

10491

W.L. Brown, Jr.
COLLECTION

TRANSACTIONS

OF THE

TEXAS ACADEMY OF SCIENCE

FOR 1901.

A CONSIDERATION OF S. B. BUCKLEY'S "NORTH
AMERICAN FORMICIDAE."

WILLIAM MORTON WHEELER,
Professor of Zoology, University of Texas.

VOLUME IV, PART II, NO. 2.

AUSTIN, TEXAS, U. S. A.:
PUBLISHED BY THE ACADEMY.
1902.

THE TEXAS ACADEMY OF SCIENCE.

A CONSIDERATION OF S. B. BUCKLEY'S "NORTH AMERICAN FORMICIDAE."*†

WILLIAM MORTON WHEELER,
Professor of Zoology, University of Texas.

During the years 1866 and 1867, Mr. S. B. Buckley, who was State Geologist of Texas from 1874 to 1875, published descriptions of some sixty-seven presumably new species of ants from the United States. The work was undertaken without any previous training in entomology, and has been regarded as something of a taxonomic fiasco.† Nor could this have been otherwise when one reflects that there are scarcely any insects more difficult of analysis and description than the Formicidæ. As Buckley lived in Texas during his study of the ants, it happens that some thirty-eight, or more than half of the species described, are from the State of the Lone Star. The area from which he drew his specimens comprises Central Texas (Travis and the neighboring counties west to San Saba, Mason and McCulloch counties), and the northern portions (Wichita and Buchanan [now Stephens] counties). This is, of course, a rather limited region, and hence represents only a part of the great ant-fauna of the State. The very different ant-fauna of the Trans-Pecos, as well as that of Southeastern Texas, was in great part unknown to Buckley.

The sixty-seven odd descriptions are, indeed, fearfully and wonderfully made. With a persistency, which at times seems almost intentional, the author selects for description the worthless, insignificant

*Contributions from the Zoological Laboratory of the University of Texas, No. 30.

†A study of S. B. Buckley's character and attainments should be undertaken by anyone who would estimate his work properly. Some valuable notes on this subject have been collected by Mr. Robert T. Hill (The Present Condition of Knowledge of the Geology of Texas, Bull. No. 45, U. S. Geol. Survey, 1887, p. 32 et seq). I am indebted to my friend Dr. W. B. Phillips, Director of the State Mineralogical Survey of Texas, for calling my attention to this interesting paper.

features of the ant's body,* and passes without a word over the important, distinctive characters. His conception of generic characters is even more nebulous than his appreciation of specific differences. Sometimes he mistakes the sex of the form he is describing, and at other times confounds several very distinct forms in a single description.

No wonder, therefore, that Prof. Forel wrote, in 1884: "Quant aux descriptions de Buckley, elles sont telles que je suis obligé d'en faire absolument abstraction, vu qu'elles ne permettent pas de reconnaître une seule espèce, ni même les genres." Dr. Gustav Mayr and Prof. Emery, however, who have occupied themselves somewhat more extensively with the ants of the United States, have gone to considerable pains to determine the species described by the Texan geologist. They have, indeed, succeeded in identifying some of the forms more or less accurately, but the great bulk of Buckley's names still clogs our taxonomy and exasperates the student.

To some, the wisest course would seem to be to follow Forel and ignore Buckley's work *en bloc*; and certainly the writer of these pages would be the last to drag these names from their well-merited neglect, were it not that the Formicidæ, for the following reasons, occupy a somewhat peculiar position among insects: First, the number of species representing the family in a given portion of the United States, or, in fact, in the whole country, is not very large. This greatly facilitates identification by elimination. Second, in any locality as circumscribed as that from which Buckley obtained more than half of his species, certain forms are always very abundant and cannot fail to arrest the attention of the most superficial observer and collector. Third, the habits of the species are often more characteristic than their morphological traits, so that when the former are recorded they are a great aid in recognizing species.

Now these considerations have some bearing on Buckley's work. As I have devoted my leisure hours during the past three years to studying and collecting the ants of Texas, especially in the very spot which for many years was Buckley's home, I am naturally in a better position to judge of his Texan species than those who have had to study the ant-fauna of this region at long range. It is clear that Buckley must have left us descriptions of the more striking and ubiquitous ants of Central Texas, and this is borne out by a study of his work. Moreover, in several cases the ethological notes appended to his descriptions leave no doubt as to the species he had in hand.

