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MELVILLE T. COOK, Editor

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No. 1

"INSECTAE BORINQUENSES"

A Revision of

"INSECTAE PORTORICENSIS"

A Preliminary Annotated Check-List of the Insects of Porto Rico, with Descriptions of some News Species"

Jour. Dept. Agr. P. R. Vol. 7, No. 1 (January 1924), pp. 313, fig. 2.
San Juan, March 5, 1924

and

"FIRST SUPPLEMENT TO INSECTAE PORTORICENSIS"

Jour. Dept. Agr. P. R., Vol. 7, No. 4 (October 1924), pp. 38-43,
San Juan, August 1924.

By GEORGE N. WOLCOTT

INTRODUCTION

The earliest recorded collection of insects in Puerto Rico was made by Andrés Pedro Ledru and is reported in his "Viaje a la Isla de Puerto Rico en el Año 1797", Paris, 1810. Of the forty-six insects listed from Porto Rico under their scientific names, ten can be readily identified:

<i>Termes morio</i> Fabr.=	<i>Nasutitermes costalis</i> Holmgren
<i>Blatta americana</i> L.=	<i>Periplaneta americana</i> Linn.
<i>Grillus assimilis</i> Fabr.=	<i>Grillus assimilis</i> Fabr.
<i>Achaeta grillotalpa</i> Fabr.=	<i>Scapteriscus vicinus</i> Scudder
<i>Cimex victor</i> Fabr.=	<i>Proxys victor</i> Fabr.
<i>Pulex penetrans</i> Linn.=	<i>Dermatophilus penetrans</i> Linn.
<i>Elater phosphoreus</i> F.=	<i>Pyrophorus luminosus</i> Illiger
<i>Passalus pentaphyllus</i> Latreille=	<i>Passalus pentaphyllus</i> Latreille
<i>Scarabaeus tytanus</i> Fab.=	<i>Strataegus barbigerus</i> Chapin
<i>Bembex signata</i> Linn.=	<i>Stictia signata</i> Linn.

and one can guess at the probable identity of many of the others. Considering the time when Ledru wrote, the incompleteness of his list is not surprising, and as he lists many more species than are named, and does not omit mention of smaller and less obvious forms, such as ichneumons and ants, its real importance should not be underestimated, even though its value is mainly historic.

In 1882, Dr. Augustin Stahl of Bayamón, P. R. had published at San Juan his "Fauna de Puerto Rico", pages 82 to 102 being devoted to a discussion of the systematic classification of insects, and pages 169 to 249 to a list of specimens from Cuba, Trinidad and Porto Rico in his collection at Bayamón. Copies of his paper are now rare, and little is left of his collection, although it is reported that fragments of it still exist.

For a considerable number of years before the appearance of Stahl's paper, the German consul stationed at Mayagüez, Herr D. Leopoldo Krug, had been collecting insects, and at his instance the eminent naturalist, Dr. Juan Gundlach, made two trips to Porto Rico, and together they collected at Mayagüez and in various other parts of the Island. Their collections were sent to Berlin, where they were studied, classified and the many new species described by various specialists. Between May 1887 and September 1893, Gundlach published the sections dealing with insects of his "Fauna Porto Riqueña" in the *Anales de la Sociedad Española de Historia Natural*, Madrid, embodying the results of their work. Herr H. J. Kolbe identified their specimens of Neuroptera, described the new species and listed the entire collection. Dr. Henri de Saussure identified the Orthoptera, but at the time Gundlach published, he did not know whether Saussure had published the descriptions of the new species, the manuscript names for which he gives. Dr. Uhler identified the Hemiptera, but apparently did not publish descriptions of the new species from Porto Rico, and Gundlach notes only a few Homoptera, as Dr. Uhler identified them only to genus. Altho various specialists in small groups of Coleoptera, especially Herr G. Quedenfeldt and Herr J. Weise, identified or described new species from Porto Rico, a number of large and common species peculiar to Porto Rico, notably the *Lachnosterna*, are not even mentioned by Gundlach because he could not get them determined or described. Herr Victor Von Roeder identified the Diptera, listing and re-describing about eighty species and describing eleven new species. Dr. H. Dewitz identified the Hymenoptera, excepting the ants, and described many new species. He also listed the butterflies collected in Porto Rico, and described and listed some of the moths. He was unable to work up the entire collection of Lepidoptera, which was turned over to Herr H. B. Möschler, whose extensive paper, containing descriptions of many new species, was published posthumously by Herr M. Saalmüller. Gundlach's paper will remain a lasting monument to his energy, perseverance and industry in advancing systematic entomology in Porto Rico.

Since Gundlach's time, various workers from the United States have supplemented portions of his list. Dr. D. W. Coquillett in the Diptera, Prof. Wm. M. Wheeler in the Formicidae, Mr. Thos. H. Jones in the Coccidae, Mr. J. A. G. Rehn in the Orthoptera, Messrs. Leng and Mutchler in the Coleoptera, and Dr. Nathan Banks in the Isoptera, have published important papers.

In 1914, Mr. R. H. Van Zwaluwenburg prepared a list of all determinations of insects in the collections at the two experiment stations, giving the number of the note or determination and the host records of those at the Mayagüez (Federal) Station, of which he was at that time Entomologist. He also listed all those recorded in the literature which was available to him, but unfortunately he had neither Stahl's nor Gundlach's papers. His list was never published, but typewritten copies, together with a supplement of 15 pages, March 1915, were presented to a small number of persons or institutions especially interested.

Important advances in Entomology since the change in government in 1898 have been made in the economic field by workers at the two Experiment Stations. Since 1903, the reports of the Federal Experiment Station at Mayagüez, and a few papers devoted largely or entirely to Entomology, have contained references to many insects from an economic standpoint. Mr. O. W. Barrett was Entomologist and Botanist there from 1903 to 1905; Mr. W. V. Tower, Entomologist from 1906 to 1911, and from 1917 to 1923, Dr. C. W. Hooker in 1912, and Mr. R. H. Van Zwaluwenburg from 1914 to 1917.

With the establishment of the experiment station of the Sugar Producers' Association in 1910, an intensive study of the insect pests of sugar cane was initiated, the results of which have appeared as annual reports, lists of the insect pests of sugar cane, and as bulletins or circulars of a single insect or group of insects. Following the transfer of the station to the Insular Government, the field of entomological investigation was broadened to include all economic insects, and a great diversity of publications has appeared.

The original list, of which this is a revision, was an attempt to summarize the records in literature of the occurrence of the insects in Porto Rico, together with the records of the collections at the two experiment stations; that at Mayagüez as given by Van Zwaluwenburg in his list, which includes a number, prefixed by "P. R." if considered not of economic importance, and often host records, but with locality, usually Mayagüez or vicinity, and collector unspecified; that at Río Piedras with host and locality records (Río Piedras always implied if not specified), accession number or collector's initials and sometimes other data.

