rounded; disk moderately convex and rather depressed in the central area; sides precipitous in the humeral region, thence gradually and arcuately declivous, similarly so apically; surface rather coarsely and closely punctate. Scutellum somewhat transverse and rounded at apex.

Abdomen moderately convex, with fifth ventral segment arcuate at apex. Legs moderate in length and stoutness.

Male. Narrower. Abdomen less than moderately convex, fifth ventral truncate at apex.

Measurements. (Types). Length 2.0-2.5 mm.; width 1.0-1.2 mm.

Holotype, female (No. 4131), and allotype, male (No. 4132), in the author's collection, Museum of the California Academy of Sciences. Collected in Borego Valley, San Diego County, California, April 10, 1933, by Mr. H. S. Gentry, to whom the species is dedicated. Three paratypes in Mr. Gentry's collection and one in that of the author. Seven specimens studied, one accidentally destroyed.

Gentryi is very distinct in its small, robust form, pattern of elytral maculation and concolorous pronotum. It resembles certain species of *Dasytes* and *Dasytastes*, and from these easily separated by absence of the pronotal submarginal line and maculation. In *Listrus* Mots. the lateral pronotal margins are serrulate and the ungual appendages are quite as long as the claws. The elytra are immaculate in *Listrus minimus*, *punctatus* and *obscurellus*. In *Listrus martini*, *rubripes*, *annulatus* and *pictipes* the elytra are more or less distinctly trifasciate; *longicollis* is a narrow and parallel species with a more or less æneous luster; in *ornatulus* the body is less robust, legs dark, the elytral pattern more irregular, not sharply defined, and the subapical fascia is not typically interrupted at the suture. *Listrus concurrens*, occurring in San Diego County, is less robust, has the pronotum densely punctate and the elytra bifasciate at and behind the middle. *Gentryi* may follow *concurrens* in the list of species.

Listrus coalingensis Blaisdell, new species

Form elongate, parallel suboblong to subovate, about three times as long as wide. Color black with a more or less æneous tinge; second, third and fourth antennal segments pale; trophi more or less pallido-piceous; tibiæ and tarsi rufous to somewhat piceous. Pubescence moderately dense, recumbent, not completely hiding the punctation, cinereous on the upper surface, with that of the maculæ brown to black. Hairs of the elytra slightly coarse and narrowly subsquamiform, longer on the pronotum, more hairlike and cinereo-plumbeous on sterna and abdomen, albescent and very dense on scutellum and parapleuræ, similar but finer, shorter and less abundant on the legs. Maculation variable in the sexes and usually less defined in the male.

Head widest across the eyes and there quite equal to the pronotal length, twice as wide as long before the post-ocular line;

frons broadly and feebly impressed, punctures small, denser laterally than centrally, intervals not indented except laterally. Eyes large and very prominent, strongly convex, width of each as viewed from above equal to one-fourth of the interocular surface. Antennæ slender, differing in the sexes, first segment robust and black.

Pronotum about one-seventh wider than long, widest behind the middle; apex broadly and feebly arcuate, rounding with the sides, angles absent; sides most arcuate and prominent behind the middle, convergent anteriorly and much less arcuate, angles sometimes marked by a denticle, margins finely denticulate, fimbriæ moderate in length and curved backward and upward; base broadly and moderately strongly arcuate, more prominent posteriorly than the position of the angles, more or less slightly sinuate laterally within the rounded angles. Disk moderately convex, somewhat more arcuate and declivous antero-laterally and feebly impressed postero-laterally; punctures small and very dense, best defined centrally and confused laterally.

Elytra rather feebly convex in the central area, arcuately and abruptly declivous laterally in about basal two-thirds, gradually and arcuately declivous laterally and apically in about apical third; base broadly emarginate, humeri rounded and broadly exposed, discal surface slightly impressed within the umbones, sides straight and parallel, broadly arcuate and convergent in apical fourth to the narrowly rounded sutural angles, apices briefly dehiscent. Margins very finely denticulate, denticles well spaced. Disk rather densely punctate, punctures a little larger than on the pronotum, surface more or less finely rugulose.

Under surface of body more or less shining. Abdomen less than moderately convex, finely and densely punctate. Legs moderate in length and rather slender. Metafemora not inflated nor arcuately adapted to sides of body, straight and when extended backward passing slightly beyond the apical margin of third abdominal segment.

Male. Narrower. Pronotum a little wider than long, sides straighter anteriorly. Elytra about twice as long as wide. Antennæ longer, extending slightly beyond the pronotal base, distal segments not incrassate, segments four to seven slightly prominent anteriorly (subserrate); second segment oval and a little longer than wide, third obconical, smallest and twice as long as wide; four to seven inclusive about twice as long as wide, slightly prominent anteriorly at about apical third, sixth least so, fifth and seventh most so, fifth longest and most prominent; segments seven to ten inclusive quite equal in length and about one-third longer than wide; eighth, ninth and tenth subtriangular and nearly as long as wide at apex; eleventh elongate, subfusiform-oval and twice as long as wide.

Maculation dark and more or less feebly defined. On each elytron consisting of a small humeral macule, a post-basal about equidistant from suture and scutellum, another at middle about one-third from base and more or less indefinitely connected with the post-basal; two irregular and more or less disintegrated fasciæ, one at middle, the other at apical fourth, and a variable subapical macule. At times the transverse fasciæ are distinct, narrow and zigzag, more or less interrupted at suture and middle of each elytron. Pronotal dark and central area may be irregularly oval and emarginate anteriorly to slightly four-lobed; lateral semilunar maculæ entire or divided at middle. Fifth abdominal segment not modified but arcuato-truncate at apex.

Female. Broader and sometimes slightly ovate. Pronotum relatively smaller, about a fifth wider than long; sides more arcuate and not so noticeably convergent anteriorly. Elytra somewhat less than twice as long as wide and about three times as long as the pronotum. Antennæ more slender and relatively shorter, not attaining the pronotal base, not subserrate anteriorly; segments three and four smallest and subcylindrical, twice as long as wide; fifth largest and prominent anteriorly, as long as wide; seventh slightly more prominent than sixth or following segments; sixth, eighth, ninth and tenth almost as wide as long, subtriangular as viewed from above and quite circular in section; otherwise as in the male.

Maculation more definite and stronger, each elytron with six more or less circular maculæ; usually the fasciæ are divided at suture, the posterior at middle of each elytron and the anterior obsolescent or feeble in lateral two-thirds or indefinitely continuous; the subbasal and the lunate macule at basal third may be obscurely united. More or less atrophy or expansion of the maculæ is normal. Pronotal darker central area may be poorly defined as in the male or distinct and four-lobed; the lateral semilunar maculæ may be more or less divided at middle. Legs shorter and less stout; metafemora attaining middle of third ventral segment. Fifth abdominal segment arcuate at apex.

Measurements. (Types). Length 3.5-3.0 mm.; width 1.0-1.2 mm.

Holotype, Male (No. 4133), and allotype, female (No. 4134), in the Museum of the California Academy of Sciences. Collected in Jacalitos Canyon, Coalinga, Fresno County, California, March 18, 1931, by E. P. Van Duzee. Thirteen specimens studied: eleven paratypes, 4 males and 7 females.

Coalingensis is to be differentiated by the following characters: Males elongate, narrower and parallel; female stouter, parallel to slightly wider posteriorly. Pronotum of male less

transverse and noticeably convergent and straighter anteriorly. Maculation more or less obscurely defined in the male, usually better marked in the female. Antennæ moderately dissimilar in the sexes. See figures.