*Such, e. g., as the distance (sometimes measured to within one or two hundredths of an inch!) to which the wing tips of the female project beyond the abdomen as if, forsooth, the abdomen of these insects were incapable of expansion or contraction.

But after all attempts at identifying Buckley's species by Mayr, Emery, and myself, there still remains a most perplexing residuum consisting of a number of forms belonging to difficult genera like *Formica*, *Camponotus*, *Lasius*, *Prenolepis*, *Myrmica*, *Pheidole*, *Crematogaster*, etc. In my opinion, these will never be recognized, and should be consigned to that taxonomic rubbish-heap which has for many years past been receiving the worthless entomological names and descriptions of Walker, Macquart, Bigot, F. Smith, and others.

In the following pages I have seen fit to cite Buckley's species *seriatim* with their conjectural identifications. I am not aware of having made any effort to strain a point in favor of Buckley,—for I hold that no zoologist deserves a particle of credit for writing a worse than useless description,—but if I have succeeded in throwing a little light on some of his species, I could wish this to be regarded as a tribute to a pioneer naturalist who long ago searched the woods and hill-slopes of Texas, collecting ants and observing their ways "with much pleasure and satisfaction."

1. *Formica nova-anglæ*; female, worker. Maine.

This may be *F. exsectoides*, Forel, or some form of *F. rufa*, L. (e. g., *F. obscuripes*, Forel), but the description is too vague, and should be discarded.

2. *Formica Nortonii*; female, worker. Conn.

Probably either *F. pallide-fulva*, Latr., subsp. *nitidiventris*, Emery, or *F. obscuripes*, Forel, but the description is worthless like the preceding.

3. *Formica americana*; female, worker. Conn.

This is very probably one of the northern varieties of *Camponotus marginatus*, Latr. (e. g., var. *minutus*, Emery), as Emery ('93, p. 676; '94, p. 337) suggests; since the female is described as black with the exception of the mouth-parts and legs, and has no discal cell, whereas the worker has a red thorax. The description, however, is too vague, and Emery's varietal name should not be supplanted by Buckley's.

4. *Formica connecticutensis*; female, worker. Conn.; N. Y.; D. C.

This is almost certainly a form of *F. fusca*, L., but the description is so loose as to apply to any of the following subspecies and varieties, which are not uncommon, as I know from collecting in Connecticut: *F. fusca*, var. *subsericea*, Say, var. *subanescens*, Em., and subsp. *subpolita*, Em., var. *neogagates*, Em.

5. *Formica gnava*; male, female, worker. Texas; D. C.; N. Y.; Conn.

Buckley certainly included several species of *Formica* under this name. The description throughout was evidently drawn from a Texan variety of *F. fusca*, intermediate between var. *subsericea*, Say, and var. *neorufibarbis*, Em. Emery suggests (*in litteris*) the name *sub-*

sericeo-neorufibaris for this form, which differs from the typical *neorufibaris* in presenting a darker clouding of the vertex and thoracic dorsum. It is the only *Formica* of the kind occurring in Central Texas. It is very common in rather damp, shady localities in Travis and the adjoining counties. It must have been known to Buckley, who gives Central Texas the first place in his list of localities. Of course, his mention of New York, etc., in this connection shows, that he had also some other species (in all probability, *F. nitidiventris*) in mind while he was writing the description. His ethological notes, "very active and brave; bites sharply, and emits a strong odor of formic acid," and his description of the workers as being of a "bronze" color when first caught, or seen in their cells," can refer only to the Texan form, and to no other similar *Formica* known to me. As the name suggested by Emery (*in litt.*) is rather cumbersome, while Buckley's is very brief and descriptive, I would suggest that the mid-Texan form of *Formica fusca* be henceforth known as var. *gnava*, Buckley.

6. *Formica occidentalis*; female, worker. N. Y.; Conn.

Emery ('94, p. 337) suggests that this may be *Lasius claviger*, Mayr. It is evident that the description refers to a yellow *Lasius*, but the species of this genus are too difficult of separation to be identified from descriptions like those of Buckley.

7. *Formica monticola*; female, worker. N. Y.

This, too, is a yellow species of *Lasius*; and as the head of the female is described as being narrower than the thorax, we may suppose that Buckley had before him specimens of *L. myops*, Forel, or *L. brevicornis*, Emery, but, as in the case of the preceding species, there is no possible way of deciding.

