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THE MUTILLID WASPS OF THE GENUS TIMULLA WHICH OCCUR IN NORTH AMERICA NORTH OF MEXICO*

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The Mutillid wasps discussed in this paper form a part of the genus *Timulla* Ashmead. The species of this genus occurring in North America north of Mexico have long been a problem to students of Mutillidae not only as to their generic affinities but especially with regard to the recognition, diagnosis and relationships of the various species. The latter difficulty has been especially acute in the case of the female sex. The two sexes are so different in appearance that they have been described as different species and the two sexes of a single species have been correlated heretofore in only a few instances. The identification of the described females has been exceedingly difficult on account of the failure to recognize the morphological criteria by which they may be separated. This state of affairs was well expressed by Bradley (1916) as follows: "The only character by which I have been able to separate the females is the shape of the thorax, and this cannot be expressed in a key with sufficient exactness to make it probable that it can be used for identification of specimens without a series for comparison. The structure of the pygidium varies from entirely smooth to granular and through various stages of wrinkling to rugose. I cannot conclude that its differences are specific; nor are those found in the carina of the petiole."

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During the past eight or nine years I have been able to bring together several thousand specimens of this genus collected in the United States and Canada. A study of this material has shown that the species can be readily separated in the female sex and that several of the species of males previously thought to represent single species were in reality composite and represented two or more species or subspecies. A number of nomenclatorial problems have been encountered which made the study of the type material imperative. All of the type specimens have been seen with the exception of the species described by Say. The types of Fabricius, Lepeletier de Saint-Fargeau and F. Smith were examined while studying in Europe as a Fellow of the John Simon Guggenheim Memorial Foundation. It was found that the two species described by Fabricius had not been recognized as belonging to this genus and the one described by Lepeletier had been misidentified. I have also studied the types of all the species described from Mexico since the species occurring in Texas, New Mexico and Arizona undoubtedly extend their distribution to a greater or less degree into that country and duplication of descriptions of the same species might possibly exist.

The results of the study of the material mentioned above are presented herewith and include keys for the separation of species adapted for each sex; nomenclatorial changes resulting from the correlation of the two sexes and other causes; historical synonymy for each species; description of new species and subspecies; maps indicating the geographical distribution of many of the species; figures illustrating certain salient characters of the males; a bibliography of the literature pertaining to the species treated, and certain other minor notes.

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Genus *Timulla* Ashmead

Mutilla subgenus (*Mutilla*) (Division I) Blake, Trans. Amer. Ent. Soc., vol. 3, 1871, p. 227.

Mutilla (Division I) Blake (part), Trans. Amer. Ent. Soc., vol. 13, 1886, pp. 194, 281.

Mutilla Cresson (part), Trans. Amer. Ent. Soc., suppl. vol., 1887, p. 263.

Timulla Ashmead, Journ. New York Ent. Soc., vol. 7, 1899, p. 55.

Mutilla (group *hexagona*) Fox, Trans. Amer. Ent. Soc., vol 25, 1899, p. 269.

Mutilla (Division I) Blake (part), Trans. Amer. Ent. Soc., vol. 42, 1916, pp. 199–214.

Genotype.—*Mutilla dubitata* Smith, only species originally included by Ashmead.

Diagnostic characters of males: Eyes large, strongly ovate, deeply emarginate within; first abdominal segment small and gradually dilated to the apex, completely sessile with the second segment, not at all transversely developed; tegulae large, conchiform; vertex rounded throughout, not elevated nor flattened, punctate throughout, not at all longitudinally striato-punctate; felt lines present on second abdominal tergite only, not present on the second sternite; distance between origin of vein M on vein R and the base of the stigmatic cell equal to or less than the length of the latter.

Diagnostic characters of females: Eyes strongly ovate; first abdominal segment small and gradually dilated to the apex, completely sessile with the second, not at all transversely developed; dorsum of thorax rectangular in outline; pygidial area present and well-defined; second abdominal tergite maculated with two spots or lines of pale glittering pubescence.

The genus *Timulla,* as defined above, not only includes all the New World species for which the genus was erected, but also those species belonging to *Trogaspidia* Ashmead which occur in Africa, Asia, Australia and the Islands of the Pacific Ocean. I have pointed out (1933) that no structural basis has been found that will serve to separate *Trogaspidia* from *Timulla,* although no intensive and critical study has been made to discover such characters. The genus *Trogaspidia* was originally erected to include certain African species in the male sex which have the scutellum gibbose rather than evenly convex, but many Asiatic species assigned to this genus have the scutellum evenly convex, while certain South American species assigned to *Timulla* have the scutellum gibbose. I am therefore retaining both names for the present as subgeneric categories of the genus *Timulla,* the subgenus *Timulla* to include the New World species, and the subgenus *Trogaspidia* to include the Old World species.

Subgenus *Timulla* Ashmead

As early as 1836 Thomas Say recognized that his species *hexagona* together with one or two others differed from other North

American Mutillidae in having emarginate eyes, but assumed that they belonged to the genus *Mutilla*, an Old World genus, and described them as such. Later, Blake (1871) proposed to separate the North American species of *Mutilla* into two subgenera, *i.e.*, *Mutilla* for those with emarginate, ovate eyes, and *Sphaerophthalma* for those with circular, non-emarginate eyes. The subgenus *Mutilla* was again subdivided into two divisions, the first including those with the first abdominal segment small, but gradually dilated to the apex and completely sessile with the second segment (the species discussed in this paper). In a second paper Blake (1886) continued the usé of these same terms but elevated his subgenera to generic rank and assumed that the species he assigned to *Mutilla* were congeneric with the Old World species assigned to that genus. Ashmead (1899) proposed the new genus *Timulla* with *Mutilla dubitata* Smith as genotype. *Timulla* by definition included those species which Blake had included in his "Division I" of Mutilla. Fox (1899) apparently had his manuscript finished before the publication of Ashmead's paper and treated the same group of species as "group *hexagona*" of the genus *Mutilla*. André (1903) reduced *Timulla* to a synonym of *Mutilla* L. and restored all the species to that genus. Bradley (1916) used *Timulla* as a subgenus of *Mutilla* in his revision of the group.

The males of the New World species of *Timulla* (subgenus *Timulla*) not only differ from *Mutilla* L. in the form of the first abdominal segment but also differ in the form of the genitalia. The females of *Timulla* (*Timulla*) differ from those of *Mutilla* L. in the form of the first abdominal segment, and in the type of pattern of pale pubescent markings. *Timulla* is not at all closely related to *Mutilla* but has close affinities with the Old World species of *Trogaspidia*. I consider the genus *Timulla* as a valid genus with cosmopolitan distribution and use the subgenus *Timulla* to include all the New World species.

The present paper deals with all the known species occurring in North America north of Mexico. A future paper will treat all the Mexican, Central American, South American and West Indian species. All of the species treated herein have the scutellum nongibbose, slightly and evenly convex in the males. All of the females have the head entirely ferruginous. A large percentage of the nearctic female *Timullas* have black heads and many of the nearctic males have the scutellum gibbose.

The morphological characters of the males which are most useful

in the diagnosis of the species occurring north of Mexico are as follows: form of the last abdominal tergite; a median, elongate, glabrous area is present on this tergite which terminates in various types of carinae, in tubercles, or is sloped off to the distal margin of the tergite; the distal margin of the last tergite may be emarginate medially as in *leona* or not; the sixth, seventh, and eighth sternites, as well as the hypopygium, may be armed with tubercles or ridges, and the presence or absence of these tubercles is important; the form of the scape is modified in many species; what may be considered normal is a more or less cylindrical, arcuate scape which is bicarinate beneath; a number of species, of which *vagans* is typical have the terminal portion of the scape dilated and flattened, with a single strong carina beneath and provided beneath at the tip with a thick brush of pale, glittering hairs; some species have the mandibles simple, not excised and without a strong tooth beneath, others have the mandibles deeply excised beneath and with a strong tooth near the base beneath; the form of the median area of the clypeus is diagnostic in many cases; one group of species represented by *sayi* Blake has this area subtriangular and almost flat, others such as *vagans* have the same area transversely concave and the posterior elevated margin of the area arcuate; in many species the posterior, inner angle of the middle coxae bears an acute tooth while others have the middle coxae unarmed; additional minor characters are the color of the wings, comparative lengths of first and second segments of the flagellum, form of the first segment of flagellum, sculpture of the propodeum, presence or absence of mesosternal tubercles, color of calcaria, color and distribution of pubescence, color of integument, and finally the size of the ocelli.

It is peculiar that certain male Mutillidae and Myrmosidae which are nocturnal and are attracted to lights all have enormous ocelli, although there is apparently no morphological evidence to indicate that the function of the ocelli is related to the amount of light available. Nevertheless, the mutillids belonging to the genus *Photopsis* (sens lat.), and the myrmosids of the genera *Brachycistis* and *Chyphotes* are all nocturnal, are attracted to lights, and all have enormous ocelli. Most of the species of *Timulla* are apparently diurnal and have small ocelli, but certain species such as *sayi, hollensis, subhyalina, ocellaria* and *huntleyensis* have very large ocelli and many specimens of these species are before me which bear labels "taken at light." Here is a group of species in which part are diurnal as far as we know and which have small ocelli, while another group which have large ocelli have been taken at lights at

night. What is the significance of this apparent correlation between large ocelli on the one hand, and nocturnal habits and positive phototropism on the other?

The genitalia of the males discussed herein have all been examined and studied. The genitalia *in toto, i.e.,* removed from the abdomen but not dissected apart do not offer any characters of specific value. The genitalia of each species was therefore dissected into its various parts and mounted on slides. A study of these slides has shown that while the genitalia exhibit subtle specific differences, the latter are by no means as useful in a diagnostic way as the external morphological differences of the body. I (1934) found in a study of the Mutillidae of the Philippine Islands that those species of *Timulla* (*Trogaspidia*) having a gibbose scutellum had decidedly asymmetrical genitalia, *i.e.,* the two halves of the uncus were unlike and were modified in such a way as to present obvious specific and even subspecific differences. On the other hand those Philippine species of the same genus which have a non-gibbose scutellum had the two halves of the uncus symmetrical or only very weakly asymmetrical. These latter species invariably have the fifth, sixth and seventh sternites as well as the hypopygium simple, without tubercles or ridges. Our American species of *Timulla* (*Timulla*) discussed herein have a non-gibbose scutellum, and have the two halves of the uncus weakly asymmetrical, but have well developed tubercles on one or more of the above mentioned sternites and ridges on the hypopygium.

The morphological characters of the females most useful for diagnosing species are as follows: relative widths of the thorax anteriorly and posteriorly, in *ferrugata* the thorax is wider posteriorly than anteriorly, in others the two widths are the same, while in *navasota* the thorax is narrower posteriorly than anteriorly; the sides of the dorsum of the thorax may be parallel and not emarginate, or they may be distinctly emarginate medially; sculpture of the pygidium; presence or absence of the scutellar scale; presence or absence of a mesonotal-scutellar suture; puncturation of the second abdominal tergite, pubescent pattern of the dorsum of the abdomen; color of pubescence at the distal margin of the first tergite, and the color of the terminal abdominal segments.

