

















3  
V. 1, no. 1-15  
Sl.  
577  
35721  
1921  
ENT

# NORTH AMERICAN CICADAS

BY

WILLIAM T. DAVIS  
*Hempson*

A COLLECTION OF PAPERS PUBLISHED IN THE JOURNAL OF THE  
NEW YORK ENTOMOLOGICAL SOCIETY  
FROM 1915 TO 1921



STATEN ISLAND, N. Y.

1921

PRESS OF  
THE NEW ERA PRINTING COMPANY  
LANCASTER, PA.



595.747.1

DRG

INS

## CONTENTS

- Notes on Some Cicadas from the Eastern and Central United States  
with a Description of a New Variety of Cicada Pruinosa. 1910
- New Species of Cicadas from California and Utah. 1915
- A New Variety of Cicada Resembling *C. Dorsata*. 1915
- A New Cicada from Arizona. 1915
- Notes on Cicadas from the United States with Descriptions of Several  
New Species.
- Two New Cicadas Belonging to the Genus *Okanagana*.
- Two New Cicadas from Lower California, Mexico.
- Sonoran Cicadas Collected by Harry H. Knight, Dr. Joseph Bequaert  
and Others, with Descriptions of New Species.
- Mississippi Cicadas, with a Key to the Species of the Southeastern  
United States.
- Cicadas of the Genus *Cacama*, with Descriptions of Several New  
Species.
- Cicadas of the Genera *Okanagana*, *Tibicinoides* and *Okanagodes*,  
with Descriptions of Several New Species.<sup>1</sup>
- A New Cicada of the Genus *Melampsalta*.
- North American Cicadas Belonging to the Genera *Platypedia* and  
*Melampsalta*. 1922
- Records of Cicadas from North America with Descriptions of New  
Species.
- An Annotated List of the Cicadas of Colorado with Description of a  
New Species.

<sup>1</sup> The quotation from Walker on page 196, eighth line from bottom, should read "indistinct except at tips," instead of "distinct except at tips."



## INDEX TO SPECIES

This index refers to species of Cicadas mentioned in several papers published in the Journal of the New York Entomological Society from 1915 to 1921 (See table of contents). The year of publication is first given and then follows the page reference, thus "20—96" refers to "North American Cicadas Belonging to the Genera Platypedia and Melampsalta," published in 1920, page 96.

- ampliata Van Duzee, 20—96, 121,  
122, 123, 135  
apache Davis, 21—3, 4, 5, 15  
aperta Van Duzee, 20—96, 99, 114,  
115, 117, 120, 121, 135; 21—14, 15  
arctostaphylae Van Duzee, 19—182,  
185, 208; 21—11  
areolata Uhler, 20—95, 96, 98, 99,  
102, 107, 108, 109, 110, 111, 112,  
113, 115, 135  
arizona Davis, 16—51, 52, 65; 17—  
209; 21—8  
astigma Davis, 17—7, 8, 10  
auletes Germar, 15—1, 2, 3, 4, 5, 6,  
7, 8, 10; 16—43, 60; 18—142, 144,  
149  
aurantiaca Davis, 17—9, 10; 19—182,  
185, 209  
aurifera Say, 16—44, 45, 46, 64;  
21—44, 46  
australis Davis, 18—143, 144, 148  
azteca Kirkaldy, 17—212  
balli Davis, 19—182, 186, 211, 212,  
213, 223; 21—11  
barbata Davis, 20—100, 115, 117,  
120, 135; 21—14, 54, 55  
bella Davis, 19—182, 184, 196, 198,  
223; 21—45, 51  
bequaerti Davis, 17—210, 211, 215;  
18—151; 21—6, 7  
biccnica Walker, 18—142, 145, 155  
bicستا Walker, 15—7  
bifidus Davis, 16—47, 48, 49, 64;  
17—207; 21—49  
blaisdelli Uhler, 17—6, 8, 9, 10  
californica Davis (Cacama), 19—70,  
75, 79  
californica Distant (Okanagana),  
17—213; 19—182, 186, 187, 214,  
215  
calliope Walker, 18—154; 19—340,  
341; 20—124, 125, 126, 127, 128,  
131, 132, 133, 134, 135; 21—45, 55  
camerona Davis, 20—125, 126, 134,  
135  
canadensis Provancher, 19—182, 184,  
185, 204, 205, 207, 223  
canescens Van Duzee, 19—182, 185,  
208, 209  
cancularis Harris, 15—164; 16—45,  
46, 60, 64; 18—142, 143, 154; 21—  
43, 46  
carbonaria Davis, 19—70, 76, 77, 79  
cassini Fisher, 15—21; 18—153  
castanea Davis, 16—49, 50, 51, 64,  
65; 17—208; 21—8  
characteria Germar, 16—61  
chisos Davis, 16—62, 63, 64, 65  
cinctifera Uhler, 16—49; 17—210;  
21—2, 3, 4, 15  
consobrina Distant, 19—182, 187,  
214, 215; 21—11  
constricta Davis, 20—121, 122, 123,  
135; 21—55  
crassa Walker, 15—164  
crepitans Van Duzee, 19—69, 70,  
73, 77, 79  
crucifera Walker, 16—54

- cruentifera* Uhler, 19—182, 188, 189, 190, 191, 223; 21—45, 50  
*cultriformis* Davis, 15—239, 240, 241; 21—1  
*cupreo-sparsus* Uhler, 19—180, 182, 188, 219, 220  
*davisi* Smith and Grossbeck, 16—45, 46, 60, 64; 18—143, 146, 147, 154  
*dealbata* Davis, 15—162, 163, 164, 241; 21—47  
*delicata* Osborn, 16—51, 60, 65; 17—209; 18—150  
*dissimilis* Distant, 19—68, 70, 71, 76, 79  
*distanti* Van Duzee, 17—6, 7, 8, 9  
*dorsata* Say, 15—161, 162, 163; 16—60; 21—45, 47, 48  
*duryi* Davis, 17—206, 207, 215; 21—48  
*engelhardti* Davis, 18—144, 147  
*erratica* Osborn, 16—59, 60, 65; 18—151  
*eugraphica* Davis, 16—52, 53, 54, 58, 59, 65; 17—212; 21—44  
*falcata* Davis, 20—99, 113, 114, 135  
*figurata* Walker, 15—1, 8; 16—43, 44, 60, 64; 18—142, 144, 149  
*floridensis* Davis, 20—125, 131, 132, 135  
*fratercula* Davis, 15—20, 21; 19—182, 183, 185, 209  
*furcata* Davis, 19—69, 72, 79  
*gracilis* Davis, 19—182, 221, 223; 21—14  
*grandiosa* Scudder, 21—56, 57  
*grossa* Fabricius, 15—1, 2, 3, 4, 8; 16—43  
*haematoda* Linnaeus, 20—126  
*harnedi* Davis, 18—143, 146, 154  
*hesperia* Uhler, 15—17; 19—180, 182, 187, 218, 221; 21—52, 57  
*hieroglyphica* Say, 16—60, 61, 62, 63, 64, 65; 18—152  
*hirsuta* Davis, 15—13, 21; 19—182, 188  
*inauditus* Davis, 17—204, 205, 215; 21—1  
*intermedia* Van Duzee, 20—96, 119  
*johannis* Walker, 16—62, 63, 64, 65; 18—152  
*kansa* Davis, 19—340; 20—125, 133, 134, 135; 21—55  
*keddiensis* Davis, 20—99, 108; 21—14  
*knighti* Davis, 17—208, 215; 21—7  
*laticapitata* Davis, 21—14, 15, 16  
*latifasciata* Davis, 15—8, 10; 18—143, 145  
*latipennis* Davis, 21—54, 57  
*leurensis* Goding and Froggatt, 20—125  
*linnei* Smith and Grossbeck, 15—10, 164; 16—60; 18—143, 146, 154; 21—43, 45, 46  
*literata* Walker, 15—1, 8  
*longirostris* Distant, 19—68, 69, 70, 78  
*lurida* Davis, 19—182, 183, 192, 193, 195, 223  
*lutea* Davis, 20—98, 103, 106, 107, 108, 110, 135  
*lyricen* DeGeer, 15—8; 16—44, 60; 18—144, 147, 155  
*magnifica* Davis, 19—182, 189, 190, 191, 223; 21—50  
*marginata* Say, 15—1, 2, 3, 4, 5, 8, 10, 162, 163, 239, 240, 241; 16—43, 60; 17—204; 21—45, 56  
*marginalis* Walker, 15—1, 5, 163; 17—204; 18—145, 150; 21—45, 46, 56  
*mariposa* Davis, 15—12, 13, 14, 21; 19—182, 191; 21—8, 12, 14  
*maura* Distant, 19—68, 69, 70, 78, 79  
*mercedita* Davis, 15—16, 17, 18, 21; 17—214, 215; 19—180, 182, 187, 220  
*milvus* Walker, 16—57, 59  
*minor* Uhler, 20—96, 100, 115, 117, 118, 119, 120, 121, 135; 21—14, 54  
*minuta* Davis, 15—17, 18, 21; 19—180, 182, 187, 220  
*modesta* Distant, 21—8  
*mohavensis* Davis, 20—98, 100, 102, 135; 21—53, 54

- montezuma* Distant, 17—204; 21—2  
*musiva* Germar, 20—124  
*napa* Davis, 19—182, 183, 194, 195, 223  
*nigriviridis* Davis, 21—1, 9, 11, 16  
*noveboracensis* Emmons, 19—202, 204  
*occidentalis* Walker (Okanagana), 16—235; 19—182, 184, 196, 197, 198, 207  
*occidentalis* Davis (Platypedia), 20—98, 106  
*olympusa* Walker, 16—42, 56, 57, 59; 18—142, 145, 150; 21—6  
*oregona* Davis, 16—233, 236; 19—182, 185, 210  
*ornata* Van Duzee, 19—182, 183, 194, 195  
*pallescens* Germar, 20—126, 127; 21—55  
*pallida* Distant (Tibicen), 17—212, 215  
*pallida* Van Duzee (Clidophleps), 17—6, 9  
*pallidula* Davis, 17—213, 214, 215; 19—182, 187, 219  
*parvula* Say, 18—154; 19—340; 20—124, 125, 126, 128, 133; 21—45, 55, 56  
*perita* Cockerell, 21—56, 57  
*primigenia* Cockerell, 21—57  
*pruinosa* Say, 15—8, 9, 10; 16—60; 17—204; 18—143, 145, 146  
*psophis* Walker, 17—209  
*putnami* Uhler, 20—95, 98, 99, 100, 102, 103, 104, 105, 106, 108, 113, 115, 135; 21—14, 45, 53, 54, 57  
*reperta* Uhler, 16—51, 58, 60, 65; 17—210, 211, 215; 18—151  
*resh* Haldeman, 15—1, 3, 4, 5, 7, 8, 10, 164, 240; 16—60; 18—144, 149; 21—44  
*resonans* Walker, 15—1, 6, 7, 8, 10; 16—43, 44, 60; 18—142, 144, 148  
*rimosa* Say, 15—11, 12, 13, 14, 19; 17—6; 19—180, 182, 184, 196, 199, 202, 203, 204, 205, 206, 213, 223; 21—8, 45  
*robertsonii* Fitch, 15—164; 18—150  
*rotundifrons* Davis, 16—235, 236; 19—182, 188  
*rubrovenosa* Davis, 15—11, 21; 19—182, 186, 208, 213  
*rufipes* Davis, 20—98, 101, 102, 135  
*sayi* Smith and Grossback, 16—60; 18—143, 144, 147  
*schaefferi* Davis, 15—19, 20, 21; 19—182, 183, 196; 21—50  
*septendecim* Linnaeus, 15—21; 18—152  
*sex-guttata* Walker, 16—42, 62, 64  
*signifera* Walker, 17—213  
*similaris* Smith and Grossbeck, 15—8; 16—43, 44, 60; 18—144, 147, 155  
*similis* Davis, 20—99, 103, 110, 112, 113, 135  
*simulata* Davis, 21—12, 16  
*sonora* Walker, 15—1, 6  
*sordidata* Uhler, 16—51, 55, 56, 57, 58, 59, 65; 18—150; 21—6  
*striatipes* Uhler, 17—214; 19—180, 182, 187, 215, 217; 21—44, 57  
*superba* Fitch, 16—60; 17—204; 18—146  
*swalei* Distant, 16—42, 51  
*synodica* Say, 15—11, 14, 15, 16, 17, 18, 20; 19—182, 186, 211, 212, 213, 221; 21—11, 45, 51, 52, 57  
*texana* Davis, 16—54, 55, 56, 59, 65; 21—6  
*tibicen* Linnaeus, 15—4, 9; 21—45  
*townsendi* Uhler, 16—46, 48, 49, 64; 17—207  
*transversa* Walker, 21—5, 16  
*triangulata* Davis, 15—14, 16, 21; 19—182, 185, 186, 210  
*tristis* Van Duzee, 19—182, 184, 185, 204, 207  
*truncata* Van Duzee, 17—6, 9, 10  
*uncinata* Van Duzee, 17—214, 215; 19—182, 187, 219

- utahensis* Davis, 19—180, 182, 187,  
 216, 223; 21—52  
*valvata* Uhler, 17—212; 19—68, 69,  
 70, 71, 73, 76, 77, 79; 21—45, 49  
*vanduzeei* Distant (Okanagana), 15—  
 14, 19; 17—213; 19—182, 186, 188,  
 214, 215; 21—11, 12, 14, 16  
*vanduzeei* Davis (Platypedia), 20—  
 59, 100, 115, 116, 120, 121, 135;  
 21—14, 15  
*vandykei* Van Duzee, 19—182, 183,  
 192, 193, 194  
*varia* Walker, 15—164  
*variegata* Davis (Cacama), 19—70,  
 73, 74, 75, 76, 79  
*variegata* Fabricius (Cicada), 18—  
 142  
*venosa* Uhler, 17—213; 21—49, 57  
*virgulata* Distant, 16—51  
*viridifascia* Walker, 16—42, 58, 60;  
 17—210, 211, 215; 18—142, 145,  
 151; 21—6  
*viridis* Davis, 18—153, 155; 19—182,  
 185, 209  
*vitripennis* Say, 16—42, 54, 58, 60,  
 65; 17—212; 18—145, 151; 21—5,  
 6, 7, 44  
*winnemanna* Davis, 15—8, 10; 18—  
 143, 145

NOTES ON SOME CICADAS FROM THE EASTERN  
AND CENTRAL UNITED STATES WITH A DE-  
SCRIPTION OF A NEW VARIETY OF  
CICADA PRUINOSA.

By WM. T. DAVIS

[Reprinted from the JOURNAL OF THE NEW YORK ENTOMOLOGICAL SOCIETY, Vol.  
XXIII, No. 1, March, 1915.]



NOTES ON SOME CICADAS FROM THE EASTERN  
AND CENTRAL UNITED STATES WITH A DE-  
SCRIPTION OF A NEW VARIETY OF  
CICADA PRUINOSA.<sup>1</sup>

BY WM. T. DAVIS,

NEW BRIGHTON, STATEN ISLAND, N. Y.

Under the name *Rihana grossa Fabricius*, W. L. Distant in his Synonymic Catalogue of Homoptera, Part 1, Cicadidæ, London, 1906, includes as synonyms *Cicada marginata* Say (1825), *Cicada auletes* Germar (1834), *Cicada resh* Haldeman (1852), *Cicada sonora* Walker (1850), *Cicada resonans* Walker (1850), *Fidicina literata* Walker (1850), *Cicada marginalis* Walker (1852) and *Fidicina figurata* Walker (1858). In using the specific name *grossa* for the largest cicada in the eastern United States Distant follows the synonymy suggested by Prof. Uhler in 1905.

It appears to the present author, however, after going over a considerable number of specimens accumulated during the past few years, that several of the names considered as synonyms really refer to very distinct species and he has here tried to clear up the matter to some extent. Mr. E. P. Van Duzee thinks that the generic name *Tibicen* should be used for the species here mentioned; they are placed under *Rihana* by Distant, as stated above. However, as they were

<sup>1</sup> The photographs of the species mentioned were made by Mr. Howard H. Cleaves, of the Staten Island Association of Arts and Sciences.

nearly all first described under *Cicada*, we have here used that name, as any change is unnecessary for the object of this paper.

***Cicada auletes* Germar.**

*Cicada grossa* Fabricius?

For a good life-sized figure of this species see Howard's "Insect Book," Plate XXVIII, fig. 19, where it bears the name of *C. marginata* Say. Smith and Grossbeck figure the genitalia of this species also under the name of *C. marginata* in their "Studies in Certain Cicada Species," Entomological News, April, 1907.

In Entomological News for March, 1905, Prof. Uhler has this to say of *Cicada grossa*: "This species has recently been brought to light in the British Museum, where, through the courtesy of Dr. G. R. Waterhouse, I was permitted to examine the types of Fabricius in the collection of Sir Joseph Banks. They proved to be two specimens of the large form of which I have specimens from North Carolina, Arkansas, Texas, Kansas, New York City, Northern New Jersey, Maryland and Virginia. . . . Variations in size, color and pattern of markings are, perhaps, responsible for the exaggerated synonymy which has accumulated upon this species."

Among the synonyms of *C. grossa* he places *Cicada marginata* Say (1825), *Cicada auletes* Germar (1834), and a number of species described by Walker in 1850.

The original description of *C. grossa* by Fabricius in 1775 is very general and would do for many of the large cicadas. He says, however, that the tarsi are black. In our insect they are olive green. He also gives the habitat as Brazil, but as Uhler says, this may be an error.

The next name on the list is *Cicada auletes* Germar, and there is no doubt about this being our species. He says the insect lives in Pennsylvania and he refers to the figure of the "great Indian Cicada" in the work of August Johann Rösel, "De Natuurlyke Historie der Insecten," Tab. XXV, fig. 5, where is shown a species a little over three inches in length. This of course is not our American insect but ours in size approaches it. Germar describes the pruinose condition of the insect, also its black and olive coloring, including the legs which he says are olivaceous. Of the operculum he says that it is "large, reaching middle of abdomen, oblong, with the sides sub-sinuate, apex obtusely rounded, olivaceous."

Our largest cicada can then be called *C. auletes* Germar with certainty, though possibly it should be called *C. grossa*, but Dr. Uhler's tendency in this group, to associate two or more species under one name is well known, and he may have been mistaken in this instance. At any rate it is narrowed down to one or the other of these names and *C. marginata* and *C. resh* should not be considered in the case as I hope to show.

*Cicada auletes* has a rather wide distribution and in the following records those marked with an asterisk are represented by specimens in the author's collection.

Brant Rock, Plymouth Co., Mass. (C. A. Frost). Collection Boston Society of Natural History.

Martha's Vineyard, Mass. Boston Society of Natural History, and Museum of Comparative Zoology, Cambridge, Mass.

New Haven, Conn. Collection Conn. Agri. Exp. Station.

Long Island, N. Y.,\* July, Aug., Sept., Oct.

Staten Island, N. Y.,\* July, Aug., Sept.

Manhattan Island, N. Y. City,\* Sept. 8, 1910.

New Jersey,\* Aug., Sept., Oct., particularly abundant in the sandy areas in the central and southern parts of the state.

District of Columbia, collection Am. Museum of Natural History.

Baltimore, Maryland.

Fairfax Co., Va.,\* Aug. (C. R. Shoemaker).

Nelson Co., Va.,\* July, Aug. (Col. Wirt Robinson).

Raleigh, N. C.,\* July, Aug., Sept. (C. S. Brimley).

Lake Toxaway, N. C. (Mrs. Slosson).

Southern Pines, N. C., Aug. (A. H. Manee).

Clemson College, S. C., Aug. (M. P. Somes).

Atlanta, Ga., July, Aug. (J. C. Bradley).

Bainbridge, Ga., Sept. (J. C. Bradley).

Mobile, Alabama,\* Aug., Sept. (H. P. Loding).

Baton Rouge, La. (H. A. Morgan).

Mississippi.

Mountain Grove, Mo., Aug. (M. P. Somes).

Chetopa, Kans.,\* July 24, 1914 (D. R. Beardslee).

Allegan, Mich., Aug. 19, 1913 (collected by F. Psota and in the collection of W. J. Gerhard). This is a male and looks just like specimens from New Jersey.

The author has forty specimens of this species in his collection and has seen many more, and they show hardly any variation. In fresh specimens the dorsal part of the abdomen at base and the three last segments are often pruinose, leaving four intermediate segments dark in color. The following measurements are taken from a male from New Jersey and a female from Staten Island, N. Y.

	Male, Mm.	Female, Mm.
Length of body .....	41	40
Length of fore wing .....	53	52
Expanse of wings .....	117	115

#### *Cicada marginata* Say.

This species was described from Missouri by Thomas Say in 1825 and was called *marginata* for the reason that the abdominal segments are yellowish on their posterior margins. The length of the insect is as he says "more than two inches and a quarter to the tip of the hemelytra," but it is not much more. The W-mark on the fore wings is absent or nearly so in this species, and the costal margin is somewhat bent near its central portion instead of being evenly rounded as in *Cicada resh*. It is also smaller and of a lighter green color than the olivaceous *aulctes*. Uhler in his Preliminary Survey of the Cicadidæ of the United States, Antilles and Mexico, Trans. Maryl. Acad. Sci., 1892, says that the "W-shaped mark near the tip of the wing-covers" is sometimes absent in *Cicada tibicen* and that this is also the case "most commonly of all, with *C. aulctes* Germ. (*marginata* Say)." He had probably been examining true *marginata* when he wrote this. The male genitalia are very different from *aulctes*. The supra-anal plate is narrower and is without the three dorsal terminal points present in that species. Further the uncus when viewed in profile is narrowed to the rounded tip and not widened as in *aulctes*. When viewed from behind, that is at full face, the uncus ends in a rounded point, whereas in *aulctes* the end is notched.

As was stated in connection with the remarks on *C. aulctes* and *C. grossa* the figure in Entomological News, Vol. XVIII, Pl. 3 is that of the genitalia of *Cicada aulctes* and not of *Cicada marginata* as there stated.

The following specimens are in the author's collection:  
Cincinnati, Ohio, Aug. 7, 1911, female (Chas. Dury).

Kentucky, Aug. 28, 1902, male (Chas. Dury).

Wakefield, Clay Co., Kansas, male and female (J. C. Warren).

Chetopa, Labette Co., Kansas, July, 1 male, 3 females; Aug., 6 males, 4 females (D. R. Beardslee).

In the collection of the Museum of Comparative Zoology there are two females from Texas and a male marked "Florida (Miss Willard)."

Walker in his List of Homoptera, Vol. IV, p. 1128, 1852, changes Say's *marginata* to *Cicada marginalis* "to distinguish it from *C. marginata* Olivier." This last is now *Ariasa marginata* Oliv. according to Distant. It is a Brazilian species.

#### **Cicada resh** Haldeman.

This species was described from the Great Salt Lake Valley by Prof. S. S. Haldeman in the appendix to the report on the Exploration and Survey of the Valley of the Great Salt Lake of Utah, Washington, 1853.

In the author's collection there are seventy-six specimens identified as this species. They are from Louisiana, Texas and Oklahoma and are like in markings the specimen figured by Haldeman on Plate IX of the report referred to. In fresh specimens the pronotum is green with the "narrow Y-shaped line divided to the base, a narrow transverse lateral spot on each side posteriorly and another anteriorly, immediately behind the lateral stemmata. Mesonotum black, with a large lateral elongated yellow spot [green in fresh specimens], and a pair of similarly colored medial spots in the shape of the Hebrew letter *resh* inverted, and the points converging anteriorly upon the medial line." The usual W-shaped mark is present on the fore wings. In the male the supra-anal plate ends in three points as in *auletes*, but the central one is not as long and prominent as in that species. The uncus when viewed in profile is broadened and rounded at the extremity, and when viewed at full face the end is shallowly notched, but not as deeply as in *auletes*.

Haldeman gives "length of the body fourteen, to the end of the upper wings twenty-two lines, width of the prothorax seven lines." Most of the specimens in the author's collection are a trifle over these measurements, but they are from further south than the type locality.

Marksville, Avoyelles Co., La., Sept. 15, 1912, 1 male and 1 female.

Houma, Terre Bonne Co., La., July, 1914, 2 males and 4 females (E. C. Wurzlow).

Port Hudson, Miss, male, collection Mus. Comp. Zoology.

Elgin, Comanche Co., Oklahoma, July, 1914, 1 male and 1 female (Alanson Skinner).

Washunga, Kay Co., Oklahoma, July, 1914, 1 female (Alanson Skinner).

Orange, Orange Co., Texas, July, 1914, 5 males, 8 females; August, 3 males, 4 females; September, 21 males and 26 females (Miss McGill).

*Cicada sonora* Walker.

This species was described without locality by Francis Walker in 1850 in "List of the Specimens of Homopterous Insects in the Collection of the British Museum, Part I, London, 1850." The wings are said to expand 60 lines, which makes it too large for anything but *auletes*. The markings as described do not agree, however, with those of that species.

*Cicada resonans* Walker.

This species was described in the same publication with *Cicada sonora*, and as with that insect no locality was given. Walker says in part: Body tawny with ferruginous tinge; head with a broad black band; face partly black; "scutcheon" of the fore-chest adorned with a very large obconical black stripe; borders mostly black; hind-scutcheon much widened and slightly waved on each side; middle-chest adorned with six black stripes, the second pair broader than the outer pair, narrower than the inner pair which are obconical; a large slightly cross-shaped black spot rests on the cross-ridge. Abdomen black above; legs tawny; fore thighs armed with three teeth of various size. Wings colorless; veins tawny; first and second cross-veins clouded with brown; primitive areolet faun-color; fore-flaps and the base of the hind-flaps gray with a buff tinge. Length of the body 18 lines; of the wings [expanse] 56 lines.

If the locality had been given as southeastern North America there would be little or no doubt as to which insect was described.

What he says about the fore femora being armed with three teeth of various sizes is of no importance, for some individuals of this species have three teeth, while others have but two.

The insect under consideration has often been identified as *Cicada bicosta* Walker, which was also described without locality. Distant, however, says this occurs in Mexico and Costa Rica, and in *Biologia Centrali-Americana* gives a figure of the insect on Tab. 3. This shows a smaller species than the one under consideration, with the hind borders of the abdominal segments ferruginous. Walker's original description of *Cicada bicosta* gives the length of body as 16 lines, and an expanse of wings of 48 lines, measurements too small for *resonans*. He also says that the hind borders of the abdominal segments are ferruginous, "middle-chest adorned with four black obconical stripes," instead of six as in *resonans*, and the "hind flaps" of the wings "at the base and fore-flaps brown," instead of "gray with a buff tinge."

I may add to the description of what I take to be *resonans*, that in the male the supra-anal plate is broad and ends in three points, as in *auletes* and *resh*; the uncus when viewed in profile is broad at the tip and shaped somewhat like a horse's hoof; when viewed from the back or at full face, the extremity is broad and truncated and not notched. In some specimens it is very slightly sinuated.

In the author's collection there are twenty specimens that are covered very well both as to size and markings by Walker's description of *resonans*, and they can bear that name until a better one is found.

Southern Pines, N. C., 3 males, 6 females; July, August and September (A. H. Manee).

Spring Creek, Decatur Co., Ga., July 23, 1911, female (J. C. Bradley).

Ormond, Volusia Co., Fla., 2 females (Mrs. Annie T. Slosson).

La Grange, Brevard Co., Fla., 2 males, 6 females, July, August, September and October (Davis and Chaudoin).

Gulf Port, Hillsboro Co., Fla., 2 males (A. G. Reynolds).

Mobile, Alabama, 1 female (H. P. Loding).

In the collection of the Museum of Comparative Zoology there is a female from Port Royal, S. C. (Fowler), and a female, here referred to this species, from Kansas.

***Fidicina literata*** Walker.

This species was also described by Walker in 1850 in "List of the Specimens of Homopterous Insects in the Collection of the British Museum, Part 1," and as with *resonans* no locality is mentioned. From size and description especially of the mesonotum it may be the same as *Cicada auletes*. The length of the body is given as 20 lines and the expanse of wings as 59 lines, which are a little large for *auletes*.

***Fidicina figurata*** Walker.

This was described in 1858 in "List of the Specimens of Homopterous Insects in the collection of the British Museum, Supplement"; and as with several of the species already mentioned no locality is given. If it is North American it is probably either *Cicada lyricen* De Geer (1773) or *Cicada similis* Smith and Grossbeck (1907). Walker says: "Prothorax reddish, black in front and behind, with a double tawny stripe, border tawny, with a black streak on each side. . . . Fore wings narrow, much acuminate. . . . Length of the body 17 lines; of the wings 44 lines." We understand that the wings expand 44 lines.

The fore wings are acuminate in both *lyricen* and *similis*, particularly so in the latter; they both have the hind border of the prothorax black, and the size is right for either. The hind margin of the prothorax is green or olive in *auletes*, *marginata* and *resli* and the wings in these three species are not much acuminate, and *figurata* is also too small an insect to be considered the same as *grossa* or *auletes*.

Leaving the cicadas that have been more or less associated in the past with *Cicada auletes* or *grossa* we come to the consideration of *Cicada pruinosa* and its varieties.

***Cicada pruinosa* var. *latifasciata*** new variety.

In their "Studies in Certain Cicada Species," Entomological News, April, 1907, Smith and Grossbeck drew up a description of *C. pruinosa* from the eight specimens from the coast of New Jersey in their possession, and in describing *C. winnemanna*, Bulletin of the Brooklyn Entomological Society, October, 1912, the writer followed their lead in considering these specimens typical of Say's species. However, in the last few years we have, through the kindness of

friends, accumulated a collection of about one hundred specimens of this species from Wells County, Indiana (E. B. Williamson), Hollister, Missouri (H. H. Knight), Falls City, Nebraska (H. G. Barber), Wakefield, Kansas (J. C. Warren), McPherson, Kansas (Warren Knaus), and Chetopa, Kansas (D. R. Beardslee). We have also examined many more in other collections including several from Texas. From this evidence it appears that the coast specimens, which have the stripe on the third abdominal segment comparatively broad, constitute a variety and cannot be considered typical with those from the interior of the country which have the stripe more attenuated or sometimes wanting. Of the variety we have collected about twenty in Cape May County, New Jersey; Mr. Francis Harper has sent us seventeen from the neighborhood of Beaufort, N. C., and a number of others have been examined in collections, from along the coast of New Jersey, and North Carolina, and two examples marked "Pennsylvania" are in the collection of the Academy of Natural Sciences of Philadelphia. In the collection of Mr. Otto Hiedemann there is a male of this variety from Victoria a town near the coast of Texas, and in the Uhler collection, U. S. Nat. Museum, there is a specimen collected by Belfrage in Texas.

Say says of *Cicada pruinosa*: "Found on the Missouri; it is also very common in Pennsylvania, and much resembles *C. tibicen* Fabr., but differs in being pruinose beneath, and in having white abdominal spots." Probably true *pruinosa* as well as the variety occurs in Pennsylvania, the latter being confined to the coastal region.

*Cicada pruinosa* was originally described in part as having the "tergum black: segments destitute of differently colored posterior margins, basal segment with a white pruinose spot each side of the back, another transversely elongated and attenuated one on the lateral base of the third segment, and another upon the lateral base of the caudal segment: venter dusky in the middle: caudal segments beneath testaceous, dusky near the middle tip."

Smith and Grossbeck say of the specimens they had from the coast of New Jersey and which we now know to be a variety: "Abdomen above black, base of first segment with a white, heavily pruinose lateral dash, which encroaches to some extent upon the second segment; a similar but longer and broader lateral dash extends along the base of the third segment and a spot of the same color is

on each side of the eighth segment. In the female the dash of the second segment differs from that of the male in not becoming attenuated dorsally, but in being squarely truncated."

For the variety thus described with the broad white lateral dashes on segment three, we propose the name of *latifasciata*. We then have *Cicada pruinosa* as described by Say, with the tergum entirely black or nearly so, with the attenuated white stripe at the lateral base of the third abdominal segment, being the form common from Indiana, Missouri, Nebraska, Kansas, etc., of which we figure a male from Chetopa, Kansas; *Cicada pruinosa* var. *latifasciata* so far known only from the coastal region of the eastern and southern United States, with the broad stripe on segment three and abdomen beneath more shining black, of which we figure a male from Cape May Co., New Jersey, and *Cicada pruinosa* var. *winnemanna* with the hind margins of the abdominal segments more or less fulvous, the second segment having the band broader than the others and a white streak generally hardly discernible each side at the base of the third segment, of which we figure a male from Plummer's Island, Maryland. The females of these cicadas have the characteristic markings far less distinct than in the males and occasionally some are entirely absent.

*Cicada pruinosa* and its varieties approaches *C. linnei* Smith and Grossbeck in appearance more closely than any other of our species, but in *linnei* the fore-wings are abruptly bent near the middle, whereas in *pruinosa* the curve is more regular. The genitalia are about the same in both species. Their songs are not at all similar.

Seen in series *pruinosa* from Kansas has the costal margin of the fore wings evenly curved, whereas specimens from Indiana and especially var. *winnemanna* show a decided tendency to a sudden bend near the central portion of the costal margin.

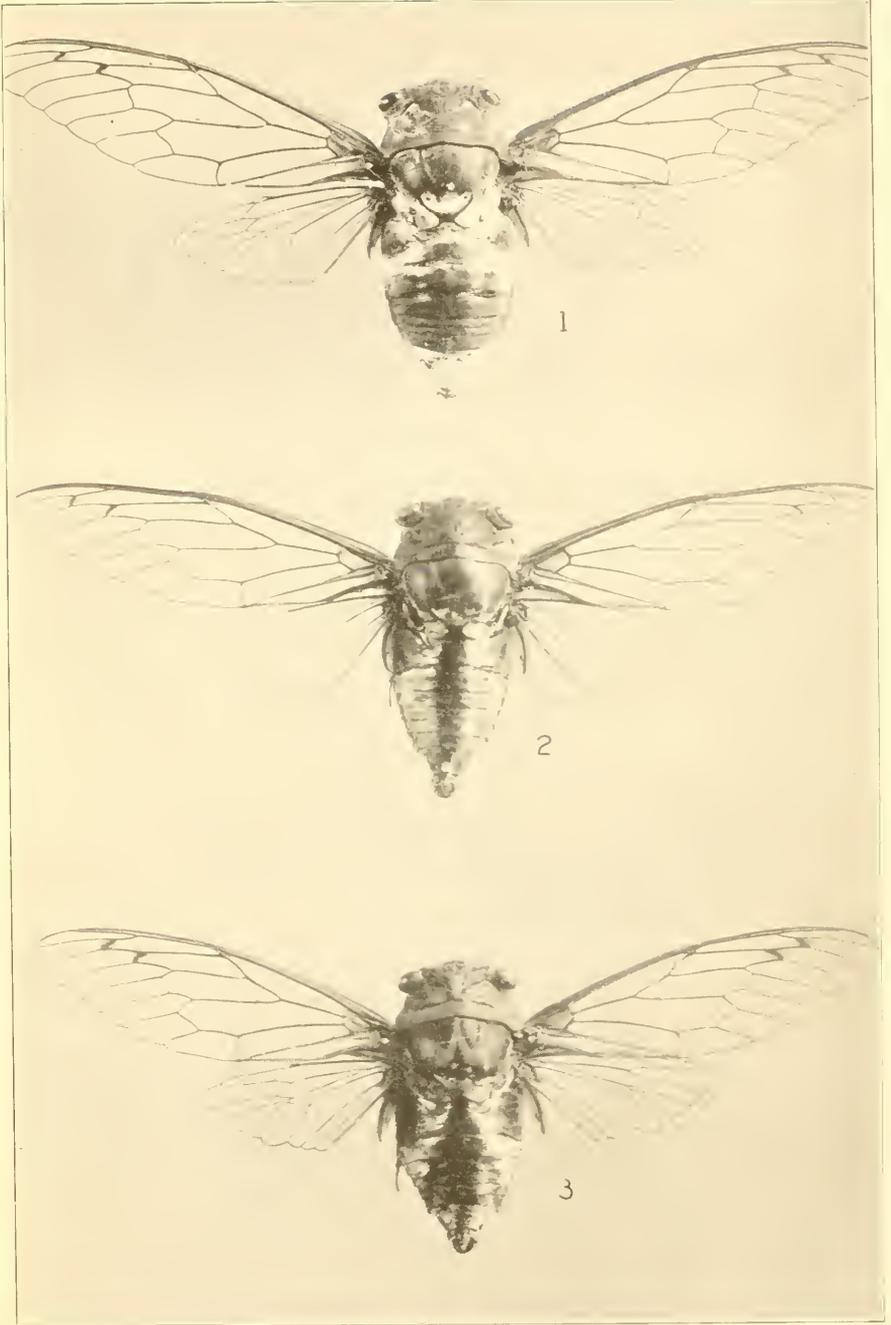
#### EXPLANATION OF PLATES.

##### PLATE 1.

- Fig. 1. *Cicada auletes* Germar.  
 Fig. 2. *Cicada resonans* Walker.  
 Fig. 3. *Cicada resh* Haldeman.

##### PLATE 2.

- Fig. 1. *Cicada marginata* Say.  
 Fig. 2. *Cicada pruinosa* Say.  
 Fig. 3. *Cicada pruinosa* var. *latifasciata* Davis.  
 Fig. 4. *Cicada pruinosa* var. *winnemanna* Davis.



Cicadidæ.





Cicadidæ.











NEW SPECIES OF CICADAS FROM CALIFORNIA  
AND UTAH.

By Wm. T. DAVIS

[Reprinted from the JOURNAL OF THE NEW YORK ENTOMOLOGICAL SOCIETY, Vol.  
XXIII, No. 1, March, 1915.]



## NEW SPECIES OF CICADAS FROM CALIFORNIA AND UTAH.

BY WM. T. DAVIS,

NEW BRIGHTON, STATEN ISLAND, N. Y.

In preparing his Preliminary Review of the West Coast Cicadidæ, printed elsewhere in this JOURNAL, Mr. Edward P. Van Duzee examined a number of specimens from my collection and has very kindly suggested that I describe some of the new species. He has also been good enough to place in my hands some of the specimens described in the above mentioned paper, so that I might have them for comparison.

It is evident that there are a considerable number of species of cicadas in the states bordering the Pacific ocean many of which may best be treated of by comparison with *Okanagana rimosa* and *Okanagana synodica* described many years ago by Thomas Say from the middle west. Say's description of *synodica* is particularly good and the species has been easily identified from the Rocky Mountain region of Colorado, where it is quite abundant. Following this plan the descriptions here given often make reference and comparison to these two standard species.

### *Okanagana rubrovenosa* new species.

Type male, Mariposa Co., California, June 15, 1914.

A little smaller than *O. rimosa*, slimmer and with proportionately narrower fore wings; color black and dark sanguineous. A strikingly handsome species.

Length 22 mm.; to tip of the wings 31 mm.; fore wing 8.5 by 26 mm. Head as wide as the anterior portion of the pronotum, front about as prominent as in *rimosa*; surface of the head between the eyes not deeply furrowed. Front convex, the median sulcus somewhat narrowed above, transverse rugæ about as prominent as in *rimosa*. Pronotum 3.5 by 8 mm., the sides parallel, or nearly so anteriorly; humeral angles shaped as in *rimosa*, with the wrinkles less prominent. Opercula oblique, sides sinuated. Last ventral seg-

ment long with the sides from about the middle nearly parallel to the truncated end. Valve of the male long, about as in *rimosa*. Uncus hooked at the end but not suddenly. Fore wings with the basal cell narrower than in *rimosa*. The dorsum in this species is black, but has a dull reddish appearance owing to its covering of rufus hairs. There is a dark red, narrow, broken line on the head just above the antennæ, and the hind margins of the pronotum, mesonotum and metanotum are also dark red. The X in the type is black, but in two of the paratypes it is dorsally touched with dark red. The mid-dorsal spots so general on the mesonotum of species of *Okanagana* are absent. Beneath nearly all black with a patch of silvery hairs each side at the base of the wings. The front is narrowly lined with dark red about the transverse rugæ. Fore femora black striped with dark red; the middle and hind femora and tibiæ more red than the anterior pair. Opercula edged with red, also the posterior margin of each abdominal segment. Uncus black, especially above; valve black on lower surface with the upper edge red. The red markings on the body are not at all conspicuous. Venation of all of the wings nearly uniform sanguineous, darkened and more spread out over the cells at base.

In addition to the type there are three paratyptic males in the author's collection, all collected at the same time and place by Mr. Nunenmacher, and a small male from Napa Co., California, is in the collection of the American Museum of Natural History.

***Okanagana mariposa* new species.**

Type male, Mariposa Co., California, June 16, 1914.

Larger than *rimosa* with rather narrow wings; largely black in color and decorated with orange.

Length 29 mm.; to tip of the wings 42 mm., fore wing 8 by 35 mm. Head as wide as the anterior portion of the pronotum; front about as prominent as in *rimosa*; top of head lacking the furrow present in *rimosa* on each side leading from the posterior ocellus toward the eye. Front convex, the median sulcus narrowed above, transverse rugæ about as prominent as in *rimosa*. Pronotum 5.5 by 11 mm., the sides anteriorly not quite parallel and edged with irregularly set teeth. (These might be reduced to sinuations in some specimens.) Humeral angles shaped as in *rimosa* with the wrinkles

about as prominent. Opercula oblique with the inner, lower angle not much produced. Valve 5 mm. in length. Uncus not hooked at the end, but very slightly narrowed, truncated and the end shallowly notched, thus different in shape from *rimosa* and No. 19 described in Mr. Van Duzee's paper referred to above. Venation and color of the wings about as in *rimosa* except that the bright or reddish orange is replaced by duller tints at the base of all of the wings, and the costa is greenish yellow. The dorsum of this species is nearly all black. The supra-antennal plates are touched with orange; the pronotum is narrowly edged with dull orange except on the anterior margin, and a very faint mid-dorsal streak of the same color extends to the outer edge from about its central portion. The mesonotum has the top of the X touched with pale orange and the four spots in front of the X are arranged in a semi-circle. The sides of the mesonotum are ornamented with orange at the base of the wings, two pale spots being particularly conspicuous. The posterior part of the metanotum is edged with orange. The dorsum of the abdomen has the posterior edge of the first and last segments narrowly streaked with greenish orange; the lower edge of the supra-anal plate and the upper edge of the valve are greenish orange; the uncus is black. The valve is greenish beneath and the lower surface of each abdominal segment is black edged on posterior margin and sides with light orange. The legs are orange streaked and spotted with black about as in *rimosa*, except that there is more black particularly on the fore femora.

The shape of the fore wings in *mariposa* is different from that of any other species of the genus I have seen in that the outer margin is not so evenly curved, but forms more of a straight line to the tip of the wing.

***Okanagana hirsuta*** new species.

Type, female, Santa Rosa Island off the coast of southern California.

A hairy species, with particularly long hairs on under side and on the legs.

Length 25 mm.; to tip of the wings 37 mm.; fore wings 7 by 31 mm. Head nearly as wide as the anterior margin of the pronotum; front about as prominent as in *rimosa*; median sulcus narrow with parallel sides. Pronotum 4.5 by 10.5 mm., the sides anteriorly not

quite parallel and somewhat sinuated; humeral angles rounded; anterior angles prominent. Last ventral segment with the notch about half as deep as the segment is long and broadly V-shaped. The venation is the same as in *mariposa*, but the basal areole is clear instead of fuscous as in that species, *rimosa*, *vanduzeei*, etc. The costa is greenish yellow edged in part with black. There is the usual fuscous and orange colors at the base of all of the wings and the flaps are bright orange, on the hind wings clouded with fuscous. The dorsum of this species is black variegated with bright orange. Head black with the supra-antennal plates touched with orange; the pronotum is very narrowly edged with orange anteriorly and with a little broader band on the posterior margin and humeral angles; the slightly sinuated sides are black. The mesonotum has the orange spot on the top of the X divided by a black line and the four spots in front of the X are arranged in a semi-circle. The posterior margin is narrowly bordered with orange, and there are two orange spots at the base of each fore wing. The posterior part of the metanotum is edged with orange. The dorsum of the abdomen has all of the segments, except the basal one, narrowly edged on their hind margins with bright orange, the stripes being about obliterated along the median line. On the second segment the stripe is broader than on the others, but is absent dorsally. Beneath, the abdominal segments are black edged posteriorly with bright orange. All of the femora are striped with orange and black. The lower surface is thickly clothed with very long, light colored hairs, which are to be found even on the legs out to the tarsi; on the hind tibiæ they are about twice as long as its diameter. When viewed from above the hairs from the lower surface are seen to form a fringe about the body.

The female type in the collection of the American Museum of Natural History is the only specimen seen by the writer.

**Okanagana triangulata** new species.

Type male, Mendocino Co., California, May 10, 1910.

The triangular or obconical black area at the base of the abdomen is a conspicuous character of this insect. Length 21 mm.; to tip of the wings 25 mm.; fore wing 8 by 20 mm. Head small and narrower than the front margin of the prothorax; the front produced and a little blunter than in *synodica*; the supra-antennal plates with outer

edge nearly rounded, and the sulcus extending from the central oculus backward to the posterior margins quite deep. The median sulcus on the front rather shallow and almost obliterated at its upper end; transverse rugæ as in *synodica*. Pronotum 3.5 by 8 mm., the sides not parallel but converging toward the eyes as in *synodica*, the humeral angles rounded, beyond a rather deep sinus extending about one half of the distance toward the anterior angles which are prominent and not so much bent downward as in *synodica*. Opercula oblique, sides sinuated. Last ventral segment with the base a little longer than the sides which converge to the truncated tip. Valve of the male broader and proportionately shorter than in *synodica*. Uncus viewed in profile not hooked but with a sinuation near the tip not present in *synodica*; when viewed from above, produced into two points with a considerable intervening notch, instead of being truncated with a shallow sinuation as in *synodica*. Fore wings with the basal areole narrowed to an obliquely rounded apex; both pairs of wings suffused at the base with testaceous; fore and hind flaps ornamented with bright orange. Veins of the fore wings testaceous, not fuscous beyond the middle as in *synodica*. The dorsum of this species is black and yellow sparsely covered with golden hairs. Head above with the elevations black except an extended spot of black on each supra-antennal plate; depressions pale. Pronotum except the anterior angles margined with pale particularly broad on the hind margin; the elevations mostly black, the pale color extending irregularly upward from the grooves on to the sides. Mesonotum black, edged behind and to the fore wings with orange; X black at center, edged with orange; four pale spots in front of the X arranged in a semicircle, and at the tip of each anterior line of the X there is a conspicuous, light yellow, impressed puncture. From the base of each fore wing there extends an oblong spot having a clouded central area. Metanotum with posterior edge dull orange. Dorsum of the abdomen with a basal obconical black area with the hind margin of each segment yellow and on the sides two rows of spots more or less incomplete. The last segment is all yellow with indications of two basal spots. Supra-anal plate not as deeply notched at the end as in *synodica*, black above edged with yellow below; uncus yellow. Beneath, the valve, also the abdominal segments entirely yellow.

except a conspicuous black line on the posterior margin of the first segment. Legs yellow, streaked and spotted with black.

The type was collected by Mr. Nunenmacher. In the collection of the American Museum of Natural History there is a female from Angel Island, California, that probably belongs to this species, though the basal areole of the elytra is not so narrowed to a rounded apex as in the male type. However, otherwise it appears to be the same. The last ventral segment has a broad V-shaped notch extending about half of the way to its base.

**Okanagana mercedita** new species.

Type male, Merced Co., California, June 18, 1914.

Length 19 mm.; to the tip of the wings 21 mm.; fore wing 6.5 by 17 mm. Head about as broad as the front margin of the pronotum, the front produced nearly as in *synodica*; supra-antennal plates with outer edge rounded. The median sulcus on the front rather broad, with the sides sinuated. Pronotum 3 by 7.5 mm., the sides not parallel, the humeral angles rounded and the anterior angles bent downward. Opercula oblique, sides sinuated. Last ventral segment with the base longer than the sides which converge to the rounded end. Valve is long as in *synodica* (5 mm.). Uncus when viewed in profile, hooked; when viewed from above narrowed toward the deeply notched apex. Fore wings with the basal areole oblong and square at apex; both pairs of wings more transparent than in *synodica* and *triangulata*, with the veins commencing at the transverse fold infuscated. Costa of the fore wings yellowish; all of the wings fuscous and bright orange at base; flaps bright orange. The dorsum of this species is blackish sparingly covered with light colored appressed hairs. Head above black with a light colored band in front of the anterior ocellus and extending on to the supra-antennal plates where there is an enclosed black spot over each antenna; a light spot on the median sulcus extends to the posterior margin. Pronotum with the central portion black except some of the grooves, and irregularly margined with pale except the hind margin which is more definitely banded. Mesonotum black with two light colored streaks on the anterior part being the exterior lines of the often present W-mark of some species; below these the X, which is light colored and joins on to the light colored band encircling the posterior

part of the mesonotum. At the tip of each anterior line of the X there is a black impressed puncture. Metanotum with posterior edge greenish yellow. Dorsum of the abdomen black with the segments narrowly edged with yellow except the last segment which is yellowish with a large irregular spot dorsally and a faint, narrow one each side. In the dorsal spot there are indications of two small included light spots at the base of the segment. Supra-anal plate dorsally black with the sides yellow. Uncus yellow shaded with brown, particularly at the tip. Beneath, the valve yellow, also the posterior margins of the abdominal segments, the last one having the entire central area yellow. Each ventral segment has two dark spots, one on each side of the central area. The opercula yellow touched with orange and black. Legs yellow streaked and spotted with black.

A paratypic female has the hind margin of the last ventral segment deeply notched almost to the base; the segment is pale with a black spot on either side; otherwise the female is colored as in the male.

In addition to the type and the female mentioned above, there are in the author's collection 16 males and 14 females, all from Merced Co., California. This series shows the transverse fold crossing the fore wings at the node, often considerably developed and in this respect approaching the much larger *Tibicinoides hesperius*, which it also resembles in color and markings more than it does *synodica*. Further the uncus is shaped much more like that of *hesperius* than *synodica*, the head, however, in form is more like the latter species. The outer row of cells in the fore wing are proportionately short in *mercedita*, whereas they are long in *hesperius* and *synodica*. The front in *hesperius* is usually margined on the upper surface by a well-defined elevated ridge.

***Okanagana minuta*** new species.

Type from Stanford University, California, May 26, 1914.

The smallest *Okanagana* so far described.

Length 16 mm.; to the tip of the wings 18 mm.; fore wings 5.5 by 15 mm. Head not quite as broad as the front margin of the pronotum; the front produced as in *synodica*; supra-antennal plates anteriorly not much rounded. Median sulcus of the front broad. Pronotum 2.5 by 6 mm., the sides not parallel, the humeral angles

rounded and the anterior angles rather prominent. Opercula oblique with the apex turned inward as in *synodica*. Last ventral segment with the base longer than the sides which gradually converge to the rounded end. Valve 3.5 mm. in length. Uncus when viewed in profile hooked; when viewed from above narrowed toward the deeply notched apex. Fore wing with the basal areole oblong and square at apex; both pairs of wings more transparent than in *synodica*, with the veins commencing at the transverse fold infuscated. Costa of the fore wings yellowish; all of the wings fuscous and bridge orange at base; flaps bright orange. The dorsum of this species is blackish, covered with light-colored appressed hairs. Head above black with an irregular pale band before the eyes and a yellowish spot on each supra-antennal plate; a light spot on the median sulcus extends to the posterior margin. Pronotum with the central portion black with the yellow color of the grooves extending well upward; margined with yellow, that of the hind margin being particularly definite. Mesonotum black with the W-mark on the anterior part represented by its two outer lines, below these the X, which is black touched on the apex with pale; hind margin around to the wings, yellowish. At the tip of each anterior line of the X there is a conspicuous black impressed puncture surrounded by golden hairs. Metanotum with posterior edge greenish yellow. Dorsum of the abdomen black with all of the segments edged with yellow. Supra-anal plate dorsally black with the sides yellow. Uncus nearly black. Beneath, the valve pale, also the posterior margins of the abdominal segments, the last one being about one half pale. The opercula black broadly edged with pale.

In addition to the type I have examined 11 paratypic males all from the same place as the type and from Mr. Clarence H. Kennedy. Mr. Van Duzee has also sent to me a female from Fresno Co., Cal. (J. C. Bradley, Collector), that probably belongs to this species and which has the deep notch in the last ventral segment broadly U-shaped, instead of V-shaped as in *mercedita*. *Okanagana minuta* in some respects closely resembles *O. mercedita*, especially when large individuals of the one species are compared with small examples of the other, but when viewed in series the head of *minuta* is seen to be proportionately much smaller than that of *mercedita*. Thus in a large *minuta* and a small *mercedita*, each expanding about 38 mm.,

the head of the former measured across the eyes is 4.5 mm., and that of the latter is 5.5 mm.

***Okanagana schaefferi* new species.**

Type, male, Bucks Valley, Iron Co., Utah.

A large insect with very prominent front, larger than either *O. rimosa* or *O. vanduzeei*, but with the wings shaped as in those species. The colors and markings resemble those of *vanduzeei*.

Length 28 mm.: to the tip of the wings 38 mm.; fore wing 12 by 32 mm. Head not quite as broad as the front margin of the pronotum; front strongly produced, and the upper surface with a not very sharply defined broad elevated margin; front sulcus narrow. Pronotum 5 by 11 mm.; the humeral angles rounded and the sides evenly narrowed toward the anterior angles which are rounded. Opercula oblique with the ends not much turned inward. Last ventral segment with the base about as long as the sides which gradually converge to the truncated end which is slightly sinuated. Valve 4 mm. in length. Uncus when viewed in profile short, stout not hooked; when viewed from above, broad, widest in the middle, with the end truncate. Wings rather broad, transparent, and with the venation as in *rimosa* and *vanduzeei*. Costa of the fore wings yellowish. All of the wings fuscous and orange at the base; flaps orange, those of the hind wings a little fuscous. Head above black with a light spot on the edge of each supra-antennal plate. Pronotum black edged all round with orange and about one half of the median groove yellow. Mesonotum black with hind margin irregularly bordered with light orange; X orange, with a black central line and a black band across each anterior ridge followed by orange. Two very small orange spots beyond. A yellow dash near the base of each fore wing. Metanotum with the posterior edge light orange. Dorsum of the abdomen black with all but the basal segment posteriorly edged with orange; uncus black. Beneath, the valve pale orange; hind margins of all of the segments orange, except the last which is more than one half pale orange. The opercula black with the hind margins orange. Fore femora all black except the distal tips which are orange. Middle and hind femora black except the orange colored distal tips and inner surface. Rostrum black, orange at base, head black beneath, except the small orange spots about each antenna.

The type, in the collection of the Brooklyn Museum of Arts and Sciences is the only one I have seen. It was collected in 1904 by Messrs Doll & Engelhardt on sage brush. I take great pleasure in naming this species after Mr. Charles Schaeffer, of that Museum, who has always taken much interest in cicadas and with whom I have spent many pleasant days afield.

***Okanagana fratercula*** new species.

Type, male, Bucksk Valley, Iron Co., Utah.

A small black and orange species, a little larger than *O. synodica* and with clearer wings. It in fact closely resembles *O. schaefferi*, but while that is a very large *Okanagana* this is a very small one.

Length 20 mm.; to the tip of the wings 26 mm.; fore wings 8 by 20 mm. Head not quite as broad as the front margin of the pronotum; front considerably produced and on the upper surface margined by a well-defined elevated ridge, front sulcus narrow. Pronotum 3 by 8 mm.; the sides not parallel, the humeral angles rounded; sides sinuated toward the anterior angles which are prominent. Opercula oblique with the ends turned upward. Last ventral segment with the base about as long as the sides which gradually converge to the rounded end. Valve 3 mm. in length. Uncus when viewed in profile short, stout, not hooked; when viewed from above, broad at middle tapering to the end which shows a depression but is not notched. Wings transparent with veins beyond the middle fuscous. Costa of the fore wings yellowish edged with fuscous. All of the wings fuscous and orange at base; flaps orange, fuscous centrally. Head above black, with a yellow spot on each supra-antennal plate. Pronotum black, entirely bordered with yellow, and about one half of the median groove faintly yellow. Mesonotum black with hind margin irregularly bordered with light orange; X orange, with a black band across each anterior ridge followed by orange. Two small orange spots beyond. The dorsal light spots taken together are arranged in a semicircle. A yellow dash next the base of each fore wing. Metanotum with the posterior edge light orange. Dorsum of the abdomen black with all but the basal segment posteriorly edged with orange; uncus black with a triangular orange spot at base. Beneath, the valve pale, brown at tip and black at base, hind margins of all of the segments orange. The opercula black tipped with orange.





Cicadidæ.

Fore femora all black except the distal tips which are orange; middle and hind femora black except the orange-colored distal tips and inner surface. Rostrum black, orange at base; head black beneath, except the small orange spots about each antenna.

The type is in the collection of the Brooklyn Museum of Arts and Sciences and is the only one I have seen. It was collected in 1904 by Messrs. Doll and Engelhardt on sage brush. *Okanagana fratercula* seems to be a "little brother" to *O. Schaefferi*, and perhaps bears about the same relationship to it as does *Tibicina cassinii* to *T. septemdecim* in the eastern states.

EXPLANATION OF PLATE 3.

- Fig. 1. *Okanagana rubrovenosa*.
- Fig. 2. *Okanagana mariposa*.
- Fig. 3. *Okanagana hirsuta*.
- Fig. 4. *Okanagana schaefferi*.
- Fig. 5. *Okanagana fratercula*.
- Fig. 6. *Okanagana minuta*.
- Fig. 7. *Okanagana triangulata*.
- Fig. 8. *Okanagana mercedita*.







A NEW VARIETY OF CICADA RESEMBLING  
C. DORSATA.

By WM. T. DAVIS.

[Reprinted from the JOURNAL OF THE NEW YORK ENTOMOLOGICAL SOCIETY, Vol.  
XXIII, No. 3, September, 1915.]



## A NEW VARIETY OF CICADA RESEMBLING C. DORSATA.

BY WM. T. DAVIS.

NEW BRIGHTON, STATEN ISLAND, N. Y.

Thomas Say states that his *Cicada dorsata* was found near the Konza village in Missouri, which was located on the Kansas river in what is now the eastern part of the present state of Kansas. Say's original description is in part as follows: "Head and thorax varied with greenish-yellow and black; scutel blackish-chestnut, the W and X marks greenish-yellow, lateral lines of the W white near the thorax, a white line from the humerus is interrupted by the anterior lines of the X, and also in the middle between these two lines, a white spot between the two lateral lines of the X; tergum black, a dorsal line of white spots and a marginal line of white spots which are continued over the terminal segment, the lateral spot of the first and second segments is very much dilated and confluent, that of the third segment is much elongated and attenuated towards the back, a white oblique spot on the first segment each side of the dorsal line; all these white marks are pruinose. Length two inches to the tip of the hemelytra."

Some individuals are a little larger than this. We figure a male from Chetopa, southeastern Kansas. Specimens have been examined from

Nebraska, Coll. Mus. of Comp. Zoölogy, Cambridge, Mass.

Riley Co., Kans., Sept. 7, 1907, male. Collection Brooklyn Museum, N. Y.

Wakefield, Clay Co., Kans., female (J. C. Warren). Davis collection.

McPherson, Kans., Aug. 10, 1913, female. Collection Brooklyn Museum, N. Y.

Chetopa, Labette Co., Kans., July and Aug., 3 males (D. R. Beardslee). Davis collection.

Mountain Grove, Wright Co., Mo., Aug. 4, 1902, male. Davis collection.

Mountain Grove, Wright Co., Mo., female. Collection Mo. Agri. Exp. Sta.