8. *Formica gracilis*; female, worker. N. Y.

Very probably, as Emery suggests ('94, p. 337), the common *Tapi-noma sessile*, Say. It may be safely put down as a synonym of that common and well-known Dolichoderine.

9. *Formica parva*; worker. D. C.

The small size (.1 inch) would indicate that this can hardly be a *Formica*. It may be merely a small form of the preceding. The description is utterly worthless.

10. *Formica atra*; worker. D. C.

This is evidently a *Camponotus*. Emery suggests that it may be the same as the form which he has called *C. marginatus*, subsp. *discolor*, var. *cnemidatus*.

11. *Formica virginiana*; worker. D. C.

Perhaps a variety of *F. pallide-fulva*, Latr., according to Emery ('94, p. 337).

12. *Formica arenicola*; worker. D. C.

Buckley's description of this species agrees pretty well with specimens of *Prenolepis imparis*, Say, which sometimes nests in very sandy soil. But this ant is decidedly hairy, and Buckley expressly states that his form is "not hairy."

13. *Formica politurata*; worker. Mich.

Emery suggests ('94, p. 338) that this may be a variety of *F. fusca*, subsp. *subpolita*, Emery, but the description agrees about equally well with *F. lasioides*, Em., var. *picea*, Em. The name and description may be safely discarded as worthless.

14. *Formica septentrionale*; female, worker. Mich.; Ill.

Evidently a *Camponotus* which Emery ('94, p. 338) believes may be a variety of *C. marginatus*, Latr.

15. *Formica floridana*; worker. Fla.

Recognized by Emery ('93, p. 670) as a variety of *Camponotus abdominalis*, Fabr., and listed as *C. a.*, var. *floridanus*, Buckley. Mayr ('86, p. 423) obtained one of Buckley's types of this species from Norton.

16. *Formica tejonica*; male. Cala.

The absence of the discal cell, which is nearly always present in *Formica*, indicates that this is a *Camponotus*. Buckley's description agrees well with males of *C. maculatus*, Fabr., subsp. *vicinus*, Mayr, var. *niti-diventris*, Em., from California.

17. *Formica tenuissima*; worker. Tex.

Mayr ('86, p. 432) believed that this was very probably *Forelius (Iridomyrmex) McCooki*, Forel. I cannot accept this determination for three reasons: First, Buckley could not have recorded this species as "rare"; second, he has given a description of *McCooki* as *F. fatida* (see No. 27); third, Buckley's *F. tenuissima* is very probably a variety of *Brachymyrmex Heerii*, Forel, with pale yellow males and rather hairy body in the worker. This form is really rare in Central Texas according to my own observations, and occurs "in the ground beneath stones," as Buckley says. The description does not, however, completely fit my specimens.

18. *Formica perminuta*; worker. Tex.

This form was regarded by Emery as perhaps a species of *Brachymyrmex*. It may be the form referred to in connection with the preceding species. But Buckley's description also agrees very well with immature workers of a small *Prenolepis* very common under stones in Central Texas (see No. 19). This is another very dubious and therefore worthless description.

19. *Formica picea*; worker. Tex.

According to Mayr ('86, p. 431), who saw some of Buckley's types, this is *Prenolepis vividula*, Nyl. (= *P. parvula*, Mayr, according to Emery). I have not yet been able to find the true *P. parvula* about Austin (Buckley's type locality), nor, indeed, anywhere in Texas, but instead I have often found a very closely allied form which Emery (*in litt.*) regards as an undescribed species (see, however, Buckley's *F. ter-ricola*, No. 28). I believe that it would be best to accept Mayr's synonymy or to discard Buckley's name and description altogether.

20. *Formica Lincecumii*; male, female, worker. Tex.

Emery ('94, p. 338) believed that this might prove to be a species of *Formica*, but no such tree-inhabiting *Formica* is known to me to occur in Texas. Buckley may perhaps have had specimens of a *Dolichoderus*, *D. Taschenbergi*, Mayr., e. g., which should occur in Texas, as it is known to occur in Louisiana. Unfortunately, only the worker of *D. Taschenbergi* is known, so that the description of the male and female of Buckley's species can not as yet be utilized in the determination. Buckley's form could be identified as *Camponotus (Colobopsis) impressus*, Rog., which lives in trees, were it not that he expressly mentions the presence of a discal cell in the female, and could scarcely have overlooked the peculiar configuration of the head in this sex.