For some reason which is not readily apparent the males and females of the genus *Timulla* are taken more often in copula than the two sexes of any other group of Mutillidae. This fact together with an abundance of available material has enabled me to correlate the two sexes of the majority of the species. Bradley (1916) was

able to correlate the two sexes of four species; I have been able to correlate the two sexes of fourteen species and subspecies from the material before me. Our knowledge of host relationships is very deficient; nothing whatever is known about the hosts of any of the New World species. *Timulla* (*Trogaspidia*) *minor* subsp. *minor* Ashmead has been reared from *Tiphia lucida* Ashmead in the Philippine Islands, but not a single New World *Timulla* has ever been reared from its host so far as is known.

KEY TO THE SPECIES OF TIMULLA

Males

1. Distal margin of last abdominal tergite distinctly emarginate medially 2
   Distal margin of last abdominal tergite not emarginate medially 3
2. Median, impunctate area of last tergite terminating in a transverse, arcuate carina; tegulae sparsely, pale pubescent ..... *leona* (Blake)
   Median, impunctate area of last tergite terminating in an inverted U-shaped carina, the sides of the U diverging, not parallel; tegulae thickly, pale pubescent ..... tyro n. sp.
3. Wings conspicuously banded, that is, fuscous with a median, transverse, hyaline band 4
   Wings subhyaline to fuliginous but not transversely banded as above 5
4. Scape with a strong, sharp carina beneath, without a brush of hairs, but with sparse, white hairs beneath; first segment of flagellum compressed but not noticeably broader than the following segments; clypeus without a median tubercle near its anterior margin ..... *ornatipennis* (Bradley)
   Scape not carinate, but with a very dense brush of long, white pubescence; first segment of flagellum very broad and flat, much broader than the following segments; clypeus with a median tubercle near its anterior margin ..... *barbata* (Fox)
5. Last abdominal tergite with a low, median, longitudinal, impunctate ridge, not elevated posteriorly, but terminating in a pair of obscure, almost obsolete tubercles, and continued to the distal margin by a low, sharp, median carina ..... *ferrugata* (Fabricius)
   Last abdominal tergite with a high, median, angulate keel posteriorly, or with a median, impunctate, glabrous ridge terminating in the arms of a Y-shaped carina 6

6. Last abdominal tergite with a high, median, keel posteriorly, the dorsal and caudal lines of which form a right angle 7
   Last abdominal tergite with a median, impunctate, glabrous ridge terminating in the arms of a Y-shaped carina 8
7. Calcaria pale; head, pronotum and anterior half of mesonotum clothed with pale pubescence.
   navasota subsp. *navasota* (Bradley)
   Calcaria dark brown; head, pronotum and mesonotum clothed for the most part with black pubescence.
   navasota subsp. **nebulosa** n. subsp.
8. Fifth and sixth abdominal sternites each with a pair of well developed lateral tubercles, while the seventh sternite and the hypopygium have oblique, low carinae 9
   Fifth sternite without lateral tubercles, and sometimes the sixth sternite without lateral tubercles 10
9. Pronotum, mesonotum, scutellum and sometimes propodeum more or less ferruginous ..... *dubitata* subsp. *dubitata* (Smith)
   Thorax entirely black ..... *dubitata* subsp. **fugitiva** n. subsp.
10. Mandibles distinctly excised beneath and with a conspicuous tooth beneath near the base 14
    Mandibles not excised beneath, although sometimes shallowly emarginate, never with a conspicuous tooth beneath near the base 11
11. Mesosternal tubercles well developed and oblique in position; sternites six and seven with strong, prominent lateral tubercles; median area of clypeus transversely concave, the posterior elevated margin arcuate 12
    Mesosternal tubercles absent; sixth sternite without lateral tubercles, the seventh with only rudimentary lateral tubercles; median area of clypeus triangular, flat, scarcely at all concave 26
12. First segment of flagellum and the proximal half of the second strongly compressed and broadened, the first segment distinctly longer than the second; scape without a pubescent brush beneath; propodeum very coarsely reticulate ..... **compressicornis** n. sp.
    First and second segment of flagellum cylindrical, not compressed or broadened, the first slightly shorter than the second; scape with a thin brush of pale pubescence beneath; propodeum moderately reticulate 13
13. Pubescence of vertex, pronotum, mesonotum, tegulae and abdominal tergites, for the most part black; integument of

second abdominal tergite entirely ferruginous except the narrow, distal margin more or less black.

barbigera subsp. *barbigera* (Fox)

Pubescence of vertex, pronotum, mesonotum and tegulae glittering ferruginous for the most part; pubescence of abdominal tergites entirely fulvous; second abdominal tergite ferruginous except the proximal fourth black.

barbigera subsp. **rohweri** n. subsp.

14. Scape more or less broadened and flattened distally, with a single well-developed carina beneath, and with a more or less dense brush of pale pubescence beneath 15

Scape scarcely broadened and not flattened distally, with two distinct, parallel carinae beneath, and without a brush of pale pubescence beneath 20

15. Abdomen mostly ferruginous, clothed with sparse, black pubescence 16

Abdomen mostly fulvous, clothed with glittering, fulvous pubescence 17

16. Thorax entirely black ..... *vagans* subsp. *vagans* (Fabricius)

At least the pronotum and mesonotum ferruginous.

vagans subsp. **rufinota** n. subsp.

17. Scape strongly dilated and flattened distally, the brush of pale hairs dense, conspicuous 18

Scape only moderately dilated distally, the brush of pale hairs sparse, inconspicuous 19

18. Ocelli large, the distance between the eye margins and the lateral ocelli equal to twice the diameter of the latter; pubescence of vertex and pronotum pale; oblique carina of hypopygium dentiform posteriorly; second abdominal sternite blackish ..... **huntleyensi** n. sp.

Ocelli small, the distance between the eye margins and the lateral ocelli at least three times the greatest diameter of the latter; erect pubescence of vertex and pronotum black; oblique carina of hypopygium rounded, not dentiform posteriorly; second abdominal sternite entirely ferruginous.

grotei (Blake)

19. Second abdominal sternite infuscated to distinctly black; pale pubescence of pronotum sparse.

suspensa subsp. **sonora** n. subsp.

Second abdominal sternite entirely ferruginous; pale pubescence of pronotum thick.

suspensa subsp. **jonesi** n. subsp.

20. Ocelli small, the distance between the eye margins and the lateral ocelli equal to three or more times the greatest diameter of the latter 21
Ocelli very large, conspicuous, the distance between the eye margins and the lateral ocelli slightly less than the greatest diameter of the latter 25
21. Thorax conspicuously, but not entirely, ferruginous; abdomen ferruginous, clothed with sparse, ferruginous pubescence or with black and pale pubescence 24
Thorax entirely black; abdomen fulvous, clothed with sparse, fulvous pubescence 22
22. First abdominal segment black; wings fuliginous with a slightly darker band at the apex; intermediate coxae with a tubercle at the inner posterior margin ..... *oajaca* (Blake)
First abdominal segment ferruginous like the remainder of the abdomen; wings subhyaline with a darker band at the apex; intermediate coxae with a distinct tooth at the inner posterior margin 23
23. Middle and posterior tarsi ferruginous; sides of propodeum reticulate; median, glabrous area of clypeus depressed and concave medially ..... **neobule** n. sp.
Middle and posterior tarsi black; sides of propodeum with moderate, distinct, shallow punctures; median, glabrous area of clypeus transversely concave ..... **nitela** n. sp.
24. Clypeus transverse, subrectangular, transversely concave; abdomen clothed with sparse, ferruginous pubescence. *floridensis* (Blake)
Median area of clypeus subtriangular, almost flat, only slightly concave; anterior abdominal tergites with black, apical fringes, the distal tergites with pale, glittering pubescence. **kansana** n. sp.
25. Thorax entirely black ..... *ocellaria* subsp. **ocellaria** n. subsp.
Prothorax and mesonotum ferruginous, remainder of thorax black ..... *ocellaria* subsp. **rufidorsa** n. subsp.
26. Ocelli small, the distance between the eye margins and the lateral ocelli at least twice the greatest diameter of the latter. 27
Ocelli large, the distance between the eye margins and the lateral ocelli distinctly less than twice the greatest diameter of the latter 28
27. Propodeum very deeply and coarsely reticulate; legs clothed with pale pubescence; distance between the eye margins

and lateral ocelli equal to three times the diameter of the latter ..... *rufosignata* (Bradley)

Propodeum only moderately reticulate; legs clothed with black pubescence; distance between the eye margins and lateral ocelli equal to slightly more than twice the greatest diameter of the latter ..... **tolerata** n. sp.

28. Wings subhyaline; thorax almost entirely ferruginous, only the mesosternum black ..... **subhyalina** n. sp.

Wings fuscous to fuliginous; thorax either entirely black, or only the pronotum, propleura and mesonotum ferruginous. 29

29. Distance between the eye margins and lateral ocelli equal to approximately one and one-half times the greatest diameter of the latter; tegulae very dark ferruginous or black, not concolorous with the mesonotum if the latter is ferruginous. 30

Distance between the eye margins and lateral ocelli approximately equal to the greatest diameter of the latter; tegulae ferruginous, concolorous with the mesonotum.....*sayi* (Blake)

30. Pronotum, propleura and mesonotum ferruginous. *hollensis* subsp. *hollensis* (Melander)

Thorax entirely black ..... *hollensis* subsp. **melanderi** n. subsp.

Females

1. Thorax very noticeably broader posteriorly than anteriorly 2

Thorax only slightly or not at all broader posteriorly than anteriorly 3

2. Pygidial area obscurely sculptured, only faintly granulate. *floridensis* (Blake)

Pygidial area longitudinally striate ..... *ferrugata* (Fabricius)

3. Second abdominal tergite with coarse, confluent punctures, especially at the sides, the punctures conspicuous through the pubescence; distal half of pygidial area granulated 4

Second abdominal tergite finely punctate throughout, without conspicuous, large punctures visible through the pubescence, or if with moderately large punctures, the latter well separated and interspersed with fine punctures; distal half of pygidial area area either striate, rugose or granulate. 6

4. Scutellar scale well developed; anterior pale pubescent markings of second tergite linear ..... *oajaca* (Blake)

Scutellar scale absent; anterior pale pubescent markings of second tergite ovate 5

5. Thorax very slightly narrowed posteriorly the sides of the dorsum subparallel; abdomen largely ferruginous to dark ferruginous; legs entirely bright ferruginous.
navasota subsp. *navasota* (Bradley)

Thorax strongly narrowed posteriorly, the sides of the dorsum distinctly converging posteriorly; abdomen mostly black; at least the tibiae and tarsi black.
navasota subsp. **nebulosa** n. subsp.

6. Sides of dorsum of thorax not emarginate medially 7
Sides of dorsum of thorax distinctly emarginate medially 11

7. Pygidial area finely, longitudinally striate 8
Pygidial area irregularly rugose, or granulate 9

8. Lateral margins of posterior face of propodeum strongly denticulate; legs, especially the tibiae, dark ferruginous; abdomen dusky to black above except the pale pubescent markings ..... *leona* (Blake)
Lateral margins of posterior face of propodeum slightly serrate, but not strongly denticulate; legs pale ferruginous throughout; abdomen ferruginous, except pale pubescent markings, only slightly dusky above ..... **tyro** n. sp.

9. Disk of second tergite finely punctate, only the lateral areas of the tergite with large punctures; pygidial area irregularly rugose 10
Disk of second tergite with moderately large, separated punctures interspersed with fine punctures; pygidial area granulate ..... **nicholi** n. sp.