Mr. D. L. Van Dine, the first Entomologist at the Río Piedras Station, collected all the insects, mostly from sugar cane, with accession numbers of the years 1910 and 1911 (ending in—10 or—11). Mr. Thomas H. Jones collected most of the insects listed in 1912, and those numbered from 1 to 499, 700 to 999, and 1201 to 1299 in 1913; 1 to 100 and 701 to 898 in 1914, altho Mr. Van Dine made a number of collections in 1912 and a few in 1913. Mr. E. G. Smyth collected, usually at light at Guánica, those listed under 500 to 699 and 1000 to 1199 in 1913; and at Mona Island or other localities those under 1300 to 1399 in 1913; at Guánica those under 500 to 699 in 1914 and under 200 to 999 in 1915; at Río Piedras many in 1916 and most of those in 1918, 1919 and 1920. Dr. G. N. Wolcott was responsible for a few collections in 1914, those between 1 and 190 in 1915, some in 1916 and many in 1921 and 1922, those from 101 to 180 at Isabela in 1932, and many from 1933 to date. Dr. R. T. Cotton collected many of the insects, especially those in citrus groves, listed in 1916 and practically all in 1917. Messrs. R. A. Crespo, E. Nelson and L. A. Catoni collected a few of the insects listed in 1918, 1919, and 1920. Mr. J. D. More collected a few insects in 1920, and those, mostly insects of cotton, or ants, under 500 to 625 in 1921 and 1922. Mr. Francisco Seín collected many insects, mostly from coffee in 1921 and 1922, and on coffee and on other crops since, to date.

Mr. S. S. Crossman collected some insects, mostly on tobacco or at light at Aibonito, unaccessioned, but followed by his initials (SSC) and Mr. G. B. Merrill those followed by his initials. The records followed by the initials of other entomologists represent unaccessioned specimens or field notes. The records of unlabeled specimens bear their own mute testimony to the anonymity of their collectors.

Commas are used to separate the data differing in only one particular of host or locality, semicolons those differing in both host and locality, and often periods to separate the records of adult, larva and egg. Records of collections at Río Piedras (or Santurce and San Juan) are placed first and this locality is implied when none is specified.

The references to the lists of Stahl, Gundlach and the specialists who identified and listed his collections, of Van Zwaluwenburg, of Leng & Mutchler, and to the more extensive systematic papers, are given merely as the name, or initial, of the writer; those to the original of this list, to its supplement, to "Entomología Económica Puertorriqueña", and to "An Economic Entomology of the West Indies" as "IP", "IPSup", "EEP" and "EEWI" respectively; those to other references by author, with the year of publication and

page separated by a dash. When the insect was listed under another genus, or in synonymy, or incorrectly, the name under which it was listed is usually given before that of the authority for the record, and applies to all references on the same line or in the same paragraph.

All records, whether verified by later collections and determinations, or not, have been included, but the more doubtful have been enclosed in brackets. Manuscript names given by Stahl and Gundlach are included, as some of them have been validated by publication of descriptions long after the appearance of their lists.

In 1914, several entomologists from the American Museum of Natural History, New York City, collected insects in Porto Rico, and some of the larger and more common specimens of their collections were returned as a named collection, placed first in the University of Porto Rico, later at the Insular Experiment Station, and at present what remains of the collection is in the Museum at San Juan. From a list of these specimens, made by the compiler at the time of their transfer to the Station, the "AMNH" records in this list are taken.

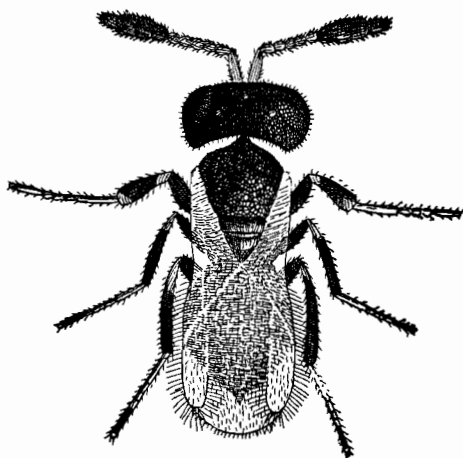
To Dr. L. O. Howard, formerly Chief of the Bureau of Entomology, the compiler is most greatly indebted for making the preparation of the original list possible, by obtaining from the specialists in the Bureau and in the National Museum the determinations of specimens, and by authorizing personal consultation with these gentlemen. Not only did they determine specimens, but in some cases they revised the first draft of the section of the check-list which was submitted to them, in many cases adding new records of specimens or from literature not available to the compiler, and to each of them he is under deep obligation. In the paragraph preceding each order are given the names of the specialist, or specialists, who have determined specimens of insects of that order. In the body of the list, if this is the first record of the insect in Porto Rico, the name of the specialist making the determination is given immediately after the name of the insect and on the same line with it. If the insect was described from Porto Rico, the reference to the original description is given, if known, followed by "TYPE from P. R.". But if the insect has been previously recorded, the name of the specialist making the determination is usually given with the accession or interception number of the particular specimen which he determined.

Mr. John R. Johnston, the first Plant Pathologist at the Río Piedras Station identified many of the plants on which Mr. Van Dine and Mr. Jones found insects feeding. But it is to his successor, Mr. John A. Stevenson, to whom the Entomological Department is most

SCELIONIDÆ

Prophanurus alecto Crawford—det. A. B. Gahan.

Wolcott 22e-24: a parasite of the eggs of *Diatraea saccharalis* F., notes, a short description and illustration of adult.



Prophanurus alecto Crawford. Eighty-five times natural size. (Drawn by G. N. Wolcott.)

EEWI-176 to 17: same data and illustration.

from eggs of *Diatraea saccharalis* Fabr. (234-21), at Toa Baja (336-21).

Phanurus flavus, Dodd, Alan P., "A New Proctotrypoid Egg-parasite from the West Indies (Hym.)" in *Entomological News*, Vol. 25, p. 350, October, 1914, TYPE from Porto Rico.

EEWI-322: the same data.

from eggs of *Ormenis pygmaea* Fabr. (360-12 TYPE), a common parasite.

Hadronotus carinatifrons Ashmead—det. C. F. W. Muesebeck from Coreid eggs at Canóvanas (505-12).

Telenomus sp.—near **convergens** Ashmead—det. C. F. W. Muesebeck reared from *Leucoptera coffeella* Guerin from Lares and Isabela by F. Seín (7-35).

Telenomus flaviventris Ashmead—det. C. F. W. Muesebeck reared from eggs of *Ormenis* sp. on sugar-cane by Thos. H. Jones (634-12, 676-12).

Telenomus sp. nov.—det. C. F. W. Muesebeck reared from eggs of *Ormenis* sp. by Thos H. Jones (205-12, 340-12).

Telenomus sphingis Ashmead

Gahan, A. B., "Synonymical and Descriptive Notes on Parasitic Hymenoptera." Proc. U. S. Nat. Mus., Vol. 77, Art. 8, No. 28313, pp.-11. Washington, 1930.

(as *T. monilicornis* Ashmead—det. J. C. Crawford) Tower 08-35; Tower 10-27; Wolcott 22c-8; EEP-88: reared from eggs of *Phlegethontius sexta* Johan.

PLATYGASTERIDÆ

Leptacis sp. nov.—det. C. F. W. Muesebeck
on canna (I No. 5287).