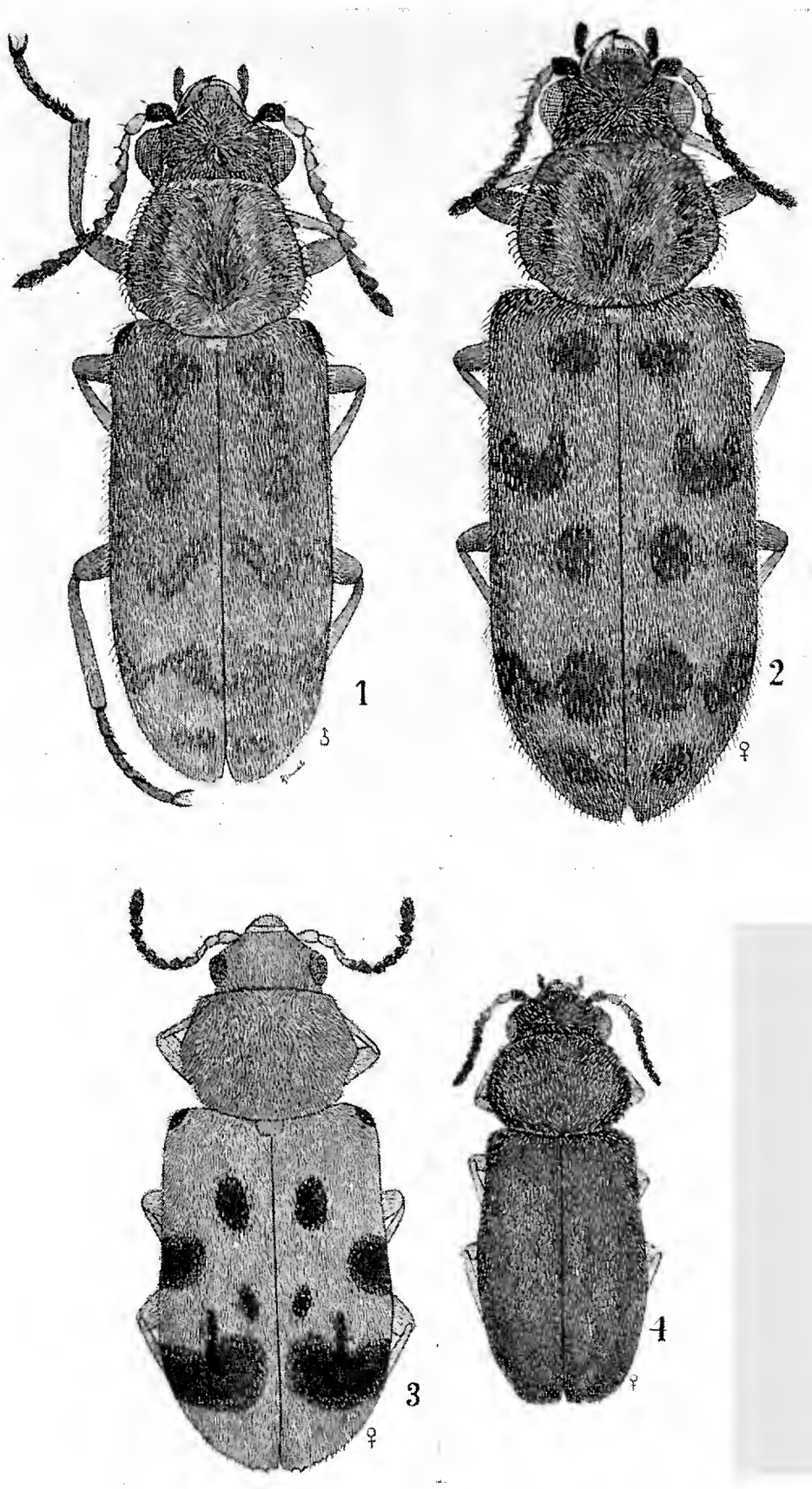
By my synoptic table[2] *coalingensis* falls near *fidelis* Casey and *subæneus* Casey. I have studied Casey's types in the National Museum and made the following notes at the time: Male type of *fidelis* has the pronotal darker pattern feeble, but an hour-glass macule and lateral lunate vittæ are discernible, and the discal punctures are sharply defined and perforate with the interstitial surface smooth in the central area. Antennæ slender, second segment cylindrical and twice as long as wide at apex, third subequal to second in length and feebly triangular; fifth a little larger, subtriangular and prominent anteriorly. Habitat is given as "Cal" without other data.

In *subæneus* the female type was collected in Contra Costa Co., and paratypes at Yountville, Napa Co., California. In this species the maculation is not distinctly defined and evidently more or less denuded; pronotal punctation densely indentato-punctate. The antennæ were not described in detail by Casey. These organs are very important in differential diagnosis of species.

Confusus Casey is small, male not distinctly parallel and the maculation is very indefinite and often entirely absent. Type male was taken in the environs of San Francisco. Many species are more or less local and locality must always be considered. See synoptic table referred to in foot note. *Extricata* Casey occurs in San Diego Co., and is more æneus, larger and with a well developed maculation.

---

[2] Stanford Univ. Publ., Biol. Sci's, I, No. 3, 1921, p. 175.



Explanation of figures

Fig's. 1 and 2. *Listrus coalingensis* new species, male and female. Length 3.5 mm.

Fig. 3. *Listrus gentryi* new species, female. Length 2.5 mm.

Fig. 4. *Listrus minimus* new species, female. Length 2 mm.

BRACHYTARSUS IN CALIFORNIA

(Coleoptera, Anthribidæ)

BY ELWOOD C. ZIMMERMAN

To my knowledge only one species of the genus Brachytarsus (*B. franseria* Barrett) has been recorded from California. I have a series of four specimens collected by Mr. F. R. Platt at Callahan, Siskiyou County, June 13, 1934, that are unquestionably *B. strictus* Boheman. The previous western record I had for this species was Kansas. Mr. L. L. Buchanan writes that the National Museum has none from farther west than Iowa in the arranged collection. I have seen four specimens of *B. nigromaculatus* Schaeffer labeled "Yuma, Ariz" in the Van Dyke collection.

The three species of Brachytarsus known from California may be distinguished as follows:

1. Basal carina of the prothorax bent forward and continued a short distance anteriorly along the side.....2
... Basal carina of the thorax not bent forward nor continued anteriorly along the sides; derm and scaling conspicously pale; southeastern California .....*nigromaculatus* Schaeffer
2. Body elongate, subparallel-sided, only one-half as broad as long; the basal margin of the prothorax not conspicuously bent posteriorly at the baso-lateral angles; northern California .....*strictus* Boheman
... Body rather short, ovoid, almost three-fifths as broad as long; the basal margin of the prothorax with the baso-lateral angles distinctly angulate at the sides (bent posteriorly around the shoulders); southern California coast.....*franseria* Barrett

P. W. Wolfurm, in Junk and Schenkling's "Coleopterorum Catalogus," part 102, 1929, Anthribidæ, records *Brachytarsus beyeri* Schaeffer from California. According to Schaeffer's original description this species is from Lower California.

Change of Name

Lepidopus Van Dyke, Pan-Pacific Ent. 12: 2, 1936, pp. 76-77, being preoccupied, as kindly indicated to me by Mr. Oehser of the Smithsonian Institution, I now wish to change to *Cryptolepidus*.—Edwin C. Van Dyke.