10. Abdomen reddish; anterior, lateral, pale pubescent spots on second tergite indistinct or entirely absent.
ornatipennis (Bradley)
Abdomen black, with pale pubescent markings, the anterior, lateral, pale pubescent spots on the second tergite distinct.
wileyae n. sp.

11. Last three abdominal tergites bright ferruginous, clothed with ferruginous pubescence 12
Last three abdominal tergites dusky or black, without ferruginous pubescence 13

12. Sides of thorax deeply emarginate medially; ferruginous area of second tergite with moderate, distinct, separated punctures; second tergite with a median, obscure spot of sparse, black pubescence at the anterior margin ..... *euterpe* (Blake)
Sides of thorax only shallowly emarginate medially; second

tergite with intermixed small and fine punctures throughout; anterior margin of second tergite without a median, obscure, black pubescent spot ..... **euphrosyne** n. sp.

13. Posterior margin of first abdominal tergite with a pale pubescent band 14
Posterior margin of first abdominal tergite with a black pubescent band ..... **dubitatiformis** n. sp.

14. Scutellar scale entirely absent 15
Scutellar scale present and distinct 16

15. Sides of thorax weakly emarginate; front, vertex and dorsum of thorax with moderate, contiguous punctures; legs entirely black ..... **contigua** n. sp.
Sides of thorax strongly, deeply emarginate; front, vertex and dorsum of thorax with coarse, confluent punctures; coxae, trochanters and femora ferruginous.
barbigera subsp. *barbigera* (Bradley)

16. Second abdominal tergite with lateral, narrow, subparallel, pale pubescent bands connecting the posterior marginal, pubescent bands of the first and second tergites 17
Second abdominal tergite without complete, longitudinal pubescent bands, at the most with lateral, elongate, pale pubescent spots on the anterior half 18

17. Legs entirely black ..... *suspensa* subsp. *suspensa* (Gerstaecker)
Legs, at least the coxae, trochanters and femora, ferruginous.
suspensa subsp. **sonora** n. subsp.

18. Mesonotal-scutellar suture distinct just anterior to the scutellar scale, the latter broad and distinct 19
Mesonotal-scutellar suture not evident; scutellar scale narrow, not prominent; pygidial area longitudinally rugose.
dubitata subsp. *dubitata* (Smith)

19. Second abdominal tergite velvety black, without anterior, pale pubescent spots, with only a posterior marginal, pale pubescent band; fifth tergite with the pale pubescent spots distinctly separated ..... *grotei* (Blake)
Second abdominal tergite ferruginous to blackish, with a pair of more or less distinct, pale pubescent spots on the anterior half; fifth tergite with a pale pubescent band, narrowed medially but not interrupted 20

20. United States and Canada east of the Rocky Mountains except Florida ..... *vagans* subsp. *vagans* (Fabricius)
Florida ..... *vagans* subsp. **rufinota** n. subsp.

Timulla (*Timulla*) *ferrugata* (Fabricius). (New combination)

1804. *Mutilla ferrugata* Fabricius, Syst. Piez., p. 438, no. 47, female.

1811. *Mutilla ferrugata* Olivier, Encycl. méthod. Insect., viii, p. 60, no. 34, female.

1845. *Mutilla ferrugata* Lepeletier, Hist. nat. Insect. Hymén., iii, p. 608, female.

1845. *Mutilla rufa* Lepeletier, Hist. nat. Insect. Hymén., iii, p. 631, male. (New synonymy.)

1871. *Mutilla Promethea* Blake, Trans. Amer. Ent. Soc., iii, p. 229, male. (New synonymy.)

1886. *Mutilla Promethea* Blake, Trans. Amer. Ent. Soc., xiii, p. 198, male.

1897. *Mutilla ferrugata* Dalla Torre, Cat. Hymen., viii, p. 40, female.

1897. *Mutilla Promethea* Dalla Torre, Cat. Hymen., viii, p. 74, male.

1897. *Mutilla rufa* Dalla Torre, Cat. Hymen., viii, p. 79, male.

1899. *Mutilla promethea* Fox, Trans. Amer. Ent. Soc., xxv, p. 271, male.

1903. *Mutilla promethea* André, Gen. Ins., i, fasc. 11, p. 42, male.

1903. *Mutilla rufa* André, Gen. Ins., i, fasc. 11, p. 42, male.

1903. *Ephuta ferrugata* André, Gen. Ins., i, fasc. 11, p. 60, female.

1903. *Mutilla promethea* Melander, Trans. Amer. Ent. Soc., xxix, p. 323, male.

1916. *Mutilla* (*Timulla*) *promethea* Bradley, Trans. Amer. Ent. Soc., xlii, p. 209, male and female.

1928. *Timulla ferrugata* Mickel, Bull. 143, U. S. Nat. Mus., p. 135, female.

Type.—Female, Carolina, in collection of University of Kiel. Holotype of *rufa* Lepeletier is in Spinola collection, University of Turin, Turin, Italy. Holotype of *promethea* Blake is in American Entomological Society collection, Philadelphia.

Specimens examined.

NEW JERSEY: male, Weymouth, July 23, 1923.

MARYLAND: female.

VIRGINIA: male, Norfolk, July 8, 1910 (F. A. Johnston); male, Norfolk, September 21 (E. G. Smyth).

NORTH CAROLINA: male, Wilmington, January 21, 1919 (Max Kisliuk); male, Raleigh, October, 1917 (J. E. Eckert); male, Southern Pines, September 24, 1907 (A. H. Manee); male, Lumberton, July 3, 1903 (F. Sherman).

SOUTH CAROLINA: female, Columbia, September 10, 1908; male, Myrtle Beach, July 5, 1927 (H. C. Coker).

GEORGIA: female, Savannah; male, Clyde, September 11–12, 1931 (Bradley and Knorr); female, Fort Valley, September 6, 1902 (Bridwell); male, Tifton, June 13, 1906; male, Tifton; female, Albany, May 16, 1916 (W. D. Pierce); male, Swainsboro, May 31, 1931 (P. W. Fattig); male, St. Simon's Island, June 4, 1911; female, St. Simon's Island, July 14, 1931 (C. A. Frost); three males, Billy's Island, Okefenokee Swamp, June, 1912; four females, Spring Creek, Decatur Co., May 18–21, 1916 (J. C. Bradley); female, Spring Creek, Decatur Co., June 7–23, 1911 (J. C. Bradley); eleven females, male, Spring Creek, Decatur Co., July 16, 29, 1912 (J. C. Bradley); female, Spring Creek, Decatur county, August 9–12, 1931 (Bradley and Knorr); male, Bainbridge, May 30–June 1, 1911 (J. C. Bradley); female, Bainbridge, July 30, 1912; male, Bainbridge; female, Thomasville, May 21, 1915 (C. S. Spooner); two males, four females.

FLORIDA: female, LaBelle, April 18 (J. N. Knull); female, Jacksonville, July 21; female, Jacksonville; female, Lakeland (G. G. Ainslie); female, Sanford, April, 1932 (C. O. Bare); female, Sanford, May 21, 1931 (C. O. Bare); male, Orlando, May 28, 1925 (O. C. McBride); male, Orlando, June 2, 1925 (O. C. McBride); male, Gainesville, Alachua county, April 23, 1922; two males Gainesville, Alachua county, May 4, 1928 (Alexander-Walker); female, Gainesville, Alachua county, May 11, 1911; female, Gainesville, August 17, 1931 (Bradley and Knorr); female, Alachua county, March 18, 1930 (C. J. Guard); female, Palatka, May 3–4, 1916 (J. C. Bradley); male, Lake County, April 20, 1922 (T. P. Winter); two males, Kissimmee Prairie, August 25, 1931 (Bradley and Knorr); female, Homestead, March 5 (A. Mosier); male, Homestead, April 18, 1924 (T. R. Robinson); female, Indian River (H. G. Hubbard); female, Ft. Mead, August 13, 1930 (R. H. Beamer); female, Wildwood, August 2, 1930 (J. Nottingham); female, Enterprise, April 18; female, Bell Glade, July, 1926 (M. D. Leonard); three males.

MISSISSIPPI: female, Agricultural College, April 16, 1916 (W. H. Carpenter); female, Agricultural College, November 1, 1917 (N. A. Moore); female, Agricultural College, June 15, 1915 (C. C. Greer); male, Agricultural College, June 27, 1914 (C. C. Greer); male, Agricultural College, July 3, 1914 (C. C. Greer); male, Agricultural Col-

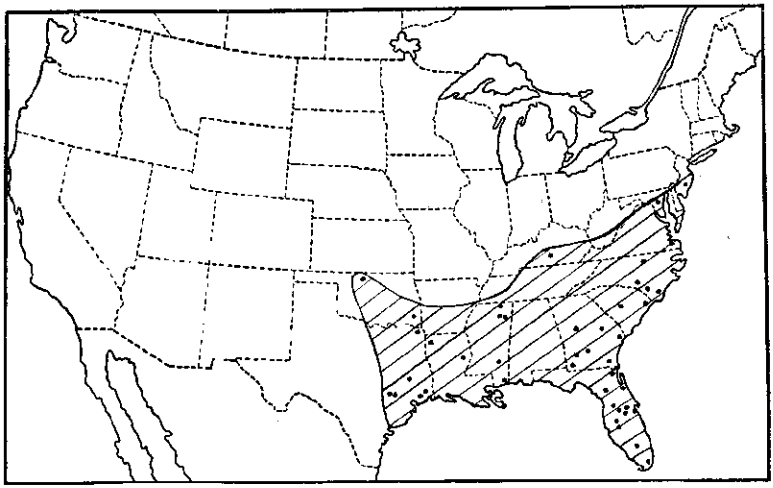
lege, July 6, 1914 (C. C. Greer); male and female, Agricultural College, July 10, 1914 (C. C. Greer); two males, Agricultural College, July 14, 1914 (C. C. Greer); female, Agricultural College, May 8, 1921 (P. D. Sanders); male, Agricultural College, June 25, 1913 (J. G. Hester); two females, Agricultural College, July 1, 1913 (J. G. Hester); male, Agricultural College, July 14, 1913 (J. G. Hester); male, Agricultural College, July 19, 1913 (J. G. Hester); female, Agricultural College, fall, 1921 (G. A. Thompson); two females, Agricultural College, July 10, 1913 (T. F. McGehee); female, Agricultural College, July 29, 1913 (T. F. McGehee); female, Agricultural College, May, 1922 (C. T. Wallace); female, Agricultural College, May 14, 1921 (S. W. Box); female, Agricultural College, October 14, 1914 (S. M. Thomas); female, Agricultural College, October 20, 1914 (A. M. Rogers); female, Agricultural College, May 1, 1922 (W. C. Avens); female, Agricultural College, May 16, 1921 (C. E. Loeb); female, Agricultural College, April 15, 1922 (H. C. Ashcraft); female, Agricultural College, June 13, 1921 (J. W. Lumpkin); male, Agricultural College, July 12, 1921 (J. W. Lumpkin); female, Agricultural College, April 24, 1921 (R. D. Morrow); female, Agricultural College, March 30 (J. C. Garrett); female, Agricultural College, November 5, 1921 (C. E. Ross); male, Agricultural College, October, 1919 (W. M. Porter); male, Agricultural College, August 6, 1913 (C. F. Stiles); male, Agricultural College, May, 1922 (J. H. Heckman); male, Agricultural College (P. D. Houston); female, Agricultural College, July 25, 1917; female, Starkville, May 14, 1922 (O. E. Earnest); male, Blue Mountain, July 11, 1914 (H. H. Carter); male, Laurel, August, 1916 (M. G. Dyess); two males, Ocean Springs, June 5, 1915 (F. F. Bibby); two males, Ocean Springs, June 8, 1915 (F. F. Bibby); male, Ocean Springs, June, 1915 (F. F. Bibby).