FORMICOIDEA

Wheeler, Wm. M., "The Ants of Porto Rico and the Virgin Islands." Bull. Amer. Mus. Nat. Hist., Vol. 24, Art. 6, pp. 117-158, fig. 4, pl. 2. New York, 1908.

Wheeler, Wm. M., "Ants." pp. xxv & 663, fig. 285, ref. 70 pp. Columbia University Press, New York, March 1910.

Wolcott, G. N., "Recent Experiments in the Control of Puerto Rican Ants." Jour. Dept. Agr. P. R., Vol. 17, No. 3, pp. 223-239, ref. 6. San Juan, November 14, 1933.

(The first draft of this section was prepared by Mr. J. D. More; the determinations of the ants eaten by lizards were made by the compiler. To the American Museum of Natural History the compiler is indebted for permission to reproduce the illustrations from Dr. Wheeler's papers; all such illustrations being here noted as "Drawn by R. B. Howe.")

PONERINÆ

Platythyrea punctata F. Smith

Wheeler: between Arecibo and Utuado, "in a shady cafetal." on *Caladium* at Arecibo (I No. 5442).

Euponera (Pseudoponera) stigma Fabr.

Wheeler: in Culebra Island and at Utuado, "nesting under stones or logs."
on orange leaves at Ponce (I No. 3222).

Ponera opaciceps Mayr

Wheeler: on Culebra Id., at Utuado, Monte Morales, Monte Mandios and at Coamo Springs, "under bark of decaying logs in damp places."

Wetmore 16-87: eaten by Swallow.

(as sp.) Wolcott 24-4: three individuals in 3 sq. ft. of pasture at Pt. Cangrejos.

Ponera ergatandria Forel

Wheeler: at Utuado.

Anochetus mayri Emery

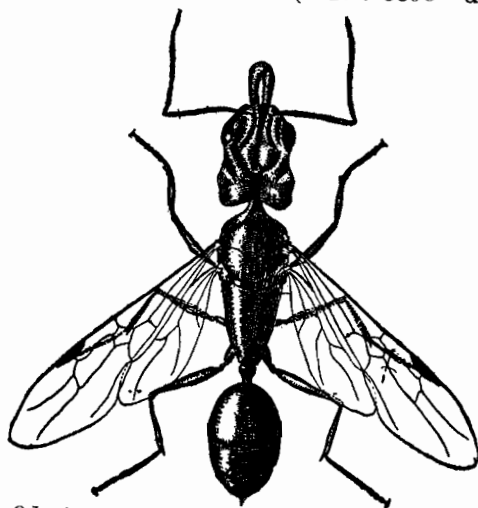
Wheeler: at Utuado, Vega Baja, Monte Morales and Monte Mandios, at Coamo Springs, San Juan, Adjuntas, Arecibo, "common under dead leaves and stones in the shade of cafetals and platanals."

Wolcott 24-16, 28: eaten by *Anolis pulchellus* and *A. cristatellus*.

Anochetus (Stenomyrmex) emarginatus testaceus Forel

Wheeler: on Culebra Id., "along dry arroyos on the higher part of the island."

on grapefruit at Palo Seco (I No. 5398—det. Mann).



Odontomachus haematodes L., winged adult.

Five times natural size. (Drawn by F. Maximilien.)

Odontomachus haematodes Linn.

Wheeler: at many localities, "common, nesting under stones or logs or in untidy mound nests about the roots of trees, but only in shady places and rather rich soil."

Wetmore 16-80: eaten by Petchary.

Wolcott 24-16, 19, 28, 33: eaten by *Anolis pulchellus*, *A. cristatellus* and *A. gundlachi*. Wolcott 33-223: "barraco".

AMC: many localities.

(I No. 879—det. Mann), at light (I No. 3131); at Ciales in rotten stump (59-21).

Odontomachus heamatodes Linn., subsp. *insularis* Guerin, var. *ruginodis* Wheeler—popularly known as "berraco".

Wheeler: at Utuado, Adjuntas, Coamo Springs, "less common—in open sunny places in sandy soil of river bottoms."

Wetmore 16-91: eaten by Mockingbird.

(705-16, 1117-16), at base of tree (267-12), in rotten coconut husks (183-21), with *Pseudococcus sacchari* Ckll. under leaf-sheaths of sugar cane (162-11); at roots of sugar cane at Guánica (226-11), on Vieques Id. (GNW); on sugar cane at Guayanilla (GNW); at light, second story of house (32-24).

Odontomachus haematoda L. var. *notata* Mann, W. M., "Addition to the Ant Fauna of the West Indies and Central America". Bull. Amer. Mus. Nat. Hist., Vol. 42, Art. 8, p. 404. New York, 1920: TYPES from Monte Mandios, P. R. (Wheeler collection).

MYRMICINÆ

Cerapachys (Syscia) seini Mann, Wm. M., "Entomology—a New Ant from Porto Rico." Jour. Washington Academy Sci., Vol. 21, No. 17, pp. 440-441, fig. 1. Washington, D. C., October 19, 1931: TYPE from among roots of sugar-cane in P. R. Seín 30-175: feeding on larvae of *Perforadix sacchari* Seín.

Pseudomyrma flavidula F. Smith

Wheeler: a single worker at Tallaboa.

Pseudomyrma flavidula Smith, var. *delicatula* Forel—det. Wheeler
Wolcott 24-54: on coffee.

on trunk of rotten tree and on sugar cane (323-12); on coffee tree at San Germán (399-21); on cotton at Pt. Cangrejos (605-22); in termite nest at Ciales (612-22); on grapefruit at Arecibo (I No. 5370).

Monomorium destructor Jerdon

Wheeler: "a single colony nesting at the base of *Acacia farnesiana* tree at Tallaboa." Van Z. (P. R. 1013).

Wolcott 24-19: eaten by *Anolis pulchellus*.

Monomorium minutum Mayr

Van Z. (P. R. 622).

Monomorium pharaonis Linn.

Wheeler: "common in houses and hotels—also nesting out of doors in the ground on Culebra Id."

Van Z. (P. R. 1014).

Wolcott 24-16: eaten by *Anolis pulchellus*.

Wolcott 24-3: seven individuals in 3 sq. ft. of pasture at Pt. Cangrejos.

in houses (153-11, 681-12).

Monomorium carbonarium F. Smith, subsp. *ebeninum* Forel

Wheeler: on Culebra Id., and at many places in Porto Rico "under stones, in Tillandsias and under bark."

Van Z. (P. R. 322).

Van Dine 13-32, Jones 16-15, Colón 19-30: attending *Sipha flava* Forbes on sugar cane.

(as sp.) Wolcott 24-25, 28: eaten by *Anolis stratulus* and *A. cristatellus*.

nesting under leaf-sheaths of sugar cane (161-11), in tunnel of *Diatraea saccharalis* Fabr. in sugar cane (204-11), attending *Sipha flava* Forbes on young sugar cane (328-12, 333-12), on seed cane (721-12)—all det. Wheeler—nesting in cabbage head (408-19) tunneling among the inner leaves; under cow dung (268-12); attacking larva of *Desmia ufeus* Cramer (601-21); attending *Sipha flava* Forbes on sugar cane at Guánica (227-15); on coffee at San Sebastián (604-21); "injurious to the fruits of roselle, *Hibiscus sabdariffa*, by nesting in them." E. G. Smyth.