SOME NEW SPECIES OF LEAFHOPPERS IN GROUPS FORMERLY INCLUDED IN THAMNOTETTIX*

BY E. D. BALL

University of Arizona, Tucson

Pasadenus limbatus Van Duzee

Van Duzee described *Thamnoettix limbatus* in 1890 from a single male No. 612, labeled "California Coquillette". The female has never been described. As two closely related species are at hand, it was necessary to examine the unique type to make certain which species was the true *limbatus*. Through the kindness of Dr. Drake and Dr. Knight, this was accomplished.

The female is nearly 6 mm. long and considerably broader than the male, cinnamon brown, lighter than the male, the apical portion of the vertex paler, the costal margin very broadly creamy yellow back to the apical cells. All below pale yellow, the female segment only a little over one-half as long as its basal width, the posterior margin rounding with two black dashes margining the ovipositor.

Neallotype ♀ and seven parallotype females from Saugus, California, June 7, 1935, taken by P. W. Oman. Neallotype and three parallotypes returned to him. The holotype has the face darker than the average of the species, in which it is pale yellow without markings.

Pasadenus omani Ball, n. sp.

Resembling *limbatus* but larger with an obtuse vertex and extremely long genitalia. Cinnamon brown, the males smoky, with narrow creamy stripes on the costal margins. Length ♀ 6.5 mm.

Vertex much broader and proportionately shorter than in *limbatus*, slightly obtusely angled, the margin thicker than in that species. Elytra flaring behind, the claval nervures approaching each other and often touching or joined by a cross nervure, usually two or more cross nervures between the outer claval and the suture, while in *limbatus* the claval nervures are normal and there is rarely more than one cross nervure to the claval suture. Female segment one and one-half times as long as its basal width, slightly narrowing posteriorly, with a definite median notch instead of

* Types in the author's collection, unless otherwise stated.

wider than long and rounding posteriorly as in *limbatus*. Male valve very short, plates broad at base, roundingly narrowing for one-third their length, then produced into long, almost parallel margined, finger-like tips twice as long as the basal part and slightly divergent at their apices where they fit over the keel of the pygofers. Pygofers definitely constricted near the middle, then together forming a triquetrus apex. Color cinnamon brown, often smoky, pale brown below with light arcs on the front. The costa narrowly creamy.

Holotype ♀, allotype ♂, and two paratypes taken by the writer south of Lebeck, California, June 29, 1934, and twelve paratypes Mint Canyon, California, July 7, 1935 (Oman). Named in honor of Mr. P. W. Oman, whose extensive collecting and careful systematic work have been major factors in the recent advancement of our knowledge of the Homoptera.

Pasadenus deltus Ball, n. sp.

Form of *limbatus* Van D nearly, larger with a more sharply angled vertex. Golden with a triangular compartment at the apex of the long outer anteapical. Length ♂ 5 mm.

Vertex definitely acutely angular, as long as the pronotum. Elytra with the nervures concolorous, veins of clavus widely separated with no cross nervures. The outer anteapical cell long, obliquely narrowing posteriorly with an oblique cross nervure that cuts off an apical triangle, only about three extra nervures along the costa. Male valve longer than in *limbatus*, obtusely triangular with apex blunt, the plates together narrower than in *limbatus*, triangularly narrowing and then extended into two broad, finger-like plates that are independently rounding and slightly divergent at the apex. Their total length about one and one-half times the basal width, but definitely exceeding the short, blunt pygofers. Pygofers with the dorsal margin extended as an incurved thumb-like projection.

Holotype, male, June 12, 1931, and one paratype male August 1, 1912, taken at Beaumont, California, by the writer.

Cyperana smithi pollicarius Ball, n. var.

Resembling *smithi*, slightly larger, much broader, with the black band on vertex broad and broken in the middle and below the ocelli. Golden orange, the scutellum creamy, the elytra with a greenish cast above the black tergum. Face golden, the sutures black around the clypeus. Below black the legs yellow, male genitalia much larger than in typical *smithi*. The plates are

abruptly cut out on the inside at one-half the length of the valve, exposing the styles and pygofers. The outer margins thickened and chitinized into thumb-like black projections, like a pair of widely opened tongs. Length of ♂ 5.5 mm.

Holotype, male, and one paratype male taken by the author at Quincy, California, July 23, 1912.

Cyperana wanakena Ball, n. sp.

Form of *smithi* nearly, golden with four spots on vertex margin. Length ♀ 6 mm.

Vertex narrower, and slightly longer than in *smithi*, therefore, slightly more angulate. Pronotum narrow, inclined to be elevated posteriorly, exhibiting an exceptionally long scutellum. Female segment of the *stramineus* type with the inflated bosses with about seven corrugations on each side, but much shorter, three times as wide as long with a deeper, wider median emargination and a definite obtusely angular median projection. Male plates of the var. *pollicarius* type with the internal angles cut out and in the form of rounding lobes. The long sinuate-margined styles appearing in the notches. The outer angles of the plates are broad, mitten-like flaps, hanging down over the pygofers.

Color golden with a reddish cast, the elytra with a greenish cast on the disc, becoming slightly smoky subhyaline posteriorly. Face and legs golden, four spots across the vertex margin, the outer two dots, the inner pair, much larger and slightly crescentiform. Sternum, venter and ovipositor black, sometimes the segments with a narrow marginal light line. The female segment is all black, while in *stramineus* its base as well as the venter is yellow.

Holotype ♀ Wanakena, N. Y., August 12, 1920 (Dr. C. J. Drake); allotype ♂ and two paratypes Oden, Michigan, August 12, 1906; one paratype Cranberry Lake, N. Y., August 19, 1920 (Osborn and Drake). Paratype in the Ohio State University collection.

Colladonus tahotus Ball, n. sp.

Resembling *januatus*, slightly larger, darker brown with two black spots on vertex. Length ♀ 5 mm.

Vertex about as in *januatus*, a little longer compared with the pronotum. The disc brown, sometimes emphasized as a dark line against the light anterior margin. Margin rounding over to the yellow face two large round black spots over the margin about equidistant from each other and the ocelli. All above

back of the vertex reddish or smoky brown. The costa broadly light, below pale cinnamon.

Holotype, ♀, allotype, ♂, and six paratypes Pine Valley, California, July 6, 1931, and eight paratypes, Weed, California, June 27, 1934. All taken by the author.

Elymana ovatina Ball, n. sp.

Resembling *inornata* Van D., slightly larger, darker green with a more acute vertex and a pair of concave lines back of the lateral margins. Length ♀ 6 mm.

Vertex right-angled, rounding over to the front, a concave brown arc back of the margin from the ocellus to just back of the apex on either side and another pair parallel with these just over the edge. Face with numerous fine brown arcs and a pair of large black spots below the antennæ. Pronotum pale creamy in front of an arcuated line. Elytra definitely green instead of subhyaline as in *inornata*. Female segment twice wider than long, posterior margin nearly truncate with a broad, blunt, dark-marked, median projection. In life it is arched over the ovipositor, so as to appear emarginate. Male plates spoon-shaped, much broader than in *inornata* with long, black spines appearing below.

Holotype, ♀, allotype, ♂, and thirteen paratypes, August 7, 1935. All taken by the writer in the Santa Rita Mountains, Arizona.

Peritelopsis globiventris (Lec.) Infesting Roots of the Globe Artichoke

Specimens of the uncommon broad nosed weevil *Peritelopsis globiventris* (Lec.) were collected on June 30, 1936, feeding on the roots of the globe artichoke at Davenport, Santa Cruz County, California. Considerable damage was noticeable to the roots of several plants affected, but the infestation was very localized and not of any great economic importance. Dr. Edwin C. Van Dyke kindly made the determination and reports it as an uncommon species of the sand dune areas of the coast. This infestation undoubtedly was an overlap from native plants in the vicinity.—W. Harry Lange, Jr.