KENTUCKY: male.

LOUISIANA: male and female (in copula) Tallulah, October 16, 1910 (R. A. Cushman); female, Tallulah, April 10 (R. A. Cushman); male, Tallulah, June, 1916 (C. S. Whittington); female, Shreveport, May 29, 1905; male, New Orleans; female, Lake Bruins, August 3, 1925 (B. E. Montgomery); eight males, two females.

TEXAS: female, Wharton, June 24, 1917; female, Willis, May 14, 1903 (Bridwell); female, Columbus (Wickham); two females, Colorado county, August 5, 1922 (Grace O. Wiley); female, Liberty, October 12, 1933; female, Madison county, August 20, 1931 (F. F. Bibby); male, Nome, June 21, 1918 (E. L. Diven); male, New Boston, October 26, 1906 (F. C. Bishopp); male.

OKLAHOMA: female, Latimer county, June 16, 1931 (R. D. Bird); female, Isabel, June 8, 1931 (C. C. Deonier); male and female (in copula), Alfalfa county, August 6, 1932 (Pritchard and Deonier).



Distribution of *Timulla* (*Timulla*) *ferrugata* (Fabricius)

I have previously (1928) suggested that *ferrugata* Fabricius belonged to the genus *Timulla*. Through the courtesy of Dr. Olaw Schroeder, of the Zoological Institut, University of Kiel, and Dr. H. Bischoff, of the Zoological Museum of the University of Berlin, I was able to reexamine a specimen in the Kiel collection bearing a label "*ferrugata*" in Fabricius' handwriting. This specimen agrees exactly with the original description. The latter particularly describes the distal margin of the first abdominal segment as black, and the remaining margins cinereus. The Kiel specimen has the distal margin of the first segment black and the margins of the remaining segments cinereus, but the first segment has obviously been rubbed and was originally clothed with pale pubescence. Other diagnostic characters of the Kiel specimen are the thorax broader behind than in front, and the legs black except ferruginous femora. Females which Bradley (1916) assigned to *promethea* Blake agree in every respect with the Kiel specimen, including the black distal margin of the first tergite although the black area of Bradley's specimens is clothed with pale pubescence.

The original description of *ferrugata* mentions the specimens as belonging to the Bosc collection. This collection is now in the

Muséum Nationale d'Histoire Naturelle, Paris. I have investigated the possibility of the type's presence there. There is only one specimen in the Bosc material at Paris that can possibly have any claim as the type specimen of this species. It is labeled "*M. antiguensis* Fabricius. H. in Carolina." It is a specimen of *Dasymutilla lepeletierii* Fox. It cannot be the type for the following reasons: (1) The description states "parva"; this specimen is large, 14 mm. long; (2) Description states "reliquis margine cinereo"; this specimen has the distal margin of the second tergite black with a median, pale pubescent spot; (3) Description states "femoribus ferrugineis"; the specimen has the femora blackish like the other parts of the leg.

Further confirmatory evidence that the Kiel specimen is the one Fabricius described as *ferrugata* is to be found in the fact that specimens in the Spinola collection at Turin, Italy, which originally came from the Olivier collection and the Latreille collection are labeled "*ferrugata* Fabr." and are conspecific with the Kiel specimen.

I have examined the female recorded by Bradley (1916) as the allotype of *promethea* Blake and find it to be the same as the Kiel specimen. A second pair taken in copula is recorded above from Louisiana and a third pair from Oklahoma. The male in both cases is the same as *rufa* Lepeletier and *promethea* Blake. I have examined the holotype of both *rufa* and *promethea* and find them to be identical. The female in both of the above cases is the same as the Kiel specimen.

Timulla (*Timulla*) *ornatipennis* (Bradley). (New combination)

1916. *Mutilla* (*Timulla*) *ornatipennis* Bradley. Trans. Amer. Ent. Soc., xlii, pp. 205–206, 318, male and female.

Holotype male and allotype female.—Southern Pines, North Carolina, August 12, 1907 (A. H. Manee), nos. 111.1 and 111.2 in Cornell University collection, Ithaca, New York.

Diagnostic characters of the female not mentioned in the original description are: scape and pedicel ferruginous, the flagellum blackish; antennal scrobes distinctly carinate above; sides of dorsum of thorax parallel, not noticeably emarginate at the mesonotal region; length of thorax about one and two-thirds times the width; dorsum of thorax with large, confluent punctures, almost longitudinally rugoso-punctate; mesonotal-scutellar suture obsolete; scutellar scale present and distinct; lateral margins of posterior face of propodeum denticulate; second tergite finely punctate on the disk, the punctures becom-

ing moderate in size towards the sides; anterior pale pubescent spots of second tergite obsolete; pygidial area irregularly rugose; median carina of first sternite elevated anteriorly into a prominent tooth.

The holotype and allotype have been examined and specimens compared with them.

Specimens examined.—

NEW JERSEY: two females, Iona, May 16, 1909 (G. M. Greene).

VIRGINIA: two males, Falls Church, September 4, 1915 (C. T. Greene); female, Falls Church, September 14, 1915 (G. M. Greene); female, Colonial Beach, July, 1897; female, Clifton, July 15, 1923 (J. C. Bridwell); two females, Clifton, July, 1933 (J. C. Bridwell); two females, Clifton, August 20, 1933 (J. C. Bridwell).

NORTH CAROLINA: male and female (in copula), Southern Pines, July 9, 1907 (A. H. Manee); female, Raleigh, April 16, 1904 (C. S. Brimley); female, Raleigh, early August (C. L. Metcalf); female, Kittrell, September, 1917 (J. E. Eckert); male, Wilson, September 1, 1914; female (Forel).

SOUTH CAROLINA: female, Clemson College (J. O. Pepper).

GEORGIA: female, Atlanta, April 23, 1933 (P. W. Fattig); female, Atlanta, August 11, 1934 (P. W. Fattig); female, Atlanta, August 30, 1934 (P. W. Fattig); female, Atlanta, September 5, 1932 (P. W. Fattig); male and female (in copula), Stone Mt., August 11, 1932 (P. W. Fattig); female, Chickamauga, July 10, 1898; male, Tifton; female, Billy's Island, Okefenokee Swamp, September 1–5, 1913.

FLORIDA: female, Tampa, March 27; male, Capron, April 25; female, Ft. Meyers, May 7, 1916 (J. C. Bradley); female.

ALABAMA: female, Greenville, August 3, 1915.

TENNESSEE: female, Knoxville, May 1, 1890; male.

MISSISSIPPI: female, Agricultural College, April 14, 1918 (C. M. Brickell); female, Agricultural College, April 6, 1919 (W. T. Covington); female, Lucedale, March 3, 1932 (H. Dietrich); female, Fulton, July 14, 1930 (P. W. Oman).

The characters used in the keys will separate both sexes of this species from related forms without difficulty. The female has been confused with *dubitata* Smith but that species has the thorax distinctly emarginate medially at the sides.

Timulla (*Timulla*) *barbata* (Fox). (New combination)

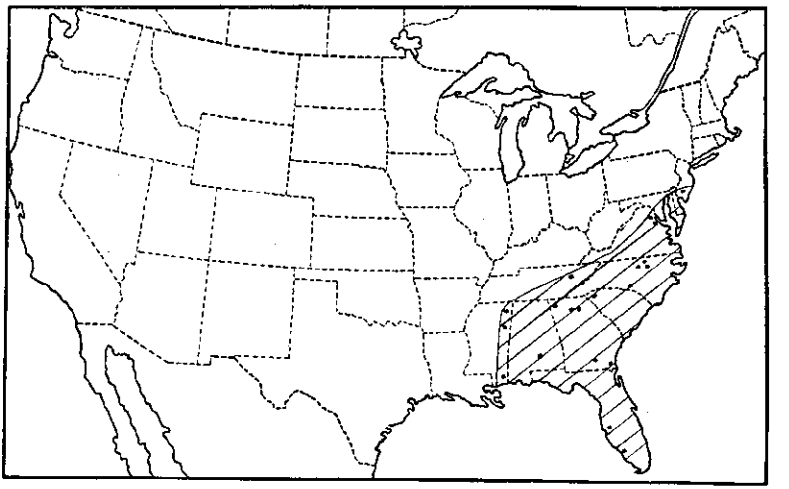
1899. *Mutilla barbata* Fox, Trans. Amer. Ent. Soc., xxv. p. 272, male.

1903. *Mutilla barbata* André, Gen. Ins., i, fasc. 11, p. 41, male.

1916. *Mutilla* (*Timulla*) *barbata* Bradley, Trans. Amer. Ent. Soc., xlii, p. 205, male.

Type.—Male, Ripley County, Missouri (P. J. Smith), in collection of American Entomological Society, Philadelphia.

A second specimen is in the collection of the University of Kansas; male, Caddo County, Louisiana, August 19 (R. H. Beamer).



Distribution of *Timulla* (*Timulla*) *ornatipennis* (Bradley)

The thick, long fringe of white hairs on the yellowish scape beneath; the broad, flat, first flagellar segment; and the banded wings separate this at once from all other species in the genus.

Timulla (*Timulla*) *leona* (Blake). (New combination)

1871. *Mutilla leona* Blake, Trans. Amer. Ent. Soc., iii, p. 230, female.

1886. *Mutilla leona* Blake, Trans. Amer. Ent. Soc., xiii, p. 200, female.

1894. *Mutilla leona* Cameron, Biol. Centr.-Amer., ii, p. 269, female.

1897. *Mutilla leona* Dalla Torre, Cat. Hymen., viii, p. 53, female.

1900. *Mutilla leona* Fox, Ent. News, xi, p. 401, female.

1903. *Mutilla leona* André, Gen. Ins., i, fasc. 11, p. 42, female.

?1903. *Mutilla nestor* Melander, Trans. Amer. Ent. Soc., xix, p. 323, male.

Type.—Female, Mexico (F. Sumichrast), in collection of American Entomological Society, Philadelphia.

The description of the male is as follows: Head, thorax and legs, black; first abdominal segment blackish, the posterior margin ferruginous; remainder of abdomen ferruginous; inferior margin of mandibles strongly emarginate and with a prominent tooth near the base; distal margin of last abdominal tergite distinctly emarginate medially. Length, 15 mm.

Head entirely black, clothed throughout with pale, glittering pubescence, thickest on the front; clypeus transversely concave, the concave area glabrous, and the elevated posterior margin of the glabrous area evenly arcuate; scape distinctly bicarinate beneath; first and second flagellar segments approximately equal in length; ocelli small, the distance between the lateral ones and the inner eye margins more than three times the greatest diameter of the former.

Thorax entirely black; pronotum clothed with erect and appressed, pale, glittering pubescence; mesonotum clothed with black pubescence, except the anterior fourth with pale, glittering pubescence; anterior half of scutellum with erect, black hairs, the posterior half with erect, pale hairs; propodeum clothed with sparse, appressed, pale pubescence; pleural areas clothed with sparse, pale pubescence; scutellum strongly, evenly convex, densely punctured; enclosed area of propodeum not elevated posteriorly into a tubercle; tegulae large, glabrous, finely punctate throughout, clothed throughout with sparse, pale, glittering pubescence; mesosternal tubercles transverse.