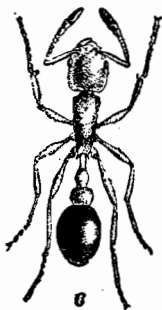
Monomorium floricola Jerdon

Wheeler: "common in Tillandsias, under bark-scales of trees and in hollow twigs."

Van Z. (P. R. 1015).

Wetmore 16-63: eaten by Woodpecker.

(142-11), carrying away dead flies (455-12), on cotton (355-21): in tunnel of *Diatraea saccharalis* Fabr. in sugar cane at Humacao (51-13); nesting in hollow twigs on coffee at Lares (151-20), at Peñuelas (397-21), at Sabana Grande (398-21), at San Germán (400-21), in empty cocoon of *Megalopyge krugii* Dewitz on coffee at Caguas (112-21); in native lima bean pods at Manatí (I No. 3676).



Cardiocondyla emeryi
Forel. (Drawn by
R. B. Howe.)

Cardiocondyla emeryi Forel

Wheeler: on Vieques and Culebra Ids., and at many places in Porto Rico, "The colonies—are small and in sandy places, especially in river or creek bottoms and on sea beaches."

Wetmore 16-63: eaten by Woodpecker.

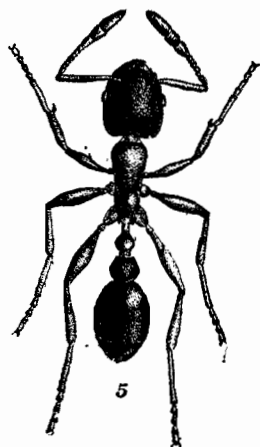
Wolcott 24-14: eaten by *Anolis pulchellus*.

Cardiocondyla venustula Wheeler 08-128: TYPE from Coamo Springs, P. R.; in small colonies in sandy and gravelly beds of streams or on sea-beaches. Also from Culebra Id. Illustration of worker.

Wheeler 10-126: same illustration.

Wetmore 16-87: eaten by Swallow.

Wolcott 24-14: eaten by *Anolis pulchellus*.



Cardiocondyla venustula

Wheeler. (Drawn by
R. B. Howe.)

Solenopsis geminata Fabr., the "hormiga brava".

Barrett, O. W., "Control of the Brown Ant (*Solenopsis geminata* Fabr.) in Orange Orchards." Circ. 4, P. R. Agr. Expt. Station, May 9, 1904. pp. 1-3.

Barrett 05-388: injurious to citrus trees.

Tower, W. V., "Control of the Brown Ant (*Solenopsis geminata* Fabr.) and the Mealy Bug (*Pseudococcus citri* Riss) in Pineapple Plantations." Circ. 7, P. R. Agr. Expt. Station, p. 3. Mayagüez, 1908 (reprinted in Wolcott 33-224 to 226).

Wheeler: "commonest of all the ants—except in—Culebrita.

—This ant not only stores up seeds in its nests and is highly carnivorous, but it also attends aphids and coccids." With *Aphis nerii* Boyer on milkweed at Culebra.

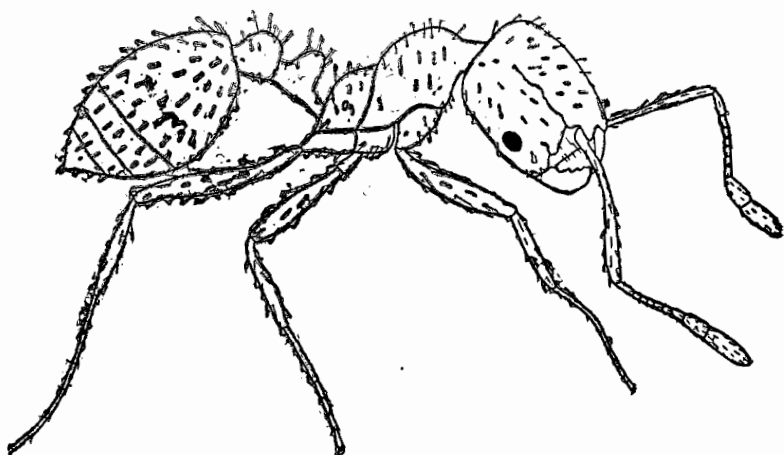
Wheeler 10-126: on Culebra Id.

Tower 11a-11: injury to citrus groves and methods of control.

Van Dine 11-29; Van Dine 12-20; Van Dine 13-30: attending *Pseudococcus sacchari* Ckll. on sugar cane.

Van Dine 13-32; Jones 15b-15: attending *Sipha flava* Forbes on sugar cane.

- Jones 15b-17: attending *Aphis setariae* Thos. on sugar cane.
 Van Z. (P. R. 311).
 Jones 15-9: injuring okra plants.
 Wetmore 16-40, 61, 66, 74, 116, 119, 128: eaten by Killdeer,
 Ani, Tody, Mango, Oriole, Mozambique, and Grasshopper
 Sparrow.
 Cotton 18-296: injuring eggplant.
 Colón 19-32: summary of injuries.
 Wolcott 22-10: protecting aphids.
 Smyth 19-138: "injures citrus, cowpeas, eggplants and bananas."
 Wolcott 24-54: in coffee.
 Wolcott 24-3: one hundred twenty-two individuals in 3 sq. ft.
 of pasture at Pt. Cangrejos.
 EEP-67, 104: on citrus, on eggplant—economic accounts.



Solenopsis geminata F., worker. (Drawn by F. Seín.)

- Díaz, M. A., "Resultados de la Demostración No. 33: Exterminio de Hormigas". Rev. Agr. P. R., Vol. 14, No. 1, pp. 38-39. San Juan, 1925: control of "hormiga brava" in a tobacco seed-bed.
 Wolcott 24-11, 16; 25, 28: eaten by *Ameiva exsul*, *Anolis pulchellus*, *A. stratulus* and *A. cristatellus*.
 Hoffman 32-726: attending Cottony Cushion scale.
 Leonard 32-126, 137: on citrus and pineapples.
 Leonard 33-122: on pineapples.
 Wolcott & Seín 33-218: attending Cottony Cushion Scale.
 EEWI-464 to 467: control with crude carbolic acid emulsion (after Tower), and thallium sulfate only in houses.
 Wolcott 33-224 to 232: experiments in control with thallium, successful in the house, crude carbolic acid emulsion best in the field. Wolcott 34-94: summary of the above.