21. *Formica festinata*; female, worker, soldier. Tex.

This species is recognizable with certainty as a variety of *Camponotus fumidus*, Rog., of very common occurrence on the dry hill-slopes of Central Texas. It is characterized by the absence of hairs on the antennal scape of the worker major.* This is such a large, conspicuous and widely distributed ant that Buckley simply could not have overlooked it. Moreover, his ethological notes are reasonably correct and apply to no other species in the State: "They are very active, traveling beneath rocks and sticks where they have cells and galleries in the earth to a depth of twelve or eighteen inches. They are not war-like, and rarely bite when caught, nor are they often seen in the open air, hence they probably seek food by night." A good instance of Buckley's superficiality as an observer is shown in his supposition that the dark-headed workers major are simply older individuals than the slender honey-yellow minors. The Central Texas form of *C. fumidus* may be known as var. *festinatus*, Buckley.

22. *Formica insana*; female, worker. Tex.

This is undoubtedly a synonym of *Dorymyrmex pyramicus*, Roger. Besides the fact that the description agrees well with the commoner

*In Trans-Pecos Texas this form is replaced by another variety (*fragilis* Pergande or *pubicornis* Emery).

Texas forms, McCook ('79, pp. 185-186), who suggested this determination, claims to have seen two of Buckley's types in the collection of the Philadelphia Academy of Natural Sciences. Buckley's ethological notes are correct and will scarcely apply to any of our other ants, but his English name, "Crazy ant," is a misnomer, as this species is by no means *non compos mentis*. Always alert and self-assertive, it is one of our few species that can adapt itself to the extremes of a Texas drought and make a livelihood when most other ants are compelled to aestivate in the depths of the soil.

23. *Formica masonia*; worker. Tex.

If I am not mistaken, this is a *Liometopum*. The description agrees very well with *L. apiculatum*, Mayr, which I recently captured in the Trans-Pecos (Paisano Pass, Brewster county). But as it would apply almost equally well to *L. microcephalum*, Panz., var. *occidentale*, Em., which in all probability occurs in Western Texas, Buckley's name should not be substituted for that of Mayr.

24. *Formica saxicola*; female, worker. Tex.

Emery ('94, p. 338) conjectures that this may be a species of *Lasius*. As yet I have been unable to find any species of this genus in the State. Buckley's specimens were from North Texas (Buchanan [now Stephens] County), however, and it is not improbable that *Lasius* may occur in that region. Buckley's color description points to a form like *L. americanus*, Em., or *L. aphidicola*, Walsh.

25. *Formica discolor*; female, worker. Tex.

Emery ('93, p. 677) regards this form as a subspecies of *Camponotus marginatus*, Latr., now known as subsp. *discolor*, Buck. He is undoubtedly correct in this determination. The form under consideration is very common throughout Central Texas. It is sometimes found beneath logs as stated by Buckley, but small colonies are far more frequently found inhabiting the abandoned galls of *Holcopsis cinerosus*, Basset, on live-oak trees (*Quercus virginiana*).

26. *Formica sansabeana*; male, female, worker. Tex.

This, too, is unquestionably a *Camponotus*, and is adopted by Emery ('93, p. 673) as *C. maculatus*, Latr., subsp. *McCooki*, Forel, var. *sansabeanus*, Buckley. The species is common, but local. Though it is sometimes found in decaying stumps, as Buckley states, it occurs far more frequently under stones in shady places. Males and winged queens are present in the nests throughout the year.

27. *Formica fatida*; female, worker. Tex.

This is another ant concerning which there can be no question. It is simply *Iridomyrmex (Forelius) McCooki*, Forel, and it is surprising that McCook, who was familiar with the species and with Buckley's

work did not recognize the fact. The description of the female—notably, the brown bands on the abdomen—will apply to no other Texan ant. The habits are also correctly described, e. g., its peculiar custom of going in single file, ascending and descending trees, its disagreeable odor (“resembling rotten cocoa-nut”), and the number (“ten or twelve”) of dealated queens often found in a single nest. I suggest, therefore, that Forel’s name as of later date be regarded as a synonym of Buckley’s, which should, of course, be changed to *Forelius* (or *Iridomyrmex*) *fatidus*, Buckley.

