

Article VI.—THE ANTS OF PORTO RICO AND THE VIRGIN ISLANDS.

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PLATES XI AND XII.

Contributions to our knowledge of the ant-fauna of Trinidad, the Windward Islands and of St. Thomas among the Virgin Islands have been slowly brought together in a number of papers by Mayr, Emery, Urich, and especially by Forel. And Guérin, Roger, Mayr and Forel have recorded a number of species from Jamaica, Cuba, Hayti and San Domingo, but up to the present time practically nothing has been published on the ant-fauna of our recently acquired provinces, Porto Rico, Culebra and Vieques. And while it was possible, of course, to form a general notion of the faunas of these islands from what was known concerning the ants inhabiting the other links of the Antillean chain, it was, nevertheless, desirable to fill this hiatus in our knowledge with actual data. I was therefore very glad to have the opportunity during March, 1906, of visiting Porto Rico and Culebra with a party in charge of the director of the New York Botanical Garden, Professor N. L. Britton. On this expedition Vieques was not visited but Culebra, the "Treasure Island" of Robert Louis Stevenson's well known story, was thoroughly explored. Unfortunately one of the most promising portions of Porto Rico, the rich tropical forests on the slopes of the highest mountain of the island, El Yunque, which rises to an altitude of some 3487 feet, was not included in our itinerary, as the work of the expedition was primarily botanical and as considerable attention had been paid to the plants of this region by collectors previously sent out from the Botanical Garden. While in Culebra, both Professor Britton and myself were much indebted to Captain B. T. Walling, Commandant of the United States Naval Station, and to the gentlemen of his staff for their generous assistance in our work and personal interest in our welfare.

As might be expected, the following annotated list, which includes also the species recorded from St. Thomas, is rather meager, for tropical islands are often much poorer in Formicidæ than continental regions of the same area in more temperate latitudes. Another reason for the poverty of the Porto Rican ant-fauna is to be found in the fact that for many years past this island has been the most densely populated and most intensively cultivated of the West Indies. With the exception of the above mentioned forests of El Yunque, only bits of the virgin forest have been preserved, and

these occupy the summits of the higher mountains. Excursions to two of these, Monte Morales and Monte Mandios (altitude about 3000 feet) near Utuado, yielded few species of ants not found at lower elevations in the more cultivated districts. It is probable that even El Yunque is not as rich in species as its luxurious rain-forests might lead one to imagine, for if this were the case it would be difficult to understand how the species could be absent from other parts of so small an island, since ants like other organisms tend to spread more or less beyond their optimum environment.

The ant-fauna of Porto Rico and the Virgin Islands, notwithstanding its poverty, has both a positive and a negative interest and significance, that is, both in what it comprises and in what it falls to comprise. So far as known, the species may be separated into the three following groups, which may also be distinguished in the other West Indian islands:

1. The species common to the American mainland but of long enough residence in the Antilles to have produced in several instances characteristic subspecies or varieties. To this group belongs the great bulk of the ant-fauna of Porto Rico and Culebra.

2. The recently introduced species from the tropics of the Old World. These have been carried by man in ships or merchandise from one island to another, or have been disseminated by winds and currents to many of the islands after introduction into some one of them. Such species are: *Monomorium floricola*, *destructor*, *pharaonis* and *salomonis*, *Pheidole megacephala*, *Tetramorium guineense* and *simillimum*, *Tapinoma melanocephalum*, *Pre-nolepis longicornis* and perhaps also *Cardiocondyla emeryi* and *venustula*. With the exception of the two species last mentioned, all the members of the genus *Cardiocondyla* are confined to the Old World. *C. emeryi* is common in India and Palestine and *C. venustula*, though now first described from Porto Rico and Culebra, is so closely related to *C. nuda* of Samoa, Tonga, the Sandwich Islands, India and Northern Africa, that it may well have been imported, just as *Monomorium salomonis* has been carried to the Bahamas from Spain or the Sahara.

3. The ancient, presumably autochthonous genera and species or their immediate descendants. This is a very small, and owing to the incompleteness of our knowledge of the ant-fauna both of the West Indies and of the tropical mainland, a rather doubtful group. The only Antillean genera not hitherto recorded from the American continent are *Emeryella* and *Epitritus*, the former based on a single worker from Hayti, the latter known to be represented in Europe. The genus *Macromischa*, however, comprising perhaps the most beautiful of all the Formicidæ, though it has two species in Mexico and one in Texas, is very largely Antillean, and none of the West Indian species has as yet been taken on the continent. We may, therefore, infer that this genus at least has arisen on the islands and has within com-

paratively recent times developed its series of peculiar species. These stand out as the native wood-nymphs of the islands in sharp contrast with the mass of Formicid tramps from the Old World and the somewhat commonplace immigrants from the continent.

The following negative peculiarities of the Porto Rican and Culebran ant-fauna may be noticed:

1. The small size of the species in general. Even representatives of the larger *Camponoti* of the *maculatus* and *abdominalis* groups, which occur in some of the other West Indian Islands, are conspicuously absent.
2. The complete absence of some of the well-developed neotropical genera and subgenera, such as *Cryptocerus*, *Dolichoderus*, *Azteca* and *Atta* s. str.
3. The paucity of species belonging to other genera, like *Pseudomyrma*, *Cremastogaster*, *Pheidole* and *Camponotus*, so abundantly developed in other parts of tropical America.

The most abundant ant in Culebra and Porto Rico is, of course, the ubiquitous "fire-ant," or "hormiga brava" (*Solenopsis geminata*), a species so prolific, versatile and aggressive, and so fond of living in cultivated fields and in the neighborhood of human dwellings, that it has probably prevented many introduced species from extending their range or even from gaining a foothold in the islands. Two such species, both of East Indian origin, *Prenolepis longicornis* and *Pheidole megacephala*, have nevertheless managed to establish themselves, the former everywhere in Cuba and Porto Rico, the latter as yet only in certain places. The most careful search failed to reveal the presence of *Ph. megacephala* in Culebra, but in the little island of Culebrita, less than a mile to the eastward, it is in full possession to the exclusion of every other ant. Here I found it everywhere: in the masonry walls of the lighthouse on the highest point of the island, under stones and logs throughout the thickets and in crater nests on the beaches of foraminiferous sand down to high water mark. It is probable that it has been prevented by the *Solenopsis* from gaining a foothold in Culebra, for I can hardly believe that winged females of the *Pheidole* have been unable to cross the narrow channel which separates the two islands. In Porto Rico *Ph. megacephala* is so sporadic in its occurrence as to suggest either that it has been introduced at several widely separated points and has been unable to spread, or that it has been exterminated over a large portion of its range by the fire-ant.

That all three of these species may co-exist in abundance in the same island is shown by Forel's observations in St. Thomas, which he visited in 1878.¹ After enumerating five cosmopolitan species, he says: "Three of

¹ Die Ameisen der Antille St. Thomas. Mitth. Münch. Entom. Ver., V, 1, 1881, 16 pp.

these species are so enormously abundant as to give the ant-fauna of the island its present character; these are *P. longicornis*, *S. geminata* and *Ph. megacephala*. The slender, long-legged *P. longicornis* shoots about like an arrow over the rocks and pavements, so that one seems to see only whirling black lines crossing one another on the ground. In all the gardens



Fig. 1. Group of *Cecropia peltata* L. on mountains near Utuado, P. R. (Photograph by Dr. M. A. Howe.)

and thickets abounds the war-like, painfully stinging *S. geminata*, the only one that builds distinct earth-works. In the houses (and in the streets, too), on the other hand, there are swarms of *Ph. megacephala* (*Æcophthora pusilla* Heer), whose habits as a house-ant have been admirably described by Heer.¹ *P. longicornis* also occurs in houses. These three species are

¹ Die Hausameise Madeiras; Zürich, Höhr, 1852.

found everywhere in the island." Forel mentions *P. longicornis* as nesting on board the steamer "Silesia," a fact suggestive of the way in which it has been transported to all parts of the world.

According to Heer's and Forel's observations, *Ph. megacephala* is especially fond of nesting in the fissures of rocks and pavements and in the



Fig. 2. *Cecropia peltata* showing foliage perforated by insects. Mountains near Utuado, P. R. (Photograph by Dr. M. A. Howe.)

crannies of masonry walls. This may account for its absence in Culebra, where there are no pavements and only wooden dwellings, affording no retreat in which it could breed unmolested by the savage fire-ant. *P. longicornis*, which is popularly known in tropical Florida as the "crazy

ant," and in Cuba as the "hormiga loca," is probably able to hold its own on account of its wonderfully agile and disconcerting gait, and the dispatch with which it can carry away its brood when its formicaries are disturbed or attacked.

The meagerness of the native ant-fauna of Porto Rico and Culebra, may also, I believe, be attributed in great measure to the aggressive habits of *S. geminata*. This ant prefers to nest in open, sunny places and especially in sandy or loamy soil. It is much less frequent in shady woods or damp spots. *Pheidole jelskii* var. *antillensis* does, indeed, manage to nest in the same stations as the *Solenopsis*, but the workers can run rapidly like those of *Prenolepis*, and the soldiers are probably protected by their very nauseating odor which resembles that of the legionary ants of the genus *Eciton*. All the other ants are either hypogæic in their habits, nest under stones in the woods and damp places, where the *Solenopsis* does not care to live, or inhabit the hollow twigs of trees and bushes where they are safe from the attacks of this and other species.

I was not a little surprised to find a tree that might be supposed to surpass all others in affording shelter for ants in its hollow stems, quite destitute of these insects. This is the *Cecropia peltata* Linn. which is common on the rocky slopes of the mountains in many parts of Porto Rico (Figs. 1 and 2). In the structure of its stems and foliage it closely resembles the Brazilian *C. adenopus* (= *peltata* Vellozo nec Linn.) which, according to Fritz Müller, Schimper and von Ihering, is almost always inhabited by colonies of *Azteca muelleri*. The internodal pits which enable the *Azteca* to perforate the stems with greater facility and enter their spacious cavities, and the Müllerian bodies on which the ants feed, are also clearly present in the Porto Rican *Cecropia*. In this tree the bodies are coral red, but are embedded, as in the Brazilian species, among the hairs of the cushion (trichilium) at the base of the leaf-petiole. On first seeing these trees I naturally expected to find them teeming with ants, but with the exception of a single colony of a small and timid species (*Iridomyrmex melleus*), inhabiting a dead and broken branch, I was unable to find any ants either in the cavities or on the branches and foliage, though I carefully scrutinized every *Cecropia* I could reach in several different localities. The *Iridomyrmex* certainly prefers the small twigs of other trees and bushes and its occurrence in the *Cecropia* was exceptional. I would also call attention to the fact that the trees were in excellent health, although their foliage, in nearly all cases, had been much eaten by insects (Fig. 2). It is certain, therefore, that *C. peltata*, though possessing essentially the same structure as the Brazilian *adenopus*, is not myrmecophilous, at least in Porto Rico. This seems to be true also of some other species of *Cecropia* in the mountains of South America, and

lends support to Rettig's view¹ that the ants have adapted themselves to trees already possessing certain morphological peculiarities which have therefore been developed without any reference to myrmecophily.

The island of Culebra is composed of volcanic rock and is clearly xerophytic as attested by several prominent species of Cactaceæ in its flora. Its highest point which is only a little over 600 feet above sea-level, is too low to intercept the rain-laden trade-winds from the Atlantic, and the small amount of water which falls on its hilly surfaces flows off rapidly into the sea. The high mountain range which traverses Porto Rico from east to west divides the island into a northern humid and a southern arid region. The flora and fauna of the latter region bear an unmistakable resemblance to those of Culebra and of the xerophytic Bahamas. These differences in the distribution of moisture, however, do not seem to express themselves very clearly in the distribution of the Formicidæ. Of the sixty-five species, subspecies and varieties of these insects recorded in the following pages, twelve have been found only in St. Thomas, four only on Culebra, and twenty-one only on Porto Rico; eleven are common to Culebra and Porto Rico, five to St. Thomas and Porto Rico, and twelve occur on all three of the islands.

Subfamily PONERINÆ.

1. *Ectatomma quadridens* (Fabr.).

Formica quadridens FABRICIUS, Entom. System., II, 1793, p. 362, no. 51. ♀.

Ponera quadridens ILLIGER, Mag. f. Insektk., VI, 1807, p. 194.

Ectatomma brunnea F. SMITH, Catalog. Hymen. Brit. Mus., VI, 1858, p. 103, no. 2,

♂ ♀.

Ponera (*Ectatomma*) *quadridens* ROGER, Berl. Entom. Zeitschr., IV, 1860, p. 307, no. 37, ♀.

Ectatomma quadridens MAYR, Verh. zool. bot. Ges. Wien, XII, 1862, p. 732, no. 2.

Mayr cites a specimen of this ant in the Vienna Museum as doubtfully coming from St. Thomas. Forel found no species of the genus *Ectatomma* in that island, and I have seen no trace of them in Culebra or Porto Rico.

2. *Platythyrea punctata* (F. Smith).

Pachycondyla punctata F. SMITH, Catalog. Hymen. Brit. Mus., VI, 1858, p. 108, no. 9, ♂ ♂.

Platythyrea punctata ROGER, Berl. Entom. Zeitschr., VII, 1863, p. 173.

Platythyrea inconspicua MAYR, Verh. zool. bot. Ges. Wien, XX, 1870, p. 961, ♀.

Platythyrea pruinosa MAYR, *ibid.*, p. 962, ♂.

Platythyrea punctata FOREL, Rev. Suisse Zool., IX, 3, 1901, p. 335.

¹ Ameisenpflanzen-Pflanzenameisen. Ein Beitrag zur Kenntnis der von Ameisen bewohnten Pflanzen und der Beziehungen zwischen beiden. Botan. Centralbl., XVII, Beih. 1904, pp. 89-122.

Porto Rico: Between Arecibo and Utuado.