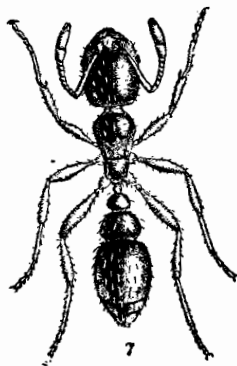
attending *Pseudococcus sacchari* Ckll. on sugar cane (147-11, 595-12), at Guánica (288-11); attending *Pseudococcus nipae* Mask, on *Psidium guajava* (270-12); attending *Saissetia hemisphaerica* Targ. on coffee at Lares (162-20); attending *Toxoptera aurantiae* Boyer on mamey at Ciales (602-21); attending *Sipha flava* Forbes on sugar cane (330-12) and *Aphis setariae* Thos. on sugar cane (92-13); with *Liburnia* sp. on Guinea grass (108-12); carrying off dead insects (63-10); attracted by juice from freshly-cut sugar cane (720-12), of corn (331-21). of bean (784-14); injuring corn (154-11), eggplant (180-16, 483-16); at base of palm (342-21); in tobacco seed beds at Caguas (24-10); forming shelters over Cottony Cushion scale on grapefruit trees after hurricane of San Ciprián at Dorado (154-32); on ginger at Cabo Rojo (I No. 743); attending aphids on lima beans at Loíza (I No. 1671); attending *Toxoptera aurantiae* on grapefruit at Bayamón (I No. 812); piling up dirt around dahlias (20-33); at Aguas Buenas (I No. 1198); at Adjuntas (I No. 5194).

var. *rufa* Jerdon—det. S. A. Rohwer.

in asparagus at Palo Seco (I No. 452); on eggplant at Manatí (I No. 585).

***Solenopsis globularia* F. Smith, var. *borinquensis* Wheeler 08-131.**

TYPE of var. from El Morro at San Juan, Porto Rico, and from Culebra Id.; nesting "in the white sand of the sea-beaches just above high-water mark". Illustration of worker. Wetmore 16-93: eaten by Thrush.



Solenopsis borinquensis
Wheeler. (Drawn by
R. B. Howe.)

***Solenopsis globularia* var. *desecheonis* Mann, Wm. M., "Additions to the Ant Fauna of the West Indies and Central America". Bull. Amer. Mus. Nat. Hist. Vol. 42, Art. 8, p. 428. New York, 1920: TYPE from Desecheo Id.**

Solenopsis corticalis Forel

Wheeler: in the stem of a bamboo at Utuado.

Solenopsis picea Emery

Wheeler: under bark of rotten log at Utuado.

Solenopsis azteca Forel, var. **pallida** Wheeler 08-131, TYPE of variety from Coamo Springs, P. R.; "a small nest under a boulder in a dry stream bed".

Cremastogaster victima F. Smith, var. **steinheili** Forel

Wheeler: "common—under bark or in hollow twigs:" Sheds built over coccids on leaves of *Cordia macrophylla* by colonies at Culebra Id.

Wheeler 10-223: construction of "carton nests" on Culebra Id. attending mealy-bugs on *Croton* at Yauco (600-22); attending *Toxoptera aurantiae* Boyer on mamey at Plantaje (603-22); on cotton at Villalba (609-21); in dead coffee twigs at Guayama (111-21); nesting in old cocoons of *Megalopyge krugii* Dewitz on citrus tree at Fajardo (468-12).

Pheidole fallax jelskii Mayr var. **antillensis** Forel

Wheeler: at many places in Porto Rico and on Culebra Id. Van Z. (P. R. 1018).

Wetmore 16-91, 93, 119: eaten by Mockingbird, Thrush and Mozambique.

Wolcott 24-16, 19, 22, 25, 28: eaten by *Anolis pulchellus*, *A. krugii*, *A. stratulus*, and *A. cristatellus*.

nesting under cement walk (159-11); nesting in cane field and attacking live changa, *Scapteriscus vicinus* Scudder, at Sardinera, Toa Baja (163-20); attacking live female wasp, *Campsomeris dorsata* Fabr. at Yauco (135-21).

Pheidole megaloccephala Fabr.

Wheeler: at many places in Porto Rico, and on Culebrita Id.

Wheeler 10-155: absent in Culebra Id., abundant in Culebrita.

Van Z. (P. R. 1020).

attending *Pseudococcus* sp. (609-12), attacking caterpillars (736-19), driving away *Solenopsis geminata* Fabr. (GNW); in ginger roots (I No. 770); attending aphids on lima beans at Loíza (I No. 1607); at Arecibo (I No. 4396).

Pheidole subarmata Mayer, var. **borinquensis** Wheeler 08-133:

TYPE of variety from P. R.; "only a few soldiers and workers in a colony—in sandy, sunny places like roads and creek bottoms". Illustrations of soldier and worker.

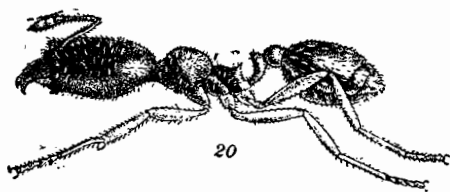
Wheeler 10-99: same illustrations.

Wetmore 16-129: eaten by Grasshopper Sparrow.

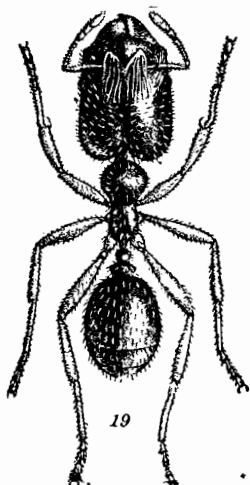
Wolcott 24-28: "or some other species of *Pheidole* than *antillensis*" eaten by *Anolis cristatellus*.

Pheidole flavens sculptor Forel

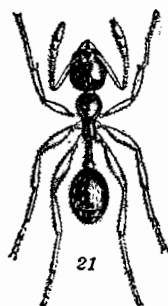
Wheeler: a single soldier at Coamo.



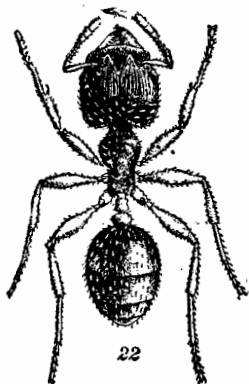
Pheidole borinquensis Wheeler: soldier.
(Drawn by R. B. Howe.)



Pheidole borinquensis
Wheeler: soldier.
(Drawn by R.
B. Howe.)



Pheidole borinquensis
Wheeler: worker.
(Drawn by R. B.
Howe.)



Pheidole moerens Wheeler:
soldier. (Drawn by
R. B. Howe.)



Pheidole moerens
Wheeler: worker.
(Drawn by R.
B. Howe.)

Pheidole flavens exigua Mayr

Wheeler: redescribed. "Colonies—under logs and stones in open woods and cafetales." At Utuado and Coamo. on *Inga vera* at Cayey (619-22).

Pheidole moerens Wheeler 08-136, TYPE from Utuado, Porto Rico, from under stones and prostrate plantain trunks in the woods and cafetals. Illustrations of soldier and worker.

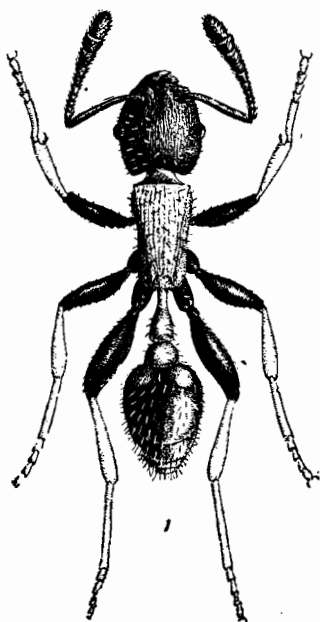
Macromischa isabellae Wheeler 08-138, TYPE from Monte Morales and Monte Mandios, Porto Rico, from colonies under the roots of an epiphytic orchid and in a hollow twig. Illustrations of workers.