Abdomen ferruginous, except the first segment largely black, only the distal margin ferruginous, clothed throughout with erect and appressed, fulvous pubescence, except the erect pubescence of the first tergite pale; distal margin of last tergite distinctly emarginate medially; last tergite with a median, elongate, glabrous, impunctate area terminating before the distal margin in a transverse, strongly elevated carina, the latter viewed posteriorly distinctly arcuate; sixth sternite unarmed; seventh sternite with small lateral tubercles; hypopygium with a pair of widely separated, longitudinal ridges on the anterior half.

Legs entirely black, sparsely clothed with pale, glittering pubescence; middle coxae with a weak tooth at the inner, posterior margin; calcaria pale.

Wings dark fuscous.

Allotype.—Male, Tallulah, Louisiana, July 17, 1925, in collection of University of Minnesota.

Specimens examined.—

GEORGIA: two males, Bainbridge.

ALABAMA: male, Thomasville, June 10, 1917; three males, Jackson, Tombigbee River, June 10, 1917.

MISSISSIPPI: female, Agricultural College, June 24, 1914 (C. C. Greer).

ARKANSAS: male, Pine Bluff, September, 1890.

LOUISIANA: two females, New Orleans; male, Cameron, June 29, 1905; male, Tallulah, July 24, 1925; two males.

TEXAS: female, Brownsville, May 1, 1904 (H. S. Barber); three males, Galveston, May (F. H. Snow); male, Galveston, June 16, 1924 (Trotter); male, Galveston, July 24, 1924 (Trotter); three females, Richmond, May 29, 1918 (J. C. Bradley); two females, Richmond, Brazos River, June 22, 1917; eight females, five males, Wharton, June 24, 1917; male, Austin, May 21, 1921 (R. H. Painter); three females, Columbus (Wickham); female, Bastrop County; male, College Station, June 15, 1932; male, College Station, June 26, 1932 (H. J. Reinhard); male, College Station, August 17, 1932 (S. W. Bromley); two males, McLennan County, July 10, 1934 (F. F. Bibby); male and female, McLennan County, July 16, 1933 (F. F. Bibby); two females, Aransas County, August 6, 1928 (R. H. Beamer and A. M. James).

OKLAHOMA: male, Alfalfa County, August 6, 1932 (C. C. Deonier).

KANSAS: male, Douglas County, July 25, 1919 (Wm. E. Hoffmann); male, Riley County, June 30; male, Riley County, July 17 (Popenoe); female, Riley County, July 26 (G. A. Dean); female, Riley County, July 21 (Popenoe); female, Riley County, July 22 (G. A. Dean); female, Riley County, August 8 (J. B. Norton); female, Clay County, August, 1901 (Bridwell); male.

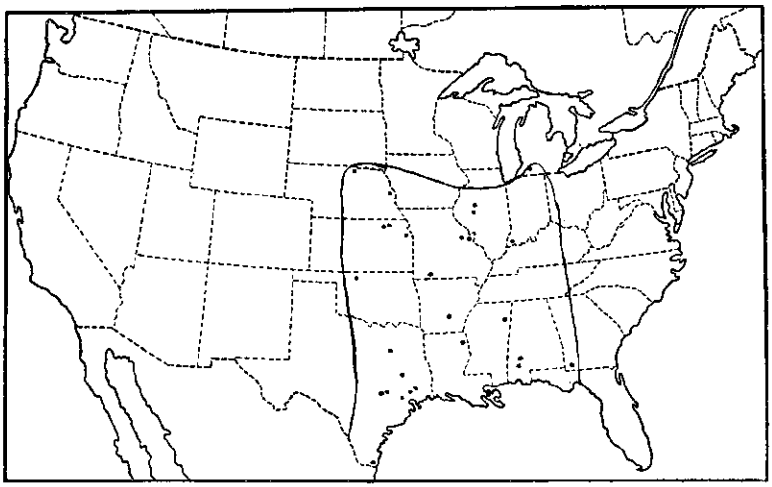
NEBRASKA: male, Omaha, July 7, 1914 (L. T. Williams); two males, Omaha, August 3, 1914 (L. T. Williams); male and female, Omaha, August 12, 1913 (L. T. Williams); female, Omaha, August 13, 1914 (L. T. Williams); male, Omaha, August 14, 1913 (L. T. Williams); male, Omaha, August 19, 1913 (L. T. Williams); female, Omaha, September 9, 1913 (L. T. Williams); male, Carns, July 22, 1902 (M. H. Swenk).

MISSOURI: male and female, Callaway County, October, 1898; male, St. Louis, August 16, 1922 (P. Rau); two females, St. Louis (P. Rau); male, Hollister, August 12, 1912 (H. H. Knight).

ILLINOIS: two females, Meredosia, August 22, 1898 (F. M. McE.); two females, Havana, October 6.

INDIANA: male and female, Posey County, August 10, 1927 (B. E. Montgomery).

MICHIGAN: male.



Distribution of *Timulla* (*Timulla*) *leona* (Blake)

The female of *leona* is closely related to *prominens* Cameron. The latter has the same form of thorax, the same sculpture of the pygidium and the same pubescent markings of the abdomen, but has an entirely black head. André (1898, Ann. soc. ent. France, lxvii, p. 38) identified a male mutillid from Mexico as *ardens* Gerstaecker and described the female taken with it as the female of *ardens*. I have examined these two specimens in the Muséum Nationale d'Histoire Naturelle, Paris, and find that the male is not *ardens*, but an undescribed species, while the female is *prominens* Cameron. The male taken with this female must then be the male of *prominens*. This male has the distal margin of the last abdominal tergite emarginate medially, and has the median, impunctate, glabrous area of the same tergite terminating in a transverse carina before the distal margin of the tergite. The carina is slightly arcuate and extends transversely through the median three-fifths of the tergite. Since the female of *leona* is closely related to the female of *prominens*, it follows that the male of *leona* is probably related to the male of *prominens*. The male described above is not only closely related to

the male of *prominens* but it has practically the same geographical distribution as the females of *leona*. It differs from *prominens* in having sparser pale pubescence on the dorsum of the propodeum and on the tegulae, and the carina of the last abdominal tergite extends transversely through only the median two-fifths of the tergite, and is strongly arcuate. To further support this conclusion, the material before me includes five instances where this male and female have been collected at the same time and place, *i.e.*, McLennan County, Texas, July 16, 1933 (F. F. Bibby); Wharton, Texas, June 24, 1917; Callaway County, Missouri, October, 1898; Omaha, Nebraska, August 12, 1913 (L. T. Williams), and Posey County, Indiana, August 10, 1927 (B. E. Montgomery). The female has been confused in collections with *vagans* subsp. *vagans*, although the longitudinally striate pygidium separates it at once from that species. The male has been confused with *oajaca* which it resembles in color, but differs in the emarginate distal margin of the last abdominal tergite.

Timulla (*Timulla*) **tyro** n. sp.

Male.—Head and thorax black, clothed with pale pubescence, except the posterior three-fourths of the mesonotum with black pubescence; abdomen ferruginous, clothed with fulvous pubescence; legs black except the tibiae dark ferruginous and the tarsi distinctly ferruginous; tegulae with thick, pale pubescence; distal margin of last abdominal tergite emarginate; median, impunctate area of last tergite terminating in an inverted U-shaped carina. Length, 11 mm.

Head entirely black, clothed throughout with rather thick, erect and appressed, pale pubescence; mandibles strongly emarginate beneath and with a prominent tooth near the base beneath; clypeus transversely concave, the concave area glabrous, impunctate, the elevated, posterior margin evenly arcuate; scape distinctly bicarinate beneath; first and second segments of flagellum approximately equal in length; ocelli small, the distance between the eye margins and lateral ocelli equal to four times the diameter of the latter.

Thorax entirely black, clothed with pale pubescence, except the posterior three-fourths of mesonotum with black pubescence; pale pubescence thick on pronotum, scutellum and mesopleurae, elsewhere sparse; scutellum evenly convex, densely punctured; enclosed area of propodeum not elevated posteriorly into a tubercle; dorsum and posterior face of propodeum dis-

tinctly, shallowly reticulate; tegulae large, clothed with thick, pale pubescence; mesosternal tubercles transverse.

Abdomen entirely ferruginous, clothed with fulvous pubescence throughout; distal margin of last tergite distinctly, roundly emarginate medially; last tergite with a narrow, elongate, median, impunctate area terminating in an inverted U-shaped carina, the sides of the U diverging posteriorly, not parallel; sixth sternite with a pair of distinct tubercles, one at each postero-lateral angle; seventh tergite with a pair of similar but slightly stronger tubercles; hypopygium with a pair of widely separated, longitudinal ridges anteriorly, the ridges elevated posteriorly forming a sharp tooth projecting backwards.

Legs black, except the tibiae dark ferruginous, and the tarsi distinctly ferruginous, clothed with sparse, pale pubescence; calcaria pale.

Wings fuscous.

Female.—Pale ferruginous throughout, including the legs; head and dorsum of thorax coarsely punctured, almost longitudinally rugoso-punctate; sides of dorsum of thorax parallel, not noticeably emarginate; scutellar scale broad and well developed; a distinct mesonotal-scutellar suture anterior to the scutellar scale; lateral margins of posterior face of propodeum slightly serrate, not strongly denticulate as in *leona;* abdomen finely punctured, slightly dusky above due to sparse, short, black pubescence; abdomen with pale markings above as in *leona;* pygidial area distinctly, longitudinally striate.

Holotype.—Male, Cat. No. 50954 U. S. National Museum, Imperial County, California, May, 1911 (J. C. Bridwell).

Allotype.—Female, Arizona, in collection of United States National Museum.

Paratype.—Female, Needles, California (Wickham), in University of Minnesota collection.

Closely related to *leona* Blake. The male differs from the latter as expressed in the key, in the ferruginous color of the tibiae and tarsi, the distinct tubercles on the sixth sternite and the thicker, pale pubescence on the head and pronotum. The female differs in the serrate, rather than strongly denticulate, lateral margins of the propodeum, and the much paler ferruginous color of the body and legs. Although the two sexes have not been taken in copulation there can be no doubt that the specimens placed here represent the two sexes of a single species. The female is so closely related to *leona* Blake that it is separated from specimens of that species with difficulty,

and while the male is distinct from the male of *leona* as noted above and in the key, it is very closely related. The geographical ranges of the two are widely separated in the United States, *leona* having been taken only as far west as central Texas while *tyro* is known from Arizona and southeastern California. *Tyro* will undoubtedly be found in the state of Sonora, Mexico, and possibly in lower California.

Timulla (*Timulla*) *navasota* subsp. *navasota* (Bradley). (New combination)

1916. *Mutilla* (*Timulla*) *navasota* Bradley, Trans. Amer. Ent. Soc., xlii, p. 213, male.

Holotype.—Male, Brazos County, Texas, in Museum of Comparative Zoology, Cambridge, Massachusetts.