TWO MEALYBUGS OF THE GENUS PUTO ATTACKING CITRUS

BY S. E. FLANDERS

University of California Citrus Experiment Station, Riverside

Mealybugs of the genus *Puto* are widely distributed and form a part of the fauna of the citrus plant. This genus, like *Phenacoccus*, is to be distinguished from *Pseudococcus* by the denticle on the inner face of the tarsal claws. *Puto*, however, differs from *Phenacoccus* by having all the cerarii surrounded by a definite chitinized area.

According to Ferris, *Puto yuccæ* (Coq.) is recorded as attacking lemon and lime in California. Recently it was reported on the roots of young citrus trees in Ventura County by Mr. Lorbeer, manager of the Fillmore Citrus Protective District. It is a large species, 5 to 6 mm. long, with a pale body entirely covered with thick plates of white, cottony wax and fringed with short, stout tassels; the caudal tassels somewhat longer. The young resemble minute white rosettes and often cluster together in cavities in the soil about the roots. No ovisac is formed as the species is viviparous.

Another species of *Puto*, probably *Puto spinosus* (Rob.), is found on citrus in Australia and India. This species differs from *P. yuccæ* in lacking the triangular dermal pores and in having the cerarian spines truncate instead of pointed. Specimens were collected by Harold Compere on citrus at Coonoor, India, in June, 1932, and by the writer on oranges near Sydney, Australia, in March, 1931.

These two species differ widely in their external appearance. The female of the Australian species is a large oval insect, about the size of *Pseudococcus gahani*. The body is yellow and the dorsum sparsely powdered with white wax except on a middorsal longitudinal stripe. The most striking feature, however, is the fringe of 34 clusters of glassy bristles. The lateral bristles equal the width of the body and the caudal bristles equal the length. Finely spun cottony threads appear loosely woven about the bristles on each cluster. The base of each bristle appears to be set on one of the truncate cerariian spines. There are from 10 to 30 of such spines on each cerarius. The anterior

cerarii, which are the most strongly chitinized, bear the most spines.

In Australia this mealybug occurred on trees that were also infested with *Pseudococcus gahani*, and in about equal numbers. Like *Pseudococcus gahani*, this species of *Puto* is apparently held in check by parasites. Some of the prepared specimens show the mandibles of internal parasites.

A NEW FORM OF POLYGONIA HYLAS

BY FRANK CLAY CROSS

Polygonia hylas orpheus Cross, n. form

This form of *Polygonia hylas* Edwards is not a new form in the sense of being a new discovery. Indeed Dr. Holland erroneously pictured it, in his *Butterfly Book*, as the nimotypical form of *hylas*, from which it differs very notably. The typical *hylas* is mottled conspicuously on the under surfaces of its wings, and has a silvery obtuse angle-mark in the center of each secondary, as pictured by Dr. Comstock in his *Butterflies of California.*

The form *orpheus*, here described, is a uniform purplish dark gray on the under surfaces of its wings, and the silvery marks on the secondaries are entirely lacking. Both males and females exhibit the form.

Holotype, male, taken in Deer Creek Canyon, near Denver, Colorado, May 31, 1936. This specimen, and one paratype taken on the same date and in the same place, are in the collection of the author in the Colorado Museum of Natural History. Four paratypes in the collection of Mr. F. Martin Brown of Colorado Springs, Colorado.

This form of *Polygonia hylas* apparently corresponds to the *marsyas* form of *Polygonia satyrus*, which was classified by Barnes and Benjamin in their check list, published in 1926, as a geographic race. Nevertheless both the nimotypical form of *satyrus* and the *marsyas* form may be taken in the same immediate area and in the same seasons of the year, as proved by my own experience. Therefore if *satyrus* proper and *marsyas* are races which overlap, it may be that one or the other form of *hylas* also predominates in certain areas, in which case the *orpheus* form should be listed as a race.

DR. NEEDHAM'S MONOGRAPH OF THE MAYFLIES

The Biology of the Mayflies with a Systematic Account of the North American species. By James G. Needham, Jay R. Traver and Yin Chin Hsu. Ithaca, N. Y., Comstock Publishing Co., 1935. 759 pages, 40 plates and 168 text figures.

Dr. Needham has again placed our students under deep obligations by the publication of this work on another group of neuropteroid insects. Part I includes 236 pages of a most interesting and important discussion of the morphology and biology of this order of insects, bringing together the results of the studies that have been made in the past both in this country and in Europe. Part II is a systematic account of all our known North American mayflies with keys to all taxonomic groups and "verification" tables of the species, the latter a feature new to the writer but apparently a most useful one. The descriptions are ample and the illustrations numerous and most helpful. Assuming the index to be complete the work treats of some 45 genera and 500 species.

Criticism seems quite out of place in noticing a work as complete as this, but the policy adopted by the authors of this work is open to criticism on two points that it seems to the reviewer should be protested whenever they appear in a systematic work. First the alphabetical arrangement of the species leaves the student without a guide to their relationship to one another. The work will not be complete until the publication of a systematic catalogue. Second, the acceptance of species founded on larval characters alone, leaves such species unknown until a synonym has been made or it has been bred out. The approval of this system by the International Committee on Zoological Nomenclature does not justify this custom. The ornithologist does not describe a new species of bird from a clutch of unfamiliar eggs, and no more should an entomologist describe an insect from an egg or immature specimen. Few insects have a more interesting life history and the publication of this monograph will serve as an additional stimulus to their study. With Dr. Needham's Monograph of the North American Odonata and that on the Plecoptera, Dr. Betten's Report on the Trichoptera of New York State, listing western species, and Carpenter's Revisions of the Mecoptera and the Raphidias, we have a good beginning toward a knowledge of our Neuropteroid insects—E. P. Van Duzee.

OBSERVATIONS ON THE HABITS OF SOME WESTERN LONGICORN BEETLES

(Coleoptera, Cerambycidæ)

BY E. GORTON LINSLEY

University of California

Although the Cerambycidæ is a group that may be of considerable economic importance, comparatively little is known of the life histories or habits of a great many of our commonest western species, and the following random observations may therefore prove of interest.

METHIA and STYLOXUS

The habits and food plants of our Californian Methiini have been largely problematical. The adult beetles are rarely captured (usually at light). Information at hand, however, indicates that the larvæ are twig girdlers. A few years ago the writer reared *Methia arizonica* Schffr. from girdled branches of mesquite (*Prosopis*) and Mr. A. T. McClay has recently established the host plants of three additional species. Mr. McClay reared *Styloxus californicus* (Fall) from small twigs of live oak (*Quercus agrifolia*) and *S. bicolor* Champ. & Knull as well as an undescribed species of *Methia* from California Juniper (*Juniperus californica*). The larval work of these species is somewhat similar to that of many of the Elaphidionini. The larvæ girdle the small twigs in which they bore, feeding in the girdled portion. The girdled twigs, when not broken off by the wind, are very conspicuous against the green foliage of the tree. When brought indoors and caged, *Styloxus* usually requires two years to mature. Whether or not this is the normal development period in nature has not been established.