A couple of workers found running on the ground in a shady cafetal. The types of this species, which is widely distributed in tropical America, were from San Domingo. Forel has recorded it from Barbados, Jamaica, Martinique, Guadeloupe, St. Vincent and Grenada. It is known also to occur in Colombia, Mexico, Venezuela and the Bahamas.

3. *Euponera* (*Pseudoponera*) *stigma* (Fabr.).

Formica stigma FABRICIUS, System. Piez., 1804, p. 400, no. 18, ♀.

Ponera quadridentata F. SMITH, Journ. Proc. Linn. Soc., Zool., III, 1858, p. 143, no. 4, ♀.

Ponera americana MAYR, Verh. zool. bot. Ges. Wien, XII, 1862, p. 722, no. 3, ♀.

Ponera stigma EMERY, Ann. Mus. Civ. Genova, XXV, 1887, p. 434, no. 136, ♀.

Pachycondyla (*Pseudoponera*) *stigma* EMERY, Ann. Soc. Entom. Belg., XLV, 1901, p. 46.

Euponera (*Pseudoponera*) *stigma* FOREL, Ann. Soc. Entom. Belg., XLV, 1901, p. 398; Rev. Suisse Zool., IX, 3, 1901, p. 339.

Culebra; Porto Rico: Utuado.

Numerous workers from small colonies nesting under stones or logs. One colony in Culebra was found nesting in a rotten Cactus stump.

4. *Neoponera villosa* (Fabr.).

Formica villosa FABRICIUS, System. Piez., 1804, p. 409, no. 55, ♀.

Ponera villosa ILLIGER, Mag. f. Insektk., VI, 1807, p. 194, ♀.

Ponera bicolor GUÉRIN, Iconogr. Régn. Anim., VII, Insect., 1845, p. 242, no. 2, ♀.

Ponera pedunculata F. SMITH, Catalog. Hymen. Brit. Mus., VI, 1858, p. 96, no. 46, tab. 6, fig. 25, ♀.

Pachycondyla villosa MAYR, Verh. zool. bot. Ges. Wien, XII, 1862, p. 721, no. 1.

Neoponera villosa EMERY, Ann. Soc. Ent. Belg., XLV, 1901, p. 47.

Porto Rico (Am. Mus. Nat. Hist.).

The label on this specimen may not be authentic, and should perhaps read "Costa Rica," although it is, of course, possible that this conspicuous species may have been imported into Porto Rico with Central or South American orchids. I could find no traces of it in the localities where I collected, nor has it been recorded, to my knowledge, from any of the other islands of the West Indies.

5. *Ponera opaciceps* Mayr.

MAYR, Verh. zool. bot. Ges. Wien, XXXVII, 1887, p. 536, ♀ ♀.

Culebra; Porto Rico: Utuado; Monte Morales; Monte Mandios; Coamo Springs.

Not uncommon under stones or under the bark of decaying logs in damp places. This species is widely distributed, occurring as far north as the Bahamas and Texas.

6. *Ponera ergatandria* Forel.

FOREL, Trans. Entom. Soc. London, 1893, p. 365, ♀ ♀ ♂.

Porto Rico: Utuado.

Two workers taken under prostrate plaintain stems. The male of this species, which, like the preceding occurs in the Bahamas and in Texas, is wingless and ergatoid, as Forel has shown.

7. *Anochetus mayri* Emery.

EMERY, Ann. Mus. Civ. Genova, XXI, 1884, p. 378, no. 1, ♀; Ann. Soc. Entom. France, (6) X, 1890, p. 65, ♀ ♀.

St. Thomas (Emery); Porto Rico: Utuado, Vega Baja, Monte Morales, Monte Mandios, Coamo Springs, Morro at San Juan, Adjuntas, Arecibo.

Common under dead leaves and stones in the shade of the cafetals and platanals. The colonies are small, comprising only about a dozen individuals. Usually one finds isolated workers or females moving about under cover of the dead leaves in search of prey. The females seem to be apterous, although the thorax is large and of the usual structure. Specimens with distinct wing-stumps are rare. The larvæ are covered with pointed tubercles and resemble those of *Odontomachus*; the cocoons are rather broad, lemon yellow, with a black meconial spot at the anal pole.

8. *Anochetus* (*Stenomyrmex*) *emarginatus testaceus* Forel.

FOREL, Trans. Ent. Soc. London, 1893, p. 356, ♀ ♂; *ibid.*, 1897, p. 298, ♀.

Culebra.

Several colonies nesting under stones in the shade of trees along the dry arroyos on the higher part of the island (Monte Resaca). The number of individuals in a colony varies from about thirty to one hundred. The cocoons are long and slender like those of *Leptogenys*.

9. *Odontomachus hæmatodes* (L.).

Formica hæmatoda LINNÉ, System. Natur., Ed. 10, I, 1758, p. 582, no. 16, ♀.

Formica maxillosa GOZE, De Geer, Abh. Gesch. Insect., III, 1780, p. 390, no. 2, ♀.

Taf. XXXI, figs. 3-5.

Formica unispinosa FABRICIUS, Entom. System., II, 1793, no. 359, ♀.

Myrmecia unispinosa FABRICIUS, System. Piez., 1804, p. 423, no. 1, ♀.

Odontomachus hæmatodes LATREILLE, Hist. Nat. Crust. et Insect., XIII, 1805, p. 257, ♀.

Porto Rico: Arecibo, Utuado, Monte Morales, Monte Mandios, Adjuntas, Vega Baja, Aibonito, Coamo Springs.

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.

10. *Odontomachus hæmatodes* L. var. *ruginodis* Wheeler.

WHEELER, Bull. Am. Mus. Nat. Hist., XXI, 1905, p. 82, ♀ ♀.

Porto Rico: Utuado, Adjuntas, Coamo Springs.

This variety, which is less common than the typical form of the species, was found only in open, sunny places in the sandy soil of river bottoms. It is smaller than the typical *hæmatodes*, has a paler head, and the petiole is less acuminate above, with a shorter spine.

Subfamily MYRMICINÆ.

11. *Pseudomyrma flavidula* F. Smith.

F. SMITH, Catalog. Hymen. Brit. Mus., VI, 1858, p. 157, no. 15, ♀; WHEELER, Bull. Am. Mus. Nat. Hist., XXI, 1905, p. 83, ♀ ♀ ♂.

Porto Rico: Tallaboa.

A single worker of this species, running on the twigs of a bush, was the only specimen of the genus seen in Porto Rico and Culebra.

12. *Monomorium destructor* (Jerdon).

Atta destructor JERDON, Madras Journ. Lit. and Sci., XVII, 1851, p. 105. ♀.

Myrmica vastator F. SMITH, Journ. Proc. Linn. Soc., Zool., II, 1857, p. 71, no. 3. ♀.

Myrmica ominosa GERSTÆCKER, Monatsb. Akad. Wiss. Berl., 1858, p. 263, no. 18. ♀.

Myrmica atomaria GERSTÆCKER, *ibid.*, p. 263, no. 19, ♀.

Myrmica (Monomorium) vastator F. SMITH, Catalog. Hymen. Brit. Mus., VI, 1858, p. 123, no. 37, ♀.

Myrmica (Monomorium) basalis F. SMITH, *ibid.*, p. 125, no. 43, ♀.

Monomorium basale MAYR, Reise d. Novara, Zool., II, 1. Formicidæ, 1865, p. 92, no. 3. ♀.

Monomorium destructor EMERY, Dalla Torre, Catalog. Hymen., VII, 1893, p. 66.

Porto Rico: Tallaboa.

A single colony of this now widely distributed ant was found nesting at the base of a tree (*Acacia farnesiana*) on the road between Ponce and Tallaboa. The workers were moving in files up and down the trunk. It is said that this species in its native country (India) is, like the rat, instrumental in disseminating the bubonic plague.

13. *Monomorium pharaonis* (L.).

- Formica pharaonis* LINNÉ, System. Natur., Ed. 10a, I, 1758, p. 580, no. 7, ♀.
Formica antiquensis FABRICIUS, Entom. System., II, 1793, p. 357, no. 30.
Myrmica domestica SHUCKARD, Magaz. Nat. Hist., n. s., II, 1838, p. 626, ♀ ♀.
Myrmica unifasciata BOSTOCK, Trans. Entom. Soc. London, II, 3, 1839, Proc. LI-LII.
Atta minuta JERDON, Madras Journ. Litt. and Sci., XVII, 1851, p. 105.
Myrmica (Monomorium) fragilis F. SMITH, Catalog. Hymen. Brit. Mus., VI, 1858, p. 124, no. 42, ♀.
Myrmica (Monomorium) contigua F. SMITH, *ibid.*, 1858, p. 125, no. 44, ♀.
Monomorium pharaonis MAYR, Verh. zool. bot. Ges. Wien, XII, 1862, p. 752, no. 1.

Culebra; Porto Rico: San Juan, Arecibo.

This ant, which has now been introduced into nearly all parts of the world, is common in the houses and hotels. In Culebra it was also found nesting out of doors in the ground near the old government house.

14. *Monomorium carbonarium ebeninum* Forel.

- Monomorium carbonarium* FOREL, Mitth. Münch. Entom. Ver., V, 1881, p. 8, no. 7, ♀.
Monomorium minutum MAYR race *ebeninum* FOREL, Grandidier's Hist. Nat. et Pol. de Madagascar, XX, 1891, pt. 2, p. 165.
Monomorium carbonarium F. SMITH race *ebeninum* FOREL, Biol. Centr. Amer., Hymen., III, 1899-1900, p. 78.

St. Thomas (Forel); Culebra; Porto Rico: Santurce, Utuado, Coamo Springs, Aibonito, Adjuntas, Arecibo, Vega Baja.

Common under stones, in Tillandsias and under bark. A number of females taken from a single nest at Arecibo are wingless and subergatoid like those I have described from the Bahamas.

15. *Monomorium floricola* (Jerdon).

- Atta floricola* JERDON, Madras Journ. Lit. and Sci., XVII, 1851, p. 107, ♀.
Monomorium speculare MAYR, Sitzb. Akad. Wiss. Wien, LIII, 1866, p. 509, ♀.
Monomorium pæcilum ROGER, Berl. Entom. Zeitschr., 1863, p. 199, ♀ ♀.
Monomorium floricola EMERY, Dalla Torre, Catalog. Hymen., VII, 1893, p. 66.

Culebra; Porto Rico: Vega Baja, Coamo Springs, Tallaboa.

Common in Tillandsias, under the bark-scales of trees and in hollow twigs. All the females were apterous like those of this and the preceding species seen in the Bahamas (Wheeler, Bull. Am. Mus. Nat. Hist. XXI, pp. 87, 88, figg. D and E).

16. *Monomorium subcæcum* Emery.

EMERY, Bull. Soc. Entom. Ital., XXVI, 1894, p. 14 (of reprint), ♀ ♀.

St. Thomas (Emery).

This pale yellow species, according to Emery's description, is very aberrant, having the eyes reduced to single facets. It is allied to the East Indian *M. fossulatum* Emery.

17. *Cardiocondyla emeryi* Forel.

PLATE XI, FIG. 6.

FOREL, Mittheil. Münch. Entom. Ver., V, I, 1881, p. 5, no. 3, ♀.

St. Thomas (Forel); Vieques (Busck); Culebra; Porto Rico: San Juan, Santurce, Utuado, Adjuntas, Coamo Springs.

This species, originally described from St. Thomas, has since been found to be widely distributed, not only in the West Indies, but also in India, Palestine and Madagascar. I have recorded it from the Bahamas and Bermuda, and have a specimen from Cayamas, Cuba (E. A. Schwarz). The individual collected by Busck in Vieques is a winged male. The colonies of this ant are small and in sandy places, especially in river or creek bottoms and on sea beaches. The female is still unknown though the worker was described more than a quarter of a century ago.

18. *Cardiocondyla venustula* sp. nov.

PLATE XI, FIG. 5.

Worker. 2-2-25 mm.

Head longer than broad, as broad in front as behind, with faintly convex, subparallel sides and nearly straight posterior border. Mandibles rather narrow, 6-toothed. Clypeus convex in the middle behind, with straight anterior border. Frontal area small, triangular, elongated. Antennal scapes not reaching the posterior corners of the head by a distance somewhat greater than their largest transverse diameter. Second and seventh funicular joints as long as broad; joints 3-6 broader than long; terminal joint longer and larger than the two preceding unequal joints

together. Thorax slender, with rounded, sloping humeri and pronounced mesoëpino-
tural constriction. Epinotum with two rather blunt teeth, which are as long as
broad at their bases; basal surface slightly convex, nearly twice as long as the con-
cave declivity. Petiole slender, node from above spherical, as long as broad and as
long as the slender peduncle, into which it narrows rather abruptly. Postpetiole
only $1\frac{1}{2}$ times as long as the petiole and barely half as broad as the first gastric seg-
ment, but little broader than long, transversely elliptical; in profile distinctly lower
than the petiolar node. Gaster elongate elliptical, somewhat flattened above. Legs
slender.

Mandibles obscurely and sparsely punctate. Clypeus and frontal area somewhat
shining, the former indistinctly, longitudinally rugulose. Head opaque, finely and
regularly reticulate-rugulose. Thorax and post-petiole opaque, finely and densely
punctate on the sides and below, above somewhat shining, with smaller punctures;
petiole still smoother and more shining throughout, with distinct and very small
punctures above. Gaster glabrous, with minute scattered punctures. Legs some-
what shining.

Appressed pubescence covering the body and appendages grayish, somewhat
longer and sparser on the gaster. Hairs very few, confined to the anterior border
of the clypeus.

Dark reddish brown; head and gaster nearly black; mandibles, antennal scapes
and legs more yellowish; funiculi and the greater portion of the femora and tibiae,
especially of the posterior legs, and the nodes of petiole and postpetiole, infuscated.

Female. Length 2.75-3 mm.