Wheeler 10-128: same illustrations.

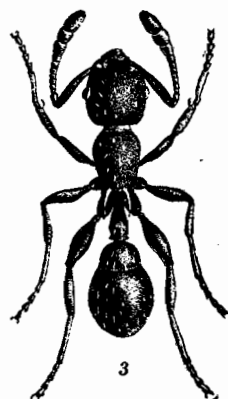
Wolcott 23-57: on coffee.

Wolcott 24-29: eaten by *Anolis cristatellus*.

in mountains north of Yauco on coffee (425-21), on *Inga vera* (611-22), nesting in old stump (608-22).



Macromischa isabellae Wheeler.
(Drawn by R. B. Howe.)



Macromischa albispina
Wheeler. (Drawn
by R. B. Howe.)

Macromischa albispina Wheeler 08-139, TYPE from Culebra Island, one colony in the ground in the shade of a thicket. Illustrations of workers.

Wheeler 10-128: same illustrations.

(as var. *pallipes*) Mann 20- : from P. R.

Tetramorium guineense Fabr.

Wheeler: on Culebra Id., eating papaya, *Carica papaya*, fruit.
Van Z. (P. R. 1016).

in tunnel of *Diatraea saccharalis* Fabr. in sugar cane at Yabucoa (65-13 det. Wheeler); in house at San Juan (I No. 974 det. Wm. M. Mann).

Tetramorium (Tetrogus) simillimum F. Smith

Wheeler: under stones and logs on the beach of Culebra Id., and in the creek bottom at Coamo Springs.

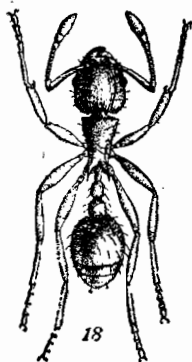
Wolcott 24-16: eaten by *Anolis pulchellus*,
entering small holes in the buds of sugar cane (152-20 det. Mann); adult (I No. 5587).

Wasmannia auropunctata Roger

Wheeler: "common—under stones, prostrate plantain trunks or logs in shady places," on Culebra Id., and at many points in Porto Rico. Illustration of worker.

Van Dine 13-30: attending *Pseudococcus sacchari* Ckll. on sugar cane.

Van Dine 13-33; Jones 15b-15: attending *Sipha flava* Forbes on sugar cane. Colón 19-30: mention. Van Z. (P. R. 321).



Wasmannia auropunctata Roger. (Drawn by R. B. Howe.)

Wetmore 16-75, 87, 101, 108: eaten by Swift, Swallow, Oven-Bird and Parula Warbler.

Van Zwaluwenburg 17a-515: reported to occasionally kill out and displace colonies of "hormiguilla" in coffee groves.

Wolcott 24-14, 16 to 19, 22, 25, 29, 33: eaten by *Anolis evermanni*, *pulchellus*, *krugii*, *stratulus*, *crisatellus* and *gundlachi*.

Wolcott 24-3, 10: five individuals in 3 sq. ft. of pasture at Pt. Cangrejos; in coffee groves.

EEP-50: erroneously thought to be the cause of leaf-miner injury to coffee.

Wolcott 33-223: "albayaide."

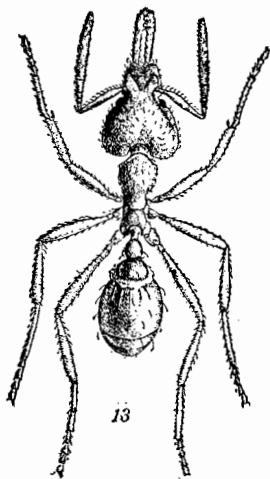
attending *Pseudococcus sacchari* Ckll. on sugar cane (181-11, 205-11, 596-12); attending *Pseudococcus citri* Risso on coffee at Ciales (600-21) attending *Sipha flava* Forbes on sugar cane (331-12); on coffee at Yabucoa (606-22), at Quebradillas (616-22); attending cottony cushion scale at Bayamón 138-22; most often noted, since the introduction of green scale, *Coccus viridis* Green, attending this scale in coffee groves (GNW & FS).

Strumigenys rogeri Emery

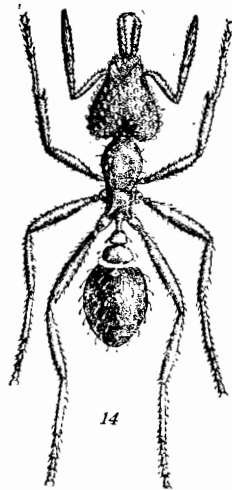
Wheeler: under stones in stream bed at Coamo Springs. Illustration of worker.

Wetmore 16-119: eaten by Mozambique.

(as sp.) Wolcott 24-29: eaten by *Anolis cristatellus*.



Strumigenys rogeri Emery.
(Drawn by R. B. Howe.)



Strumigenys obscuriventris
Wheeler. (Drawn by
R. B. Howe.)

Strumigenys louisianae Roger, var. **obscuriventris** Wheeler 08-145, TYPE from Coamo Springs, Porto Rico, colonies in dry stream bed. Illustration of worker.

Wheeler 10-132: same illustration.

Atta (Trachymyrmex) jamaicensis Ern. Andre

Wheeler: from Culebra Id.

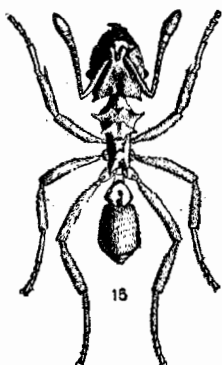
Wheeler, Wm. M., "The Fungus-growing Ants of North America", Bull. Amer. Mus. Nat. Hist., Vol. 23, Art. 31 pp. 669-807, pl. xlix-līii, fig. 31, New York, September 30, 1907.

Atta (Mycocepurus) smithi Forel, var. *borinquensis* Wheeler 07-718, TYPE Vega Baja, Arecibo, Utuado and Monte Mandios, from Porto Rico.

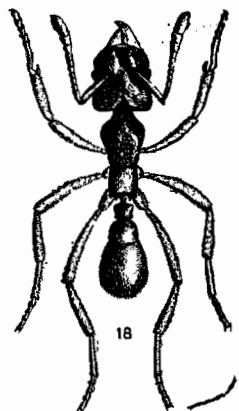
Wheeler: from many points in Porto Rico.

Wheeler 10-320: Illustration.

Wolcott 24-16, 22: eaten by *Anolis pulchellus* and *A. stratulus*.



Atta smithi Forel. (Drawn by R. B. Howe.)



Myrmicocrypta brittoni Wheeler. (Drawn by R. B. Howe.)

Myrmicocrypta brittoni Wheeler 07-728: TYPE from Santurce, P. R. Wheeler: at Santurce. Wheeler 10-318: Illustration.