ATIMIA DORSALIS LeConte

This species has long been known to breed in various cupressine trees (*Cupressus*, *Juniperus*, *Libocedrus*, *Sequoia*, etc.). Throughout most of its range there is only one brood each year. Eggs are deposited in spring and early summer in cracks and crevices of the bark of recently dead wood and the larvæ mine in the cambium, just beneath the bark, and pupate in the heart-

wood. Transformation takes place in the fall and emergence in the spring. In the coastal area of Southern California, however, observations made by Mr. K. D. Sloop and the writer indicate that there are two broods a year. In this region the Monterey Cypress (*Cupressus macrocarpa*) has been used for many years as an orchard wind-break and an ornamental shrub. The largest brood appears in late fall (October and November) and during these cold months the insects are very abundant upon the cypress. They usually attack plants which have been weakened by adverse moisture conditions or by barkbeetle (*Phlœosinus cupressi*) attack, but occasionally injure apparently healthy trees. The larval habits become somewhat modified when feeding in living trees, and they usually work more deeply in the wood. So severe has been the attack of *Atimia* and *Phlœosinus* in this area that cypress is being largely replaced as a wind-break by Eucalyptus.

Acmaeops and Cortodera

Very few observations have been recorded upon the habits of the Lepturini of western United States. Most of the known species feed in damp decaying wood, a very few in living trees, but regarding the large group which includes *Acmœops* and *Cortodera*, little has been known. In an attempt to learn something of the biology of these genera, the writer discovered that the larvæ of two species (*A. tumida* Lec. and *C. spuria* Lec.) feed upon the roots of buttercup, *Ranunculus californicus*, in the foothill regions near San Francisco Bay. The young larvæ apparently bore within the roots, but the older larvæ roam freely through the soil, feeding externally. Pupal cells are formed in the soil an inch or so below the surface. Transformation occurs in early spring and the adults emerge when the buttercups are in blossom (March and April). *Acmœops tumida* usually appear a week or ten days after the first examples of *C. spuria* have emerged, and may be found after the last of the latter species has disappeared. Adults of both species feed upon pollen of the buttercup and mating occurs on the flowers of this plant.

ASILIDÆ, NEW AND OTHERWISE, FROM THE SOUTHWEST, WITH A KEY TO THE GENUS STICHOPOGAN

BY J. WILCOX

Division of Truck Crop and Garden Insect Investigations, Bureau of Entomology and Plant Quarantine, U. S. Department of Agriculture, Puyallup, Washington.

In this paper two genera of robber flies (Asilidæ) are described as new, three genera are recorded from the United States for the first time, eight new species are described, and notes and descriptions of several other species of interest are given. A key is given to those species of the genus *Stichopogon* Loew (*Neopogon* Bezzi)[2] that are found in the United States.

This paper is based on material collected in the last few seasons by D. K. Duncan, of Globe, Ariz., and R. T. Kellogg, of Silver City, N. Mex., to whom I am especially indebted. I am also indebted to the Ohio State Museum, the California Academy of Sciences, the Museum of Comparative Zoology, the University of Kansas, Dr. H. A. Scullen of the Oregon State College, Owen Bryant of Tucson, Ariz., and C. H. Martin, for the loan or gift of specimens. I also wish to express my appreciation to Marston Bates for comparing specimens in the Museum of Comparative Zoology. Unless otherwise noted, the types and paratypes of the new species are in my collection.

Itolia Wilcox, new genus

This genus is most closely related to *Townsendia* Williston. It differs from all other genera of the Dasypogoninæ except *Townsendia* by having only four posterior cells, and from *Townsendia* by having the third (ordinarily the fourth) posterior cell closed and the front but slightly wider at the vertex than at the antennæ.

Face flat, slightly more prominent at oral margin, slightly diverging below; mystax confined to oral margin. Front considerably excavated; ocellar tubercle large. First and second antennal joints short, not longer than wide; third joint not quite as long as first two joints together, slightly coarctate but widest at base and gradually tapering to apex; style two-jointed, first joint short, two joints together, including minute spine at tip, half as long as third joint. Thorax convex, shining and densely pruinose in part; two rather weak presutural bristles and one

[2] I am following Bromley (Ann. Ent. Soc. Am., 27: 79, 90, 98, 1934) in using *Stichopogon* rather than *Neopogon* for the American species of this genus.

postalar bristle; scutellum largely shining, with fine hair, no bristles. Pleuræ and coxæ mostly pruinose, with rather long, dense pilosity; hypopleural patch long, crinkly at tip. Abdomen largely pruinose, with shining areas; a lateral row of bristles on first segment; hairs on dorsum short, those on sides somewhat longer. Male genitalia rather prominent, similar to those of *Dioctria*; ovipositor with a circlet of spines at apex. Legs normal; empodium and pulvilli present. Third posterior cell of wings (fig. 1) closed and with a minute petiole which does not reach the wing margin; anal cell similar; anterior cross-vein at about middle of discal cell; fourth vein continuous with costa or wing margin, posterior to this the margin of wing membranous.

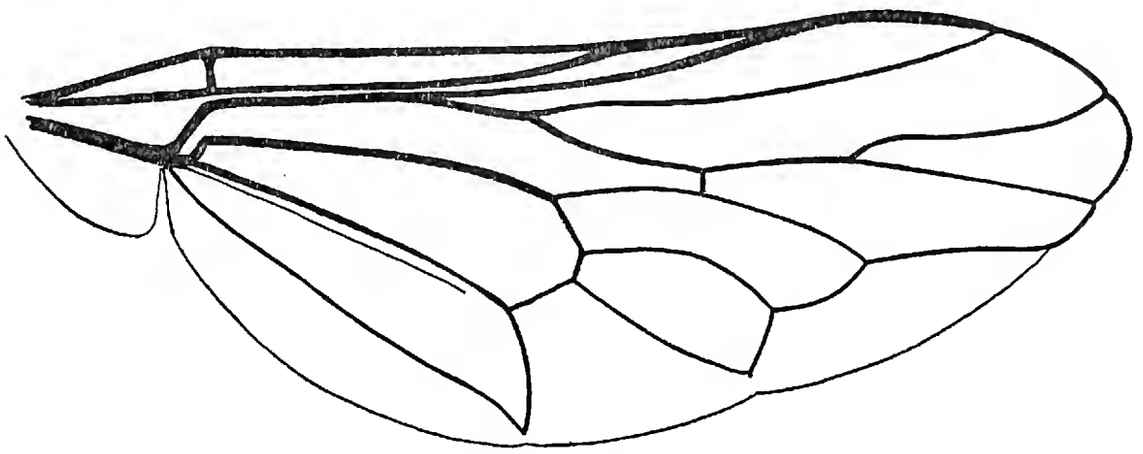


Figure 1.—Wing of *Itolia*, new genus (X10).

Genotype: *Itolia maculata* Wilcox, new species

Named for my wife, Itol Josephine Wilcox, who has collected or helped to collect many species of Asilidæ.

Itolia maculata Wilcox, new species

Male: Length 7 mm. Head black, densely pruinose; mystax, weak bristles on ocellar tubercle and upper occiput, and hairs, white. First two antennal joints black clothed with short white hairs; third joint and basal half of style brownish; apical half of style and minute bristle at tip yellowish white.

Thorax shining; part of humeri and postalar calli, a broad central stripe, and a broader lateral stripe on each side truncate in front and narrowly constricted at transverse suture but not completely bisected, black; remainder of mesonotum and pleuræ and coxæ, except lower part of mesosternum, a small spot on metasternum, and anterior half of coxæ, densely pruinose; pruinose areas bearing white hair, which is more abundant on propleura and mesopleura; hypopleural hairs long, erect, white, crinkly at tip. Two weak white presutural bristles and one weaker white postalar bristle. Scutellum shining black, narrowly transversely

pruinose at base; a few short, fine, whitish hairs apically.