Resembling the worker. Thorax narrower than the head, more than twice as
long as broad, somewhat flattened above. Epinotal teeth stronger than those of
the worker but of the same shape. Petiole and postpetiole of the same shape and
proportions.

Head, thorax and postpetiole opaque above; petiole slightly more shining; all
of these parts uniformly reticulate-rugose; the mesonotum behind with more longi-
tudinal rugae; epinotal declivity smooth and shining.

Pubescence as in the worker. Wings minutely hairy, with a long marginal fringe
on the posterior pair.

Head, thorax and nodes of petiole uniformly dark brown; gaster black, except
the bases of segments 2-4, which are yellowish. Mandibles, legs and antennae of
the same color as in the worker. Wings white, with colorless veins and stigma.

Culebra; Porto Rico: Coamo Springs.

This species is very closely related to *C. nuda* Mayr of India, Tonga and
Samoa, and more remotely to *C. parvinoda* Forel of India. The worker
may be distinguished from that of *nuda* by the shape and proportions of the
petiole and postpetiole. In *nuda* the petiolar node is less abruptly marked
off from the peduncle and is distinctly longer than broad, while the post-
petiole is fully twice as broad as the petiole and its sides are roundly angular
when seen from above. The epinotal spines are more robust and the
mesoëpino-
tural furrow is not so deep. From *parvinoda*, *venustula* differs

in its much darker color, and in having the thorax more slender, less flattened above, with more rounded humeri and much smaller epinotal teeth.

C. venustula is not uncommon in sandy and gravelly places, especially on the sea-beaches, where it lives in small colonies, comprising a single deälated queen and a few dozen workers, in shallow nests like those of some species of *Leptothorax*. It was found in Culebra in the same stations as *C. emeryi*. At Coamo Springs a few winged females were captured March 23, while they were issuing from a nest in a gravelly creek bottom.

19. *Solenopsis geminata* (Fabr.).

For the elaborate synonymy of this species see MAYR, Novara Expedit. Zool., II, 1. Formicidæ, p. 108, and DALLA TORRE, Catalog. Hymenopt., VII, 1893, p. 76.

St. Thomas (Forel); Culebra; Porto Rico: Arecibo, Adjuntas, San Juan, Santurce, Vega Baja, Utuado, Monte Morales, Monte Mandios, Coamo Springs, Ponce, Tallaboa, Mayaguez.

This, the commonest of all the ants on the islands visited, was found everywhere, except in the little island of Culebrita. All the specimens are of the typical dark form of the species, except those from Mayaguez, which are paler and redder. This ant not only stores up seeds in its nests and is highly carnivorous, but it also attends aphids and coccids. In Culebra I found it visiting aphids on the leaves of a superb milk-weed (*Callotropis procera*), and in several localities in this island and in Porto Rico it was seen attending coccids on the roots of grasses and on the bark of trees. Winged females and males were found in the nests March 4 to 24.

20. *Solenopsis globularia* (F. Smith).

Myrmica (*Monomorium*) *globularia* F. SMITH, Catalog. Hymen. Brit. Mus., VI, 1858, p. 131, no. 68, ♀ ♀ ♂.

Solenopsis steinheili FOREL, Mitth. Münch. Entom. Ver., I, 1881, p. 11, no. 11, ♀.

Solenopsis globularia FOREL, Bull. Soc. Vaud. Sc. Nat. (2), XX, 1884, p. 376.

St. Thomas (Forel).

The typical form of this species from Brazil is described by Smith as "pale rufo-testaceous, very smooth and shining, with a rufo-fuscous band on the abdomen, the basal and apical margins pale." This description seems to agree very well with the specimens described by Forel from St. Thomas, but the numerous specimens which I collected in Culebra and Porto Rico are much darker and may be designated as a distinct variety:

21. *Solenopsis globularia* var. *borinquenensis* var. nov.

PLATE XI, FIG. 7.

Culebra; Porto Rico: Morro at San Juan.

The worker of this form has the posterior portion of the head, the pronotum and the whole or nearly the whole of the first gastric segment, dark brown, in some specimens almost black. The postpetiole is transversely elliptical, distinctly broader than long. This form nests in the white sand of the sea-beaches just above high-water mark.

The form which I cited in a former paper as *S. globularia* from Andros I., Bahamas, is really a distinct subspecies, which may be called *lucayensis* subsp. nov. It is pale yellow throughout, with only a faint fuscous trace of the gastric band and the petiole and postpetiole are much narrower than in the typical form or in the var. *borinquenensis*, the postpetiole being nearly as long as broad and much narrower than the first gastric segment. (Pl. XI, Fig. 8.)

22. *Solenopsis corticalis* Forel.

FOREL, Mitth. Münch. Entom. Ver., V, 1, 1881, p. 13, no. 12, ♂ ♀.

St. Thomas (Forel); Porto Rico: Utuado.

A single colony, comprising a dealated female and a number of workers, was found in the stem of a bamboo.

23. *Solenopsis picea* Emery.

EMERY, Bull. Soc. Entom. Ital., XXVIII, 1896, p. 57 (of reprint), ♂ ♀.

Porto Rico: Utuado.

A number of workers, taken from a single colony nesting under the bark of a rotting log, agree very closely with types of this species from Costa Rica.

24. *Solenopsis azteca* Forel var. *pallida* var. nov.

Porto Rico: Coamo Springs.

A number of workers, taken from a small nest under a boulder in a dry stream bed, differ from some of Forel's types from St. Vincent in their much paler coloration. The body and appendages are yellow, the head has a reddish brown cloud on the vertex and the first gastric segment a dark brown transverse band. *S. azteca* seems to be closely related to *S. sulphurea* Roger of Venezuela, the worker of which, as Emery has recently

shown, also lacks the teeth on the border of the clypeus but has well developed clypeal ridges. Judging from Emery's figure, Roger's species has smaller eyes and longer antennal scapes than *azteca*.

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

Cremastogaster steinheili FOREL, Mitth. Münch. Entom. Ver., V, 1, 1881, p. 15, no. 13, ♂.

Cremastogaster victima var. *steinheili* EMERY, Zool. Jahrb. Abth. f. Syst., VIII, 1894, p. 288, nota.

St. Thomas (Forel); Culebra; Porto Rico: Coamo Springs, Vega Baja, Aibonito.

Common; nesting in Tillandsias, under bark or in the hollow twigs of various trees. This variety, which seems to be widely distributed through the West Indies, is closely related to the var. *missouriensis* Pergande which ranges as far north as Missouri. In one locality in Culebra colonies of *steinheili* were found to have constructed "sheds" or "tents" of fine vegetable débris over coccids, both on the upper and lower surfaces of the large shining leaves of a tree (*Cordia macrophylla*). These sheds were small, flattened or conical structures each covering only one or a few coccids.

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

PLATE XII, FIG. 24.

Pheidole fallax FOREL, Mitth. Münch. Ent. Ver., V, 1, 1881, no. 9, 4 ♀.

Ph. jelskii var. *antillensis* FOREL, Ann. Soc. Entom. Belg., XLV, 1901, p. 356.

St. Thomas (Forel); Culebra; Porto Rico: Utuado, Monte Morales, Monte Mandios, Morro at San Juan, Santurce, Coamo Springs, Vega Baja.

The specimens collected from more than a dozen nests agree very closely with those taken on the Bahamas and undoubtedly belong to the variety *antillensis*. To Forel's description of the nests of this form I have only to add that the crater opening is usually slit-shaped or irregular and not round, at least in Culebra and Porto Rico. In the latter island I have seen craters nearly a foot in diameter, sometimes with several openings close together. Males and winged females were taken from two colonies in Culebra as early as March 4 and 6. In this island *antillensis* nests indifferently on the lava slopes, in the sand of the sea-beach or in the compact soil of the roads.

Ph. fallax becomes more puzzling as more material is brought to light. Forel has finally decided to separate the form which Mayr described as var. *jelskii* from *fallax* and to regard it as a distinct species, but an examination

of specimens from a number of localities, including cotypes of Forel's and Emery's varieties and subspecies, leaves me in doubt as to the specific value of *jelskii*. The soldiers of the described forms may be distinguished by means of the following table:

1. Occipital incisure of head very deep, narrow at the bottom; antennal scapes robust, reaching only a short distance behind the eyes (*jallax* Mayr = *colombica* Forel var. *rubens* Forel, Pl. XII, Fig. 25) 2.
- Occipital incisure much more shallow; antennal scapes more slender, reaching to between $\frac{1}{3}$ and $\frac{1}{2}$ the distance from the eyes to the posterior corners of the head (*jelskii* Mayr) 5.
2. Head and thorax both deep ferruginous red (Cuba; Colombia; Jamaica) *jallax* Mayr (typical)
Head paler than the gaster and posterior portion of the thorax, which are black 3.
3. Head yellowish; its posterior corners somewhat smooth and shining (Colombia) subsp. *colombica* Forel.
Head deep ferruginous red; its posterior corners sculptured and opaque 4.
4. Anterior third of first gastric segment opaque, densely punctate (Brazil) subsp. *emiliae* Forel
Less than one-third of the first gastric segment punctate; sculpture of head coarser and more reticulate; antennal scapes shorter (Brazil, Chaco) var. *retijera* Emery.
5. First gastric segment shining 6.
- First gastric segment in great part subopaque and finely punctate 7.
6. Sculpture of head feeble (Cayenne) subsp. *jelskii* Mayr (typical).
Sculpture of head stronger and denser; color more vivid; head somewhat smaller; antennal scapes somewhat longer (Trinidad, St. Vincent, Bahamas, Porto Rico) var. *antillensis* Forel.
7. Thorax, pedicel and gaster dark brown, head lighter, reddish brown; sculpture like that of the typical *jelskii*, with the posterior corners of the head smooth and shining (Venezuela; Brazil) var. *jallacior* Forel.
Ferruginous red throughout, sculpture of head and thorax very strong; posterior corners of the former not shining; first gastric segment largely opaque and punctate (Brazil; Tucuman) var. *arenicola* Emery.

27. *Pheidole megacephala* (Fabr.).

For the extensive synonymy of this species see DALLA TORRE, Catalog. Hy-men., VII, 1893, p. 92.

St. Thomas (Forel); Culebrita; Porto Rico: Aibonito, Arecibo, Mayaguez.

28. *Pheidole subarmata* Mayr. var. *borinquenensis* var. nov.

PLATE XII, FIGS. 19-21.

Porto Rico: Morro at San Juan, Santurce, Utuado.

This variety is closely related to var. *elongatula* Forel of St. Vincent.

The head of the soldier is quite as much elongated, but the sides are straighter. The body is dark chestnut brown, with the discs of the mandibles, a band across the head in front of the eyes, and the antennæ, deep red. The legs, including the coxæ, are yellow, the antennal clubs fuscous. In some specimens the posterior corners of the head, the pedicel and base of gaster are also somewhat reddish. The coloration of the worker is very much like that of the soldier. Types of var. *elongatula* received from Professor Forel and specimens of the typical *subarmata* from South and Central America are much paler and intermediate in color between the Porto Rican variety and the yellow var. *nassavensis* which I have described from the Bahamas.

The formicaries of the var. *borinquensis* are small craters thrown up in sandy, sunny places like roads and creek bottoms. There are only a few soldiers and workers in a colony.

29. *Pheidole flavens sculptor* Forel.

FOREL, Trans. Entom. Soc. London, 1893, p. 414, ♂ ♀.

Porto Rico: Coamo Springs.

A single soldier agrees very well with Forel's description of this subspecies, first taken in St. Vincent, and characterized by having the entire head of the soldier and female sculptured, even to the posterior corners, with only the region immediately surrounding the occipital foramen smooth and shining.

30. *Pheidole flavens exigua* Mayr.

Pheidole exigua MAYR, Horæ Soc. Entom. Ross., XVIII, 1884, p. 36 ♂.

Pheidole flavens subsp. *exigua* EMERY, Bull. Soc. Ent. Ital., XXVIII, 1896, p. 50 (of reprint).

Soldier. Length 2.25–2.5 mm.

Head, excluding the mandibles, a little longer than broad, a little broader in front than behind, with rounded posterior corners, deep occipital excision and pronounced occipital impression, convex in the middle, without a frontal furrow but with elongated, flattened impressions, or scrobes for the antennal scapes. Eyes at the anterior third of the head. Mandibles moderately convex, with two larger apical and two smaller basal teeth. Anterior border of gula with a pair of prominent teeth. Clypeus short, moderately flattened, its anterior border with three subequal sinuate excisions, so that it appears to be bluntly bidentate. Frontal area triangular, with a median carinula. Frontal carinæ as long as the antennal scapes, the latter reaching half the distance between the eyes and the occipital excision. Antennal club as long as the remainder of the funiculus; joints 2–9 small, broader than long. Thorax small and narrow, through the prominent humeri barely half as long as the head; pro- and mesonotum convex, the latter angular in profile; mesoepinotal constriction deep and broad. Epinotum in profile with subequal base and declivity, the former

convex, the latter concave and sloping, bordered on each side with a prominent ridge, which is continued into the acute, erect spines. The latter are a little longer than broad at their bases and further apart than long. Median portion of epinotum concave. Petiole from above suboblong, more than twice as long as broad, as broad in front as behind, with sides slightly concave in the middle; node compressed anteroposteriorly, with long concave anterior and abrupt posterior slopes; its upper border is entire and somewhat convex from behind, and rather sharp and acute in profile. Postpetiole about $1\frac{1}{2}$ times as broad as the petiole, broader than long, broadest near the anterior border, with prominent but rather blunt anterior angles. Gaster somewhat smaller than the head. Legs rather slender.

Shining; anterior $\frac{2}{3}$ of head, thorax, petiole, and sides of post-petiole subopaque. Mandibles sparsely punctate, with coarsely rugose bases. Clypeus smooth, except the antero-lateral portions, which are sparsely and longitudinally rugose. Anterior $\frac{2}{3}$ of head, with the exception of the scrobe-like depressions, longitudinally rugose, with punctate interrugal spaces. The rugæ between the frontal carinæ are subparallel. On the sides of the head they stop abruptly at the scrobe-like depressions which are indistinctly punctate and shining. Pro- and mesonotum and epinotal declivity transversely rugose; remainder of thorax, petiole and sides of postpetiole densely punctate.