Dallas, Texas, 3 males, 1 female. Collection Museum Comp. Zoölogy, Cambridge, Mass.

In collections there is another cicada usually associated with *dorsata*, but which is really quite distinct and which we consider to be more of a mountain form of what has been identified as Say's *C. marginata* (See this JOURNAL for March, 1915, Vol. XXIII, plate 2). This variety is altogether a whiter insect than true *marginata*; the color of the prothorax is a much lighter yellow-green, the wings show a tendency to be broader in proportion to their length, and when seen in series the head across the eyes is generally narrower.

The male genitalia are, however, alike in the two insects, and very different from those of *Cicada dorsata* as the accompanying figure will show. The prominent line of dorsal white spots has caused its association with *dorsata*. It will be noted that Say says that the ground color of the tergum in *dorsata* is black, whereas in *marginata* and the variety under consideration the segments are yellowish or brownish on their posterior margins.

It may be described as follows:

***Cicada marginata* var. *dealbata* new variety.**

Type, male, Colorado Springs, Colorado. Davis collection.

Markings resembling those of *C. dorsata*, but *marginata* var. *dealbata* is more green in color and has less black about the central area of the pronotum. The mesonotum is marked as in *dorsata* but is more pruinose; the tergum has a dorsal line of white spots as in *dorsata*, but the sides are broadly pruinose and the posterior margin of each segment is narrowly edged with greenish yellow. Beneath both insects may be of the same color, though *dorsata* is usually much darker. The opercula are about as broad as long and broadly rounded at the tips. The fore wings in *dorsata* are oval in shape with the inner side (radius) of the costal margin blackish; the veins are heavy and

thickened, and the W-mark is prominent, whereas in *marginata* var. *dealbata* the fore wings are more acuminate in form, the costal margin is green, darkened beyond the middle of the wing and the W-mark is not conspicuous



or is wanting. One of the greatest differences between the two insects is in the genitalia. The uncus in *dorsata* viewed at full face is narrow and the piece below into which it locks is broadly notched with the extremities rounded. In var. *dealbata* the uncus is more nearly triangular in shape and the lower piece is narrowly notched with the extremities much produced. The male type of var. *dealbata* is figured.

Length of body 35 mm.; length of fore wing 46 mm.; expanse of wings 105 mm.

The following specimens are in the author's collection unless otherwise stated:

Mount Hope, Sedgwick Co., Kans., male (J. C. Warren). Collection Brooklyn Museum, N. Y.

McPherson, McPherson Co., Kans., Aug. 10, 1914, male (W. Knaus). Collection Brooklyn Museum, N. Y.

Cheyenne Co., Kans., 3,300 ft., male (F. X. Williams).

Colorado, two males.

Denver, Col., August 15, 1912, male (Oslar).

Platte Canon, Jefferson Co., Col., July 25, 1913, male; also male without date (Oslar).

Chimney Gulch Golden, Col., August, male (Oslar).

Pueblo, Pueblo Co., Col., female, Aug. 17, 1878, and female without date. Collection of Cornell University.

Colorado Springs, Col., male, Sept. 3, 1912, male (Oslar).

Durango, La Plata Co., Col., Aug. 1, 1912 male; also male without date (Oslar).

The name *Cicada marginata* was preoccupied when Say used it in 1825 by the earlier (1790) *Cicada marginata* of Olivier, now placed in the genus *Ariasa*. In 1852 Walker proposed the name *Cicada marginalis* for Say's species and if this is to be used, the name of the insect under consideration should be *Cicada marginalis*

var. *dealbata* Davis. However, *dealbata* will probably be raised to specific rank when more is known about it. Some of our eastern species, which are plainly distinct, like *linnei* and *canicularis*, have similar genitalia.

Distant in his Catalogue of the Cicadidæ (1906) mentions three synonyms of *Cicada dorsata*. *Cicada robertsonii* Fitch (1856) is the first of these. The original description states that the wings are "glossy-hyaline, their veins slender, green, becoming light yellow at their apices; rib of the anterior wings edged with black on its inner side, length to the tip of the closed wings in the female two inches and fifteen hundredths. From the Creek Indian territory. . . ." This is not descriptive of either *dorsata* or *marginata* var. *dealbata* and we believe that *Cicada resh* Haldeman, was probably the insect under consideration.

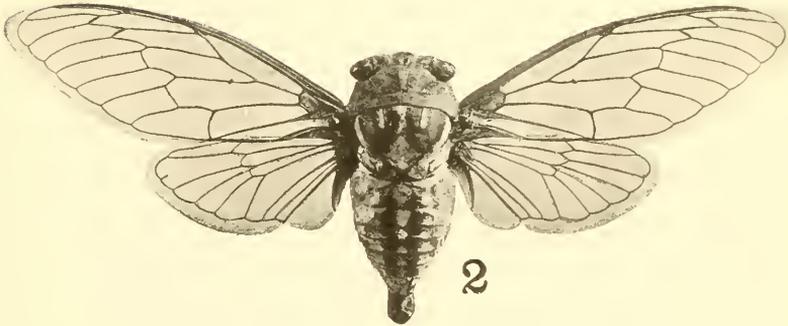
The next synonym mentioned by Distant is *Thopha varia* Walker. No locality was given when this species was described, but from the size and general description together with the tawny and ferruginous markings mentioned it appears to be the same as *C. dorsata* Say. The wings are said to be "almost colourless, tawny at the base, veins ferruginous, tawny towards the base, where they are partly black, very slightly clouded with tawny towards the tips; first and second cross-veins and the longitudinal vein beyond them clouded with brown." This is a good description of the wings of *Cicada dorsata*.

The third synonym is *Fidicina crassa* Walker. As in the last description no locality is mentioned, but from the general account of the insect it appears to be a *dorsata* with the pruinose markings eliminated by age. "Wings vitreous, rather broad; veins tawny, piceous towards the tips. Fore wings with first and second transverse veins very oblique, clouded with dark brown. . . ."

#### EXPLANATION OF PLATE XII.

Fig. 1. *Cicada dorsata* Say.

Fig. 2. *Cicada marginata* var. *dealbata* Davis.



Cicadidæ.







A NEW CICADA FROM ARIZONA.

By WM. T. DAVIS.

[Reprinted from the JOURNAL OF THE NEW YORK ENTOMOLOGICAL SOCIETY, Vol.  
XXIII, No. 4, December, 1915.]



## A NEW CICADA FROM ARIZONA.

BY WM. T. DAVIS,

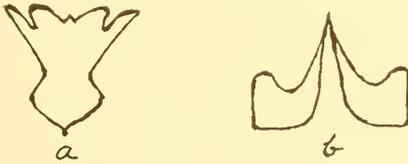
NEW BRIGHTON, STATEN ISLAND, N. Y.

Through the kindness of officials connected with the Biological Survey, U. S. Department of Agriculture, I recently had the opportunity of examining a small collection of Cicadas from various parts of the United States, and among them was the new species here described.

*Cicada cultriformis* new species.

Type male, Blue River, a branch of the Gila River in Greenlee Co., Arizona, August 25, 1914. E. G. Holt, collector. (Collection U. S. Biological Survey.)

Resembles *Cicada marginata* Say in size, color and markings. Head black with an oblong greenish yellow spot each side between the eyes and a small spot of the same color on the front just above the transverse rugæ. Pronotum greenish yellow with a large, conspicuous black spot occupying the fore part of its central area (see Fig. a). The hind margin of the pronotum (collar) is entirely unicolorous as in *marginata*. The mesonotum is black, with a pruinose band each side at the base of the wings; the elevated x is greenish



yellow, and there are two conspicuous, irregularly formed (pipe-shaped) greenish yellow spots occupying its central portion (see Fig. b). The tergum is black, each side broadly margined with pruinose, and the segments have their posterior margins yellowish. There is also an indication of a dorsal line of pruinose spots on the tergum, which in the type have been nearly worn off. Beneath the head is blackish, the remainder of the insect being greenish yellow and more or less pruinose. The costal margin of the fore wing is entirely greenish yellow, darkened beyond the middle, and the w-mark is inconspicuous. Both fore and hind wings are greenish yellow at base, with the veins darkened beyond the middle.

In genitalia *Cicada cultriformis* is widely different from *Cicada marginata*. The dorsal piece is one third broader, as may be seen in the accompanying figures. The uncus is rather broad with the extremity truncate; it is more

narrow and rounded in *marginata*. But the greatest differences are in the lower pieces into which the uncus locks, which are 5 millimeters long in *cultriformis*, and when seen in profile are shaped like the blade of a pruning knife, hence the name. In *Cicada marginata* these same pieces are about 2.5 millimeters in length and not shaped at all like those of *cultriformis*.<sup>1</sup> The costal margin of the fore wing in *cultriformis* is evenly rounded and not so suddenly bent as in *marginata*, and the opercula, which are broadly rounded at the extremities in both species, are larger.

Allotype, female; bears the same date as the type. It is in the author's collection.

It has the same large, conspicuous black spot on the pronotum as the type, and the two central, large, pipe-shaped spots on the mesonotum are as well defined and of the same shape. The specimen was killed before it was mature and before its colors had completely developed.

MEASUREMENTS (IN MILLIMETERS).

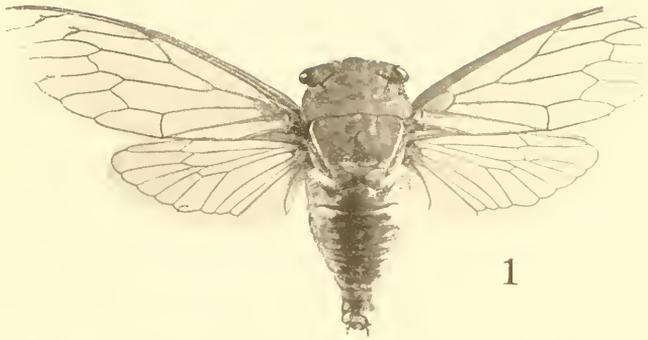
	Male Type.	Female Allotype.
Length of body .....	40	38
Width of head across eyes .....	16	17.5
Expanse of fore wings .....	110	125
Greatest width of fore wing .....	17	19
Greatest width of operculum .....	9	

The species here described is one of our largest cicadas, and while it may be readily distinguished from its nearest known allies by its peculiar genitalia, we think that the large, black spot on the pronotum will also prove of specific value.<sup>2</sup> The outer lines of the bowls of the pipes in the pipe-shaped spots on the mesonotum, run parallel in *Cicada cultriformis* both in the type and the allotype, which they do not do in Haldeman's figure of *Cicada resh* and in about two hundred specimens that we have identified as that species from Texas and Oklahoma. The markings of *Cicada resh* differ in other respects, and it is also a much smaller insect.

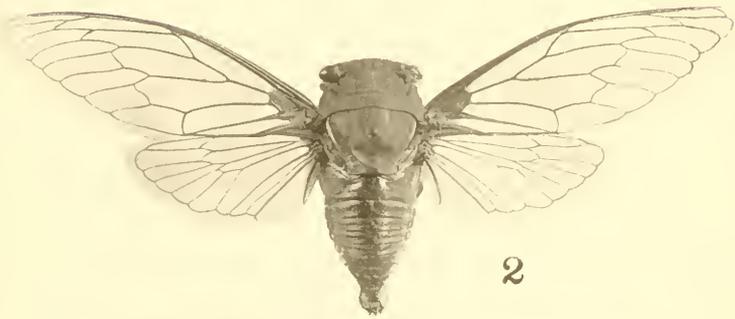
As the figure of *Cicada marginata* Say published in this JOURNAL for March, 1915 (Vol. XXIII, Pl. 2, fig. 1) was not quite satisfactory, we herewith present a second one. The insect from which it was taken

<sup>1</sup> By coloring them white Mr. H. H. Cleaves brought out the differences more clearly in the photographs from which the figures were made.

<sup>2</sup> Since the above description was written a female *Cicada cultriformis* from Verde Valley, Arizona, August 1, 1913, A. W. Murrill collector, (Collection U. S. Nat. Museum), and a male labeled "Arizona" in the Uhler collection, U. S. Nat. Museum, have been examined. In size and markings they closely resemble the type and allotype as described.



1



2



Cicadidæ.



came from Chetopa, Kansas (D. R. Beardslee) and expands 120 millimeters. This is supposed to be not a great many miles from the type locality. *Cicada marginata* has sometimes a line of pruinose spots on the tergum, but generally these spots are inconspicuous or have been entirely obliterated by age. In specimens of the same size the eyes are much further apart in *marginata* than they are in the allied *Cicada dealbata* described in this JOURNAL for September, 1915.

## EXPLANATION OF PLATE XVIII.

- Fig. 1. *Cicada cultriformis* Davis, reduced.  
Fig. 2. *Cicada marginata* Say, reduced.  
Fig. 3. *Cicada cultriformis*; genitalia, enlarged.  
Fig. 4. *Cicada marginata*; genitalia, enlarged.
-







NOTES ON CICADAS FROM THE UNITED STATES  
WITH DESCRIPTIONS OF SEVERAL  
NEW SPECIES.

BY WM. T. DAVIS

[Reprinted from the JOURNAL OF THE NEW YORK ENTOMOLOGICAL SOCIETY, Vol.  
XXIV, No. 1, March, 1916.]



NOTES ON CICADAS FROM THE UNITED STATES  
WITH DESCRIPTIONS OF SEVERAL  
NEW SPECIES.

NOTES ON CICADAS FROM THE UNITED STATES  
WITH DESCRIPTIONS OF SEVERAL  
NEW SPECIES.

BY WM. T. DAVIS,

NEW BRIGHTON, STATEN ISLAND, N. Y.

While the writer has a rather large collection of Cicadas from the United States, more material may cause the opinions here expressed to be considerably modified. Especially is this the case regarding those species originally described without locality, such as *swalei*, *olympusa*, *viridifascia* and *sex-guttata*. More specimens are also to be desired from the type locality of what is here considered as Say's *Cicada vitripennis*.<sup>1</sup>

<sup>1</sup> The author is indebted to Mr. Chris. E. Olsen for making a number of drawings of genitalia, and to Mr. Howard H. Cleaves for taking the photographs from which the plates have been made.

**Cicada figurata** Walker.

This species was described in 1858 in List of the Specimens of Homopterous Insects in the collection of the British Museum, Supplement, p. 19. Unfortunately no locality was given. The description in part is as follows: "Black, mostly tawny beneath. Head with a large tawny spot on each side in front between the eyes. . . . Prothorax reddish, black in front and behind, with a double tawny stripe; border tawny, with a black streak on each side. Mesothorax with four oblique tawny stripes; the middle pair recurved inward; the lateral pair enclosed at each of their tips by a lateral tawny streak; sides and hind ridges tawny. Legs tawny. Wings vitreous. Fore wings narrow, much acuminate testaceous at the base, and with a testaceous streak along the sixth discoidal areolet; primitive areolet black; veins piceous; costa testaceous to the tip of the front areolet; first and second transverse veins slightly curved, clouded with black. . . . Length of the body 17 lines; of the wings [expanse] 44 lines."

As far as the writer is aware the insect has not been recognized since it was described and the name has been placed as a synonym of *Cicada aulctes* or *grossa* by Distant and of *Cicada marginata* by Uhler. Lately seven specimens have been examined that are well covered by the above description. They are as follows:

Logansport, DeSoto Co., Louisiana, August 1905, male. (Received from W. Dwight Pierce.) Coll. U. S. National Museum.

Verda, Grant Co., Louisiana, July, 1915, male. (Received from Prof. R. W. Harned.) Coll. Agri. College, Miss.

Alabama, female. Coll. Brooklyn Museum of Arts and Sciences.

Mobile, Alabama, female (H. P. Loding). Davis collection.

Mississippi, female. (Received from Prof. R. W. Harned.) Coll. Agri. College, Miss.

Meridian, Lauderdale Co., Miss., Sept. 10, 1915, female. (Rehn & Hebard). Davis collection.

Gainesville, Florida 1915, male. (J. R. Watson.) Davis collection.

All of the above mentioned are dull, tawny colored insects, with narrow and much acuminate fore wings with the primitive areolet black. In the considerable number of specimens that we have of *Cicada resonans* and *Cicada similis*, the fore wings are not as acuminate, and the primitive or basal areolet is not black. The

membranes or flaps at the base of both the fore and hind wings are dark gray in both *resonans* and *similaris*, also in *lyricen*, whereas in what we take to be *figurata* they are yellowish in color, especially those of the fore wings, with a pinkish tinge. In *similaris* the uncus when seen in profile is shaped something like the head of a snake with expanded jaws; in what we have identified as *resonans*, the uncus when viewed in profile is broad at the tip and shaped somewhat like a horse's hoof, and when viewed from the back the extremity is broad and truncated and not notched. In what we consider *figurata* the uncus is simple. When it is seen in profile it is scoop-shaped, and from behind it is obtusely rounded with the extremity not as broad as in *Cicada lyricen* which it somewhat resembles. We formerly expressed the opinion (this JOURNAL, March, 1915, p. 8) that *Cicada figurata* might be either *Cicada lyricen* or *Cicada similaris*, but since we have seen the male from Louisiana referred to above and which we figure, we think that Walker's species has been rediscovered. Mr. Charles Schaeffer, of the Brooklyn Museum, has had, for some time, the female belonging to that institution set aside as a distinct species.

***Cicada aurifera* Say.**

Thomas Say described this species in 1825, but recent authors have failed to identify it. Say says in part: "Body covered with golden pubescence; beneath hairy. Inhabits Missouri . . . the two particular anastomoses are strongly marked with blackish . . . thorax but little varied with black: scutel [mesonotum] black, with the usual testaceous lines: tergum black, densely covered with golden hair: beneath pruinose. Length one inch and a half nearly to the tip of the hemelytra. Found near the Konza village."

When Smith and Grossbeck wrote their paper "Studies in Certain Cicada Species," published in Entomological News, for April, 1907, they examined the specimens in the collection of the U. S. National Museum at Washington and noted on a label placed below two females from Kansas, "New Species." From lack of material they refrained from describing the insect which is here identified as *Cicada aurifera*. In 1914 the writer received a male of this species from Mr. J. C. Warren of Wakefield, Kansas, and more recently he has had the privilege through the courtesy of Prof. S. J. Hunter and Mr. R. H. Beamer of examining forty-nine additional specimens from the col-

lection of the University of Kansas. We think that the species represented by this extensive material is Say's long lost *Cicada aurifera*. It is of the right size; fresh specimens are pubescent; beneath hairy; the first and second cross veins conspicuously blackened, almost spot-like: the pronotum is almost wholly green and "little varied with black"; the mesonotum is black with the "usual tectaceous lines"; the tergum is black covered with golden hair in fresh specimens; beneath pruinose, and lastly most of the insects came from near the type locality, for Franklin Co., Kansas is not far from the site of the Konza Indian village visited by Thomas Say.

Uhler states in his Preliminary Survey of the Cicadidae of the United States, Antilles and Mexico, Transactions Maryland Academy of Science, 1892, that *Cicada aurifera* was known only from the original description and adds: "It seems to be a pale variety of *C. canicularis*, which inhabits that state, but the size given is smaller than that of any specimens thus far brought to our notice." He was nearly correct in this, for *Cicada aurifera* is related to *Cicada canicularis* Harris, but still more closely to *Cicada davisi* Smith and Grossbeck. We figure a male *Cicada aurifera* from Franklin Co., Kansas, a male *Cicada canicularis* from Lake Mahopac, New York, and a male *Cicada davisi* from Manson, N. C. It will be seen that in *canicularis* the eyes are not set as obliquely as they are in *davisi*, and in *aurifera* they are still less prominent. In examples of the same expanse of wing, *aurifera* measures less across the head than does *davisi*. The uncus when seen from behind is broader in *canicularis* than in *davisi* and *aurifera*, but in *aurifera* the tip is more gradually rounded in either of the other two. Beneath the opercula are about of the same shape in all three species. The color pattern of the three species is similar. The pronotum is all green in *aurifera* with the exception of the triangular black spot contiguous to the anterior margin and enclosing a wedge-shaped spot of green. In *davisi* the pronotum is usually more black, but the hind margin or collar is green. In *canicularis* the collar is green with its front margin often edged with black. The mesonotum is blacker in *canicularis* than in either of the other two; the usual W-mark and elevated X of a lighter color, is present in all three. The tergum is black in the three species, but in *aurifera* the hind margins of the segments are often edged with testaceous. The wings of *canicularis*

and *davisi* are of the same shape, but in *aurifera* they are proportionately shorter and broader. The first and second cross veins of the fore wings are but slightly infuscated in *canicularis* and sometimes not at all; in *aurifera* the infuscation is sharply defined, while in *davisi* it is generally more indefinite and the ends of the fore wings are often clouded as well. Beneath, all three species are pruinose when fresh. *Canicularis* has the central area shining black and extending in the form of an irregular band to the end of the abdomen; in *davisi* this band is more green, especially along the sides and still less definite, while in *aurifera* the band is almost obsolete, in rubbed specimens there being usually an oblong black spot at the base of each segment on the under side.

The following specimens of *Cicada aurifera* have been examined:

Franklin Co., Kans., 895 ft., 23 males, 15 females (R. H. Beamer).  
Collection University of Kansas.

Anderson Co., Kans., 1047 ft. 1915, 2 males, 1 female (R. H. Beamer).  
Collection University of Kansas.

Allen Co., Kans., 962 ft., 1915, 3 males, 1 female (R. H. Beamer).  
Collection University of Kansas.

Riley Co., Kans., Sep., 1 female (Marlatt).  
Collection U. S. National Museum.

Kansas, 1 female (Marlatt).  
Coll. U. S. Nat. Museum.

Wakefield, Clay Co., Kans., Aug. 25, 1914, 1 male (J. C. Warren).  
Davis collection.

Seward Co., Kans., 2,600 ft., August 18, 1911, 2 males, 2 females  
(F. X. Williams).  
Collection University of Kansas.

#### ***Cicada townsendi* Uhler.**

In the collection of the United States National Museum there is a male cicada marked "Las Cruces" on one label, and "*Cicada Townsendii*, Uhler, New Mex." on the other. This is supposed to be one of the specimens from which Uhler drew up his original description, for he says that four of them came from the vicinity of Las Cruces, New Mexico. Mr. Otto Heidemann, in charge of the cicadas in the National Museum, has kindly permitted my having a figure made of the specimen, which is here presented. In addition to this typical specimen, we figure through the courtesy of Dr. Henry Skinner a smaller and more pruinose male from Alamogordo, New

Mexico, May 10, 1902. Other material examined has been as follows:

Southern California. A female in the U. S. Nat. Museum bears the label "Southern Cal. (not Lower Cal.)."

"Texas." A rather small male and female. Coll. U. S. Nat. Museum.

Marfa, Tex. June 5, 1908, male and female (Mitchell and Cushman). Coll. U. S. Nat. Museum.

Marathon, Tex. June 7, 1908, female (Mitchell and Cushman). Coll. U. S. Nat. Museum.

In Utah, Colorado and Kansas there is another cicada that greatly resembles *tozensendi*, but is a little smaller and has a very differently shaped uncus. It may be described as follows:

*Cicada bifida* new species.

Type male, Clear Creek, Colorado, July 23, 1914. Davis collection.

Allotype female, St. George, Washington Co., Utah (Engelhardt and Doll). Davis collection.

A black and yellow green colored species; fresh specimens conspicuously pruinose.

Head black, with the following yellowish tinged with green: a spot above the base of each antenna, a central triangular spot in front of the ocelli, an irregular spot of a little lighter color on each side near the eye and contiguous to the hind border, and a small spot on the front above the transverse rugæ. Pronotum yellowish green with a large central black spot which is broadened near the front margin, and to a very much less extent on the hind margin where it extends on to the collar. In some of the paratypes this black spot contains one of a yellowish green color. On either side the grooves are blackened, and the hind margin or collar is blackened in the center, as mentioned above, and has a black spot each side at the humeral angles. Mesonotum black with the central W-shaped mark near the front margin yellowish green in color; behind this is the elevated x also yellowish green and with the anterior marks extending well forward and nearly touching the W-mark. The sides near the base of the fore wings are also yellowish green. Tergum black with an indication of a dorsal row of pruinose spots faintly defined; sides of the abdomen irregularly bordered with yellowish green, the last segment being nearly all of that color except the central area which is darkened. The fore wings have the costal margins yellowish green nearly to the extremities of the wings and the subcostal veins are blackened; the first and second cross veins are darkened, but not conspicuously so. The basal areole of each fore wing contains a short darkened dash of color, otherwise they are nearly clear; the flaps of both the fore and hind wings are grayish white. Beneath

lighter and nearly of a uniform yellowish color, with a little black about the eyes and on the legs which are more or less streaked, the fore tibiae and tarsi being nearly all blackened. Opercula slightly lighter colored than the segments; overlapping for more than half of their length; about half as long as the abdomen and symmetrically narrowed from each side to a rounded point. Uncus when viewed in profile slender and much curved, and when seen from



### *C. townsendi.* *C. bifida.*

behind widened and deeply cleft at the extremity. It somewhat resembles in form the iron claw often used in pulling tacks. The insect is quite pruinose beneath, especially on the fore parts, and above, the pruinose areas often cover the lighter markings.

#### MEASUREMENTS (IN MILLIMETERS).

	Male Type.	Female Allotype.
Length of body .....	27	25
Width of head across eyes .....	9.5	9.5
Expanse of fore wings .....	71	72
Greatest width of fore wing .....	12	12
Greatest width of operculum .....	6	
Greatest length of operculum .....	9	

In addition to the type which is figured, and allotype, the following specimens have been examined:

St. George, Washington Co., Utah, July, male (Engelhardt and Doll.) Davis collection.

Golden, Colorado, July 18 and 20, 1909. Male and female. Collection W. J. Gerhard.

Morton Co., Kans., 3,200 ft., June, 1902, one male and three females (F. H. Snow). Collection University of Kansas and Davis collection.

Hamilton Co., Kans., 3,350 ft., June, 1902, three males (F. H. Snow). Collection University of Kansas and Davis collection.

Garden City, Finney Co., Kans., June, 1895, male and female (H. W. Menke). Collection U. S. Nat. Museum.

Arizona, male. Uhler collection, U. S. Nat. Museum.

As has been stated *Cicada bifida* greatly resembles *Cicada townsendi* which, however, appears to range somewhat further to the south. It may be readily distinguished from that species by being smaller, by the less prominent front; by having the basal cell of the fore wings less black and the collar or hind margin of the pronotum of a nearly uniform color, that is it has not about the frontal half blackened as in *townsendi*. The uncus in *Cicada bifida* is deeply cleft at the tip, and simply rounded in *townsendi*. Further in *townsendi* the penis is armed with a chitinous pair of thorns dark in color and bent inward, which are not present in *Cicada bifida*.

*Cicada castanea* new species.

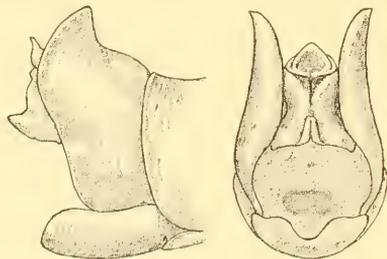
Type male, Jerome, Arizona, June (Oslar). Davis collection.

Allotype female, Prescott, Arizona (Oslar). Davis collection.

The triangularly shaped opercula of this species are proportionately much longer than they are in *Cicada cinctifera* from the same region, and they are also more rounded at the tips.

Head with the front ochraceous tinged with black and a small, brighter spot at apex. A broad, irregular black band connects the eyes, behind which, each side, are two ochraceous spots, and an oblong one of the same color is above the base of each antenna. Pronotum castaneous with a central longitudinal dark band dilated both anteriorly and posteriorly (in some of the paratypes enclosing a castaneous streak); the front margin narrowly lined with a streak of a lighter color. The posterior margin or collar clouded with black near the humeral angles, and yellowish on anterior angles, otherwise of the same color as the main portion of the pronotum. Mesonotum shining black with a faint castaneous W-shaped line outlining two obconical spots on the central part of the fore margin; the sides and the cruciform elevation castaneous with two black depressed dots near the upper extremities of the latter. Tergum castaneous with the tympanal areas lighter and each segment faintly clouded at base; last segment with a conspicuous pruinose spot each side. Fore wing with the costal margin green to the end of the radial cell, beyond darkened. Subcostal vein dark brown. The marginal cells down to the cubital cell slightly clouded with brown, but each cross vein heavily clouded, also an indication of several small, dark spots along the outer margin. One of the female paratypes constitutes a variety having the fore wings suffused entirely with brown, as well as about two thirds of the area of the hind wings. At base the fore wings are darkened, also a dark spot in each basal cell; the

membranule orange with a pinkish tinge. Hind wings orange at base, clouded beyond, the color spreading out over nearly all of the area of the last two anal cells. Beneath yellowish with a black spot contiguous to each eye and a few conspicuously black spots near the base of the legs, particularly those of the median pair. The triangularly shaped opercula are long and rather blunt at the lower extremities and extend about one half the length of the abdomen.



*Cicada castanea*

The uncus when seen in profile has at the extremity a projection like an up-turned nose; when viewed from behind it is seen to be divided longitudinally through this nose; the ends are expanded and truncate. The last ventral segment of the female is doubly notched at its extremity, that is, it is broadly notched and this notch in turn has a central one.

MEASUREMENTS (IN MILLIMETERS).

	Male Type.	Female Allotype
Length of body .....	19.5	20
Width of head across eyes .....	8	8
Expanse of fore wings .....	63	64
Greatest width of fore wing .....	10	10
Greatest width of operculum .....	4.5	
Greatest length of operculum .....	6	

In addition to the type which is figured, and allotype, the following specimens have been examined:

Jerome, Arizona, three males, two females (Oslar). Davis collection.

Prescott, Arizona, nine males (Oslar). Davis collection.

Baboquivari Mts., Arizona, male (F. H. Snow). Collection Univ. of Kans.

Santa Rita Mts., Arizona, female. Collection Brooklyn Museum of Arts and Sciences.

This species resembles somewhat *Rihana virgulata* Distant, from Mexico, figured in Biol. Centr.-Amer., Rhynch. Hom. 1, p. 140, but in that insect the opercula are short, and the eyes are more prominent. It resembles still more closely *Rihana swalci* Distant, described without locality but supposed to come from Central America. The figure in Ann. Mag. Nat. Hist. (7), xiv, p. 427 (1904), shows a more robust-bodied species than *castanea* with more prominent eyes. There also appears to be differences in color pattern in the head, pronotum and mesonotum. *Castanea* from its form and character of genitalia, belongs near to *delicata* Osb., *reperta* Uhler and *sordidata* Uhler, that is in the genus *Cicada* as defined by Distant, and not in his genus *Rihana*. This species in time when more collecting has been done, may prove to be a variety of *swalci*, but the name *castanea* can still apply, especially to the variety with the fore wings entirely suffused with brown, as shown in the female from the Santa Rita Mts., Arizona, and included in the description.

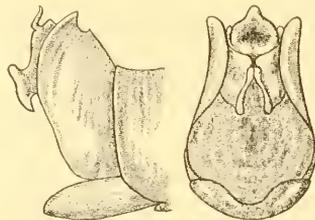
*Cicada arizona* new species.

Type male, Santa Rita Mts., Arizona, 5,000 to 8,000 ft., June (F. H. Snow). Davis collection.

In form resembling *Cicada castanea*, but smaller with clear wings and short rounded opercula.

Head black with a greenish yellow spot above the base of each antenna and one each side at posterior margin; median sulcus on front also greenish yellow. Pronotum greenish yellow with a central longitudinal dark band dilated both anteriorly and posteriorly; grooves narrowly lined with black; posterior margin or collar greenish yellow but clouded at the extremities. Mesonotum shining black with two curved lines in the form of parenthesis near the front margin and the cruciform elevation greenish yellow in color. There are two black, depressed dots near the upper extremities of the cruciform elevation. Tergum dark chestnut colored with the relatively large and protruding tympanal areas slightly lighter in color. Wings clear, with the costal margin yellowish to beyond the middle of the wing and then clouded; the subcostal vein is dark brown. First and second transverse veins clouded. Membranule of the fore wings pinkish at base; those of the hind wings more gray. Beneath yellowish and more or less pruinose; black about the eyes and pink on each side of the transverse rugæ; a few black spots near the base of the legs. The opercula are short, do not touch and have the extremities obliquely rounded. The uncus viewed in profile has a relatively large pro-

tubercle extending backward from its central portion, below which the extremity is bent inward in the form of a claw. Viewed from behind, it is seen that the uncus is divided longitudinally and that it ends in two claws separated considerably and from between which the penis protrudes.



*Cicada arizona*

MEASUREMENTS (IN MILLIMETERS).

	Male Type
Length of body .....	17
Width of head across eyes .....	7
Expanse of fore wings .....	5.2
Greatest width of fore wing .....	7.5
Greatest width of operculum .....	4
Greatest length of operculum .....	3

In addition to the type which is figured, five males have been examined, all from the Santa Rita Mts., Arizona, collected by Prof. F. H. Snow and in the collection of the University of Kansas.

*Cicada eugraphica* new species.

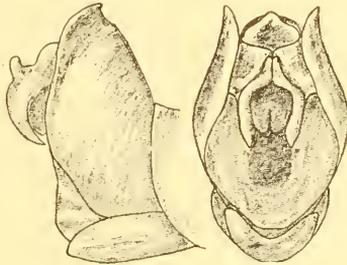
Type male, Albuquerque, Bernalillo Co., New Mexico. Davis collection.

Allotype female, Barstow, Ward Co., Tex., July 20, 1905 (J. C. Crawford). Collection U. S. National Museum.

An orange and black species with clear wings.

Head black with an orange spot above the base of each antenna and a larger one each side nearer the eyes; also one each side contiguous to the hind margin. The transverse rugæ are blackened, orange at the sides and an orange spot on the front; no longitudinal impressed line. Pronotum orange and black, the central longitudinal stripe conspicuously orange, with a dissected black band each side which is widened anteriorly and posteriorly; grooves blackened; collar orange, irregularly blackened along the front margin, also at the humeral angles. Mesonotum with four obconical black spots, the

inner pair short, the outer pair longer and extending backward to the elevated x; there is also a black stripe extending along each side from the x to the base of each fore wing. Between the x and the two central obconical spots there is an irregular cross-shaped spot, and the two depressed black points, common to many species, and near the anterior extremities of the x, are also present. The x and lighter lines on the mesonotum are orange. The tergum is a very dark brown; the segments narrowly edged with orange posteriorly, and the lateral grooves extending down the sides from the dorsal line are noticeable. The fore wings have their costal margins orange for about half of their length, beyond which they are blackened; the subcostal veins are very dark brown. The first and second cross veins of the fore wings are not clouded; both pairs of wings are orange at the base with the flaps grayish white. Beneath lighter colored, the legs orange, streaked and spotted with testaceous. The abdomen with the segments darkened along each side. Opercula light orange, a little less than half as long as the abdomen, and rounded



*Cicada eugraphica*

at the extremities, the inner edges touching or nearly so. Uncus when viewed in profile showing a considerable protuberance extending backward from its central portion, below which it terminates as a curved claw bent inward; when seen from behind of the wish-bone shape, stouter and with the extremities more bent toward each other than in the next species.

MEASUREMENTS (IN MILLIMETERS.)

	Male Type.	Female Allotype.
Length of body .....	2.2	2.3
Width of head across eyes .....	8.5	9.5
Expanse of fore wings .....	62	70
Greatest width of fore wing .....	9.5	11
Greatest width of operculum .....	5.5	
Greatest length of operculum .....	5	

In addition to the type, which is figured, and allotype, the following specimens have been examined:

Marfa, Presidio Co., Tex., June 5, 1908, three males (Mitchell and Cushman). Coll. U. S. Nat. Museum.

Van Horn, Culberson Co., Tex., June 19, 1909, male (F. C. Bishopp). Coll. U. S. Nat. Museum.

Barstow, Ward Co., Tex., July 22, 1905, male (J. C. Crawford). Coll. U. S. Nat. Museum.

Mesilla, Dona Ana Co., New Mex., July 1, 1897, male and female. Coll. Prof. A. P. Morse.

Alamogordo, Otero Co., New Mex., seven males (G. v. Krockow). Coll. Am. Museum Natural History.

Graham Mts., Ash Creek, Arizona, alt. 3,200 ft., May 30, 1914, male (E. G. Holt). Coll. U. S. Biological Survey.

Graham Mts., Arizona, June 29, 1914, male (E. G. Holt). Coll. U. S. Biological Survey.

San Bernardino Ranch, Cochise Co., Arizona, 3,750 ft., Aug., male (F. H. Snow). Coll. University of Kans.

Douglas, Cochise Co., Arizona, Aug., male (F. H. Snow). Coll. University of Kans.

*Cicada cugraphica* is sometimes labeled in collections *Cicada vitripennis* Say which it resembles, but this last is a much lighter colored and greener insect with the fore wings narrower, and the uncus, when seen in profile, with the curved claw more slender. *Cicada vitripennis* also occurs more to the eastward.

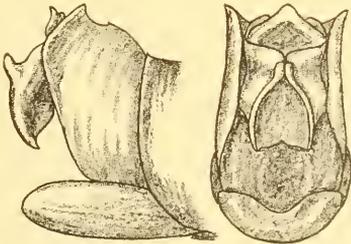
This is not the Mexican *Cicada crucifera* Walker, in which the second marginal areolet is very much longer than the first, whereas in *cugraphica* the first is much longer than the second.

***Cicada texana*** new species.

Type male, Lyford, Cameron Co., Texas, Aug. 6-7, 1912 (Rehn and Hebard). Davis collection.

Head with the black band that extends between the eyes in many species here broken up into spots as follows: the region about the ocelli is black, there is a black spot on each side of this and there is black about the eyes. The transverse rugæ are streaked with black and there is a green spot centrally on the front. The remainder of the head is greenish or yellowish green. Pronotum yellowish green with a central, longitudinal broad stripe of a lighter green. On either side of this are two interrupted black stripes with their extremities broadened at the anterior margin. Beyond this the furrows are blackened. The hind margin or collar is uniformly green in color in the type and three of the paratypes; in the fourth there is a brownish point each side

near the humeral angles. Mesonotum with two short obconical black spots at the fore margin, on either side of which there is a much dissected dark band, broadest anteriorly and extending backward to the extremities of the elevated x; there is also a dark stripe extending along each side from the x to the base of the fore wings. There is an irregular cross-shaped spot between the x and the two central obconical spots, and the two depressed black points, common to many species, and near the anterior extremities of the x are also present. The x and lighter lines on the mesonotum are yellowish in the type, but the x is greener in the paratypes. The tergum is testaceous; the tympanal areas lighter, each darkly clouded near its center, and the segments are lighter in color along their posterior margins. The dorsal surface is more or less covered with a short, silken, light-colored pubescence. The fore wings have the costal margins greenish yellow for about half of their length, beyond which they are blackened; the subcostal veins are dark brown. The first and second cross veins of the fore wings are clouded, and the flaps at the base of both fore and hind wings are whitish or grayish white. Beneath lighter colored and pruinose, blackened about the eyes, the legs yellowish, streaked and spotted with testaceous. The abdomen nearly uniformly colored except the darker spot on the last ventral segment and a linear one on the valve; segments slightly darkened along the base. Opercula yellowish, a little less than half the length of the abdomen and rounded at the extremities, the inner edges almost touching. Uncus when viewed in profile with the inner edge not



*Cicada texana*

deeply notched, as in some species, but more rounded with the extremities bent inward, and when viewed from behind the hard raised portion resembles in shape a widely arched wish-bone. In *Cicada sordidata* Uhler the uncus, when viewed in profile, has the claw-like extremities freer and bent inward to a greater extent, and when viewed from behind the wish-bone arch is not as wide.

## MEASUREMENTS (IN MILLIMETERS).

	Male Type.
Length of body .....	22
Width of head across eyes .....	8.5
Expanse of fore wings .....	58
Greatest width of fore wing .....	9
Greatest width of operculum .....	4.5
Greatest length of operculum .....	5

In addition to the type, which is figured, and which is a rather small individual, the following specimens have been examined:

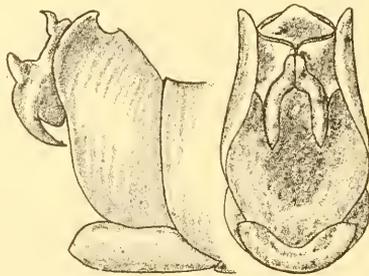
San Benito, Cameron Co., Tex., fifteen males. Davis collection.

Brownsville, Cameron Co., Tex., three males (F. H. Snow).  
Coll. University of Kans.

*Cicada texana* closely resembles *Cicada sordidata* Uhler from Florida and Georgia, but may be separated from that species by the differently shaped uncus, by the less prominent grooves extending laterally down the sides of the abdominal segments and by having a somewhat brighter color pattern. There also seems to be, judging from the material at hand, some constant differences in color.

*Cicada olympusa* Walker.

*Cicada sordidata* Uhler, was described in the Transactions of the Maryland Academy of Sciences, 1892, p. 175, from two males from Southern Florida. We figure a male from Big Pine Key, Fla., Sept.



*Cicada sordidata*

19, 1913, that has been compared with one marked "S. Fla." in Uhler's collection in the United States Nat. Museum, and labeled in his handwriting "*Cicada sordidata*." This was no doubt one of his

types. His published description is very full and among other things he says that the first three apical areoles of the fore wings "including the veins and cross veins smoke-brown." This is subject to some variation, though the first and second cross veins are always clouded in mature specimens. He says: "Opercula short, pale, but little more than one-third the length of the abdomen, narrowing toward the tip, and rounded there; the tips widely separated by a wedge-shaped space; the drums completely covered by an inflated segment, with a wide interval between, which is occupied at the outer end by a smooth hump. The raised smooth line thus begun is continued back upon the succeeding tergal segments, and from each prominence a grooved line extends outwards to the border of the segments."

*Cicada olympusa* Walker was described in 1850, but no locality was given. It has been credited to North America by Distant. The description would seem to cover *Cicada sordidata* which is of the same size and we have been unable to find any other species in collections that fits it so well. Walker says in part: "scutcheon of the fore-chest [prothorax] adorned with four black stripes; the middle pair long, widened on the fore border and on the hind border; the outer pair short and slightly curved; furrows and sides blackish; hind scutcheon [hind margin or collar] green, widened, rounded and adorned with a large pitchy mark at the base of each fore-wing, nearly straight on each side: scutcheon of the middle chest [mesonotum] adorned with four obconical black stripes; inner pair short with tawny borders; outer pair much longer, excavated into eight separate parts; a large black spot with a black dot on each side between the inner pair and the cross-ridge . . . fore borders of the [abdominal] segments adorned with pitchy interrupted bands; overduct ferruginous: drums pale tawny, very small, far apart; inner sides pitchy."

If it is meant that the extremities of the opercula are far apart then the above description agrees with *sordidata*, in which, however, the upper and inner edges of the opercula touch or nearly so.

*Cicada milvus* was described by Walker in 1858 from a single female from the "United States" and has been placed by Distant as a synonym of *Cicada olympusa*. Walker describes *milvus* as reddish tawny and says in part: "Prothorax with four black stripes, the

inner pair approximate, connected by a short black band in front, the outer pair very near the borders; two black discal dots; hind border greenish. Mesothorax with four conical black stripes, the inner pair short, the outer pair much intersected. Abdomen with an interrupted black band on each segment. Wings vitreous; veins pale green, black towards the tips. Fore wings with the first and second transverse veins clouded with dark brown." The wings are said to expand 27 lines, that is about 57 mm.

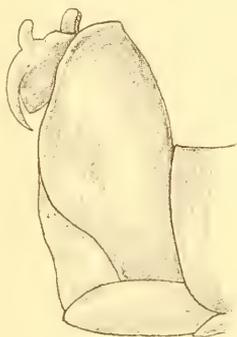
*Cicada viridifascia* Walker.

*Cicada sordidata* has been placed by Distant as a synonym of *Cicada viridifascia*, but this last is a larger insect, about the size of *Cicada reperta* Uhler. *Cicada viridifascia* was described in 1850 without locality. Walker says in part: "wings colorless; fore border tawny for half the length, black from thence till near the tip; veins tawny; cross-veins and adjoining parts of the longitudinal veins tawny; primitive areolet partly brown; fore-flaps whitish, as are also the hind-flaps at the base. Length of the body 11-12 lines [24-26 mm.]; of the wings [expanse] 33-34 lines [70-72 mm.]." This as well as the remainder of the description covers fairly well *Cicada reperta* Uhler, which has been found along the Atlantic coast from North Carolina to Southern Florida, but it does not cover *Cicada sordidata*, which has the first and second cross veins in the fore wings clouded and expands about 60-65 mm.

*Cicada vitripennis* Say.

What we have identified as this species is an insect with green in its coloring as mentioned by its describer; not entirely orange and black as in *Cicada cugraphica* from further west. Say says that the insect was presented to him by Mr. Nuttall "from the Arkansaw," and we figure a reddish green female collected by Mr. Alanson Skinner, July, 1914, at Perkins, Oklahoma, as probably from somewhere near the type locality. We have three additional specimens, all males and a little smaller of what appear to be of the same species, collected by Mr. W. J. Gerhard in July at Miller, Indiana, and Clark Junction, Indiana. Though a number of collections have been examined no species that so well fits Say's description has so far been found, but future collecting in the region from which the type came, may add to our knowledge in this particular.

A male *Cicada erratica* from Shreveport, La., kindly loaned by Prof. Herbert Osborn, its describer, is also figured. It is one of the seven males from which the original description was made and the figure here given of the genitalia will further serve in identifying the species. The genitalia of this insect is like that of the three much



*Cicada erratica*

smaller males from Indiana, mentioned above. We have a number of specimens of *erratica* from Logtown, La., June (E. S. Tucker, La. Agri. Exp. Sta.); Palmyra Island, about thirty miles below Vicksburg, Miss., June (R. N. Lobdell); Agri. College, Miss., July (H. E. Cox), and Scotts, Ark., August (John M. Moose, Jr.). The last three were kindly sent to me by Prof. R. W. Harned, to whom I am indebted for many cicadas. In the collection of the U. S. National Museum there is a female from Alexandria, La., June 22, 1910 (E. S. Tucker), and Prof. Harned has a specimen collected at Rosebloom, Miss., in August, 1915.

From present information we think that these related insects should be arranged as follows:

Species with first and second cross veins infuscated.

*Cicada olympusa* Walker, 1850.

*Cicada miltus* Walker, 1858.

*Cicada sordidata* Uhler, 1892.

*Cicada texana* Davis.

Species with clear wings.

*Cicada eugraphica* Davis.

*Cicada viridifascia* Walker, 1850.

*Cicada reperta* Uhler, 1892.

*Cicada vitripennis* Say, 1830.

*Cicada erratica* Osborn, 1906.

It will be noted that the above arrangement is not in accord with that to be found in Genera Insectorum where some of the species mentioned are in the genus *Rihana* and others in *Cicada*. However, all of the species mentioned above have a general likeness, and if the uncus is examined it will be found to be of the wish-bone pattern. We think that all the species with the uncus simple, as for example *linnei*, *lyricen*, *similaris*, *pruinosa*, *sayi*, *canicularis*, *davisi*, *marginata*, *auletes*, *resh*, *figurata*, *resonans*, *superba* and others might well be placed in *Rihana*, or in some genus to separate them from those with the wish-bone shaped uncus, which we have here placed in *Cicada*. This would necessitate the removal of *Cicada dorsata* Say, as it appears in Genera Insectorum, to the genus *Rihana*, for it has a simple uncus and we think that this should be done. It is a very easy matter to relax a male cicada and pull out the genitalia with a pin so that part will dry in a position where it can be examined. In this way the genera *Rihana* or *Tibicen*, and *Cicada*, can be separated more satisfactorily than by comparing the relative length of the head with the space between the eyes.

***Cicada delicata* Osborn.**

We figure one of the five typical males of this distinct species, from Cameron, Cameron Co., La., which Prof. Herbert Osborn has kindly sent to us for comparison.

The following records may be added:

Brownsville, Tex., June, four males, one female (F. H. Snow). Coll. University of Kans., and Davis collection.

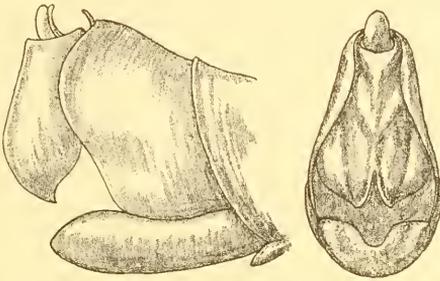
Katherine, Willacy Co., Tex., Aug. 8, 1912, female (Rehn and Hebard). Davis collection.

Del Rio, Valverde Co., Tex., 900-1,100 ft., Aug. 22, 23, 1912, male (Rehn and Hebard). Davis collection.

***Cicada hieroglyphica* Say.**

This species was described in 1830 by Say, who says that it "Inhabits Pennsylvania and New Jersey," but is "rather rare." There are localities in the Pine Barrens, however, as for example Lake-

hurst, N. J., where in late June and in July it is often very common, and on warm days the songs of the numerous individuals constitute an almost continuous performance. We figure a male from Lakehurst, which will give a good idea of its size, form and wing pattern. The head, pronotum and mesonotum are tawny, tinged with green and marked with black as mentioned by Say; the abdomen tawny, narrowly lined between the tympana with black; a short longitudinal line on the dorsum of the second segment, the basal half of the last segment and most of the supra-anal plate, are also black. There is a conspicuous black spot behind each eye, not mentioned by Say, and



*Cicada hieroglyphica*

the black marks on the head, pronotum and prothorax are well defined. In the writer's collection there are specimens of this species, in form and markings like those from New Jersey, from Southern Pines, N. C., Clayton, Ga., Grand Bay, Mobile Co., Ala., and Osyka, Pike Co., Miss.

E. F. Germar in Thon, *Entomologisches Archiv*, 11, 2, p. 4 [should have been p. 40], 1830, gives a description of *Cicada characterica*, which he says inhabits Georgia, America. The description is short but it covers *Cicada hieroglyphica*, and from the locality given there seems to be no doubt but what that was the species intended. This description has been overlooked of late years and has not been brought to the attention of entomologists, the name not appearing in *Genera Insectorum*. The question arises which name has priority as both *Cicada hieroglyphica* and *Cicada characterica* are recorded as having been proposed in 1830. Say's description appeared in the *Journal of the Academy of Natural Sciences of Philadelphia* and

pages 179-244, which include his paper, were not published until August 1830, or later.

*Cicada johannis* Walker.

This was described in 1850, and St. John's Bluff, Florida, is given as the type locality. *Johannis* has been placed by Distant as a synonym of *Cicada hieroglyphica* and it probably is only a race. It, however, presents some differences and the writer for some time has regarded specimens from Florida as separable from typical *hieroglyphica*. In specimens otherwise of the same size the distance across the head at the eyes is generally greater than in New Jersey individuals, and the marks on the head, pronotum and mesonotum are more in the nature of black spots and dashes than of continuous lines. The black spot behind each eye is reduced to a narrow basal line in *johannis* and below the transverse black band on the front the region of the rugæ is unicolorous. In *hieroglyphica* there is usually a dark line running down the median groove of the transverse rugæ. There are a number of other color differences that are quite constant. We have a male from Carrot Island, near Beaufort, N. C., June 23, 1913 (F. Harper), that is marked like the specimens from Florida, showing that we may expect *johannis* along the coast. A male of *Cicada johannis* from La Grange, Brevard Co., Florida, is figured.

A few pages further on in the same publication where *Cicada johannis* was described, namely in the "List of the Specimens of Homopterous Insects in the Collection of the British Museum," Part 1, Walker describes *Cicada sex-guttata* without locality. He says the wings expand 30 lines instead of 26-28 lines as in *johannis* and that the tympana (he calls them opercula) are small instead of large as in *johannis*. His lengthy description of the color pattern fits the Florida species quite as well as any of the others here considered and many specimens from Florida are also of the size of his *sex-guttata*. This species has been placed by Distant as a synonym of *hieroglyphica*, but when large collections have been made some locality may yield specimens to fit the description.

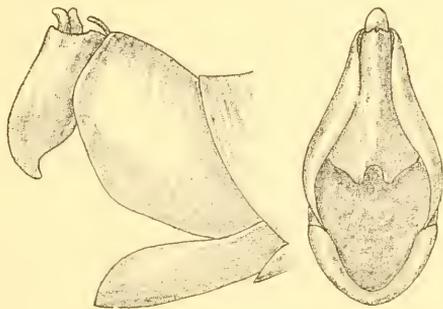
*Cicada chisos* new species.

Type male, Chisos Mts., Brewster Co., Texas, June 10-12, 1908 (Mitchell and Cushman). Collection U. S. Nat. Museum.

Allotype female, same locality and date. Davis collection.

Closely resembles *Cicada hieroglyphica* in markings, but is larger and has differently shaped fore wings, opercula and genitalia.

Head greenish tawny with a black spot each side slightly above the base of each antenna and adjoining the upper transverse rugæ. Front without any median groove at the upper portion of the transverse rugæ, its place being taken by an oblong greenish orange spot, rounded at the top and pointed at the bottom; each side the ridges of the rugæ are greenish orange and the grooves blackened. The region about the ocelli is included in a broad, somewhat U-shaped black mark, each side of which there is a large, curved, black spot extending toward the eye. There is a black mark on the inner side of each eye which extends backward so that the area behind each eye is wholly black. Pronotum greenish tawny, the central area occupied by two parallel black irregular marks widened before and behind until they meet, leaving a central dart-shaped area of a lighter color, the point of which points backward and extends to the collar. Each side of the two central marks there is a short, parallel irregular black stripe and the grooves are blackened. The hind margin or collar has on each side on its anterior edge, but nearer the humeral angles, a short black mark and on each humeral angle there is a broad curved black band extending to the eye. The mesothorax has extending backward from its fore margin seven black marks, the central one a narrow stripe extending backward nearly to the x. The next two marks on either side of the central one extend backward for nearly one half of the length of the pronotum; next comes a short spot with posterior end pointed and then the outer broad, black stripe extending backward nearly to the x and having a curved spot adjoining it at almost right angles. The x has a spot at each of its anterior extremities, otherwise it is greenish tawny like the rest of the mesonotum. The hind border is slightly more excavated at the x than in either *hieroglyphica* or *johannis*. Abdomen tawny, narrowly lined between the tympana with black; the basal half of the last segment and the supra-anal plate also black. The region of each spiracle is slightly clouded. The tympana are small with their anterior margins rounded and not covering the openings as



*Cicada chisos*

completely as in *hieroglyphica* and *johannis*. Beneath lighter, nearly unicolorous; black about the base of the rostrum; also at the base of the abdomen and each side near its tip. There are a few dark spots on the legs. The opercula are small and are more fully rounded out, that is, the outer margin of each one forms more nearly a part of a circle than in *hieroglyphica*. The uncus, which is figured, when seen from behind is broadly notched with the upper part of the notch rounded, and not narrowly notched as in *hieroglyphica*.

## MEASUREMENTS (IN MILLIMETERS.)

	Male Type.	Female Allotype.
Length of body .....	27	22
Width of head across eyes .....	8	8
Expanse of fore wings .....	68	67
Greatest width of fore wing .....	11	10
Greatest width of operculum .....	3.5	
Greatest length of operculum .....	3	

In addition to the types the male of which is figured and will show the wing pattern, two paratypic males of the same date and locality have been examined. There are also many more specimens from the same locality in the collection of the U. S. Nat. Museum.

From *Cicada sex-guttata* of unknown locality, *Cicada chisos* differs in being larger, and in having a different color pattern on the head, pronotum and mesonotum. In Biol. Centr.-Amer., Rhynch. Hom. 1. Tab. 3, Figs. 2, 2a and 2b, a Mexican specimen is figured under the name of *Tettigia hieroglyphica* Say. With the exception of the shape of the opercula, which are fully rounded in *Cicada chisos*, the illustrations represent quite well the species under consideration.

## EXPLANATION OF PLATES.

## PLATE III.

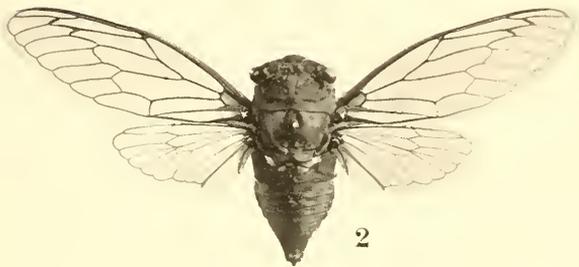
- Fig. 1. *Cicada figurata* Walker.  
 Fig. 2. *Cicada canicularis* Harris.  
 Fig. 3. *Cicada davisii* Smith and Grossbeck.  
 Fig. 4. *Cicada aurifera* Say.

## PLATE IV.

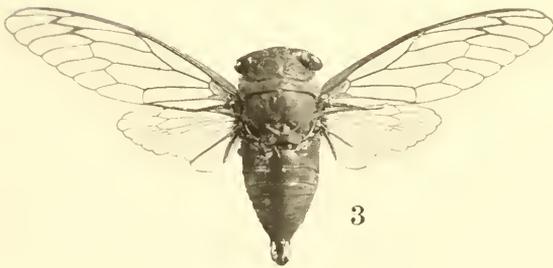
- Fig. 1. *Cicada townsendi* Uhler. Type.  
 Fig. 2. *Cicada townsendi* Uhler.  
 Fig. 3. *Cicada bifida* Davis. Type.  
 Fig. 4. *Cicada bifida* Davis, enlarged.  
 Fig. 5. *Cicada castanea* Davis, enlarged.



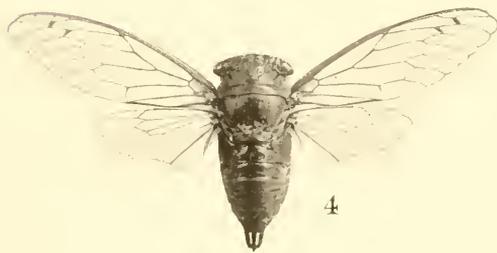
1



2



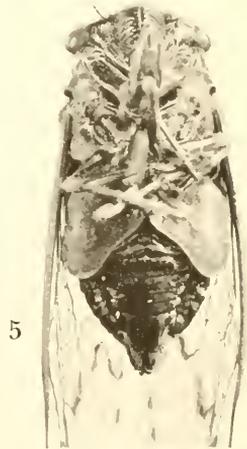
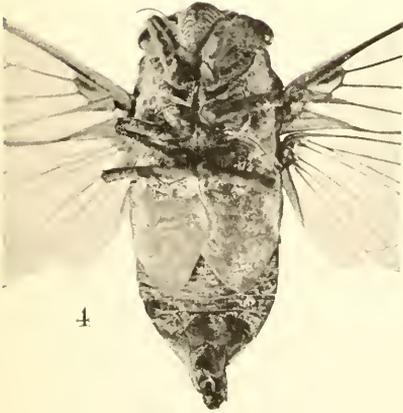
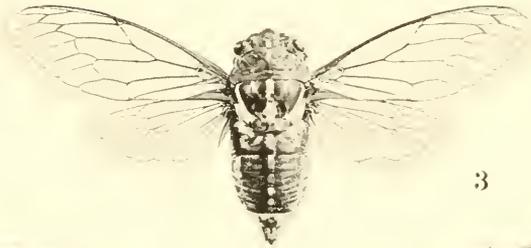
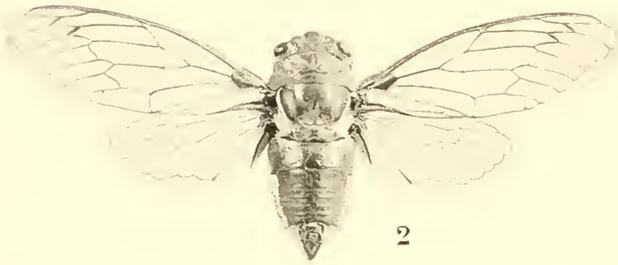
3



4

Cicadidæ.