Abdomen shining black in ground color, except very narrow posterior margin of second and third segments, posterior one-third of fourth segment, and fifth to seventh segments, which are largely reddish brown; each segment with a broad, interrupted, pruinose band occupying about posterior two-thirds, narrowly interrupted on second, gradually increasing in width of separation to fifth, where the interval is about equal to one-third the width of the segment; bands on first, sixth, and seventh segments similar to those on fifth. Hairs and bristles white; about six weak lateral bristles on first segment; hairs on sides of first segment long, those on remaining segments short. Venter largely pruinose, white pilose. Hypopygium conspicuous, shining, white pilose; hypandrium divided and rather broad, each part about twice as long as broad, somewhat widened apically, basal two-thirds black, apical third reddish; surstyli reddish, about three times as long as broad, equal in length to hypandrium; epandrium black, shorter than the other parts, narrowed apically.

Legs shining; trochanters, basal half of fore and middle femora, and basal two-thirds of hind femora, except narrowly at base, black; remainder of femora, and tibiæ, except tip of hind tibiæ, yellowish red; tarsi brown, except base of hind metatarsi and basal half of other metatarsi, which are yellowish; claws black, narrowly yellowish white at base; pulvilli white; empodium yellowish. Hairs and bristles white. Hind metatarsi equal in length to three following joints; fore and middle metatarsi equal in length to two following joints.

Halteres brown at base, stem light brown, knob yellowish. Alulæ light brown, margin yellowish, fringe white. Wings clear hyaline, veins yellowish; anterior cross vein at middle of discal cell, which is acuminate apically; third vein branching slightly before apex of discal cell.

Female: Length 7.5 mm. Similar to male. Sixth, seventh, and eighth abdominal segments without pollen; eighth segment black; fifth to seventh reddish; spines at tip light brown. Tarsi and apex of all tibiæ black.

Types: Holotype male and allotype female, Santa Rita Mts., Ariz., June (D. K. Duncan). Paratypes: Two females, Phoenix, Ariz., August (D. K. Duncan) and Florence, Ariz., VI-24-1932 (D. K. Duncan), in the writer's collection; four males, Bill Williams Fork, Ariz., July and August (F. H. Snow), in the Ohio State Museum; two females, San Carlos Lake, Ariz., August (D. K. Duncan) and San Carlos, Ariz., VIII-7-1933 (Parker, Lot 28), in D. K. Duncan's collection.

In the specimens from Bill Williams Fork the abdomen is

largely yellowish red except the sides of the first and second segments, which are brown, and the legs, except the knees, which are dark brown or black.

ARCHILESTRIS MAGNIFICUS (Walker)

This large, truly magnificant species is here reported from the United States for the first time. A female was collected by D. K. Duncan at El Oro Mine, Baboquivari Mts., Ariz., elevation 4,000 feet, VIII-17-1932. S. W. Bromley has informed me that he has seen specimens from Arizona in the collection of the California Academy of Sciences[3]. As this species is described by Back[4], no further comments are needed.

Eucyrtopogon limpidipennis Wilcox, new species

Male: Length 6.5 mm. Black; cheeks, palpi, and proboscis shining; face and front densely covered with gray pollen; front and vertex with a brownish tinge, especially on the front above the antennæ. Mystax black; hairs above mouth white; a row of fine erect black hairs on sides of front; about six long black bristle-like hairs on ocellar tubercle together with some shorter black hairs; all but one of occipital bristles yellowish; beard and hairs of palpi and proboscis white. Antennæ black, thinly coated with gray pollen; first joint about one and one-half times as long as second, both with fine white hairs, the first with three and the second with one strong black bristle below; third joint slightly tapering apically, one and one-fourth times as long as first two joints together; style two-jointed, acute apically, nearly as long as third joint.

Thorax largely covered with gray pollen, with a well-defined geminate central brown stripe and a broader intermediate stripe bisected by the transverse suture, brown. Hairs rather long, black; bristles black, two or three presutural, one supra-alar, and one postalar. Scutellum covered with yellowish gray pollen, with fine white hairs on the disc, posterior margin bearing six long, black, bristle-like hairs. Pleuræ, except mesopleura, which is pollinose, covered with gray pollen and white pilose; hypopleural hairs long, crinkly at tip, all white, except three to five of the hairs, which are brownish.

Abdomen bluish black, shining; with gray pollen as follows: First segment at sides; anterior and posterior corners and a narrow anterior transverse band divided at middle and not reaching

[3] These specimens have been seen since the above was written. The data are as follows: Baboquivari Mts., Ariz., VIII-15-1922, IX-1-1923, IX-15-1924, and X-1924 (O. C. Poling), presented by C. L. Fox; and Chiricahua Mts., Tex Canyon, Cochise County, Ariz., elevation 6,000 feet, IX-13-1927 (J A. Kusche).

[4] Trans. Am. Ent. Soc., 35: 216-217. 1909.

lateral margins on second; third to fifth with posterior corners and anterior transverse band as on second; the sides, broader apically, and narrowly confluent with anterior band at sides on sixth; and the seventh entirely. Hairs and bristles white; about five lateral bristle-like hairs on first segment; hairs on sides rather long on dorsum short and sparse. Venter uniformly covered with gray pollen and white pilose. Hypopygium short, black, shining, with white and golden pile.

Legs black, hairs white, bristles golden brown; claws black; pulvilli brown; empodium reddish brown.

Alulæ brown, margin yellowish, fringe whitish. Base and lower stem of halteres brown, upper stem blackish brown, knob wine-red. Wings hyaline, villi very small and inconspicuous, faintly brown at base of fifth posterior cell, on anterior cross-vein, at fork of third vein, and on discal cross-vein. Veins brown, anterior cross-vein at apical two-thirds of discal cell; third vein branching slightly beyond discal cross-vein.

Female: Length 7.5 mm. Mystax entirely black. Anterior band of pollen on third and fourth abdominal segments narrowly connected at middle, and on sixth segment nearly obliterated, absent on seventh with the posterior spots faint; eighth segment entirely black; spines brown at tip. Branch of third vein in one wing having a stump of a vein slightly longer than anterior cross-vein.

Holotype: Male, Grant County, N. Mex., XI-19-1932 (R. T. Kellogg). Allotype: Female, same data. Paratypes: 12 specimens, both sexes, same data as type; and 11 specimens, both sexes, Silver City, N. Mex., X-28-1933 (R. T. Kellogg).

This small species is at once distinguished from all the other described forms by the anterior bands of pollen on the abdomen.

Eucyrtopogon kelloggi Wilcox, new species

Male: Length 9 mm. Head black; face thinly and occiput densely covered with gray pollen; front and ocellar tubercle thinly covered with brown pollen; mystax black, some of lower hairs white at tip; the rather long hairs along sides of front, numerous long bristle-like hairs on ocellar tubercle, and occipital bristles, black; beard, fine hairs on upper occiput, proboscis, and palpi, white. Antennæ black, thinly pollinose; first joint one and one-fourth times as long as second and both joints wider than third, which is widest at base, nearly parallel-sided from basal one-fourth to apex and one and one-third times as long as first two joints together; style slightly more than one-half as long as third joint; first two joints with numerous yellowish hairs, on anterior side the first joint bearing one strong and two slender, and the second one slender and two strong, black bristles.

Mesonotum brown, the central stripe shining and divided anteriorly by a narrow line of golden brown pollen; intermediate stripes thinly golden brown, abruptly broadened inwardly before transverse suture; remainder of mesonotum covered with gray pollen with a touch of brown when viewed at some angles. Numerous hairs black; bristles black, four presutural, two supra-alar, and three postalar. Scutellum shining brown on disc, marginally with gray pollen, with numerous silky white hairs and 10 long black marginal bristles. Pleuræ thinly covered with brownish and grayish pollen, hairs white; hypopleural hairs long, crinkly at tip, one-half black and one-half white, the white ones mostly posterior.