28. *Formica (Tapinoma) terricola*; male, female, worker. Tex.

According to Mayr ('86, p. 431), who saw Buckley’s types, this species is *Prenolepis vividula*, Nyl. (= *P. parvula*, Mayr). This is possible, but I am inclined to believe that Buckley’s specimens represented the closely allied *Prenolepis* mentioned above (see No. 19). The description of *F. terricola* is more explicit than that of *F. picea*, and includes all the sexes. It applies, moreover, perfectly to the only *Prenolepis* I have as yet taken at Austin (the type locality). The nests contain males and winged queens throughout the year. Buckley mentions their occurrence in March, which would be early even in Texas for the appearance of these sexes in any other ants except certain species of *Camponotus*. Buckley’s specific name may, therefore, be retained for this apparently distinct species, of which I shall give a full description in a subsequent paper.

29. *Formica (Tapinoma) wichita*; worker. Tex.

Mayr ('86, p. 431) saw the types of this species, which he regards as identical with the common northern *P. nitens*, Mayr (= *P. imparis*, Say). This species does not occur in Central or Western Texas so far as my observations extend. Buckley’s specimens were from the northern border of the State (Wichita River).

30. *Formica (Hypochira) subspinosa*; worker. Tex.

This species, described from Central Texas, appears to be a *Dolichoderus*, as Emery suggests ('94, p. 338), but up to the present time I have looked in vain for any ant that will agree with Buckley’s description. His account of the metathorax certainly does not apply to any of the known species of *Dolichoderus* from the United States.

31. *Polyergus texana*; female. Tex.

This is another enigma. At first one is inclined to believe that Buckley may have described some dark colored male *Eciton* as a female *Polyergus*, but since the discovery of a species of *Polyergus* with black legs and abdomen (*P. breviceps*, var. *bicolor*, Wasmann) by Father Muckermann in Southern Wisconsin, and of a very closely allied variety by myself in Northern Illinois ('01, p. 715; foot-note), one is inclined

to suspect that there may be a completely black race of *Polyergus* in this country, and that Buckley may have been fortunate enough to find a virgin queen of this form. But the dimensions given by Buckley (0.17 inch) are certainly small for either a female *Polyergus* or a male *Eciton*.

32. *Ponera texana*; worker. Tex.

This is, in all probability, a species of *Leptogenys*, as Emery ('94, p. 338) suggests. It seems to be merely a variety of the species described as *P. elongata* (see No. 35).

33. *Ponera amplinoda*; worker. Tex.

Undoubtedly a synonym of *Pachycondyla harpax*, Fabr., which is local, but by no means "rare," as Buckley claims, throughout Central Texas.

34. *Ponera pennsylvanica*; worker. Pa.

Recognized by Emery ('94, p. 267) as the American form of *P. coarctata*, Latr., and retained as a subspecies (*P. c.*; subsp. *pennsylvanica*, Buck.).

35. *Ponera elongata*; worker. Tex. *

This is undoubtedly the same as the species which was later described by Mayr as *Leptogenys (Lobopelta) septentrionalis*. The type locality is Austin, and Buckley's description agrees almost perfectly with the worker. He has even noted the difference in the red coloration of the individuals of the same nest. This difference, which is very striking, depends, of course, on the degree of maturity. The ant is common in certain localities about Austin. Buckley says it is "not active," but this is true only during cold weather. It is to be regretted that Buckley's specific name must be substituted for Mayr's, which expresses the fact that this is the only species of *Leptogenys* known to occur as far north as the United States.

36. *Ponera (Ectatoma) Lincecumii*; worker. Tex.

Undoubtedly a species of *Pseudomyrma*, as Emery maintains ('94, p. 270). Of the four Texan species of this genus known to me (viz.: *P. gracilis*, *flavidula*, *pallida*, and *brunea*), the description would apply only to an immature specimen of the last, but this form is itself doubtful on account of the meagreness of F. Smith's description; so that this identification would be simply explaining the obscure by the more obscure.

37. *Odontomachus texana*; worker. Tex.