Cicadidæ.





1



2



3



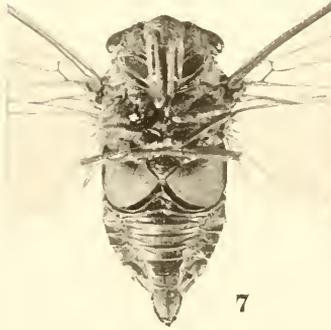
4



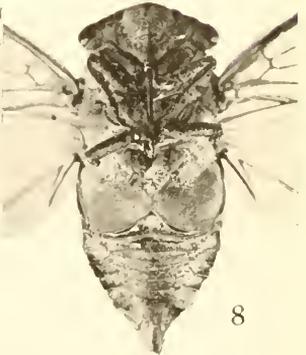
5



6



7



8

Cicadidæ.





1



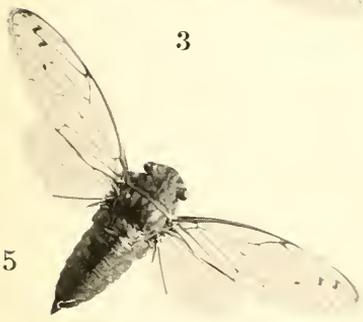
3



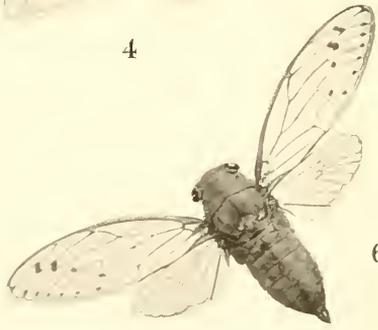
2



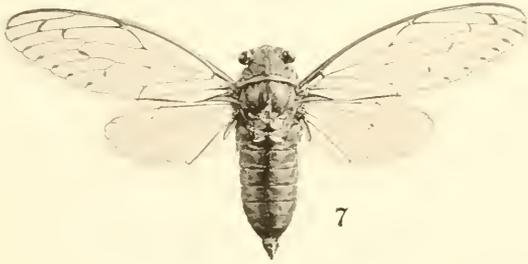
4



5



6



7

Cicadidæ.



PLATE V.

- Fig. 1. *Cicada castanea* Davis. Type.
- Fig. 2. *Cicada arizona* Davis. Type.
- Fig. 3. *Cicada eugraphica* Davis. Type.
- Fig. 4. *Cicada texana* Davis. Type.
- Fig. 5. *Cicada sordidata* Uhler.
- Fig. 6. *Cicada arizona* Davis, enlarged.
- Fig. 7. *Cicada eugraphica* Davis, enlarged.
- Fig. 8. *Cicada texana* Davis, enlarged.

PLATE VI.

- Fig. 1. *Cicada reperta* Uhler.
- Fig. 2. *Cicada delicata* Osborn.
- Fig. 3. *Cicada vitripennis* Say.
- Fig. 4. *Cicada erratica* Osborn.
- Fig. 5. *Cicada hieroglyphica* Say.
- Fig. 6. *Cicada johannis* Walker.
- Fig. 7. *Cicada chisos* Davis. Type.











TWO NEW CICADAS BELONGING TO THE GENUS  
OKANAGANA

BY WM. T. DAVIS

[Reprinted from the JOURNAL OF THE NEW YORK ENTOMOLOGICAL SOCIETY, Vol.  
XXIV, No. 3, September, 1916.]



## TWO NEW CICADAS BELONGING TO THE GENUS OKANAGANA.

By WM. T. DAVIS,

NEW BRIGHTON, STATEN ISLAND, N. Y.

Through the courtesy of Mr. Edward P. Van Duzee I am enabled to describe a new species of *Okanagana* from Oregon. The fifteen specimens examined came originally from the Oregon Agricultural College and Experiment Station, Corvallis, Oregon.

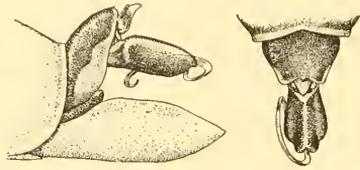
### *Okanagana oregona* new species.

Type male, Mary's Peak, Oregon, July 18, 1903. Davis collection.

Allotype female, Corvallis, Oregon, June 4. Collection Edw. P. Van Duzee.

Head as broad as the front margin of the pronotum; front not much produced. Median sulcus of the front deep and well defined. Pronotum with the humeral angles rounded and the anterior angles rather prominent. Opercula oblique with the extremities not as rounded as in some species of the genus. Last ventral segment with the base about as long as the sides which gradually converge to the rounded extremity. Uncus when viewed in profil-

sinuated but not hooked at the end; when viewed from above broadened out



and then constricted before the extremity which is notched. Basal areole of the fore wings clear or very little clouded, oblong, square at apex. Costa of the fore wings yellowish to beyond the middle, then fuscous; flaps at base of wings bright red; the dark clouded spot at base of cubital cell, common to many species, is not present, there is, however, the usual black spot at the extreme base of the wing. Hind wings entirely bright red at base, the red edged outwardly with irregular clouded spots. The dorsum partly covered with short golden hairs, especially on the abdomen, while the underside is clothed with rather long silky hairs. Head black with the supra-antennal plates, a band, expanded at the extremities extending transversely before the front ocellus, and the median groove leading from the ocellus to the hind margin, yellowish. Beneath, the head is black in the region of the transverse rugæ, margined with yellowish. Pronotum black, margined all around, but very narrowly in front, with yellowish. Metanotum black, posteriorly margined with yellowish. Dorsum of the abdomen black, the segments edged posteriorly with reddish. Uncus black. Beneath, pale, including the valve, with black spots and stripes about the legs. There are some conspicuous black markings at the base of the abdomen, and more than the terminal half of the rostrum is shining black.

MEASUREMENTS (IN MILLIMETERS).

	Male type.	Female allotype
Length of body .....	20	19
Width of head across eyes .....	6	6
Expanse of fore wings .....	48	50
Greatest width of fore wing .....	8	8.5
Greatest width of operculum .....	2.5	
Length of valve .....	4	

In addition to the type which is figured and allotype, the following specimens have been examined: Corvallis, Oregon, June 29, 1896, female; June, 1906, male (Buchanan); May 27, female (Currin); July 9, male; August, female. Mary's Peak, Oregon, July 18, 1903, three males (Gellatly). Eugene, Oregon, June 10, 1905, male (Foster). Crooked River, Oregon, June 23, 1906, male and female in copulation; also female marked 1906. Philomath, Oregon, September 14, 1906, male.

Accompanying these specimens there is a pupa 20 mm. in length and 6 mm. across the eyes. It is an *Okanagana* pupa and probably belongs to this species. The long series of specimens shows this to be a distinct species. It is not the *Cicada occidentalis* described by Francis Walker in *The Naturalist in Vancouver Island and British Columbia* by John Keast Lord, London, 1866, which is a much larger insect with different markings.

From the collection of the University of Kansas I have received for study through the kindness of Prof. S. J. Hunter and Mr. R. H. Beamer, a female *Okanagana* that differs considerably from other members of the genus known to me.

***Okanagana rotundifrons* new species.**

Type, female, Congress Junction, Yavapai Co., Arizona, July (F. H. Snow).

A shining black and yellowish species with a conspicuously blunt and rounded front.

Head as broad as the front margin of the prothorax; the front blunt and rounded; the median sulcus broad and shallow. Pronotum with the humeral angles rounded, and the anterior angles both rounded and deflexed. The last ventral segment is broadly and deeply notched. Fore wings with the basal areole oblong, square at apex, and very clear; venation, including the costal and subcostal veins, shining black, except along the inner margins of the costal and subcostal veins and at the base of the wings, which is straw colored. Flaps of the fore wings pinkish in color; of the hind wings also pinkish but including a fuscous dash. Head above shining black, the supra-antennal plates yellowish except close to the eyes and the transverse groove above the front also yellowish. The front is shining black except a well defined line bordering the sides at the edge of the transverse rugæ. Pronotum shining black, the hind margin and median sulcus yellowish, the remainder of the surface intricately mottled with yellowish and black. Mesonotum shining black, with the hind margin narrowly yellowish, also a yellowish spot near the base of each fore wing. The W-mark is nearly obliterated, only the outer lines showing faintly. Metanotum black with the posterior margin yellowish. Dorsum of the abdomen shining black with the hind margins of all the segments edged with yellowish. Beneath, the legs are black, touched, particularly at the joints and narrowly along the sides, with yellowish; each abdominal segment is shining black at the base and yellowish on the posterior margin. The yellowish areas, both above and below, are also shining.

MEASUREMENTS (IN MILLIMETERS).

	Female type.
Length of body .....	25
Width of head across eyes .....	8
Expanse of fore wings .....	71
Greatest width of fore wing .....	11.5

While the type is so far the only known specimen, this species may be easily separated from all the other described members of the genus by the peculiarly blunt and rounded front and shining black and yellowish surface.

## EXPLANATION OF PLATE II.

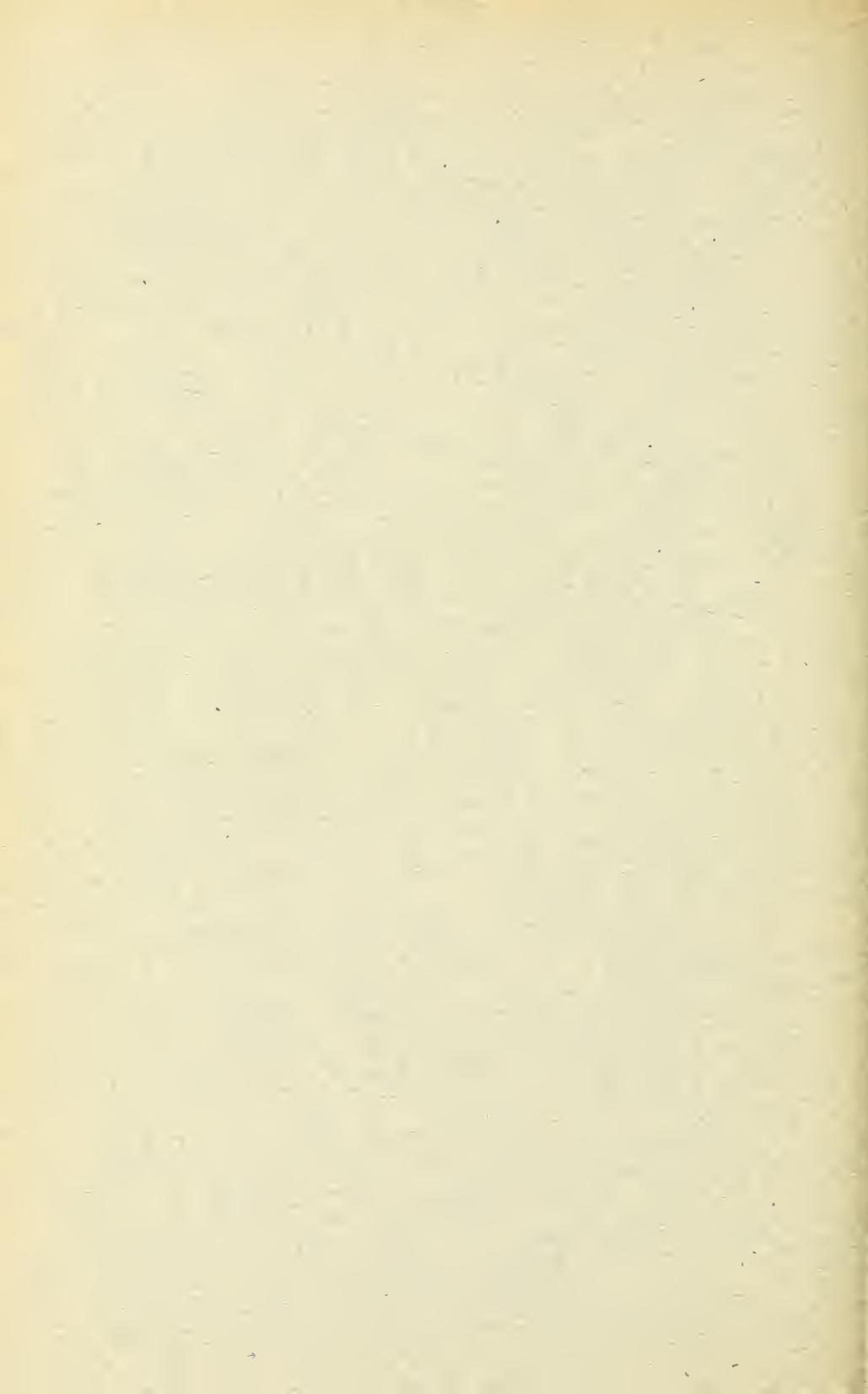
- Fig. 1. *Okanagana oregona* Davis. Type.  
Fig. 2. *Okanagana rotundifrons* Davis. Type.  
Fig. 3. *Okanagana rotundifrons* greatly enlarged to show rounded front.



*Cicadidæ.*







TWO NEW CICADAS FROM LOWER CALIFORNIA,  
MEXICO

BY WM. T. DAVIS

[Reprinted from the JOURNAL OF THE NEW YORK ENTOMOLOGICAL SOCIETY, Vol.  
XXV, No. 1, March, 1917.]



## TWO NEW CICADAS FROM LOWER CALIFORNIA, MEXICO.

BY WM. T. DAVIS,

NEW BRIGHTON, STATEN ISLAND, N. Y.

The descriptions here presented have been made possible through the kindness of Professor Myron H. Swenk, of the University of Nebraska, who has permitted me to examine a number of interesting species from the collection of that institution.

In the Transactions of the Maryland Academy of Science, 1892, p. 163, Prof. P. R. Uhler described *Tibicen blaisdelli* from the vicinity of San Diego, California. Distant later placed the species in his genus *Okanagana*, of which he designated *rimosa* Say as type.

In "A Preliminary List of the Hemiptera of San Diego County, California." Transactions of the San Diego Society of Natural History, Vol. 2, p. 47, October, 1914, Mr. E. P. Van Duzee described *Okanagana distanti* with varieties *truncata* and *pallida* as closely related to *blaisdelli*. The type locality for *distanti* and varieties is San Diego, Calif., and vicinity.

In "A Preliminary Review of the West Coast Cicadidæ," Journal N. Y. Ento. Society, Vol. XXIII, p. 31, March, 1915, Mr. Van Duzee proposed the genus *Clidophleps* to include the known species *blaisdelli* Uhler, and *distanti*, the latter being designated as type. In the original description of *blaisdelli* in 1892 Uhler pointed out the peculiar form of the radial and adjoining cells and stated that a new genus might be erected, the "elongation and expansion of these cells" suggesting a close relation with *Platypedia*.

The original description of *blaisdelli* contains the following: ". . . the radial cell large, wide, reaching beyond the middle of the wing-cover and its bent apex forming the base of three ulnar cells, the cell below the radial one [median] is narrow throughout one half of its length, and beyond this it is greatly expanded towards its triangular tip, the cell next below this [cubital] is shorter, but quite wide, with its inner vein strongly arched, and with a kind of triangular fuscous nodus bounding its outer end." In *C. distanti* as well as its varieties ". . . the greatly thickened and nodose transverse vein

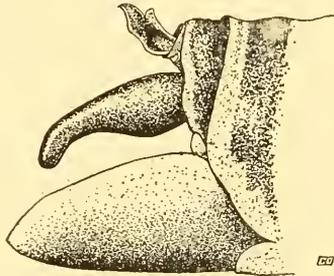
at the apex of the clavus" is a prominent feature according to Van Duzee.

The following, while clearly a *Clidophleps*, lacks some of the prominent characters of the two species of the genus so far described.

*Clidophleps astigma* new species.

Type, male, San Fernando, Lower California, Mexico, May, 1889 (W. E. Bryant). Collection, University of Nebraska.

Head as broad as the front margin of the pronotum; front considerably produced, much more so than in *distanti*. Median sulcus of the front well defined. Pronotum with the humeral angles rounded; the anterior angles also rounded and rather prominent. The opercula with the extremities rounded. Last ventral segment rounded and slightly emarginate at apex. Uncus when viewed in profile bent downward at extremity and deeply sinuated on the lower



*Clidophleps astigma*

surface of the apical half. Basal areolæ of the fore wings clear. Costa of the fore wings narrowly margined with brown, membranes orange. Hind wings with membranes lighter colored and clouded. The fore wings are proportionately narrower than in *distanti*, the costal margins are more evenly curved, the central portions are not so much bulged outward, or upward if the wings are expanded, and the "triangular fuscus nodus" at the outer end of the cubital cell is reduced to a mere thickened vein. Head black with the supra-antennal plates and triangular area behind the middle ocellus yellow. Beneath, the head is black margined with yellow on each side of the transverse rugæ. In some of the paratypes the median sulcus is yellowish. Pronotum narrowly margined with yellow and with a narrow yellow stripe about one millimeter in width extending from the front margins to the hind margin, on either side of which there is a large irregular brownish colored area clouded along the depressions. Mesonotum black with an irregular yellow spot near the base of each fore wing; the mesothoracic cross is yellowish, as are two narrow and curved spots near its front extremities. On either side between the cross

and the spot at base of wing there is an elongate spot in the type and paratypes not present in any specimens of *blaisdelli* or *distanti* so far examined, nor mentioned in the description of those species. The W-mark at the fore margin has but the outer lines present. Metanotum black, the hind margin and sides yellowish. Dorsum of the abdomen black with the hind margins of all of the segments edged with yellow. Beneath, the legs are yellow lined with black on the tarsi, tibiæ and femora, the fore tibiæ being nearly all black. Each abdominal segment is black centrally at base and yellowish on the posterior margin and sides, each yellow side area includes a clouded spot. The last ventral segment has the posterior half yellow and the valve is yellowish clouded centrally with fuscous.

## MEASUREMENTS (IN MILLIMETERS).

	Male Type.
Length of body .....	21
Width of head across eyes .....	6
Expanse of fore wings .....	54
Greatest width of fore wing .....	8
Greatest width of operculum .....	1.5
Length of valve .....	3.5

In addition to the type, three other males collected at the same locality and at the same time have been examined. The smallest has an expanse of wings of 44 millimeters but otherwise closely resembles the type. The almost total obliteration of the stigma at the end of the cubital cell will serve to separate this species from the two others in the genus. It also has narrower fore wings and more prominent front than *distanti*, and the veins of both pairs of wings are not as stout and black as in *blaisdelli*. As San Fernando in Lower California, Mexico, is only a little over two hundred miles south of San Diego County, California, *C. astigma* will very likely be found within the limits of the United States.

The following additional records of specimens of *Clidophleps* in the author's collection or examined by him may be of interest.

**C. blaisdelli** Uhler.

San Diego Co., Calif., June 20, 1913. Mr. Van Duzee states that this specimen was collected at Alpine from the chaparral. It is figured on plate 2. fig. 1.

**C. distanti** Van Duzee.

San Diego Co., Calif., May 24, 1914, four males, July 22, 1914, female (E. P. Van Duzee).

**C. *distanti* var. *truncata*** Van Duzee.

San Diego Co., Calif., June 28, 1913, male cotype (Van Duzee); San Diego, Calif., June 27, 1915, male (W. S. Wright); San Diego, Calif., male.

**C. *distanti* var. *pallida*** Van Duzee.

San Diego Co., Calif., June 14, 1913, male cotype (Van Duzee); Sequoia Nat. Park, Calif., August 6, 1915, 1,700 ft. two males (J. C. Bradley).

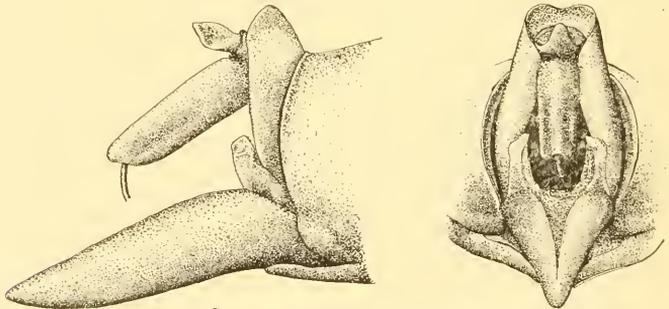
I am indebted to Mr. Van Duzee for identified specimens of his *C. distanti* and its varieties, also for the loan of the male *C. blaisdelli*.

One of the most noticeable species of *Okanagana* that we have seen is represented in the collection of the University of Nebraska by four individuals, three males and a female, all bearing the locality label "Lower California?" From its colors the species is probably an inhabitant of an arid or semi-arid region.

***Okanagana aurantiaca*** new species.

Type male and allotype female from Lower California? Collection, University of Nebraska.

Head rather small and not quite as broad as the front margin of the pronotum; front moderately produced. Median sulcus of the front well defined. Pronotum with the humeral angles rounded and the anterior angles rather prominent. Opercula with the extremities rounded, especially on the outer side. Uncus when viewed in profile not hooked at the end; when viewed



*Okanagana aurantiaca*

from above tapering to the extremity. The last ventral segment in the type is rounded at the extremity, also in one of the paratypes, while in the other paratype, it is not so much rounded and is sinuated. In the allotype the last ventral segment is broadly and deeply notched. Basal areolæ of the fore





FIG. 1.



FIG. 2.



FIG. 3.



FIG. 4.

Cicadidæ.

wings clear. The veins of both the fore and hind wings are orange in color except those of the marginal cells which are inconspicuously darkened; the membranes at the base of both pairs of wings are also orange colored and only slightly brighter colored than the veins. The head is orange both above and below, with a fuscous spot on the front and a broken black band extending between the eyes; the tip of the rostrum and the terminal joints of the antennæ are fuscous. Pronotum orange with four linear fuscous marks, on each side of the median groove anteriorly, and two dots centrally near the posterior margin. In one of the paratypes the two anterior streaks are wanting. Mesonotum orange with a central broken band of black extending on to the mesothoracic cross; anteriorly there are about three irregular clouded fuscous spots on each side of the central, blackened area, and near the base of each fore wing there is a black streak. Metanotum orange blackened near the base of each hind wing, and with a central black spot, a continuation of the dorsal band of the mesonotum. Dorsum of the abdomen orange with a median black spot on each segment, the spots gradually growing smaller toward the extremity of the body. Beneath orange with two inconspicuous black spots at the base of each wing, both the fore and hind pairs, also small and inconspicuous fuscous spots near the base of the legs. There is a dark cloud centrally at the base of the abdomen beneath, except in the allotype, which has the abdomen all orange. All of the legs are orange except the claws, which are fuscous.

## MEASUREMENTS (IN MILLIMETERS).

	Male Type.	Female Allotype.
Length of body .....	23	23
Width of head across eyes .....	6	6
Expanse of fore wings .....	52	64
Greatest width of fore wing .....	9	10
Greatest width of operculum .....	2.5	
Length of valve .....	5	

A glance at this insect gives one the impression of an entirely orange-colored cicada with a black band between the eyes, and a conspicuous dorsal band of the same color extending from the hind margin of the pronotum to the end of the abdomen.

## EXPLANATION OF PLATE 2.

- Fig. 1. *Clidophleps blaisdelli* Uhler.  
 Fig. 2. *Clidophleps distanti* var. *truncata* Van Duzee.  
 Fig. 3. *Clidophleps astigma* Davis.  
 Fig. 4. *Okanagana aurantiaca* Davis.











SONORAN CICADAS COLLECTED BY HARRY H.  
KNIGHT, DR. JOSEPH BEQUAERT AND OTHERS,  
WITH DESCRIPTIONS OF NEW SPECIES.

By WM. T. DAVIS,

[Reprinted from the JOURNAL OF THE NEW YORK ENTOMOLOGICAL SOCIETY,  
Vol. XXV, No. 4, December, 1917.]



[Reprinted from JOURNAL OF THE NEW YORK ENTOMOLOGICAL SOCIETY. Vol.  
XXV, No. 4, December, 1917.]

SONORAN CICADAS COLLECTED BY HARRY H.  
KNIGHT, DR. JOSEPH BEQUAERT AND OTHERS,  
WITH DESCRIPTIONS OF NEW SPECIES.

BY WM. T. DAVIS,

NEW BRIGHTON, STATEN ISLAND, N. Y.

Mr. Harry H. Knight and Dr. Joseph Bequaert were members of the Cornell University Biological Expedition, organized by Prof. J. Chester Bradley, that started by automobile from Ithaca, New York, in May, and reached California in August, 1917. Both of these gentlemen collected what cicadas they were able to find as the journey progressed, and have kindly turned them over to me. They form an interesting collection and I have been unable to identify two of them with descriptions of species mentioned in *Biologia Centrali-Americana*, or previously known from the United States. These are here described as new, together with two others from the same general region that I have from other sources. A new *Okanagana* from California is also described.

Of the fourteen species here placed in the genus *Tibicen*, only the first seven, in the opinion of the author, really belong there. In the remaining seven the uncus is wish-bone shaped instead of simple, and the first cross vein of the fore wing does not, as a rule, start as far back or near to the base of the wing from radius 3, as it does in the species having the simple uncus. The last seven species here referred to, and others of like character, will no doubt in due time be assigned to one of the genera already described, but they do not belong to the genus *Cicada*, where they would fall in Distant's arrangement by the shape of the head, for Mr. Van Duzee has pointed out in the Bulletin

of the Buffalo Society of Nat. Sciences, June, 1912, and in the Canadian Entomologist for November, 1914, that the genus as so restricted does not include any of the original Linnean species of *Cicada*.

***Tibicen pruinosa* Say.**

Wharton, Texas, June 24, 1917, male (H. H. K.).

***Tibicen marginalis* Walker (*marginata* Say).**

Wharton, Texas, June 24, 1917, male, and Victoria, Texas, June 25, 1917, male (H. H. K.).

***Tibicen superba* Fitch.**

Wharton, Texas, June 24, 1917, male; Sutherland Springs, Texas, June 26, 1917, male, and New Braunfels, Texas, June 28, 1917, female (H. H. K.).

***Tibicen montezuma* Distant.**

Comstock, Texas, July 3, 1917, male (H. H. K.).

This specimen agrees well with the figure and description in Biol. Centr.-Amer., as does a male from Gatesville, Texas, July 16, 1888, in the collection of the U. S. Nat. Museum.

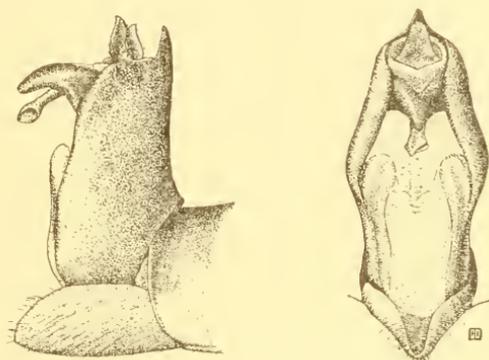
***Tibicen inauditus* new species.**

Type male from west of Vega, Oldham County, Texas, July 15, 1917 (Miss McGill). Davis collection.

A black and light orange or straw-colored species, with rather prominent eyes, and a conspicuous pruinose spot on each side of the abdomen.

Head above black with the following marks light orange-colored: a spot on the rather prominent front, a triangular one just behind this, two small ones (one larger than the other) above each antenna, and an irregular one each side of the ocelli at the back of the head. Pronotum black with the anterior margin faintly touched with light orange; the posterior margin more broadly so, the light band being about one half a millimeter in width. The anterior angles are light orange, and the tops of the raised portions, occupying the central part of the pronotum, are orange-colored and darker than the margins. Mesonotum black with a well defined pruinose stripe on each side near the base of the wings. The hind margin is light orange including the ridges of the elevated X. The central portion is occupied by two light spots at the extremities of the X, and anterior to the depressions there are four others, the two central spots being curved and the outer ones more rounded. Tergum black with two pruinose spots at the base, one large one each side below the tympanum, and the eighth segment also conspicuously pruinose. The posterior edge of each segment is narrowly edged with light orange.

Fore wings with the costal margins straw-colored to the end of the radial cells, beyond darkened; subcostal veins black; first and second cross veins infuscated. The basal cell of each fore wing contains a conspicuous black, longitudinal mark, with the posterior portion of the cell nearly clear. The flaps of both fore and hind wings are grayish in color. Beneath light straw-colored, with what dark margins there are about the head, nearly concealed by pruinose. The transverse rugæ are orange with the sides black and the hollows well filled with white silken hairs. There are also many hairs in the rather shallow median sulcus, and longer ones under the eyes. The legs are straw-colored, inconspicuously touched and lined with black. The opercula, straw-colored with the extremities rounded and the inner margins



*Tibicen inauditus.*

not overlapping. The last ventral segment slightly truncate at extremity. The valve also straw-colored. The external parts of the genitalia nearly all black.

MEASUREMENTS (IN MILLIMETERS).

	Male Type
Length of body .....	23
Width of head across eyes .....	9
Expanse of fore wings .....	67
Greatest width of operculum .....	5
Greatest length of operculum .....	5

In addition to the type, two other males were collected by Miss Mildred McGill during an automobile trip. She writes as follows: "They were collected close to the Ozark Trail, which leads through Glenrio, Tex., to Las Vegas, N. M. As you know it is mostly planes in this part of the country and it was in what is called the Cap Rocks which are pretty high and except for grass are barren on top. But

in the canyons there are large cottonwood and hackberry trees and grape vines. Along the rough, rugged sides of the canyon are cedars and small bushes, that are called here skunk bushes, and soap-weeds, or bear grass. It was on these small bushes and bear grass that I captured the cicadas. It was about 2.30 or 3 P. M. I located them by their singing, which was very shrill."

**Tibicen** species?

Black Canyon near Bumble Bee, Arizona, July 30, 1917, female (H. H. K.). I have no male with which to compare this specimen, and it is therefore doubtfully placed, but it resembles *Tibicen inauditus*, though larger.

**Tibicen duryi** new species.

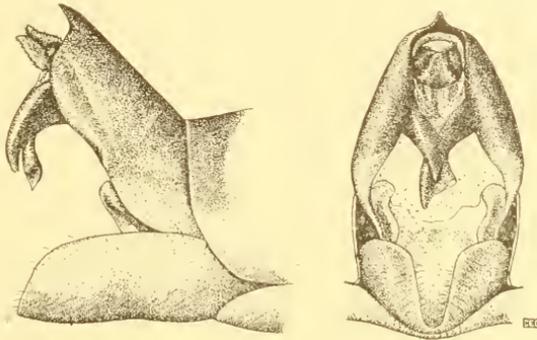
Type male, Jemez Springs, New Mexico, 7,000 ft., June 27, 1917 (John Woodgate). Davis collection.

Allotype female, Box Canyon, Grant County, June, 1912 (Charles Dury). Davis collection.

A black and reddish species much resembling an *Okanagana* in coloring, especially when the wings are closed. The head at the eyes not much broader than the front margin of the pronotum.

Head above black with the following marks deep orange in color: a spot on front, a somewhat triangularly shaped one just behind this, one above each antenna, and one irregular spot each side of the ocelli at the back of the head extending to back of the eyes. Pronotum black margined with orange, and slightly broader so on the posterior margin than on the anterior and sides. The tops of the raised portions occupying the central part of the pronotum are deep orange-colored and darker than the margins. Mesonotum black with a pruinose spot each side near the anterior margin (sometimes nearly obliterated), and a pruinose stripe each side near the base of the wings. The hind margin, the elevated portion of the  $\times$ , two spots at the extremities of the  $\times$ , and four spots (two inner curved) beyond the depression, orange. Tergum black with two pruinose spots at the base, one large one each side below the tympanum on the third segment, and also more or less conspicuously pruinose on the eighth segment. The posterior margins of all of the segments, except the first and second, narrowly lined with red, which is conspicuously broadened on the eighth segment of the female. The female from Fort Grant, Arizona, has a blacker dorsum, but the hind margin of the eighth segment is conspicuously red. Fore wing with the costal margin straw-colored to the end of the wing; subcostal vein black; first and second cross veins infuscated. The basal cell of each fore wing with about the outer half conspicuously blackened; more clear at base. The wings are red at base, including the flaps of both the fore and hind pair. There are

also some conspicuous black markings interspersed with the red at the base of the wings. Beneath orange, with what dark markings there are about the head nearly concealed by pruinose and silvery hairs. The transverse rugæ are black; the legs are orange conspicuously streaked with black. The



*Tibicen duryi*.

opercula orange, with the extremities rounded and the inner margins overlapping. The last ventral segment orange, narrowed and somewhat rounded at the extremity. The valve also orange-colored. The external parts of the genitalia nearly all black.

MEASUREMENTS (IN MILLIMETERS).

	Male Type.	Female Allotype
Length of body .....	28.	26.
Width of head across eyes .....	10.	9.5
Expanse of fore wings .....	73.	74.
Greatest width of fore wing .....	11.5	11.5
Greatest width of operculum .....	6.	
Greatest length of operculum .....	6.	

In addition to the type and allotype the following specimens have been examined:

Jemez Springs, New Mexico, July 12, 1916, 7,500 ft., female; June 15, 1917, 7,000 ft., female; July 22, 1917, 6,400 ft., male, all collected by John Woodgate. Post Creek Canyon, Fort Grant, Arizona, July 17, 1917, female (Dr. Joseph Bequaert). This last is a large specimen with wings expanding 82 millimeters. All of the above are in the author's collection.

Though this cicada resembles *Tibicen townsendi* and *Tibicen bifida*, the opercula are not as long as in either of those species, the

front is not as prominent as in *townsendi* and the genitalia differ. See illustrations in JOURNAL N. Y. ENTO. SOC., March, 1916.

Mr. Charles Dury, of Cincinnati, Ohio, who has sent me many insects, presented me with my first specimen a number of years ago, and I take pleasure in naming the species in honor of my friend.

**Tibicen castanea** Davis.

Bonita, Arizona, Pinaleno Mts., July 16, 1917, five males (H. H. K.). Post Creek Canyon, Fort Grant, Arizona, July 17, 1917, female (J. B.).

This species was described from Arizona in the JOURNAL N. Y. ENTOMOLOGICAL SOCIETY for March, 1916, where illustrations will be found.

**Tibicen knighti** new species.

Type male from Santa Catalina Mts., Tucson, Arizona, July 23, 1917 (Harry H. Knight). Davis collection.

Head above black with a dark yellowish spot each side between the antenna and the eye and an irregular one each side of the ocelli at the back of the head and extending to back of the eye. Pronotum blackish, shining, with the posterior marginal band olive colored, the band extending along the sides to the anterior angles, the posterior angles of the pronotum, however, are fuscous. Mesonotum shining chocolate-colored, the elevated  $\times$  olive,



*Tibicen knighti*.

and the sides of that color also to the base of the fore wings where there is an orange spot seen only when the insect is expanded. The outer sides of the W-mark are faintly outlined in part with olive. Tergum shining, the tympanal areas rather conspicuous and chocolate-colored. The succeeding segments blacker with the posterior margins faintly chocolate-colored. Last segment with a pruinose spot each side, and more conspicuously chocolate-colored than segments three to seven. Fore wing with the costal margin yellowish to the end of the radial cell, darker beyond; subcostal vein black;

first and second cross veins slightly infuscated. The basal cell of each fore wing nearly clear, but blackened along the anterior margin. The flaps of both fore and hind wings are gray in color. Beneath pruinose, black about the eyes, where there are some long, silken, white hairs. The transverse rugæ are yellowish and somewhat blackened where they join the shallow frontal sulcus. The legs are chocolate-colored with lighter spots and dashes, the hind pair being lighter colored than the other two pair. The opercula are pruinose, the lower extremities of the inner margins not quite touching, and the ends rounded. The ventral segments are dark chocolate-colored, central ones being lighter posteriorly. The last segment is rounded at the extremity and the valve is black. The external parts of the genitalia chocolate-colored and black.

MEASUREMENTS (IN MILLIMETERS).

	Male Type
Length of body .....	24.
Width of head across eyes .....	9.5
Expanse of fore wings .....	70.
Greatest width of operculum .....	5.
Greatest length of operculum .....	4.5

In addition to the type four other males were collected on rocky slopes at the same time and place. Mr. Knight says: "This form has a most unusual song; resembles loud rasping of an Acridid grasshopper; rasps and intervals about equal." This species resembles in form, in color, and in shining appearance the much smaller *Tibicen arizona* from the Santa Rita Mts., Arizona, described and figured in the JOURNAL N. Y. ENTO. Soc., March, 1916. It also resembles somewhat in form, though not in color, the figure of *Cicada psophis* in Biol. Centr.-Amer., but it does not agree with Walker's original description.

I take great pleasure in naming this insect after Mr. Harry H. Knight, who spent much time in collecting cicadas for me, as the records in this paper will attest, and who has also sent to me many other specimens on former occasions.

*Tibicen delicata* Osborn.

Laguna, Texas, Nueces River, July 2, 1917, on *Bignonia*, the desert willow, 5 males, 1 female, and Sheffield, Texas, Pecos River, July 4, 1917, all collected by Mr. Knight.

This species was figured on plate VI, fig. 2, JOURNAL N. Y. ENTO. Soc., March, 1916, the illustration being made from one of the type

specimens sent to me by Prof. Osborn. The seven individuals here recorded differ from this typical male, and also from the sixteen specimens in the author's collection, in having about the apical fourth of each fore wing more smoky than usual.

***Tibicen cinctifera* Uhler.**

Florence, Arizona, July 29, 1917, fifty-seven males, fourteen females (H. H. K. and J. B.); Black Canyon, Bumble Bee, Arizona, July 31, 1917, male (H. H. K.); Tempe, Arizona, August 1, 1917, four males, two females (J. B.). Grand Canyon, Arizona, Lower Bright Angel trail, August 2, 1917, three males (H. H. K.); Buckeye, Arizona, August 7, 1917, six males, twenty-one females, on poplars along irrigation ditch (H. H. K. and J. B.); Palomas, Arizona, August 8, 1917, three males (H. H. K.). Mr. Knight says of those from Florence: "On mesquite, song continuous, even toned, moderately shrill note."

The above records cover the specimens with the hind margin of the pronotum broadly banded with straw color or greenish, and the costal margin of the fore wing to the end of the radial cell also light colored. There is, however, a variety of a much darker orange color with the hind margin of the pronotum more narrowly banded with orange. For this variety we have the following records:

Del Rio, Texas, Devil's River, July 3, 1917, male; Bonita, Arizona, July 16, 1917, and Tucson, Arizona, Sabin's Canyon, Santa Catalina Mts., July 23, 1917, all collected by Mr. Knight, who states on one of the labels that "this form has a continuous song."

***Tibicen viridifascia* Walker var. *bequaerti* new variety.**

The reasons for believing that Uhler's *Cicada reperta* is a synonym of *Cicada viridifascia* Walker are given on page 58, JOURNAL N. Y. ENTO. SOC., March, 1916.

On August 10, 1916, the author collected a *Tibicen viridifascia*, and heard many more singing at Ft. Monroe, Va., the most northern locality so far known for the species. Southward from Virginia we have numerous records and specimens from along the Atlantic coast to Big Pine Key, Florida. Some of these specimens have been compared with Uhler's *reperta* in his collection in the U. S. Nat Museum, and found to be the same.

From the Gulf coast of Florida we have seen a female collected at

Carrabelle, August 9, 1903, in the collection of Prof. Albert P. Morse. In the author's collection are the following: Baldwin Co., Alabama, July 8, 1917, male collected "in a cypress on the beach by the bay" (H. P. Loding); Ship Island, Miss., August 24, 1915, female (Rehn and Hebard); Mandeville, La., June, 1916, female (H. Edw. Hubert); Timbalier Island, Terre Bonne Co., La., August 12, 1917, two males captured among the black mangroves, *Avicennia nitida* (E. C. Wurzelow). In Texas Mr. Knight collected at Richmond, June 23, 1917, five males, and at Wharton, June 24, 1917, four males. These places are about fifty miles from the coast.

The twenty-five specimens in the author's collection of Uhler's *reperita*, or *viridifascia* Walker, as we think it should be called, from the Atlantic coast, differ in markings from those from the Gulf coast, and still more so from those from Texas. The Atlantic coast specimens are darker with the venation largely orange in color, the disk of the pronotum is black with the elevated portions fulvous as described by Uhler, and the collar, or hind margin of the pronotum, is yellowish, or greenish, in some individuals. The w-mark has the lower extremities of the w quite rounded. The tergum is dark, in most of the twenty-five specimens of a chocolate color. There is the dark area in the basal cell, as described by Uhler.

The specimens from the Gulf coast so far examined are much lighter in color, the disk of the pronotum is not as conspicuously blackened especially along the front margin of the collar; the w-mark has the lower extremities of the w more pointed, and the tergum is more tawny. The nine specimens from Texas are marked like those from along the Gulf coast, the basal cell in the fore wing, however, is clear, slightly touched with black along the fore margin, and the eyes are more prominent than in specimens from the Atlantic coast. The genitalia appear to be alike in all of the specimens. Some of the features mentioned may be seen by a comparison of the figures given on the accompanying plate. We consider that the Gulf coast and especially the Texas examples, constitute a variety for which we propose the name *bequaerti*. As the type of this variety a male from Richmond, Texas, June 23, 1917, has been selected, and is shown on the plate at fig. 6. The male *viridifascia* figured, came from Beaufort, North Carolina.

*Tibicen azteca* Kirk. (*pallida* Distant, preoccupied).

Sutherland Springs, Texas, June 26, 1917, male (H. H. K.).

In the collection of the U. S. National Museum there are three Texas specimens that have been identified as *pallida*, and from the description of the species and figure in *Biologia Centrali-Americana*, the determination is probably correct. We figure one of the National Museum specimens. In addition to the above we can add the following records:

Wichita Falls, Texas, August 16, 1905, female (Prof. A. P. Morse); Foss, Oklahoma, July, 1916, twelve males (Miss Anna Bennett). Miss Bennett writes as follows concerning those she collected: "Found generally in the wheat and oats stubble, but some were found on trees, weeds and bushes. They sing continually, but are quite hard to locate because of their color. I believe we found most of them in the open away from the creeks and canyons."

*Tibicen eugraphica* Davis.

Fort Stockton, Texas, July 5, 1917, eleven males, one female (H. H. K. and J. B.); Chancellor Station, Pecos Co., Texas, July 5, 1917 (H. H. K.); Fabens, Texas, July 9, 1917, four males (J. B.), two males, two females on screw bean (H. H. K.); Mesilla Park, New Mexico, July 11, eight males, two females on edge of desert on mesquite (H. H. K.); Mesilla Park, N. Mex., July 12, five males (J. B.); Aden, N. Mex., July 12, 1917, nine males on desert (H. H. K.); Steins, N. Mex., July 14, 1917, male (J. B.); Aqua Caliente, Arizona, August 7, 1917, two males, one female (J. B.).

The following interesting record may be added to the above: Barber Co., Kansas, 1,468 ft., July 19-21, 1916, eighty males and eleven females (R. H. Beamer). Collection University of Kansas. None in this long series show any indication of green coloring. In Barber Co., *eugraphica* and what I have identified as *vitripennis* Say, occur together. Say mentions green coloring in *vitripennis*, which is true of those from Barber Co., Kans., as well as those from further north and south. *Vitripennis* is proportionally a longer-winged species. *Tibicen eugraphica* was described and figured in the JOURNAL N. Y. ENTO. SOCIETY, March, 1916.

*Cacama valvata* Uhler.

Comstock, Texas, July 3, 1917, male (H. H. K.).

***Proarna venosa* Uhler.**

New Braunfels, Texas, June 27, 1917, three males (H. H. K.); Comstock, Texas, July 3, 1917, eleven males, two females (H. H. K.); Juno, Texas, July 3, 1917, four males (H. H. K.); Pecos River, Sheffield, Texas, July 4, 1917, two males (H. H. K.); Fort Stockton, Texas, July 5, 1917, one male (J. B.). Alamogordo, N. Mex., July 1, 1917, three males (Prof. Wm. M. Wheeler); Aden, N. Mex., July 12, 1917, sixty-six males and seven females "on desert grass" (H. H. K.); Steins, N. Mex., July 14, 1917, one male, one female (H. H. K.).

***Pacarina signifera* Walker.**

Victoria, Texas, June 25, 1917, three males, two females (H. H. K.); Gillette, Texas, June 26, 1917, twenty males and two females on *Prosopis glandulosa* (H. H. K.); Sutherland Springs, Texas, June 26, 1917, four males, two females (H. H. K.); Sabine, Texas, July 1, 1917, at light (J. B.).

The specimens here recorded have been usually identified in the U. S. Nat. Museum and elsewhere, as *Pacarina signifera* Walker, but we are by no means sure that this is correct.

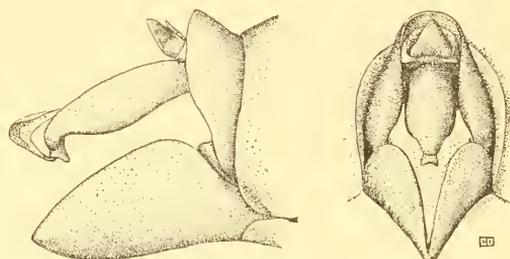
To the foregoing descriptions it may be well to add one of a new species of *Okanagana* from California.

***Okanagana pallidula* new species.**

Type male, Athlone, Merced County, California, August 3, 1917 (Alonso C. Davis). Wm. T. Davis collection.

A yellowish insect, almost unicolorous, with the membrane or flaps at the base of the wings orange. There are two dark spots, one on either side, on the metanotum, and there are faint indications of darker markings in some of the paratypes, but nothing constant. Some of the specimens are greenish yellow (the type is yellowish), and one shows two minute dark dots centrally near the hind margin of the pronotum; also two dark spots are included in the outlined W-mark on the mesonotum. The costal margin of the fore wings, beyond the radial cell, is also generally darkened. Beneath there is a central dark spot at the base of the abdomen, and some dark dots about the base of the legs. In structure the conspicuous feature as seen from above is the cone-like projection of the front, which is more prominent than in either *Okanagana californicus* or *Okanagana vanduzeei* which are

also more hairy beneath. The front of the head is shaped about as in *O. striatipes* from Utah, except that it is even more produced. The basal cell in the fore wing is about as long but narrower than in that species, and the eyes are less prominent. The uncus when viewed in profile is hooked at the extremity as shown in the illustration.



*Okanagana pallidula*

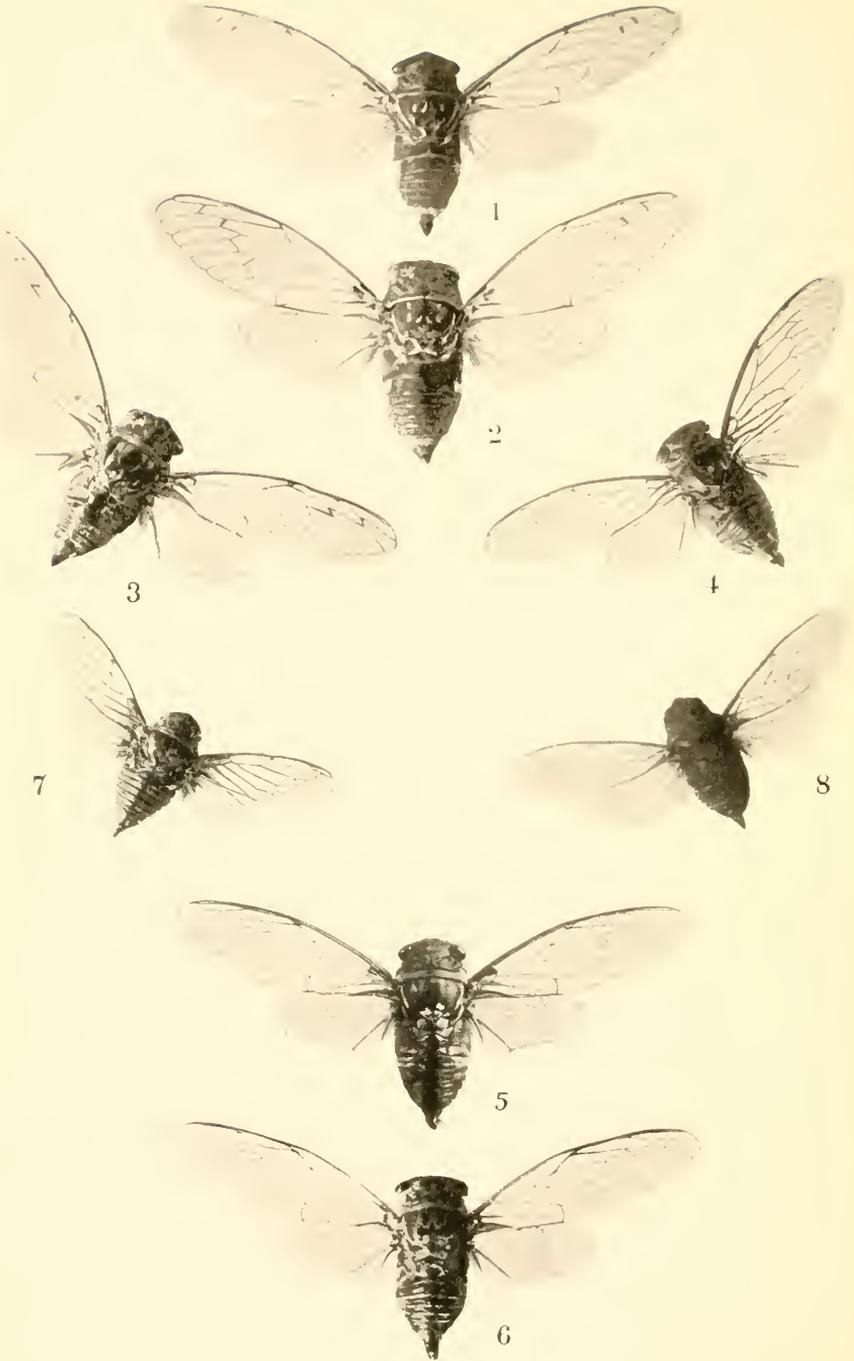
MEASUREMENTS (IN MILLIMETERS).

	Male Type
Length of body .....	19
Width of head across eyes .....	6
Expanse of fore wings .....	52
Greatest width of fore wing .....	8
Greatest width of operculum .....	3
Length of valve .....	3

In addition to the type the following specimens have been examined, all males and collected at Athlone, Merced County, California, in 1917 by Alonzo C. Davis, who says that they "make a zeeee" noise: July 18, one; July 19, one; July 22, two; July 23, three, one greenish individual "singing with his head out of a hole" in the ground; August 12, two.

At first sight the individuals of this species appear to be immature, but as they were captured while singing that supposition is disposed of, and further structural characters separate *pallidula* from its most closely related congeners. While *Okanagana mercedita* Davis, and the nearly related *Okanagana uncinata* Van D., have the front of about the same shape and the uncus hooked, they are much smaller and the venation is also quite different. In those species the radial cell has the front and hind margin more parallel, and the median cell is differently shaped, as may be seen by comparing the figures of





Cicadidæ.

*Okanagana uncinata* and *Okanagana pallidula* on the accompanying plate. *O. mercedita* was figured, JOURNAL N. Y. ENTO. SOC., Vol. XXIII, pl. 3, and through the kindness of Mr. Edw. P. Van Duzee I am now able to figure the type of his *uncinata*.

EXPLANATION OF PLATE XIII.<sup>1</sup>

- Fig. 1. *Tibicen inauditus* Davis. Type.
- Fig. 2. *Tibicen duryi* Davis. Type.
- Fig. 3. *Tibicen knighti* Davis. Type.
- Fig. 4. *Tibicen pallida* Distant.
- Fig. 5. *Tibicen viridifascia* Walker (*reperta* Uhler).
- Fig. 6. *Tibicen viridifascia* Walker var. *bequaerti* Davis.
- Fig. 7. *Okanagana uncinata* Van Duzee. Type.
- Fig. 8. *Okanagana pallidula* Davis. Type.

<sup>1</sup> The drawings for this paper were made by Mr. Chris E. Olsen, and the photographs, from which the plate was made, by Mr. H. H. Cleaves and the author.

---











MISSISSIPPI CICADAS, WITH A KEY TO THE  
SPECIES OF THE SOUTHEASTERN UNITED  
STATES.

BY WM. T. DAVIS

[Reprinted from the JOURNAL OF THE NEW YORK ENTOMOLOGICAL SOCIETY  
Vol. XXVI, Nos. 3-4, September-December, 1918.]



MISSISSIPPI CICADAS, WITH A KEY TO THE  
SPECIES OF THE SOUTHEASTERN UNITED  
STATES.

BY WM. T. DAVIS,  
NEW BRIGHTON, STATEN ISLAND, N. Y.

For several years Professor R. W. Harned has kindly sent to me for identification the cicadas collected by the students of the Mississippi Agricultural and Mechanical College. It has been a pleasure to go over the specimens, and now that records for eighteen species have accumulated, including a new one, it seems desirable to make a list of those known to occur in the state. Mississippi is rich in cicadas, and as far as the present records show, has even more species than Florida. This is easily explained, for some of the western species reach as far eastward as the valley of the Mississippi River. The discovery of the green-colored *Okanagana*, described in this paper, from the delta section of the state, has been a great surprise. It suggests that other unknown forms may still exist and emerge from time to time from their unseen feeding places beneath the sur-

face of the ground. As far as is known this is the first species of *Okanagana* found in the Gulf States east of Texas.

The key to genera and species not only covers the cicadas from Mississippi, but the southeastern United States in general. The only species of the region not occurring in Mississippi are *Tibicen canicularis* (Harris), found at least as far south as Cape May County, New Jersey, and *Tibicen biconica* (Walker) of Florida and the West Indies. These two species are figured as a further aid to their identification.

The *Tettigonia variegata* Fabricius, from "Carolina," has not been identified, owing to faulty description. It may be one of several of our well-known species. Francis Walker described *Cicada resonans*, *Cicada viridifascia*, *Fidicina figurata* and *Fidicina olympusa* without locality, but the species have been credited to North America by Distant in *Genera Insectorum*, who placed them in two instances as synonyms of *Tibicen auletes*. All four names have here been applied to species native to Mississippi and nearby states. It is hoped that this has been done correctly, but whether correctly or not it has seemed preferable to use the names until the matter can be settled, as it will be in time by the growth of more extensive collections, and perhaps by the examination of the specimens described by Walker, if they at this time can surely be identified as his material.

Of the twenty species mentioned in the present paper, sixteen belong to the genus *Tibicen* and are so listed by Mr. Van Duzee in his *Catalogue of the Hemiptera*. The remaining four genera contain but one species each.

Thanks are due to Dr. Wm. H. Wiegmann, of the New York Entomological Society, who has kindly subjected the keys to the test of determining specimens, and it is hoped that they will be found of service.

#### KEY TO GENERA OF CICADAS OF THE SOUTHEASTERN UNITED STATES.

Tympanal coverings concealing tympanal orifices.

Head large and broad, body walls of abdomen thickened; opercula large ..... **Tibicen** Latreille.

Head small, abdomen translucent; opercula very small. . . **Cicada** Linnæus.

Tympanal coverings absent.

Cells of median area of fore wings longer than marginal cells.

Head (including eyes, which are red in life) nearly as broad as base

- of mesonotum. Opercula rather large, nearly touching on inner margin .....**Tibicina** Kolenati.  
 Head, including eyes, much narrower than base of mesonotum. Opercula small with extremities far apart.....**Okanagana** Distant.  
 Cells of median area of fore wings of about the same length or shorter than the marginal cells.  
 Very small species .....**Melampsalta** Kolenati.

KEY TO SPECIES OF THE GENUS **TIBICEN** FOUND IN THE SOUTHEASTERN UNITED STATES.

- A.** Large, heavy bodiéd species; head broad, uncus simple, and first cross vein in the fore wings starting from radius 3 far back, or about one third distant from base of first marginal cell.
- B.** Uncus longer than broad. Black species with green or greenish markings and black area on the central part of the abdomen beneath, except in *sayi*, and new variety of *davisi*.
- C.** Hind margin of pronotum or collar, green or greenish.  
 A narrow irregular area of black on the under side of the abdomen; opercula short and broad, and usually in the males an attenuated, pruinose stripe each side on the dorsum of segment three .....**pruinosa** (Say).  
 Dorsum of abdomen with the hind margin of the segments more or less brown and generally but a trace of pruinose stripe each side on segment three.  
     **pruinosa** var. **winnemanna** (Davis).  
 Dorsum of abdomen shining black with a broad pruinose mark each side on segment three; blackened area on under side of abdomen more in the nature of an even stripe.  
     **pruinosa** var. **latifasciata** (Davis.)  
 A longitudinal band of black on the under side of the abdomen, the opercula more lobate, and the margin of the front wings suddenly bent near the middle.  
     **linnei** (Smith & Grossbeck).  
 A definite longitudinal band of black on the under side of the abdomen; head with the front rather prominent. Not a large species .....**canicularis** (Harris).  
 An irregular band of black on the under side of the abdomen, head rounded in front; a rather small species.  
     **davisi** (Smith & Grossbeck).  
 Abdomen greenish centrally on under side, blackened area wanting, marginal cells of fore wings clouded.  
     **davisi** var. **harnedi** new variety.
- CC.** Hind margin of pronotum or collar black or nearly so (except in *sayi* var. *australis*).
- D.** Central area of the abdomen beneath black.

Opercula long and with the legs usually somewhat chestnut colored; the uncus when seen in profile forked, resembling the open mouth of a snake.

**similaris** (Smith & Grossbeck).

Opercula much shorter, more rounded, and the black area on the under side of the abdomen in the nature of an even stripe. Uncus not forked.

**lyricen** (De Geer).

Blacker than typical *lyricen*, lacking the considerable amount of fulvous markings on the pronotum and mesonotum. A fulvous somewhat anchor-shaped mark centrally on the pronotum.

**lyricen** var. **engelhardti** (Davis).

*DD.* Central area of the abdomen not black beneath, often pruinose, as well as the long opercula.

Collar black, often with a greenish spot each side near the outer angles. . . . . **sayi** (Smith & Grossbeck).

Collar all green or nearly so, as well as the pronotum and mesonotum . . . . . **sayi** var. **australis** (Davis).

*BB.* Uncus broad at the base, triangular in shape and generally about as broad as long. Opercula broad and rounded at the extremities; no definite black area on the central part of the abdomen beneath, usually unicolorus.

*E.* Wings long and narrow, collar 2 mm. or less in breadth at central portions; dorsum of abdomen black or nearly so.

Basal cell of fore wings rusty in color, anal cells (membranes) of both pair of wings gray; usually expands 110 mm. or more . . . . . **resonans** (Walker).

Basal cell of fore wings often black or nearly so, anal cells of both pair of wings yellowish. Expands about 100 mm. . . . . **figurata** (Walker).

*EE.* Wings broad, hind margin of the pronotum or collar green or greenish and more than 2 mm. broad.

*F.* Anal cells or membranes at base of fore and hind wings gray.

Dorsal segments of the abdomen not margined with brown; in fresh specimens the basal segments pruinose, also the terminal segments, leaving the four middle segments black. A large species expanding over 110 mm. . . . . **auletes** (Germar).

*FF.* Anal cells or membranes at base of fore and hind wings light orange, two prominent marks on the mesonotum resembling the Hebrew letter resh inverted.

Fore wings with the first and second cross veins clouded, and the dorsum of the abdomen brownish or brownish black . . . . . **resh** (Haldeman).

Fore wings with the first and second cross veins but

faintly or not at all clouded and the abdominal segments margined posteriorly with brown. In fresh specimens there is usually a median row of white spots on the dorsum of the abdomen. .*marginalis* (Walker).