Abdomen shining blue-black, with posterior margins, broadly interrupted at middle, covered with gray pollen. Hairs on sides long and white, on the dorsum short and black. Genitalia shining black, with numerous moderately long brown hairs.

Legs shining black, knees narrowly brownish; coxæ thinly covered with gray pollen. Hairs white; bristles black, some with white tips; claws and empodium black; pulvilli brownish black.

Alulæ brown with wide yellowish margin and fringe of fine yellowish hairs. Halteres dark brown. Wings unusually long, largely brown villous except costal, basal and anal cells which are largely hyaline; a broad hyaline spot at base of first submarginal cell extending through first basal cell and very narrowly into discal cell; and a narrow hyaline spot in second submarginal cell extending through first posterior cell and into second; brown villosity slightly darker on cross-veins and furcations; veins brown. All posterior cells broadly open; anterior cross-vein at about two-thirds distance from base of discal cell; third vein branched before discal cross-vein.

Female: Length 11 mm. Similar to male. Seventh and eighth abdominal segments wholly shining black; eight or nine brown spines at tip of ovipositor; hairs of ovipositor short and yellowish.

Holotype: Male, Silver City, N. Mex., XI-5-1932 (R. T. Kellogg). Allotype: Female, same data. Paratypes: 16 specimens, both sexes, same data.

The narrow face distinguishes this from all other species of *Eucyrtopogon* except *limpidipennis* and an unnamed species from eastern Oregon, it being but little more than one-half the width of one eye at the antennæ, while all other species seen have the face at least three-fourths the width of one eye. In the unnamed species from Oregon the male costa is fimbriate, which separates both species from it; this species also lacks bristles on the first antennal joint, and the style is nearly as long as the third joint.

Stichopogon arenicola Wilcox, new species

Male: Length 7 mm. Black; face and occiput densely covered with grayish pollen; front, vertex and ocellar tubercle pollinose, the last two with a brownish tinge; mystax and hairs white, mystax confined to oral margin, fine erect hairs numerous on front; occipital bristles yellowish, five on each side. Antennæ black, thinly covered with grayish pollen; first and second joints with short white hairs; first joint slightly longer and narrower than second; third one and one-half times length of first two together; style two-thirds length of third joint.

Thorax and scutellum black, densely covered with grayish yellow pollen; mesonotum with an indistinct broad black central stripe. Short, fine, white hairs numerous on mesonotum; bristles black, one presutural, one supra-alar, and one or two postalar; scutellum with numerous long white marginal hairs; hypopleural hairs long, about 10 in number, white.

Abdomen black, densely covered with grayish yellow pollen, at some angles the broad sides, somewhat wider anteriorly, appearing more grayish. Hairs white, numerous, long on sides of first segment, short elsewhere except for a few of intermedate length on sides of second segment near base. Genitalia densely covered with grayish yellow pollen and white pilose, narrowly shining dark brown basally.

Legs black; coxæ densely, and the remaining parts rather densely, covered with gray pollen. Hairs white; bristles white except those on last three or four joints of hind tarsi, which are black; claws black, broadly dark reddish basally; pulvilli and empodium brownish.

Lower stem of halteres brown, upper stem and knob yellowish white. Wings hyaline, veins brown; fourth posterior cell slightly narrowed apically and with a petiole at base about equal in length to anterior cross-vein; anal cell closed and short petiolate; anterior cross-vein at one-third distance from base of discal cell.

Female: Length 9 mm. Similar to male. Abdomen on sides with yellowish gray pollen, broader anteriorly and narrowly connecting on some segments, remainder with yellowish-brown pollen; eighth segment entirely covered with yellowish-gray pollen; spines at tip of abdomen brown, 12 in number.

Holotype: Male, Gila River Valley, San Carlos, Ariz., elevation 2,700 feet, III-17-1934 (D. K. Duncan). Allotype: Female, same data. Paratypes: 30 specimens, both sexes, same data and III-27-1934, 10 of these in D. K. Duncan's collection. These specimens range from 6.5 to 9 mm. in length.

Most closely related to *S. argenteus* (Say); differs in that

mystax is confined to oral margin and in the black thoracic bristles and general yellowish color instead of white.

STICHOPOGON CATULUS *Osten Sacken*

Stichopogon catulus Osten Sacken, Biol. Centr.-Am., Dipt., vol. 1, p. 170, 1887.

This species was described from two male specimens collected in northern Sonora, Mexico (Morrison). As Osten Sacken omits a number of the characters used today to separate the species of this genus, both sexes are described.

Male: Length 7 mm. Head densely pruinose; mystax and hairs white; five black occipital bristles on each side. Antennæ black, thinly pruinose; second joint slightly longer than the first, both white pilose; third joint one and one-third times as long as first two joints together; style three-fifths as long as third joint.

Mesonotum subshining black, thinly covered with gray pollen with a suggestion of a broad central, geminate black stripe. Hairs short, erect, longer on sides; on humeri, on mesonotum between humeri, and on lateral margins, white, elsewhere black. Bristles long, black; one presutural, one supra-alar, and one postalar. Scutellum densely pruinose, with numerous fine white marginal hairs about as long as scutellum. Pleuræ and coxæ densely covered with gray pollen, hairs white; about a dozen long white bristles in hypopleural row.

Abdomen black; broad sides extending narrowly across anterior margins of second to fifth segments, sides and broader posterior angles of sixth and seventh segments, eighth segment and genitalia entirely, and first segment except the middle basally, covered with gray pollen. Hairs white on sides and on areas covered with pollen, short and black on black areas. Venter with a longitudinal black shining stripe on segments, increasing in width apically; otherwise covered with gray pollen; hairs white.

Legs black, thinly covered with gray pollen; claws black, reddish basally; pulvilli brown. Hairs white, on posterior side of hind tibiæ and below on tarsi golden; bristles on femora and tibiæ white, on fore and middle tarsi largely white, on hind tarsi black; a pair of bristles on each side at apex of first and second joints of fore tarsi and three bristles on these segments of middle tarsi, very long.

Alulæ largely dark brown with a yellowish margin and fringe. Halteres largely dark brown, part of stem and knob dull yellowish. Wings hyaline, veins brown, anterior cross-vein at basal one-fourth of discal cell.

Female: Length 7.5 mm. Face and front densely covered with

golden pollen; occiput above yellowish gray; mystax yellow. Mesonotum, except humeri and central part of transverse suture, which is gray, thinly covered with golden pollen; a conspicuous, broad, undivided black stripe down the middle. Scutellum and coxæ covered with grayish yellow pollen; pleuræ pollinose. Pollen of abdomen grayish yellow, pattern as in male; pollen on sixth and seventh segments indistinct; eighth segment except anterior angles entirely covered with pollen; hairs on sixth and seventh segments black, on eighth white; about 10 blunt dark brown spines at tip; venter of ovipositor yellowish red.

Described from a male and female collected at Silver City, N. Mex., VI-16-1933 (R. T. Kellogg). Additional specimens with same data as above and V-30-1933; Baboquivari Mts., Ariz., April (D. K. Duncan); and Sabino Canyon, Santa Catalina Mts., Ariz., April (D. K. Duncan).

This species is probably most closely related to *S. argenteus*, from which it differs by the black bristles on the occiput, thorax, and tarsi; the maculate abdomen, and the mystax confined to the oral margin. Some of the specimens are only 4 mm. long.

STICHOPOGON FRAGILIS Back

Stichopogon fragilis Back, Trans. Am. Ent. Soc., 35: 334-335, 1909.