The description of the female, which was heretofore unknown, is as follows: Female.—Head, thorax and legs ferruginous, except tips of mandibles and flagellum beyond the first segment blackish; abdomen ferruginous; second abdominal tergite with a pair of anterior, ovate, pale pubescent spots; lateral margins of thorax not emarginate medially; thorax slightly narrower posteriorly than anteriorly; scutellar scale absent; second tergite with large, close, confluent punctures throughout; pygidial area mostly granulate. Length, 9 mm.

Head entirely ferruginous, except the tips of the mandibles and the flagellum beyond the second segment blackish; mandibles edentate at the tip and with a small tooth within near the tip; clypeus elevated posteriorly, the elevated margin arcuate, and with a large, transverse, median tubercle immediately posterior to the elevated margin; scape obscurely punctate above; first segment of flagellum slightly shorter than the second and third segments united; antennal scrobes distinctly carinate above; front, vertex and genae with large, dense, confluent punctures throughout and clothed with sparse, erect pubescence, ferruginous on the front and vertex, pale on the genae; relative widths of head and thorax, 3.5 : 3.3.

Thorax entirely ferruginous, the dorsum clothed with sparse, erect, ferruginous pubescence, the posterior face of propodeum with sparse, erect, pale pubescence and the pleural areas with sparse, pale micropubescence; lateral margins of dorsum of thorax almost parallel, not emarginate medially, the thorax slightly but distinctly narrower posteriorly than anteriorly; relative widths of thorax at humeral angles and propodeum, 3.3 : 3.1; humeral angles rounded; dorsum of thorax

with large, dense, deep, confluent punctures, becoming shallower posteriorly and finally reticulate and slightly asperate on the posterior face of propodeum; scutellar scale entirely absent; lateral margins of posterior face of propodeum dentate; propleura densely punctuate anteriorly, the sides of propodeum with scattered, moderate punctures anteriorly and dense, large punctures posteriorly, and the pleural areas entirely micropunctate.

Abdomen ferruginous, dusky posteriorly; first tergite with moderately large, separated punctures and sparse, erect, pale pubescence, except the distal margin with a band of dense, appressed, pale pubescence; second tergite with large, close, more or less confluent punctures interspersed with fine punctures, clothed with sparse, erect and appressed, fuscous pubescence, except at the sides with sparse, erect, pale pubescence, and a pair of anterior, ovate spots and a broad, distal band of dense, appressed, pale pubescence, the anterior margin of the distal pubescent band slightly and angularly dilated medially; tergites three to five with moderate punctures anteriorly replaced by fine punctures posteriorly, clothed with sparse, erect and appressed black pubescence, except sparse, pale, erect pubescence at the lateral margins and each with a pair of subquadrate spots of dense, appressed, pale pubescence, the spots converging towards the tip of the abdomen, those on tergite five distinctly separated; pygidial tergite with pale and fuscous pubescence, the pygidial area granulate; first sternite with a median, longitudinal carina on the anterior two-thirds, the elevated margin of the carina distinctly emarginate anteriorly; second sternite with large, close punctures throughout, clothed with sparse, erect, pale pubescence and with a thin, distal fringe of pale hairs; tergites three to five with small, dense punctures towards the distal margin and each with a thin, distal fringe of pale hairs.

Legs entirely ferruginous, sparsely clothed with pale pubescence; calcaria pale.

Allotype.—Female, without locality data, taken in copula with a male, in collection of the United States National Museum.

Specimens examined.—

Texas: male, Lee County, September 7, 1905; male and female, Dallas (Boll); male, McLennan County, August 7, 1933 (H. B. Mills); male, Laredo, July 1, 1930 (H. M. Smith); male, Plano, July (E. S. Tucker); male, Plano, August (E. S. Tucker); two males,

Brownsville, June 5, 1904 (H. S. Barber); two males, Brownsville, June 6, 1904 (H. S. Barber); three males, Brownsville, June; male and female.

The female resembles the female of *oajaca* in having the second abdominal tergite strongly punctured, but differs from *oajaca* in having the thorax slightly narrower posteriorly than anteriorly, in the absence of the scutellar scale, in having the anterior, pale pubescent markings of the second tergite ovate instead of linear, and in the much more densely and deeply punctured anterior portion of the dorsum of the thorax. The allotype specimen has the abdomen rubbed so that the pale markings are practically obliterated; the description of the pale markings of the abdomen has been taken from one of the paratypes. The two females other than the allotype have the abdomen very dark ferruginous.

The male is closely related to *amulae* Cameron from Mexico, but the latter has much smaller ocelli and denser pale pubescence on the pronotum. This subspecies is replaced in western Texas, New Mexico and Arizona, as well as northwestern Mexico, by the following subspecies. Specimens vary in length from 13 to 22 mm.

Timulla (*Timulla*) *navasota* subsp. **nebulosa** n. subsp.

Male.—Exactly like subsp. *navasota* except the calcaria are very dark brown, and the pubescence of the head, pronotum and anterior half of mesonotum is predominantly black with a few pale hairs intermixed; mandibles not emarginate, not toothed beneath; ocelli large, the distance between the inner eye margins and the lateral ocelli equal to the greatest diameter of the latter. Length, 17 mm.

Female.—Head, thorax, coxae, trochanters and femora except the tips, ferruginous; flagellum, abdomen, tips of femora, tibiae and tarsi, black; lateral margins of thorax converging posteriorly, not emarginate medially, the thorax distinctly narrower posteriorly than anteriorly; narrow distal margin of first tergite, broad distal margin of second tergite, a pair of anterior spots on the second tergite, and a pair of large, quadrate, lateral spots on tergites three to five, all of dense, appressed, pale, glittering pubescence; second tergite coarsely punctate; pygidial area finely ridged in a pattern resembling a finger print. Length, 11 mm.

Head, scape, pedicel and proximal third of first flagellar segment, ferruginous, the remainder of the flagellum black; front and vertex clothed with sparse, glittering, very pale fer-

ruginous pubescence, the genae with sparse, pale, glittering pubescence; mandibles slender, edentate at the apex, not emarginate nor toothed beneath; clypeus elevated posteriorly into a prominent arcuate ridge, the latter with prominent lateral angles; first segment of flagellum slightly shorter than segments two and three united; antennal scrobes distinctly carinate above; front, vertex and genae strongly, confluently punctuate, somewhat longitudinally rugoso-punctate; posterior margin of genae obscurely carinate; relative widths of head and thorax, 4.7 : 5.0.

Thorax entirely ferruginous, the dorsum clothed with sparse, erect and recumbent, glittering, very pale ferruginous pubescence; dorsum strongly, confluently, longitudinally rugoso-punctate; humeral angles moderately angulate; relative widths of thorax anteriorly and posteriorly, 5.0 : 4.2; scutellar scale entirely absent; posterior half of lateral margins of posterior face of propodeum dentate; lateral margins of dorsum of propodeum straight, not crenulate, gradually converging posteriorly from the pronotal tubercles; anterior margin of propleura defined by a carina; propleura with large, close punctures anteriorly and micropunctate throughout; mesopleura with moderate, close punctures at the posterior margin and on the postero-ventral area, as well as micropunctate throughout; metapleura with scattered, moderate punctures ventrally and micropunctate throughout; sides of propodeum with scattered, moderate punctures anteriorly and large, close punctures posteriorly, as well as micropunctate throughout.

Abdomen entirely black, clothed with sparse, erect and appressed, black pubescence except narrow, distal margin of first tergite, a pair of large, subovate spots on anterior half of second tergite reaching the anterior margin of tergite and merging into lateral pale areas, broad, distal margin of second tergite, lateral fifths of second tergite, a pair of large, transverse spots on tergites three to five, those on three widely separated, those on five distinctly separated but close, lateral areas of pygidial tergite, sparse pubescence on sternite two, and distal fringes of sternites two to five, all pale and glittering, the pubescence of the margins of tergites one and two, and spots on tergites two to five all dense and appressed; second tergite with large, close, dense, confluent punctures interspersed with very small punctures; pygidial area as described above; first sternite with a prominent thin keel elevated anteriorly and posteriorly; second

sternite with large punctures, dense and confluent laterally, close and only slightly confluent medially; sternites three to five with moderate, dense, confluent punctures distally.

Coxae, trochanters, femora except the tips, and front tibiae, ferruginous; tips of femora, intermediate and posterior tibiae, and all the tarsi, black; calcaria ferruginous.

Holotype.—Male, Douglas, Arizona, September, 1930 (W. W. Jones), in University of Minnesota collection.

Allotype.—Female, Santa Rita Mts., Arizona, August 12, 1932 (D. K. Duncan), in University of Minnesota collection.

Paratypes.—Male, Douglas, Arizona, September, 1930 (W. W. Jones); three males, Douglas, Arizona, August (F. H. Snow); male, Tucson, Arizona (F. H. Snow); two females, Tucson, Arizona (F. H. Snow); female, Palmerlee, Arizona, July 18 (H. A. Kaeber); male, Vegas José, New Mexico, August 4; male, Steins, New Mexico, July 14, 1917; three males, Phantom Lake, Fort Davis Quad, Davis Mts., Texas, June 14, June 19 and July 12, 1916 (F. M. Gaige); two females, Phantom Lake, Ft. Davis Quad, Davis Mts., Texas, May 24 and June 14, 1916 (F. M. Gaige); male, State of Coahuila, Mexico (C. A. Purpus).

The male paratype from Tucson, Arizona, has the calcaria brown, but the pubescence on the vertex, pronotum and anterior half of mesonotum is mostly pale. While the male and female have not been taken in copula, the relationships of the two sexes to the respective sexes of subsp. *navasota* make certain they are the two sexes of a single subspecies. The female of subsp. *nebulosa* is like that of subsp. *navasota* in the form of the thorax, absence of scutellar scale, sculpture of pygidium, puncturation of second abdominal tergite and pale markings of the abdomen. *Nebulosa* differs from *navasota* in having the thorax more strongly narrowed posteriorly and in the much darker color of the abdomen, tibiae and tarsi.

Timulla (*Timulla*) *dubitata* subsp. *dubitata* (Smith). (New combination)

1855. *Mutilla dubitata* Smith, Cat. Hymen. Brit. Mus. iii, p. 60, female.

1871. *Mutilla dubitata* Blake, Trans. Amer. Ent. Soc., iii, p. 256, female (in part).

1886. *Mutilla dubitata* Blake, Trans. Amer. Ent. Soc., xiii, p. 201, female (in part).

1897. *Mutilla dubitata* Dalla Torre, Cat. Hymen., viii, p. 33, female.

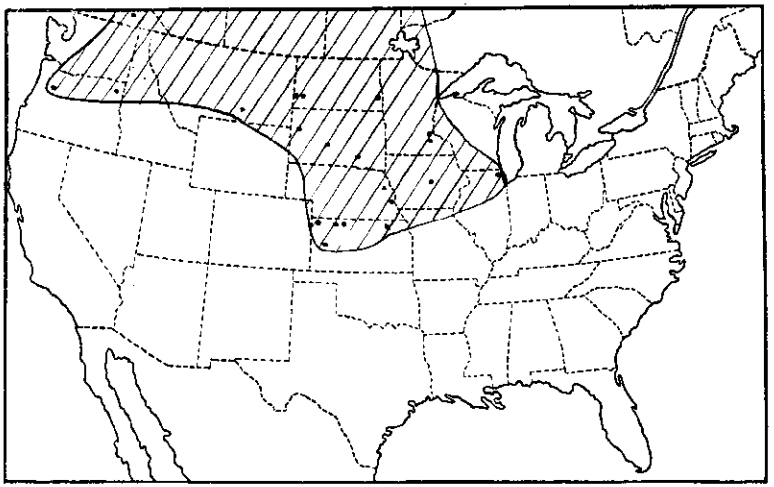
COLORADO: seventeen males.