AA. Small species; uncus wish-bone shaped, and first cross vein in the fore wings starting from about the middle of the first marginal cell.

G. First and second cross veins of fore wings clouded.

Expanse of wings about 90 mm. . . . .*biconica* (Walker).

Expanse of wings about 60 mm. . . . .*olympusa* (Walker).

GG. First and second cross veins of fore wings not clouded, wings clear throughout and expanding about 70 mm.

Head rather large, front rounded, collar greenish or yellowish and contrasted in color rather sharply with the brown and black of pronotum and mesonotum . . . . .*viridifascia* (Walker).

Head proportionately smaller than in the last; front more protruding; collar not so contrastingly colored and fore wings narrower . . . . .*vitripennis* (Say).

#### *Tibicen pruinosa* (Say).

Figured in JOURNAL N. Y. ENTO. SOC., March, 1915, Pl. 2, fig. 2. This is one of the most common species in Mississippi, and forty-two specimens have been examined, twenty-two of them from Agricultural College, Oktibbeha County. The other localities are Iuka, Coldwater, Okolona, Rosebloom, Strongs, Greenville, Starkville, Jackson, Forkville and Norris. The dates of capture range from June to October. So far none have been received from the southern part of the state.

The known distribution of this species is the general region of the valley of the Mississippi as far north as eastern Nebraska, and as far east as Indiana. In the more elevated regions of Virginia, North Carolina and southwestward, the variety *winnemanna* Davis, with the posterior margins of the segments generally brownish, is to be found, while the variety *latifasciata* Davis, with a broad white, pruinose mark on the third abdominal segment, occurs along the Atlantic coast, close to the ocean. These two varieties may possibly be found in Mississippi, the first in the higher parts of the state, and the second along the coast.

The song of *pruinosa* is quite unlike that of any of the other large native cicadas, and may be rendered as *s-zape, s-zape, s-zape*. The insect often remains quiet all day, singing from about 3 or 4 P. M. until dark.

*Tibicen linnei* (Smith & Grossbeck). Pl. VII, fig. 1.

Ratliff, summer, 1915, female (A. McIntosh). There is considerable uncertainty about this specimen, for the reason that locality labels may have become mixed, but as the species occurs in Tennessee there is no reason why it should not occur in Mississippi as well.

The female of this species often closely resembles that of *T. pruinosa*, but in *linnei* the fore wings are abruptly bent near the middle, whereas in *pruinosa* the curve is more regular. The song is very different from that of *pruinosa* and is a continuous *z-ing*, but generally of short duration.

*Tibicen davisii* (Smith & Grossbeck). Pl. VII, fig. 3.

Longview, September, 1916, female (J. H. Oswalt); Vimville, August 2, 1914, female (E. R. Raney); Columbia, July, female (B. Morris); Hattiesburg, August, 1916, male (W. H. Cook); Caesar, summer, 1916, male and female (R. H. Stewart); Anner, July, 1915, male, and summer, 1916, male (H. P. Smith); Long Beach, July 10, 1916, male (W. J. Frederick).

In addition to the above there is a female which represents a variety of *davisii*. We also have two others from Arkansas. This variety may be described as follows:

*Tibicen davisii* var. *harnedi* new variety. Pl. VII, fig. 4.

Type male, Helena, Arkansas, June, 1916 (K. D. Jacob). Davis collection.

Allotype female, Rodney, Jefferson Co., Miss., August, 1917 (O. A. Hammett). Collection, Miss. Agri. and Mechanical College.

More robust than typical *davisii*, with broader wings, the first seven marginal cells of the fore wings being clouded much as in *Tibicen superba* Fitch. The dorsal markings are quite green in color, the central, green, wedge-shaped mark on the pronotum is not separated from the hind margin, but is confluent with it; the collar is bright green. The dorsal surface is less rusty in appearance than in typical *davisii*. Beneath the abdomen is greenish, without the "narrow black portion in the center," as in typical *davisii*.

In addition to the type and allotype we have a female from Hot Springs, Arkansas, September, 1917 (M. R. Harrington).

We figure a typical *T. davisii* from North Carolina, and the type of var. *harnedi*.

## MEASUREMENTS IN MILLIMETERS.

	Male Type.	Female Allotype.
Length of body .....	33	30
Width of head across eyes .....	13.5	14
Expanse of fore wings .....	81	87
Greatest width of fore wing.....	13	13
Greatest width of operculum.....	6	

*Tibicen davisii* occurs throughout the southeastern states as far north as New Jersey. Its song is a continuous *z-ing* of short duration, and is more sharp in tone, though not as loud as that produced by the larger, related black species.

*Tibicen similaris* (Smith & Grossbeck). Pl. VIII, fig. 2.

Agricultural College, October 11, 1914, male, October 14, 1914, female, and "summer," male. Anner, summer, 1916, male (H. P. Smith); Kiln, summer, 1916, male (H. W. Lee).

This species occurs from Mississippi to Virginia, and is very common in parts of Florida, where it may be heard singing in the small turkey oaks and elsewhere. In fresh specimens there is a pruinose lateral mark along the base of the abdomen often observable when the insect is in flight.

*Tibicen lyricen* (De Geer). Pl. VIII, fig. 1.

Red Bank, August, 1917, male (J. G. Kizer); Logtown, summer, 1917, female (A. Lutken); Rienzi, August 23, 1915, male (H. Y. Jumper).

This is a widely distributed insect in the eastern half of the United States, being found from Texas to Florida, and Kansas to Massachusetts. In the higher parts of Virginia, North Carolina, Tennessee and Georgia, the variety *engelhardti* (Davis) is the prevailing form of the species. This is characterized by having the pronotum and mesonotum nearly all black, except for the somewhat anchor-shaped, tawny spot on the former. It will perhaps be found in the uplands of Mississippi.

The song of *lyricen* is a rather monotonous *zing*.

*Tibicen sayi* (Smith & Grossbeck).

Figured in Howard's Insect Book under the name of *tibiccn*, Pl. 27, fig. 20.

This is probably the most common of the large cicadas found in Mississippi, and has been reported from all parts of the state. Eighty-one specimens have been examined, and the dates of capture are from June to September, but it will also be found in October. The localities from which these specimens came arranged from north to south are: Nesbitt, Kossuth, Corinth, Coldwater, Blue Mountain, Sledge, Ratliff, Charleston, Houlika, Pace, Buena Vista, Cleveland, O'Reilly, Pheba, Greenville, Leland, Winona, Vaiden, Long View, Sturgis, Agricultural College, Columbus, McCool, Goodman, DeKalb, Ferns Springs, Flora, Jackson, Forkville, Lake, Vimville, Montrose, Fayette, Ellisville, Columbia, Hattiesburg, McComb, Picayune, Anner and Kiln.

This species is distributed over most of the eastern half of the United States from eastern Texas and Kansas northward to Michigan and New York. We have collected it as far south as the Caloosahatchee River, Florida. The variety *australis* Davis, which is much greener colored, occurs not uncommonly in parts of Florida and Georgia, and should be found in Mississippi.

The song of this species is more impetuous than that of most of the related species, rising to a rapid *zing* and then gradually subsiding.

#### **Tibicen resonans** (Walker).

Figured in JOURNAL N. Y. ENTO. SOC., March, 1915, Pl. 1, fig. 2.

Agricultural College, July 11, 1914, male (G. W. Bacot); October 14, 1914, male (W. E. Vernon); female of no date (J. C. Holton); Ora, July 20, 1914, male (F. Rogers); Laurel, July 17, 1916, female, and August 12, 1916, male (M. G. Dyess); Ellisville, August, 1916, male (O. W. Collins); Clara, July 21, 1916, female (F. B. Pittman); Hattiesburg, August, 1916, female (W. H. Cook) and August 13, 1916, female (T. R. Hearon); Columbia, July, 1915, female (B. Morris); Wiggins, August 16, 1916, male (H. T. Powers). Caesar, summer, 1916, male and three females (R. H. Stewart); Anner, July, 1915, female (H. P. Smith), and male without date (R. H. Stewart); Kiln, summer, 1916, two males (H. W. Lee), and July, 1915, female (A. B. Curet); Ocean Springs, September 13, 1915 (C. E. Wilson).

So far no specimens have been reported from further north than Agricultural College, but as the insect is found in the sand ridges in

North Carolina, there is no reason why it should not occur quite far north in Mississippi, provided soil conditions are right.

**Tibicen figurata** (Walker).

Figured in JOURNAL N. Y. ENTO. SOC., March, 1916, Pl. 3, fig. 1.

Quincy, August 8, 1915, female (K. L. Cockerham); Montgomery Co., summer, female, and July 29, 1916, female (L. J. Liston); Longview, August 30, 1916, female (F. Oswalt); Agricultural College, August, 1916, female (N. C. Oakes), and October 19, 1916, female (C. C. Greer); West, July, 1915, female (F. L. Craft); Meridian, September 10, 1915, female (Rehn & Hebard); Gloster, May 17, 1916 (C. F. Yllander); Anner, summer, 1916, female on pine (H. P. Smith).

So far this species has been examined only from Arkansas, Louisiana, Mississippi, Alabama and Florida.

**Tibicen auletes** (Germar).

Figured in JOURNAL N. Y. ENTO. SOC., March, 1915, Pl. 1, fig. 1; Howard's Insect Book, under name of *marginata*, Pl. 28, fig. 19.

This is an abundant species in Mississippi and forty-seven specimens have been examined, the dates of capture ranging from June to November. The June record is for a female collected at Lake in 1916, by W. C. Parker, and the November 4, 1916, record is a female from Agricultural College, collected by J. E. Vaughn. The other localities are Red Banks, Iuka, Coldwater, Okolona, Webb, Egypt, Walthall, Lexington, Flora, Jackson, Meridian, Stonewall, Ollie, Mount Olive, Ellisville, Laurel, Columbia, Hattiesburg, Moselle, Overt, Picayune, Anner, Gulfport and Ocean Springs.

This species is widely distributed, being found from eastern Kansas and Nebraska to Michigan and Massachusetts, and southward along the coast to Florida.

Its song is monotonous in tone and not loud, considering the size of the insect. It often commences to sing late in the afternoon and continues off and on until dark.

**Tibicen resh** (Haldeman).

Figured in JOURNAL N. Y. ENTO. SOC., March, 1915, Pl. 1, fig. 3.

Greenville, August 17, 1916, male (W. M. Crumpton); Fayette, July 25, 1917 (J. T. Shelton).

Specimens from Kansas, Missouri, Oklahoma, Arkansas, Alabama, Louisiana, and a great many from Texas, have been examined in addition to those mentioned above. The type locality given by Haldeman is "the Great Salt Lake Valley," but no cicada filling the description has been seen by the writer from Utah. In the preface to his article containing the original description, Haldeman states that owing to the small number of insects collected by the Stansbury expedition, specimens from Texas have been included in his paper, so there may be an error in locality. If in time a species from Utah is found that more closely fills the description of *resh*, we still have the name of *robertsonii* Fitch for the Mississippi insect.

***Tibicen marginalis*** (Walker).

*Cicada marginata* Say.

Figured in JOURNAL N. Y. ENTO. SOC., March, 1915, Pl. 2, fig. 1, and December, 1915, Pl. 18, fig. 2.

Nesbitt, August, 1915, male (L. E. Lea), Flora, August, 1916, male (H. B. Greaves); Hattiesburg, September 11, 1915, male and female on willow (Rehn and Hebard); two males with no labels.

This species seems to be more particularly confined to the central part of the United States, reaching northward to Kansas and Iowa, and eastward to western Ohio, Kentucky and Tennessee.

***Tibicen olympusa*** (Walker).

*Cicada sordidata* Uhler.

Figured in JOURNAL N. Y. ENTO. SOC., March, 1916, Pl. 5, fig. 5.

Long Beach, July, 1916, two males (W. J. Frederich). While this is so far the most western record, the insect will probably be found in Louisiana. It is common in Florida, especially near the coast, occurs in southern Georgia, and Mr. H. P. Loding has sent me four males from Mobile, Alabama, collected July 2, 1916.

In this, as well as in probably all the remaining species of *Tibicen* here mentioned, the song may last for a long time. In the present species it much resembles the stridulation of some of the *Neoconocephalus* grasshoppers or Tettigoniidæ.

*Tibicen delicata* (Osborn), found in Louisiana and Texas, may possibly be found also in Mississippi. It is figured in the JOURNAL N. Y. ENTO. SOC., March, 1916, Pl. 6, fig. 2.

**Tibicen viridifascia** (Walker).

*Cicada reberta* Uhler.

Figured in JOURNAL N. Y. ENTO. SOC., March, 1916, Pl. 6, fig. 1.

Long Beach, July, 1916, female (W. J. Frederick); Ship Island, August 24, 1915, female (Rehn and Hebard).

The specimens from Mississippi so far examined belong to the variety *bequaerti* Davis, though not typical, described and figured in the JOURNAL N. Y. ENTO. SOC., December, 1917.

*Tibicen viridifascia* occurs from Virginia southward along the coast, and is quite common in eastern Florida. The song is continuous and may be rendered *zeekie, zeekie, zeekie*.

**Tibicen vitripennis** (Say).

*Cicada erratica* Osborn.

Figured in JOURNAL N. Y. ENTO. SOC., March, 1916, Pl. 6, figs. 3 and 4.

Friar's Point, July 2, 1910, male (E. C. Crockett); Saltillo, summer, female, collected in the middle of a large swampy woods (T. P. Cassidy); Rosebloom, August, 1915, female (Rex Buchanan); Greenville, June, 1916, male and female (W. F. Wheatley); July 12, 1916, female (G. S. Vincent), and August, 1916, female (W. H. McClain); Lexington, September 1, 1916, female (Wm. W. Broome); Vicksburg, July, 1915, female (E. L. Brien), and July, 1916, two females (A. E. Bonnelly); Palmyra, July, 1912, five males and five females (R. N. Lobdell). In addition to the above mentioned Mr. Lobdell has personally sent to the writer three males and two females, also some pupæ and pupæ cases "collected during July at Palmyra Island, Mississippi," which he states is subjected to periods of inundation, so the young insects are evidently able to live in very wet soil.

Prof. R. W. Harned has contributed the following note: "In regard to the distribution of *Tibicen vitripennis* I am inclined to think that this insect will only be found on low ground or in swampy places. This insect seems to be fairly prevalent in what is known as the delta section of Mississippi or the Yazoo-Mississippi Delta. This is the alluvial western part of the state. This species is also fairly abundant in similar soils in Arkansas and Louisiana. The first time that I ever noticed this species was late in June, 1912. I found them quite numerous in fields at Palmyra Island, south of Vicksburg. I

was surprised to find them coming out of the ground several hundred yards away from any perennial plants. They were also emerging from soil that had been under water a few weeks before. The species is quite common in the cotton fields of the delta."

The distribution seems to be confined to the central United States. Specimens have been examined from Mississippi, Louisiana, Arkansas, Oklahoma, Kansas, Nebraska and Indiana.

***Cicada hieroglyphica* Say.**

Figured in JOURNAL N. Y. ENTO. SOC., March, 1916, Pl. 6, fig. 5, and Howard's Insect Book, Pl. 28, fig. 11.

Corinth, summer, 1917, male (R. M. Lancaster). Osyka, June 12, 1914, male (E. A. Morgan); Pascagoula, June 10, 1915, female (R. O. Vaughn).

Occurs from Riverhead, Long Island, N. Y., to eastern Kansas and southward. In peninsular Florida the variety *johannis* Walker replaces the typical form. The black marks on the head, pronotum and mesonotum are more in the form of spots than of continuous lines as in typical *hieroglyphica*.

The song does not continue long, but sometimes, as in the Pine Barrens of New Jersey, the insects appear in numbers, when their united effort produces a considerable noise.

***Tibicina septendecim* (Linnaeus).**

Figured in Howard's Insect Book, Pl. 27, fig. 16.

Only the thirteen-year race is known from Mississippi, and the following notes on distribution within the state have been taken from Bulletin No. 71, U. S. Dept. of Agriculture, Bureau of Entomology, 1907, C. L. Marlatt:

Brood XIX (1907-1920); fairly well distributed over the state.

Brood XXI (1909-1922); recorded from the eastern part of the state only.

Brood XXII (1910-1923); southwestern Mississippi.

Brood XXIII (1911-1924); distributed over the state but particularly in the northern half.

Brood XXIV (1912-1925); recorded from Franklin and Holmes counties.

Brood XXVI (1914-1927); "an outpost in Mississippi is also

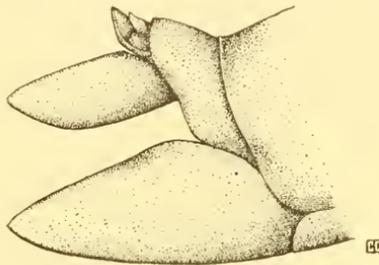
reported by Mr. George H. Kent, Suffolk, Franklin county, who reports their appearance throughout the southwestern portion of the county in the month of May."

Brood XXVII (1915-1928); "a small brood was reported for Franklin County, Miss., as appearing about May 20, 1902, by Mr. George H. Kent, of Suffolk."

Variety *cassinii* (Fisher) is smaller than the typical form, with the ventral surface of the abdomen generally much darker in color.

*Okanagana viridis* new species. Pl. VIII, figs. 4 and 5.

Type male, O'Reilly, Mississippi, July 10, 1917 (Ernest Waldauer)). Davis collection.



*Okanagana viridis*

A green insect, almost unicolorous, with the membranes or flaps at the base of the wings yellowish. The venation of the wings is green, except the costal margin, which is yellowish to the end of the radial cell. The basal cell is nearly clear. There is also a slight indication of yellow about the head, the tympana and the uncus. The front of the head is rounded and not prominent, the eyes are not prominent, and the uncus is straight, as shown in the figure. Beneath the insect is green about the head and fore legs, and yellowish green centrally to the end of the valve. The sides are green. The colors are the same in both the type and allotype. The notch in the last ventral segment of the abdomen of the female is simple, that is not doubly notched as in some species of *Okanagana*.

MEASUREMENTS IN MILLIMETERS.

	Male Type.	Female Allotype.
Length of body . . . . .	25	22
Width of head across eyes . . . . .	7.5	7.6
Expanse of fore wings . . . . .	64	64
Greatest width of fore wing . . . . .	10	10
Greatest width of operculum . . . . .	2	
Length of valve . . . . .	4.5	

Allotype female of same locality and date. Collection Mississippi Agricultural and Mechanical College.

In coloring this is a remarkable species and reminds one of the green phases of *Melampsalta calliope* to be found in Florida and elsewhere. Mr. Waldauer writes as follows of the capture of the insects: "At the time, July 10, 1917, I was working a crew of day hands in a piece of new ground corn, about one mile northwest of the Yazoo and Mississippi Valley railroad station at O'Reilly, Mississippi. One member of my crew was attracted by the singing of one of these insects and knowing that I was making a collection called my attention to the same. Upon investigation I found one of these cicadas on the under side of a blade of corn. This was evidently the male. Near this place in the same field, a few minutes later I found the other."

*Melampsalta calliope* (Walker).

*Cicada parvula* Say.

Figured in Howard's Insect Book, Pl. 28, fig. 8.

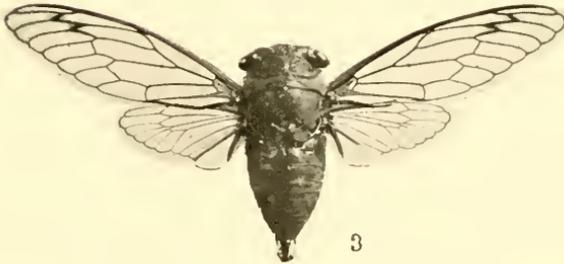
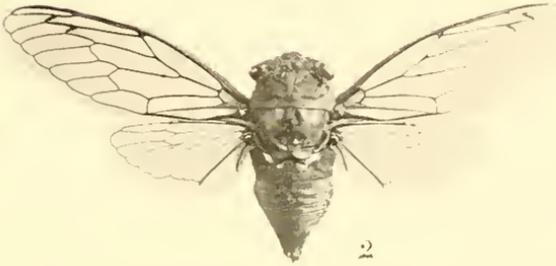
Thirty-one specimens have been examined, the dates of capture ranging from May 14, 1915, at Fontainebleau (J. Chaffin), to August 5, 1916, Hattiesburg (T. R. Hearon). The other localities are: Houlika, Verona, Egypt, Stonewall, Laurel, Columbia, Lucedale, Anner, Caesar, Ocean Springs, Kiln, Long Beach, Nugent and Pascagoula.

This is the smallest cicada occurring in the state, and is rather plentiful, as indicated by the above records. The species has a wide distribution and shows considerable variation. The females are generally a little larger than the males and with broader heads. There are both green and brown individuals. *Cicada calliope* Walker was described from North Carolina; *Cicada parvula* Say was described from Missouri, probably that part of it now included in eastern Kansas.

#### EXPLANATION OF PLATES.

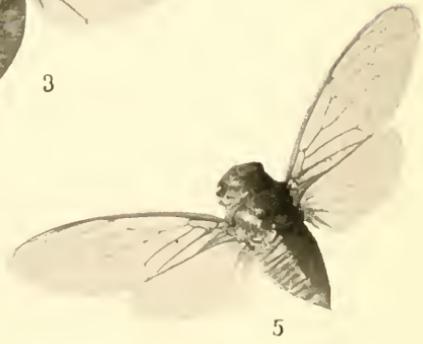
##### Plate VII.

- Fig. 1. *Tibicen linnei* (Smith & Grossbeck).
- Fig. 2. *Tibicen canicularis* (Harris).
- Fig. 3. *Tibicen davisii* (Smith & Grossbeck).
- Fig. 4. *Tibicen davisii* var. *harnedi* Davis. Type.



Cicada.





Cicada.



## Plate VIII.

- Fig. 1. *Tibicen lyricen* (De Geer).  
Fig. 2. *Tibicen similaris* (Smith & Grossbeck).  
Fig. 3. *Tibicen biconica* (Walker).  
Fig. 4. *Okanagana viridis* Davis. Type.  
Fig. 5. *Okanagana viridis* Davis. Allotype.









CICADAS OF THE GENUS CACAMA, WITH DESCRIPTIONS OF SEVERAL NEW SPECIES.

BY WM. T. DAVIS

[Reprinted from the JOURNAL OF THE NEW YORK ENTOMOLOGICAL SOCIETY  
Vol. XXVII, No. 1, March, 1919.]



[Reprinted from JOURNAL OF THE NEW YORK ENTOMOLOGICAL SOCIETY, Vol.  
XXVII, No. 1, March, 1919.]

## CICADAS OF THE GENUS *CACAMA*, WITH DESCRIPTIONS OF SEVERAL NEW SPECIES.

BY W. M. T. DAVIS,

NEW BRIGHTON, STATEN ISLAND, N. Y.

In Genera Insectorum Mr. Distant lists *Cacama maura* Dist. from Mexico and Yucatan; and both *Cacama dissimilis* Dist. and *Cacama longirostris* Dist. from Mexico. These three species were described in 1881 in Biol. Centr.-Amer., *maura* and *longirostris* under the generic name of *Proarna*, and *dissimilis* as a *Cicada*. Uhler's *Proarna valvata* described from Texas and Arizona in 1888 in Entomologica Americana, is listed in that genus in Genera Insectorum, but Mr. Van Duzee removed it to the genus *Cacama* in 1915 (JOURNAL N. Y. ENTO. SOCIETY). In the Transactions of the San Diego

Soc. Nat. Hist., ii, p. 45, 1914, Mr. Van Duzee described *Proarna crepitans* from California, which in 1915 he also removed to the genus *Cacama*. So the genus up to the present has had five known species, three from Mexico and two from the United States.

In *Cacama* the tympanal coverings in the male entirely conceal the orifices, which is also the case in the genus *Tibicen*, but the head including the eyes is much narrower in *Cacama*, being little more than two thirds the width of the mesonotum. The abdomen is broad and much rounded behind; in *Tibicen* it is more tapering. The apical areas of the fore wings in *Cacama* are eight in number, the two lowermost small and somewhat square in shape. In *Tibicen* the two lowest apical areas are not as nearly of the same size, the seventh being much smaller than the eighth.

The type of the genus is *Cacama maura* (Distant), figured in Biol. Centr.-Amer., and also in Genera Insectorum. *Cacama longirostris* is also figured in Biol. Centr.-Amer. The remaining species, including four new ones and a female from Yucatan, which has been identified as *maura*, are figured on the plates accompanying this article. Owing to the lack of specimens available for its preparation the following table for the separation of species is not altogether complete.

#### Genus *Cacama*.

- Rostrum not quite or barely reaching posterior coxæ ..... **A.**  
 Rostrum reaching posterior coxæ or beyond ..... **B.**  
 Rostrum reaching the first abdominal segment ..... **C.**

#### **A.**

- A black species. Basal cell of fore wings usually includes a darkened area near front margin, translucent on hind margin; anal membranes of both pairs of wings grayish, sometimes slightly ochraceous with hind margins gray. First and second transverse veins of fore wings hardly infuscated. Black spot on dorsum of the pale colored eighth abdominal segment of male quadrate. Abdomen above with first segment straw colored or pruinose; beneath straw colored ..... **valvata** (Uhler).  
 Not as dark in color as the last. Basal cell of fore wings ochraceous, translucent in part; anal membranes of both pairs of wings ochraceous. First and second transverse veins of fore wings slightly infuscated. Eighth abdominal segment of male almost entirely black, light colored each side at base and near extremity. Abdomen orange colored beneath. Uncus deeply notched at the extremity ..... **furcata** new species.

Body considerably variegated with ochraceous; basal cell of fore wings ochraceous, translucent in part; anal membranes of both pairs of wings orange. First and second transverse veins of fore wings infuscated. Black spot on dorsum of eighth abdominal segment in male inversely napiform (turnip-shaped) .....**variegata** new species.

Resembles *variegata* in color and size, but with head usually smaller and the narrowed fore wings with outer margin more straight. Basal cell of fore wings nearly clear; first and second cross veins hardly infuscated.

**californica** new species.

**B.**

Basal area of fore wings "slightly ochraceous and opaque": anal membranes of fore and hind wings orange with hind margin gray. First and second transverse veins of the fore wings "scarcely infuscated."

**dissimilis** (Distant).

Resembles *valvata* in being a black species, but has a larger head and is more hairy beneath about the legs. Basal cell of the fore wings blackish, translucent in part; anal membranes of both pairs of wings dark gray, abdomen above, entirely black at base. Dorsum of the eighth abdominal segment of male black with a small pruinose area each side.

**carbonaria** new species.

Basal cell of the fore wings translucent in part; anal membranes of the fore and hind wings orange. First and second transverse veins of the fore wings infuscated .....**crepitans** (Van Duzee).

Basal area of fore and hind wings black, first and second transverse cross veins of the fore wings infuscated .....**maura** (Distant).

**C.**

Basal area of the fore wings black, cell partly clear, first and second cross veins not infuscated .....**longirostris** (Distant).

**Cacama valvata** (Uhler).

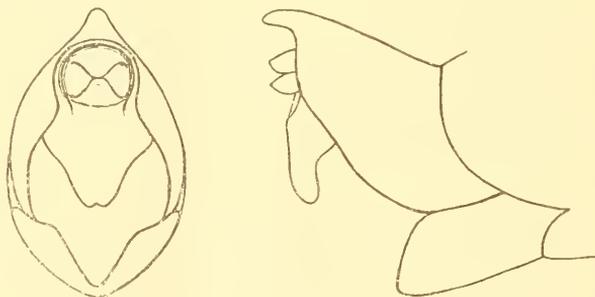
1888. *Proarna valvata* Uhler. Entomologica Americana, IV, p. 84.

Specimens examined: Tascosa, Tex., June, 1918, male (Miss McGill), D's Coll. Pecos River, Tex., May 24, male, U. S. Nat. Mus. Coll. Devil's River, Tex., July 3, 1917, male, Cornell University Coll. Jemez Springs, N. M., 6,400 ft., 15 males, 3 females, June, 1918, and 6 males, 3 females, July 2 and 3, 1918 (John Woodgate), D's Coll. Alamogordo, N. M., June 6 and 7, 1902, Coll. Acad. Nat. Sci. Phil. Pueblo, Col., June 15, 1900, male (Univ. of Kans.), D's Coll. Pueblo, Col., June 15, 1900, 3 females, E. D. Ball Coll. Carson City, Col., July 3, male, D's Coll. Trinidad, Col., June 3, 1910, male (F. C. Bishopp), U. S. Nat. Mus. Coll. Cañon City, Col., July

3, male, U. S. Nat. Mus. Coll. Holly, Col., June 19, 1900, male, E. D. Ball Coll. Coolidge, Col., June 18, 1900, male, E. D. Ball Coll. Ft. Collins, Col., June 28, 1900, male, E. D. Ball Coll. Kanab, Utah, June 24, 1913, male (E. D. Ball), D's Coll. Kanab, Utah, June 24, 1913, two males and female (E. D. Ball), Coll. Dr. Ball. Arizona, male, labeled "*P. valvata* Uhler," by Uhler, U. S. Nat. Museum Coll. Bradsh Mts., Ariz., June 22, 1892, two males, Coll. Oregon Agri. College. Rincon Mts., Ariz., male and female, D's Coll. Nogales, Ariz., July, female (Oslar), D's Coll. Grand Canyon, Ariz., sage bush country half way level in Canyon, June 5, 1915, male (B. B. Fulton), D's Coll. Grand Canyon, Ariz., Indian Garden, June 9, 1916, male (Geo. P. Engelhardt), D's Coll.

The two males from the Grand Canyon are smaller than the others in my collection.

Uhler in the original description mentions three males as typical specimens, one "from the vicinity of the Pecos River in Texas, and



*Cacama valvata*

the others were captured in Arizona." The remaining specimen mentioned by him from Camp Grant, Arizona, with "a much longer rostrum than the types," is in the collection of the U. S. Nat. Museum. In addition to the locality it is labeled "Palmer's Assorting No. 1043." The rostrum reaches the posterior coxæ, and we think the specimen is referable to *Cacama dissimilis* (Distant).

Mr. Woodgate writes of the *valvata* he sent from Jemez Springs, N. M., that they were very shy and often found about the bush cactus. Some he took in the evening while they were at rest on the cactus. "They are the only insects except ants that can settle on the bush

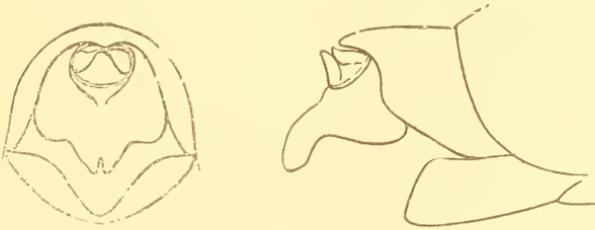
cactus without impaling themselves. The toughest beetles become impaled when they settle on this cactus and the ants proceed to eat them, but these Cicadas that have a very swift flight, can settle with impunity." He says that "their song is not sustained for more than about two minutes in the brightest sunshine even."

*Cacama furcata* new species.

Type male, labeled "Lower California?" Collection, University of Nebraska.

A dark colored species decorated with orange and black at the base of both pairs of wings.

Head black with a light brown spot above each antenna and a median light brown line below the central ocellus. Region of the transverse rugæ black, variegated each side with brown and black. The orange colored rostrum is black at tip, and extends slightly beyond the median coxæ. Pronotum black or nearly so, with a brownish spot on the front margin each side of the central line; the lateral margins variegated with brown, and a rather conspicuous upturned brownish line near the posterior angles. Mesonotum black, except the outer two lines of the central W mark, the extreme lateral margins at the base of the fore wings, and the front limbs of the X, which are brownish. Tergum black or nearly so, with the segments narrowly edged



*Cicada furcata*

at the sides of the body with brown. The first segment almost entirely black, the hind margin edged with brown, especially conspicuous near the central portion, and a minute pruinose spot each side near the extremities and adjoining the tympana. The eighth segment is nearly all black, light brown near the tip and on the sides; there is also a basal pruinose line. Fore wings with the basal cell nearly clear; both the fore and hind wings are variegated at base with orange and black; the membranes are orange tinted with gray on their posterior margins. Costal margin of the fore wings testaceous with a series of connected darker spots to the end of the radial cell, from which point the margin is darker colored to the end of the wing. The outer margin of the fore wing is nearly straight, somewhat abruptly turned at the eighth

marginal cell; the first and second cross veins are hardly infuscated. Beneath the insect is almost wholly dull orange in color, variegated with black about the legs and at the sides of the abdomen. Opercula dull orange, overlapping along the inner margin and broadly rounded behind. Uncus deeply notched at the extremity.

MEASUREMENTS IN MILLIMETERS.

	Male Type.
Length of body .....	27
Width of head across eyes .....	8.5
Expanse of fore wings .....	72
Greatest width of operculum .....	7
Greatest length of operculum .....	7

This is a smaller species than *valvata*, more orange colored at the base of the wings, with the eighth abdominal segment nearly all black instead of pale. Beneath it is orange colored as in *crepitans*, and not pale, especially the opercula, as in *valvata*. The rostrum is longer than in *valvata*, but not as long as in the much smaller *crepitans*.

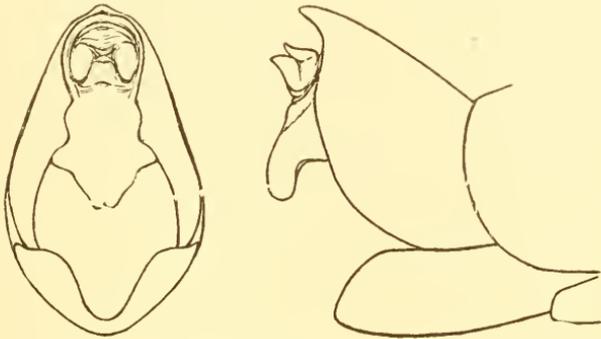
For the privilege of describing this species I am indebted to Prof. Myron H. Swenk, of the University of Nebraska.

***Cacama variegata*** new species.

Type male and allotype female from San Benito, Texas, June, 1918 (Miss Matz). Davis collection.

Head black with a brownish spot above each antenna; one near each posterior ocellus, and one centrally on the hind margin; also one in front of the central ocellus. Upper area of transverse rugæ black, centrally with a brown streak; face light colored and pruinose; white hairs especially about the eyes. The testaceous colored rostrum is blackened at the tip and extends slightly beyond the median coxæ. Pronotum black, much variegated with light brown and rusty brown; the hind margin is edged with brown which extends inward (forward) near the posterior angles. The central area is rusty brown, each side of a somewhat lighter colored oblong spot. Mesonotum black with the outer lines of the W mark well defined. The mesonotal X is brown, the front limbs and hind limbs being each crossed by black bands. There are two oblong spots in the depression in front of the X. The sides are light colored, overlaid with pruinose which extends forward along each side to the hind margin of the pronotum. Tergum black, exposed part of first segment light colored and pruinose; second segment margined behind centrally with brown; third segment with a light colored spot each side, which is also more or less pruinose; eighth segment light colored and pruinose with an apical inversely napiform black spot. Two black dots, one each side, are included in the pruinose area. Fore wings with the basal cell partly obscured, especially at

the base and front margin; both the front and hind wings are variegated at base with testaceous and black, the membranes are orange. Costal margin of the fore wings testaceous with a series of connected darker spots to the end of the radial cell, from which point the margin is darker colored to the end of the wing. The outer margins of the fore wings are more evenly rounded than in any other species here considered; the first and second cross veins are considerably infuscated. Beneath the body is light or straw colored, especially the opercula, variegated with black about the legs and at the sides of



*Cicada variegata*

the abdomen. Opercula overlapping along the inner margin and broadly rounded behind.

MEASUREMENTS IN MILLIMETERS.

	Male Type.	Female Allotype.
Length of body .....	29	27
Width of head across eyes .....	9.5	9.5
Expanse of fore wings .....	75	79
Greatest width of operculum .....	7.5	
Greatest length of operculum .....	8.5	

The allotype, and other females collected at the same time, have more brown on the tergum than in the males. The first abdominal segment is pruinose, which extends on to the fore part of the second segment; the third to the seventh segments are pruinose on the sides, while the eighth segment is light colored and pruinose. There are the same black or dark brown dots each side on the eighth segment as in the male. The ninth segment is also light colored. Beneath the last ventral segment is evenly rounded each side of the central notch.

In addition to the type and allotype there are 17 males and 15 females in the writer's collection, all from San Banito, Texas, and col-

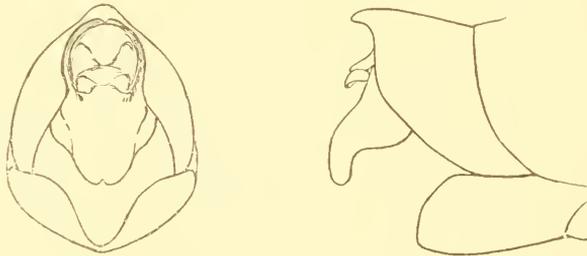
lected in June, 1918. In the collection of the U. S. National Museum there are the following specimens: San Diego, Tex., May 5, male (E. A. Schwarz); McAllen, Tex., May 22, male (McMillan); Cotula, Tex., May 10, 1906, six males and three females, May 11, 1906, ten males and seven females, June 1, 1906, female, all collected by Crawford and Pratt, and one male collected May 12, 1906, by F. C. Pratt.

This species can be separated from all of the others here considered by the shape of the fore wings, which, as has been stated, are more evenly rounded, that is, the outer margin is not as straight as it is in the others.

*Cacama californica* new species.

Type male and allotype female from Los Angeles County, California, July (Collection Coquillett). U. S. National Museum.

This species resembles *Cacama variegata* in color pattern and general appearance, and the rostrum is of the same length, but it differs otherwise in the following particulars: The head is usually smaller; the fore wings are narrower with the outer margins more straight, and with the space between the marginal cells and the edge of the wings very broad. The basal cell is nearly clear, and the first and second cross veins are hardly infuscated. A side view of the abdomen shows the operculum to be sinuated on the margin, instead of evenly curved as in *variegata*. The opercula are also shorter though



*Cacama californica*

of the same general shape. The end of the abdomen as viewed either from above or below is seen to be broader or more flattened out.

MEASUREMENTS OF MILLIMETERS.

	Male Type.	Female Allotype.
Length of body .....	27	27
Width of head across eyes .....	9	9.5
Expanse of fore wings .....	76	79
Greatest width of operculum .....	7	
Greatest length of operculum .....	6	

In addition to the type and allotype, ten males and three females were collected by Mr. Coquillett in Los Angeles County, California, in July. In the collection of Dr. E. D. Ball there is a female collected by him at Cabazon, Calif., June 20, 1909.

This species is not quite as contrastingly colored as in *variegata*; the membranes at the base of the wings are not so deeply orange in color, being more yellowish and gray.

***Cacama dissimilis* (Distant).**

1881. *Cicada dissimilis* Distant, Biol. Centr.-Am., Homop. 1, p. 10.

Three males and one female identified as this species and from the collection of the University of Nebraska, have been examined. They are labeled Sonora, Mex., Eisen Collector. In the Uhler collection, U. S. National Museum, is the male already mentioned from "Camp Grant, Ariz. (Palmer), Palmer's Assorting, No. 1043," which has been compared with one of the males from Sonora, Mexico. All of these specimens have the rostrum reaching to about the middle of the posterior coxæ; first and second transverse veins of the fore wings are "scarcely infuscated" as stated in the original description. The original description further states that the basal area is "only slightly ochraceous and opaque," which is also true of the specimens mentioned above.

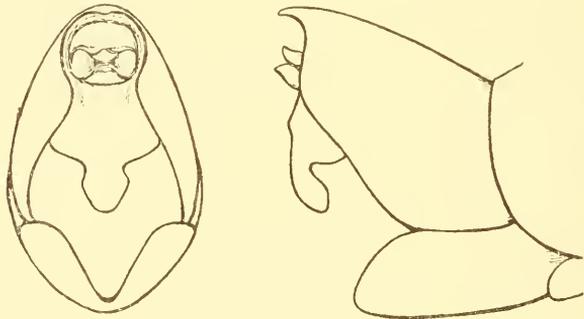
***Cacama carbonaria* new species.**

Type male, in Davis collection, and presented to the writer by Dr. E. D. Ball, who states that it came from near Mexico City, Mexico. It bears the number "337."

This is a very black species and resembles *Cacama valvata* in size and color.

Head black with a brown spot above each antenna, one each side on the hind margin near the posterior ocelli, one in front of the median ocellus, and a line on the front in the region of the transverse rugæ. The brown rostrum is long and extends to the posterior coxæ, but hardly beyond them. The face is black with white hairs; a pale stripe follows the sides of the transverse rugæ, and a second one leads from the base of the rostrum toward each eye. The pronotum is black and pubescent, as in *valvata*; on the hind margin there is an irregular brown spot each side that extends nearly to the posterior angles. Mesonotum black, slightly lighter near the base of the wings. The X has the fore limbs brown, each one bearing a black spot; the hind limbs are black. Tergum black, including the exposed part of the first segment, which is light colored and *pruinose* in *valvata*. On each side there is a pruinose spot, which covers the lower part of the tympanum and extends to the fourth

segment. The eighth segment is nearly all black, with a small light spot each side, which is also pruinose. Fore wings with the same testaceous and black colors at base, as in *valvata*, and the anal membranes of both pairs of wings likewise gray. About one third of the basal area is clear also as in *valvata*. The first and second transverse veins of the fore wings are slightly infuscated. Beneath the opercula are dull straw colored as in *valvata*, but the ends of the second and third pair of coxæ are orange colored. The opercula overlap along the inner margin and are broadly rounded at the extremities. A side view of the abdomen shows the operculum to be sinuated on the margin in order to cover a more protruding tympanum than is found in *valvata*. The end of the abdomen is considerably broadened out at the extremity; much more so than



*Cacama carbonaria*

in *valvata*. When viewed in profile the uncus is seen to be deeply sinuated near its central portion.

MEASUREMENTS IN MILLIMETERS.

	Male Type.
Length of body .....	29
Width of head across eyes .....	10
Expanse of fore wings .....	73
Greatest width of operculum .....	7
Greatest length of operculum .....	7

This is a larger headed and proportionately broader bodied species than *valvata*; the rostrum is also much longer and the uncus differently shaped.

I am indebted to Dr. Ball for permission to retain the specimen.

*Cacama crepitans* (Van Duzee).

1914. *Proarna crepitans* Van Duzee, Trans. San Diego Soc. Nat. Hist., 2, p. 45.

Mr. Van Duzee says in the original description: "Described from

seven male examples taken in Mission Valley on the hillside opposite the city of San Diego, July 9, 1913. This species makes an unusually loud crackling noise which is often repeated and well sustained, but the insect was very active and difficult to capture, especially as its home was among the cactus on the steepest part of the hill."

Mr. Van Duzee has been good enough to send me one of the above mentioned males, in addition to which I have, through the kindness of Prof. Myron H. Swenk, been able to examine two additional males from the collection of the University of Nebraska. One is labeled San Jose del Cabo, "Lower California, Mexico, Eisen Coll., 1893," and the other simply "Lower Calif.?"

**Cacama maura** (Distant).

1881. *Proarna maura* Distant, Biol. Centr.-Am., Homop., 1, p. 13, pl. 2, fig. 5.

The original description states of the fore wings that the "basal area, costal membrane, and transverse veins at bases of second and third apical areas black." Basal area of the wings also black. It is said to inhabit Mexico, also Yucatan.

In the collection of the U. S. National Museum there are several specimens from Yucatan labeled *maura*, which are brownish instead of black. There is also a chestnut-brown female in the writer's collection from Yucatan, supposed to belong to this species, and which is figured on the accompanying plate.

**Cacama longirostris** (Distant).

1881. *Proana longirostris* Distant, Biol. Centr.-Am., Homop., 1, p. 13, pl. 2, fig. 4, 4a and 4b.

In the original description is the statement that the tegmina have a "black basal area," but a smaller one than in *maura*. Fig. 4 b, referred to above, shows the rostrum extending beyond the opercula to the "apex of the first abdominal segment."

Uhler, in *Entomologica Americana*, Vol. IV, p. 84, 1888, says of *longirostris*: "Inhabits Mexico. It resembles the preceding species [*maura*] in form, but has a much longer rostrum, and lacks the broad tract at the base of the wings."

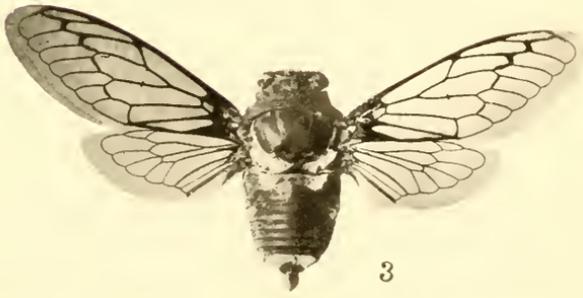
## EXPLANATION OF PLATES.

## PLATE XIII.

- Fig. 1. *Cacama valvata* (Uhler).  
Fig. 2. *Cacama furcata* Davis. Type.  
Fig. 3. *Cacama variegata* Davis. Type.  
Fig. 4. *Cacama variegata* Davis. Allotype.

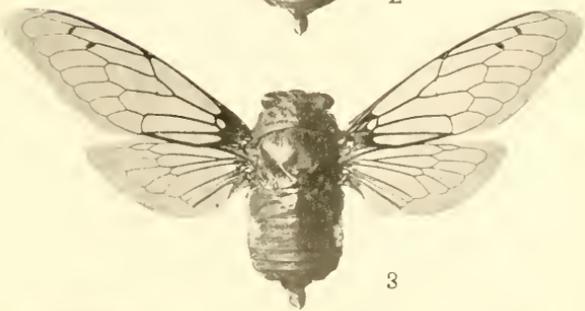
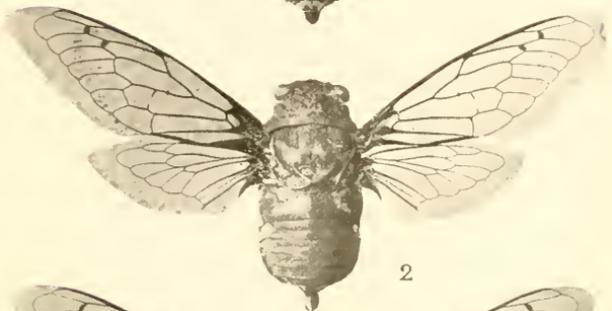
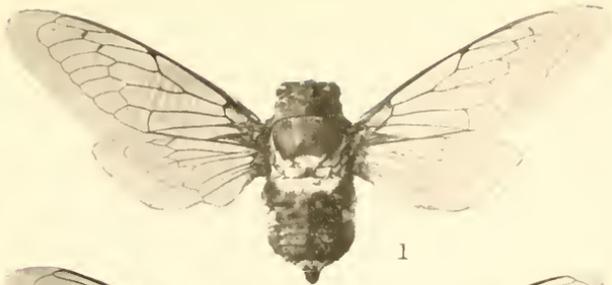
## PLATE XIV.

- Fig. 1. *Cacama californica* Davis. Type.  
Fig. 2. *Cacama dissimilis* (Distant).  
Fig. 3. *Cacama carbonaria* Davis. Type.  
Fig. 4. *Cacama crepitans* (Van Duzee). Cotype.  
Fig. 5. *Cacama maura* (Distant).
-



Cacama.





Cacama.







CICADAS OF THE GENERA OKANAGANA, TIBICIN-  
OIDES AND OKANAGODES, WITH DESCRIP-  
TIONS OF SEVERAL NEW SPECIES.

By Wm. T. Davis

[Reprinted from the JOURNAL OF THE NEW YORK ENTOMOLOGICAL SOCIETY  
Vol. XXVII, Nos. 2-3, June-September, 1919.]







CICADAS OF THE GENERA OKANAGANA, TIBICIN-  
OIDES AND OKANAGODES, WITH DESCRIP-  
TIONS OF SEVERAL NEW SPECIES.

BY WM. T. DAVIS,

NEW BRIGHTON, STATEN ISLAND, N. Y.

The genus *Okanagana* probably contains more species of cicadas than any other in North America, and they are also in many instances quite hard to separate. In the northeastern part of the continent there appear to be only two species, but in the central and western parts it is far otherwise, and in California they are very numerous. As a rule the individuals of the same species resemble one another quite closely in color pattern, but occasional variation is seen, especially when the species is rather widely distributed. In his Preliminary Review of the West Coast Cicadidæ, published in the JOURNAL OF THE N. Y. ENTOMOLOGICAL SOCIETY, March, 1915, Mr. E. P. Van Duzee states that the "structural characters are very few in some of the genera, notably *Okanagana*, and I have been obliged to fall back upon color characters in the preparation of the key. The color and markings, while variable in extent, are quite constant in general facies for each species." A considerable number of species have been made known since 1915, but it will be some time before our collections are sufficiently complete to warrant the statement as to the exact number.

In considering the genus *Okanagana* it became necessary to first

identity Say's *Cicada rimosa*, described in 1830, and designated as the type of his genus *Okanagana* by Mr. Distant in 1905. We hope that we have successfully accomplished this, and the conclusions reached are to be found in the remarks on *rimosa*.

The original description of the genus *Okanagana* was published in the Annals and Magazine of Natural History, Seventh Series, Volume XVI, pp. 23, 190, 1905, and is as follows: "Head (including eyes) considerably narrower than base of mesonotum and almost equal to its length (including cruciform elevation); front shorter than vertex, its apex more or less emarginate, vertex centrally sulcate; pronotum about as long as head, its anterior angles in a line with eyes, its posterior angles dilated; abdomen in male longer, in female about as long as space between apex of head and base of cruciform elevation; tympana completely exposed, tympanal coverings entirely absent; face more or less centrally sulcate; rostrum reaching the intermediate coxæ; opercula small, transverse; abdomen beneath with the lateral margins broadly recurved; tegmina and wings hyaline; tegmina with the basal cell about or almost twice as long as broad, apical areas eight; wings with six apical areas. Type, *O. rimosa* Say (*Cicada*)."

The genus *Tibicinoides* was described by Mr. Distant in the Annals and Magazine of Natural History, Series 8, Vol. XIV, p. 166, Aug., 1914, and Uhler's *Tibicen cupreo-sparsus* was designated as type. Some of the characters mentioned are "tegmina and wings semiopaque; tegmina with the basal cell about twice as long as broad; apical areas short in length, eight in number, a curved rudimentary vein, curved inwardly, crossing tegmen from base of first ulnar area to base of lower apical area; posterior tibiæ with a few fine spines." While the fore wings in *Okanagana mercedita* and *O. minuta* are not colored as in *cupreo-sparsus*, the short apical areas show the three species to be related, and they may in the future be placed in the genus *Tibicinoides* as indicated in the table.

Owing to the length of the marginal cells Uhler's *Cicada hesperia* has been placed in the table near *striatipes* and *utahensis*, which it also resembles in some other features, instead of in the genus *Tibicinoides*, where its color pattern would place it.

In the table for the separation of species the natural sequence could not be followed in every instance, but we hope that it will serve to identify the members of this difficult group. In order to study these Cicadas the specimens should be spread so that the venation, the character of the basal cell of the fore wing and the color of the basal membranes can be seen. If the wings on one side, preferably the left, are expanded, it will suffice. Cicadas dry very quickly on the stretching board and freshly captured individuals need remain thereon only about a week, and those that have been relaxed in a softening box a still shorter time. In *Tibicen*, *Cacama* and most of the other genera of North American cicadas the uncus is withdrawn by the insect into the abdomen, but in *Okanagana*, *Tibicinoides*, *Clidophleps* and *Platypedia* it is always exposed. Often it can be fully examined without changing its position, but if the end be bent downward and concealed by the valve, the uncus should be lifted upward when the insect is mounted on the stretching board. A portion of a match can be inserted with a forceps between the uncus and the valve until the parts are dry, or the uncus may be simply lifted up with a pin.

I have received important material from the following named persons; other acknowledgments are made in connection with the specimens recorded:

Dr. E. D. Ball, Dr. J. Chester Bradley, Prof. A. C. Burrill, Dr. R. H. Beamer, Prof. W. H. Brittain, Prof. Robert A. Cooley, Alonzo C. Davis, Emerson L. Diven, George P. Engelhardt, Prof. Frederick M. Gaige, Edmund H. Gibson, Morgan Hebard, Miss Esther P. Hewlett, Otto Huellemann, Prof. S. J. Hunter, Charles W. Johnson, Frank M. Jones, Clarence H. Kennedy, Warren Knaus, Dr. H. H. Knight, J. N. Knull, E. R. Leach, Prof. A. L. Lovett, Miss Mell McGill, Dr. W. M. Mann, P. W. Mason, George A. Moore, Dr. Albert P. Morse, Howard Notman, Miss Edith M. Patch, Prof. Rufus H. Pettit, Col. Wirt Robinson, Charles Schaeffer, Prof. H. C. Severrin, Ernest Shoemaker, Dr. Henry Skinner, Tom Spalding, Prof. L. M. Stöhr, Prof. Myron H. Swenk, Edward P. Van Duzee, Prof. H. F. Wickham, John Woodgate and Prof. Wm. S. Wright.

## LIST OF SPECIES.

<i>Okanagana.</i>	<i>synodica</i> (Say)
<i>cruentifera</i> (Uhler)	<i>balli</i> Davis
<i>magnifica</i> Davis	<i>rubrovenosa</i> Davis
<i>mariposa</i> Davis	<i>vanduzeei</i> Distant
<i>vandykei</i> Van Duzee	<i>vanduzeei</i> var. <i>consobrina</i> Distant
<i>lurida</i> Davis	<i>vanduzeei</i> var. <i>californica</i> Distant
<i>ornata</i> Van Duzee	<i>striatipes</i> (Haldeman)
<i>napa</i> Davis	<i>utahensis</i> Davis
<i>schaefferi</i> Davis	<i>hesperia</i> (Uhler)
<i>occidentalis</i> (Walker)	<i>pallidula</i> Davis
<i>bella</i> Davis	<i>uncinata</i> Van Duzee
<i>rimosa</i> (Say)	<i>mercedita</i> Davis
<i>canadensis</i> (Provancher)	<i>minuta</i> Davis
<i>tristis</i> Van Duzee	(Males not known.)
<i>arctostaphyle</i> Van Duzee	<i>hirsuta</i> Davis
<i>canescens</i> Van Duzee	<i>rotundifrons</i> Davis
<i>viridis</i> Davis	<i>Tibicinoides.</i>
<i>aurantiaca</i> Davis	<i>cupreo-sparsus</i> (Uhler)
<i>fratercula</i> Davis	<i>Okanagodes.</i>
<i>oregona</i> Davis	<i>gracilis</i> Davis
<i>triangulata</i> Davis	

## KEY TO THE SPECIES OF THE GENERA OKANAGANA AND TIBICINOIDES.

A. Male uncus not hooked at extremity, sometimes sinuate.

B. Expanse of fore wings more than 50 mm.

C. Base of fore and hind wings orange red more or less variegated with black.

D. Outer edge of fore wings forming a somewhat straight line.  
Very large species.

Pronotum all black; mesonotum with orange, discal spots; front margin of fore wings bright orange to end of radial cell, slightly darker beyond; venation not thickened; blood-red at base of both pairs of wings; notch in last ventral segment of female double. Expands 70-75 mm. ....**cruentifera** (Uhler)

Pronotum all black; mesonotum black except at sides; front margin of fore wings bright orange to first marginal cell; venation thickened, especially about the marginal cells; notch in last ventral segment of female simple. Expands about 80 mm. ...**magnifica** new species

Pronotum narrowly edged on sides and posterior margins with rufus; venation not at all thickened. Expands about 75 mm. ....**mariposa** Davis

*DD.* Outer edge of front wing of a more continuous curve.

Medium sized species, except *schaefferi*, which is large.

*E.* Legs almost entirely orange or greenish in color. Abdomen pale beneath including the rather long valve.

Pronotum mostly pale with a black median vitta gemmate anteriorly, the lateral oblique groves more or less broadly black. Two broad pale marks extending from the anterior extremities of the mesonotal  $\times$ ; a rather dull colored species with the uncus deeply cleft at extremity. Expands about 70 mm. . . . . *vandykei* Van Duzee

Pronotum as in *Vandykei*; mesonotum reddish straw color, black centrally; tergum black with posterior edge of the segments pale. A shining species with the uncus seen from above shallowly noticed at the extremity, and sinuate on lower margin when seen in profile. Expands a little over 60 mm. . . . . *lurida* new species

Head, pronotum and mesonotum almost entirely black, front margin of fore wing bright orange to the end of radial cell; basal cell opaque. Expands about 60 mm. . . . . *ornata* Van D.

Head, pronotum and mesonotum black, much variegated with dull orange; venation of fore wings uniformly light in color, basal cell clear; tergum shining black with the segments narrowly margined with orange posteriorly. A larger headed species than the last, and with a shorter uncus. Expands about 60 mm. . . . . *napa* new species

*EE.* Legs, especially the front pair considerably blackened.

*F.* Shining species with rather broad wings, and the hind margin of pronotum orange or reddish.

Front of head strongly produced; pronotum edged on sides and hind margin with orange, hind margin of abdominal segments both above and beneath orange. Last segments of abdomen beneath with short scattered pubescence. Expands about 75 mm. (Except in size this and *fratercula* resemble each other, and some specimens that may belong to the last named species are much larger than the type.) . . . *schaefferi* Davis

Venation of the fore wings fuscous, except the costal margin, which is often narrowly edged with black, but otherwise greenish-

orange to the end of the radial cell; sub-costal vein black. Basal cell clear or nearly so. Pronotum edged on hind margin and at posterior angles and sometimes narrowly on sides with greenish-orange. Head small rather blunt in front, and proportionately broader than in the next species, very hairy on dorsal surface and with a considerable amount of rather long hairs behind the eyes; beneath thickly clothed with whitish hairs. Last ventral segment of female doubly notched. Expands about 60 mm. . . . . *occidentalis* Walker

Of a slightly blueish tint, otherwise colored about as in the last species, but the costal margin of the fore wings to the end of the radial cell often bright orange, the basal cell clouded sometimes blackened. Pronotum usually plainly edged with orange on sides as well as on hind margin. Head not as blunt when viewed from above as in *occidentalis*, proportionately narrower and with little hair behind the eyes, also less hairy beneath. Last ventral segment of female not doubly notched, or second notch but feebly indicated. Expands about 60 mm. . . . . *bella* new species

*FF.* Dull bodied species or at most feebly shining, with proportionately narrower wings, and the hind margin of pronotum orange or reddish, except in *tristis* where it is black. Dorsum of the abdomen often with conspicuous transverse rows of short silvery hairs.

Basal cell of fore wings slightly clouded, pronotum blackish mottled each side with testaceous, the hind margin and sides reddish. Tergum with the posterior edges of the segments reddish, the vestiture more sparse than in *canadensis* and more in the nature of hairs. Expands about 60 mm.

*rimosa* (Say)

Venation of the fore wings often thickened; basal cell clouded and blackened. Pronotum usually entirely black, except the hind margin which is testaceous, sometimes

clouded each side with reddish; tergum black with much tomentum, which when removed leaves a smooth surface. A black species with the usual four orange spots before the mesonotal X, and orange membranes at the base of both pairs of wings. Expands about 62 mm.

**canadensis** (Provancher)

Venation about as in *canadensis*, but the veins not thickened. Pronotum generally all black, but sometimes mottled with dull red each side of the center. Further distinguished from the other two species in this section by having the abdomen beneath centrally pale. Expands about 70 mm.