Hairs yellowish; long, suberect and abundant on the body; shorter and more reclinate on the legs and antennal scapes.

Head, thorax and pedicel pale ferruginous; gaster, antennæ and legs yellow. Borders of mandibles and anterior border of clypeus dark brown or black.

Worker. Length 1.3 mm.

Head, excluding the mandibles, a little longer than broad, with slightly convex sides, and slightly concave posterior margin. Eyes in front of the middle of the head. Mandibles with two acute apical and several indistinct basal teeth. Anterior border of clypeus straight and transverse in the middle, its surface rather convex. Antennal scapes reaching a little beyond the posterior corners of the head. Thorax similar to that of the soldier, but with more rounded and sloping humeri, and with the pro- and mesonotum distinctly flattened in profile. Epinotal spines small and very acute. Petiole similar to that of the soldier, but with the node rounded and not compressed anteroposteriorly. Postpetiole but little broader than the petiole, nearly as long as broad, sub-spherical. Gaster about as large as the head.

Mandibles shining, striatopunctate; head, thorax and petiole opaque, densely and uniformly punctate; head in front of the eyes with a few longitudinal rugæ. Gaster glabrous.

Pilosity and color like those of the soldier, but the hairs on the body are sparser. The borders of the mandibles and clypeus are brown.

Female (deâlated). Length 2.75-3 mm.

Head like that of the soldier, but proportionally broader and with less excised posterior border. Antennal scapes reaching nearly to the posterior corners. Thorax through the wing-insertions as broad as the head through the eyes, flattened above and much narrowed in the epinotal region. Epinotal spines stout, acute, longer than broad at their bases, directed upward and backward and at their bases further apart than long. Petiole similar to that of the soldier but with the upper border of the node deeply excised in the middle. Postpetiole twice as broad as the petiole, with its anterior border straight and produced on each side as a blunt but prominent angle, posterior portion much narrower. Gaster elongate elliptical, flattened above.

Smooth and shining, especially the mesonotum and gaster. Head subopaque, with sculpture similar to that of the soldier, except that the rugæ extend over the posterior corners and occipital excision. Pleuræ opaque, punctate-rugulose; epinotum with prominent transverse rugæ. Petiole and postpetiole opaque, finely punctate-rugulose. Mesonotum and gaster with small, scattered, piligerous punctures.

Deep chestnut brown, anterior portion of head, pleuræ and peduncle of petiole paler. Mandibles, antennæ and legs brownish yellow. Borders of mandibles and clypeus blackish.

Cayenne (Mayr); Porto Rico: Utuado, Monte Mandios, Coamo Springs.

Redescribed from three females and numerous soldiers and workers taken from several colonies nesting under stones and logs in the open woods and cafetals. The soldier of this subspecies, as Emery has pointed out, may be distinguished from those of other forms of the *flavens* group by the peculiar sculpture of the head, the antennal scrobe being sharply defined laterally by a distinct ruga. The female is remarkably small and dark colored.

31. *Pheidole mærens* sp. nov.

PLATE XII, FIGS. 22 AND 23.

Soldier. Length 2.5–2.75 mm.

Head large, including the mandibles but little longer than broad, as broad in front as behind, with rather straight sides and moderately deep, angular occipital excision. Occipital depression pronounced, transverse; occipital groove shallow but distinct. Eyes just behind the anterior third of the head. Anterior border of gula with two prominent teeth. Mandibles convex, with a pair of blunt apical teeth. Clypeus flattened, with a distinct median carina, its anterior border sinuately excised in the middle. Frontal area triangular, impressed. Frontal carinæ shorter than the antennal scapes. Scrobe-like depressions very faint. Antennæ slender, scapes reaching to $\frac{1}{4}$ the distance between the eyes and the posterior corners of the head, curved and slender at the base, incrassated at their tips. Funicular joints 2–8 small, a little broader than long. Thorax through the prominent but rounded humeri about half as broad as the head. Pro- and mesonotum in profile very convex, rounded, the latter somewhat angular behind. Epinotum with subequal base and declivity, the former slightly convex, the latter slightly concave in the middle, with a prominent ridge on each side continuous with the acute spines. These are longer than broad at their bases and directed upward, backward and slightly outward, and are further apart at their bases than long. Petiole suboblong, more than twice as long as broad, with an anteroposteriorly compressed node, which has a long concave anterior and a short, abrupt posterior slope. Its upper border is rounded and entire. Postpetiole half again as broad as the petiole, distinctly broader than long, broader in front than behind, with straight anterior border and prominent but blunt anterior corners. Gaster flattened, as large as the head. Legs rather robust.

Shining; mandibles with very coarse scattered punctures and a few coarse basal striæ. Clypeus longitudinally rugose on the sides. Anterior $\frac{1}{4}$ of head with sharp

longitudinal rugæ, the spaces between which are feebly reticulate, especially in the region of the obsolescent scrobes. Posterior corners of head with a few coarse, widely scattered punctures. Thorax coarsely reticulate rugose, subopaque on the sides; pronotum shining, with a few coarse, transverse rugæ. Petiole and postpetiole more finely punctate-rugulose, subopaque, the latter smooth and shining above. Gaster glabrous, with minute, widely scattered piligerous punctures.

Hairs yellowish, suberect and moderately abundant, both on the body and appendages.

Head and thorax dark brown, almost black; pedicel, gaster, mandibles, clypeus, cheeks and antennæ reddish yellow; legs yellow; border of mandibles and clypeus black.

Worker. Length 1.5-1.75 mm.

Head, excluding the mandibles, a little longer than broad, with straight posterior border and rounded sides. Mandibles with several subequal teeth, those at the apex being but little longer than the others. Clypeus rounded and convex in the middle, with entire anterior border. Antennal scapes reaching a little beyond the posterior corners of the head. Thorax resembling that of the soldier, but with more rounded and sloping humeri, somewhat flatter pronotum and more attenuate epinotal spines. Petiole like that of the soldier but with a more conical node. Postpetiole suboblong, a little broader than the petiole and a little broader than long. Gaster about as large as the head.

Mandibles somewhat shining, sparsely punctate. Head and thorax opaque, densely and coarsely punctate, the front of the former with a few indistinct longitudinal rugæ. Petiole and postpetiole more finely punctate on the sides and below, opaque; the nodes smoother and shining. Gaster glabrous.

Pilosity like that of the soldier.

Head and thorax black, brownish in immature specimens. Gaster dark brown, paler posteriorly; pedicel, mandibles and antennæ brownish yellow; legs somewhat paler.

Culebra; Porto Rico: Utuado, Monte Morales, Monte Mandios.

Described from numerous specimens taken under stones and prostrate plantain trunks in the woods and cafetals. This species evidently belongs to the *flavens* group and is closely related to *Ph. flavens exigua* on the one hand and to *Ph. orbica* Forel and *Ph. dimidiata* Emery on the other. The soldier differs from that of *exigua* in its darker color, and much fainter and indistinctly defined antennal scrobes; from *orbica* in the shape of the postpetiole and to some extent in the shape of the head, which is more rounded on the sides and more glabrous behind; from *dimidiata* in the much shorter postpetiole, much less incrassated femora and less dense longitudinal rugæ on the head. The worker of *mærens* differs from those of *orbica* and *dimidiata* in the dense opaque sculpture of the head and from that of *exigua* in its darker color and coarser punctuation.

32. *Macromischa pulchella* Emery.

EMERY, Bull. Soc. Entom. Ital., XXVII, 1896, p. 26 (of reprint), ♂ ♀.

St. Thomas (Emery).

33. *Macromischa isabellæ* sp. nov.

PLATE XI, FIGS. 1 AND 2.

Worker. Length 3.5–3.7 mm.

Head rectangular, distinctly longer than broad, with subparallel sides, straight posterior border and eyes a little in front of its middle. Mandibles 5-toothed. Clypeus depressed in the middle, with its anterior border faintly and sinuately excised. Antennal scapes reaching a little beyond the posterior corners of the head; joints 1 and 8 of the funiculus as long as broad, joints 2–7 broader than long, terminal joint of club as long as the two preceding subequal joints together. Thorax nearly three times as long as broad, a little broader in front than behind, with a prominent, straight, transverse ridge across the pronotum, terminating on each side in the angular humerus. In profile the upper surface of the thorax is depressed and evenly rounded, without sutures and without an angle between the base and declivity of the epinotum. Epinotal spines small and blunt, as long as the distance between their bases, directed upward and but slightly backward and outward. Petiole from above more than twice as long as broad, pedunculate and gradually broadening behind, with straight sides; in profile the node is high and rounded, with concave anterior and slightly convex posterior slopes. Postpetiole campanulate, nearly as broad in front as behind, rounded above, less than $1\frac{1}{2}$ times as broad as the petiole and about half as broad as the first gastric segment. Both petiole and postpetiole are distinctly concave beneath in profile, without teeth. Gaster small. Legs long, with incrassated femora, their length and thickness increasing from the first to the third pair.

Opaque; gaster and tibiae glabrous. Mandibles coarsely longitudinally striated. Clypeus, head, thorax, petiole and postpetiole very finely and densely punctate, so that the surface has a velvety appearance; the clypeus, thorax and middle of the head rather faintly longitudinally rugose, the rugæ on the thorax being further apart than those on the head and those on the clypeus radiating from a point on the middle of the anterior border.

Hairs snow-white, sparse and erect, obtuse and stouter on the thorax, pedicel and gaster; on the antennæ they are more slender and appressed, on the legs reduced to a sparse pubescence.

Mandibles, antennæ, head, coxæ, femora and gaster blue black; the first gastric segment with a brilliant satiny blue reflection, visible only in certain lights. Thorax, petiole, postpetiole and trochanters dull orange red; tips of mandibles, tibiae, tarsi and two elliptical spots at the base of the first gastric segment, honey yellow.

Female. Length 3.9 mm.

Resembling the worker, but with the following differences in sculpture and coloration: Upper surface of head covered with coarse reticulate rugæ in addition

to the dense punctation; pleuræ with much coarser longitudinal rugæ; mesonotum densely and regularly longitudinally rugose. The mesonotum, with the exception of its anterior third, blue black and the pro- and mesopleuræ more or less blackened, especially below. The elliptical yellow spots on the gaster are much larger, being nearly as long as the first segment. The wings are grayish hyaline, with pale brown veins and stigma.

Male. Length 3.5 mm.

Head through the eyes a little broader than long, with rounded, convex posterior portions and very short, concave cheeks. Mandibles small, pointed and dentate. Antennæ long and slender; funicular joints cylindrical, except the first, which is no longer than broad; scapes as long as the first and second funicular joints together. Thorax rather short, as broad through the wing-insertions as the head through the eyes. Mesonotum with deep Mayrian furrows, each crossed by a regular series of short ridges. Epinotum unarmed, sloping, feebly convex. Petiole from above about three times as long as broad, narrowed in front, with subparallel sides behind; node in profile low and rounded. Postpetiole about $1\frac{1}{4}$ times as broad as the petiole, as long as broad, campanulate. Gaster slender, with well developed cerci and genitalia. Legs slender, femora not incrassated.

Opaque; gaster smooth and shining; legs subopaque. Head, thorax and pedicel finely and densely punctate; the sides and posterior portion of the head somewhat reticulately rugulose and the sides of the pronotum with faint longitudinal rugæ. Mesonotum in front with a smooth median longitudinal band.

Hairs whitish, suberect and pointed, sparse on the head, thorax and gaster. Pubescence on antennæ and legs similar to that of the worker.

Black; antennæ and legs fuscous; tarsi and articulations of legs sordid yellow. Wings grayish hyaline, with dull yellowish veins and black stigma.

Summits of Monte Morales and Monte Mandios (about 3000 ft.).

Described from numerous workers, a single female and four males. One of the workers was found running on the leaves of a bush, the remaining specimens were taken from two colonies, one nesting under the roots of an epiphytic orchid, the other in a hollow twig. Both colonies were small, each comprising only a few dozen workers. These moved rather slowly, with the small gaster turned downward and forward between the large hind legs. I take great pleasure in dedicating this the most beautiful of the Porto Rican ants to Mrs. Elizabeth G. Britton. It is clearly distinct from all the described species which show great differences in size, sculpture and coloration.

34. *Macromischa albispina* sp. nov.

PLATE XI, FIGS. 3 AND 4.

Worker. Length 2-2.25 mm.

Head rectangular, longer than broad, as broad in front as behind, with feebly rounded sides, straight posterior border and the eyes just in front of the middle. Mandibles 5-toothed. Clypeus with broadly rounded, entire anterior border.

Antennal scapes reaching to the posterior corners of the head. Funicular joints 2-8 small, much broader than long; terminal joint as long as the two preceding subequal joints together. Thorax short, a little more than twice as long as broad, somewhat broader in front than behind, evenly rounded above and in front, without a transverse postcervical ridge and without sutures. Epinotum with a distinct concave declivity and two acute, tapering spines which are as long as the declivity, longer than their distance apart at the base, directed backward, outward and but slightly upward, and distinctly curved inward and downward at their tips. Petiole three times as long as broad, pedunculate in front and gradually widening behind; node high, laterally compressed and somewhat flattened above, with long, concave posterior slope. Postpetiole fully three times as broad as the petiole, campanulate, broader behind than in front, nearly as broad as the first gastric segment and about twice as broad as long. Gaster small, with broad, straight, anterior border. Legs, especially the hind pair, with incrassated femora, middle femora shorter than the fore pair.

Opaque, very finely and densely punctate, so that the surface has a velvety appearance. Gaster smooth and shining; legs subopaque. Clypeus coarsely longitudinally rugose. Mandibles obscurely striatopunctate.