Of the two species of *Odontomachus* known to occur in the United States, viz.: *O. hæmatodes*, L., subsp. *insularis*, Guér., and *O. clarus*, Rog., Emery ('94, p. 269) conjectures that Buckley's species is probably synonymous with the former, on account of its smaller size. I believe,

however, that Buckley's species must be a synonym of *O. clarus*, Rog., as this species is common and widely distributed in Texas (from Austin to the Trans-Pecos and north to Bosque County), whereas I have never been able to find *insularis* in the State. Size cannot be a criterion, as I have seen many specimens of *O. clarus* that were smaller than specimens of *insularis* in my collection. Besides, Buckley is apt to underestimate the length of his species. But perhaps any attempt to determine the exact synonymy of Buckley's species is of very little moment, since *O. clarus* may be regarded merely as an extreme subspecies of *O. hamatodes*. (See Forel, '01a, p. 124.)

38. *Myrmica rubra*; worker. Tex.

Undoubtedly *Eciton cæcum*, Latr., according to Emery ('94, p. 258). Buckley's name is, of course, of no account, because it was in use even in his day as the name of a very different and very common European and American ant.

39. *Myrmica subrubra*; female, worker. D. C.; Va.

This is treated by Emery ('94, p. 301) as a synonym of the common northern *Stenammina* (*Aphænogaster*) *tennesseense*, Mayr, without further comment. If this is correct, Buckley must have described the male of *tennesseense* as the female. He describes this sex as black and as having short epinotal spines, whereas the queen of Mayr's species is red and has very large and peculiar epinotal spines, which Mayr described at length when he first mentioned this peculiar female under the name of *Aphænogaster lævis* ('62, pp. 95-96). In a later paper ('86a, p. 365) Mayr also claims that Buckley mistook the male of *Stenammina tennesseense* for the female.

40. *Myrmica californica*; worker. Cala.

Recognized by Emery ('94, p. 311) as a species of *Pogonomyrmex*, and now known as *P. californicus*, Buckley.

41. *Myrmica novaboracensis*; female. N. Y.

This ant, described from a female only, is supposed by Emery ('94, p. 286) to be some form of *Cre mastogaster lineolata*, Say.

42. *Myrmica* (*Monomarium*) *diversa*; female, soldier, worker. Tex.

This name covers a multitude of sins, for I am confident that Buckley included under it several species of *Pheidole*, with *Solenopsis geminata* into the bargain! The first part of the description of the soldier seems at first sight to refer to *Ph. Kingü*, André, var. *instabilis*, Emery, especially where he says that the head varies "much in size." This is the only *Pheidole* measuring as much as 0.22 inch, and with variable head, to be found about Austin, but *instabilis* has the eyes very distinctly in front of the middle of the head, so that the remainder of the description must refer to another species and the previously mentioned variation in

the size of the head was probably due to confounding several species. This could be done very readily by a superficial collector, as there are about a dozen species of *Pheidole* in the neighborhood of Austin, and some of these are very common. The female described by Buckley is certainly not the female of *instabilis*, as the latter has a very characteristic coloration quite unlike that of any other Texan species known to me. Again, some of the ethological remarks must refer to *Solenopsis geminata*, as, e. g., when he describes the ants as "throwing the excavated earth without order over the surface."

43. *Myrmica* (*Monomarium*) *minima*; female, worker. Tex.

There can be no doubt, as Emery has shown ('94, p. 274), that this is merely a variety of *Monomarium minutum*, now known as *M. m.*, var. *minimum*, Buckley.

44. *Myrmica* (*Monomarium*) *caca*; worker. Tex.

Emery ('94, p. 260) suggests that this is probably an *Eciton*. It may be either *E. opacithorax*, Emery, or *E. Schmitti*, Emery, but the description is too vague to be intelligible.

45. *Myrmica* (*Monomarium*) *marylandica*; worker. D. C.; Md.

Very probably some form of *Cremastogaster lineolata*, Say, as Emery maintains ('94, p. 286). This is shown by the locality and by Buckley's remark, "it often carries its abdomen turned up erect."

46. *Myrmica* (*Monomarium*) *montana*; worker. Tex.

This is probably the small agricultural ant which I have described as *Pogonomyrmex imberbiculus* ('02). The description agrees equally well, however, with *Xiphomyrmex spinosus*, Pergande, which is often found in the same localities, though the latter does not, as a rule, live under stones. I am certain that Buckley's rather vague account must refer to one or the other of these two species.

47. *Myrmica* (*Monomarium*) *lineolata*; female, worker.