**tristis** Van D.

CC. Base of the fore and hind wings not of the usual orange red variegated with black.

Color rufo-ferruginous including the venation of fore and hind wings, with a few marks on the vertex and a dorsal vitta on the tergum black. Expands about 70 mm.

**arctostaphylæ** Van D.

Body almost entirely black; basal cell of the fore wings clear; membranes at base of both pairs of wings whitish. Expands about 65 mm. ....**canescens** Van D.

Body and wing venation nearly entirely green; basal cell of fore wings clear. Expands 65 mm. ....**viridis** Davis

Body and wing venation nearly entirely orange; basal cell of fore wings clear; a black band between the eyes, and a conspicuous dorsal band of the same color extending from the hind margin of the pronotum to the end of the abdomen. Expands about 55 mm. ....**aurantiaca** Davis

BB. Expanse of fore wings 50 mm. or less; orange variegated with black at base of both pairs of wings. (Some examples of *fratercula* exceed 50 mm.)

G. Pronotum in mature individuals black centrally margined with orange especially behind. In *triangulata* the grooves of the pronotum are sometimes orange colored.

Basal cell of fore wings darkly opaque, abdomen black beneath with hind margins of segments reddish. A dark colored species. Expands about 47 mm. **fratercula** Davis

Basal cell and venation of fore wings yellowish; abdomen yellowish beneath with numerous silken hairs; front of head and eyes not prominent. Expands about 50 mm.

**oregona** Davis

Basal cell of fore wings translucent; abdomen yellowish be-

neath with silken hairs very short or absent; front of head and eyes prominent. Expands about 50 mm.

**triangulata** Davis

GG. Pronotum in mature individuals black with the central portions variegated with orange or yellow. Basal cell of fore wings yellowish or translucent.

Head small, front prominent; discal yellow marks extending from the mesonotal  $\times$  to the front margin of the mesonotum. The veins surrounding the first seven marginal cells of fore wing infuscated. Expands about 42 mm.

**synodica** (Say)

Membranes at base of fore and hind wings pinkish, remainder of wing venation yellowish. The W mark on the front portion of the mesonotum separated from the mesonotal  $\times$ ; tergum darker, the terminal segments nearly all yellow as in *synodica*. Expands about 46 mm.

**balli** new species

AA. Male uncus hooked at extremity.

B. Rather slender bodied species with the venation of fore and hind wings colored almost uniformly throughout.

Black clothed with minute dark rufous hairs giving the insect a dull reddish aspect. Expands about 55 mm.

**rubrovenosa** Davis

BB. Stouter bodied species, the fore and hind wings variegated with orange and black at the base.

C. Third marginal cell more than one half as long as second ulnar area adjoining and immediately behind it.

D. Expand about 55 to 60 mm. Black species with basal portions of fore and hind wings orange variegated with black.

E. Front of head not conspicuously produced; under side of abdomen with very numerous long silken hairs.

F. Abdomen black above or nearly so in var. *californica*.

Almost wholly black above, pronotum dull rufous, particularly on the sides; abdomen beneath with the central area black, except the reddish or yellowish posterior margin of each segment; valve black on under side. Expands about 60 mm.

**vanduzeei** Distant

Dorsal markings much lighter, especially about the mesonotal  $\times$ ; abdomen beneath with a black spot on each segment except

the last. Expands about 55 or 60 mm.

**vanduzeei** var. **consobrina** Distant

Dorsal markings of the pronotum still more extended and confluent; beneath, abdomen almost entirely yellowish, valve yellowish. Expands about 57 mm.

**vanduzeei** var. **californica** Distant

**EE.** Front of head conspicuously produced; silken hairs on under side of abdomen short and inconspicuous.

Dorsal surface with much appressed golden pubescence; abdomen black and yellowish above, and usually entirely yellowish beneath. Basal cell usually transparent. Expands about 53 mm.

**striatipes** (Haldeman)

Dorsal surface with the hairs more upright than in *striatipes*, which it much resembles in markings. Dorsum of abdomen black, beneath central area usually black with hind margins of segments reddish. Basal cell darkened. Expands about 60 mm. . . . **utahensis** new species

**DD.** Expand about 52 mm., usually much less.

**G.** Fore and hind wings, except marginal cells, infuscated. Uncus when viewed from behind with hook terminating in a broadly rounded notch. Expands about 52 mm. . . . . **hesperia** (Uhler)

**GG.** Fore and hind wings clear except at extreme base, where the membranes are orange.

Yellowish or yellowish green; front conical and prominent. Expands about 50 mm.

**pallidula** Davis

Smaller and darker than the last; head small; front not so prominent. Venation approaching the next two species. Expands about 42 mm.

**uncinata** Van Duzee

**CC.** Marginal cells short; the third one in fore wings about one half as long as second ulnar area adjoining and immediately behind it.

**H.** Both pairs of wings clear except near base.

Head including eyes about 5 mm. broad. Expands about 40 mm. . . . . **mercedita** Davis

Head including eyes about 4 mm. broad. Expands about 35 mm. . . . . **minuta** Davis

**HH.** Both pairs of wings clouded, particularly the basal half of front pair.

Head including eyes about 4.5 mm. broad, membranes

at base of both pairs of wings vermilion; tergum black. Expands about 34 mm.

***Tibicinoides cupreo-sparsus* (Uhler)**

In addition to the species mentioned in the key there are two others of which only the female sex is known. *Okanagana hirsuta* Davis was described and figured in the JOURNAL OF THE N. Y. ENTOMOLOGICAL SOCIETY for March, 1915, from a specimen in the collection of the American Museum of Natural History, labeled Santa Rosa Island, California. It expands about 80 mm., and resembles a greatly enlarged *vanduzecci*, but it is even more hairy beneath than in that species; the front of the head is not quite as rounded, and the basal cell of the fore wing is clear instead of clouded as in *vanduzecci*. Unfortunately in the original description the width of the fore wing in *hirsuta* is printed 7 instead of 11 mm. The insect is shown correctly in the figure.

*Okanagana rotundifrons* Davis was described and figured in the JOURNAL OF THE N. Y. ENTOMOLOGICAL SOCIETY for September, 1916, from a female in the collection of the University of Kansas taken in Arizona. It expands 71 mm., and is a shining black and yellowish species, with a conspicuously blunt and rounded front.

***Okanagana cruentifera* (Uhler). Pl. xix, fig. 2.**

1892. Trans. Md. Acad. Sci., i, p. 161.

In the United States National Museum there is a female from "F. H. Hillman, Reno, Nev. 6, 21, 1890," labeled "*Tibicen cruentifera* Uhler, Cotype from Uhler's Coll." in the handwriting of Mr. Heidemmann. No label by Uhler is on the specimen. It is spread; expands 75 mm., with the front of the head quite prominent, and the notch in the last ventral segment double. According to the original description all of the cotypes came from Nevada. Another specimen in the Uhler collection, captured after *cruentifera* had been described, is labeled "F. H. Hillman, Reno, Nev. 7, 3, 98," and identified as "*Tibicen cruentifera* Uhler, Nev." in Uhler's handwriting. This is a spread specimen, expands 78 mm.; front is prominent; the pronotum is almost entirely black, with a hair line of red along the hind margin; venation about the marginal cells not clouded.

A male in the U. S. National Museum is labeled simply "Nev.," and on a separate label "P. R. Uhler collection." This may be one

of the cotypes. It expands nearly 70 mm.; head and pronotum entirely black, grooves containing much pubescence; mesonotum with the usual discal reddish spots, hind margin red; tergum with posterior margins of the segments red; fore wings with the costal margin orange to the end of the radial cell, darker beyond; first and second cross veins not infuscated; basal cell clouded; membranes at base of both pairs of wings of a bright red. Beneath femora dull red variegated with black especially at the ends; under side of abdomen black with the posterior margin of each segment rather broadly and unevenly margined with red; valve light colored. We present a figure of this specimen.

In the American Museum of Natural History there are three females from Nevada, one of them labeled Virginia City, like the one described above. They expand from 70 to 75 mm.

Lately we have received a female collected June 25, 1919, and a male collected June 27, 1919, at Coal Creek, Iron Co., Utah, by Mr. Tom Spalding.

Four males labeled Los Angeles Co., Cal., July, Collection Coquillet, are in the United States National Museum and are like the Nevada male described above. Two males from Nellie, Calif., June 20 and 24, 1918 (E. P. Hewlett), are in the writer's collection and are darker than the other specimens here mentioned, with the costal margin of the fore wings not as brightly colored and edged with a narrow line of black. The membranes of both pairs of wings are blood red at base as in true *cruentifera*. The tergum is nearly all black, while beneath the abdomen and valve are shining red, the former blackened along the sides and at base. Expand 70 mm. This seems to be a variety of *cruentifera*.

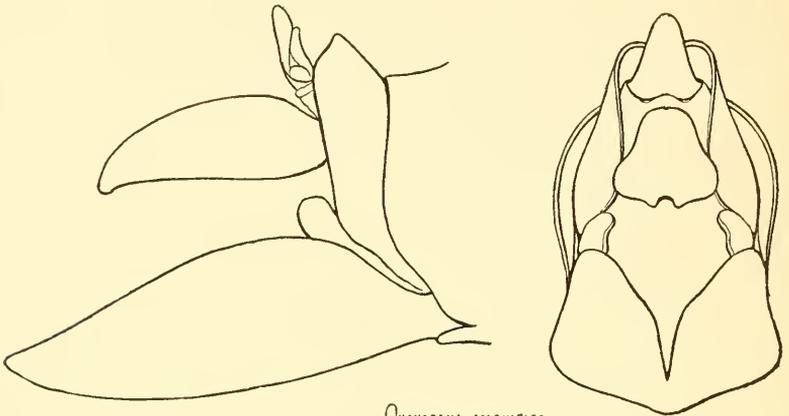
**Okanagana magnifica** new species. Pl. xix, fig. 1.

Type male from Jemez Springs, New Mexico, June 4, 1918 (John Woodgate), and allotype female from same place, July 1, 1918. Davis collection.

Resembles *O. cruentifera*, but is larger and has differently shaped uncus.

Head slightly narrower than the front margin of the pronotum; front moderately protruding and covered with long grayish hair, face also very hairy. Median sulcus of the front well defined. Pronotum with the humeral

angles rounded, the anterior angles not very prominent and almost hidden by long hairs from behind the eyes and growing on the pronotum itself. Last ventral segment slightly constricted at the sides, then broadened out to the extremity, which has the outer angles rounded; not sinuate at extremity. Uncus when viewed in profile elevated centrally with a slight sinuation near



OKANAGANA MAGNIFICA

the lower extremity; when viewed from behind, notched at the extremity, and more deeply so than in *cruentifera*. The valve in the male is long and orange in color. The last ventral segment in the allotype is simply and broadly notched; the notch is double in *cruentifera*. Fore wings with the costal margin bright orange nearly to the extremity of the wings, the remaining veins fuscous, somewhat thickened and clouded at the marginal cells; basal cell blackened; membranes at base of both pairs of wings of the brightest orange; not blood-red as in *cruentifera*. Head entirely black; in some of the paratypes the antennae are marked with orange on the basal joint. Pronotum entirely black in the type; in the allotype it is very narrowly edged posteriorly with red. Mesonotum red at the sides, otherwise black including the X. Metanotum edged posteriorly with red. Tergum black with the first six segments edged with red at extreme lower part of the sides only, segments seven to nine edged completely on the posterior margin with red. Beneath the body including the legs hairy; the legs are orange-red striped with black and the abdominal segments more evenly edged posteriorly with orange-red than in *cruentifera*.

## MEASUREMENTS IN MILLIMETERS.

	Male Type.	Female Allotype.
Length of body .....	35	31
Width of head across eyes .....	9	9
Expanse of fore wings .....	84	84
Length of valve .....	8	

In addition to the type and allotype I have received sixty-two males and eighty-nine females collected at Jemez Springs, New Mexico by John Woodgate at 6,400 ft. to 7,500 ft. elevation, June 2 to July 2, 1918. They were most common about the middle of June. Mr. Woodgate writes that the "Navajo children tear the legs and wings off of the cicadas and eat them—say they taste like pecan nuts."

The species must have been quite plentiful in 1918 in parts of New Mexico, for Mr. Warren Knaus sent me a male and female collected about four miles southeast of Santa Fe, on the old Santa Fe trail on scrub pine and cedar, June 15, at an altitude of about 7,000 feet. In 1919 Mr. Woodgate collected seventy-eight specimens of this species at Jemez Springs. Mohave Co., Arizona, 1919, 3 males, 4 females.

In the United States Natural Museum there is a male *magnifica* labeled "*Tibicen cruentifera* Uhler var. Uhler," from "E. A. Bush, San Jose, Cal., Aug. 2, 1887." Evidently Uhler himself considered this not a true *cruentifera*. Two other specimens are as follows: a female from "Nordhoff, Cal., 4, 6, 1905, W. M. Slosson," expands 88 mm., last ventral segment with notch simple; male "From W. M. Slosson, Nordhoff, Cal., June 4, 1905, found on pinon trees near the west end of San Emedio Mts., Cal." The male bears a further label by Mr. Heidemann, "*Tibicen cruentifera* Uhler var." Also in the U. S. National Museum there is a female from "Nucla, Col. Ch. T. Trueb, Sept. 7, '09," with a slightly smaller head than the Nordhoff female. It expands 88 mm. and the last ventral segment is simply notched. It is labeled "*Fidicina cruentifera* Uhler, O. H."

**Okanagana mariposa** Davis.

1915. Journal N. Y. Ento. Soc., xxiii, p. 12, pl. 3, fig. 2.

The type of this species came from Mariposa Co., California, June 16, 1914. In the collection of the United States National Museum there is a male also from Mariposa Co., Calif. It has been compared with the type and is like it in every particular, except that it is larger, expanding 90 mm. Lately Dr. F. E. Blaisdell has sent to me two males and a female collected by him at Hullville, Lake Co., Calif., June 13, 1917. The female is the first one I have seen and is colored, as are the two males, almost exactly as in the male type. The size is very nearly the same. Beneath the notch in the last ventral segment is remarkable for its great breadth; at its central portion there

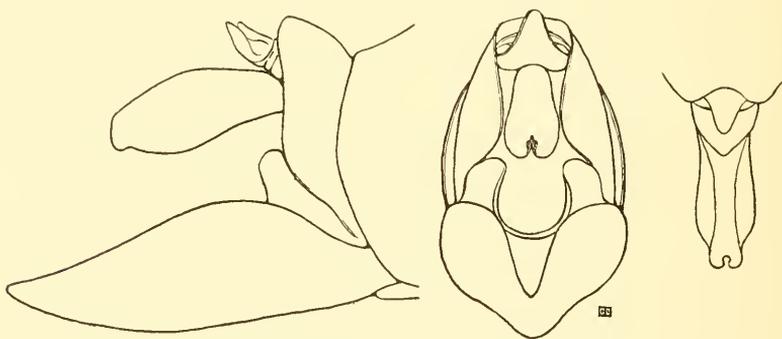
is a minute sinuation just opposite the ovipositor. The straight outer margin of the fore wings and the broad head with slightly protruding front, are conspicuous features of this large species.

A male and female collected at Bellevue, Washington Co., Utah, June 21, 1919 (Tom Spalding) are like the specimens examined from California.

***Okanagana vandykei* Van Duzee.**

1915. Journal N. Y. Ento. Soc., xxiii, p. 38.

Reported in the original description from Carrville, Trinity Co., Calif., June 29, 1913; Nash Mine, Trinity Co., Calif., June 29, 1913, 8,000 ft., and Plumas Co. Calif., June. To these records may be added a female from Keddie, Plumas Co., Calif., June 7, 1918, 3,500 ft. (F. M. Jones), Davis collection. We have examined a male from



*OKANAGANA VANDYKEI*

Riddle, Oregon, June 18, which is like the paratype from Plumas Co., with the same long, orange colored valve, orange marks on pronotum, etc., except that the front is more prominent and black. A female from Forest Grove, Oregon, July 30, 1917 (Catherine Jones collector), has the body colored as usual, but the costal margin of the fore wings to the end of the radial cell is bright green instead of the more usual orange. The first anal vein is also bright green, and the basal cell is darkened along the hind margin.

***Okanagana lurida* new species. Pl. xix, fig. 3.**

Type male from Pulman, Washington (C. V. Piper). Collection U. S. National Museum.

Resembles *Okanagana vandykei* in color but has less dark markings, and is more shining. The uncus is not as deeply cleft at extremity as in that species. It is probably generally smaller, judging from the type.

Head slightly narrower than the front margin of the pronotum;



*OKANAGANA LURIDA*

front moderately produced. Median sulcus of the front not very deep. Pronotum with the humeral angles rounded, the lateral edges rather rough and uneven, and the anterior angles prominent. Last ventral segment hardly constricted at the sides, but evenly narrowed to the extremity, which is almost truncate. Uncus when viewed in profile sinuate on lower part with the greatest depth beyond the center; when viewed from behind shallowly notched. Fore wings with the venation almost entirely straw colored; the veins about the marginal cells are fuscous, and the basal cell is clear or nearly so. The membranes at the base of both pairs of wings are bright orange. Head reddish straw-colored with a short irregular blackish mark each side of the central ocellus, and a blackish dot between each hind ocellus and the eye. Front and the transverse rugæ black. Pronotum reddish straw-colored with a central band, narrowest in the middle, black; also blackened irregularly in the grooves, and a submarginal black band posteriorly and on the sides. Mesonotum almost entirely reddish straw-colored; the region covered by the W mark blackened; and an irregular central black band extending from thence to the elevated X, which is pale, but the adjoining depressions are black. Metanotum reddish straw-colored, with a submarginal blackened area. Tergum black, with each segment reddish straw-colored posteriorly.

The uncus is black. Beneath the legs are almost entirely light in color blackened at the knees, the abdominal segments are covered with much short hair; are reddish straw-colored margined anteriorly with red. In addition each segment has two dark colored basal blotches more or less connected, one each side of the center. The valve is dark colored on the lower surface, lighter near the upper margins, and when viewed in profile it does not extend as far beyond the end of the uncus as it does in *vandykei* and *ornata*.

## MEASUREMENTS IN MILLIMETERS.

	Male Type.
Length of body .....	26
Width of head across eyes .....	7.5
Expanse of fore wings .....	62
Length of valve .....	5

**Okanagana ornata** Van Duzee.

1915. Journal, N. Y. Ento. Soc., xxiii, p. 33.

In the collection of the American Museum of Natural History there is a male labeled "Nevada." We have also examined a male from Hood River, Oregon, June 10, 1916, in the collection of the Oregon Agricultural College, and a female from Blue Canyon, Calif., June 7, 1909 (Ball), in the collection of Dr. E. D. Ball. In the writer's collection there are two males and one female from Sonoma Co., Calif., one of the former being the allotype of the species, and a male from Keddie, Plumas Co., Calif., June 28, 1918, 3,500 ft., collected by Mr. Frank M. Jones of Wilmington, Delaware, who kindly presented it to me. This is a very bright and contrastingly colored species. Mr. Van Duzee states "This species may be recognized by its black, almost immaculate upper surface with bright orange venation."

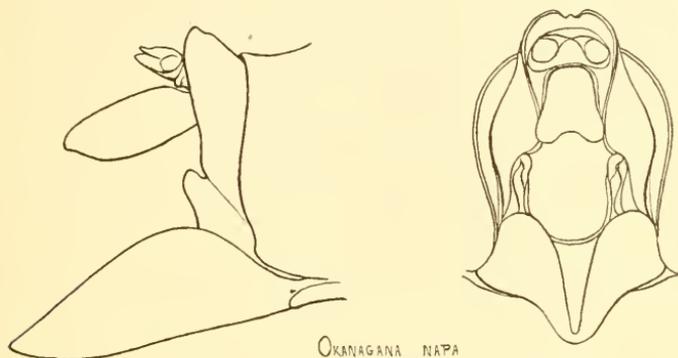
**Okanagana napa** new species. Pl. xix, fig. 4.

Type male from Napa County, Calif. (J. J. Rivers). Collection U. S. National Museum.

Resembles *Okanagana ornata* in size and in being shiny, but is lighter colored, has a larger head and a shorter uncus.

Head quite broad and nearly of the same width as the front margin of the pronotum; front not prominent; median sulcus well defined. Pronotum

with both the humeral and anterior angles rounded, the latter much more so than in either *lurida* or *ornata*. Last ventral segment gradually narrowed to the extremity which is sinuated with the angles much rounded. Uncus when viewed in profile short with the lower side much straighter than in *lurida*; when viewed from behind, shallowly notched. Fore wings with the venation almost entirely straw colored, slightly darkened about the marginal cells; the basal cell is clear. The membranes at the base of both pairs of wings are



orange, but these as well as the venation, lack the bright color of *ornata*. Head black with the grooves, front and the region of the transverse rugæ almost wholly dull orange. There is a broken black band consisting of four spots extending across the front, and the hollows between the transverse ridges are narrowly lined with fuscous. The terminal part of the rostrum is black, the base is pale. Pronotum black centrally, but margined all round except at the anterior angles with dull orange, and the orange of the grooves considerably spread. This leaves only the central part black, with some irregular black marks on the ridges between the grooves, and a submarginal black band along the sides and posterior margin. Mesonotum dull orange with four obconical black marks on the anterior margin, and a central spear-shaped mark extending toward the orange elevated  $\times$ . There is a black dot each side at the anterior extremities of the  $\times$ , also an interrupted black band extending each side from the  $\times$  to the base of the fore wing. Metanotum edged posteriorly with orange. Tergum shining black, with the segments narrowly edged posteriorly with orange. The uncus is black. Beneath the legs are light colored except at the knees and the fore femora are somewhat blackened on the inner side; the abdomen is light, except the usual dark spot centrally near the base, and the valve is also light in color.

#### MEASUREMENTS IN MILLIMETERS.

	Male Type.
Length of body .....	24
Width of head across eyes .....	7.5
Expanse of fore wings .....	58
Length of valve .....	4.5

**Okanagana schaefferi** Davis.

1915. Journal N. Y. Ento. Soc., xxiii, p. 19, pl. 3, fig. 4.

This species was described from a single male in the collection of the Museum of the Brooklyn Institute of Arts and Sciences, from Iron Co., Utah, 1904. In June, 1917, Mr. George P. Engelhardt of the Brooklyn Museum collected a number of specimens in the foot hills of the Kolob Mts., Washington Co., Utah, and kindly gave me seventeen males and two females. Other specimens examined have been a male, Manti, Sampete Co., Utah, June 23, 1903, collection Dr. E. D. Ball, a male from Salida, Colorado, June, 1885, collection University of Nebraska, and a female from Jemez Springs, 6,400 ft., New Mexico, June 17, 1919 (J. Woodgate). A noticeable feature of this large insect is the strongly protruding front of the head.

**Okanagana occidentalis** (Walker).

1866. Walker in Lord's Naturalist in Vancouver Island and British Columbia, ii, p. 339.

This species was listed as a synonym of *rimosa* Say by Distant in his Synonymic Catalogue of Homoptera (1906), but it is distinct from that species, and from *Okanagana bella* described in this paper, which it more closely resembles. The most noticeable differences between these three species have been mentioned in the table, and in series *occidentalis* is not as blue-black as *bella*, and the pubescence on the upper surface is more abundant and more golden in color. The true *rimosa* is a duller colored insect, the tergum not shining as in *occidentalis* and *bella*. Walker's description is poor and we may be in error in applying it to this species. The description would also apply to some specimens of *vanduzeei* except that they are usually too small. He states that the body is, 12 lines in length, is black, and that the mesothorax has two V-shaped testaceous marks, "which extend from the fore border to the disk, and are distinct except at the tips." These V-shaped marks are commonly present in what we have called *occidentalis*, and the tips are usually well defined. In *bella* the V-shaped marks are obscure or absent.

John Keast Lord in The Naturalist in Vancouver Island and British Columbia, has this to say of this species: "But there was one sound—song perhaps, I may venture to call it—that was clearer, shriller and more singularly tuneful than any other. It never ap-

peared to cease, and it came from everywhere—from the tops of the trees, from the trembling leaves of the cottonwood, from the stunted underbrush, from the flowers, the rocks and boulders . . . all chanting the same refrain. . . . It turned out to be an entirely new species, and now figures in the British Museum as *Cicada occidentalis*." Dr. Charles J. Gahan has written me under date of May 12, 1919, that this specimen cannot at the moment be located in the British Museum. It would appear from Lord's original narrative that the type locality for this species is in the north-eastern part of the present state of Washington in Colville Valley, where the Boundary Line Commission had its headquarters.

In the collection of the United States National Museum there is a female *occidentalis* from Victoria, Vancouver, H. G. Hubbard collector, which expands 70 mm. and is like many examples in the writer's collection; the last ventral segment is doubly notched and the basal cell in the fore wing is clear. From the collection of the University of Nebraska we have examined four males labeled British Columbia (G. W. Taylor). From the collection of the Dept. of Agri. Prov. of Nova Scotia, a male collected by W. Downes at Armstrong, B. C., July 12, 1915; and from the collection of H. H. Lyman, a female from North Bend, B. C., July 24, 1890. Prof. A. L. Lovett of the Oregon Agricultural College, has kindly sent the following material from the collection of that institution: Eureka, Wash., June 30, 1895, female; Rainier, Or., July, 1905, male (Thayer); Sauvier's Island, Or., June 8, 1906, male (Farrell); Dixie, Wash. Co., Or., July 31, 1907, male; Oswego, Or., June 5, 1904, female (Ewing), June 8, 1907, female (George Ewing), July 7, 1907, female (George Ewing); Willamina, Or., July 2, 1911, female; Philomath, Or., Aug. 14, 1906, female (Schrack); Corvallis, Or., June 2, 1906, male (Buchanan), June 12, male, July 10, 1896, male, Sept. 2, 1911, female, Sept. 9, 1906, male (Woods); Cascadia, Linn Co., Or., male, July 28, 1903 (Rosendorf), Aug. 1, 1903, male (Rosendorf). Two females from Dilley, Oregon, are in the writer's collection.

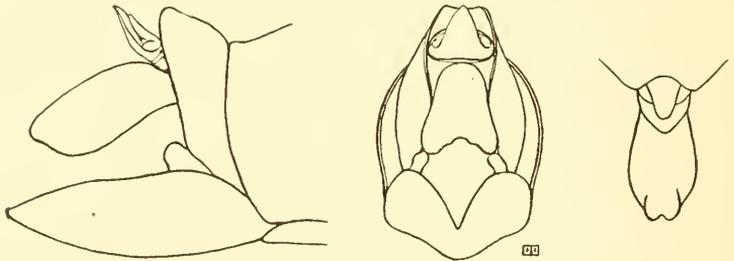
Mr. Otto Huellemann of Wallace, Idaho, has sent me 51 specimens of this species collected near his home, in the years 1915 to 1918 inclusive. Three were collected in May, eight in June, and forty in July. Judging from those received they were very plentiful in

July, 1917. The specimens of this long series are uniform in appearance, they are black above with the hind margin of the pronotum orange, four orange spots arranged in a semi-circle before the mesonotal  $\times$ , and the  $\times$  itself with the elevated parts touched with orange. The basal cell of the fore wing is clear. The last ventral segment in the females is doubly notched.

*Okanagana bella* new species. Pl. xx, fig. 1.

Type male from Stockton, Utah, June, 1915, and allotype female from Soldiers' Canyon, Stockton, Utah, June 27, 1915 (Tom Spalding). Davis collection.

Resembles *Okanagana occidentalis*, but differs as indicated in the remarks on that species, and in the characters given in the table.



OKANAGANA BELLA

Head rather small and not quite as broad as the front margin of the pronotum; front moderately produced; median sulcus well defined. Pronotum with the humeral angles rounded; the anterior angles prominent and slightly rounded. Sides of pronotum have a few irregular serrations. Last ventral segment longer than in *occidentalis*, and with the sides curved inward to the extremity which is rounded. In some specimens from southern Utah the extremity of the segment is slightly sinuate. Uncus when viewed in profile not hooked at extremity, short and slightly deeper beyond the middle; when viewed from behind, with a shallow notch at extremity. Last ventral segment of the allotype has a broad simple notch, but in some of the paratypes there is a slight indication of a second notch. Fore wings with the costa orange to the end of the radial cell, darker beyond; the subcostal vein is fuscous. Basal cell clouded; the remaining veins fuscous, except at the base of wing, which is orange; the membranes of both the fore and hind wings are vermilion. Head black with the supra-antennal plates and the grooves in front of the middle ocellus orange. The region of the transverse rugæ black bordered by orange. The rostrum is black, orange at base. Pro-

notum shining black, slightly bluish, with the sides and posterior margin orange; the front margin sometimes narrowly edged with orange. Mesonotum shining bluish black bordered on the sides posteriorly with orange. The elevated  $\times$  has the fore limbs touched with orange, in front of which are the usual four orange spots arranged in a semi-circle. In some of the darker specimens from Oregon the mesonotum is more nearly black. Metanotum black edged posteriorly with orange. Tergum shining black, with the same slightly bluish tint of the parts already described; the segments very narrowly edged posteriorly with orange, the orange most conspicuous at the sides. In some of the Oregon specimens the tergum is nearly all black. Uncus black. Beneath, the legs are orange blackened at the joints and considerably blackened on the inner side of the fore femora. The abdominal segments are blackened centrally, orange on the posterior margins, also with a black spot on each segment at the sides. Valve black, sometimes orange at the sides along the upper margin. In some of the specimens from Colorado the valve is entirely orange.

## MEASUREMENTS IN MILLIMETERS.

	Male Type.	Female Allotype. <sup>1</sup>
Length of body .....	25	23
Width of head across eyes .....	6.5	7
Expanse of fore wings .....	58	62
Length of valve .....	5	

Some of the paratypes represent a darker race, blacker on the legs, and in the fore wings the costal margin is not as conspicuously orange.

This insect has generally been considered the *Cicada rimosa* of Say, but that species is duller colored and appears to be more eastern in its range.

The following specimens of *Okanagana bella* have been examined:

Utah.—Logan, June 10, 1904, male; July 4, 1904, two females; June 22, 1906, four males, two females; Logan Canyon, June 19, 1909, three males and two females; July 4, 1909, two females, from collection Dr. E. D. Ball. Garland, June 11, 1904, male; June 18, 1904, male and two females, collection Dr. Ball. Wellsville, July 3, 1904, female, collection Dr. Ball. Salt Lake City, June 8, 1902, male, and June 15, 1902, male, Davis collection; male and two females without date labels (Dr. Henry Skinner), collection Acad. Nat. Sci., Philadelphia. Silver Lake, July (Dr. Skinner), collection Acad. Nat. Sci., Philadelphia. Mill Creek, June 20, 1906, two females (E. G. Titus),

Dr. Ball collection. Stockton, June, 1915, three males (Tom Spalding), and Soldiers' Canyon, Stockton, June 27, 1915, three males and two females (Tom Spalding), Davis collection. Santaquin, male and two females (T. H. Parks), Davis collection. Provo, June 3, 1910, female; June 4, 1910, two males; June 24, 1912, two males and two females (Spalding), Davis collection. Eureka, June 19, 1910, female (Spalding), Davis collection. Nephi, June 25, 1912, male, collection Dr. Ball. Cedar Mountains, Iron Co., 8,500 ft., July 11, 1917, seven males (Geo. P. Engelhardt), Davis collection. Kolob Mountains, Washington Co., 8,500 ft., June 30, 1917, eight males (Geo. P. Engelhardt), Davis collection.

Kansas.—Male and female with no date label, collection Acad. Nat. Sciences, Philadelphia.

Colorado.—Livermore, July 8, 1900, two males, collection Dr. Ball. Ft. Collins, June 29, 1901, two males and three females, collection Dr. Ball. Estes Park, male, collection Univ. of Kansas. Golden, June 26, 1911, male (C. A. Frost), Davis collection. Russell, June 24, male (H. S. Smith), Davis collection. Creede, 8,844 ft., Aug., 1914, female (S. J. Hunter), collection Univ. of Kansas. Durango, August 1, 1912, male (Oslar), Davis collection.

New Mexico.—Hot Springs, San Miguel Co., 7,000 ft., August, 1882, female (F. H. Snow), collection Univ. of Kansas. Jemez Springs, June, 1916, two females; July 5, 1916, female; June 14, 1917, female; June 20, 1918, two females; June 15, 1919, female (John Woodgate), Davis collection. Albuquerque, August 14, 1910, female (Oslar), Davis collection.

Wyoming.—Newcastle, male and female, collection Univ. of Nebraska. Yellowstone National Park, June 20, 1907, male; June 30, 1907, female; July 9, 1907, female (Col. Wirt Robinson), Davis collection.

Montana.—Nigger Hill, Powell Co., July, female (W. M. Mann), Davis collection. Sedan, July 1, 1906, four males. Corvallis, July 14, 1908, male. Gallatin Co., June 16, 1902, male (R. A. Cooley), and July 1, 1915, male. Bozeman, 4,800 ft., July, 1901, male and female (E. J. S. Moore); July 3, 1905, male; July 3, 1906, male; July 20, 1907, female; June 20, 1912, three males. Paradise Valley, Park Co., July 9, 1904, male and female. Billings, July 10, 1912, female. Cul-

bertson, Valley Co., June 29, 1911, female (J. R. Parker). Enid, July 12, 1912, male. Miles City, Aug. 4, 1915, male. All of the Montana records, the first one excepted, are from specimens in the collection of the Montana Agricultural Experiment Station.

Idaho.—Whitebird, June 29, 1907, male (Dr. J. M. Aldrich). Moscow, June 13, 1911 (Dr. J. M. Aldrich). Both of these records are from specimens in the collection of the University of Idaho.

California.—El Dorado Co., July, 6,280 ft., male (Dr. F. E. Blaisdell). Monachee Meadows, Tulare Co., 8,000 ft., July 17, 1917, male (G. R. Pilate). Top of Mt. San Antonio, 10,000 ft., Southern Calif., June 29, 1914, female (H. Newcomb). San Antonio Canyon, Ontario, July 25, 1907, male and female, Coll. Ohio State Univ. In these and some of the Oregon examples the basal cell of the fore wings is almost entirely black.

Oregon.—Corvallis, July 18, 1896, male and female without date. Salem, June 30, 1911, female. Crooked River, central Oregon, June 23, 1906, five males, three females. Minam Nat. Forest, July 5, 1914, female (W. J. Chamberlin). Baker City, July 6, 1906, male, and July 12, male. The above Oregon records from specimens in the collection of the Oregon Agricultural College. The following two from the collection of the U. S. Biological Survey: McDermitt, Malheur Co., June 5, 1915, male (E. A. Preble); Rome, Owyhee River, female without date label (E. A. Preble).

Lately Mr. L. P. Rockwood sent me for examination five males and one female collected at Baker City, June 17, 18 and 24, 1917, which have very dark colored bodies, the tergum showing but little red on the edges of the segments at the sides, the basal cell is nearly black; the anal membranes are vermilion and the costal margin of the fore wings is bright orange to the end of the radial cell. He also sent to me two males and a female collected by C. W. Creel, at Paisley, Lake Co., south central Oregon, on the borders of Chewaucan Marsh.

Washington.—Ephrata, Douglas Co., June 21, 1918, female (A. C. Burrill), collection U. S. Entomological Station, Forest Grove, Oregon.

Alberta.—Jasper, July 4, 1915, two males, collection Cornell University and Davis collection.

British Columbia.—Male without any date labeled "Brit. Col. (G. W. Taylor)," Davis collection. Lillooet, July 6, 1918, male (A. B. Baird), Baird collection.

*Okanagana rimosa* (Say). Pl. xx, fig. 2.

1830. *Cicada rimosa* Say, Jl. Acad. Nat. Sci., Phila., vi, p. 235.

1854. *Cicada noveboracensis* Emmons, Nat. Hist. N. Y. Ins., p. 152, pl. 9, fig. 6.

The principal characters given in the original description are: "Body black above, . . . a rufus spot over the antennæ; thorax obsoletely varied each side with piceus; posterior and lateral edges rufus: scutel with the elevated cruciform line, two spots before it, and two or three on each side rufus: . . . tergum, posterior edges of the segments rufus: beneath rufus, varied with black: . . . length to the tip of the hemelytra one inch and one-fourth." Say further adds: "Mr. Nuttall presented me two specimens, which he obtained on the Missouri, and I found one on the Arkansaw"; also: "On the prominent middle of the hypostoma is a very obvious impressed line."

The insect which he collected "on the Arkansaw," when he was with Major Long's expedition to the Rocky Mountains in 1819-1820, may not have been the same species as the two specimens mentioned first in the description and given to him by Nuttall, who obtained them along the Missouri River.

It next becomes important to ascertain, if possible, from what locality the type specimens of *Cicada rimosa* were obtained, and I have been to some pains to look up the original authorities. As an aid to this Dr. N. L. Britton, of the New York Botanical Garden, has sent to me some notes by Dr. P. A. Rydberg on the three journeys made by Thomas Nuttall, the botanist, to regions west of the Mississippi. It was on the first of these, namely in 1811, or Astoria expedition, that he collected the two specimens referred to, for the very good reason that in the second expedition of 1819-1820, he went along the Arkansas River, and did not touch the Missouri; and the third expedition started in 1834 after *Cicada rimosa* had been described.

John Bradbury, another botanist, was with the Astoria expedition, and in 1817 he published in London, England, a narrative of his travels in the interior of America. He and Nuttall accompanied Mr. Hunt from St. Louis up the Missouri as far as the Arickara Indian

village in the north central part of the present South Dakota, and in late June they both went about 150 miles still further north to the Mandan Indian village close to the site of the present city of Bismark in North Dakota, where they stayed for a few days before returning to the Arickara village. In Bradbury's account we read on page 226 the following from Mr. Cook's narrative of Mr. Hunt's expedition from the Aricaras to the Pacific. "Messrs. Hunt, Crooks, Miller, M'Clellan, M'Kenzie, and about sixty men, who left St. Louis in the beginning of March, 1811, for the Pacific Ocean, reached the Aricara village on the thirteenth day of June. . . ." Mr. Crooks was one of the partners and we quote his statement to show, among other things, that it was 1811 and not in 1810, as has sometimes been stated, that the Astoria party ascended the Missouri. From reading Irving's account one might easily get the impression that it was in 1810.

Irving in his Astoria says: "On the 18 of July Mr. Hunt took up his line of march by land from the Arickara village leaving Mr. Lisa and Mr. Nuttall there where they intended to await the expected arrival of Mr. Henry from the Rocky Mountains. As to Messrs. Bradbury and Breckenridge they had departed some days previously on a voyage down the river to St. Louis, with a detachment from Mr. Lisa's party."

Mr. Bradbury records that he started on July 17, and it took him until the end of July, or slightly longer, to reach St. Louis, and on page 193 he further states that Mr. Lisa with whom Nuttall had remained, arrived in St. Louis in November.

From the foregoing it will be seen that *Cicada rimosa* was no doubt taken close to the Missouri River in what is now North or South Dakota, for Mr. Nuttall did not arrive at the Aricara village until about the time the species of *Okanagana* emerge, and allowing him a month or more to reach St. Louis, he left the Indian village after their season was over.

We now know that there are several species of *Okanagana* that resemble *rimosa* and may be mistaken for it, but having located Mr. Nuttall's whereabouts in June, July, August and September, 1811, covering the time of emergence of these insects, we can more certainly identify the species by our examination of specimens from the same region. This has been done and a male collected at Sioux City

on the Missouri by A. W. Lindsey, and presented to me by Prof. H. F. Wickham, has been identified as *Okanagana rimosa*. This insect fits Say's description in every particular. The uncus is slightly more pinched or ridged on the dorsum, also the cleft at the extremity is somewhat deeper than in the males of *Okanagana noveboracensis* (Emmons) from New York and Maine, but in other particulars it appears to be the same. It is probable therefore that *noveboracensis* is the same as *rimosa*, certainly not more than a variety.

The fore wings in *rimosa* and *canadensis* (Provancher) are proportionately narrower than in any of the other species considered and in this particular the two Okanaganas that extend to the northeastern United States and eastern Canada, can thus be separated from the more western forms, *tristis* Van Duzee, excepted.

In addition to the Sioux City example already referred to, the following specimens have been examined:

Minnesota.—Itasca, July, 1908, female, and male and female labeled simply "Minnesota," collection University of Minnesota.

Wisconsin.—Bayfield, female (Prof. H. F. Wickham), Davis collection.

Manitoba.—Aweme, June 19, 1917, two males (N. Criddle), Davis collection. Treesbank, July 7, 1907, male, and June 11, 1914, male (N. Criddle), Davis collection.

Ontario.—Toronto, June 19, 1896, female, collection Dr. E. D. Ball.

Illinois.—Ogle Co., male (Uhler collection), U. S. Nat. Museum.

Quebec.—Kazubazua, Ottawa District, July, 1917, male, collection C. B. Gooderham.

Pennsylvania.—Cresco, Monroe Co., June 9, 1918, female (J. N. Knull), Davis collection. Echo Lake, Pike Co., July 8, 1910 (E. Shoemaker), Davis collection.

New York.—Ithaca, July 25, 1916, female, and August 1, 1916, male, collection Cornell University. Windsor, Broome Co., June 5, 1918, female, and June 7, 1918, female (Notman), Howard Notman collection. Wilmington, Essex Co., July 12, 1914, male (Davis), Davis collection. Rockaway Beach, Long Island in wash-up, June 26, 1909, female (Geo. P. Engelhardt), collection Museum Brooklyn Institute Arts and Sciences, and June 14, 1914, female (Ernest Shoemaker), Davis collection.

Massachusetts.—North Saugas, July 8, 1907, male (D. H. Clements), U. S. Nat. Museum. Melrose Highlands, June 4, 1911, two males (H. E. Smith), U. S. National Museum. Medford, male (J. H. Rogers), Boston Soc. Natural History. Lawrence, male (J. O. Treat), Boston Soc. Natural History. Concord, June 25, 1854, male, Harris collection, and June 17, 1914, male (W. Reiff), Boston Soc. Natural History.

New Hampshire.—Chocorua, August 12, 1917 (Linder), Boston Soc. Natural History.

Maine.—Cumberland Co., July 11, 1916, male and female, and July 12, 1916, two males (A. S. Nicolay), Davis collection. Brunswick, male (A. S. Packard), Boston Society Natural History. Hampden, July 10, 1907, two males (C. W. Johnson), Davis collection. Orono, July 13, 1906, male, July 31, 1906, male, and July 18, 1913, female, collection Me. Agri. Exp. Station. Harrington, June, 1908, Boston Soc. Natural History. Columbia, July 8, 1912, two males, three females (S. F. Blake), Davis collection; July 3, 1912, male and female, and July 8, 1912, male and three females (S. F. Blake), Boston Soc. Natural History.

Nova Scotia.—Truro, July 5, 1913, male (L. G. Saunders), Saunders collection.

The song of this species continues for some time and somewhat resembles the sound produced by *Necoconocephalus retusus* or *N. robustus*, two of the large, long-horned katydid-like insects. Though we have not been able to collect them, we have heard cicadas of the genus *Okanagana* singing on Crow's Nest Mt., West Point, N. Y., on June 15, 1913, and again on June 13, 1914, and Col. Wirt Robinson collected a pupa-skin on the same mountain. We have also heard them singing in Letchworth Park, Portage, N. Y., June 13, 1915; near Potter's Swamp, Yates Co., N. Y., June 14, 1915, and in Egles-ton's Glen on the east side of Lake Keuka, N. Y., June 15, 1915.

*Okanagana canadensis* (Provancher). Pl. xx, fig. 3.

1889. Petite Faune Entomologique du Canada, iii, p. 213.

This name is placed by most authors as a synonym of *rimosa*, but we think incorrectly. *Okanagana canadensis* on the whole is a larger species than *rimosa*; it is also blacker with the upper portions especially the tergum adorned with much tomentum, different from the

vestiture of *rimosa*. While the pronotum is usually black edged posteriorly with testaceous, there are occasional specimens in which it is mottled each side with testaceous.

I am indebted to Prof. L. M. Stöhr of Ironside, Quebec, for a long series of this species. On June 21, 1916, he collected a male; in 1917 he collected in all 39 specimens as follows: June 22, 2 males; June 23, 4 males; June 24, 3 males; June 26, 3 males; June 27, 6 males; June 28, 7 males; July 2, male; July 19, male and female; July 22, female; July 26, 5 males, 1 female; July 28, 2 males; July 30, male, and Aug. 15, female. In 1918 he collected ten specimens as follows: June 14, male; June 15, male; June 19, 3 males; June 20, female; June 25, 2 males; July 30, male; July 31, male. In June, 1919, he collected eighteen males and five females. These insects are alike and very black in appearance with the venation of the front wings somewhat thickened. When the wings are closed they show the narrow testaceous hind border of the pronotum, a spot each side at the base of the fore wings, four spots arranged in a semi-circle in front of the  $\times$ , and the higher parts of the  $\times$  itself usually touched with testaceous.

Prof. Stöhr writes as follows concerning this species: "It is almost exclusively on pines; I have heard it, however, on cedar trees, and in two instances on willows. Usually it perches at the very extremity of the trees, often only a few inches below the terminal bud, or at the end of the branches. In order to begin the hunting one moves toward the cluster of trees from whence the song seems to proceed. It is, however, difficult to take one's bearings for the noise now seems to come from the left and now from the right. Conditions still get worse when the suspicious insect suddenly stops its song while one is looking his eyes out in order to locate it, and absolute silence follows the loud clamour. If one has not ascertained with certainty the exact position of the insect, he might better try his luck elsewhere, if he does not want to take too many chances. Once a tree found on which an *Okanagana* sits, the ascent begins. When the song has not stopped before, invariably it ceases then, and from the top of the pine one has no other resource than to inspect branch by branch and with good luck one may thus detect the Cicada perched on a twig, the dark color of the bark making it diffi-

cult to distinguish the insect. After ten minutes or more of silence it flaps its wings spasmodically and accompanies the manœuvre with a low rattling sound; after that the song starts monotonous and strident." The cicadas commence to sing about 9 in the morning and continue until about 5 o'clock in the afternoon or even later. In catching the insects Prof. Stöhr states that he got the best results by enveloping his hand with a net used for taking minnows, the narrow meshes of which would coop up the cicada and prevent it from slipping through the fingers.

In addition to those already mentioned the following specimens of *canadensis* have been examined: Sudbury, Ontario, 1893, female, Davis collection; Hymers, Ontario, June 26, 1913, male, and male without date (H. Dawson), Davis collection; Nipigon, Ontario, July 9, 1907, male and female (Dr. Skinner), Academy Nat. Sci. Philadelphia. Niagara Falls, N. Y., female, Am. Museum Nat. History; Schoharie, Schoharie Co., N. Y., June 14, 1918, male (H. Notman), Notman collection; Enfield Falls, N. Y., August 3, 1901, collection University of Minnesota. Charter Oak, Huntingdon Co., Pa., July 11, 1917, male and female (J. N. Knull), Davis collection. Through the kindness of Prof. F. M. Gaige, we have been able to examine the following from the collection of the University of Michigan: Porcupine Mts., Upper Michigan, Aug. 13, 1904, male (A. G. Ruthven); Isle Royale, Michigan, 1878, three males.

***Okanagana tristis* Van Duzee.**

1915. Journal N. Y. Ento. Soc., xxiii, pp. 26, 35.

In the original description based on specimens from Northern California it is stated that, "The elongated form, somber black color and fulvous venter will distinguish this form." It is also quite a large insect. As in *occidentalis* the notch in the last ventral segment of the female is double, but in addition to being differently colored, it is larger than *occidentalis* and has narrower wings.

Specimens have been examined as follows:

California.—Dunsmuir, July 20, three males (Dyar and Caudell), U. S. Nat. Museum; Keddie, Plumas Co., 3,500 ft., June 29, 1918, female and July 7, 1918, female (F. M. Jones), Davis collection; Plumas Co., June 16, 1913, male (Nunenmacher), Davis collection; Eldridge, Sonoma Co., paratype, female, Davis collection; Eldridge,

male, Davis collection; Sonoma Co., female, Davis collection; Trinity Co., June 6, 1917, female (E. R. Leach); Santa Cruz Co., July, 1917, male (E. R. Leach), Davis collection.

Oregon.—Josephine Co., June 8, 1910, female, and June 9, 1910, male (Nunenmacher), Davis collection.

Washington.—Near Mt. Rainier, August 25, 1916, female (J. A. Kuche), Davis collection.

**Okanagana arctostaphylæ** Van Duzee.

1915. Journal N. Y. Ento. Soc., xxiii, pp. 26, 34.

This species was described from four males and one female from Calaveras Co., Calif., 1,800 ft., collected by Dr. F. E. Blaisdell. One of the male cotypes is now in the U. S. National Museum, and one in the writer's collection.

The uncus is not hooked at the extremity and so for convenience in identification the insect is considered here, but it and *rubrovenosa*, which has a hooked uncus, closely resembles each other. They are also both rather slender bodied insects. The color of the basal cell, costal margin, veins and membranes, is dull red in both species. In *arctostaphylæ*, however, the body is not as black as in *rubrovenosa*; it has a black band connecting the eyes; a black irregular spot behind the ocelli; sides of the pronotum blackened; collar of the same reddish color as the central part of pronotum; abdomen with a black dorsal vitta, broadest at the base.

**Okanagana canescens** Van Duzee.

1915. Journal N. Y. Ento. Soc., xxiii, pp. 26, 37.

The male type of this species came from Sonoma Co., Calif., July 14, 1908, and is in the collection of Dr. F. E. Blaisdell. Mr. Van Duzee also had a female from the Bay region of California when he wrote his description.

To these records we can add the following all from California. A male labeled "California," Am. Museum Natural History; Chico, two males (Dr. E. D. Ball); Alameda, July 12, 1911, male (Nunenmacher), Davis collection; Palo Alto, three males (C. H. Kennedy), Davis collection; Merced Co., two males, June 19, 1914, Davis collection. One of the males from Merced Co., and one from Palo Alto, have been examined by Mr. Van Duzee. In the U. S. National Mu-

seum there is a male from Santa Cruz Mts., Calif., that appears to belong to this species. It bears a label "New to Uhler, 1893." The lighter colors on the head, pronotum and mesonotum are much more extended than usual. The tergum is black; the uncus is the same as in *canescens*.

**Okanagana viridis** Davis.

1918. Journal N. Y. Ento. Soc., xxvi, p. 153, pl. 8, figs. 4-5.

This species was described from a male and female from O'Reilly, Mississippi, and so far they are the only specimens known. Its green color and size will serve at the present time to separate this remarkable insect from the other species of the genus.

**Okanagana aurantiaca** Davis.

1917. Journal N. Y. Ento. Soc., xxv, p. 9, pl. 2, fig. 4.

The three males and one female from which this orange and black species was described are supposed to have come from Lower California, Mexico. No additional specimens have been seen.

**Okanagana fratercula** Davis.

1915. Journal N. Y. Ento. Soc., xxiii, p. 20, pl. 3, fig. 5.

This was described from a single male in the collection of the Museum of the Brooklyn Institute of Arts and Sciences, from Iron Co., Utah. The following are additional records: Kolb Mts., Washington Co., Utah, 8,500 ft., June 30, 1917, male (George P. Engelhardt), Davis collection; Nephi, Utah, June 25, 1912, male (Dr. E. D. Ball), Davis collection; Blackfoot, Idaho, June 22, 1904, male (E. S. G. Titus), U. S. National Museum; Springfield, Idaho, July 24, male and female (H. Skinner), Acad. Natural Sciences, Philadelphia; Reno, Nevada, June 6, 1909, two males (Dr. E. D. Ball), Davis collection; Iron Springs, Cedar City, Iron Co., Utah, June 26, 1919, 5,750 ft., three males and twelve females (T. Spalding); Coal Creek, Iron Co., Utah, June 27, 1919, male (T. Spalding), Davis collection. The specimens from Nevada and Iron Co., Utah, may belong to a distinct and larger species with wing expanse as great as 65 mm. They have the front wings beautifully colored. The veins surrounding the marginal cells and first ulnar cell, are very dark, the remaining veins are bright yellow, and the basal cells is blackened. The tergum is blacker than in typical *fratercula*, segments seven and eight being the only

ones edged with orange on dorsum; valve yellow. The female from Springfield mentioned above is like the male type with which it has been compared, except that it expands 58 mm. instead of 46. The shape of the head and colors are the same. The last ventral segment shows a slight indication of a double notch.

**Okanagana oregona** Davis.

1916. Journal N. Y. Ento. Soc., xxiv, p. 233, pl. 11, fig. 1.

The original description was from the type, allotype, and thirteen other specimen, all from Oregon. Additional records are: Wren, Oregon, July 4, 1905, male; East Toll Gate, Oregon, July 15, 1906, female, and Mayville, Oregon, July 15, male, all from Prof. A. L. Lovett, and in the collection of the Oregon Agri. College. Mt. Moscow, Latah Co., Idaho, 5,000 ft., two males (T. Magee), from Prof. A. C. Burrill, Univ. of Idaho. Bridger Canyon, Gallatin Co., Montana, July 7, 1904, female, from Prof. R. A. Cooley, and in the collection of the Montana Agri. Experiment Station.

The venation in the wings of this small species is yellowish in color, and the wings are proportionately narrower than in the preceding species.

**Okanagana triangulata** Davis.

1915. Journal N. Y. Ento. Soc., xxiii, p. 14, pl. 3, fig. 7.

This species was described from a male collected in Mendocino Co., California, and a female in the collection of the American Museum of Natural History from Angel Island near San Francisco was cited as probably of the same species. Mr. G. R. Pilate has sent to me from Olancho, Inyo Co., California, 88 males and 84 females collected June 25, 1917, that agree with the type. They were very numerous at that time on the grass of the Olancho meadows, and Mr. Pilate states that his fingers became quite sticky from some alkaline substance that adhered to the insects as they crawled from the soil. While this species and *oregona* resemble each other, they may be separated by the characters given in the table, which appear to be constant for the long series examined. Four males have recently been received from Ukiah, Mendocino Co., California, May, 1919 (E. P. Hewlett).

***Okanagana synodica* (Say).**

1825. Journal Acad. Nat. Sci. Phil., iv, p. 334.

There is no other described *Okanagana* that closely resembles this narrow bodied, small-headed, yellow and black species, which Say recorded as inhabiting the base of the Rocky Mountains. It has a much greater distribution than has heretofore been given. The following specimens have been examined:

Montana.—Livingston, July 31, 1905, three males; Miles City, July 11, 1915, male, all from collection Montana Agri. Exp. Station.

Nebraska.—Squaw Canyon, Sioux Co., July 20, 1892, three males; War Bonnet Canyon, eight males, ten females; Bad Lands north of Monroe Canyon, Sioux Co., July, on sage, five males (M. A. Carriker, Jr.), and male and female, June 21, 1911 (R. W. Dawson); Big Spring, June 29, 1912, eight males (E. M. Harrison). All Nebraska records from collection University of Nebraska.

Kansas.—Hamilton Co., 3,350 ft., five males (F. H. Snow); Rush Co., 2,060 ft., June 29, 1912 male (F. X. Williams), and Trego Co., 2,450 ft., July 12, 1912, male (F. X. Williams), collection University of Kansas. In the collection of Purdue University there are two females and a male labeled Kansas, and in the Academy Nat. Sciences, Philadelphia, two examples without date.

Colorado.—Denver, May, male; six males and a female without date, and a male labeled "on prairie around Denver, Col., May" (Oslar), Davis collection. Ft. Collins, male (Pergande and S. Henshaw), Mus. of Comparative Zoölogy, Cambridge, Mass. Ft. Collins, June 18, 1900, two males; Pueblo, June 15, 1900, male, and Larmar, June 17, 1900, three females, collection Dr. E. D. Ball. Salida, July 2, 1885, three males and three females, and four males, 1885, collection University of Nebraska.

New Mexico.—Female labeled "New Mex.," Davis collection. Male labeled "New Mex." Museum of Comparative Zoölogy, Cambridge, Mass. Sandia Mts., N. M., male, collection Florida Agri. Exp. Sta.

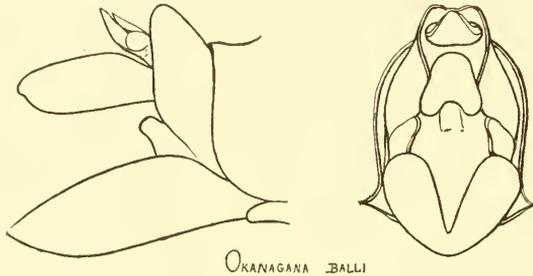
Texas.—Tascosa, June 1, 1918, male (Miss M. McGill), Davis collection.

***Okanagana balli* new species.** Pl. xx, fig. 5.

Type male from Little Rock, Iowa (Dr. E. D. Ball), and allotype female from same locality. Davis collection.

This is a small species a little larger than *synodica*, with the wings not quite as transparent as usual, which is also the case in *synodica*.

Head not quite as broad as the front margin of the pronotum; front rather prominent. Median sulcus of the front well defined. Pronotum with the humeral angles rounded and the anterior angles rather prominent. Last ventral segment with the base about as long as the sides, which gradually converge to the truncate extremity. Uncus when viewed in profile situated



ORANAGANA BALLI

but not hooked at the end; when viewed from above evenly curved and narrowed to the extremity which is notched. The last ventral segment in the female allotype is doubly notched. Venation of both pairs of wings yellowish, the costal margin of the fore wings a little darker beyond the radial cell; basal cell yellowish and translucent. The membranes at the base of both pairs of wings are orange-red in color. Dorsum partly clothed with short golden hairs especially on the abdomen along the posterior margin of the segments; beneath the pubescence is short. Head black with all of the grooves and supra-antennal plates testaceous, beneath black in the region of the transverse rugæ, which are margined with testaceous; rostrum pale at base. Pronotum black variegated each side, especially in the grooves with pale, and margined all around, except for a short space at humeral angles with testaceous. Mesonotum black, with the hind margin, the elevated X, two spots at the anterior extremities of the X, and the posterior part of the W-mark, testaceous. Metanotum black, posteriorly margined with testaceous. Tergum black, the segments narrowly edged posteriorly with testaceous. Uncus black with a dorsal pale stripe. Beneath pale, including the valve; the usual black spot at the base of the abdomen; legs pale, femora darkened.

MEASUREMENTS IN MILLIMETERS.

	Male Type.	Female Allotype.
Length of body .....	19.5	20
Width of head across eyes .....	6	6
Expanse of fore wings .....	47	51
Length of valve .....	4	

*Okanagana balli* looks something like a small *rimosa*, but is more yellow in color, and the transverse fold crossing the fore wings at the node is sometimes developed, as it is in *synodica*.

The first specimen I examined of this species came from Dr. O. S. Westcott, Oak Park, Ill., but was without locality or date label. In the U. S. National Museum there is a female labeled Winona, Minn., and in the Uhler collection in the same museum, there is a male from Greene Co., Iowa, labeled "Tibicen n. sp., Stal." In Prof. Albert P. Morse's collection there is a male labeled Little Rock, Iowa, and Dr. E. D. Ball has sent to me fifteen males and one female from Little Rock, Iowa. It is evident that at the time they were collected they appeared as a swarm, but unfortunately they bear no date. In the collection of the University of Minnesota there is a male labeled Rock Co., Minn., June 24, 1910, and four other males without locality labels. In the collection of the South Dakota State College, there are five males and two females labeled Brookings, S. D., and a male and female labeled S. D. These and the specimens mentioned above closely resemble one another in size and markings.