Hairs snow-white, obtuse and erect, very sparse on the head, thorax and gaster. Legs and antennæ with short, dilute pubescence.

Blue black; first gastric segment with satiny, blue reflections visible only in certain lights. Epinotal spines white. Tip of gaster, frontal carinæ, and mandibles, except the teeth, sordid yellowish; legs and antennæ fuscous, femora and antennal clubs often black or very dark brown.

Female (deâlated). Length 4 mm.

Resembling the worker but much larger. Thorax robust, a little more than $1\frac{1}{2}$ times as long as broad and as broad through the wing-insertions as the head through the eyes. Epinotal spines stouter and blunter than in the worker and further apart at their bases than long. Postpetiole nearly three times as broad as long, but considerably narrower than the gaster, which is long and voluminous. Mesonotum covered with fine longitudinal striæ, with a smooth anteromedian and two smooth posterolateral lines. Color and pilosity as in the worker.

Culebra.

Described from thirty workers and a single female, representing a single colony which was found nesting in a small cavity in the ground in the shade of a thicket, where some of the workers were moving about slowly over the dead leaves and twigs. *M. albispina* belongs to the group of small species comprising *M. lucayensis* Forel, *androsana* Wheeler, *pastinifera* Emery, *subditiva* Wheeler, etc.

Emery (Bull. Soc. Ent. France, 1896, pp. 102, 103) was undoubtedly right in eliminating from Roger's genus *Macromischa* all the Old World species that had been assigned to it by Mayr. These species belong, as Emery says, to *Tetramorium*. The American species, whose center of distribution is the Antilles, have a very distinctive and unmistakable habitus. The following table includes the workers of all of the described species of

the genus with the exception of *M. lucayensis* Forel of which only a female specimen is known:

1. Species with more or less metallic coloration 15
Species without metallic coloration or merely with violet lustre or reflection on the head or first gastric segment 2
2. Epinotum unarmed 3
Epinotum armed with spines 4
3. Thorax without a mesoepinotal constriction; thorax and petiole light red; postpetiole, head and gaster black; legs, antennæ, mandibles and anterior border of head reddish brown. Length 5-5.5 mm. (Cuba) *versicolor* Roger
Thorax with a pronounced mesoepinotal constriction; light red, with black antennæ and gaster; legs dark brown. Length 7 mm. (Cuba) *punicans* Roger
4. Ferruginous red; epinotal spines very large and long, straight, pointed and divergent 5
Epinotal spines much smaller 6
5. Mesoepinotal constriction feebly marked; gaster and legs yellowish. Length 4.5 mm. (San Domingo) *sallei* Guérin
Mesoepinotal constriction profound; gaster dark brown (Mexico) *cresoni* Ern. André
6. Deep brownish red 7
Of a different or more variegated coloration 8
7. With a brown transverse band on each segment; antennal scapes reaching or barely surpassing the posterior corners of the head. Length 4-4.2 mm. (Panama) *salvini* Forel
Gaster entirely brown; antennal scapes distinctly surpassing the posterior corners of the head; femora less incrassated; peduncle of petiole longer and more slender. (Panama) var. *obscurior* Forel
8. Largely black species 9
At least the thorax red or yellowish 11
9. Surface of body excepting the gaster, opaque 10
Surface of body shining; small species (2 mm.); petiole with a slender peduncle suddenly enlarging behind into an upright anteroposteriorly compressed scale which is but little narrower than the postpetiole (Texas) *subditiva* Wheeler
10. Large species (6-6.5 mm.); black; head and gaster with faint violet reflections; legs shining, dark brown (Cuba) *lugens* Roger
Small species (2-2.25 mm.); black; with white epinotal spines, laterally compressed petiolar node and very broad postpetiole (Culebra) *albispina* sp. nov.
11. Surface of body shining; head and gaster black; mandibles, antennæ, thorax, pedicel and legs dilute testaceous. Length 1.5 mm. (St. Thomas) *pulchella* Emery.
Surface of body opaque 12
12. Petiolar node much compressed anteroposteriorly, transverse, suddenly rising from the peduncle, with its upper border curved forward; epinotal spines long and slender, directed backward 13
Petiolar node laterally compressed, gradually rising from the peduncle, with a conical summit; epinotal spines small and erect; head, gaster and femora black; thorax, petiole and postpetiole red; tibiæ and tarsi yellow. Length 3.5-3.7 mm. (Porto Rico) *isabellæ* sp. nov.

13. Upper border of petiolar node but slightly bent forward; head, postpetiole and gaster black. Length 1.9–2 mm. (Bahamas) . . . *androsana* Wheeler.
Upper border of petiole much curved forward, both head and thorax red 14
14. Legs shining. Length 2.6 mm. (Bahamas) *pastinifera* Emery (typical).
Legs opaque, finely and densely punctate. Length 2.–2.5 mm. (Bahamas)
var. *opacipes* Wheeler.
15. Greater portion of head glabrous, coarsely and longitudinally rugose in front of the eyes; body shining metallic green with violet reflections; nodes of petiole and postpetiole brown, shining, with metallic green or blue reflections; peduncle of petiole and articulations honey yellow; antennal scapes and mandibles brown, funiculus black. Length 4 mm. (Cuba) . . . *squamifera* Roger.
Head either densely punctate or longitudinally rugose above . . . 16
16. Head opaque or with a silky luster . . . 17
Head shining . . . 18
17. Head and thorax purplish red, with violet reflections and silky luster; pedicel and legs shining, yellowish brown; gaster black. Length 5–5.5 mm. (Cuba)
porphyritis Roger.
Head green, with blue and violet reflections; thorax purplish violet with æneous reflections; pedicel yellowish brown, nodes, gaster and femora dark metallic green or brown, very glabrous; tibiae, tarsi and funiculi lighter brown. Length 5.5 mm. (Cuba) . . . *iris* Roger.
18. Head shining, violet, thorax red, passing into violet on the pleuræ; epinotal spines, pedicel and legs shining, yellowish brown, gaster black; head with rather widely separated longitudinal rugæ, thorax with coarse irregular rugæ; peduncle of petiole as long as the thorax. Length 5–6 mm. (Cuba)
purpurata Roger.
Head and thorax deep metallic green, passing into violet on the cheeks, pleuræ and epinotum; mandibles, clypeus, frontal carinæ, neck, terminal tarsal joints and anterior end of petiolar peduncle dull orange; remainder of petiole, postpetiole, gaster and legs black; coxæ, trochanters and extreme bases of femora honey yellow; head with dense longitudinal rugæ, thorax covered with strong, regular arcuate, transverse rugæ; petiole less than half as long as the thorax. Length 3–3.5 mm. (Bahamas) . . . *splendens* Wheeler.

35. *Rogeria curvipubens* Emery.

EMERY, Bull. Soc. Entom. Ital., XXVI, 1894, p. 54 (of reprint). ♂ ♀.

The small ants of the genus *Rogeria* seem to represent a generalized type with affinities to *Leptothorax*, *Tetramorium* and *Stenamma*. Unfortunately only workers and dealated females are known, so that the precise position of the genus, which must depend to some extent on the venation of the wings, cannot be determined at present. The worker of *R. curvipubens* measures only 1.3–1.75 mm. The head is covered with reclinate curved hairs, the thorax with long sparse pile. The types are from St. Thomas and Bolivia. I have recorded the occurrence of this species also in the Bahamas (Andros Island).

36. *Rogeria foreli* Emery.

EMERY, Bull. Soc. Entom. Ital., XXVI, 1894, p. 55 (of reprint), ♀.

This species differs from the preceding in its larger size (2–2.25 mm.), feebler sculpture, the absence of erect hairs on the body and the less shining petiolar node. The types are from St. Thomas.

37. *Tetramorium guineense* (Fabr.).

Formica guineensis FABRICIUS, Entom. System, II, 1793, p. 357, no. 31, ♀.

Myrmica bicarinata NYLANDER, Acta Soc. Sc. Fennic., II, 3, 1846, p. 1061, no. 10,

♀ ♀.

Myrmica cariniceps GUÉRIN, Rev. et. Mag. Zool. (2), IV, 1852, p. 79, ♀.

Myrmica kollari MAYR, Verh. zool. bot. Ver. Wien, III, 1853, p. 283, ♀ ♀ ♂.

Tetramorium kollari MAYR, *ibid.*, V, 1855, p. 425, no. 1.

Tetramorium cariniceps ROGER, Berl. Entom. Zeitschr., V, 1861, p. 171.

Myrmica reticulata F. SMITH, Trans. Entom. Soc. London (3), I, 1, 1862, p. 33, ♀.

Tetramorium guineense MAYR, Verh. zool. bot. Ges. Wien, XII, 1862, p. 740, no. 1.

Culebra.

Numerous workers found eating the ripe and broken fruit of the papaw (*Carica papaya*) on Monte Resaca, the highest point of the island.

38. *Tetramorium* (*Tetrogmus*) *simillimum* (F. Smith).

Myrmica simillima F. SMITH (*nec* Nylander) List Brit. Animals Brit. Mus., Pt. 6, Acul., 1851, p. 118, ♀.

Tetrogmus caldarius ROGER, Berl. Entom. Zeitschr., I, 1857, p. 12, ♀ ♀ ♂.

Myrmica (*Leptothorax*) *simillima* F. SMITH, Catalog. Brit. Foss. Hymen., 1858, p. 31, no. 10, ♀.

Myrmica caldaria MEINERT, Naturv. Afh. Dansk. Vid. Selsk. (5), V, 1860, p. 334 no. 28, ♀ ♀ ♂.

Tetramorium simillimum MAYR, Europ. Formicid., 1861, p. 61.

St. Thomas (Forel); Culebra; Porto Rico: Coamo Springs.

In Culebra a few colonies were found nesting under stones and logs on the beach, in Coamo Springs several colonies were seen under stones in the creek bottom near the baths.

39. *Wasmannia auropunctata* (Roger).

PLATE XII, FIG. 18.

Tetramorium ? *auropunctatum* ROGER, Berl. Entom. Zeitschr., VII, 1863, p. 182, no.

74, ♀ ♀ ♂.

Tetramorium auropunctatum FOREL, Bull. Soc. Vaud. Sc. Nat. (2), XX, 1884, p. 375, ♀.

Ochetomyrmex auropunctatus FOREL, Ann. Soc. Entom. Belg., XXX, 1886, C. R. p. xlix.

Tetramorium (Xiphomyrmex) auropunctatum FOREL, Mitth. Schweiz. Entom. Ges., VII, 10, 1887.

Wasmannia auropunctata FOREL, Trans. Entom. Soc. London, 1893, p. 383, ♀ ♂.

Culebra; Porto Rico: Utuado, Monte Morales, Monte Mandios, Adjuntas, Coamo Springs, Morro at San Juan; Vega Baja.

This little ant is common in all the localities above mentioned, nesting under stones, prostrate plantain trunks or logs in shady places, especially in the plantanals and cafetals. The larger dark colored males and females were found in several nests at Utuado and Monte Mandios (March 17 and 20). The workers in a colony are very numerous, and, as indicated by their pale yellow color, lead a hypogæic life. The nests are often established around the roots of plants, and in such situations I have seen the ants attending root-coccids, like the yellow *Lasii* of our northern States.

40. *Cryptocerus atratus* (L.).

Formica atrata LINNÉ, System. Natur., Ed. 12a, I, 2, 1758, p. 581, no. 15. ♀.

Formica quadridens DE GEER, Mém. Hist. Insect., III, 1773, p. 609, no. 7, tab. 31, figg. 17-20.

Cryptocerus atratus FABRICIUS, System. Piez., 1804, p. 418, no. 1.

St. Thomas (Forel).

It is very doubtful whether this large ant is really a native of St. Thomas. It is more probable that the specimen recorded by Forel had been introduced with plants from the tropical mainland.

41. *Cryptocerus minutus* Fabr.

FABRICIUS, System. Piez., 1804, p. 420, no. 5, ♀.

St. Thomas (Mayr).

42. *Strumigenys membranifera simillima* Emery.

EMERY, Bull. Soc. Entom. Ital., XXII, 1890, p. 69 (of reprint), tav. viii, fig. 5, ♀.

St. Thomas (Emery).

This subspecies, as Emery admits, is hardly distinguishable from the typical Italian form. "The head is a little narrower, especially in front, more distinctly impressed in the median line behind the clypeus, the antennal

funiculus is more slender, with the last joint just perceptibly longer than the preceding joints taken together."

43. *Strumigenys rogeri* Emery.

PLATE XII, FIG. 13.

Pyramica gundlachi ROGER, Berl. Entom. Zeitschr., VII, 1862, Pl. I, Fig. 18a, ♀ (nec ♂).

Strumigenys rogeri EMERY, Bull. Soc. Entom. Ital., XXII, 1890, p. 31 (of reprint), tav. vii, fig. 6, ♂.

St. Thomas (Emery); Porto Rico: Coamo Springs.

Numerous workers and females taken from several colonies nesting under stones in a nearly dry stream bottom behind the Coamo baths. The rediscovery of the female of this species shows that Emery was right in his contention that Roger had described two very different species under the name of *Pyramica gundlachi*. The females among my specimens agree perfectly with Roger's description and figure (Taf. I, Fig. 18a).

44. *Strumigenys eggersi* Emery.

EMERY, Bull. Soc. Entom. Ital., XXII, 1890, p. 32 (of reprint), tav. vii, fig. 9, ♂ ♀.

St. Thomas (Emery).

45. *Strumigenys louisianæ* Roger var. *obscuriventris* var. nov.

PLATE XII, FIG. 14.

Porto Rico: Utuado, Coamo Springs.