This species was described from a single female specimen taken at Alamogordo, N. Mex., April 24, 1902 (H. L. Viereck). Apparently no other specimens have been reported; so the male is described below.

Male: Length 4 mm. Similar to female, with the following differences: Abdomen from some angles entirely pruinose, but viewed posteriorly segments I and VIII wholly pruinose and II to VI pruinose on sides, slightly wider anteriorly; broad dorsum of these segments dull brownish black with narrow posterior borders yellowish. Coxæ and femora black or dark brown in ground color, densely covered with gray pollen; tibiæ and tarsi yellowish except last tarsal joint and hind tibiæ apically, which are brownish, thinly covered with gray pollen. Fourth posterior cell slightly narrowed but open at wing margin a distance equal to one and one-half times the length of the anterior cross-vein; petiole of anal cell equal in length to anterior cross-vein.

Described from a male taken in Pinal County, Ariz., elevation 2,200 feet, IV-1-1934 (D. K. Duncan).

Additional specimens of both sexes from same locality and

from Florence Junction, Ariz., IV-7-1934 (D. K. Duncan). These specimens range from 3 to 5 mm. in length.

The majority of the specimens that are in good condition agree as to the color of the legs and abdomen as described above, but there are several in which the abdomen and femora are yellowish, as described by Back. The anal cell is barely closed at the wing margin in some specimens.

KEY TO THE SPECIES OF *Stichopogon* Loew

1. Scutellum with well-developed marginal hairs or bristles.....2
... Scutellum without marginal hairs or bristles.....6
2. Occipital bristles black; bristles of thorax and tarsi largely black; pollen of face and thorax in males white, in females more or less yellow; sides extending triangularly to anterior margin of most abdominal segments pollinose; length 4-8 mm. (Mexico, N. Mex., Ariz.).....*catulus* Osten Sacken
... Occipital bristles white.....3
3. Tibiæ and tarsi largely yellowish; bristles largely white; sides and anterior corners of abdomnal segments pruinose, remainder of segments brown, narrowly yellowish apically; length 3-5 mm. (N. Mex., Ariz.).....*fragilis* Back
... Legs entirely black.....4
4. Tarsal bristles largely black; abdominal segments I, IV, and VIII pruinose, remaining segments largely black except that in the female segment VII is largely white; thoracic hairs and bristles white; length 8-11 mm. (Calif.).....*coquilletti* (Bezzi)
... Tarsal bristles largely white; abdomen wholly covered with pollen 5
5. Thoracic bristles black; mystax confined to oral margin; thorax and abdomen yellowish pollinose; length 6-8 mm. (Ariz.).....*arenicola* n. sp.
... Thoracic bristles white; mystax more abundant and extending upwards on face somewhat; thorax and abdomen whitish pruinose; length 6-8.5 mm. (Atlantic States, Ill., Mich., Kans., Colo., Calif.?) .....*argenteus* (Say)
6. Legs black; fourth posterior cell not petiolate at base.....7
... Base of the tibiæ reddish; fourth posterior cell at least short petiolate at base.....8
7. Short hairs of mesonotum largely white; in females segments I, VII, and VIII of abdomen and in males segments I and VIII and genitalia almost wholly pruinose, remaining segments with transverse blackish spots enclosed by whitish pollen; thoracic bristles white; length 9-10 mm. (Utah).....*salinus* (Melander)
... Short hairs of mesonotum largely black; segments I, IV, and

VIII of abdomen and genitalia wholly pruinose, remaining segments largely velvety black; thoracic bristles usually at least partly black; length 9.5-14 mm. (widespread in East., Wash., Oreg., Calif., Ariz., N. Mex., Colo., Mont., Tex., Utah, etc.) ..... (*snowii* Bezzi[5]) *trifasciatus* (Say)

8. Abdomen largely reddish, anterior and posterior margins of segments 1-4 narrowly pruinose, anterior margin of segments III and IV more prominently so, segments I-IV with sides pruinose; length 6-8 mm. (widespread east of Rocky Mountains) ..... *abdominalis* Back

... Abdomen pruinose, segments I-VII with triangular black spots, dorsum with golden brown bloom; length 8-11 mm. (Tex.) ..... *colei* Bromley[6]

Saropogon aridus Curran

Saropogon aridus Curran, Am. Mus. Novitates No. 425, p. 3, 1930.

This species was described from a single male specimen collected at Black Dike Prospect, Sierritas, Ariz., July 26-29, 1916 (F. E. Lutz). The female is described below.

Female: Length 12 mm. Head black in ground color; mystax, frontal and upper occipital bristles, and beard and hairs of proboscis whitish; hairs on palpi and below on first two antennal joints and ocellar and shorter intermediate bristles on occiput black. First and second antennal joints subequal in length, each about twice as long as broad; third joint one and one-fifth times as long as first two joints together; style very short, hardly more than one-tenth as long as third joint and barely distinguishable from it, rounded apically, concave behind.

Thorax black in ground color, apparently pruinose but greased in this specimen; bristles white. Scutellum black, with two pairs of short marginal bristles about one-third as long as scutellum, two of the three now present are whitish, the other one black. Coxæ pruinose, hairs white; hypopleural bristles partly black and white.

First, basal one-fourth of second, and seventh and eighth abdominal segments, black. the remainder reddish brown; the first segment and the venter, which is black, densely covered with gray pollen; remainder of abdomen shining. Hairs and lateral bristles on first segment whitish; spines at apex brown.

Legs shining black, apical two-thirds of hind femora except tip, reddish brown. Hairs and bristles whitish except on tarsi,

[5] Pan-Pac. Ent. 10: 84, 1934.

[6] Ann. Ent. Soc. Am. 27: 82, 1934. Couplet 8 taken from Bromley's key.

where they are partly black; claws black, narrowly brownish at base; pulvilli light brown; empodium brownish.

Halteres yellowish red. Wings light brown, darker on anterior third; veins brown; anal and fourth posterior cells narrowly open; anterior cross-vein at five-ninths distance from base of discal cell.

Described from a female taken in Santa Cruz Valley, 11 miles north of Nogales, Ariz., elevation 4,000 feet, VIII-12-1932 (D. K. Duncan).

Also a male and female specimen on hand from the following localities: Male, Huachuca Mts., Ariz., VIII-1-1927 (L. D. Anderson); and female, Santa Rita Mts., Ariz., VII-25-1927 (R. H. Beamer); in the collection of the University of Kansas.

The females of this species could be confused only with females of *abbreviatus* Johnson. The entirely reddish legs and the black lateral margins of the abdominal segments of *abbreviatus*, however, should readily separate it from *aridus*. The bristles on the scutellum are also shorter and more numerous in *abbreviatus*.

The presence of an antennal style has not been generally used to separate *Saropogon* from *Diogmites* (*Deromyia* auct.). All the species of *Saropogon* from the United States that I have seen possess an antennal style; in most species it is smaller than the third joint and easily seen, but in *abbreviatus* and *aridus* it is of the same size as the third joint and not plainly differentiated from it.

To be concluded in the January, 1937, number.

The numbers of volume XII of the Pan-Pacific Entomologist were mailed on the following dates: No. 1, March 20, 1936; No. 2, May 15, 1936; No. 3, September 1, 1936; No. 4, December 15th, 1936.

THE
PAN-PACIFIC ENTOMOLOGIST

Published by the
Pacific Coast Entomological Society
in co-operation with
The California Academy of Sciences

VOLUME TWELVE

1936

San Francisco, California

1936

CONTENTS OF VOLUME XII