MONTANA: male, Huntley, July 23, 1917; two males, Huntley, August 23, 1915; six males.

OREGON: male, Union, September 1, 1896 (C. V. Piper); male, Corvallis, July 20, 1925 (D. A. Wilbur); male, Corvallis, August 16, 1925 (D. A. Wilbur).

BRITISH COLUMBIA: male, Vernon, July 25, 1917 (Sladen).

Without locality data: twenty-eight males.



Distribution of **Timulla (Timulla) subhyalina** n. sp.

This species has been incorrectly identified in the past as *hexagona* Say and has also been confused with *sayi* Blake. Superficially it appears much like *sayi*, but has smaller ocelli, much paler wings, and almost entirely ferruginous thorax. It is easily recognized by these three characters. In the seventy-six specimens ranging in distribution from Illinois, Minnesota and Kansas to Oregon and British Columbia, which have been examined, there is almost no variation in the color of the thorax or in the transparency of the wings, and while there is some variation in the size of the ocelli, it is slight and they are always distinctly smaller than in *sayi*. One specimen from Corvallis, Oregon, has the ocelli moderate in size; space between eye margins and lateral ocelli equal to one and one-half times the diameter of the latter; the other has the ocelli large, *i.e.*, the two dimensions approximately equal; otherwise the two specimens are identical. Although previous workers have believed this species to be the

same as Say's *hexagona*, that view is not tenable, since Say described the latter as having the thorax entirely black and the wings fuliginous. The specimens range in length from 9 to 16 mm.

Timulla (*Timulla*) *hollensis* subsp. *hollensis* (Melander). (New combination)

1903. *Mutilla Sayi* var. *hollensis* Melander, Trans. Amer. Ent. Soc., xxix, p. 324, male.

1916. *Mutilla* (*Timulla*) *hexagona* Bradley, Trans. Amer. Ent. Soc., xlii, p. 213, male (in part).

Type locality, Wood's Hole, Massachusetts. Location of type unknown.

Specimens examined.—

MASSACHUSETTS: male, Nantucket, September 9; male, Nantucket, September 10; two males, Nantucket, September 12.

NEW YORK: male, Cold Spring Harbor, Long Island, August 4, 1921 (E. G. Anderson); male, Yaphank, Long Island, September 22, 1911; male, Yaphank, Long Island, October 11, 1913.

MARYLAND: male, Frederickstown.

Without data: male.

Very similar in appearance to *sayi* Blake from Texas, but differs in the fuscous to black color of the pubescence of the vertex, mesonotum and scutellum, the tegulae conspicuously darker in color than the mesonotum, and the smaller ocelli.

Timulla (*Timulla*) *hollensis* subsp. **melanderi** n. subsp.

1916. *Mutilla* (*Timulla*) *hexagona* Bradley, Trans. Amer. Ent. Soc., xlii, pp. 213–214, male (in part).

Male.—Head, thorax, first abdominal segment, and legs, entirely black; remainder of abdomen ferruginous; head and thorax clothed with sparse, pale pubescence, except the mesonotum and anterior portion of scutellum with sparse, black pubescence; thin, apical fringe of first abdominal tergite black; second tergite with a broad, distal band of sparse, black pubescence; third and fourth tergites sparsely black pubescent distally; remaining tergites with mostly pale pubescence; distance between eye margins and lateral ocelli approximately one and one-half times the greatest diameter of the latter; mandibles not excised beneath; wings dark fuscous. Length, 13 mm.

Holotype.—Male, Falls Church, Virginia, August 7 (Nathan Banks), in collection Cornell University, Ithaca, New York.

Paratypes.—Male, Falls Church, Virginia, September 4, 1915 (C. T. Greene); male, Plummer's Island, Maryland, August 5, 1914 (R.

C. Shannon); male, Baltimore, Maryland, July, 1909; male, Clementon, New Jersey, July 29, 1900 (G. M. Greene); male, Gloucester County, New Jersey, September 7, 1890; male, Philadelphia, Pennsylvania, August 17, 1891; male, Enola, Pennsylvania, August 20, 1910 (W. S. Fisher).

Exactly like subsp. *hollensis* except the thorax entirely black, and the vertex and posterior part of scutellum with pale pubescence.

Timulla (Timulla) dubitatiformis n. sp.

1909. *Mutilla* (*Timulla*) *briaxus* Rohwer, Trans. Amer. Ent. Soc., xxxv, pp. 132–133, female (not male).

1909. *Mutilla* (*Timulla*) *dubitatiformis* mss. Rohwer, Trans. Amer. Ent. Soc., xxxv, p. 133, female.

Female.—Ferruginous, the flagellum and legs blackish, broad distal margin of the first and second abdominal tergites, and exposed areas of tergites three to five, all black; first tergite with a narrow, distal band of black pubescence; second tergite with a narrow, distal band narrowly dilated at the anterior middle, of dense, glittering, pale pubescence; tergites three to five with distal bands of dense, glittering, pale pubescence, that on the third interrupted medially; lateral margins of thorax slightly but distinctly emarginate medially; thorax not broader posteriorly than anteriorly; scutellar scale obscure, almost obsolete; mesonotal-scutellar suture obscure; pygidial area weakly, longitudinally rugose, the surface granulate throughout. Length, 9 mm.

Head ferruginous, the flagellum blackish, slightly tinged with ferruginous; tips of mandibles black; front and vertex with sparse, erect and recumbent, ferruginous pubescence, elsewhere the head with sparse, pale, glittering pubescence; mandibles slender, edentate at the tips and with a slight tooth within near the apex; posterior margin of clypeus strongly, arcuately elevated, the elevated margin obscurely serrate; surface of clypeus anterior to elevated margin concave, glabrous; clypeus with a small, distinct, median tubercle immediately posterior to the elevated margin; antennal tubercles approximate; first segment of flagellum slightly shorter than segments two and three united; antennal scrobes distinctly carinate above; front and vertex with moderate, dense, confluent punctures; genae with moderate, close punctures interspersed with very fine punctures; relative widths of head and thorax, 3.8 : 3.5.

Thorax entirely ferruginous, the dorsum clothed with sparse,

erect and recumbent, ferruginous pubescence, elsewhere with sparse, pale, glittering pubescence, that on the pleural areas appressed; lateral margins of dorsum of thorax slightly but distinctly emarginate; humeral angles broadly rounded; scutellar scale obscure, almost obsolete; mesonotal-scutellar suture obscure; dorsum of thorax with moderately large, dense, confluent punctures, the latter somewhat larger than on the front and vertex; dorsum and posterior face of propodeum reticulate, the posterior half of the latter only very faintly reticulate; lateral margins of posterior face of propodeum slightly crenulate; pleural areas micropunctate and micropubescent; sides of propodeum with small, scattered punctures as well as micropunctate.

Abdomen ferruginous, except the distal margin of the first tergite, broad, distal margin of second tergite, and exposed areas of tergites three to five, all black; first tergite with a narrow, distal band of black pubescence; tergites two to five with pale, glittering pubescence at the distal margin as described above; first tergite with moderate, separated punctures interspersed with fine punctures, clothed with sparse, erect, pale pubescence except at the distal margin; lateral areas of second tergite with moderate, distinct punctures, the posterior third dilated at the anterior middle with fine, close punctures, clothed with sparse, erect and recumbent, dark ferruginous pubescence, the recumbent pubescence black in certain lights, and both erect and recumbent pubescence becoming pale and glittering towards the lateral margins; distal margin of second tergite with a pale pubescent band as described above; tergites three to five with fine, close punctures and sparse, erect and recumbent, dark pubescence except the distal bands as mentioned above; pygidial areas as described above; first sternite with a median, longitudinal carina on the anterior two-thirds; second sternite with moderate, distinct punctures interspersed laterally and posteriorly with fine punctures; sternites three to five with small, close punctures towards the distal margin; hypopygium with small, close punctures; all the sternites with sparse, pale, glittering pubescence, and sternites two to five each with a thin, distal fringe of pale pubescence.

Legs very dark ferruginous, more or less blackish; coxae, and femora beneath distinctly ferruginous; tibial spines ferruginous; legs clothed throughout with sparse, pale pubescence; calcaria pale.

Holotype.—Female, Cat. No. 18463 U. S. National Museum, Boulder, Colorado, May 26, 1908 (T. D. A. Cockerell).

Paratypes.—

MASSACHUSETTS: female, Nantucket, September 13, 1927 (C. W. Johnson).

CONNECTICUT: female, Lyme, May 13, 1911 (A. B. Champlain).

NEW YORK: female, Orient, Long Island, May 22, 1933 (Roy Latham); female, Riverhead, Long Island, July 1, 1933 (Roy Latham); female, Riverhead, Long Island, August 7, 1933 (Roy Latham); female, Sag Harbor, Long Island, May 6, 1932 (Roy Latham); female, Calverton, Long Island, June 19, 1932 (Roy Latham); two females, Cold Spring Harbor, Long Island, June 17, 1923 (E. G. Anderson); female, Cold Spring Harbor, Long Island, June 22, 1921 (E. G. Anderson); three females, Cold Spring Harbor, Long Island, June 27, 1921 (E. G. Anderson); female, Cold Spring Harbor, Long Island, June 27, 1921 (S. H. Emerson); female, Cold Spring Harbor, Long Island, August 9, 1921 (S. H. Emerson); female, Cold Spring Harbor, Long Island, September 13, 1922 (E. G. Anderson).

NEW JERSEY: female, Cold Spring, July 14, 1903.

MARYLAND: female, Chesapeake Beach, July 27, 1913 (R. C. Shannon); female, College Park, August 23, 1925 (C. E. Green); female, Beltsville, July 4, 1912 (W. L. McAtee); female, Plummer's Island, June 11 (H. S. Barber).

VIRGINIA: female, Arlington, May 15, 1925 (D. H. Blake); female, Clifton, May, 1933 (J. C. Bridwell); female, East Falls Church, June 18, 1912; female, Falls Church, August 2; female, Falls Church, August 4 (Nathan Banks); female, Falls Church, September 1, 1915 (C. T. Greene); female, Gunston Cove, June 4, 1922 (Budlong and Barber).

OHIO: female, Athens, July 29, 1932 (W. C. Stehr); female, Columbus, April 13, 1902 (Bridwell).

GEORGIA: female, Stone Mountain, August 16, 1913.

FLORIDA: female, Orange County, June 24, 1929 (A. J. Wafford).

MISSISSIPPI: female, Agricultural College, April 21, 1918 (R. G. Prescott); female, Agricultural College, April 25, 1917 (E. E. Johnson); female, Agricultural College, May 6, 1922 (H. G. Miller); female, Agricultural College, May 22, 1922 (Hewes); female, Agricultural College, July 8, 1913 (J. G. Hester); female, Agricultural College, July 11, 1913 (T. F. McGehee); female, Agricultural College, July 22, 1922 (W. C. Avens); female, Agricultural College, September 21 (S. R. Evans).

LOUISIANA: two females, New Orleans.

MISSOURI: female.

IOWA: female, Iowa City (Wickham); female, Ames, August 18, 1926; female, Sioux City, September 5, 1927 (C. N. Ainslie).