This variety differs from the typical form from Florida, Louisiana and Texas in having the gaster, except at the base, dark brown or black, and the ferruginous tint of the body in general darker. At Utuado a few isolated specimens of this variety were found under prostrate plantain trunks in rather damp places. At Coamo Springs several colonies, with their larvæ and pupæ were found nesting under small stones in the same creek bottom as *S. rogeri*, just back of the bath-houses. Misled by Roger's imperfect description, Emery redescribed *louisianæ* under the name of *unispinulosa* (Bull. Soc. Entom. Ital. XXII, 1900, p. 30, Tav. VII, Fig. 5), but he later detected the single preapical mandibular tooth in one of Roger's types and recognized *unispinulosa* as a synonym (Morph. Jahrb. Abth. f. Syst. VIII, 1894, p. 326).

The following table will serve for the identification of the workers and females of the preceding and other American species of *Strumigenys*, with the exception of *S. mandibularis* F. Smith, which was inadequately described, and may be the same as *S. smithi* Forel:

1. Mandibles long and slender, close together at their insertions, with only two borders, an internal and an external, usually parallel or subparallel and overlapped by the clypeus only at their bases 2
2. Mandibles shorter, some distance apart at their insertions, with three borders, i. e. with the internal border differentiated into a basal and a more apical (masticatory) border, and overlapped for a considerable distance by the anterior border of the clypeus 26
3. Inner borders of mandibles without teeth but with a series of minute denticles; (without denticles only in a variety of *eggersi*) 3
4. Inner borders of mandibles without teeth and denticles or with a few spine-like teeth 7
5. Antennal scapes suddenly incrassated near the middle; mandibles less than half as long as the head. Length 1.8-1.9 mm. (Brazil) . . . *crassicornis* Mayr. Antennal scapes gradually or not at all incrassated; mandibles more than half as long as the head 4
6. Mandibles straight, at least at the base; distinctly shorter than the head . . . 5
7. Mandibles curved outward just beyond the base and inward near the apex, as long as the head; inner border near the apex with 5-6 denticles; fourth funicular joint $1\frac{1}{2}$ times as long as broad. Length 1.7-1.8 mm. (Brazil) . . . *denticulata* Mayr.
8. Mandibles very slender, gradually tapering to their suddenly incurved tips; a little shorter than the head 6
9. Bases of mandibles with parallel sides as far as the middle, then curved outward somewhat; about $\frac{2}{3}$ as long as the head, with the apical curved inner border minutely denticulate. Length 2-2.2 mm. (Brazil) . . . *subdentata* Mayr.
10. Inner apical borders of mandibles with 6-7 minute denticles. Length 1.25-1.3 mm. (St. Thomas) *eggersi* Emery (typical)
11. Inner apical borders of mandibles without denticles; thorax more elongated; epinotal spines shorter; color darker. Length 1.7 mm. (St. Vincent) . . . var. *vincentensis* Forel.
12. Inner borders of mandibles without teeth or denticles 8
13. Inner borders of mandibles with at least one subapical tooth 10
14. Mandibles somewhat shorter than the head, parallel, very close together, turned up somewhat at their tips which have an upper simple and a lower bifurcated tooth, all of which are turned sharply inward at a right angle. Length 2 mm. (Cuba) *gundlachi* Roger.
15. Mandibles but little more than half as long as the head 9
16. Pronotum without a median longitudinal ridge. Length 2.2 mm. (Brazil) . . . *imitator* Mayr.
17. Pronotum with a median longitudinal ridge. Length 2 mm. (Panama) . . . *elongata* Roger.
18. Inner border of mandibles with a single subapical tooth 11
19. Inner border of mandibles with two separated or approximated teeth . . . 16

11. Mandibles curved outward in the middle, $\frac{3}{4}$ as long as the head. Length 1.7-2 mm. (Brazil) *unidentata* Mayr.
Mandibles straight 12
12. Mandibles only half as long as the head. Body ferruginous. Length 2-2.25 mm. 13
Mandibles more than half as long as the head. Body fuscous, with testaceous mandibles, legs and antennæ (Brazil). Length 3 mm. *fusca* Emery.
13. Hairs on head squamiform 14
Hairs on head not squamiform, but slender and pointed. Length 2.25 mm. (Bahamas) *lanuginosa* Wheeler.
14. Antennal scapes reaching only half way between the eyes and the posterior corners of the head 15
Antennal scapes longer. (Bolivia) *louisianæ* Roger var. *longicornis* Emery.
15. Uniformly ferruginous. Length 2.25 mm. (Southern States; Central America) *louisianæ* Roger (typical).
Gaster, except the base, dark brown or black (Porto Rico).
var. *obscuriventris* var. nov.
16. Mandibles arcuate, broad, with very convex outer border, especially toward their incurved tips; inner border with two long pointed teeth, of which the proximal is continued back as a somewhat translucent lamina. Length (of female) 5.4 mm. (Panama) *godmani* Forel.
Mandibles straight or slightly curved 17
17. Basal half of inner mandibular border dilated to form a knife-like lamina, beyond which the mandible is suddenly narrowed and furnished with a pair of long spine-like, subapical teeth. Length 3.3 mm. (Brazil) . *cultrigera* Mayr.
Mandibles without a basal dilatation or lamina 18
18. Epinotal declivity on each side without a spine, but with an erect translucent plate or lamina which bears a pair of angles or lobes on its free margin 19
Epinotal declivity without erect lamina 23
19. Mandibles longer than the head; second funicular joint but little longer than broad, the fourth more than four times as long as broad 20
Mandibles much shorter than the head; second and third funicular joints barely as long as broad, fourth joint barely three times as long as broad 21
20. Length of worker 3.6-3.8 mm.; of female 4-4.2 mm. (Brazil) *saliens* Mayr (typical)
Length of female 4.5 mm.; two preapical mandibular teeth much closer to the apical teeth than in the typical form. (Brazil) var. *procera* Emery.
21. Two subapical mandibular teeth of equal length 22
Distal tooth of the subapical pair shorter than the proximal (Brazil) *smithi* Forel var. *inæqualis* Emery.
22. Eyes not strongly convex; length 2.7-3 mm. (Brazil) . . . *smithi* Forel (typical)
Eyes strongly convex (Misiones) subsp. *prospiciens* Emery.
23. The two subapical mandibular teeth long, closely approximated and near the apical teeth 24
The two subapical mandibular teeth widely separated, the proximal one very small 25
24. Mandibles shorter than the head; antennal scapes not reaching to the posterior corners of the head. Length 1.6 mm. (Antilles) *rogeri* Emery.
Mandibles longer than the head; antennal scapes reaching to the posterior corners of the head. Length 3.8-3.9 mm. (Mexico) *cordovens* Mayr.

25. Mandibles nearly straight, with the small proximal tooth near the middle of the internal border. Length 1.7-1.8 mm. (Argentina) . . . *silvestrii* Emery.
Mandibles slightly curved outward near the middle, with the small proximal tooth near the basal third of the internal border. Length 1.5-1.6 mm. (Brazil) . . . *schmalzi* Emery.
26. Portions of the inner blades of the closed mandibles not covered by the anterior border of the clypeus, denticulate or toothed for only a part of their length . . . 27
Portions of the inner blades of the closed mandibles not covered by the anterior borders of the clypeus, denticulate or toothed throughout their entire length . . . 29
27. Clavate hairs of the anterior clypeal border erect and curved backward. Length 1.6-1.7 mm. (United States) . . . *ornata* Mayr.
Clavate hairs on the anterior clypeal border directed anteriorly . . . 28
28. Length 2.25-2.5 mm.; mandibles just in front of the clypeus with a long pointed tooth; anterior clypeal border with numerous (14-16) clavate hairs; head above covered with whitish squamiform hairs (United States) . . . *pergandei* Emery.
Length 1.5-1.6 mm.; mandibles at the base with a large tooth concealed under the border of the clypeus, which has fewer clavate hairs (10-12); appressed hairs on head not squamiform. (United States) . . . *pulchella* Emery.
29. Mandibular border minutely and uniformly denticulate . . . 30
Mandibular border with teeth often of unequal length . . . 32
30. Gaster entirely opaque, reticulate punctate; second and third funicular joints as long as broad. Length 1.8-2 mm. (St. Vincent; Texas) *margaritæ* Forel.
Gaster smooth and shining, at least behind; longitudinally striated in front . . . 31
31. Mandibles short; second and third funicular joints broader than long. Length 1.5 mm. (Pará) . . . *schulzi* Emery
Mandibles longer; second and third funicular joints as long as broad. Length 2-2.2 mm. (St. Vincent) . . . *alberti* Forel.
32. Clypeus with straight, transverse anterior border; mandibles as broad as long. Length 1.5 mm. (St. Thomas) . . . *membranifera* subsp. *simillima* Emery.
Clypeus with rounded anterior border; mandibles much longer than broad . . . 33
33. Clypeus longer than broad; proximal mandibular tooth long and acuminate, separated by a short but distinct sinus from the remaining teeth . . . 34
Clypeus not longer than broad; proximal mandibular tooth not acuminate and not separated by a sinus from the remaining teeth . . . 35
34. Clypeus covered with short squamiform hairs. Length 2.5 mm. (United States) . . . *clypeata* Roger (typical).
Hairs on clypeus curved but not squamiform (United States) . . . var. *pilinasis* Forel.
35. Greatest transverse diameter of head twice that of the clypeus. Length 1.7-1.8 mm. (Brazil) . . . *frederici-muelleri* Forel.
Greatest transverse diameter of head less than twice that of the clypeus . . . 36
36. Clavate hairs on antennal scapes and clypeus robust and cochleariform. Length 1.8 mm. (Salta) . . . *conspersa* Emery.
Clavate hairs on antennal scapes and clypeus slender. Length 2-2.5 mm. (United States) . . . *rostrata* Emery.

46. *Epitritus emmæ* Emery.

PLATE XI, FIG. 12 AND PLATE XII, FIG. 17.

EMERY, Bull. Soc. Entom. Ital., XXII, 1890, p. 33 (of reprint), tav. viii, fig. 6, ♀.

St. Thomas (Emery).

There is in my collection a winged female of this species from Havana, Cuba (C. F. Baker). It agrees very closely with Emery's description of the worker from St. Thomas. The wings are very hairy, grayish hyaline, with brown veins and stigma. The venation is very much like that of *Strumigenys pergandei* Emery.

47. *Atta* (*Trachymyrmex*) *jamaicensis* (Em. André).

Culebra.

Workers, females and males from several colonies. For the synonymy and for detailed taxonomic and ethological descriptions of this and the three following *Atti*, see my recent paper: 'The Fungus-growing Ants of North America,' Bull. Amer. Mus. Nat. Hist., XXIII, 1907, pp. 669-807, pll. xlix-liii, 31 text-figg.

48. *Atta* (*Mycocepurus*) *smithi* Forel var. *borinquenensis* Wheeler.

Porto Rico: Vega Baja, Arecibo, Utuado, Monte Mandios, Coamo Springs.

49. *Cyphomyrmex rimosus minutus* Mayr.

St. Thomas (Emery); Culebra; Porto Rico: Arecibo, Adjuntas, Utuado, Monte Mandios, Monte Morales, Coamo Springs.

50. *Myrmicocrypta brittoni* Wheeler.

Porto Rico: Santurce.

Subfamily DOLICHODERINÆ.

51. *Dolichoderus bispinosus* (Oliv.).

Formica bispinosa OLIVIER, Encycl. Method., Insect., VI, 1791, p. 502, no. 60, ♀.
Formica fungosa FABRICIUS, Suppl. Entom. System., 1798, p. 281, nos. 42 and 43, ♀.

Hypoclinea bispinosa MAYR, Verh. zool. bot. Ges. Wien, XII, 1862, p. 708, no. 8, ♀.

Hypoclinea vestita MAYR, *ibid.*, p. 707, no. 7, ♂.

Monacis bispinosa ROGER, Berl. Entom. Zeitschr., VI, 1862, p. 235, no. 2, ♀ ♀.

Polyrhachis arboricola NORTON, Proc. Essex. Inst., VI, 1868, p. 4, fig. ♂.

Dolichoderus bispinosus FOREL, Bull. Soc. Vaud. Sc. Nat. (2), XV, 1878, p. 386.

St. Thomas (Mayr).

52. *Tapinoma melanocephalum* (Fabr.).

Formica melanocephala FABRICIUS, Entom. System., II, 1793, p. 353, no. 13.

Lasius melanocephalus FABRICIUS, System., Piez., 1804, p. 417, no. 5.

Myrmica melanocephala LEPELETIER, Hist. Nat. Insect. Hymén., I, 1836, p. 185, no. 5.

Formica nana JERDON, Madras Journ. Lit. and Sci., XVII, 1851, p. 125, no. 44, ♀.

Myrmica pellucida F. SMITH, Journ. Proc. Linn. Soc., Zool., II, 1857, p. 71, no. 2, ♀.

Myrmica (Monomorium) pellucida F. SMITH, Catalog. Hymen. Brit. Mus., VI, 1858, p. 124, no. 41, ♂.

Formica familiaris F. SMITH, Journ. Proc. Linn. Soc., Zool., IV, 1860, Suppl. p. 96, no. 10, ♂.

Tapinoma melanocephalum MAYR, Verh. zool. bot. Ges. Wien, XII, 1862, p. 651.

St. Thomas (Forel); Culebra; Porto Rico: Arecibo, Utuado, Ponce, Tallaboa.

Several colonies nesting under stones and under the bark of trees. From a single colony on Culebra twenty-two dealated queens were taken.

53. *Tapinoma littorale* Wheeler.

WHEELER, Bull. Amer. Mus. Nat. Hist., XXI, 1905, p. 109, ♀ ♀ ♂.

Porto Rico: Monte Morales, Monte Mandios.

A few colonies comprising dealated females, males and workers were found in the hollow twigs of trees and bushes at an altitude of about 3000 feet. These specimens agree very closely with the types from Southern Florida and the Bahamas.

54. *Dorymyrmex pyramicus* (Roger) var. *niger* Pergande.

PERGANDÉ, Proc. Calif. Acad. Sci. (2), V, 1895, p. 871, ♂.