***Okanagana rubrovenosa* Davis.**

1915. Journal N. Y. Ento. Soc., xxiii, p. 11, pl. 3, fig. 1.

The following records are additional to those given in the original description: Sonoma Co., Calif., July 4, male (O. Sack), U. S. Nat. Museum. The label further states, "Its note is continuous (not intermittent) and not loud. It resembles the whirring of a bee in confinement." Hullville, Lake Co., Calif., June 13, 1917, two males, three females (Dr. F. E. Blaisdell). Ukiah, Calif., May, 1919, three males (E. P. Hewlett). Keddie, Plumas Co., Calif., 3,500 ft., June 24, 1918, two males, and June 28, 1918, male and female (Frank M. Jones). In transmitting these specimens and a twig in which a cicada had oviposited, Mr. Jones writes: "The red cicada, of which there are four examples, was locally abundant and in constant song in the manzanita bushes, and the manzanita twig showing egg-deposit almost certainly belongs to this species, though I did not see the female at work."

The female of this beautiful insect has never been described. The one collected by Mr. Jones expands 64 millimeters and is of the same color as the type; the body black above covered with short reddish

hairs, which gives it a rusty appearance. The tergum is black where denuded of hair. Beneath the abdomen is densely clothed with hair, black in color with the hind margin of the segments dark red. The notch in the last ventral segment is double. There are the same patches of silvery hairs at the base of the fore wings as in the type. The three females received from Dr. Blaisdell are like the one just described, except that they are a little smaller.

**Okanagana vanduzeei** Distant.

1914. *Ann. Mag. Nat. Hist.*, ser. 8, xiv, p. 165.

1914. *a. var. consobrina* Distant. *Ann. Mag. Nat. Hist.*, ser. 8, xiv, p. 165.

1914. *b. var. californica* Distant. *Ann. Mag. Nat. Hist.*, ser. 8, xiv, p. 166.

The type locality for *vanduzeei* and what are here considered as two varieties of that species, is San Diego Co., California.

Through the kindness of Prof. Wm. S. Wright I have received 86 males and 9 females of *vanduzeei*; 25 males and 12 females of var. *consobrina* and 2 males of var. *californica* collected at Dulzura, San Diego Co., Calif., from June 12 to 25, 1917. Prof. Wright considered that he had collected in this long series but one species, and describes its song as follows: "It is low, long continued and sweet. They will sing for nearly half an hour without a quaver; they usually are to be found setting high up in the brush, seldom in the trees."

In addition to the specimens already mentioned the following have been examined, and unless otherwise stated they are in the writer's collection.

San Diego, Calif., May 6, 1916, twelve males, two females (Prof. Wm. S. Wright); San Diego, Calif., June 25, 1914, two males determined as *vanduzeei* and collected by Mr. Van Duzee; Santa Catalina Island, June, 1917, male; Santa Rosa Island, male, collection Am. Museum Nat. History; Los Angeles, Calif., June 10, 1916, male (A. C. Davis); San Jose, Calif., July 4, four males (King), collection Dr. E. D. Ball; Alameda Co., Calif., June 29, 1914, nine males, June 30, 1914, thirty-four males and two females (F. W. Nunenmacher); Piedmont, Alameda Co., Calif., July 22, 1912, two males, May 18, 1917, male, and July 2, 1917, eight males (Nunenmacher); Contra Costa Co., Calif., June, male; Keddie, Plumas Co., Calif., 3,500 ft., June 26, 1918, male (F. M. Jones); Oroville, Calif., July 24, 1912, male (E. D. Ball), collection Dr. Ball; Lassen Co., Calif., June 5,

1913, female (Nunenmacher); Twin Falls, Snake River Canyon, Idaho, July 6, 1917, female (Mrs. A. C. Burrill). Mr. Van Duzee has recorded this species as far north as Mt. Rainier, Washington.

Mr. E. R. Leach has sent to me the following specimens of a small form of *vanduzeei* expanding from 50 to 55 millimeters: Trinity Co., Calif., July 18, 1917, two males, one female, and June 17, 1918, two females.

Of variety *consobina* the following have been examined: San Diego Co., Calif., May 22, 1914, three males; May 23, 1914, one male; May 24, 1914, two males (E. P. Van Duzee). La Jolla, San Diego Co., Calif., June, 1916, six males and a female; August 1, 1917, one male (Geo. P. Engelhardt). Santa Monica, Los Angeles Co., Calif., May 28, 1916, male and two females (A. C. Davis), Los Angeles Co., Calif., July 8, 1916, male; Pasadena, Calif., July, 1917, male, and May, 1918, two males (Alonzo C. Davis). Santa Barbara, July 7, 1907, two males (Prof. Jas. S. Hine); San Jose, Calif., July 4, two males, one female (King), collection Dr. E. D. Ball; Polo Alto, Calif., male (C. H. Kennedy); Whitebird, Idaho, June 28, 1907, female (Dr. J. M. Aldrich). Two of the San Diego specimens have been identified as *consobrina* by Mr. Van Duzee, and several of the seven individuals from La Jolla approach typical *vanduzeei*.

Of variety *californica* the following have been examined: San Diego Co., Calif., July 9, 1913, male, collected and determined by Mr. Van Duzee; July 12, 1913, eight males; Aug. 3, 1913, one male (Prof. W. S. Wright); August, male, came to light. Pasadena, Calif., July 2, 1917, male (A. C. Davis).

In the JOURNAL OF THE N. Y. ENTO. SOC., March, 1915, Mr. Van Duzee suggests that *californica* may be a variety of *vanduzeei*, rather than a separate species as originally described.

#### **Okanagana striatipes** (Haldeman).

1852. Stansbury's Exploration and Survey of the Valley of the Great Salt Lake of Utah, p. 369, pl. 9, fig. 16.

No definite type locality is mentioned by Haldeman in the original description, which calls for an insect expanding 52 millimeters, with a prominent face; beneath yellow, end of rostrum, a few points near the joints of the feet and a transverse line at the base of the abdomen, black. The tergum is black with the margins of the segments yellow.

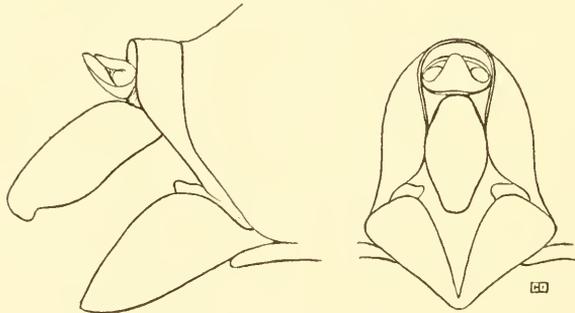
This is not an uncommon species in Utah, and neighboring states, and the following specimens have been examined: Honeyville, Boxelder Co., Utah, 1907, female (E. G. Titus), and Logan, Cache Co., Utah, July 13, 1907, male, collection Dr. E. D. Ball. Promontory Pt., Great Salt Lake, Utah, July 11, 1911, male (Dr. J. M. Aldrich), collection University of Idaho; Salt Lake City, Utah, male (Dr. Henry Skinner), Acad. Nat. Sci. Philadelphia; Stockton, Utah, July, 1913, two males; July, 1914, four males; July, 1915, female; Sept. 2, 1916, four males, all collected by Tom Spalding and in Davis collection. South Creek, Beaver Co., Utah, two males (Engelhardt), Davis collection. Cedar Creek, Iron Co., Utah, 5,500 ft., July 9, 1917, seven males (G. P. Engelhardt); Bellevue, Washington Co., Utah, 4,500 ft., June, 1917, and July 7, 1917 (G. P. Engelhardt), Davis collection. Kanab, Kane Co., Utah, June 24, 1913, two males, collection Dr. E. D. Ball. Flagstaff, Arizona, June 29, 1892, two males, Davis collection. In Mr. Van Duzee's Catalogue of Hemiptera, California and Oregon are also given as localities.

**Okanagana utahensis** new species. Pl. xx, fig. 4.

Type male from Cedar Creek, Iron Co., Utah, 5,500 ft., July 9, 1917 (Geo. P. Engelhardt), Davis collection.

Allotype female from Stockton, Utah, July, 1914 (Tom Spalding), Davis collection.

Resembles *striatipes*, but is larger and darker colored, and the



OKANAGANA UTAHENSIS

vestiture of the pronotum and mesonotum is not an appressed pubescence as in that species, but contains many long silvery hairs.

Head about as broad as the front margin of the pronotum; front more protruding than in most species of the genus; median sulcus well defined. Pronotum with the humeral angles rounded and the anterior angles prominent. Last ventral segment constricted at the sides, then broadened out to the extremity, which has the outer angles rounded and a sinus centrally. Uncus when viewed in profile hooked at the end; when viewed from behind, the hook is seen to be notched. The last ventral segment in the female allotype is rather deeply notched. Venation of the fore wings testaceous, darker beyond the transverse fold. Costal margin of fore wing yellow to end radial cell, darker beyond; subcostal vein black, or nearly so in some of the paratypes; basal cell clouded, in some of the paratypes blackened; the vein (C<sub>2</sub>) on the inner side of the eighth marginal cell is usually light in color. Both pairs of wings variegated with black at base, with the membranes orange-red. Dorsum partly clothed with short silvery hairs, which are rather long in the cavities about the mesonotal X; in *striatipes* the hairs are short about the X and more golden in color. Beneath the vestiture is abundant, but the hairs are not long. Head black with the grooves and supra-antennal plates testaceous; beneath with the median sulcus orange; the transverse rugæ black; rostrum black, orange at base. Pronotum black, the grooves testaceous; bordered all around with orange, but more narrowly on the anterior margin. Mesonotum black, with the hind margin orange; the elevated X orange, variegated with black, and four orange spots arranged in a semi-circle in front of the X. Metanotum black, posteriorly margined with orange. Tergum black the eighth and ninth segments margined posteriorly with orange. Uncus black; in some of the paratypes there is a dorsal pale stripe. Beneath, black, the legs pale striped with black, and each abdominal segment edged posteriorly and on the sides with orange. In the allotype and some of the paratypes the black is reduced to an interrupted stripe on the central part of the abdomen, with a black spot each side on the segments. Valve pale variegated with black.

## MEASUREMENTS IN MILLIMETERS.

	Male Type.	Female Allotype.
Length of body .....	24.5	24
Width of head across eyes .....	8	8
Expanse of fore wings .....	60	64
Length of valve .....	3	

In addition to the type and allotype the following specimens have been examined, and unless otherwise stated, they are in the writer's collection.

Utah.—Logan, Cache Co., June 28, 1904, male, and male, July 13, 1907, collection Dr. E. D. Ball. Hyrum, Cache Co., July 27, 1904, two males, collection Dr. E. D. Ball. Wellsville, Cache Co., Utah,

July 3, 1904, male, collection Dr. E. D. Ball. Sandy, Salt Lake Co., Utah, July 3, 1908, collection Dr. E. D. Ball. Cedar Valley, Utah Co., Utah, male and female, collection Dr. E. D. Ball. Salt Lake City, June 13, 1897, male, Academy Nat. Sci. Philadelphia. Salt Lake City, two males and a female (Dr. H. Skinner), Acad. Nat. Sci. Philadelphia. City Creek Canyon, Salt Lake Co., July 4, male (Dr. H. Skinner), Acad. Nat. Sci. Philadelphia. Salt Lake, June 16, 1913, three males (L. P. Rockwood), Rockwood collection. Stockton, Tooele Co., July 21, 1913, female; July 31, 1913, female; July, 1914, two males, one female; September 2, 1916, two males and a female, all collected by Mr. Tom Spalding. Vineyard. Utah Co., Aug., 1917, two males, and July 2, 1918, male (Spalding). South Creek, Beaver Co., Utah, female (Engelhardt). Cedar Creek, Iron Co., 5,500 ft., July 9, 1917, two males (Engelhardt). Bucks Valley, Iron Co., female (Engelhardt). St. George, Washington Co., two males (Engelhardt).

Arizona.—Tuba, June, 1913, six males and one female (Dwight Franklin).

Idaho.—Payette, Canyon Co., male (Vastal), and Glenn's Ferry, Elmore Co., 1904, two males (Ewing), collection Oregon Agri. College.

Oregon.—Heppner, Morrow Co., July 11, 1906, three males, July 14, 1907, male; July 22, 1907, two males, and a female, all collected by Nettie Currin, and in the collection of the Oregon Agri. College. Ontario, Malheur Co., Sept. 3, 1905, female (Mallett). Oakland, Douglas Co., July 21, 1917, female, collection Oregon Agri. College. Riddle, Douglas Co., June 18, male, collection Oregon Agri. College.

Washington.—Logie Creek, Yakima Co., June 16, 1916, two males (C. H. Kennedy). Of these two males Mr. Kennedy writes, "they are from sage bushes and are a true desert species. They have a long shrill call, are shy, and hard to approach."

**Okanagana hesperia** (Uhler).

1876. Bulletin U. S. Geological and Geographical Survey of the Territories, i, p. 342.

Uhler states that his type was collected in the vicinity of Denver City, Colorado, by C[yrus] Thomas.

This species has been placed in the same genus with *Tibicnoides*

*cupro-sparsus* (Uhler), but it has the marginal cells of the fore wings more nearly of the length of the ulner cells as in *Okanagana* generally, whereas in *Tibicinoides cupro-sparsus* the marginal cells are quite short. The following have been examined:

Colorado.—Denver, July 13, 1909, male; July 14, 1909, male, and July 16, 1909, three males (W. J. Gerhard), Davis collection. Denver, July 27, 1912, male, and June 10, 1913, female (Oslar), Davis collection. Golden, July, male and female (Oslar); July 18, 1909, male (W. J. Gerhard), Davis collection. Fort Collins, June 28, 1900, three males, and July 16, 1903, female, collection University of Kansas; June 28, 1900, three males, three females, and July 17, 1900, five males, collection Dr. E. D. Ball; July 16, 1903, male (Van Duzee), Davis collection. Platte Canyon, Jefferson Co., July, two males (Oslar), Davis collection. La Junta, Otero Co., two males (Oslar), Davis collection. Trinidad, Las Animas Co., July 15, 1910, female, and male and female without date (Oslar), Davis collection.

Kansas.—Trego Co., 2,450 ft., July 12, 1912, five males, one female; July 13, 1912, three males; July 17, 1912, male (F. X. Williams), collection University of Kansas.

New Mexico.—Albuquerque, male (Oslar); Silver City, male; Jemez Springs, 6,400 ft., June 28, 1918, male, June 24, 1919, female (John Woodgate), all in Davis collection.

Arizona.—Graham Mountains, July 7, 1914, male (E. G. Holt), collection U. S. Bureau of the Biological Survey.

Montana.—Billings, July 16, 1904, male; Custer, Aug. 1, 1912, male, and Miles City, July 1, 1915, three males, collection Montana Agri. Exp. Station.

***Okanagana pallidula* Davis.**

1917. Journal N. Y. Ento. Soc., xxv, p. 213, pl. 13, fig. 8.

Only the type and nine paratypic males have been examined, all collected at Athlone, Merced Co., California, in July and August, 1917, by Alonzo C. Davis, as recorded in the original description.

***Okanagana uncinata* Van Duzee.**

1915. Journal N. Y. Ento. Soc., xxiii, pp. 27, 41.

1917. Journal N. Y. Ento. Soc., xxv, pl. 13, fig. 7.

The type locality for this species is Orange Co., California. Mr. Van Duzee has kindly sent me the type for examination, and also given me a paratype.

**Okanagana mercedita** Davis.

1915. Journal N. Y. Ento. Soc., xxiii, p. 16, pl. 3, fig. 8.

Only the type, the allotype and 16 males and 14 females from Merced Co., California, June 18, 1914, have been examined.

The short marginal cells in the fore and hind wings of this species, also in *O. minuta* and *Tibicinoides cupreo-sparsus* suggest a close relationship, and we think that they will ultimately be associated in the same genus. The supplementary transverse vein at the node is also more developed in *mercedita* and *minuta* than in most species of *Okanagana*, though not quite as well defined as in *cupreo-sparsus*, the type of the genus *Tibicinoides*.

**Okanagana minuta** Davis.

1915. Journal N. Y. Ento. Soc., xxiii, p. 17, pl. 3, fig. 6.

The original description was based on the type and 11 paratypic males, all from Sanford University, California, May 26, 1914 (C. H. Kennedy), and a female, Fresno Co., California (J. C. Bradley). Mr. Alonzo C. Davis has sent me three males collected at Lebec, Kern Co., Calif., June, 1918.

**Tibicinoides cupreo-sparsus** (Uhler).

1889. Trans. Md. Acad. Sci., 1, p. 43.

This small, beautiful, black and red species has been included in the table as an aid to the identification of species, and as has already been stated, probably *Okanagana mercedita* and *O. minuta* should be transferred to the genus *Tibicinoides*. The types mentioned by Uhler were two females captured near Los Angeles, California, by D. W. Coquillett.

The following specimens are in the writer's collection, all from southern California: San Diego Co., May 6, 1914, two males, and May 24, 1914, three males (E. P. Van Duzee); San Diego, July, 1914, three males (Prof. W. S. Wright); La Jola, June 10, 1915, three males (B. B. Fulton); Dulzura, San Diego Co., June 13-21, 1917, twenty males (Prof. W. S. Wright). In the collection of Dr. E. D. Ball, there is a male collected at Ontario, San Bernardino Co., June 12, 1908.

In the Transactions of the San Diego Society of Natural History, Vol. 2, p. 48, November, 1914, Mr. Van Duzee comments on this species as follows: "This very pretty little species was abundant this

season from April 26th until nearly the first of June. It occurs almost exclusively on a certain fine tufted grass, probably a *Poa*, growing on the hillsides about La Jolla and up Mission Valley and adjacent canyons as far as the Old Mission and perhaps farther. The bright red on the base of the wings gives this species a lively appearance when spread. Like *hesperia* Uhler it has the basal one half of the elytra infuscated. It has a shrill but feeble note which is long continued and easy to locate, but can rarely be heard for more than one hundred feet."

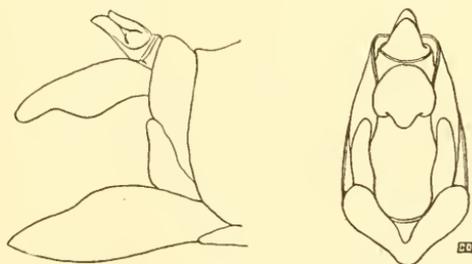
**Okanagodes** new genus.

In this genus the uncus is exposed as in *Okanagana* and the valve and wing venation are the same, but the pronotum is much narrower behind the eyes and the latter are exceedingly prominent. The front protrudes considerably and the supra-antennal plates are also prominent. The body is slim with the sides more parallel than in any known species of *Okanagana*. The type of the genus is the new species described below and figured on the accompanying plate.

**Okanagodes gracilis** new species. Pl. xx, fig. 6.

Type male and allotype female from Washington Co., Utah (Weidt). Davis collection.

A slim species the body in size about as in *Okanagana synodica*, but the



*OKANAGODES GRACILIS*

sides are more parallel and the wings are proportionately longer. Eyes vary prominent; fore part of pronotum considerably narrowed. The front is also very prominent with the median sulcus at first indistinct but lower down well developed; the supra-antennal plates are much enlarged. The result of these characters is to give the front of the head, when seen from above, a more uneven outline than in any *Okanagana* studied. The hook at the end of the

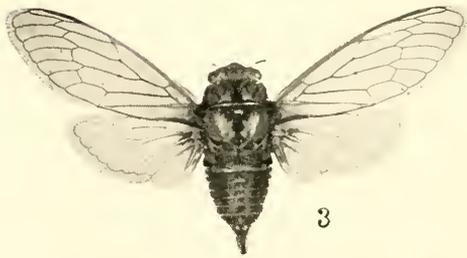
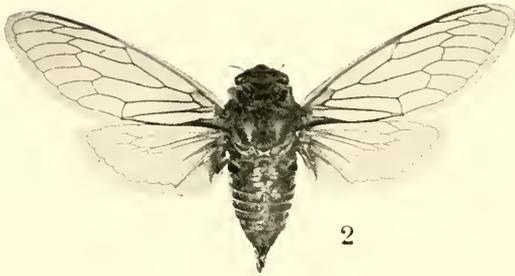
uncus is not much bent and it has no terminal notch. The opercula are small and the song apparatus plainly exposed. The comparatively few hairs on the underside of the abdomen are short and light colored; the last ventral segment is pubescent, constricted at the sides and rounded at the extremity. The insect is almost wholly straw-colored covered with a whitish pubescence; the eyes are darker and the ocelli are large and ruby colored. The transverse rugæ are darkened; there is an inverted V-shaped mark on the front between the supra-antennal plates. Pronotum with a dark-colored hour-glass-shaped spot centrally; the grooves darkened, and the posterior margin light-colored. Mesonotum with four cuneiform dark spots stretching backward from the anterior margin, the inner pair (the W-mark) not as long as the outer pair. A dark line extending from the base of each fore wing backward to the elevated  $\times$ ; two small dark spots at the anterior extremities of the  $\times$ . Metanotum with a small dark elongate spot near the base of each hind wing and a more rounded one above each tynpanum. Abdomen with the segments darkened at the base, but not on the sides. The costal margin of the fore wings straw-colored to the end of the radial cell, darkened beyond, the remaining veins and about the outer half of the wing also darkened. Basal cell clear. The anal membranes of the fore and hind wings are whitish, those of the hind wings include a clouded spot. Beneath there is a small elongate shining black spot each side near the base of the rostrum, which itself is blackened at the extremity. There is a dark spot at the base of each wing and dark lines at the base of the legs; the claws and spines of the legs also darkened. The usual dark spot centrally at the base of the abdomen. The allotype is colored as in the type except that there is a small dark spot at the side on each abdominal segment from the third to the seventh, and also a fainter one not in line with the others on segment eight. The notch in the last ventral segment is simple.

MEASUREMENTS IN MILLIMETERS.

	Male Type.	Female Allotype.
Length of body .....	19.5	20
Width of head across eyes .....	5	5.5
Expanse of fore wings .....	48	52
Length of valve .....	3	

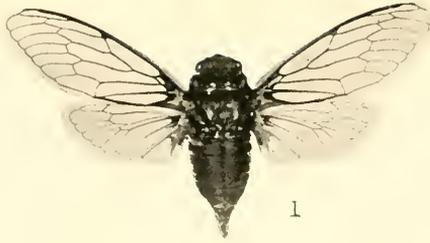
In addition to the type and allotype another male and female from the same locality and without date, are in the writer's collection, as is also a male from Maricopa, Pinal Co., Arizona, July 3, 1918, collected by A. M. Gaudin. This last has the body almost wholly straw-colored and shows but faintly or not at all the darker marks described in the type. In the collection of the Bureau of the Biological Survey, U. S. Department of Agriculture, there are eighteen males and five females, collected at Higley, Arizona, July 17 to 25, 1917, by E. G.



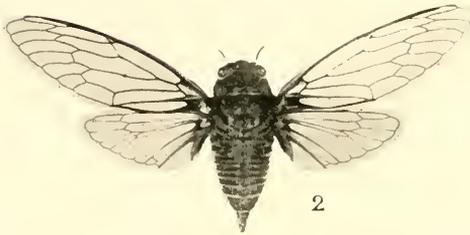


Cicadidæ.





1



2



3



4



5



6

Cicadidæ.

Holt. This series has individuals marked as in the type and others that are almost wholly straw-colored.

Several of the species of the allied genus *Clidophleps*, which comes next in the catalogue, were figured in the JOURNAL OF THE N. Y. ENTOMOLOGICAL SOCIETY, March, 1917.

#### EXPLANATION OF PLATES.

##### PLATE XIX.

- Fig. 1. *Okanagana magnifica* Davis. Type.
- Fig. 2. *Okanagana cruentifera* (Uhler).
- Fig. 3. *Okanagana lurida* Davis. Type.
- Fig. 4. *Okanagana napa* Davis. Type.

##### PLATE XX.

- Fig. 1. *Okanagana bella* Davis. Type.
- Fig. 2. *Okanagana rimosa* (Say).
- Fig. 3. *Okanagana canadensis* (Provancher).
- Fig. 4. *Okanagana utahensis* Davis. Type.
- Fig. 5. *Okanagana balli* Davis. Type.
- Fig. 6. *Okanagodes gracilis* Davis. Paratype.







## A NEW CICADA OF THE GENUS MELAMPSALTA.

By WM. T. DAVIS,

STATEN ISLAND, N. Y.

For some time the writer has been convinced that the little green Cicada mentioned by Thomas Say in connection with his *Cicada parvula*, now considered to be the same as *Melampsalta calliope* Walker, was really a distinct species separated by its smaller head, differently shaped body and genitalia, also by having five apical cells in hind wing.

Pending a longer paper on the genus with illustrations, the following description is presented.

### **Melampsalta kansa** new species.

Type male, Meade, Kansas, July (Warren Knaus). Davis collection.

Allotype female, Tascosa, Texas, June 28, 1919 (Miss M. McGill). Davis collection.

Head small, not quite as broad across the eyes as the width of the pronotum; wings proportionately broader than in *calliope*, uncus when viewed in profile not as curved as in that species; body slim with the sides more parallel than in *calliope*, and in the female the abdomen tapers more gradually. The ocelli are ruby colored as in *calliope*, but the body color and venation of the wings is grass green and not straw colored, and the male is without blackish marks on the thorax. The membranes at the base of both pairs of wings are almost white in color. Beneath the opercula are ample and rounded at the extremities, which come quite close together, whereas in *calliope* the extremities are quite far apart. The notch in the last ventral segment of the female

is deep in both species. The color of the underside is green, but lighter than above, and the tarsal claws, spines on fore femora, tip of rostrum and ovipositor, are darkened. In this species the males and females are more nearly of the same size than in *calliope* from Kansas and Nebraska.

## MEASUREMENTS IN MILLIMETERS.

	Male Type.	Female Allotype.
Length of body .....	13.5	15
Width of head across eyes .....	4	4
Expanse of fore wings .....	31	33

In addition to the type and allotype the following specimens have been examined:

Kansas.—Ellis Co., July 13, two females, received through Paul B. Lawson and M. C. Tanquary from Dept. of Entomology, Kansas State Agricultural College. I have seen three other green specimens from Kansas.

Texas.—Fredericksburg, Gillespie Co., May 29, 1906, male (J. D. Mitchell).

---

NORTH AMERICAN CICADAS BELONGING TO THE  
GENERA PLATYPEDIA AND MELAMPSALTA.

BY WM. T. DAVIS.

[Reprinted from the JOURNAL OF THE NEW YORK ENTOMOLOGICAL SOCIETY  
Vol. XXVIII, No. 2, June, 1920.]



## NORTH AMERICAN CICADAS BELONGING TO THE GENERA PLATYPEDIA AND MELAMPSALTA.

BY WM. T. DAVIS,

NEW BRIGHTON, STATEN ISLAND, N. Y.

The genus *Platypedia* was described by Uhler in *Entomologica Americana*, Vol. IV, p. 23, April, 1888, and *Cicada arcolata* Uhler, 1861, and *Cicada putnami* Uhler, 1877, were cited as belonging to the group. The original description of the genus is as follows: "Elongate, acutely tapering posteriorly, with a sub-carinate ridge on the tergum, extending from near the base to beyond the middle; wing-covers when at rest almost vertical. Head bluntly triangular, hirsute, the vertex gently sloping, almost as long as the pronotum, with the transverse sulcus deep and direct, not triangularly parted; the anterior ocellus placed in a longitudinal groove, which latter is continued upon the tumid front; front quite prominent, strongly convex; exterior cheeks long and narrow; supra-antennal plates narrow, thick, bounded each side by a notch. Pronotum short, moderately hirsute, with the dorsal surface feebly convex, not corrugated, but with two oblique grooves each side, the lateral margins almost straight, with the anterior angles feebly reflexed, and the posterior angles narrowly, but abruptly turned up; epipleural flaps as long as the pronotum, broadly crescentiform, but a little triangularly produced obliquely backwards and downwards. Anterior femora short and stout, swollen in the middle, grooved on the outside near the tip. Wing-covers wide, strongly bowed on the costal margin, the areoles large and mostly

wide, basal areole oblong, the radial areole occupying more than one-half the length of the wing-cover, the second ulnar areole short, wide, almost triangular; the apical areoles narrow, and the third, fourth, and sixth of equal length, with their inner tip triangular, while the inner end of the second, fifth, and seventh is truncated; wings narrow, not reaching as far as the tip of the discoidal areole of the hemelytra, with the anal-flaps broadly rounded, and separated by a deep emargination from the other member of the wing. Anal segment of both sexes narrow and compressed, acutely tapering, with the ovipositor of the female almost enclosed therein. Sonorous valves of the male rudimentary, inconspicuous."

To the above description may be added that owing to the great length of the radial cell the node is much nearer the end of the fore wing than in any other genus of North American Cicadas. In *Platypedia*, as in *Clidophleps*, *Okanagana*, *Okanagodes* and *Tibicinoides*, the metanotum is conspicuous behind the mesonotum, and the uncus cannot be withdrawn into the abdomen.

In August, 1888, Uhler described *Platypedia minor* in *Entomologica Americana*, which made the third species of the genus. Then followed three more, namely *aperta*, *intermedia* and *ampliata*, described by Mr. Edward P. Van Duzee in 1915 in the *Journal of the N. Y. Entomological Society*.

In his *Synonymic Catalogue of Homoptera, Part I, Cicadidæ, 1906*, W. L. Distant designated *arcolata* as the type of the genus and places *putnami* as a synonym of that species. He recognizes *minor* as a valid species. In the *Catalogue of the Hemiptera of America North of Mexico, 1917*, Mr. Van Duzee lists the six species mentioned above, and gives *arcolata* as the logotype of the genus.

As far as known no species of *Platypedia* occur east of the Mississippi River, but from western Nebraska and Colorado westward to the Pacific, and southward to the Rio Grande there are at least ten species, and two species in the allied genus *Neoplatypedia*. In the *Annals of the Entomological Society of America, Vol. XII, pp. 1-12, 1919*, Dr. Edwin C. Van Dyke has an article on *The Distribution of Insects in Western North America*, and an examination of the localities given for several species of Cicadas mentioned in this paper, suggests that some are confined to the faunal areas defined in the article

referred to. In time, as more is learned concerning the distribution of Cicadas, this will no doubt prove to be the case.

In the following pages each species is considered separately, and all specimens mentioned are in the writer's collection unless otherwise stated. I am under obligations to a number of entomologists and various institutions for the privilege of examining specimens, or for material received, and acknowledgment is made in connection with the notes on each species.

A useful table for the determination of several of the species of *Platyptedia* will be found in Mr. Van Duzee's Preliminary Review of the West Coast Cicadidae, Journal N. Y. Entomological Society, Vol. XXIII, March, 1915. That author makes the helpful statement that, "Normally all our species of *Platyptedia* have the following pale markings: Sides of the face, supra-antennal plates in part, median line and hind edge of the pronotum, hind margin of the metanotum including the posterior one half of the elevated  $\times$ , the costal nervure as far as the node and the propleura superiorly."

We would like again to emphasize the importance of stretching the specimens, or at least the two wings on the left hand side of the body, so that the characters can be more plainly seen. The membranes at the base of the wings in *Platyptedia* and *Neoplatyptedia* are often colored in a manner useful in the determination of species, and this character can hardly be seen when the wings are closed. The reproduced photographs on the plate accompanying this article serve to illustrate the size, venation, and general shape of wings and body, but they do not show the often very beautiful and strikingly contrasted colors exhibited by some of the species.

#### KEY TO THE GENERA AND SPECIES OF PLATYPTEDIA AND NEOPLATYPTEDIA.

Apical cells of fore wing eight; costal vein of fore wings evenly curved except in *Platyptedia barbata*, where it is somewhat suddenly bent. A ventral view shows the underside of the abdomen not hidden by the closed wings.

*Platyptedia* Uhler.

Apical cells of fore wing seven; costal vein of fore wings expanded and conspicuously bent beyond the middle of the radial cell. In ventral view the apical portion of the underside of the abdomen is hidden if the wings are closed ..... *Neoplatyptedia* new genus.

Genus *Platypedia* Uhler.

A. Fore wings more than twice as long as broad.

B. Large, expanding 40 millimeters or over; uncus when viewed from above long and narrow.

C. Head narrow across eyes with front strongly produced.

D. Uncus viewed in profile very thin and flattened at the extremity.

Body black, head and thorax dull, abdomen shining, reflections bluish black; fore femora entirely black, pale at extremities; membranes at base of fore wings orange. Expands about 44 millimeters. Occurs in Arizona, Colorado, New Mexico ..... *mohavensis* new species. p. 160

DD. Uncus viewed in profile slightly arched above, sinuate beneath, extremity not flattened as in *mohavensis*.

Body blue black, particularly the head and thorax; fore femora chestnut colored above, paler at extremities; membranes at base of fore wings bright orange. Expands about 40 millimeters. Occurs in California. . . . . *rufipes* new species. p. 160

CC. Head broader across the eyes with front not as strongly produced.

Uncus viewed in profile arched at top, the arch extending to the extremity, which is thickened; uncus also deepened near the base in typical *putnami* and *areolata*.

E. Body black with bluish reflections especially on the pronotum and mesonotum. Fore femora in mature individuals entirely black, pale at extremities, except in variety *occidentalis* of *putnami* which has chestnut colored fore femora. Vein separating radial cell from ulnar cells black throughout its length in mature individuals.

Costal margin of fore wings to end of radial cell brilliant orange; membranes at base of fore wings bright orange or blood red. Uncus viewed in profile with distal two thirds of lower line not straight, but curved so that the extremity sometimes appears bent downward. Expands about 50 millimeters. Occurs in Colorado, Nebraska, New Mexico, Nevada, California ..... *putnami* (Uhler). p. 162

Body blue-black and marked as in typical *putnami* except the legs which are pale, the fore femora not blackened above, and the other legs also almost wholly chestnut-colored. Occurs in western California.

*putnami* var. *occidentalis* new variety. p. 160

Body blue black but duller than in *putnami*. Costal margin of fore wings to end of radial cell, and membranes at base of fore wings orange. Expands about 53 millimeters. Occurs in Utah, Montana, Arizona, Wyoming.

*putnami* var. *lutea* new variety. p. 165

Body almost black, bluish reflections faint. Membranes at base of fore wings pale, often almost white. Uncus viewed in profile arched at top, and usually with distal two thirds of lower line but slightly curved. Expands from 48 to 54 millimeters. Northern California, Oregon.

*putnami* var. *keddiensis* new variety. P 102

EE. Body black with brassy or greenish reflections. Fore femora almost entirely chestnut colored. Membranes at base of fore wings pale, often almost white. Vein separating radial cell from ulnar cells usually pale throughout its length.

Uncus viewed in profile arched at top, distal two thirds of lower line not straight but curved so that the extremity sometimes appears bent downward. Front of head usually quite hairy. Expands from 48 to 54 millimeters. Occurs in British Columbia, Washington, Oregon, California, Idaho, Montana ..... *areolata* (Uhler). P 104

Uncus viewed in profile arched at top but more suddenly declivitous near the tip than in *areolata*; distal two thirds of lower line straight or nearly so with a subapical sinuation. Veins of fore wings almost entirely pale, except those surrounding the first and second ulnar areas, and the first seven apical areas, which are black or nearly so. Expands from 40 to 44 millimeters. Occurs in California.

*similis* new species. P 105

Uncus when viewed in profile evenly arched at top, and with lower line straight for part of its length before the hooked extremity. Hairs on front of head long and conspicuous. Costal margin of fore wings chestnut colored. Expands 45 millimeters. Occurs in Texas. .... *falcata* new species. P 106

BB. Small, expanding about 38 millimeters; uncus when viewed from above broadly ovate. Fore wing  $17 \times 6.5$  mm.

Uncus when viewed from above "nearly as broad as long, with its apex subacute." Last ventral segment in female with notch broadly V-shaped. Membranes at base of fore wings pale orange. Expands about 38 millimeters. Occurs in California. .... *aperta* Van Duzee. P 107

AA. Fore wings much broader, the breadth being equal to about one half the distance from the basal cell to the apex of the wing.

Uncus when viewed from above broadly lanceolate and subacute at apex, its width almost half the length. Last ventral segment in female with notch more narrowly V-shaped than in *aperta*. Membranes at base of fore wings orange. Expands about 36 millimeters. Occurs in California and Nevada ..... *vanduzeei* new species. P 108

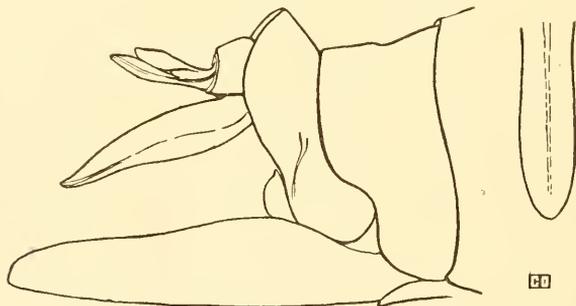
Uncus when viewed from above long and slender; seen in profile nearly straight below, arched above. Last ventral segment in female with notch

V-shaped. Membranes at base of fore wings almost white. Fore wings proportionately broader than in *vanduzeei*. Expands about 41 millimeters. Occurs in California, Nevada, Colorado.....*minor* Uhler. 117  
 Uncus when viewed from above narrow; when seen in profile somewhat resembling in shape that of *putnami*. Last ventral segment in female with notch U-shaped. Costal margin of fore wing slightly bent near the end of the radial cell. Membranes at base of fore wings red. Expands about 38 millimeters. Occurs in California.....*barbata* new species. p. 120

***Platypedia mohavensis* new species.** Plate V, fig. 1.

Type male and allotype female, from Trumble Mountain, Mohave Co., Arizona, 1919 (J. A. Crosby). Davis collection.

Resembles *Platypedia putnami*, but is much slimmer, has a narrower head, and very protruding front. The uncus in *putnami* is large and has a dorsal ridge extending to the thick rounded point; in *mohavensis* it is much smaller, the dorsal ridge is low or almost absent, and does not extend to the thin and flattened rounded extremity. Last ventral segment of the male narrow and rounded at apex; valve not as long as in *putnami*, but of the same general shape. Last ventral segment in the female with the notch narrower than in



PLATYPEDIA MOHAVENSIS

*putnami*, which results in the extremities on each side of the notch being much more broadly rounded.

The body is dull blue-black covered in greater part with white hairs, which are particularly long behind the eyes, about the mesonotal  $\times$ , and especially so beneath. The following markings are orange: supra-antennal plates in part, a small dot at the base of the vertex continued as a median line on the pronotum, which, however, does not reach the orange colored hind margin or collar; hind margin of the mesonotum including only part of the mesonotal  $\times$ , and hind margin of the metanotum. Membrane at base of fore wings orange, also the costal margin to end of radial cell, remainder of venation black or nearly so. Veins of the hind wings pale except about the apical cells. The

femora are blackened above in the middle and hind legs except at the extremities, while in the fore legs they are entirely black except at the extremities. The mercanths are long and pointed, orange in color.

## MEASUREMENTS IN MILLIMETERS.

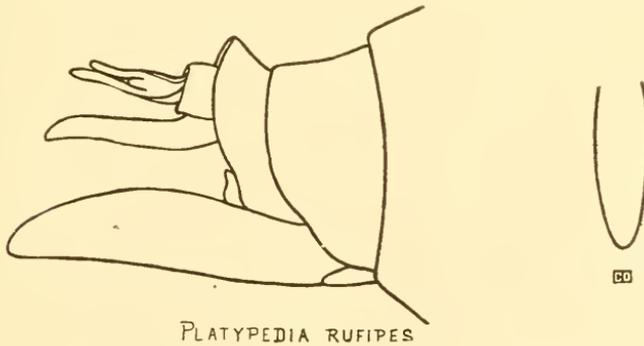
	Male Type.	Female Allotype.
Length of body .....	21	19
Width of head across eyes .....	5	5
Expense of fore wings .....	45	45
Length of valve .....	5.5	

In addition to the type and allotype there have been examined twenty-nine males and twenty-nine females from Trumble Mountain, Mohave Co., Arizona, collected by Mr. J. A. Crosby in the spring or early summer of 1919. In this long series the colors are exactly as in the type and allotype.

Stockton, Utah, May, 1916, male (Tom Spalding).

Bondad, Colorado, June 27, 1919, about 6,100 ft., male and three females (Dr. F. E. Lutz), collection American Museum of Natural History.

Chaves, New Mexico, female (from Prof. H. F. Wickham).



PLATYPEDIA RUFIPES

In the Utah, Colorado and New Mexico specimens, the color at the base of both pairs of wings is of a slightly darker orange than in the types.

*Platypedia rufipes* new species. Plate V, fig. 2.

Type male and allotype female, from Los Angeles Co., California, May (Coquillett). Collection U. S. National Museum.

Resembles *Platypedia mohavensis* in having a relatively small head and protruding front. The uncus is bent downward at the extremity, slightly ridged on the dorsal surface; when seen in profile the lower line is sinuate and the basal third is without the deepened area to be found in *putnami* and *areolata*. Last ventral segment of the male rounded at apex; valve shorter and more robust than in *mohavensis*. Last ventral segment in the female with the notch somewhat U-shaped and in form about as in *mohavensis*, that is not as broadly open as in *areolata* and *putnami*. The pale markings of the body are those common to the genus, as already mentioned. In *mohavensis* the venation of the fore wings is almost entirely black except the costal margin to the end of the radial area, while in the present species the vein separating the ulnar areas from the radial area is orange; the veins surrounding the last two ulnar areas are also almost wholly orange, while the veins surrounding the marginal areas are nearly all black. The membranes at the base of the fore wings are bright orange. The venation of the hind wings is pale, except about the marginal areas, where it is nearly entirely black.

## MEASUREMENTS IN MILLIMETERS.

	Male Type.	Female Allotype.
Length of body .....	18.5	17.5
Width of head across eyes .....	5	5.25
Expanse of fore wings .....	40	42
Length of valve .....	3.5	

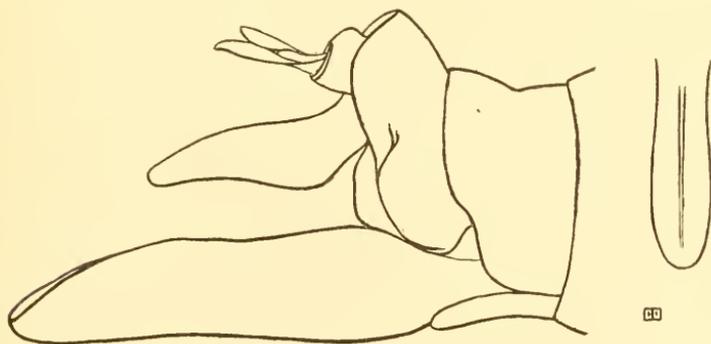
In addition to the type and allotype five females have been examined, collected in Los Angeles Co., California, May (Coquillett).

In the collection of the California Academy of Sciences there is a large male with wings expanding 52 millimeters, from Bear Lake, San Bernardino Mts., California, May 17, 1919 (J. O. Martin), that is considered here on account of the form of the uncus which resembles that of the type of *rufipes* except that it is much straighter along the lower line. The front of the head is prominent; the fore femora are chestnut colored, darkened beneath; femora of middle and hind pairs of legs striped with black; tibiae blackened at the basal joints. The fore wings have the costal margin bright orange to the end of the radial cell, but the remainder of the venation is darker than in the seven specimens of *rufipes*. This insect may belong to a distinct species.

*Platypedia putnami* (Uhler). Plate V, fig. 3.

1877. *Cicada putnami* Uhler, Bulletin U. S. Geological and Geographical Survey of the Territories, iii, p. 455.

The original description of this species states that the head, pronotum and mesonotum are "blue-black"; the "hemelytra and wings hyaline . . . base, tegulae, and costal nervures orange, the latter long and broadly arcuated; the marginal nervure beyond the anastomosis and all the other nervules blackish-piceous." The legs are described as having the "femora broadly black on the upper, fore, and hinder sides; the anterior pair also black on the under side." "Length to end of genital sheath 21 millimeters; to tip of closed hemelytra 26 millimeters." In *Entomologica Americana*, Vol. IV, p. 23, April, 1888, Uhler says of *putnami*: "This species is generally of a bright steel blue color, distinctly marked with brilliant orange. It has been taken at Ogden, Utah, in Clear Creek Canyon, Col., and in several parts of the mountainous regions of Nevada." In the original description the types are said to have been "collected in the vicinity of Clear Creek, Colorado, by Mr. J. Duncan Putnam." The male figured



PLATYPEDIA PUTNAMI

on our plate came from Clear Creek Canyon, Colorado, about thirty-five miles west of Denver, from which Uhler's types also came. A male labeled "*Platypedia putnami* Uhler, Clear Creek, Col.," is in the Uhler collection, U. S. National Museum, and is, no doubt, one of the specimens from which the original description was made. A female from Ogden, Utah, is also in the Uhler collection and is probably the one referred to by him in 1888 as mentioned above. We, however, regard this as belonging to variety *lutca*.

Specimens have been examined as follows: Colorado.—Clear Creek, male and female (Oslar). Chimney Gulch, Golden, 7,500 ft., three males, four females without date, and male and female July 1, 1913 (Oslar). Bear Creek, Morrison, July 27, 1913, male and female (Oslar). Platte Canyon, 8,000 ft., July 10, 1913, male and five females (Oslar). Golden, June 26, 1911, male (E. A. Frost). Alamosa, June 21, 1912, male and three females (Oslar). Durango, May 27, 1912, male; June 3, 1912, female; June 10, 1912, male, and three males, two females without date (Oslar). Some of the specimens from Alamosa and Durango may be immature; the wings are not as clear as usual and the fore femora are not as black except in one male.

The following Colorado specimens are in the United States National Museum: Fort Collins, June 16, 1899, male; Canon City, male (Wickham); Chimney Gulch, May 13, 1901, female (Dyar and Caudell); Platte Canyon, May 25, 1901, female, and June 1, 1901, female (Dyar and Caudell); Boulder, June 3, 1901, male and female (Dyar and Caudell); Golden, June 5, 1901, female (Dyar and Caudell); Mill Gulch, Platte Canyon, May 30, 1919, male and four females (L. O. Jackson). In the collection of the Academy Natural Sciences of Philadelphia there is a specimen from Manitou, July 1.

In the American Museum of Natural History are the following Colorado specimens collected by Dr. Frank E. Lutz: Starkville, June 13, 1919, about 6,800 ft., thirteen males, nine females; Pagosa Springs, June 21–23, 1919, about 7,500 ft., male; Bondad, June 27, 1919, about 6,100 ft., male, two females; Mesa Verde, July 3–7, 1919, about 7,300 ft., three males, three females. Dr. Lutz noted in connection with those collected at Starkville, that their song was a “clicking sound; about eight clicks, rapid at first, but slowing.”

Nebraska.—Hat Creek Valley, Sioux Co., July, 1896, two males, two females (H. G. Barber), Davis collection, and two males, three females collected at the same place and time, H. G. Barber collection. Squaw Canyon, Sioux Co., June, 1896 (Barber), H. G. Barber collection. Mr. Barber writes that there were great numbers of *putnami* in western Nebraska where he collected in 1896. Monroe Canyon, Sioux Co., June, 1911, male and two females (R. W. Dawson). War Bonnet Canyon, Sioux Co., May 20, 1901, two males (L. Bruner), and June 27, 1911, three females (R. W. Dawson). Including those

just mentioned I have seen 118 specimens from Sioux Co. in the northwest corner of Nebraska, kindly sent to me for examination from the University of Nebraska. All show bluish reflections with red-orange markings including the costa to the end of the radial cell.

Nevada.—Four females labeled "Nevada" from collection University of Minnesota. These are typical *putnami*. In the Uhler collection, U. S. National Museum, there are nine females and two males labeled "Nevada" which also appear to be typical *putnami*.

New Mexico.—Jemez Springs, Sandoval County, 6,400 ft., collected by John Woodgate, May, 1916, fifty-two males, thirty-eight females; June, 1916, three males, five females; July, 1916, male and two females at 7,500 ft.; June, 1917, female, and June 7, 1917, female at 8,000 ft.; May, 1918, male; June, 1918, fifteen males, thirteen females; July, 1918, female; May, 1919, eight males, three females; June, 1919, twenty-six males and fifty-nine females. In 1916 Mr. Woodgate wrote "the cicadas of which I sent you so many specimens, swarmed everywhere here this summer." Cloudcroft, 9,000 ft., female (Warren Knaus). Box Canyon, June, 1912, female. Four miles southeast of Santa Fe, N. M., on the old Sante Fe trail, 7,000 ft., on scrub pine and cedar, June 15, 1918, male and three females (Warren Knaus). Mr. Knaus writes: "The small species did not attempt to fly, except an occasional short flight; did not sing, but made a *snap, snap, snap, snap*, noise." Ft. Wingate, May 4, 1908 (John Woodgate), collection Academy Natural Sciences of Philadelphia.

California.—Los Angeles County, two females without date (B. Neubarth). These specimens have the legs somewhat lighter colored than typical *putnami*. They expand 48 millimeters. In the absence of male specimens they are doubtfully placed here.

Mr. J. Duncan Putnam, after whom this species was named, was connected with the Davenport, Iowa, Academy of Natural Sciences, and in the proceedings of that society, Vol. II, 1876-1878, "*Cicada putnami* Uhler" is figured on plate IV, figs. 2 and 3, male and female. Figure 3 gives a side view with wings closed; figure 4, with wings expanded. It is stated that the figures were "Drawn and engraved on stone by Herman Strecker." The figures are not accompanied by any account of the species.

**Platypedia putnami** var. **occidentalis** new variety.

Type male and allotype female, Carrville, Trinity Co., California, June 21, 1913 (Dr. E. C. Van Dyke). Collection California Academy of Sciences.

This variety has the head and thorax blue-black, marked with brilliant orange as in typical *putnami*, but it is generally larger and has lighter colored legs. The front femora are not shining black with extremities pale as is the case with Nebraska, Colorado, Montana and New Mexico specimens of *putnami*, but with the exception of being slightly darkened beneath, the femora are entirely light chestnut colored or reddish orange. The fore wings have slightly yellowish reflections; costal margin is brilliant orange to the end of the radial cell, the remaining veins are black or nearly so, and the membranes at base are brilliant orange.

## MEASUREMENTS IN MILLIMETERS.

	Male Type.	Female Allotype.
Length of body .....	22.5	21
Width of head across eyes .....	6.5	6.5
Expanse of fore wings .....	49	54
Length of valve .....	6	

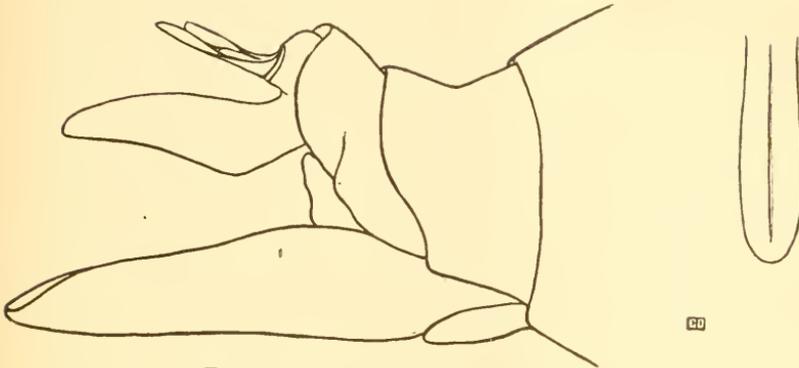
Specimens of this variety have been examined from the western part of California only. They are as follows:—Dunsmuir, Siskiyou Co., July 20, female (Dyar and Caudell); Navarro, Mendocino Co., June 7, female (Behrens), collection United States National Museum. Carrville, Trinity Co., June 1, 1913, male, and June 3, 1913, female (E. C. Van Dyke). Sonoma County, April, 1914, two females. Marin County, two females in collection American Museum of Natural History.

**Platypedia putnami** var. **lutea** new variety. Plate V, fig. 4.

Type male, State Canyon, Provo, Utah, July 7, 1916 (Tom Spalding). Davis collection.

Allotype female, State Canyon, Provo, Utah, July 1, 1916 (Tom Spalding). Davis collection.

This variety is blue-black but not so much so as in typical *putnami*, and has the lighter markings orange-yellow instead of the brilliant orange or blood-red of typical *putnami*. The fore femora are entirely black except the extremities, as in *putnami*. In Colorado and western Nebraska the colors of *putnami* are remarkable for their brilliancy, the membranes at the base of the fore wings are often of a blood-red, while further west true *putnami* is replaced in certain areas as in Utah by the present variety with orange-yellow markings, which contrast strongly with the somewhat dull blue-black of the greater part of the body.



PLATYPEDIA PUTNAMI VAR. LUTEA

MEASUREMENTS IN MILLIMETERS.

	Male Type.	Female Allotype.
Length of body .....	23	23
Width of head across eyes .....	6	7
Expanse of fore wings .....	53	59
Length of valve .....	6	

In the Uhler Collection, U. S. National Museum, there is a male of this variety from "Am. Fk. Can. Ut., June 23, 1891," labeled "*P. arcolata* Uhl. Det. by Uhler," also a female of the same variety and from the same place and collected at the same time, labeled "*P. putnami* Uhl. Det. by Uhler." This goes to show that Uhler was uncertain about the form which we have here called *lutea*.

Other specimens examined are as follows:

Utah.—Ft. Douglas, July, two females (Prof. H. F. Wickham). Provo, June 4, 1910, two females; June 17, 1912, five males, one female (Tom Spalding). State Canyon, Provo, July, 1916, thirteen males, nine females; June 17, 1917, six males, two females; June, 1918, male (Tom Spalding). Stockton, May, 1916, female (Tom Spalding). Kaysville, Davis Co., June 23, 1912, two females (E. R. Kalmbach). Bellevue, Washington Co., 4,000 ft., June, 1917, male and female (G. P. Engelhardt), Davis collection, and same locality and date two males and a female, collection Museum Brooklyn Institute of Arts and Sciences. In the U. S. National Museum are the following:—Kamas, two females (H. E. Burke); Ogden, June 20, 1885,

male; "Utah," June 16, 1904, three females (S. L. Vail); Kaysville, June 23, 1912, two males (E. R. Kalmbach).

Wyoming.—Bridger Basin, male and female, collection Museum Comparative Zoology, Cambridge, Mass.

Montana.—Gallatin Co., 5,000 ft., July 10, 1902, male (R. Berston), Montana Agri. Experiment Station.

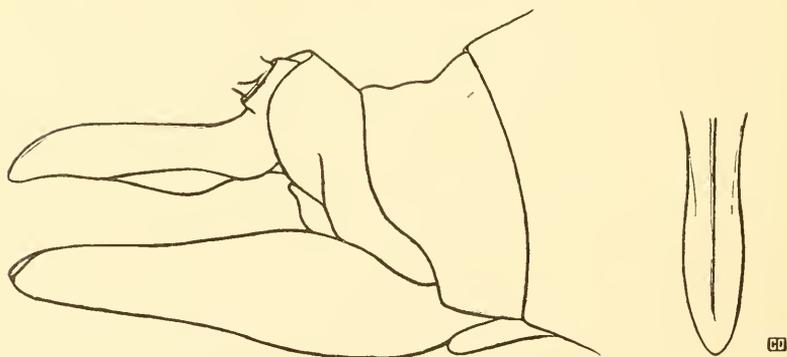
Arizona.—Top of Grand Canyon, June 6, 1916, male and three females (G. P. Engelhardt). Mohave Co., 1919, male (J. A. Crosby). Moran's Point, Grand Canyon, June, 1901, two females, collection Am. Museum of Natural History. Grand Canyon, June 16, 1907, 7,000 ft., male (H. A. Kaeber), collection Academy Natural Sciences of Philadelphia. Williams, May 26-28, four males (Barber and Schwarz), collection U. S. Nat. Museum.

*Platypedia putnami* var. *keddiensis* new variety.

Type male, Keddie, Plumas Co., California, May 16, 1919 (Mrs. Luman). Davis collection.

Allotype female, Keddie, Plumas Co., California, June, 1918 (Frank Morton Jones). Davis collection.

The front femora in this variety are black, except the distal extremities, and the vein separating the radial cell from the ulnar cells is black throughout its length. It is a darker form than *areolata* and the reflections are slightly



PLATYPEDIA PUTNAMI VAR. KEDDIENSIS

bluish in color. The membranes at the base of the fore wings are almost white as in typical *areolata*, not orange as in variety *lutea*, and the costal margin to the end of the radial cell shows a brownish tint, not the brilliant orange or reddish-orange of *putnami*, or the clear orange of variety *lutea*

from Utah, Montana, and Arizona. The uncus approaches in shape that of *Platypedia similis* from further south.

## MEASUREMENTS IN MILLIMETERS.

	Male Type.	Female Allotype.
Length of body .....	23	23
Width of head across eyes .....	6	6.5
Expanse of fore wings .....	49	52
Length of valve .....	5.5	

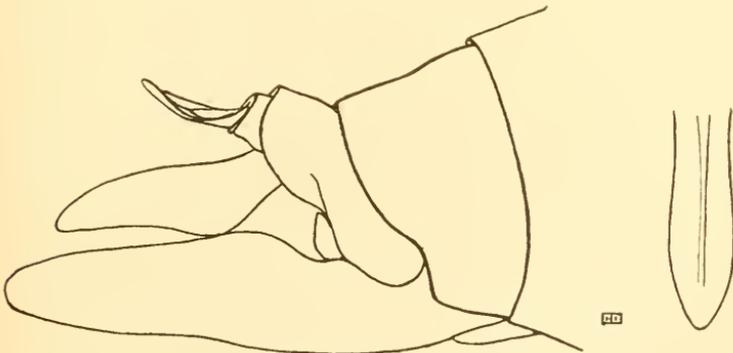
In addition to the type and allotype the following specimens have been examined, from California:—Keddie, Plumas Co., June 7, 1918, female, June 24, 1918, female, June 28, 1918, female (Frank Morton Jones); May 16, 1919, male (Mrs. Luman). Plumas County, June 14, 1913, female (F. W. Nunenmacher). Lassen County, June 5, 1913, male (F. W. Nunenmacher).

In the collection of the Colorado Agricultural College, there is a female labeled Corvallis, Oregon, July 8, 1896.

*Platypedia areolata* (Uhler). Plate V, fig. 5.

1861. *Cicada areolata* Uhler. Proceedings Academy Nat. Sciences of Philadelphia, xiii, p. 285.

In the original description the color is given as "black, with a slightly æneous tinge"; the "eyes very prominent"; the "hemelytra



PLATYPEDIA AREOLATA

broad, obtuse, dilated upon the costal margin to the tip of the first marginal areolet, costa and two posterior longitudinal veins at base, yellow, remainder of the veins piceous, veins of the wings yellow,

piceous at the tip, excepting the middle longitudinal one, which is piceous almost to the base"; the "legs orange, the anterior femora black beneath"; the "penis cover [uncus] is subfusiform, carinated above, and with an interrupted groove exterior to the concave sulcus present upon each side of the middle." The length is given as 21 millimeters, and the expanse as 50 millimeters. The type locality is given as "east of Fort Colville in Washington Territory." In the Uhler collection, U. S. National Museum there is a single female labeled "*Cicada arcolata* Uhler, E. of Ft. Colville, N. W. Bound. Surv." This is no doubt one of the types mentioned in the original description. It expands 56 millimeters and the fore wings are 10 millimeters broad. The reflections are brassy. The fore legs are now missing, but we have Uhler's statement in the original description, "legs orange the anterior femora black beneath."

In the Bulletin of the U. S. Geological and Geographical Survey of the Territories, 1874-1875, Vol. I, p. 343, Uhler has this to say of the distribution of *arcolata*: "Collected in Cache Valley, Utah, by C. Thomas, but previously known from San Mateo, Cal. (A. Agassiz); from Ogden, Utah; from Virginia City, Nev. (J. Behrens); and from Washington Territory." The Cache Valley and Ogden, Utah, specimens belonged probably to what is described in this paper as *putnami* var. *lutea*, and the San Mateo, California, material no doubt belonged to what we call *Platypedia similis*.