Cyphomyrmex rimosus Spinola *minutus* Mayr

Wheeler 07-719: Wheeler 10-319: Illustration.

Wheeler: from Culebra Id., and many points in Porto Rico.

Wetmore 16-101: eaten by Oven-Bird.

Wolcott 24-16: eaten by *Anolis pulchellus*.

(615-22), nesting under cow dung (269-12); under rotten log of *Erythrina glauca* at Cayey (617-22); at Aguas Buenas (I No. 1198).

DOLICHODERINAE

Tapinoma melanocephalum Fabr.

Wheeler: "nesting under stones and under the bark of trees" at many places in Porto Rico, and on Culebra Id.

Wolcott 24-14, 16, 29: eaten by *Anolis evermanni*, *A. pulchellus* and *A. cristatulus*.

Wolcott 24-4: 74 individuals in 3 sq. ft. of pasture at Pt. Can-grejos.

Wolcott 33-223: "albaricoque."

attacking live insects (110-21), carrying off dead insects (456-12); nesting under board on ground (163-13); in office at San Juan, (I No. 972).

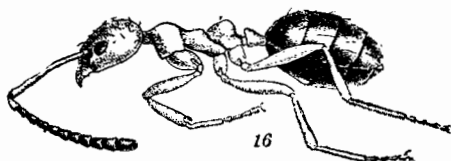
Tapinoma littorale Wheeler

Wheeler: "in hollow twigs of trees and bushes" at Monte Morales and Monte Mandios.

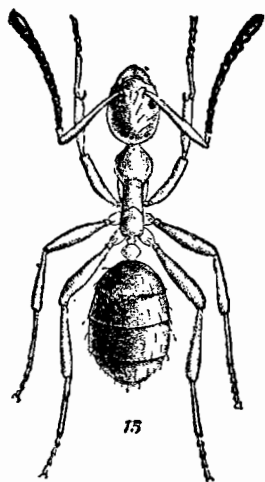
Wolcott 24-16: eaten by *Anolis pulchellus* and *A. cristatus*.
at Aguas Buenas (I No. 1198 Leonard 32-143).

Dorymyrmex pyramicus Roger, var. **niger** Pergande

Wheeler: "common in sandy and sunny places" in Porto Rico, but not on Culebra Id.



Iridomyrmex melleus Wheeler. (Drawn by R. B. Howe.)



Iridomyrmex melleus Wheeler. (Drawn by R. B. Howe.)

Iridomyrmex melleus Wheeler 08-151, TYPE from mountains of Porto Rico. Common in mountains, arboreal, nesting in hollow twigs, or building "carton" nests at base of leaves of "ortegón", *Coccoloba rugosa*, at Utuado, which are not aphid sheds. Illustrations of workers and "carton" nests.

Wheeler 10-223: construction of "carton" nests.

Wolcott 23-57: on coffee.

Wolcott 24-16, 25: eaten by *Anolis pulchellus* and *A. stratulus*.
on coffee trees, nesting in hollow twigs, or in bark in crotch, or between crossing limbs, and often building "carton" nests over colonies. at Guayama (605-21), at Corozal (606-21), at Adjuntas (607-21, 608-21), and in cocoon of *Megalopyge krusii* Dewitz (610-21), at Aibonito (611-21).

Iridomyrmex melleus var. **fuscescens** Wheeler 08-153, TYPE of variety from Monte Morales and Monte Mandios, Porto Rico, at the summits of the mountains.

on cotton at Boquerón (601-23 det. J. D. More).

Iridomyrmex humilis Mayr—det. S. A. Rohwer

on pineapples at Manatí (I No. 682). The only record of the Argentine Ant from Puerto Rico.

CAMPONITIDÆ

Brachymyrmex heeri Forel

Wheeler: "small colonies under stones" at Santurce and Utuado, and on Culebra Id..

Van Z. (P. R. 153).

Wolcott 26-16, 29: eaten by *Anolis pulchellus* and *A. cristatellus*.

Brachymyrmex heeri var. **obscurior** Forel

Wheeler: at Santurce.

Van Dine 13a-32; Jones 15b-15: attending *Sipha flava* Forbes on sugar cane. Colón 19-30: same data.

Van Z. (P. R. 317).

attending *Sipha flava* Forbes on sugar cane (332-12).

Prenolepis longicornis Latreille

Wheeler: "very common in houses, gardens and fields" in Porto Rico and on Vieques Id.

Wolcott 24-16, 25, 29: eaten by *Anolis pulchellus*, *A. stratulus* and *A. cristatellus*.

Wolcott 24-3: four individuals in 3 sq. ft. of pasture at Pt. Cangrejos.

(I No. 975); in house (134-11); on *Inga vera* at Yauco (610-22), carrying tobacco seed from seed beds at Caguas (25-10); nesting, at base of coconut palm fronds on the beach at Mameyes, attending mealybugs and *Orthezia insignis* Douglas on *Lantana camara* (335-22).

Prenolepis vividula Nylander

Wheeler: from Culebra Id., Utuado and mountains of Porto Rico.

Hoffman 32-726: attending Cottony Cushion Scale.

on coffee at Utuado (155-20), on *Inga vera* at Utuado (156-20); on banana, nesting in stem, at Maricao (157-20 det. Wm. M. Mann).

Prenolepis steinheili Forel

Wheeler: at Adjuntas and Santurce.

Prenolepis fulva Mayr

Van Z. (P. R. 1021).

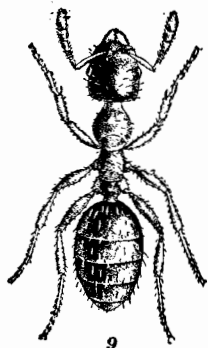
attending *Pseudococcus sacchari* Ckll. on sugar cane at Humacao (57-10 det. Wheeler).

Myrmelachista ambigua Forel, subsp. **ramulorum** Wheeler 08-155, TYPE from Arecibo and Utuado, Porto Rico, and Culebra Id., in hollow twigs of sea-grape, *Coccoloba uvifera*, and "torchuelo", *Bucida buceras*. Illustrations of worker.

McClelland, T. B., "Report of the Assistant Horticulturist" in Ann. Rept. P. R. Agr. Expt. Station at Mayagüez, 1911, p. 30. Washington, D. C., Sept. 3, 1912: in three months driven from coffee when old infested shade trees, *Inga laurina*, are cut down.

Hooker 13-34; on guamá and coffee trees. feeding on honey dew from a mealybug, *Pseudococcus citri* Risso, and a large fleshy, pink scale of the sub-family Coccinae. Injury and unsuccessful control measures.

Van Zwaluwenburg 15-33: unsuccessful methods of control.



Myrmelachista ramulorum Wheeler. (Drawn by R. B. Howe.)



Myrmelachista ramulorum Wheeler. (Drawn by R. B. Howe.)

McClelland, T. B., "Report of the Assistant Horticulturist" in Ann. Rpt. P. R. Agri Expt. Station at Mayagüez, 1913, p. 23. Washington, D. C., May 28, 1914: control by pruning young growth of coffee shade trees, *Inga laurina*, and banding with tree tanglefoot.