Porto Rico: Santurce, Arecibo, Utuado, Adjuntas, Ponce, Aibonito, Coamo Springs, Vega Baja.

This dark variety of the well-known neotropical *D. pyramicus* is common in sandy and sunny places in nearly all the localities visited in Porto Rico, but could not be found in Culebra.

55. *Iridomyrmex melleus* sp. nov.

PLATE XII, FIGS. 15 AND 16.

Worker. Length 2-2.25 mm.

Head oval, distinctly narrower in front than behind. Mandibles with two larger apical, and numerous minute basal teeth. Clypeal border straight and transverse in the middle, with a slight sinuous excision on each side. Frontal area and frontal groove obsolete. Antennæ slender, scapes surpassing the occiput by about a quarter of their length. Thorax long and narrow, longer than the head with the mandibles, broadest through the pronotum, which is convex and hemispherical, as long as broad. Mesonotum laterally compressed, somewhat less than twice as long as broad, flattened above and lower than the pronotum, separated by a sharp constriction from the epinotum which is bluntly protuberant, with a convex base rising rather abruptly from the constriction, and a somewhat longer and slightly concave, sloping declivity. Seen from above the epinotum is a little longer than broad, and a little broader than the mesonotum. Petiole about half as broad as the epinotum; scale oval from behind, and very distinctly inclined forward, so that its anterior slope is short and abruptly slanting from above backward and downward, its posterior slope much longer and gradually inclined. Gaster small, legs slender.

Surface of body smooth and rather shining, especially above. Mandibles with small scattered punctures.

Pubescence white, rather abundant, but short, covering the body and appendages, longest on the gaster. Pilosity reduced to a few slender, suberect, brown or black hairs on the gaster. In some specimens there are also a few such hairs on the head and thorax.

Honey yellow; gaster and funiculus, excepting its first joint, fuscous. Mandibular teeth and margin of clypeus reddish.

Female. Length 4.5-5 mm.

Head differing from that of the worker in having more prominent posterior, corners and a distinctly and broadly excised posterior margin. Eyes and ocelli large, the former flattened. Thorax through the wing insertions broader than the head through the eyes, narrowed in front and behind, about twice as long as broad. Mesonotum as broad as long. Epinotum thick and convex, with base rounded above and on the sides, passing into the but little sloping declivity without a distinct angle. Petiole short with an erect scale, much compressed anteroposteriorly, its upper border rounded and rather thin. Gaster elongate elliptical. Wings very long (4.5 mm.).

Surface of body and appendages more opaque than in the worker, with denser, longer, white pubescence.

Coloration like that of the worker but the yellow shade is a little deeper and more reddish. There is a small deep black spot on each side of the mesonotum near the insertion of the fore wing, and the base and posterior margin of each gastric segment is yellowish. Wings grayish hyaline, with pale brown veins and stigma.

Male. Length 1.3-1.5 mm.

Head resembling that of the worker, with well-developed, minutely denticulate mandibles, but with larger eyes and prominent ocelli. Antennæ with short scapes

which are incrassated and abruptly bent at their tips; funicular joints rapidly decreasing in length distally, the first joint being fully five times as long as broad and as long as the scape, the second joint a little shorter, the terminal joints barely longer than broad. Thorax resembling that of the female, somewhat broader than the head; mesonotum flattened above and not very high above the pronotum. Petiole with an erect, low, thick scale, which is blunt and rounded above. Gaster small, elliptical, flattened above, with prominent rounded genital appendages. Legs slender.

Sculpture, pubescence and coloration like that of the worker. Gaster without hairs. Head infuscated, especially behind. Genitalia yellowish, legs and antennæ whitish. Wings grayish hyaline, with pale gray veins.

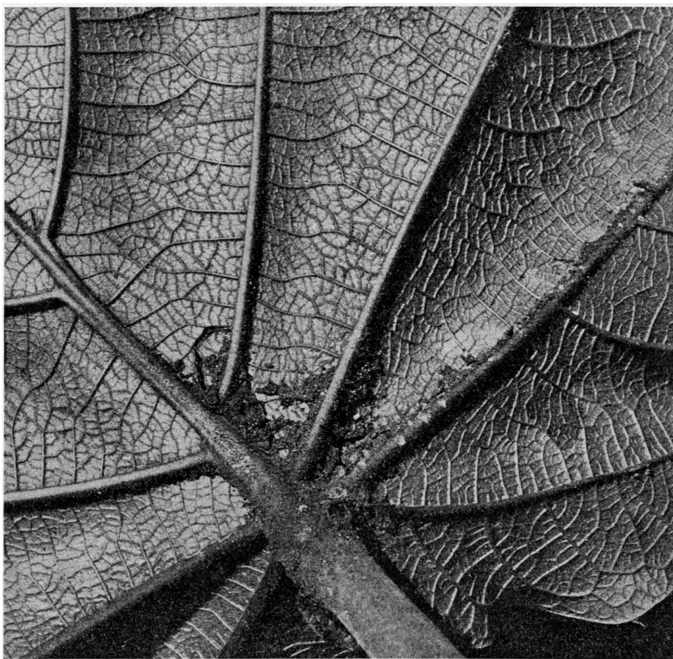


Fig. 3. Nest of *Iridomyrmex melleus* built of earth and vegetable débris along the leaf veins of *Coccoloba rugosa*; about $\frac{1}{2}$ natural size. (Photograph by the author).

Porto Rico: Arecibo, Utuado, Monte Morales, Monte Mandios, Coamo Springs, Vega Baja.

This species belongs to the same group as the other American species of *Iridomyrmex*, viz: *humilis* Mayr, *iniquus* Mayr and *despertitus* Forel, and is very closely related to the two latter, but differs in coloration, smaller size, thinner and more collapsible integument, and in having the petiole lower, longer and more distinctly inclined forward. The thorax, too, is

longer and more slender and the epinotum is somewhat less bulky and protuberant. It is not improbable that *Plagiolepis flavidula* Roger of Cuba may be some variety or subspecies of the form here described, but Roger's description is too meager to permit of identification.

I. melleus is one of the commonest ants in the mountains of Porto Rico and is distinctly arboreal. It nearly always nests in hollow twigs. Near Utuado I found it nesting also between the clasping leaf-petioles of plantains, and in the same locality several colonies had built small nests of friable carton (earth mixed with vegetable debris) on the under sides of the huge reniform leaves (sometimes a meter in diameter!) of the "ortegon" (*Coccoloba rugosa*). As these structures, which were built in the angles formed by the thick veins with the leaf-membrane (Fig. 3) contained the brood as well as the ants, they can not be regarded as aphid sheds. The workers of *I. melleus* run very rapidly. They do not have the "Tapinoma odor" so characteristic of many Dolichoderinae.

56. *Iridomyrmex melleus* var. *fuscescens* var. nov.

Porto Rico: Monte Morales, Monte Mandios.

Workers from a few colonies found in the primeval forests on the summits of these mountains differ from those of the typical *melleus* in having the body and appendages fuscous, the gaster black, the mandibles yellow and the tarsi whitish. In pubescence, pilosity and sculpture they resemble the typical form.

Subfamily CAMPONOTINÆ.

57. *Brachymyrmex heeri* Forel.

FOREL, Denkschr. schweiz. Ges. Naturw., XXVI, 1874, p. 91, taf. i, fig. 17, ♂.

St. Thomas (Forel); Culebra; Porto Rico: Santurce, Utuado.

Several workers from small colonies under stones.

58. *Brachymyrmex heeri* var. *obscurior* Forel.

FOREL, Trans. Entom. Soc. London, 1893, p. 345, ♂ ♀ ♂.

Porto Rico: Santurce, San Juan.

A darker form of the preceding, with very similar but apparently more epigæic habits.

59. *Prenolepis longicornis* (Latr.).

Formica longicornis LATREILLE, Hist. Nat. Fourmis, 1802, p. 113, ♀.

Formica vagans JERDON, Madras Journ. Lit. and Sci., XVII, 1851, p. 124, no. 41, ♀ ♀.

Formica (Tapinoma) gracilescens NYLANDER, Ann. Sc. Nat. Zool. (4), V, 1856, p. 73, no. 34, tab. iii, fig. 20.

Paratrechia currens MOTSCHULSKY, Bull. Soc. Natural. Moscou, XXXVI, 3, 1863, p. 14.

Prenolepis longicornis ROGER, Verz. d. Formicid., 1863, p. 10, no. 313.

St. Thomas (Forel); Culebra; Porto Rico: San Juan, Santurce, Arecibo, Utuado, Adjuntas, Ponce, Tallaboa, Coamo Springs.

Very common in houses, gardens and fields.

60. *Prenolepis vividula* (Nylander).

Formica vividula NYLANDER, Acta Soc. Sc. Fennic., II, 3, 1846, p. 900, no. 4. taf. 18, fig. 2, ♀ ♀ ♂.

Prenolepis vividula MAYR, Europ. Formicid. 1861, p. 52; EMERY, Ann. Soc. Entom. Belg., L, 1906, p. 130, figg. 1-4, ♀ ♀ ♂.

Culebra; Porto Rico: Monte Mandios, Monte Morales, Utuado.

The identity of this species, originally described by Nylander from specimens taken in the hot-houses of the botanical garden of Helsingfors and since found in similar places in various parts of Europe, has been recently established by Emery. An examination of Nylander's types from the Helsingfors Museum has enabled him to trace the species to America. He is inclined to regard Mexico as its original home. I had described a very similar form from Texas as *P. melanderi* and this Emery now regards as a subspecies of *vividula*. As a number of workers, two females and two males from the above mentioned localities in Culebra and Porto Rico agree very closely with Emery's description and figures and with my types of *melanderi*, I do not hesitate to assign them to the same species. It is quite probable, therefore, that *vividula* is widely distributed in the West Indies, and that it first reached Europe with orchids and other plants from this source rather than from Mexico.

61. *Prenolepis steinheili* Forel.

Prenolepis nodifera FOREL (nec Mayr), Mitth. Münch. Entom. Ver., V, 1, 1881, p. 2, no. 2, ♀.

Prenolepis steinheili FOREL, Trans. Entom. Soc. London, 1893, p. 342, ♀.

St. Thomas (Forel); Porto Rico: Adjuntas, Santurce.

Two workers agreeing very closely with typical specimens received from Professor Forel.

62. *Myrmelachista ambigua ramulorum* subsp. nov.

PLATE XI, FIGS. 9 AND 10.

Worker. Length 2-2.3 mm.

Head a little longer than broad, suboblong, with slightly concave posterior border and slightly convex sides. Eyes flattened, near the middle of the head. Mandibles 5-toothed, the first, second and fourth tooth longest. Clypeus narrow, convex, with rounded anterior border, projecting in the middle. Frontal area large, very shallow and indistinct. Frontal groove short. Antennæ short, 9-jointed; tips of scapes reaching only a short distance behind the eyes; first funicular joint nearly as long as the combined four succeeding joints, which are small and much broader than long; terminal joint as long as the two preceding joints of the club together. Pro- and mesonotum hemispherical from above, a little longer than the epinotum; mesoepinotal constriction pronounced on the sides, shallower above; epinotum longer than broad, narrowed in front, its basal surface somewhat flattened, in profile passing through a rounded angle into the shorter, sloping declivity. Petiole from above $1\frac{1}{2}$ times as long as broad, scale distinctly inclined forward, thick below but becoming more attenuated above in profile; its upper border from behind transverse and feebly excised in the middle. Gaster elliptical. Legs rather stout, with somewhat incrassated femora.

Glabrous and shining. Mandibles subopaque, finely and sparsely punctate. Sides of head with a few coarse, scattered piligerous punctures. Gaster very feebly and finely reticulate.

Hairs yellow, suberect and sparse, longer on the body, shorter on the legs and antennal scapes; on the scapes confined to the anterior surface. Pubescence absent.

Yellowish red; gaster black, with narrow pale margins to the segments; head black behind shading into red on its anterior third. Antennæ and legs yellow; the clubs of the former and the middle portions of the femora, more or less infuscated.

Female (deälated). Length 3.3-3.5 mm.

Head $1\frac{1}{2}$ times as long as broad, oblong, with straight posterior and straight, parallel lateral borders. Eyes large, flattened, a little in front of the middle of the head. Mandibles and antennæ like those of the worker, but the first funicular joint is much shorter than the four succeeding joints together. Thorax regularly elliptical from above, nearly twice as long as broad, broader than the head; in profile flattened above. Epinotum small and sloping, without distinct basal and declivous surfaces. Petiole resembling that of the worker, but with a proportionally lower and much blunter node.

Pilosity like that of the worker.

Color variable, judging from two specimens; in one it is like that of the worker, but with the mesonotum and pleuræ dark brown; in the other (possibly immature) the head and thorax are reddish yellow, with only the ocellar triangle blackened.

Male. Length 2-2.3 mm.

Head through the eyes broader than long, rounded behind, with short cheeks and moderately convex eyes and ocelli. Mandibles with two teeth, the apical smaller

and more acute than the basal. Antennæ 10-jointed, resembling those of the worker but with the club 4- instead of 3-jointed; scapes long, first funicular joint incrassated, as long as the three succeeding joints together; three basal joints of club subequal, longer than broad, terminal joints as long as the two preceding joints together. Thorax very broad and robust, nearly twice as broad as the head, elliptical, about $1\frac{1}{2}$ times as long as broad. Mesonotum rounded in front, much higher than the small pronotum, much flattened above and behind. Epinotum small, with a distinct but rounded angle between the subequal base and declivity. Petiole with a low, blunt node. Gaster elongate elliptical, flattened above, with prominent genital valves, the outer pair being triangular, twice as long as broad at the base and rounded at the tip, the median pair slender, linear and directed downward and forward, the inner pair very long, cultrate, directed backward and turned upwards at their tips. Legs slender, femora not incrassated.

Sculpture like that of the worker and female.

Body and appendages, with the exception of the antennal funiculus destitute of hairs and pubescence.