MINNESOTA: female, Fridley Sand Dunes, Anoka County, June 19, 1926 (R. W. Dawson).

SOUTH DAKOTA: female, Medicine Lake, Florence, June 23, 1927 (H. C. Severin); three females.

NEBRASKA: female, Plattsmouth, September 3, 1923 (C. B. Philip); two females, Lincoln, June 21, 1912 (E. J. Taylor); female, Lincoln, September 9, 1924 (R. W. Dawson); female, West Point; female, Scribner, June 18, 1913 (L. T. Williams).

KANSAS: female, Riley County, June 24 (Popenoe); female, Riley County, July 24 (G. A. Dean); female, Riley County (F. Marlatt); female, Baldwin, May (Bridwell); female, Baldwin, June (Bridwell); female, Baldwin, July 14, 1906 (J. C. Bridwell); female, Baldwin, August 5, 1906 (J. C. Bridwell); female, Baldwin, August 16, 1906 (J. C. Bridwell); two females, Clay County, August, 1901 (Bridwell); female, Douglas County, May 21, 1922 (W. J. Brown); female, Ottawa, July 13, 1923 (W. J. Brown); female, Emporia, August 7, 1932 (R. C. Smith); female, Sumner County (R. H. Beamer); two females, Rawlins County (F. X. Williams).

OKLAHOMA: female, Norman, April 11, 1932 (J. Smith).

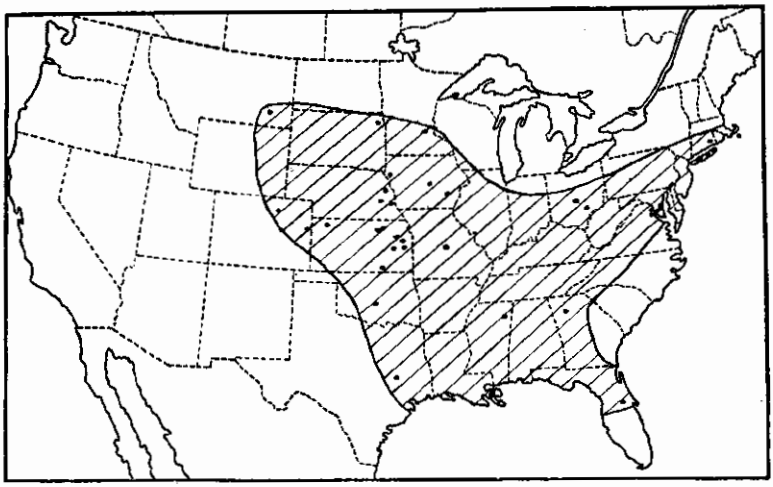
TEXAS: female, Madison County, August 22, 1932 (F. F. Bibby); two females.

COLORADO: female, Burlington, July 26, 1933 (Rodeck and James); female, Ft. Collins: two females.

MONTANA: female, Forsyth.

Without data: two females.

Dubitatiformis differs from all other female *Timullas* north of Mexico except *euterpe* and *euphrosyne* in the distal black pubescent band of the first abdominal tergite. It is readily distinguishable from the two latter species by the dusky to black color of the last three abdominal tergites, and the pale pubescent markings of the same tergites. The almost obsolete scutellar scale and the absence of pale pubescent markings on the anterior half of the second abdominal tergite are additional characters which are of aid in identification. The paratypes vary in length from 5 to 10 mm.; the color of the terminal abdominal segments varies from black to ferruginous, but they are clothed with pale pubescence, not with fulvous as in *euterpe* and *euphrosyne*.



Distribution of **Timulla (Timulla) dubitatiformis** n. sp.

This female has an exceptionally wide distribution and no male of which the female is unknown has a similar distribution. I am of the opinion that one or all of the group of males including *rufosignata, tolerata, subhyalina, hollensis* subsp. *hollensis, hollensis* subsp. *melanderi,* and *sayi* represent the male sex. All of these have a more limited distribution than *dubitatiformis,* and I have attempted without success to find some basis for separating the latter into geographical groups which could be correlated with the above males. The situation may be that the males have differentiated into geographical groups, while the females have remained stable; this has been found to be true of certain other species of Mutillidae both in the United States and the Philippine Islands. All that can be said at present is that the male will probably prove to be among those mentioned above.

This female was recognized by Rohwer as new as early as 1909, and specimens were labeled by him as *dubitatiformis* mss. Later Rohwer came to the conclusion that *dubitatiformis* mss. was the female sex of *briaxus* Blake and published a description of his specimen under the name *briaxus.* Through an oversight the name "*dubitatiformis*" was not changed to "*briaxus*" in the last paragraph of his discussion (p. 133). Specimens of *briaxus* Blake (= *vagans* Fabr.) taken in copula with females have demonstrated that the latter are entirely different from Rohwer's *dubitatiformis* mss., thus leaving the species without a valid name. In order to

avoid confusion I have used Rohwer's manuscript name *dubitatiformis* and based the description on the specimen selected and labeled by him as the holotype specimen. I am indebted to Mr. S. A. Rohwer and Miss Grace Sandhouse for the information regarding the manuscript name *dubitatiformis* and the specimens on which it was based.

Timulla (Timulla) contigua n. sp.

Female.—Head, thorax, first abdominal segment except posterior half of tergite, and anterior two-thirds of second abdominal segment, all ferruginous, the remainder of abdomen, antennae and legs, black; head and dorsum of thorax contiguously but not coarsely punctured; scutellar scale entirely absent; sides of dorsum of thorax distinctly but weakly emarginate medially; second abdominal tergite finely punctured throughout, without anterior, pale pubescent spots; pygidium faintly, longitudinally rugose anteriorly, granulate posteriorly. Length, 9 mm.

Head ferruginous, the antennae and tips of mandibles black, clothed with scattered, erect, fuscous hairs, and sparse, recumbent, ferruginous pubescence, except that on the genae, pale; mandibles edentate at the tips and with a small tooth within near the apex; clypeus strongly elevated posteriorly, the elevated margin strongly arcuate, slightly dentate at the lateral extremities and narrowly emarginate medially; antennal tubercles approximate medially; antennal scrobes distinctly carinate above; front, vertex and genae with moderate punctures, the latter close and confluent immediately behind the antennal scrobes, distinct and contiguous on the front and vertex, separated and interspersed with fine punctures at the posterior margin of vertex and on the genae; relative widths of head and thorax, 3.4 : 3.1.

Thorax entirely ferruginous, clothed with sparse, recumbent, ferruginous pubescence on the dorsum, with sparse, erect, pale hairs on the posterior face of propodeum and pale micropubescence on the pleural areas; thorax subrectangular, elongate, the width in relation to length, 3.1 : 5.5, the lateral margins of the dorsum distinctly but shallowly emarginate medially; relative widths of thorax at humeral angles, middle of prothorax, anterior spiracles, middle of mesothorax, posterior spiracles and at dorsum of propodeum, 2.6 : 3.1 : 2.7 : 2.6 : 2.8 : 3.1; humeral angles rounded; dorsum of thorax with moderate, contiguous

punctures anterior to the mesonotal-scutellar suture, coarsely punctured merging into reticulate posterior to the latter; scutellar scale entirely absent; lateral margins of posterior face of propodeum denticulate; propleura micropunctate and with obscure, moderate, shallow punctures; meso- and metapleura micropunctate and with moderate, shallow, close punctures.

Abdomen black, except anterior half of first tergite, first sternite entirely, anterior two-thirds of second segment, and the last two sternites, all ferruginous; first tergite with an inconspicuous, pale pubescent band at the posterior margin, second tergite with a broad, conspicuous band of pale pubescence at the posterior margin, the anterior margin of the band strongly, narrowly, angulately dilated medially; tergites three to five each with a band of pale pubescence at the posterior margin not interrupted medially, that on the third tergite most prominent; all the sternites with fringes of pale hairs at the posterior margin; second tergite with fine, distinct punctures interspersed with scattered, small punctures, the fine punctures becoming obsolete on the antero-lateral areas; tergites three to five with fine, distinct punctures interspersed with scattered, small punctures; pygidium faintly, longitudinally rugose anteriorly, granulate posteriorly; first sternite with a strong, longitudinal, median carina on the anterior half; second sternite with moderately small punctures on the disk, becoming interspersed with fine, distinct punctures at the lateral and posterior margins; sternites three to five with moderately small, close punctures posteriorly; last sternite with moderately small, dense punctures.

Legs entirely black, clothed with sparse, pale pubescence; calcaria pale.

Holotype.—Female, Brownsville, Texas, May 25, 1934 (J. N. Knull), in collection of Ohio State University, Columbus, Ohio.

Paratype.—Female, Texas.

Superficially resembles *dubitatiformis* but the thorax is more elongate, the scutellar scale is lacking, the front, vertex and dorsum of thorax are much less coarsely punctured, the punctures moderate and contiguous, not dense and confluent, and the first tergite with the posterior, marginal pubescent band pale instead of black. Also resembles *euphrosyne* in the color, puncturation and pattern of the second abdominal tergite, but that species has the head and thorax much more strongly punctured, the pubescent band at the posterior margin of the first tergite black, and has the last three abdominal

segments entirely ferruginous and clothed with ferruginous pubescence.

Timulla (*Timulla*) *rufosignata* (Bradley). (New combination)

1916. *Mutilla* (*Timulla*) *rufosignata* Bradley, Trans. Amer. Ent. Soc., xlii, p. 212, male.

Holotype.—Male, Everglade, Florida, April 11, 1912 (Wm. T. Davis), in collection of Cornell University, Ithaca, New York.

Specimens examined.—

GEORGIA: two males, Tifton.

FLORIDA: male, Gainesville, Alachua County, May 13, 1914; male (paratype).

Characterized by the very small ocelli, the mandibles not emarginate nor toothed beneath, the deeply, coarsely reticulated propodeum, and the ferruginous pronotum and mesonotum.

Timulla (Timulla) tolerata n. sp.

Male.—Black, except the pronotum, mesonotum, anterior margin of scutellum, tegulae, and abdomen beyond the first segment, ferruginous; mandibles not at all emarginate nor toothed beneath; median area of clypeus triangular; ocelli moderately small, the distance between the eye margins and the lateral ocelli equal to slightly more than twice the greatest diameter of the latter; propodeum moderately reticulate; mesosternum not tuberculate; median, elongate, glabrous area of last tergite terminating in a Y-shaped carina; fifth and sixth sternites without lateral tubercles; seventh sternite with the lateral tubercles almost obsolete; hypopygium with a pair of obscure, oblique carinae on the anterior half; wings fuscous throughout; legs clothed with black pubescence. Length, 12 mm.

Head black, the mandibles subterminally, vertex, and genae tinged with ferruginous, clothed with sparse, intermixed pale and fuscous pubescence; mandibles edentate at the apex and with a small tooth within near the apex, the dorsal aspect with a distinct, longitudinal carina, not at all emarginate nor toothed beneath; median area of clypeus triangular, the anterior margin and the posterior angle punctate, the remainder glabrous, impunctate; scape distinctly bicarinate beneath; first segment of flagellum approximately equal in length to the second; antennal scrobes carinate above; front, vertex and genae with moderate, close, more or less confluent punctures, the latter more separated on the genae, close and confluent on the front and vertex; ocelli as above; relative widths of head and thorax at the tegulae, 4.05 : 5.00.