Van Zwaluwenburg 16-42: desirable coffee shade trees, not attractive to the "hormiguilla" not found.

Van Zwaluwenburg 17-515: the most complete and extended account of the "hormiguilla" as a pest of coffee.

Van Z. (601) attending undetermined pink *Coccus* in twigs of *Inga laurina*.

Wetmore 16-63; eaten by Woodpecker.

Wolcott 21-48: notes.

Ferris, G. F., "Notes on Coccidae. IX. (Hemiptera)" in Canadian Entomologist, Vol. 54, No. 7, July, 1922, p. 160: description of the coccid, attended by the "hormiguilla," as *Cryptostigma ingae*.

Wolcott 23-58: host trees: attending *Cryptostigma ingae* Ferris and preliminary experiments in control with poisoned bait.

Wolcott 24-54: experiments with sodium arsenate and meat, potassium cyanide, cyanamid, and potassium ferro-cyanide.

Wolcott 24-93 to 95: details of control experiments with cyanide and meat.

Wolcott 24-8 to 10: partial control using cyanide and meat shelves.

Wolcott 24-14, 19, 25, 29, 33: eaten by *Anolis evermanni*, *A. pulchelus*, constituted 12% of the food of *Anolis stratulus*, eaten by *Anolis stratulus*, *A. cristatulus* and *A. gundlachi*.

EPP-46 to 48: an economic account.

Wolcott 26-51: in sea-grape, also in St. Thomas.

Leonard 32-128: notes.

Wolcott 33-266: considerably reduced in numbers by the hurricane of San, Felipe.

EEWI-316 to 321: an extended economic account.

Wolcott 33-232 to 238: an extended account of control experiments with meat and cyanide and meat and thallium.

Wolcott 34-95: summary of the above.

nesting in sea-grape, *Coccolobis uvifera*, attending a mealy-bug at Loíza (607-22), at Dorado (126-32); nesting in twin tree of *Ficus laevigata* in Ciales valley south of Manatí (621-22); on coffee, guava, *Inga vera*, and guamá, *Inga laurina*, throughout the coffee districts, at Utuado (153-20), at Lares (154-20), at Yauco (396-21), at Cayey (618-22); also in orange and "tulipán" or African tulip tree at Consumo and Maricao (19-35); on *Inga laurina* and coffee at Maricao Forest Reserve, elevation 2,700 ft. (20-35); successfully preventing "hormiga brava" from ascending mango tree and feeding on hamburg steak and salt pork poisoned with thallium nitrate (40-34); defeated in a imilar contest on guamá tree at Mayagüez (F. S. & GNW).

Camponotus ustus Forel

Wheeler: "in the hollow twigs of sea-grape, *Coccoloba uvifera*," at San Juan and Utuado, in Culebra Id., nesting in the ground under a block of beach-worn coral."

Wetmore 16-63: eaten by Woodpecker.

Wolcott 24-29: eaten by *Anolis cristatellus*.

in old stump at Utuado (159-20), at San Sebastián (115-21); in dead twigs of *Inga vera* at Utuado (158-20), at Ciales (600-23; in coffee at Lares (640-21); in rotting post at Naguabo (48-25); on *Tetrazygia elaeagnoides* at San José (602-23); in house (22-35).

Camponotus sexguttatus Fabr.

Wheeler: on Culebra Id., in twigs of sea-grape, illustration. At San Juan, and Fajardo (A. Busek), on flowers of *Serjania lucida* at Coamo.

Camponotus cuneiscapus Emery

Van Z. (P. R. 620).

SPHECOIDEA

CERABRONIDÆ

Crabro croesus Lepeletier

Dewitz. Gundlach, "Los ejemplares de Puerto Rico diferentes en algo del tipo cubano — en el color de la pubescencia."

Van Z. (P. R. 64).

at Guayama (I No. 4660); on Mona Id. (1308-13); reared from cocoons in rotten log (78-23 det. S. A. Rohwer).

Crabro mayeri Dewitz 81-201: TYPE from P. R.

Gundlach, "en los contornos de Mayagüez."

Psen (Mimesa) modesta Rohwer 15-244: TYPE from Mayagüez, P. R.

Cerceris krugii Dewitz 81-201: TYPE from P. R.

Gundlach, "en varias localidades."

(as sp.) Wetmore 16-98: eaten by Jamaican Vireo.

Cerceris margareta Rohwer 15-248: TYPE from Mayagüez, P. R.

Trachypus gerstaeckeri Dewitz 81-202: TYPE from P. R.

Gundlach, "en Mayagüez."

NYSSONIDÆ

Nysson (Bathystegus) basirufus Rohwer 15-247: TYPE from Mayagüez, P. R.

Hoplisis (Hoplisoides) scitulus Cresson—det. S. A. Rohwer

(891-13); on mulberry at Arecibo (I No. 4867 "?").

BEMBECIDÆ

Bembex ciliata Fabr.

Dewitz. Stahl. Gundlach, "vive en las playas." Ashmead. at Santa Isabel (419-13 det. S. A. Rohwer).

Bembex muscicapa Handlirsch—det. G. A. Sandhouse
on flowers at Salinas (I No. 4651).

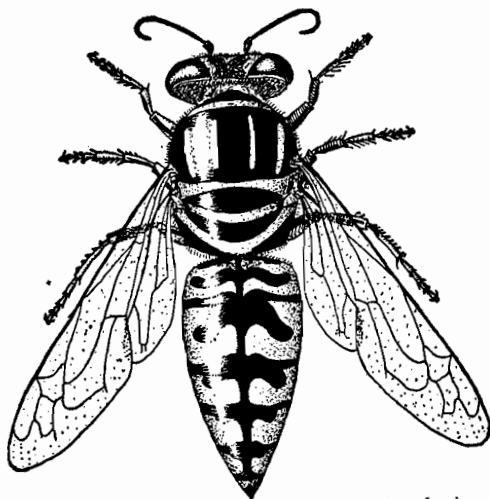
Bembex regularis Cresson
Stahl.

Stictia signata Linn.

(as *Bembex*) Ledru 1797. Dewitz. Stahl.

(as *Monedula*) Gundlach. "común en terrenos arenosos, cavando allí hoyos con mucha prontitud. Apenas se le ve posarse, pues vuela prontamente como jugueteando un individuo con otro."

Danforth 26-23: chasing flies over the Cartagena Lagoon, living in holes in the ground around its margin.



Stictia signata L. Three times natural size.
(Drawn by F. Maximilien.)

AMC: at Mayagüez xi-29, Yauco vi-31, Juncos i-32.

at Ponce (I No. 4650), at Algarrobo (751-14), at Trujillo Alto (888-13), at Dorado around ieaco blossoms (715-13), on sandy ground at Vega Alta (169-15); chasing *Chrysops variegatus* De Geer, on horses at Pt. Salinas (GNW), chasing flies attracted to molasses (182-21 det. Rohwer); on *Crotalaria* flowers at Arecibo (I No. 3635).

Microbembex monodonta Say—det. S. A. Rohwer

AMC: many localities.

resting on sand (I No. 3843. 3844); in pepper field at Loíza Aldea (I No. 4109).