Piceous; mandibles, legs, antennæ, scutellum, petiole and genitalia, except the outer valves, sordid yellow. Wings whitish hyaline, with very pale yellow veins.

Culebra; Porto Rico: Arecibo, Utuado.

This subspecies differs from the typical form of the species, described by Forel from a single worker taken in St. Vincent, in having the body more glabrous and of a much darker color and in the deeper mesoepinotal constriction. It nests in rather populous colonies in the hollow twigs of trees, especially in the sea-grape (*Coccoloba uvifera*) and "torchuelo" (*Bucida buceros*). The workers move about in long files.

63. *Camponotus ustus* Forel.

FOREL, Bull. Soc. Vaud. Sci. Nat. (2), XVI, 1879, p. 75, ♀ ♀ ♂.

St. Thomas (Forel); Culebra; Porto Rico: Morro at San Juan, Utuado, Monte Mandios.

This species is rather common, nesting like the allied *C. inæqualis* of the Bahamas and Cuba, in the hollow twigs of the sea-grape (*Coccoloba uvifera*). In Culebra one colony was found nesting in the ground under a block of beach-worn coral. The workers and females, of which a considerable number were collected, agree very well with Forel's description.

64. *Camponotus sexguttatus* (Fabr.).

Formica sexguttata FABRICIUS, Entom. System, II, 1793, p. 354, ♀.

Formica ruficeps FABRICIUS, System. Piez., 1804, p. 404, ♂.

Formica bimaculata F. SMITH, Catalog. Hymen. Brit. Mus., VI, 1858, p. 50.

Formica albofasciata F. SMITH, Trans. Ent. Soc. London (3), I, 1862, p. 29.

Formica (*Camponotus*) *ruficeps* ROGER. Berl. Entom. Zeitschr., 1862, p. 265.

Camponotus ruficeps MAYR, Sitzb. Akad. Wiss. Wien, LXI, 1870, p. 373.

Camponotus sexguttatus EMERY, Boll. Mus. Zool. Torino, IX, 1894, p. 1.

Santa Cruz (Pflug, Fabricius); St. Thomas (Emery); Culebra; Porto Rico: Fajardo (Busck), Morro at San Juan, Coamo Springs.

The female specimen on which Fabricius based this beautiful species, came from Santa Cruz, one of the Virgin Islands. It has since been found to be widely distributed through tropical America. Forel has described its habits and figured its nest in *Biologia Centr. Amer. Hymen. III*, 1899-1900, p. 155, Pl. II, Fig. 6. "It lives either in hollow twigs of trees and bushes, in bark, or in nests of coarse, loose carton, which it builds around the stems of grasses in the savannahs by agglutinating the thread-like particles of grasses and other débris. These nests are very primitive and not very populous. They resemble the webs mixed with débris constructed by certain spiders. I observed these nests in Martinique, but never in Barbados, where the same species lives in hollow stems and under bark, never in carton." In Culebra and Porto Rico I also failed to find any carton nests of *C. sexguttatus* but found it repeatedly in hollow twigs, especially of the sea-grape. It uses a small amount of carton, however, in constructing at the end of the broken twig a diaphragm which has a round opening to serve as an entrance. Sometimes the diaphragm is flat, (Fig. 4a) in other cases produced as a cone (Fig. 4b). At Coamo Springs a number of workers were seen on the flowers of *Serjeania lucida*.

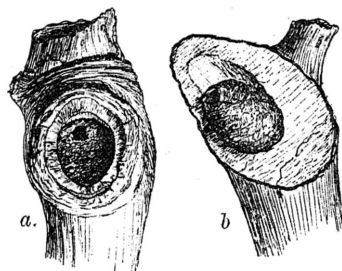


Fig. 4. Ends of broken twigs of Sea-grape (*Coccoloba uvifera*) showing carton diaphragms of *Camponotus sexguttatus* Fabr., with circular entrances.

65. *Camponotus saussurei* Forel.

FOREL, Bull. Soc. Vaud. Sci. Nat. (2), XVI, 1879, p. 103, taf. i, fig. 3, ♂.

St. Thomas (Forel).

I reproduce Forel's figure (Pl. XI, Fig. 11) of this, the most aberrant of the American *Camponoti*, as it is known from only a single worker. It should be diligently sought by the myrmecologist who has an opportunity to collect in St. Thomas. It measures 4.6 mm. and is black, with the mandibles and tarsi reddish. The body is covered with erect whitish hairs, some of which bordering the petiole and on the flexor surfaces of the femora are described as "thick, rigid and fusiform." It is, in all probability, an arboreal species.

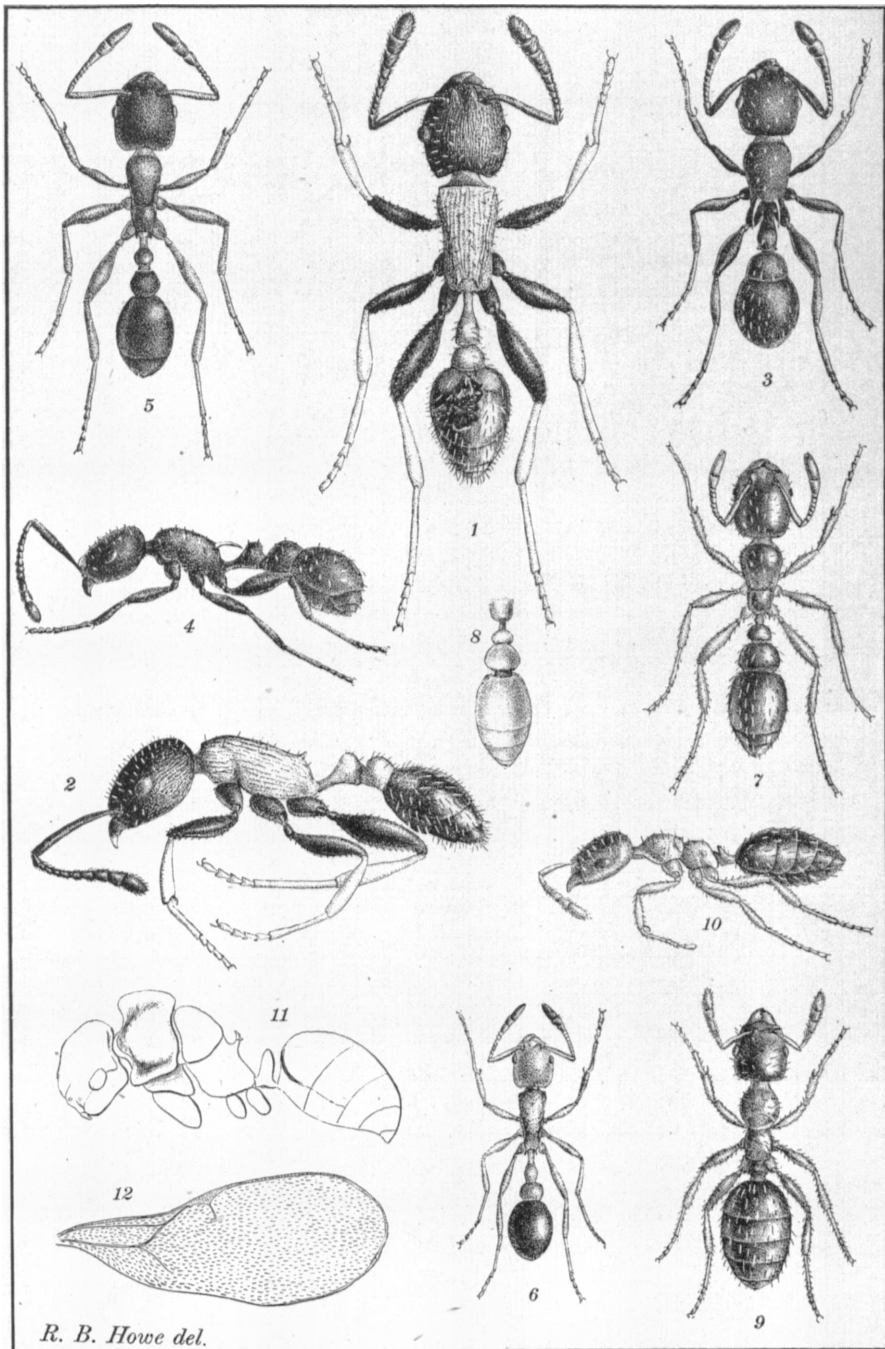
EXPLANATION OF THE PLATES.

PLATE XI.

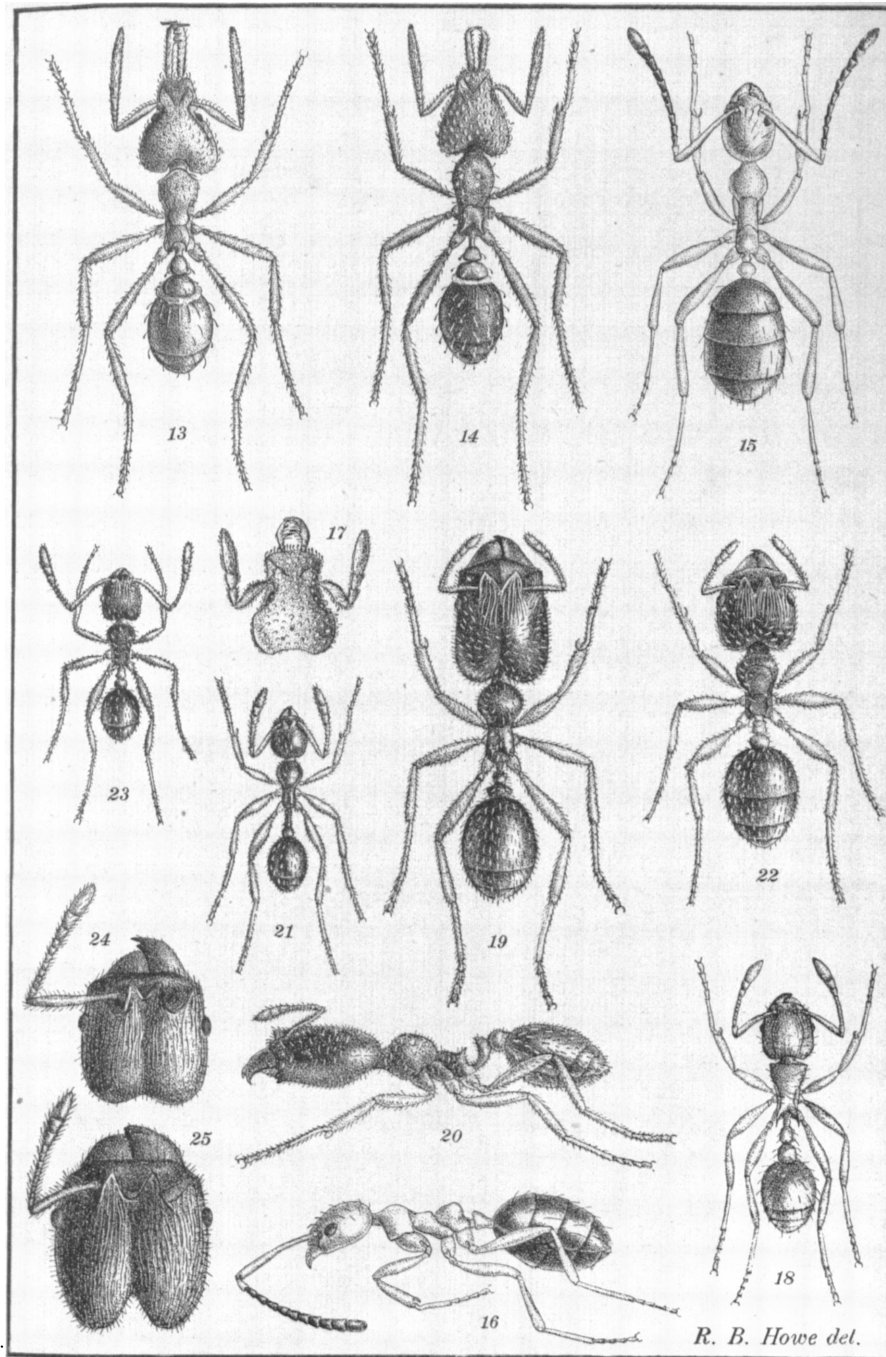
- Figs. 1 and 2. *Macromischa isabellæ* sp. nov. Worker.
Figs. 3 and 4. *Macromischa albispina* sp. nov. Worker.
Fig. 5. *Cardiocondyla venustula* sp. nov. Worker.
Fig. 6. *Cardiocondyla emeryi* Forel. Worker.
Fig. 7. *Solenopsis globularia* F. Smith var. *borinquenensis* var. nov. Worker.
Fig. 8. *S. globularia lucayensis* subsp. nov. Abdomen of worker.
Figs. 9 and 10. *Myrmelachista ambigua ramulorum* subsp. nov. Worker.
Fig. 11. *Camponotus saussurei* Forel. Worker. (After Forel.)
Fig. 12. *Epitritus emmæ* Emery. Wing of female.

PLATE XII.

- Fig. 13. *Strumigenys rogeri* Emery. Worker.
Fig. 14. *Strumigenys louisianæ* Roger var. *obscuriventris* var. nov. Worker.
Figs. 15 and 16. *Iridomyrmex melleus* sp. nov. Worker.
Fig. 17. *Epitritus emmæ* Emery. Head of female.
Fig. 18. *Wasmannia auropunctata* Roger. Worker.
Figs. 19 and 20. *Pheidole subarmata* Mayr. var. *borinquensis* var. nov. Soldier.
Fig. 21. Worker of the same.
Fig. 22. *Pheidole mærens* sp. nov. Soldier.
Fig. 23. Worker of same.
Fig. 24. *Pheidole fallax jelskii* var. *antillensis* Forel. Head of soldier.
Fig. 25. *Pheidole fallax* Mayr (typical). Head of soldier.



PORTO RICAN ANTS.



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