Specimens have been examined as follows:

British Columbia.—North Bend, June 6, 1892, two females, U. S. National Museum. Armstrong, July, 1914, male (W. Downes), collection Dept. of Agriculture Province of Nova Scotia. Lardo, Kootenay Lake, June 17, 1905, male (J. Chester Bradley), Cornell University.

Washington.—"Wash. T.," no date, female, collection U. S. National Museum. Logie Creek, Yakima Co., June 16, 1913, three males and two females (Clarence H. Kennedy). Concerning these specimens Mr. Kennedy writes as follows: "They were taken on alder, sumac and balsam trees along Logie Creek. Their call is not like the 17-year form, nor like the eastern harvest flies, but consists of just a few clicks. Until I stumbled on to one clicking it had not occurred to me that they were cicadas." One of the males from Yakima Co. is figured and genitalia drawn.

Oregon.—Dilley, female in the collection of the Museum Brooklyn Institute of Arts and Sciences, female in the writer's collection, and a male and female in the collection of H. G. Barber, all without date. Wilson, June 7, 1915, female (M. M. Rheer), Corvallis, May, 1901, male; May, 1908, female (Elta Baber); May 28, male (Mark Wright); June 5, 1912, male (L. G. Gentner); male without date (W. J. Chamberlin). Mary's Peak, Lincoln Co., May, three males and one female (W. J. Chamberlin). Odell, June 10, 1914, male. In the collection of the Oregon Agricultural College there is a long series of over forty specimens of *arcolata* which I have been permitted to examine through the courtesy of Prof. A. C. Lovett. Those from Corvallis range in date from April 1 (1897) to June 16 (1896). There is, however, a single male from Hood River, August 15, 1913, and another male labeled Philomarth, Sept. 14, 1906 (Schranck). Two females were collected in the Santiam National Forest, April 27, 1915, by W. J. Chamberlin.

Idaho.—Wallace, June 9, 1915, male, two females; May 2, 1916, male; May 3, 1916, male and female; May 23, 1916, female; May 31, 1916, female; June 9, 1916, female; May 8, 1917, male; May 9, 1917, male; May 14, 1917, three females; May 18, 1917, male; June 3, 1918, female; June 9, 1918, female; June 18, 1918, male; June 24, 1918, female; April 24, 1919, male; April 28, 1919, male; April 30, 1919, male; May 12, 1919, female; May 14, 1919, female; May 16, 1919, male and female; May 18, 1919, male; May 25, 1919, female; June 1, 1919, female; June 22, 1919, two females (Otto Huellemann). This long series of twelve males and nineteen females collected during the past five years by Mr. Huellemann show no variation. Mt. Moscow, female (Frank Magee). Moscow Mts., July 8, 1898, female, collection Am. Museum of Natural History. Troy, May 31, 1908, two females (E. T. Cresson, Jr.), collection Academy Natural Sciences, Philadelphia.

Montana.—Bonner, May 26, 1904, male, collection Brooklyn Institute of Arts and Sciences. Bear Dance, Flat Head Co., June 7, 1912, male. Four other specimens from Bear Dance, collected June 7, 1912, and two females from Thompson Falls, Missoula Co., are in the collection of the Montana Agricultural Experiment Station.

California.—Humboldt Co., May 22, 1911, male (F. W. Nunen-

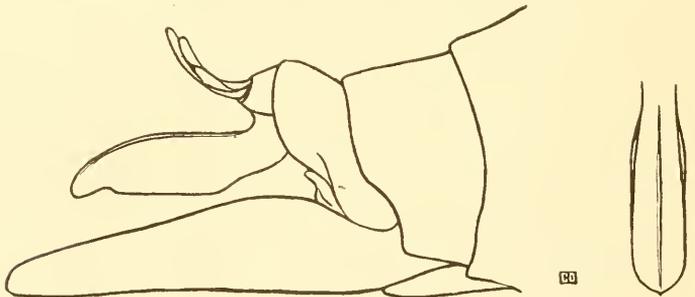
macher). Siskiyou Co., June 1, 1911, female (F. W. Nunenmacher). In the writer's collection there are also two males and three females collected in Mariposa Co., June 6 and 17, 1914, that may not be *areolata* as they are very much smaller, expanding from 40 to 46 millimeters.

**Platypedia similis** new species. Plate V, fig. 6.

Type male and allotype female from Sonoma Co., California, March 15, 1914. Davis collection.

Resembles *Platypedia areolata*, but is smaller and has a differently shaped uncus.

Shape of head as in *areolata*, except that the front is usually a little more prominent. The frontal sulcus is well defined and continuous, whereas in *areolata* it is interrupted at about the seventh or eighth transverse ridge, with the ridge itself often plainly continuing across the sulcus. The uncus is almost straight for the distal half or more of the lower line except for a subapical sinuation, while the dorsal arch is higher, also more suddenly declivitous at the extremity than in *areolata*. The last ventral segment in the male is not



PLATYPEDIA SIMILIS

as broadly rounded at the extremity as in *areolata*. The notch in the last ventral segment of the female is the same in both species, that is V-shaped.

The body is black with a brassy tinge, and the usual paler marks are yellowish orange as in *areolata*; the legs are almost wholly chestnut colored; the membranes at the base of the fore wings are almost white, and the venation of both pairs of wings, except about the marginal cells, is pale in the types. The collar or hind margin of pronotum is usually more broadly pale colored than in *areolata*

MEASUREMENTS IN MILLIMETERS.

	Male Type.	Female Allotype.
Length of body .....	21.5	18
Width of head across eyes .....	5.5	5.5

Expanse of fore wings .....	43	43
Length of valve .....	5.3	

In addition to the type and allotype specimens have been examined from numerous localities in California, which it will be noted are generally near the western part of the state and west of the Coast Range.

California.—Sonoma Co., February, 1913, male (Oslar); March 10, 1914, male and five females; March 15, 1914, two males; May 1, 1914, male and four females; April, two males, four females. Eldridge, Sonoma Co., April 19, 1917, three males. Sonoma Co., May 2, 1917, two males. San Mateo Co., June 8, 1917, two females (F. W. Nunenmacher). Crystal Lake, San Mateo Co., May 14, 1916, male (Dr. F. E. Blaisdell). Santa Cruz Co., April, 1917, male (E. R. Leach). Palo Alto, Santa Clara Co., May 26, 1914, male and female (Clarence H. Kennedy). Milpitas, Santa Clara Co., May 4, male (R. J. Smith), Havilah, Kern Co., June, 1913, female. Los Angeles, May 20, 1918, male, and Griffith Park, Los Angeles, May 13, 1918, male (Frank Morton Jones).

In the collection of the Museum of the Brooklyn Institute of Arts and Sciences, there is a male from Camp Taylor, Marin Co., California, June, 1906, in which the transverse rugæ, the femora, tibiæ and costal margin of the fore wings are of a red-orange color. The transverse rugæ are usually black in *similis*, but except in color the specimen appears to be a *similis*.

In Mr. E. P. Van Duzee's collection there are the following from Marin Co., California:—Lagunitas, March 9, 1913, male (Dr. E. C. Van Dyke); Mt. Tamalpais, May 7, 1911, female (Dr. E. C. Van Dyke).

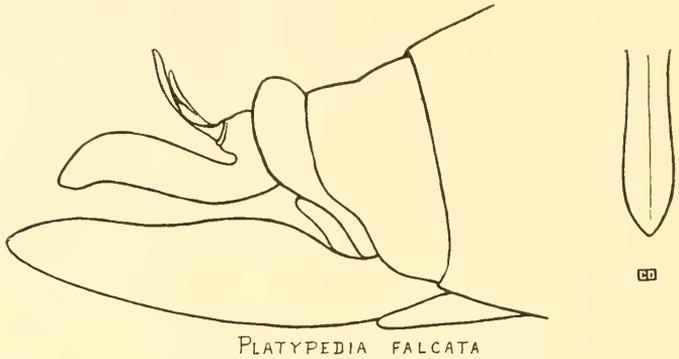
While this species resembles *arcolata* in coloring, the uncus differs more in shape than does that of *arcolata* from *putnami*. The form of the frontal sulcus also seems to be a good character whereby *similis* may be separated from *arcolata*.

**Platypedia falcata** new species. Plate V, fig. 7.

Type male, El Paso, Texas, August (G. W. Dunn). Davis collection.

Head narrow across the eyes, front prominent and clothed with long black hairs on face with silvery hairs beneath the eyes. Top of head, pronotum and

mesonotum clothed with long black hairs. Beneath extremely hairy, the hairs light in color. The uncus much bent downward at extremity as shown in the illustration. The usual pale markings are present but are more chestnut colored than they commonly are. In the fore wings the costal margin to the end of the radial cell, likewise most of the venation except about the marginal cells is chestnut colored; the basal membranes are almost white. The femora



are chestnut colored, those of the first pair of legs blackish beneath, and of the other two pairs striped on the sides with black.

MEASUREMENTS IN MILLIMETERS.

	Male Type.
Length of body .....	20
Width of head across eyes .....	5.5
Expanse of fore wings .....	46
Length of valve .....	5

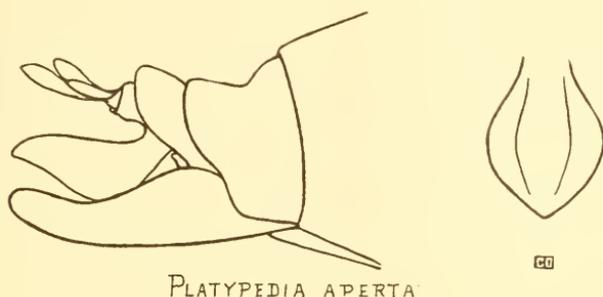
This species may be known from the other members of the genus by the differently shaped uncus, and the long stiff black hairs on the front of the head, and on other parts of the body. Only the type has so far been examined.

*Platypedia aperta* Van Duzee. Plate V, fig. 8.

1915. Journal N. Y. Entomological Society, XXIII, p. 29.

In the original description this species is said to be "about 16 mm. to tip of abdomen, with the elytral venation black and the inner margin of the second ulnar areole more rectilinear, scarcely more angled than in *arcolata*." No other species of the genus so far ex-

amined has the uncus "nearly as broad as long," as it is in *aperta*. In the female the notch in the last ventral segment is broadly V-shaped. In this species the fore wings are of the same general shape as in



PLATYPEDIA APERTA

*putnami* and *arcolata*, that is proportionately narrower than in *vanduzeei*, *minor* and *barbata*.

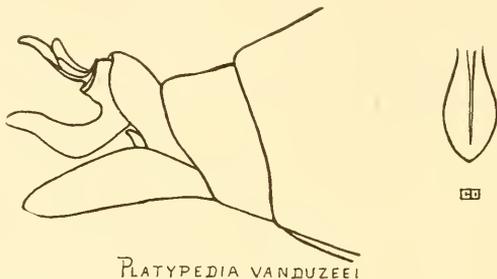
The species was described from seven males and two females taken by Mr. Van Duzee at Alpine, San Diego Co., California, June 8, 1913, and June 6, 1914, and one male from San Diego city, taken May 20, 1913. Three of the cotypes, taken on June 6, 1914, have been kindly contributed to the writer's collection by Mr. Van Duzee. The holotype, San Diego Co., Calif., June 8, 1913, male (E. P. Van Duzee), is figured on the plate. Prof. Wm. S. Wright has sent three females from San Diego, Calif., collected May 24, 1913.

*Platypedia vanduzeei* new species. Plate V, fig. 9.

Type male and allotype female, San Diego Co., California, March 22, 1914 (E. P. Van Duzee). Collection California Academy of Sciences.

Front of head moderately produced, with the sulcus distinct and the sides nearly parallel, not expanding below the middle as in *minor*. Head broader across the eyes than the front margin of the pronotum; sides of the pronotum nearly parallel until just before the posterior angles when the pronotum is suddenly widened at the collar. Body very hairy, the hairs on the head and pronotum darker than those on the rest of the body, especially on the under side, where they are almost white. Fore wings with the front margin evenly but considerably curved; the wings themselves are broader across the middle than in *aperta*. Uncus when viewed from above broadly lanceolate and subacute at apex, its width about half the length; seen in profile when raised above the valve it resembles the upturned head of a broad-headed snake. In the female the notch in the last ventral segment V-shaped.

General color bronze-black, the abdomen more shining. Membranes at base of fore wings orange; costal margin dull orange to end of radial cell; veins surrounding the apical areas of both pairs of wings black or nearly so. The pale marks on the body are those usual to the genus. The fore femora are black beneath, paler above, usually chestnut colored, sometimes striped.



PLATYPEDIA VANDUZEEI

MEASUREMENTS IN MILLIMETERS.

	Male Type.	Female Allotype.
Length of body .....	14	13.5
Width of head across eyes .....	4.5	4.5
Expanse of fore wings .....	35	36
Length of valve .....	2.5	

In addition to the type and allotype the following have been examined from California:—San Diego, May 5, 1891, three males, and May 10, 1891, one female (Dr. F. E. Blaisdell); San Diego County, March 22, 1914, four females (E. P. Van Duzee). In Mr. Van Duzee's collection there are three males and one female also collected by him in San Diego County, March 22, 1914. Los Angeles, 1887, male (Coquillett). Hills near Los Angeles, May 11, 1915, female (Alonzo Davis); Los Angeles, May 27, 1916, two males (Alonzo Davis). Griffith Park, Los Angeles, May 11, 1918, male and two females, and May 13, 1918, male (Frank Morton Jones). Pasadena, June 19, 1916, female and May, 1918, male (Alonzo Davis). Universal City, June 9, 1915, male (C. A. Hill). Santa Barbara, May 5, 1919, sixteen males and six females, May 20, 1919, four males and two females (F. E. Winters). "California," six males and four females.

Mr. Winters writes of the cicadas he collected at Santa Barbara as follows: "In the first week of May I caught my first cicadas on

the steep embankment of a hill road struck by the afternoon sun and protected by the hill and huge eucalyptus trees from the sea winds. They were sitting on wild anise or dill, preferring the stem about two feet from the ground. They were not very shy and picking them with my fingers I found the best method of collecting. Sweeping did not prove effective, for as soon as the outer branches of the wild anise, which reaches a height of three or four feet, were hit, they would let themselves drop before the main stem was reached by the net. They cling to the stem head up." The cicadas were confined to the before-mentioned embankment of the short hill road, about 300 yards in length, and Mr. Winters was unable to find a single specimen in any other locality. He continues: "Collected on the 20th inst. some more of the cicadas, six in all, but confined to one bush, and not a single one anywhere else."

In the Uhler collection, U. S. National Museum there is a single male labeled "Nevada."

This species is smaller than *minor* and resembles in size both *aperta* and *barbata*. From the former it differs in having broader fore wings and a narrower uncus; from *barbata* it may be told by the front margin of the fore wing having a more even curve, that is not as bent at the end of the radial cell, and by the shape of the uncus as figured. In the female the notch in the last ventral segment is not as broadly V-shaped as in *aperta*.

In his Preliminary Review of the West Coast Cicadidae already referred to, Mr. Van Duzee writes of this species under the name of *minor* Uhler, as follows: "This distinct little species seems to be confined to the southern portion of the state where it is very abundant at times. It is found on grassy hillsides from the last of March to about the first of July where it may generally be found resting on the stems of the sage bush. It has a short peeping note which is difficult to locate."

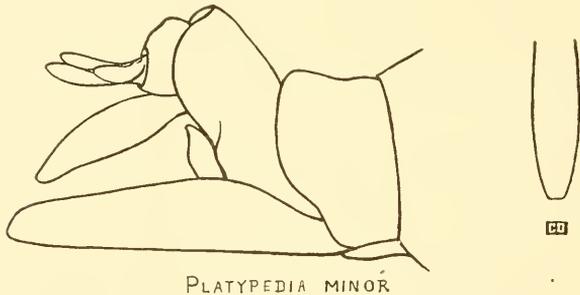
The reasons for having first identified this insect as *minor* Uhler, are considered in the remarks on that species.

*Platypedia minor* Uhler. Plate V, fig. 10.

1888. Entomologica Americana, IV, p. 81.

In the original description it is stated, "color a bronze-black, more highly polished upon the tergum than elsewhere; the surface, except-

ing the tergum and notum invested with long gray, or yellowish hairs and with white hairs around the meso-thoracic cross . . . front having the sulcus distinct from the base to below the middle, and thence expanding and becoming effaced, with the margins distinctly carinated, and the transverse grooves distinct . . . legs flavo-piceous, clothed with long remote white hairs and bristles, the coxæ, knees, and tarsi dark piceous. Wing-covers hyaline, somewhat tinged with fulvous at base, . . . membrane of base of wings and basal portion of nervures white." Length of body 16-17 mm.; to tip of closed wings 22-23 mm.; width of base of pronotum  $5\frac{3}{4}$ -6 mm. The type material is said to be "Three specimens examined from Southern California," all males.



Recently the Uhler collection in the United States National Museum was examined to see if the three males used in the original description could be found. A male was discovered bearing three labels. The first reads "Cal. S."; the second "*Platypedia minor* Uhler, San Mateo," and the third "*Platypedia minor* Uhler, San Mateo, Det. Uhler." The fact that "Cal. S." is on this specimen would seem to indicate that it belonged to the type series, though San Mateo is only about half way down the coast of California. Though now old and slightly broken this insect answers Uhler's description. A figure of the specimen is given on our plate. The uncus is rather slender, nearly straight below, arcuated above.

In his note on *Platypedia minor*, Journal N. Y. Ento. Soc., Vol. XXIII, p. 28, 1915, Mr. Van Duzee stated that what he was identifying as *minor* was somewhat smaller than called for in the original description, and that the true *minor* might be one of the other species

mentioned in his paper. We now find this to be the case thus making *Platypedia intermedia* a synonym of *minor*. The statement by Uhler that his *minor* came from Southern California was misleading.

This insect seems to be very common in parts of California and numerous examples have been examined as follows:—Humboldt Co., May 15, 1911, female; May 22, 1911, female (F. W. Nunenmacher). Trinity Co., May 7, 1917, six males, four females; May 8, 1917, one male, three females; May 30, 1917, four males, five females (F. W. Nunenmacher); May 30, 1917, three females; April 18, 1918, male; June 16, 1918, male (E. R. Leach). Mendocino Co., May 10, 1919, six males and six females (E. R. Leach). Ukiah, Mendocino Co., April 23, 1919, six males, three females; April 30, 1919, four males, one female; May 2, 1919, male; May 6, 1919, three males, three females; May 26, 1919, male; May 27, 1919, nine males; May 30, 1919, two males and one female (Esther P. Hewlett). Sonoma Co., March 15, 1914, one male, four females; March 31, 1914, six males; April, 1914, three males, one female; May 1, 1914, two males, two females; May 5, 1914, two males; May 10, 1914, three males, two females; May 20, 1914, female. Eldridge, Sonoma Co., April 19, 1917, male; April 20, 1917, two females; April 28, 1917, one male, four females. Sonoma Co., May 2, 1917, five males, three females (J. A. Kutsche) received through the kindness of Mr. Morgan Hebard. Fairfax, Marin Co., April 5, 1914, male; May 7, 1911, female (Dr. E. C. Van Dyke). Muir Woods, Marin Co., April 23, 1911, male (Dr. F. E. Blaisdell). Contra Costa Co., May 6, 1918, male (E. R. Leach). Mills College, Alameda Co., April 25, 1908. Alameda Co., May 20, 1909, female (F. W. Nunenmacher). Palo Alto, Santa Clara Co., six males, four females (Clarence H. Kennedy). Crystal Lake, San Mateo Co., May 7, 1916, male; May 14, 1916, female (Dr. F. E. Blaisdell). San Mateo Co., June 8, 1917, female (E. R. Leach). San Louis Obispo, April, female.

Through the courtesy of Mr. E. P. Van Duzee the writer has been enabled to examine the following from his collection:—Sobre Vista, Sonoma Co., Calif., May 12, 1910, male holotype of *intermedia* Van D.; Eldridge, Sonoma Co., Calif., May 15, 1914, male (J. A. Kutsche); Fairfax, Marin Co., Calif., May 7, 1911, female (E. C. Van Dyke).

In the collection of the Dept. of Agriculture, Harrisburg, Pa.,

examined through the courtesy of Josef N. Knull, there are two males from Corte Madera, Marin Co., Calif., April 17, 1915.

In the United States National Museum there are the following from California:—Santa Cruz Mts., three males and a female; San Jose, male (A. E. Bush); Napa Co., female (J. J. Rivers).

In the Academy Natural Sciences, Philadelphia, there is a male from Mt. Diablo, Pine Canyon, California, May 10, 1893.

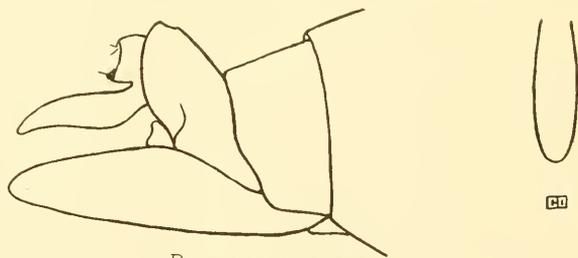
In the writer's collection there are twenty-two males and thirty-five females collected at Glenwood Springs, Colorado, June, 1919 (Oslar). Glenwood Springs is on the Grand River, one of the tributaries of the Colorado. We have also seen a female of this species from the collection of the University of Minnesota labeled Nevada. In the American Museum of Natural History there is a male labeled Mazatlan, Mexico. It is an old, discolored specimen, but the characters are all plain including the shape of the uncus. It appears to belong to the species under consideration.

***Platypedia barbata*** new species. Plate V, fig. 11.

Type male and allotype female from San Louis Obispo, California, April. Davis collection. \*

Resembles *Platypedia vanduzeei* in size, but may be separated by the broader fore wings which have the costal margin rather suddenly bent, and by the narrower uncus, as mentioned in the key.

Front of head moderately prominent, about as much so as in *vanduzeei*; sides of pronotum not as parallel as in *vanduzeei*, but somewhat converging



PLATYPEDIA BARBATA

toward the eyes. Excepting the tergum the body is covered with long hairs both above and below, the hairs on the under side are white except on the face where they are almost black. The pale colors of the upper surface are those common to the genus, and as in *aperta* and *vanduzeei*, except that the membranes at the base of the fore wings are more red than orange. Beneath the legs are mostly chestnut colored, the anterior femora darkened beneath

and all of the femora faintly striped. Tibiæ darkened at the knees. Uncus when viewed from above long and narrow, rounded at the extremity, faintly keeled near the base; seen in profile sinuate along the lower margin. Last ventral segment of the female allotype has the notch U-shaped, and not broadly V-shaped as in *aperta*, nor more narrowly V-shaped as in *vanduzeei*.

MEASUREMENTS IN MILLIMETERS.

	Male Type.	Female Allotype.
Length of body .....	15.5	16
Width of head across eyes .....	4.75	5
Expanse of fore wings .....	36	40
Length of valve .....	3.5	

Only the type and allotype have so far been examined. Though it resembles *minor* in some features and *vanduzeei* in others, this is a very distinct species.

**Neoplatypedia** new genus.

In this genus the front wings have seven apical areoles, instead of eight as in *Platypedia*, and the costal vein is strongly expanded and bent beyond the middle of the radial cell. When the insect is turned over, the wings, if closed, are seen to cover about the apical third of the abdomen; in *Platypedia* the entire under side of the abdomen is plainly in view. The uncus is remarkably long and upturned at the extremity. Type *Platypedia ampliata* Van Duzee.

Uncus when viewed from above slipper-shaped, the sides evenly converging to the rather sharp point; when seen in profile, the point rather suddenly upturned. Membranes at base of fore wings almost white. Expands 38 to 43 millimeters. Occurs in California.....**ampliata** (Van Duzee).

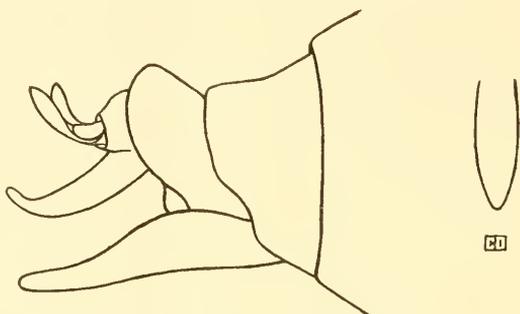
Uncus when viewed from above suddenly constricted at about one third of the distance from the rather sharp point; when seen in profile with the point gradually and moderately upturned, but not as much so as in *ampliata*. Membranes at base of fore wings orange. Expands 40 to 44 millimeters. Occurs in Arizona, Colorado, Utah, California.....**constricta** new species.

**Neoplatypedia ampliata** (Van Duzee). Plate V, fig. 12.

1915. *Platypedia ampliata* Van Duzee. Journal N. Y. Entomological Society, XXIII, p. 29.

The original description states that the remarkably broad fore wings are obviously angled beyond the middle of the costal areole, and that the costal nervure is broadly expanded, especially in the male, reaching a width of nearly one millimeter. Body clothed with long blackish hairs which become gray beneath and on either side of the mesonotal X. Front strongly produced; last ventral segment of the

male narrow and rounded at apex, valve moderately long and expanded at base; uncus lanceolate with the slender point upturned and attaining the apex of the valve. Last ventral segment of the female with a narrow subacute incision reaching nearly to its base. "Color black; supra antennal plates, a small dot at the base of the vertex con-



NEOPLATTYPEDIA AMPLIATA

tinued as a median line on the pronotum which does not reach the hind margin, narrow hind edge of the pronotum, sides of the mesonotal  $\times$  posteriorly, elytral nervures except close to their base, depressed sides of the pronotum and legs in part, pale." Length 16 mm., expanse 38 mm. The species was "described from one male without locality, in the collection of the University of California, and two females from Mary's River, Oregon, received from Dr. Wilson." Mr. Van Duzee has kindly sent me the male holotype for examination, and it is figured on the accompanying plate. It is immature which accounts for the costal nervure being so flattened out in mounting; usually it is stiffer and less pliable. The membranes at base of fore wings are white.

The following specimens have been examined:

Oregon.—Mary's River, female, collection Oregon Agricultural College. In this individual the notch in the last ventral segment is a "subacute incision" and narrower than in the twenty females of *constricta* examined from Arizona. It expands 38 mm.; membranes at base of fore wings yellowish white; fore femora black except at extremities.

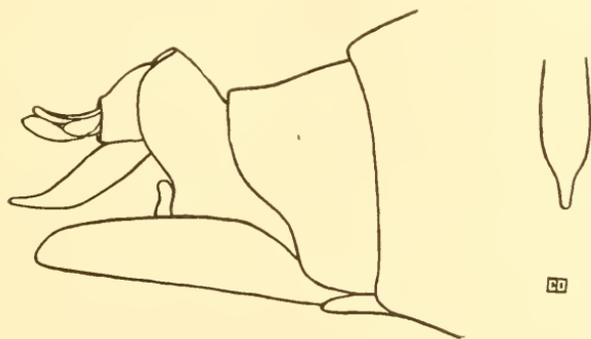
California.—Contra Costa Co., May 6, 1918, male. The genitalia of this specimen have been drawn by Mr. C. E. Olsen. The mem-

branes at the base of the fore wings are white. In the Am. Museum of Natural History there is a male labeled "California." The uncus is tapered gradually to the upturned point; membranes at base of fore wings white; fore femora black, upper surface with longitudinal chestnut colored stripes.

***Neoplatypedia constricta*** new species. Plate V, fig. 13.

Type male and allotype female from Trumble Mountain, Mohave Co., Arizona, 1919 (J. A. Crosby). Davis collection.

Resembles *Neoplatypedia ampliata* in size and general coloring, but may be separated by the following characters: The uncus instead of being evenly narrowed to the extremity is constricted about one third of the distance from the tip; when seen in profile the uncus is not so suddenly upturned, and though bent upward the curve is more gradual. The head is narrower across the eyes than in *ampliata*. In the male the abdomen when viewed from above is



#### NEOPLATYPEDIA CONSTRICTA

rather suddenly constricted beyond the sixth segment, whereas in *ampliata* it tapers more evenly to the end of the body. In the female allotype the notch in the last ventral segment reaches nearly to the base of the segment and is wider open than the notch in the female *ampliata* examined from Mary's River, Oregon. Fore femora black or nearly so, except at the extremities. Membranes at base of fore wings orange; in *ampliata* they are white or yellowish white. The supra-antennal plates, a median line on the pronotum, narrow hind edge of the pronotum, and sides of the mesonotal  $\times$  posteriorly, are pale, as is usual in *Platypedia*.

#### MEASUREMENTS IN MILLIMETERS.

	Male Type.	Female Allotype.
Length of body .....	18	18
Width of head across eyes .....	5.25	6
Expanse of fore wings .....	42	44
Length of valve .....	4	

In addition to the type and allotype fifty-nine males and twenty females collected by J. A. Crosby at Trumble Mountain, Mohave Co., Arizona, in the spring or early summer of 1919, have been examined. The following have also been seen:—Stockton, Utah, May 16, 1916, female (Tom Spalding). Beaver Valley, Utah, male; South Creek, Beaver Co., Utah, male; Washington Co., Utah, June, 1917, male (G. P. Engelhardt), collection Museum Brooklyn Institute of Arts and Sciences.

Bondad, Colorado, June 27, 1919, about 6,100 ft., fifteen males, twenty-two females, collection Am. Museum of Natural History. When these specimens were collected by Dr. F. E. Lutz, he noted that they "sang *zip, zip, zip, zip* for a long time."

In the U. S. National Museum there is a male and female labeled Los Angeles Co., Cal., May (Coquillett). These are blue black in color, particularly the head, pronotum and mesonotum; the membranes at the base of fore wings are bright orange; the uncus in the male is constricted near the extremity, though not as much so as in the examples from Arizona, Utah and Colorado. The notch in the last ventral segment of the female is as wide as in the female allotype from Arizona. In the California Academy of Sciences there are two immature males from Bear Lake, San Bernardino Mountains, California; May 13, 1919 (J. O. Martin), which have the membranes at the base of the fore wings bright orange.

#### Genus *Melampsalta* Kolenati.

In Mr. Distant's Synonymic Catalogue of Homoptera, Part I, Cicadidæ (1906), the type of the genus *Melampsalta* is given as *musiva* Germar, of the old world, and other species of the genus are recorded from continental Europe, Africa and Asia, also from Japan, Australia and New Zealand. One species is listed doubtfully from Surinam and *Melampsalta parvula* Say, from North America. In his Rhynchotal Notes, XXXV, Annals and Magazine of Natural History, series 7, 1905, Mr. Distant considers *Melampsalta* a "congested genus."

In *Melampsalta* the median and cubitus veins coalesce near the base of the fore wing, whereas in the other genera of Cicadas in America north of Mexico, these veins reach the basal cell or arculus separately. Normally in *calliope* (*parvula*) there are six apical areas

in each hind wing, but there are occasional specimens with but five. Sometimes one wing has five and the other six. In the writer's collection two female *calliope* from Louisiana have five apical areas in each hind wing, and a male from Alabama has five apical areas in the left hind wing and six in the right. A male from Clarke Co., Mississippi, has five apical areas in each hind wing. This specimen is figured on the plate. In *Entomologica Americana*, Vol. IV, p. 82, 1888, Uhler states: "Several specimens of *M. parvula* [*calliope*] have been examined by myself, in which six apical areoles were present in one wing and five in the opposite one."

While in *kansa* the median and cubitus veins unite near the base of the fore wing, thus placing it in the Division *Melampsaltaria* Distant, the fact that it has but five apical areas in the hind wing would seem to consign it to the genus *Pauropsalta* Goding and Froggatt. In the original description of the genus the head is said to be as "wide or a little broader than front of pronotum." It is narrower than front of pronotum in *kansa*, and the illustration of the venation and shape of the fore wing of *leurensis* Goding and Froggatt, the type of the genus, from Australia and Tasmania, show other differences. So it has been thought best for the present to leave *kansa* in the genus *Melampsalta*.

As the genus *Melampsalta* is not a congested one in North America, it will do for the present to also include *camerona* therein, though there is the same objection as in *kansa*, namely the small number of apical areas in the hind wing. However, this character has here been shown to be variable to some extent in the same species.

#### KEY TO THE SPECIES OF MELAMPSALTA.

(Mentioned in this paper.)

Hind wings with 6 apical areas; rarely there are specimens with but five.

Females straw colored, occasionally with dark marks on the head and thorax. Males usually smaller and with dark marks. Females expand about 37 mm.; males about 35 mm. . . . . *calliope* (Walker).

Both sexes green, immaculate, or nearly so.

*calliope* var. *floridensis* new variety.

Hind wings with 4 or 5 apical areas.

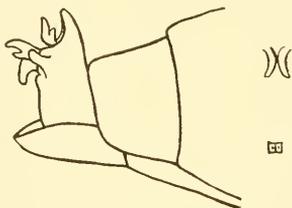
Hind wings with 5 apical areas; body slim, of the same width across the region of the tympanal openings as immediately above and below. Both sexes immaculate green and of the same size; expands about 32 mm.

*kansa* Davis.

Hind wings with 4 or 5 apical areas; body broader across the region of the tympanal openings than above or below. Both sexes greenish, with dark marks on the head and thorax; and of the same size; expands about 25 mm. ....camerona new species.

**Melampsalta calliope** (Walker). Plate V, figs. 14-15.

In 1825 Thomas Say described the only species of *Melampsalta* known up to within a short time from North America, under the name of *Cicada parvula*. He stated that the body was "dull testaceous" with some indistinct blackish marks on the thorax, and that the insect inhabited Missouri. He gave the length as seven-tenths of an inch [17.5 mm.], adding that it is a very small species, and that he has "a specimen from near the Rocky Mountains, which is entirely green, it is a female, and probably of the same species with the above. Its length, to the tip of the hemelytra, is four-fifths of an inch," that is, 20 millimeters. The first mentioned specimen was evi-



MELAMPSALTA CALLIOPE

dently a male, judging from size and color, though the sex is not mentioned by the author.

In the Canadian Entomologist, Vol. 41, p. 390, 1909, G. W. Kirkaldy states that the name *Cicada parvula* was preoccupied, and gives *calliope* Walker as the name of the species. It appears that in 1798 Fabricius described in *Supplementum Entomologiæ Systematicæ*, p. 521, a "*Cicada parvula*" from Cayenne, South America.

In 1830 E. F. Germar described *Cicada pallescens* in *Thon, Entomologisches Archiv*, ii, p. 8, from Georgia, America. It is said to be small, half the size of *C. hamatoda*. Head pale, front impressed. Collar pale testaceous, with the border all green. Mesothorax pale, variegated with green. Abdomen pale at base, green at apex. Body testaceous beneath, legs variegated with green. Wings entirely hyaline, costa and veins green, the wavy vein parallel to hind margin sometimes black.

This name was also preoccupied according to Mr. Van Duzee's

Catalogue of the Hemiptera of America North of Mexico (1917), for in 1776 Otto Frederick Muller described in his *Zoologiæ Donicæ Prodomus*, p. 102, a *Cicada pallescens* from Denmark.

In 1850 Francis Walker described *Cicada calliope* in List of the Specimens of Homopterous Insects in the Collection of the British Museum, Part I, p. 212, and gave the locality as "Warm Springs, N. Carolina." Mr. Franklin Sherman, of Raleigh, N. C., does not know of any Warm Springs in North Carolina, nor is the name in the postal guide. It may be that the present Hot Springs in Madison County was the locality.<sup>1</sup> Walker gives among other characters, body pale ferruginous; head as broad as the "fore-chest"; face slightly convex, not at all prominent, adorned with a tawny stripe; crown pitchy; eyes not prominent; "scutcheon [pronotum] adorned with two parallel pitchy stripes, its sides and the furrows also pitchy; hind-scutcheon [hind margin of pronotum or collar] rather narrow above, much broader and rounded at the base of each fore-wing, convex on the middle of each side; scutcheon of the middle-chest [mesonotum] adorned with three broad black stripes; the side pair slightly obconical and oblique; hind border hardly excavated; abdomen obconical, very little longer than the chest, paler beneath, adorned with three rows of pitchy spots, which are much longer and more distinct on each side than in the middle; hind borders of the segments pale tawny." The "wings colorless; fore border ferruginous; veins ferruginous, black towards the tips; fore membranes tawny; flaps tinged with brown at the tips, buff at the base and along the middle vein. Length of the body 6 lines [13.5 millimeters], of the wings 17 lines," [expanse of wings 38 millimeters].

As this name was not preoccupied it has been used by Mr. Van Duzee in his catalogue for the small species covered by the description, extending from the Atlantic through the southern states north-westward to Nebraska and Colorado.

<sup>1</sup> Since the above was written Mr. Nathan Banks has called my attention to Edward Doubleday's "Communication on the Natural History of North America," Entomological Magazine, October, 1838, where, under the heading "Warm Springs, North Carolina, July 8, 1838," he says: "From Asheville I walked most of the way to this place; for in this mountainous country the stage scarcely makes four miles an hour. The road runs mostly by the side of the French Broad river, between high and wooded mountains."

Madison Co., N. C., is therefore the type locality for *calliope*.

In 1888 P. R. Uhler in his "Preliminary Survey of the Cicadae of the United States," *Entomologica Americana*, IV, p. 22, states that "This neat little insect is of a pale green color when alive, sometimes marked with fuscous, but speedily becomes straw yellow after desiccation and exposure to the air. It inhabits the plateau-lands of Georgia, Tennessee, Louisiana, Arkansas, Illinois, Kansas and Texas; but it has not thus far been reported from the costal plain of any of the States in which it has been found."

In 1892 Uhler in his "Preliminary Survey of the Cicadidæ of the United States, Antilles and Mexico," *Trans. Maryland Academy of Science*, I, p. 165, says further regarding the species: "Common in various parts of the United States, and quite variable in color and pattern of marking. When fresh, the ground color is pale green, with the marking of the head, thorax and tergum brownish black; but when dried and kept for some time in the cabinet it becomes pale or dark straw-yellow. Specimens from Florida are much narrower than those from Illinois, Kansas and Nebraska. A male from Texas is faded straw yellow, with a little black on the vertex and about the antennæ. The males are sometimes much smaller than the females."

It will be noted from the foregoing that Say thought that his *parvula* might occur either "dull testaceous" or green, and Uhler considered *parvula* "quite variable in color," and that the fresh green specimens changed in the cabinet to a "pale or dark straw yellow." The series of specimens now in the writer's collection shows that *calliope* in the southeastern United States is marked in the males as described by Walker, and that the females which are usually larger are often lighter colored and without the dark marks on the body. Specimens examined from Florida and parts of Georgia are green, and the same difference in size usually exhibits between the males and females. Specimens from Nebraska, Kansas and Iowa are usually lighter colored than more eastern examples, and while the males have dark marks on the body, the females, which are usually larger than the males, are generally straw yellow; some, however, show faintly the dark marks on the dorsum, particularly on the mesonotum.

Specimens of *Melampsalta*, supposed to be *calliope* as described by Walker, have been examined as follows:

Virginia.—Opposite Plummer's Island in the Potomac River, Au-

gust 9, 1915, female (H. S. Barber). This specimen was found while looking for insects at night with a lantern.

North Carolina.—From Southern Pines and collected by the Rev. A. H. Manee, two males and two females (no date), the females are as small as the males and marked like them; female, July 7, 1911, small and marked like male; male, July 7, 1914; male, July 8, 1914; two males, July 9, 1914; sixteen males, July 12, 1915, and all marked as is usual in males. Mr. Manee writes that he finds many of these cicadas on young pines. Wilmington, August 1, 1911, female (George P. Engelhardt), collection Museum of the Brooklyn Institute of Arts and Sciences. Two females collected at the same place and time as the last by Mr. C. L. Pollard, are in this collection of the Staten Island Institute of Arts and Sciences.

Georgia.—De Witt, Mitchell Co., male (C. S. Spooner); has the dark markings usual, in males. Spring Creek, Decatur Co., July, 1912, four males, three females (J. Chester Bradley), collection Cornell University. In the Uhler collection, U. S. Nat. Museum, there are a male and two females labeled "Ga." All are about the same size and straw colored; the male with black marks on the pronotum. Albany, Dougherty Co., August 1, 1913, female (Rehn and Hebard), collection Acad. Natural Sciences of Philadelphia.

Alabama.—Mobile, five males and five females (H. P. Loding). Grand Bay, Mobile Co., May, 1915, male and female; May 20, 1915, male and female; May 22, 1915, male, all collected by H. P. Loding. Irvington, July 5, 1915, male. Mt. Vernon, May 13, 1917, two males (H. P. Loding). Spring Hill (no date), female; same locality, Aug. 1, 1917, male (T. Van Aller).

Mississippi.—Through the kindness of Prof. R. W. Harned, I have been able to examine thirty-one specimens of this species collected in Mississippi by the students of the State Agricultural and Mechanical College. The localities range from near the northern part of the state to the Gulf coast, and the dates of capture from May 14, 1915, at Fontainebleau, to August 5, 1916, at Hattiesburg. The localities are:—Verona, Houlika, Egypt, Stonewall, Laurel, Columbia, Hattiesburg, Lucedale, Anner, Caesar, Nugent, Kihn, Long Beach, Ocean Springs, Fontainebleau and Pascagoula.

It may be remembered that Uhler reported this species only from

"plateau lands," but the last six localities mentioned are in the low lying Gulf strip of Mississippi, which rises a few feet above the level of the sea.

Louisiana.—Alexandria, August 22, 1915, female (Rehn and Hebard); two females labeled "La." One of these females is plain straw colored with a greenish collar, while the other two have dark marks on pronotum and mesonotum.

Indian Territory.—Hughes, June 20, 1907, in cotton field, male (F. C. Bishopp), collection U. S. Nat. Museum.

Missouri.—Hartville, Wright Co., June 20, 1873, female, collection Museum Brooklyn Institute of Arts and Sciences.

Illinois.—In the Uhler collection, U. S. Nat. Museum, there are two males, one labeled "N. Ill.," and the other "Ogle Co., Ill." They are marked with dark spots.

Iowa.—Iowa City, June 24, 1898, female (Wickham). This is a straw colored individual. In the Uhler collection, U. S. Nat. Museum, there are three males and one female from Denison. The males have the usual dark marks, while the female is straw colored. In the same collection there is a female from Dallas Co. that has blackish marks on the thorax, but is lighter than the males.

Kansas.—Wakefield, Clay Co., male and three females; Sheridan Co., 2,650 ft., male (F. X. Williams); Barton Co., 1,816 ft., June 22, 1912, male (F. X. Williams); Ellsworth Co., July, male (Warren Knaus); Grove Co., 2,813 ft., male (F. X. Williams); Topeka, July 11, male and female (E. G. Smyth); Clark Co., June, 1,962 ft., male (F. H. Snow); Chautauqua Co., 841 ft., two males, two females (R. H. Beamer); Miami Co., 1915, male (R. H. Beamer); Ness Co., July 5, 1912, 2,260 ft., female (F. X. Williams); Douglas Co., 900 ft., two females (F. H. Snow); Riley Co., July 13, two females (Popenoe).

In the above series the males are marked with black, while the females are larger and almost wholly straw colored. A few females have indistinct darker marks, particularly on the mesonotum.

Nebraska.—Lincoln, June 25, 1908, 1,450 ft., two males, one female (R. W. Dawson); South Bend, June 25, 1915, female, and July 14, 1915, male (E. M. Partridge); Omaha, June 22, 1918, female (R. R. Leussler).

In the Uhler collection, U. S. Nat. Museum, there is a female

labeled "Nebraska," which has blackish marks on the head and thorax, a dorsal row of dark spots on abdomen, also a row of dark spots on each side of the abdomen. Wings are rather narrow. It expands 39 millimeters.

In the collection of the University of Nebraska are the following:—Rulo, Richardson Co., July 1, 1915, female (E. M. Partridge). Crete, Saline Co., July 6, 1893, female. Lincoln, Lancaster Co., June 24, female; July, male; July 4, 1893, male; June 25, 1908, 1,150 ft., nine males and two females (R. W. Dawson); June 25, 1908, female (C. H. Gable); July 18, 1908, male, and July 23, 1908, male and female (J. T. Zimmer); July 15, 1909, 1,150 ft., female (F. A. Burnham); June 20, 1911, male (L. M. Gates); June 26, 1914, male (G. W. Deming). South Bend, Cass Co., June 24, 1915, female; June 25, 1915, female; June 30, 1915, male, and July 14, 1915, male (all collected by E. G. Anderson). West Point, Cuming Co., three males; June, female; June, 1887, male; July, 1888, male and female. Maskell, Dixon Co., July 16, 1915, male and female (E. G. Anderson). Carns, Keyapaha Co., July 9, 1902, male; July 11, 1902, female; July 25, 1902, female (W. D. Pierce). In this series the fifteen females are all larger than the twenty-four males, and are of a uniform yellowish straw color. The males are marked in every instance on the head, pronotum, mesonotum and abdomen with dark spots.

Colorado.—In the U. S. National Museum there is a male and female labeled "Granada, Col." This locality is in Prowers Co., in the eastern part of the state and not far from the Kansas state line.

**Melampsalta calliope** var. **floridensis** new variety. Plate V, fig. 16.

Type male, Ft. Meade, Florida, July 30, 1915 (Mrs. F. E. Porter).

Allotype female, Rye, Florida, July 9, 1919 (Joseph Lienhart). Both in Davis collection.

In the writer's collection there are sixteen specimens from peninsula Florida of what is considered a green and geographic variety of *calliope*. This variety extends to southern Georgia, and perhaps beyond along the coast, where it joins the darker, typical form, in which the males especially are marked with black, or nearly black spots on the head and thorax. The Florida examples in addition to being grass green are immaculate or nearly so. In the many examples examined of the straw yellow or dark typical form, we have seen none from Florida, though it should be found in the northern and especially in the northwestern part of the state. The fact that there is a

grass green *Melampsalta*, though of quite a distinct species, in Texas, Indian Territory, Kansas and Colorado has confused the matter. Prof. Uhler considered the Florida insect narrower than the western one, but the considerable series examined does not confirm this. The Florida form, however, does differ from the dark specimens from Southern Pines in the Sand Hill region of North Carolina in having shorter and broader wings in proportion to the size of the body.

## MEASUREMENTS IN MILLIMETERS.

	Male Type.	Female Allotype.
Length of body .....	13	13
Width of head across eyes .....	4	4
Expanse of fore wings .....	33	32

In addition to the type and allotype the following green examples have been examined:

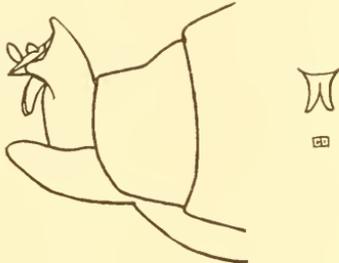
Florida.—Rye, Manatee Co., May 12, 1919, female; May 15, 1919, male; May 28, 1919, male and female; June 10, 1919, male; July 9, 1919, female (all collected by Joseph Lienhart). Gulfport, June, 1915, male, and 1915, female (A. G. Reynolds). St. Petersburg, August, 1915, male and two females (Ludwig). Lakeland, May 5, 1912, female, and May 8, 1912, two females in open woods on low vegetation (W. T. Davis). Jacksonville, July 1, 1913, collection H. L. Johnson. Live Oak, August 10, 1903, male, collection A. P. Morse. Cleveland, April, male (C. P. Benedict), collection Staten Island Inst. of Arts and Sciences. The following are in the collection Acad. Nat. Sciences of Philadelphia:—Enterprise, April 20, female; Jacksonville, August 25, 1911, female (Rehn and Hebard). Both of these specimens are green with indistinct dark marks.

In his Observations on some Hemiptera taken in Florida in the spring of 1908, Bulletin Buffalo Society Natural History, IX, p. 184, 1909, Mr. Edw. P. Van Duzee states: "One tiny male was beaten from a small tree of a broad-leaved oak at Tampa. This specimen made a surprisingly loud noise for so small an insect. It is pale green, almost immaculate and measures scarcely 12 mm. to the tip of the closed elytra."

Georgia.—Spring Creek, Decatur Co., June, 1911, male (J. Chester Bradley), collection Cornell University. Four typical male *calliope* and three females were also taken in July, 1912, at Spring Creek by Prof. Bradley, as previously noted. Spring Creek, July, 1912, female *floridensis* (C. S. Spooner), Spooner collection.

**Melampsalta kansa** Davis. Plate V, fig. 17.

This small green species was described in the Journal N. Y. Entomological Society, Vol. 27, p. 340, December, 1919, from Kansas and Texas examples. Say's "entirely green" specimen "from near the Rocky Mountains," probably belonged to this species. It may be separated from *calliope* Walker (*parvula* Say), by its smaller head, uncus of different shape, as shown in the illustration, and by having five apical areas in the hind wing instead of six. In the female of



MELAMPSALTA KANSA

*calliope* the abdomen terminates above in a conspicuous spine; in *kansa* the spine is very small.

Since the description of *kansa* was published, additional specimens have been examined as follows:

Texas.—Sabinal, Uvalde Co., June 13, 1910, male (F. C. Pratt). Dallas, May 19, 1911, female (E. S. Tucker). Grand Prairie, June 19, 1905, male (C. R. Jones). Delhart, June 16, 1910, male (F. C. Bishopp). These are in the collection of the U. S. National Museum.

Indian Territory.—Ardmore, Chickasaws Co., June 1, 1905, female on *Rudbeckia* (C. R. Jones), collection U. S. Nat. Museum.

Oklahoma.—Carnegie, Caddo Co., male, collection of Warren Knaus.

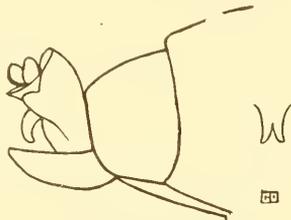
Colorado.—Lamar, about 3,600 ft., June 4-11, 1919, three males (Dr. F. E. Lutz). Regnier, Baca Co., about 4,500 ft., June 6-9, 1919, two males (Dr. F. E. Lutz). These five specimens are in the American Museum of Natural History. They have but five apical cells in each hind wing as mentioned in the description.

**Melampsalta camerona** new species. Plate V, figs. 18, 19.

Type male, Brownsville, Cameron Co., Texas, "7-6" (E. A. Schwarz). Collection U. S. National Museum.

Allotype female, Brownsville, Cameron Co., Texas, June, 1903 (Charles Schaeffer). Collection, Museum Brooklyn Inst. of Arts and Sciences.

Head small, about as wide as the sinuate, anterior margin of the pronotum; sides of the pronotum not parallel, but considerably widened toward the posterior angles, which are rounded and lobiform. Cavity in which the antenna starts oblique, with the margin high and definite, except anteriorly. Median sulcus of the face well defined. Inner margin of eyes more rounded than in either *calliope* or *kansa*. Fore wings with eight apical areas in type, but with only seven in allotype, and the single paratype. Hind wings with five apical areas in type, but only four in allotype and the paratype. Tympanal orifice rather widely open; more so than in *calliope* or *kansa*. Uncus seen in profile

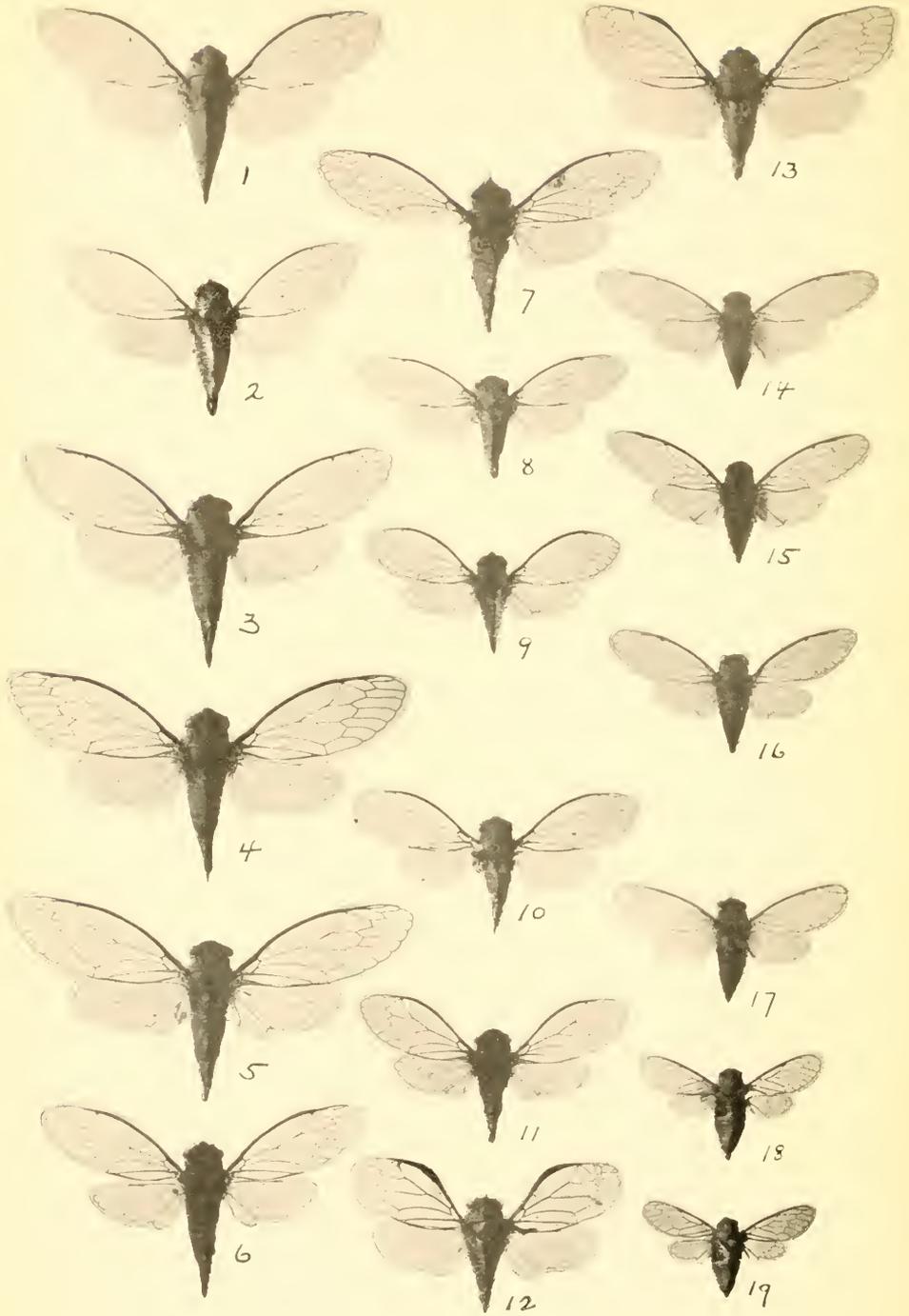


MELAMPSALTA CAMERONA

curved inward, claw-like; seen from behind deeply cleft. Beneath, the opercula rounded at the extremities, but the ends not touching; about as far apart as in *kansa*, and nearer together than in *calliope*. Last ventral segment broad at base with the sides rather suddenly converging to the rounded extremity. In the allotype the notch in the last ventral segment is broad and deep. While there are some short silvery hairs on the body, this is rather a smooth species.

General color of upper surface of body is green; head variegated with dark brown; a dark dot each side not quite in front of the posterior ocelli. Pronotum green; grooves with scattered brown marks; hind margin or collar entirely green. Mesonotum with four obconical dark marks, the inner pair about half as long as the outer pair. The outer pair broken up into separate blotches, especially near the greenish colored elevated  $\times$ . Hind margin of the metanotum green. Both pairs of wings clear; basal membranes almost white. Tergum green, the exposed tymbals darker. Beneath the head is variegated with brown, the median sulcus is yellowish, and the transverse rugæ are brown. The legs are pale variegated with brown; the opercula are green; the abdomen yellowish green with the usual dark spots centrally near the base. The allotype is nearly entirely green above, the head slightly variegated with brown along the front, and the dots nearly in front of the hind





(CICADIDÆ.)

ocelli are conspicuous. Beneath it is greenish except the transverse rugæ, tip of the rostrum, some variegated marks on the legs, and ovipositor, which are brownish.

## MEASUREMENTS IN MILLIMETERS.

	Male Type.	Female Allotype.
Length of body .....	13	12.5
Width of head across eyes .....	3.5	3.5
Expanse of fore wings .....	25.5	25.5

A single paratype of this species from the collection of the U. S. National Museum has been examined. It is a male and labeled Brownsville, Texas (C. H. T. Townsend).

## EXPLANATION OF PLATE V.

- Fig. 1. *Platypedia mohavensis* Davis. Type.  
 Fig. 2. *Platypedia rufipes* Davis. Type.  
 Fig. 3. *Platypedia putnami* (Uhler).  
 Fig. 4. *Platypedia putnami* var. *lutca* Davis. Type.  
 Fig. 5. *Platypedia areolata* (Uhler).  
 Fig. 6. *Platypedia similis* Davis. Type.  
 Fig. 7. *Platypedia falcata* Davis. Type.  
 Fig. 8. *Platypedia aperta* Van Duzee. Holotype.  
 Fig. 9. *Platypedia vanduzeei* Davis. Type.  
 Fig. 10. *Platypedia minor* Uhler. Type?  
 Fig. 11. *Platypedia barbata* Davis. Type.  
 Fig. 12. *Neoplatypedia ampliata* (Van Duzee). Holotype.  
 Fig. 13. *Neoplatypedia constricta* Davis. Type.  
 Fig. 14. *Melampsalta calliope* (Walker). Six apical cells in hind wing.  
 Fig. 15. *Melampsalta calliope* (Walker). Five apical cells in hind wing.  
 Fig. 16. *Melampsalta calliope* var. *floridensis* Davis. Type.  
 Fig. 17. *Melampsalta kansa* Davis. Type.  
 Fig. 18. *Melampsalta cameroni* Davis. Type.  
 Fig. 19. *Melampsalta cameroni* Davis. Allotype. Differs from type in number of apical cells in both pairs of wings.











RECORDS OF CICADAS FROM NORTH AMERICA  
WITH DESCRIPTIONS OF NEW SPECIES.

By WM. T. DAVIS.

[Reprinted from the JOURNAL OF THE NEW YORK ENTOMOLOGICAL SOCIETY  
Vol. XXIX, No. 1, March, 1921.]



RECORDS OF CICADAS FROM NORTH AMERICA  
WITH DESCRIPTIONS OF NEW SPECIES.

BY WM. T. DAVIS.

NEW BRIGHTON, STATEN ISLAND, N. Y.

In the present paper additional records of distribution are given for several species recently described by the writer, and four new species are recognized, one of them being *Okanagana nigriviridis*, from San Bernardino Co., California, one of the most beautiful of North American Cicadas. Two others are described from the same region, which seems to contain Cicadas not to be found elsewhere in California.

**Tibicen cultriformis** (Davis).

In the original description published in this JOURNAL in 1915, two males and two females were recorded from Arizona. An additional male from Nogales, Arizona, October 11, 1918 (G. A. Kusche), collection California Academy of Sciences, has since been examined.

**Tibicen inauditus** Davis.

In the original description published in this JOURNAL in 1917, three males, collected July 15, 1917, by Miss M. McGill, in Oldham County, northern Texas, are recorded. Miss McGill has since collected at Tascosa in the same county, a male on June 25, 1918, and two males on July 12, 1919. These specimens are all marked alike and expand about 65 millimeters each. They resemble, but are much

smaller, have less prominent eyes, and are differently marked from what we identify as *Tibicen montezuma*, examined from Texas and Arizona, which expands from 75 to 80 millimeters.

*Tibicen cinctifera* (Uhler). Pl. I, figs. 1, 2 and 3.

This species was described in the Transactions of the Maryland Academy of Science, 1, p. 156, 1892, under the name of *Cicada cinctifera*. The original description calls for an insect with front wings expanding from 76 to 85 millimeters, with the "tip and middle of base of tergum coated with white powder," and the "opercula greenish white, black at base, pruinose, triangular, a little rounded at tip, less than half as long as the venter." Of the material examined Uhler says: "Three specimens from Las Cruces, New Mexico, have been kindly sent to me by Mr. C. H. Tyler Townsend, and a large female was captured in Northern California by my friend, James Behrens."

The Uhler collection, in the United States National Museum, was examined in June, 1920, for the specimens mentioned in the original description. The following were found: male with "Las Cruces" on first label, "129" on second label, "P. R. Uhler collection" on third label, and "*Cicada cinctifera* Uhler, New Mex." on fourth label; male labeled "Las Cruces, P. R. Uhler collection, 129," and a female bearing three labels reading "N. Calif., Behrens, P. R. Uhler collection." These specimens, which are no doubt three of the four mentioned in the original description, have the "tip and middle of base of tergum coated with white powder," and the opercula a little rounded at the tips, with the outer edges nearly parallel to each other. In all three the costal margin of the fore wing is colored a rather bright orange to the end of the radial cell. Also in the United States National Museum there are two males and four females from Brewster Co., Texas, Rio Grande, June 13-17, 1908, collected by Mitchell and Cushman, that are like the typical material in the shape of the opercula and in coloring.

In the writer's collection there are the following specimens like Uhler's types of *cinctifera*: a male from Del Rio, Texas, Devil's River, July 3, 1917, collected by Dr. H. H. Knight, and a male from Mesilla, New Mexico, June 28, 1897, received from Prof. Albert P. Morse. Mesilla is in Donna Anna Co., New Mexico, on the Rio Grande and within five miles of Las Cruces the type locality.

Lately three males and three females have been examined, collected about five miles from El Paso, Texas, June 23, 1919, by Mr. H. H. Willis, and kindly sent to me by Mr. E. R. Sasscer of the Federal Horticultural Board. In the Academy of Natural Sciences, Philadelphia, there is a male from Langtry, Valverde Co., Texas, Aug. 24, 1912, 1,050-1,550 ft., collected by Rehn and Hebard.

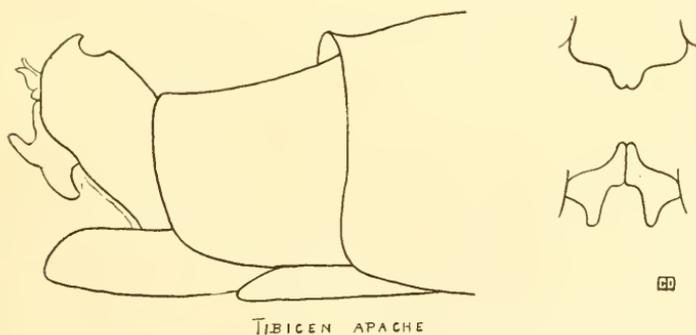
On plate 4, figure 25, Genera Insectorum, there is a figure of a cicada said to be *cinctifera*, but the fore wing is much too broad in proportion to its length, as will be noted by comparing it with the figures on the plate accompanying this article reproduced from photographs of the Mesilla male, and one of the El Paso females, referred to above.

Another species heretofore confused with *cinctifera*, and apparently more common than it, is here described as new.

**Tibicen apache** new species. Pl. I, figs. 4, 5 and 6.

Type male and allotype female from Florence, Arizona, July 29, 1917 (Dr. H. H. Knight). Davis collection.

Resembles *Tibicen cinctifera* (Uhler), but has sharper pointed opercula, the outer sides of which are not parallel, but converge; is without the central pruinose spot at the base of the tergum, and instead of having the dorsal part of segment eight all pruinose, the whitened area is reduced to two spots with



a black space between. In the allotype the plates that correspond to the opercula of the male, are sharper pointed than in *cinctifera*, the double notch in the last ventral segment is usually deeper, the terminal spine is more robust, that is, has a broader base, and the abdomen is less tapering at the extremity. In the three types of Uhler's *cinctifera* in the United States National Museum, the costal margin of the fore wing is bright orange to the end of the radial

cell, also the hind margin of the pronotum or collar, whereas in *apache* the color is light yellow or straw-color. The membranes at the base of both pairs of wings are orange or at least usually much darker than in *apache*, where they are white or light gray. Some of these differences in structure and color are more clearly brought out in the illustrations.

## MEASUREMENTS IN MILLIMETERS.

	Male Type.	Female Allotype.
Length of body .....	25	25
Width of head across eyes .....	10	10
Expanse of fore wings .....	71	75
Length of operculum .....	6.5	

In 1917, Dr. H. H. Knight and Dr. Joseph Bequaert, while in Arizona, collected many specimens of this species, which were later recorded by the writer in this JOURNAL for December, 1917, under the name of *Tibicen cinctifera*. As a matter of fact, only the male from Del Rio, Texas, Devil's River, July 3, 1917, was of that species, all of the remainder belonging to what is here called *apache*.

The following typical material of *apache* from Arizona is in the writer's collection: Florence, July 29, 1917, fifty-four males, thirteen females (Dr. Knight and Dr. Bequaert); Black Canyon, Bumble Bee, July 31, 1917, male (Dr. Knight); Tempe, August 1, 1917, four males, two females (Dr. Bequaert); Grand Canyon, Lower Bright Angel trail, August 2, 1917, three males (Dr. Knight); Buckeye, August 7, 1917, six males, twenty-one females on poplars along irrigation ditch (Dr. Knight and Dr. Bequaert); Palomas, August 8, 1917, one male (Dr. Knight). Phoenix, July, 1913, thirteen males, three females (Dr. R. E. Kunze), and July, 1914, twenty-eight males and seven females (Dr. Kunze). There are also numerous examples of this species in the collection of the United States National Museum. Dr. Knight says of the specimens from Florence: "On mesquite, song continuous, even toned, moderately shrill note."

There are several color varieties of *apache*, the commonest one having the body mostly brown or brownish instead of black. It was at first thought that specimens having the dorsum light brown variegated with pale straw-color, were immature individuals, but the accumulation of considerable material has shown that this is not the case. Specimens of the pale variety range all of the way in color

from a light brown with darker marks, particularly on the head and mesonotum, to very pale, almost unicolorous individuals from Utah. The following belong to the variety: Palomas, Arizona, August 8, 1917, two males (Dr. H. H. Knight); Yuma, Arizona, July 5, 1918, male and female (A. M. Gaudin); Yuma, California, August, female (Prof. H. F. Wickham); Riverside Co., California, female (E. R. Leach); Needles, California, August 3-4, 1919, eight males (Rehn and Hebard); Washington Co., Utah, male and "Utah," male, both without date. In the Academy Natural Sciences, Philadelphia, there is a female, collected at light, Yuma, Arizona, July 28, 1907 (Rehn and Hebard).

In Howard's Insect Book, plate 28, figure 13, a female *Tibicen apache* is figured under the name of *Cicada vitripennis*.

***Tibicen transversa*** (Walker). Pl. II, fig. 1.

This species was described from Vera Cruz, Mexico, by Francis Walker in *Insecta Saundersiana*, 1858, and was later figured by Mr. Distant in *Biologia Centrali-Americana*, Homoptera, plate 2, figure 1. In this figure the first and second transverse veins of the fore wing are not as clouded as in the two specimens, I have examined, or as called for by Walker, who says: "Fore wings with the first and second transverse veins clouded with brown." Mr. Distant, however, in the text says: "Opercula long, triangular, reaching the base of the fourth abdominal segment. Apices of the opercula obtuse; tegmina spotted with fuscous near the apex." Uhler, in the *Transactions, Maryland Academy of Science*, 1, p. 155, 1892, states of *Cicada transversa*: "The type came from Mexico. I have examined a specimen from Texas." In the list of Coleoptera, Lepidoptera, Diptera and Hemiptera collected in Arizona by the Entomological Expeditions of the University of Kansas in 1902 and 1903, *Kansas University Science Bulletin*, volume 2, number 12, May, 1904, Prof. F. H. Snow records *Cicada transversa* from two localities in southwestern Arizona, collected in 1903. We have examined some of these specimens and they are what is described in this paper as *Tibicen apache*.

The following specimens of *transversa* have been examined:

Padre Island, Texas, August 23, 1915, male. Collection University of Michigan, and examined through the courtesy of Prof. F. M. Gaige. This specimen is figured.

Galveston, Texas, August 22, 1918, male (E. C. Wurzlow). Davis collection. Mr. Wurzlow wrote that he heard this insect singing, and found it on a fence over a clump of *Amaranthus*. He also heard several others in the gardens about the houses.

***Tibicen texana*** (Davis).

In the original description in this JOURNAL for 1916, this species was recorded from three localities in Cameron County, southern Texas. The following Texas specimens have since been examined: Spofford, Kinney Co., July 8, 1907, male; Cotulla, Lasalle Co., 450 ft., August 13-14, 1912, male; Uvalde, Uvalde Co., 1,000-1,100 ft., Aug. 21-22, 1912, male; Del Rio, Valverde Co., 900-1,100 ft., Aug. 22-23, 1912, male and female in copulation; Midland, Midland Co., 2,779 ft., Sept. 19, 1912, male. These six specimens are in the Academy of Natural Sciences of Philadelphia and were collected by Rehn and Hebard.

The female of this species has never been described, so it may be well to state that the notch in the last ventral segment is broadly V-shaped with the sides of the V slightly sinuate, as in *olympusa* (*sordidata*), but judging from the only female of *texana* examined the V incision has the sides more evenly curved and broadly rounded out than in *olympusa*. In addition the head is broader than in that species.

***Tibicen vitripennis*** var. ***bequaerti*** Davis.

This insect was described and figured in the JOURNAL OF THE NEW YORK ENTOMOLOGICAL SOCIETY for December, 1917, under the name of *Tibicen viridifascia* var. *bequaerti*. The type and four paratypes were recorded from Richmond, Texas, June 23, 1917, and four paratypes from Wharton, Texas, June 24, 1917, all collected by Dr. H. H. Knight. It was stated at the time that the eyes were prominent in these specimens; also that the basal cell of the fore wing was clear, slightly touched with black along the fore margin. More material has been examined, and the writer now thinks that this insect should be considered as a variety of *vitripennis* Say, instead of *viridifascia* Walker, particularly on account of the more elongate shape of the fore wings, and the clearer basal cell. In the writer's collection there are at present thirty examples of *vitripennis*, and when these are compared with examples of variety

*bequaerti* having a like expanse of wings, they invariably are much narrower across the eyes, in other words the variety is a broad headed insect as shown by the figure accompanying the original description.

In the United States National Museum there is a female specimen of *Tibicen bequaerti* from Columbus, Texas. It bears a label stating that it was figured in the "Insect Book, Pl. 28, fig. 15." The wings in this specimen expand 76 mm., head 12 mm. across eyes, length of body 25 mm., ventral notch broad and shallow. A female *Tibicen vitripennis* Say from Louisiana with length of body also 25 mm. has the width of head 11 mm., ventral notch deeper than in the Texas example and double. A female *vitripennis* from Alexandria, La., June 22, 1910 (E. S. Tucker), expands 75 mm., length of body 25 mm., has the width of the head 11 mm.; ventral notch broad and shallow, and feebly double. In the writer's collection there is a female *bequaerti* from New Orleans, La., June, 1918 (H. E. Hubert), with expanse of fore wings 72 mm., length of body 23 mm., and width of head across eyes 10 mm. The ventral notch is simple.

It may not prove a very constant character, but in all of the specimens of *bequaerti* the transverse black stripe on the head between the eyes, does not reach the eyes, whereas in *vitripennis* the stripe continues right across the front of the head in 28 out of the 30 specimens at hand, and in the two exceptions the stripe almost reaches the eyes.

#### **Tibicen knighti** Davis.

This species was described and figured in the JOURNAL OF THE N. Y. ENTOM. SOC. for December, 1917, shortly after which Dr. H. H. Knight contributed the following additional information: "The new *knighti* was taken in Sabino Canyon of the Santa Catalina Mountains, at an altitude of about 6,500 to 7,000 feet. I spent about five minutes trying to locate the first one; I could not see it, and looked first for a Cicada and then for an Orthopterous insect. I had to give it up and scare it out of the bush before locating it. The species preferred to alight on the shrubbery that covered the rocky slopes of the canyon, among the many giant cacti. I remember I saw one female and missed it by not being careful."

**Tibicen arizona** (Davis).

When the original description of this species was published in this JOURNAL for March, 1916, only males had been examined, all collected by Prof. F. H. Snow in the Santa Rita Mts., Arizona. Since then a female collected by Prof. Snow at the same place and time has come to hand. It is like the males in general color and markings. It expands 54 millimeters; length of body 17 millimeters; last ventral segment with the shallow notch broadly open and its sides slightly sinuate. In the allied species *castanea*, the notch is broadly open, but is double.

Several specimens of a species closely resembling *arizona*, from Cuernavaca, about 40 miles south of Mexico City, Mexico, have been examined. One bears a label reading "*Selymbria modesta* Dist.," with "(Uhl)" in the lower left-hand corner. Distant's *modesta*, now placed in the genus *Ollanta*, has the "tympanal coverings large, their apices subacute anteriorly but not interiorly covering cavities." In *arizona* and the species from Cuernavaca, the tympana completely cover the cavities.

**Okanagana mariposa** Davis.

The following California records of this species, originally described from Mariposa County, were received in 1920: Upland, San Bernardino Co., June 18, 1920, male; July 1, 1920, five males, four females; July 2, 1920, male and two females (Miss E. P. Hewlett). Angeles Forest, Barley Flats, 5,000 ft., June 24, 1918, two females (Victor Duran). Mr. Duran writing of this species states that he found it "extremely abundant in the chaparral in the vicinity of Barley Flats, Sierra Madre Mountains on June 24, 1918. . . . That day and the one preceding were hot and insects of all kinds were most unusually abundant." Alhambra, Los Angeles Co., July 4, 1920, twenty-nine males and nineteen females; July 6, 1920, two males and ten females. Under date of July 8, 1920, Mr. Duran wrote of this lot, they occurred "in the chaparral of the upper parts of the canyons of the Tujunga and West Fork of the San Gabriel River, altitude 4,000 to 5,500 feet." Nevada Co., August 11, and August 13, 1920, two males (E. R. Leach).

**Okanagana rimosa** (Say).

In this JOURNAL for 1919, page 203, it was stated that Say's two specimens of this species, collected by Nuttall in 1811, no doubt came

from along the Missouri River in what is now North or South Dakota, and a male from Sioux City, on the Missouri, was identified at that time as filling in every way Say's description. Lately Mr. O. A. Stevens has kindly given me a male collected June 15, 1915, at Mandan, Morton Co., near Bismark, North Dakota. This specimen comes from what is believed to be near the type locality. It is a trifle smaller than the Iowa example, expanding 59 millimeters, but otherwise is the same.

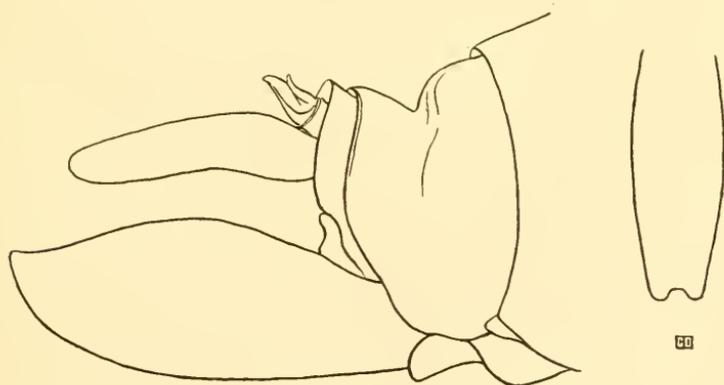
**Okanagana nigriviridis** new species. Pl. II, fig. 2.

Type male from Upland, San Bernardino Co., California, July 1, 1920 (Miss Esther P. Hewlett). Davis collection.

Allotype from same locality, July 2, 1920 (Miss Hewlett). Davis collection.

A conspicuously beautiful green and black species with slim body and narrow wings.

Head across eyes nearly as broad as front margin of the pronotum, eyes and front both prominent; median sulcus well defined. Pronotum with the humeral angles rounded, and the anterior angles well defined. A slight notch each side near the middle of the outer edge of the pronotum. Wings narrow, rather pointed, with the outer edge evenly curved. Beneath, but slightly hairy, the hairs confined to the region about the legs and the sides of the face; the



OKANAGANA NIGRIVIRIDIS

transverse rugæ are covered with a silvery pubescence. The underside of the abdomen is nearly smooth except for two spots of silvery pubescence on each segment. The upper side of the body is nearly smooth except that there is a silvery pubescent area each side on each of the segments; there are the usual hairs behind the eyes. The last ventral segment of the type is rounded, slightly

sinuate near the center; in the allotype the last ventral segment is narrowly notched, the notch extending only half way to the base. Uncus when viewed in profile arched above, sinuate beneath, and when viewed from above notched at the extremity.

Head black above, supra antennal plates and an irregular area behind the ocelli, green. Pronotum green variegated centrally with black, especially in the depressions or grooves. Mesonotum green with four obconical black spots along the anterior margin, the outer pair about twice as long as the central pair; from the central pair extends a black line backward to the elevated  $\times$ , where it either forks or is represented by two spots. There are also two black spots, one near each of the anterior extremities of the  $\times$ . There is an irregular black line extending each side from the elevated  $\times$  to the base of the fore wings. Metanotum green, irregularly spotted with black near the base of each hind wing. Front wings with the venation conspicuously black, except the yellowish-green front margin, the clouded green basal cell, and the green veins surrounding the anal area. In the hind wings the marginal cells are surrounded by more delicate blackened veins, while the venation on the basal half of the wing is greenish, the anal areas being opaquely greenish-white. Membranes at base of both pair of wings are greenish-white, those of the front wings slightly yellowish on posterior margin. Abdomen green above with the commencement of a black dorsal vitta on the first segments, a rather conspicuous black stripe on the front margin of segment three; less conspicuous ones on segments two and four, or the last may be wholly wanting. In addition segments three to six have two black spots on each side, the upper rounded and the lower linear in form. In the allotype there is an irregular black spot each side on segment nine. Uncus green, blackened along lower margin. Beneath, the head is black, the frontal sulcus partly green, the terminal part of the rostrum black, the legs green striped with black, claws and spines tipped with black, abdomen green with the usual basal dark spot, which in this instance is much reduced; valve green.

#### MEASUREMENTS IN MILLIMETERS.

	Male Type.	Female Allotype.
Length of body .....	25	25
Width of head across eyes .....	7	7
Expanse of fore wings .....	64	65
Length of valve .....	5	

In addition to the type and allotype two males were collected at Upland, California, one July 20, and the other July 29, 1920. Miss Hewlett writes: "One which I caught was singing more like a Katydid; not a steady song." In some of the species of *Okanagana* the song is quite steady.

The shape of the head in *nigriviridis* is much like that of *synodica*, also as in that species the valve is long. The dark markings on the head and thorax are also similar. On the other hand the fore wings are not as broadly rounded at the extremities as in *synodica*, the radial cell is more elongate, and the eighth apical area is proportionately longer. For the present this very distinct species can be placed next to *arctostaphylæ*.

**Okanagana synodica** (Say).

This species has been recorded from Montana, Nebraska, Kansas, Colorado, New Mexico and Texas. (See JOURNAL N. Y. ENTO. SOC., June-Sept., 1919, p. 211.) The following records extend its range to two additional states: Parowan, Utah, two males, Palmer's assorting, No. 1201, Uhler collection, U. S. Nat. Museum. Medicine Bow, Wyoming, about 6,600 ft., June 22-24, 1920, four males, collection Am. Museum of Natural History. Dr. Frank E. Lutz collected these four specimens and noted at the time "the small brown Cicada on grass, has a continuous note, but sometimes continues for only a short time."

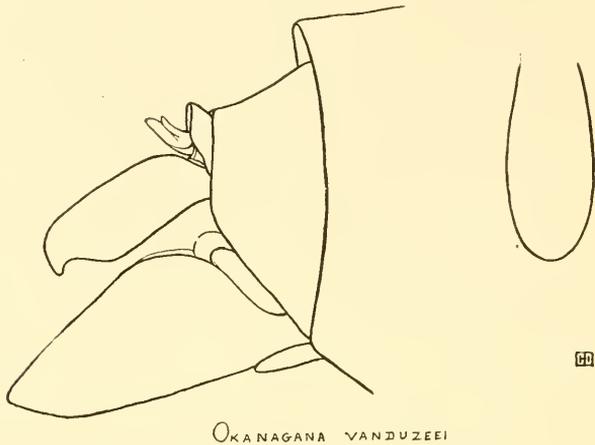
**Okanagana balli** Davis.

In the original description, JOURNAL N. Y. ENTO. SOC., June-Sept., 1919, this species is recorded from Iowa, Minnesota and South Dakota. Additional records are as follows: Lake Okoboji, Iowa, July 6, 1917 (L. L. Buchanan), collection U. S. Biological Survey. Lake Okoboji, Iowa, July, 1919, male fed to a young Arkansas Kingbird by its parent and taken from the young bird by T. C. Stephens. About seven or eight other specimens were fed to the young birds. Blue Rapids, Kansas, June 20, 1919, three males and a female (O. A. Stevens). "Nebraska," male, collection Mus. of Comparative Zoology, Cambridge, Mass. Kalispell, Flathead Co., Montana, June, male (Prof. H. F. Wickham).

**Okanagana vanduzeei** Distant. Pl. II, fig. 3.

Mr. E. R. Leach has kindly presented me with six males of *O. vanduzeei* var. *consobrina* collected in Mendocino County, California from June 20 to 27, 1920. These northern specimens are a little smaller than the average from the type locality, San Diego County, but otherwise there appears to be no difference.

We here present a figure of the genitalia of a male *O. vanduzeei*, so that a comparison may be made with the new *Okanagana simulata*.



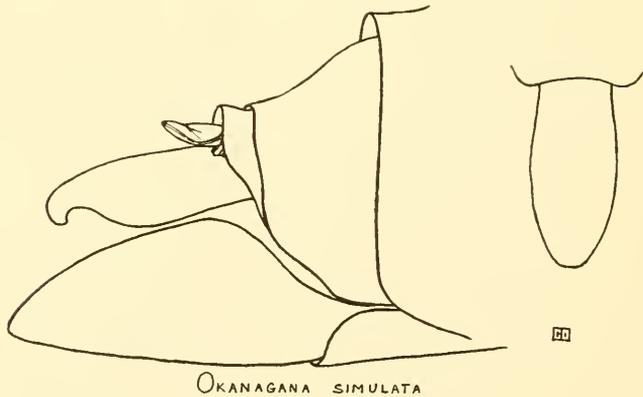
***Okanagana simulata*** new species. Pl. II, fig. 4.

Type male from Upland, San Bernardino Co., California, June 21, 1920 (Miss Esther P. Hewlett). Davis collection.

Allotype from same locality, June 29, 1920 (Miss Hewlett). Davis collection.

Resembles *Okanagana mariposa* in size and color, and *Okanagana vanduzeei* somewhat in color and form and in having a hooked uncus.

Head rather large and only a little narrower than the front margin of the pronotum; front conspicuously hairy and moderately produced; median sulcus



well defined. Pronotum with both the humeral and anterior angles rounded. Sides of pronotum without serrations. Front wings rather pointed with the outer edge forming a somewhat straight line. Beneath conspicuously hairy; last ventral segment broadly rounded and somewhat truncate at the extremity. In the female allotype the notch is sharp at the bottom with the sides somewhat sinuate. Uncus when viewed in profile hooked at the extremity.

Head black with the supra-antennal plates orange in the type; the allotype has in addition a spot on the front and the groove behind the middle ocellus dull orange. The transverse rugæ black, bordered by orange, but so covered with silvery hairs that the colors are considerably hidden. Pronotum black, the hind margin edged with dull orange. In the allotype the front margin is also narrowly edged with dull orange, and the grooves show faintly the same color. Mesonotum black, bordered on the sides posteriorly with dull orange. The elevated  $\times$  black, touched with dull orange at top and on the hind limbs; in front of the fore limbs there are the usual four orange spots arranged in a semicircle. Metanotum black, edged in part posteriorly with dull orange. Front wings with the venation almost black, with a submarginal dull orange streak extending to the end of the radial cell. Base of fore wing blackened, including the basal cell, membrane orange. Hind wings orange and dark brown or almost black at base, with the outer veins lighter than in the fore wings. Tergum black, but feebly shining, hairs silvery, uncus black. The legs are irregularly striped with orange; the femora paler at the outer joints. Beneath the abdominal segments are black centrally, edged posteriorly and on the sides with orange; the last segment is broadly edged with orange. Valve black beneath, orange along the upper margin.

#### MEASUREMENTS IN MILLIMETERS.

	Male Type.	Female Allotype.
Length of body .....	27	26
Width of head across eyes .....	9	9
Expanse of fore wings .....	75	77
Length of valve .....	5	

In addition to the type and allotype three males were collected at Upland, California, by Miss Hewlett in 1920, as follows: June 23, July 1 and July 5. In the Museum of Comparative Zoology, Cambridge, Mass., there is a male collected at Claremont, California, June 8, 1882. This locality is five or six miles to the west of Upland. I am indebted to Mr. Nathan Banks for the privilege of examining this specimen.

While this species on account of its size, large head, rather straight outer margin to the fore wings and coloring, resembles

*Okanagana mariposa*, it differs in having a hooked uncus instead of a nearly straight one; it is also more hairy. From *Okanagana vanduzeei*, which has a hooked uncus, it differs in being much larger, in having the eyes more prominent, the anterior angles of the pronotum more rounded, the front wings with the outer margin straighter, and the last ventral segment more rounded at the extremity, instead of somewhat sinuate. It, however, should be placed next to *vanduzeei*.

***Okanagodes gracilis* Davis.**

In the original description, JOURNAL N. Y. ENTO. SOCIETY, June-Sept., 1919, this species was reported from Utah, and two localities in Arizona. On August 6, 1919, at Bagdad, San Bernardino Co., California, Mr. Morgan Hebard collected two males on low plants in an arid environment. He was attracted by the song, which he at first thought was produced by an Orthopterous insect. The Cicadas ceased singing when he was still some distance from them, which made their final detection rather difficult.

***Platypedia putnami* var. *keddiensis* Davis.**

Recorded from Keddie, Plumas Co., and Lassen Co., California, also Corvallis, Oregon. Recently Mr. E. R. Leach kindly sent me two males and a female collected May 23, 1920, in Nevada Co., California.

***Platypedia laticapitata* new species. Plate II, fig. 5.**

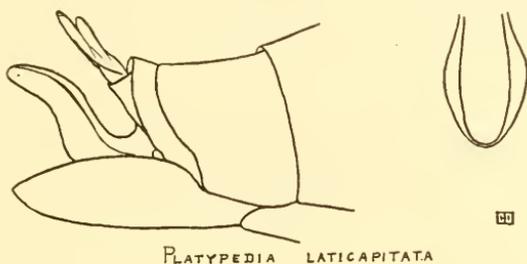
Type male, Upland, San Bernardino Co., California, June 24, 1920; allotype female from the same locality, July 1, 1920; both collected by Miss Esther P. Hewlett, and in Davis collection.

Resembles *Platypedia aperta* Van D. in its narrow fore wings; the uncus, however, is much narrower, and more as in *P. vanduzeei*, from which it differs in not having the broad wings nor the very hairy head of that species. The head is also very hairy in *minor* and *barbata*.

Front of head not prominent and about as in the other small species of the genus; median sulcus moderately well defined and broadening on the lower part of the face. The head is wide across the eyes, and the pronotum broadens from the collar toward the anterior margin, so that it is proportionately wider just behind the eyes than in any other *Platypedia* so far examined. Hairs on the greater part of the dorsal surface short and appressed, giving the insect a dull gray-black appearance; in *aperta*, *vanduzeei*, *minor* and *barbata* the hairs on the upper surface of the thorax are rather long, upright and dark colored. Hairs on the underside of the body longer and lighter colored, as is

usual. The fore wings are narrow, and have eight rather long and narrow apical areas; the costal margin is evenly curved. The uncus is upturned at the extremity as in *vanduseei*, but is more broadly rounded on the end than in that species. Last ventral segment in the allotype quite hairy, with the notch broadly v-shaped.

General color dull black, the lighter hairs giving a general grayish appear-



ance. Fore femora black on nearly the entire inner side; chestnut colored striped with black on outer side; extremities of femora pale. The hind margin of the pronotum, as well as the other usual paler markings are dull orange, while the membranes at the base of the fore wings are brighter orange.

#### MEASUREMENTS IN MILLIMETERS.

	Male Type.	Female Allotype.
Length of body .....	17	19
Width of head across eyes .....	6	6
Expanse of fore wings .....	44	43
Length of valve .....	2.5	

This insect should be considered just after *aperta* in the Key to the Genera and Species of *Platypedia* and *Neoplatypedia*, published in the JOURNAL, N. Y. Entomological Society, for June, 1920. Only the type and allotype have been examined.

#### EXPLANATION OF PLATES I AND II.

##### PLATE I.

- Fig. 1. *Tibicen cinctifera* (Uhler). Male.
- Fig. 2. *Tibicen cinctifera* (Uhler). Female.
- Fig. 3. *Tibicen cinctifera* (Uhler). Under side, enlarged.
- Fig. 4. *Tibicen apache* Davis. Type, male.
- Fig. 5. *Tibicen apache* Davis. Allotype, female.
- Fig. 6. *Tibicen apache* Davis. Under side, enlarged.

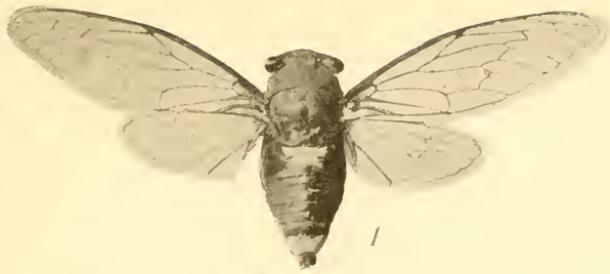
## PLATE II.

- Fig. 1. *Tibicen transversa* (Walker).  
Fig. 2. *Okanagana nigriviridis* Davis. Type.  
Fig. 3. *Okanagana vanduzeei* Distant.  
Fig. 4. *Okanagana simulata* Davis. Type.  
Fig. 5. *Platypedia laticapitata* Davis. Type.



(CICADIDAE.)





(CICADIDAE.)







AN ANNOTATED LIST OF THE CICADAS OF COLO-  
RADO WITH DESCRIPTION OF A NEW SPECIES.

By WM. T. DAVIS,

[Reprinted from the JOURNAL OF THE NEW YORK ENTOMOLOGICAL SOCIETY  
Vol. XXIX, No. 1, March, 1921.]







## AN ANNOTATED LIST OF THE CICADAS OF COLORADO WITH DESCRIPTION OF A NEW SPECIES.

BY WM. T. DAVIS,

NEW BRIGHTON, STATEN ISLAND, N. Y.

In the summer of 1919 the American Museum of Natural History sent a collecting party to Colorado, and among the insects secured by Dr. Frank E. Lutz and his two companions Messrs. Herbert F. Schwarz and Pearce Bailey, Jr., were twelve species of Cicadas. Dr. Lutz has kindly turned these over to me for determination. In the summer of 1920 Dr. Lutz secured an additional species. Prof. Theodore D. A. Cockerell has sent me several species collected in the state, one of which is here described as new, and has also furnished the names of three fossil species. To Prof. C. P. Gillette and Prof. Charles R. Jones of the Colorado Agricultural College, I am indebted for the loan of specimens representing nine species. To these sources of information have been added records made by the writer from specimens in his own collection, or sent to him at various times for determination. These last are acknowledged in connection with the several records.

There are a few species found in the eastern half of Kansas, and also in Nebraska, that do not appear to reach Colorado, but on the other hand some of the recorded species of *Okanagana* probably do not extend eastward of the mountainous regions of the state. Twenty-three species are here recorded, but only two of them, namely *Tibicen linnei* and *Tibicen canicularis*, are of the fauna of the Atlantic states. The majority of the others mentioned are confined

to the central parts of North America, only three or four of the species of *Okanagana* and *Platypedia* reaching California, and then often showing some variation from Colorado specimens.

Among the several species most likely to be collected in the future in Colorado and thus added to the present list are:

***Tibicen aurifera*** (Say).

Common in Kansas, and recorded from as far west as Seward, near the western part of that state at an elevation of 2,600 feet. This species was figured in the JOURNAL, N. Y. Entomological Society, March, 1916, Pl. 3, fig. 4.

***Tibicen resh*** (Haldeman).

Received from Elk Co., Kansas, 1,008 ft. (R. H. Beamer), and figured in JOURNAL, N. Y. Entomological Society, March, 1915, Pl. 1, fig. 3.

***Tibicen eugraphica*** (Davis).

A very common species in parts of New Mexico; we have a male from Albuquerque, Bernalillo Co., which is within 140 miles of the Colorado line. From 160 miles to the east we have seen eighty males and eleven females collected in Barber Co., Kansas, July 19-21, 1916, 1,468 ft. elevation, by Mr. R. H. Beamer. This species is usually found in dry situations. It was described and figured in the JOURNAL, N. Y. Entomological Society, March, 1916, Pl. 5, fig. 3.

***Tibicen vitripennis*** (Say).

Examined from both Nebraska and Kansas, so may possibly occur in Colorado. Figured in the JOURNAL, N. Y. Entomological Society, March, 1916, Pl. 6, fig. 3.

***Okanagana striatipes*** (Haldeman).

A more western species common in parts of Utah and Arizona, but likely to occur in Colorado as well. This species is considered in the JOURNAL, N. Y. Entomological Society, June-September, 1919, p. 215, and a figure is presented on the plate accompanying the present article.

In 1895 Prof. C. P. Gillette and C. F. Baker published a Preliminary List of the Hemiptera of Colorado, as Bulletin 31, Agricultural Experiment Station, State College of Colorado. They enumerated nine species, namely:

*Cicada dorsata* Say.

*Cicada marginata* Say [*Tibicen marginalis* Walker of this list].

*Cicada tibicen* Linn. [*Tibicen linnei* (S. & G.) of this list].

*Proarna valvata* Uhler.

*Tibicen synodica* (Say).

*Tibicen rimosa* (Say) [*Okanagana bella* Davis of this list].

*Tibicen cruentifera* Uhler.

*Platypedia putnami* (Uhler).

*Melampsalta parvula* (Say) [*M. calliope* (Walker) of this list].

The reasons for dropping *tibicen* Linn. as far as the fauna of the United States is concerned were given by Smith and Grossbeck, Entomological News, XVIII, 1907, and the other two changes are explained by the writer in the June-Sept., 1919, and June, 1920, numbers of the JOURNAL, N. Y. Entomological Society.

While there will ultimately be found just as many or even more species of Cicadas in Kansas than in Colorado, the following remarks on the latter state by Gillette and Baker in their introduction to the list already referred to, seem well justified: "Probably there is no state in the Union offering a richer field for the student of natural history than Colorado, whether it be in the line of minerology, paleontology, zoology or botany. Its broad stretch of arid plains crossed by streams of living water, its high mountain ranges, broad plateaus, innumerable gulches and deep canons, all combine to give it a most exceptional topography with a consequent diversified fauna and flora."

A very useful paper on the Cicadidae of Kansas, by P. B. Lawson, Kansas University Science Bulletin, Vol. XII, No. 2, March 15, 1920, was distributed in November, 1920. It contains descriptions of twenty-one species occurring in that state, also numerous figures of structural details. As eleven species of Cicadas have been found both in Kansas and Colorado, the paper will be helpful in considering those mentioned in the present list. There is, however, a considerable difference in the Cicada fauna of these two adjoining states, and it is always of interest to note the changes that take place in animal life as the one hundredth meridian is approached.

1. *Tibicen linnei* (Smith and Grossbeck).

Figured in JOURNAL, N. Y. Entomological Society, Sept.-December, 1918, Pl. 7, fig. 1.

"Colorado (E. V. Beales)," male without exact locality or date label. Through the courtesy of Prof. Myron H. Swenk, I have also been able to examine a female of this species in the collection of the University of Nebraska, labeled "Colorado." It is to be regretted that the information is not more complete.

There is a male in the writer's collection from West Point, Nebraska, and Mr. R. A. Leussler has sent me nine *limci* from Omaha, collected in October, 1917, and August, 1919. From Wakefield, Clay Co., Kansas, I have two males and a female collected by Mr. J. C. Warren. From the Kansas and Nebraska data it would appear that the Colorado records are no doubt correct.

2. *Tibicen canicularis* (Harris).

Figured in JOURNAL, N. Y. Entomological Society, March, 1916, Pl. 3, fig. 2, and Sept.-Dec., 1918, Pl. 7, fig. 2.

This species is recorded from Colorado in Mr. Van Duzee's Catalogue of the Hemiptera of America North of Mexico, 1917.

In his List of Hemiptera of the Region West of the Mississippi River, including those collected during the Hayden explorations of 1873, Bulletin of U. S. Geological and Geographical Survey of the Territories, vol. 1, p. 342, 1876, Uhler says: "From the mountains of Colorado. The specimen corresponds in size, structure, and markings with those from eastern Massachusetts and other parts of New England. New Jersey seems to be the region where it varies most in size and kind of markings."

In the writer's collection there are six specimens from Aweme, Manitoba (Criddle), and a male from Sioux County, western Nebraska, collected August 17, 1908 (C. H. Gable). In the collection of the University of Nebraska there are five additional specimens from the same county.

This species must not be confused with *Tibicen aurifera* (Say), which it resembles.

3. *Tibicen marginalis* (Walker).

Figured in JOURNAL, N. Y. Ento. Society, March, 1915, Pl. 2, fig. 1, and December, 1915, Pl. 18, fig. 2.

"Colorado," male (E. V. Beales), University of Nebraska. This is the only specimen so far examined from Colorado, but we have

numerous Kansas and Nebraska records, so the locality is no doubt correct.

This species does not as a rule inhabit as dry situations as *dorsata* and *dealbata*.

4. *Tibicen dealbata* (Davis).

Figured in JOURNAL, N. Y. Entomological Soc., Sept, 1915, Pl. 12, fig. 2.

This species was described in the JOURNAL, N. Y. Ento. Society, vol. 23, p. 162, Sept., 1915, and at that time was recorded from the following localities in Colorado, the dates of capture being in July, August and September: Denver; Platte Canyon, Jefferson Co.; Chimney Gulch, Golden; Pueblo, Pueblo Co.; Colorado Springs, and Durango, La Plata Co.

The following are additional records: Snyder, Morgan Co., Aug. 8, 1899, female, Univ. of Kansas; Ft. Lupton, Weld Co., male, collection Dr. E. D. Ball; Platte Canyon, Jefferson Co., Aug., 9,000 ft., four males (Oslar); Pueblo, July 31, 1907, female, and Aug., 1907, male (G. M. Hite), Univ. of Colorado; Pueblo, Aug. 9, 1920, male in vacant lot, captured by *Sphex* wasp (Dr. Lutz), Am. Museum of Natural History; Nepesta, Pueblo Co., male, collection Dr. E. D. Ball; La Junta, Otero Co., July 22-23, 1919, male and two females (Rehn and Hebard). Mr. Morgan Hebard states that this species inhabits dry situations. La Junta, August 11-13, 1920, about 4,100 ft., male (Dr. Lutz), Am. Museum of Natural History.

Writing of this species from Foss, western Oklahoma, in August, 1916, Miss Anna Bennett says: "The cicadas have all disappeared except the white-sided ones. These are very numerous here this year. In fact they are almost a pest. They sing in the evening and early part of the night. In the morning they are usually rather stupid and sleepy and are in the short weeds and grass out from the trees for a few rods, but start up with a loud noise and are quite easily caught in a net or even in the hands. They always fly for the trees and often sing after they light for a short time." Miss Bennett sent me 302 specimens of *dealbata*, well justifying her statement that the "white-sided ones" were very numerous about Foss, Oklahoma, in 1916.

Dr. Raymond H. Beamer writes that he found this species associated with *dorsata* in Kansas.

5. *Tibicen dorsata* (Say).

Figured in JOURNAL, N. Y. Entomological Society, Sept., 1915, Pl. 12, fig. 1.

In the Bulletin of the U. S. Geological and Geographical Survey of the Territories, Vol. 1, p. 342, 1876, Uhler says: "This is the grandest and most beautiful of the large western species of *Cicada*. Its note is said to be loud, piercing, and sustained, and from the great strength of the base of the wings and their fasciculæ of muscles the species must be one of the most vigorous and rapid in flight. The specimens here noticed were collected in Colorado by Prof. C. Thomas."

Dr. Raymond H. Beamer, in an account of his collecting trip in Kansas in 1916, writes that *dorsata* was the most widely spread and abundant species taken. It was commonly found on low shrubs or weeds and grass, often on barren hill tops.

Colorado records are as follows: Laporte, Larimer County, female, September 12, 1906, Colorado Agricultural College; six miles west of Loveland, Larimer County, male, August 20 (W. Foster), University of Colorado; Ft. Collins, August 1, 1903, male, Colorado Agri. College; Collins, August 19, 1898, male, University of Nebraska; Ft. Sterling, Logan County, July 11, 1909, 4,000-4,100 ft., male, Acad. Nat. Sciences of Philadelphia; Ft. Lupton, July 25, 1900, two males, collection Dr. E. D. Ball; Ft. Lupton, July 25, 1900, male, Colorado Agri. College; Wray, Yuma County, July 13, 1899, male, University of Kansas; Wray, August 17, 1919, about 4,411 ft. on sunflowers, sagebush, etc., two males (Dr. Lutz), Am. Museum of Natural History; Rocky Ford, Otero County, August 7, 1900, female, collection Dr. E. D. Ball; La Junta, Otero County, August 11-13, 1920, about 4,100 ft. on arid hills, male (Dr. Lutz), Am. Museum of Natural History.

6. *Tibicen duryi* Davis.

Figured in JOURNAL, N. Y. Ento. Soc., Dec., 1917, Pl. 13, fig. 2.

Bondad, June 27, 1919, 6,100 ft., male (Dr. Lutz), Am. Museum of Natural History.

This species is very common at times in New Mexico, and will no doubt be found abundant in parts of Colorado as well. It is a beautiful insect, and is colored near the base of both pairs of wings bright

orange or orange and gray, and in this and other respects looks at first glance, especially when the wings are closed, much like some of the species of *Okanagana* among which it lives.

7. *Tibicen bifidus* (Davis).

Figured in JOURNAL, N. Y. Entomological Society, March, 1916, Pl. 4, figs. 3-4.

Fort Collins, June 28, 1900, three males, two females, collection Dr. E. D. Ball; Fort Collins, June 28, 1900, male and June 29, 1901, male and two females, Colorado Agri. College; Salida, Chaffee Co., 1885, male, University of Nebraska; Pueblo, June 15, 1900, female, collection Dr. E. D. Ball. The male type came from Clear Creek, Colorado.

8. *Cacama valvata* (Uhler).

Figured in JOURNAL, N. Y. Entomological Society, March, 1919, Pl. 13, fig. 1.

In Cicadas of the Genus *Cacama*, with Descriptions of Several New Species, JOURNAL, N. Y. Entomological Society, March, 1919, Colorado specimens are recorded from Pueblo, Carson City, Trinidad, Cañon City, Holly, Coolidge and Fort Collins, with dates of capture in June and July. In the collection of the Colorado Agricultural College there are additional specimens from Fort Collins, June 28, 1900, male and female, and Pueblo, June 15, 1900, male and female.

This species, according to Mr. John Woodgate of Jemez Springs, New Mexico, is often found on bush-cactus.

9. *Proarna venosa* (Uhler). Plate V, fig. 1.

Cañon City, July 2, 1885, two males, one female, and July 3, male, collection University of Nebraska.

In July, 1917, Dr. H. H. Knight collected this small species very commonly "on desert grass" at Aden, New Mexico. At Foss, Oklahoma, July, 1916, Miss Anna Bennett reported finding a male on a thistle near the roots of a cottonwood "singing as loud as possible." Dr. Raymond H. Beamer has taken this species in Kansas in grass and weeds, where they were located by their song, which was low through shrill.

10. *Okanagana cruentifera* (Uhler).

Figured in JOURNAL, N. Y. Entomological Society, June-Sept., 1919, Pl. 19, fig. 2.

Bondad, June 27, 1919, 6,100 ft., three females (Dr. Lutz), American Museum of Natural History.

11. *Okanagana magnifica* Davis.

Figured in JOURNAL, N. Y. Entomological Society, June-Sept., 1919, Pl. 19, fig. 1.

In the original description a female is reported from Nucla, Colorado, Sept. 7, 1907 (C. T. Trueb), collection U. S. National Museum. The following localities can now be added: Bondad, June 27, 1919, 6,100 ft., three males, five females, found among "sagebush, oak, sabina, pinyon, cottonwood, etc." (Dr. Lutz), Am. Museum of Natural History; Mesa Verde, July 3-7, 1919, 7,300 ft., six males, three females, found among "pinyon, sabina, sagebush, etc." (Dr. Lutz), Am. Museum of Natural History. With these last mentioned specimens are two pupa skins, each about 30 millimeters in length, with broad stripes of a chocolate brown color on the hind margins of the abdominal segments. This is the largest species of *Okanagana* so far described.

12. *Okanagana schaefferi* Davis.

Figured in JOURNAL, N. Y. Entomological Society, March, 1915, Pl. 3, fig. 4.

The only two records for this species in the state, is the published one of a male from Salida, June, 1885, collection, University of Nebraska, and a male recently found in the collection of the U. S. National Museum, labeled simply "Colorado."

Mr. George P. Engelhardt has informed me that the song of this species closely resembles the whirring noise produced by a rattlesnake, and that on one occasion in June, 1917, in Washington County, Utah, he came very nearly being bitten by a snake while searching in a small bush for the supposed Cicada. Mr. J. Duncan Putnam in his "Remarks on the Habits of Several Western Cicadae," Proceedings, Davenport Academy of Natural Sciences, March, 1881, records his experience with a species of Cicada belonging to the present genus *Okanagana*: "The male makes a rattling noise, exceedingly like that of a rattlesnake. This resemblance was so close

that one day in 1873, in the Shoshone Mountains, I was attracted by a noise which I took to be one of the insects, and stooped to pick it up, when I suddenly discovered a huge rattlesnake in its stead."

13. *Okanagana bella* Davis.

Figured in JOURNAL, N. Y. Entomological Society, June-Sept., 1919, Pl. 20, fig. 1.

In the original description this species was recorded from Livermore, Ft. Collins, Estes Park, Golden, Russell, Creede and Durango in Colorado, with dates of capture from June 24 to August 1. To these records may be added the following: Lily, Moffat Co., June 30, male and two females (J. W. Frey), Am. Museum of Natural History received from University of Colorado; Fort Collins, June 29, 1901, two males and two females, Colorado Agri. College; Colorado Springs, El Paso Co., male and female (H. B. Baker), University of Michigan; The South Fork, Rio Grande, June 17, 1919, 8,500 ft., two females, "cold at night, about 42°" (Dr. Lutz), Am. Museum of Natural History; Wolf-Fall Creek, Mineral Co., June 20, 1919, 7,900 ft., male (Dr. Lutz), Am. Museum of Natural History; Pagosa Springs, June 21-23, 1919, 7,500 ft., two males (Dr. Lutz), Am. Museum of Natural History. In the Academy of Natural Sciences, Philadelphia, there are fourteen males from Sedalia, Colorado, and in the writer's collection two males and a female from Breckenridge, 9,000 ft., July (Oslar). In these sixteen specimens, as in most other males from Colorado, the valve is pale in color.

The song of this species is described by Dr. Lutz, as having the clicks run close together, and continued for a long while.

14. *Okanagana synodica* (Say). Plate V, fig. 2.

Thomas Say says in the original description: "Dr. James and Mr. Peale observed this species in great numbers in one locality, at the base of the Rocky Mountains, but it did not occur elsewhere."

Uhler says in the Bulletin of the U. S. Geological and Geographical Survey of the Territories, Vol. 1, p. 341, 1876: "This pretty little species seems to be common in Eastern Colorado. The present specimens were collected in that region by Mr. B. H. Smith and by Prof. C. Thomas."

Mr. Joseph Duncan Putnam in his "Remarks on the Habits of

Several Western Cicadæ," already referred to, records that "*Cicada synodica* Say, was quite common on the grassy plains near Denver and Boulder, in Colorado, in June, 1872. The male makes a tolerably loud rattling noise."

Gillette and Baker in their Preliminary List of the Hemiptera of Colorado, record the species from near Cañon City, August 11 (Uhler); Southern Colorado, June to July (Carpenter); Fort Collins, June 21 (Baker) and July 5 (Gillette); Manitou Park (Snow).

In the JOURNAL, N. Y. Entomological Society, June-Sept., 1919, the species is recorded from Denver, Ft. Collins, Pueblo, Lamar and Salida, with the dates of capture in May, June and July.

To the above records may be added: Walsenburg, June 14, 1919, 6,200 ft., seven males, one female, "chiefly on grass and low weeds" (Dr. Lutz), Am. Museum of Natural History; Boulder, female (Prof. Cockerell); Clear Creek Canyon, June 24, 1920, 7,500 ft., five males (Oslar).

15. *Okanagana utahensis* Davis.

Figured in JOURNAL, N. Y. Entomological Society, June-Sept., 1919, Pl. 20, fig. 4.

Mesa Verde, Montezuma Co., July 3-7, 1919, 6,600 ft, male, and

Bondad, June 27, 1919, 6,100 ft., male. Both specimens in the Am. Museum of Natural History and collected by Dr. Lutz, who states that the song is continuous. This species has not before been reported from Colorado.

16. *Okanagana hesperia* (Uhler). Plate V, fig. 4.

Denver City, Colorado, is the type locality given by Uhler in the original description.

In the JOURNAL, N. Y. Entomological Society, June-Sept., 1919, this species is recorded from Denver, Golden, Fort Collins, Platte Canyon, La Junta, and Trinidad. The dates of capture are from June 10 to July 17.

To the above records may be added: Colorado Springs, male (H. B. Baker) collection University of Michigan; La Junta, July 22-23, 1919, female (Rehn and Hebard); Animas, June 26, 1919, 6,600 ft., two males, and Bondad, June 27, 1919, 6,100 ft., "song continuous" (Dr. Lutz), Am. Museum of Natural History.

17. *Platypedia mohavensis* Davis.

Figured in JOURNAL, N. Y. Entomological Society, June, 1920, Pl. 5, fig. 1.

The only Colorado record for this species is the one already published in the original description, namely Bondad, June 27, 1919, male and three females (Dr. Lutz), Am. Museum of Natural History.

18. *Platypedia putnami* (Uhler).

Figured in JOURNAL, N. Y. Entomological Society, June, 1920, Pl. 5, fig. 3.

In the original description in 1877, Uhler states that the types were "collected in the vicinity of Clear Creek, Colorado, by Mr. J. Duncan Putnam." In the Proceedings of the Davenport Academy of Natural Sciences, Vol. 3, March, 1881, there are some "Remarks on the Habits of Several Western Cicadae," by Mr. Putnam, made at the meeting of January 31, 1879, as follows: "*Cicada putnami* Uhler (Vol. 2, Plate 4, figs. 3 and 4) I have collected only upon one occasion, July 2, 1872. It occurred in considerable numbers on some small aspen trees growing close to the water of Clear Creek, between Floyd's Hill and Idaho Springs, Colorado. The male makes a very faint chirp, differing entirely from any other Cicada I have ever heard. This species does not appear to have been collected since."

Specimens from the following localities are recorded in the JOURNAL, N. Y. Entomological Society, for June, 1920: Fort Collins, Boulder, Bear Creek in Jefferson Co., Chimney Gulch, Golden, Platte Canyon, Manitou, Canon City, Alamosa, Mesa Verde in Montezuma Co., Durango, Bondad, Pagosa Springs, and Starkville. The dates of capture are from May 13, 1901, at Chimney Gulch (Dyar and Caudell), to July 3-7, 1919, at Mesa Verde at an elevation of about 7,300 ft.

All observers report the notes of the several species of *Platypedia* as a series of short *clicks*, and Dr. Lutz states that those he collected at Starkville produced a "clicking sound; about eight clicks, rapid at first, but slowing."

Additional records are as follows: Fort Collins, June 16, 1899, three females and June 22, 1899, female, collection Colorado Agri. College. Colorado Springs male and female (H. B. Baker), collection University of Michigan.

19. *Platypedia minor* Uhler.

Figured in the JOURNAL, N. Y. Entomological Society, June, 1920, Pl. 5, fig. 10.

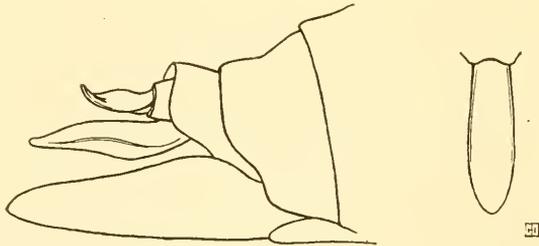
The only specimens I have seen from Colorado have already been recorded, and consist of the fifty-seven individuals collected at Greenwood Springs, June, 1919, by Mr. Oslar. The type locality for this species is San Mateo, California, but the Colorado specimens appear to be the same, though their distribution is unusual.

20. *Platypedia latipennis* new species. Plate V, fig. 5.

Type male, Douglas Spring, Routt Co., Colorado, June 26 (J. W. Frey). Collection American Museum of Natural History, received from University of Colorado.

The uncus resembles in shape that of *Platypedia mohavensis*, but the fore wings are broader and the front of the head not as prominent as in that species. The fore wings in form resemble those of  *barbata* and  *minor*, and have also a rather broad basal cell, but it is not nearly as hairy as either of those species, and the uncus is differently shaped.

Front of the head not prominent, median sulcus well defined and broadening on the lower part of the face. The whitish hairs on the body are about



PLATYPEDIA LATIPENNIS

as in *putnami*; the upper surface is nearly smooth except on the head and about the mesonotal  $\times$ , while beneath the hairs are long and numerous. The fore wings have eight apical cells, are very broad, and have the costal nerve rather suddenly bent near the end of the radial cell. When viewed from in front the costal nerve is seen to be wavy, suggesting an approach to *Neoplatypedia*. The uncus is slightly arched at the top, with the extremity rather flat and rounded; beneath it is somewhat deepened near the basal third; not as much so as in *putnami*, but more so than in *mohavensis*.

General color blue black with the lighter marks brilliant orange-red as in *putnami*, which indeed it strongly resembles in coloring, and for which it might be taken if it were not for structural characters. Fore femora entirely black

except the extremities, which are brilliant orange-red; middle and hind femora black above, orange-red beneath. The hind margin of the pronotum or collar is conspicuously orange-red, as are the membranes at the base of both pairs of wings.

## MEASUREMENTS IN MILLIMETERS.

	Male Type.
Length of body .....	19.5
Width of head across eyes .....	5
Expanse of fore wings .....	4 <sup>2</sup>
Length of valve .....	4

Only the type has been examined, but the broad fore wings, and the shape of the uncus readily separate it from the other described species of *Platypedia*. This insect should be considered just after *barbata* in the Key to the Genera and Species of *Platypedia* and *Neoplatypedia* published in the JOURNAL, N. Y. Entomological Society for June, 1920.

21. *Neoplatypedia constricta* Davis.

Figured in JOURNAL, N. Y. Entomological Society, June, 1920, Plate 5, fig. 13.

The only Colorado specimens so far examined are the fifteen males and twenty-two females collected by Dr. Lutz at Bondad, June 27, 1919, and now in the collection of the Am. Museum of Natural History. It was noted when the insects were collected that the song was a *zip, zip, zip* continued for a long time.

22. *Melampsalta calliope* (Walker), 1850.

*Cicada parvula* Say, 1825; name preoccupied.

*Cicada pallescens* Germar, 1830; name preoccupied.

Figured in JOURNAL, N. Y. Entomological Society, June, 1920, Pl. 5, figs. 14 and 15.

The only Colorado specimens so far examined are a male and a female in the U. S. National Museum, collected at Granada, Prowers Co., in the eastern part of the state. It is a common species in parts of Kansas and Nebraska.

23. *Melampsalta kansa* Davis.

Figured in the JOURNAL, N. Y. Entomological Society, June 1920, Pl. 5, fig. 17.

In the paper on the North Am. Cicadas belonging to the Genera

Platypedia and Melampsalta, published in this JOURNAL for June, 1920, five males collected by the American Museum Expedition, in June, 1919, are recorded from Regnier and Lamar. To these may now be added one male and three females from Lamar, June 17, 1900, recently sent to me for examination from the Colorado Agricultural College. The entirely green Cicada from near the Rocky mountains, which Thomas Say wrote about in 1825 in connection with his *Cicada parvula*, is supposed to have belonged to this species.

#### FOSSIL SPECIES.

##### *Cicada grandiosa* Scudder.

This species was described and wing figured in the Bulletin of the U. S. Geological Survey, No. 93, 1892, in an article entitled "Some Insects of Special Interest from Florissant and other Points in the Territories of Colorado and Utah."

In the Bulletin, American Museum of Natural History, Vol. 30, 1911, p. 76, Prof. T. D. A. Cockerell comments upon this insect as follows: "This species was based by Scudder on a hind wing, which was remarkable for its large size, and supposed to differ from true *Cicada* in several venational characters. The wing, however, agrees very nearly with that of the living American *Cicada marginata* [*marginalis* Walker], and I believe represents a quite typical *Cicada*. In March, 1911, my wife and I found at the south end of Fossil Stump Hill, Florissant, a rather poorly preserved upper wing of *Cicada*, showing all the central area, including the forking of the radius and cubitus, the median cell and the two large discal cells above it. All of this is perfectly typical for *Cicada*, and might almost have come from a wing of *C. marginata*. The large cell in the forks of the media has its side on the cell (median) below 12 mm. and that on the cell above 10 mm. As the proportions agree exactly with the upper wing which should go with Scudder's hind wing, it seems safe to assume that they belong to the same species."

##### *Lithocicada perita* Cockerell.

Described and figured in the Bulletin Am. Museum of Natural History, vol. 22, 1906, p. 457, from a plainly represented anterior wing 23 mm. in length and 10½ broad, showing almost complete venation. The costal margin is very much bent near the apex of



CICADIDAE).



the wing; the radial cell does not extend beyond the middle, and the eighth apical cell is very large and inversely triangular.

***Platypedia primigenia* Cockerell.**

Described and figured in *The American Journal of Science* for January, 1908, p. 52, from a well preserved specimen found at Florissant in 1907. The following are some of the salient characters: Length about 23 mm. (the apex of abdomen is lost). Compared with the living *putnami*, the body is larger and more robust. As in that species the femora are black. *P. primigenia* will be easily known from *Lithocicada perita* Cockerell, by the shape of the eighth apical cell, and from *Cicada grandiosa* Scudd., by the much smaller size.

It is interesting to learn that the genus *Platypedia* was represented in Colorado in Miocene times, as it is today.

EXPLANATION OF PLATE V.

- Fig. 1. *Proarna venosa* (Uhler).
- Fig. 2. *Okanagana synodica* (Say).
- Fig. 3. *Okanagana striatipes* (Haldeman).
- Fig. 4. *Okanagana hesperia* (Uhler).
- Fig. 5. *Platypedia latipennis* Davis. Type.





















SMITHSONIAN INSTITUTION LIBRARIES



39088007647845