Another unintelligible description, probably referring, as Emery suggests ('94, p. 338), to some species of *Myrmica*. The omission of any mention of locality renders it utterly worthless.

48. *Myrmica* (*Monomarium*) *columbiana*; female, worker. D. C.

This is obviously a *Cremastogaster*, but it can not be *C. lineolata*, subsp. *laviuscula*, Mayr, as Emery suggests, since the queen of this subspecies has a red head and thorax and the latter merely striped with black, whereas in the female of Buckley's form the head and thorax are black. It must be some other form of *lineolata*, possibly var. *cerasi*, Emery.

49. *Myrmica* (*Monomarium*) *aguia*; female, worker. Va.; N. Y.

This is treated by Emery ('94, p. 304) for good reasons as a subspe-

cies of Roger's *Stenammas* (*Aphaenogaster*) *fulvum*. See also Mayr ('86a, p. 365).

50. *Myrmica* (*Monomorium*) *saxicola*; worker. Tex.

In all probability, as Emery suggests, merely one of the numerous varieties of the "fire-ant," *Solenopsis geminata*, Fabr.

51. *Myrmica* (*Monomorium*) *atra*; worker. D. C.

The description is ostensibly drawn from a worker, but Emery ('94, p. 274) believes that Buckley really had before him a small dealated queen of *Monomorium minutum*, Mayr, var. *minimum*, a form which he had already described under No. 43.

52. *Myrmica* (*Tetramorium*) *exigua*; female, worker. D. C.

There can be no doubt, as Emery ('94, pp. 277-278) maintains, that this is the common little "thief-ant," *Solenopsis molesta*, Say (= *S. debilis*, Mayr). In this case again, Buckley has described the male as the female. Of late the synonymy of this species has been called in question by Forel ('01b, pp. 344, 345), who regards Say's description of *Myrmica molesta* as referring to *Monomorium pharaonis*, because Say mentions the occurrence of this ant in houses. Forel is quite positive in his assertions that *Solenopsis molesta* does not have this habit, but he is certainly mistaken in this matter. Not only has Pergande found this species to be a common house ant in Washington (see Emery, '94, p. 277), but another careful observer, Mr. C. E. Brown, of the Milwaukee Public Museum, has recently sent me numerous specimens taken in the houses in the city of Milwaukee. Should Say's specific name be discarded, which I deem inadvisable, Buckley's should be substituted. This would necessitate a change of *S. exigua*, Forel, to *S. pygmaea*, as Forel suggests.

53. *Myrmica* (*Diplorhoptrum*) *scabrata*; worker. Conn.

This is one of the most enigmatic of Buckley's descriptions. An eyeless, myrmicine ant of the color and size recorded by Buckley and occurring in Connecticut, baffles even conjecture.

54. *Myrmica* (*Atta*) *sabeana*; worker. Tex.

There can be little doubt that this is merely another synonym of *Solenopsis geminata*, Fabr., as Emery ('94, p. 276) has pointed out.

55. *Myrmica* (*Atta*) *sublanuginosa*; worker. Tex.

No Texan ant answering to Buckley's description is known to me.

56. *Atta* *Lincecumii*; soldier, worker. Tex.

This, again, is almost certainly *Solenopsis geminata*, Fabr. (Emery, '94, p. 276.)

57. *Atta picea*; soldier. Tex.

Evidently a species of *Pheidole*, and, judging from the color descrip-

tion, probably some variety of *Pheidole dentata*, Mayr., or *Ph. Hyatti*, Emery, but the exact species will never be determined. A *Ph. picea* was later described from Mexico by Mayr.

58. *Atta brazoensis*; soldier, worker. Tex.

Probably *Solenopsis geminata*, Fabr., according to Emery ('94, p. 276).

59. *Atta pennsylvanica*; soldier, worker. Pa.

This species, taken near Philadelphia, must be a *Pheidole*, as Emery ('94, p. 338) surmises. For geographical reasons, it is probably *Pheidole bicarinata*, Mayr., or some form of *Ph. vinelandica*, Forel, but this can never be decided.

60. *Atta coloradensis*; soldier, worker. Tex.

Specimens of *Pheidole* sp. mixed with *Solenopsis geminata*, according to Mayr ('86a, p. 365).

61. *Ecodoma virginiana*; worker. Va.

It is exceedingly difficult to interpret Buckley's description of this species. Emery ('94, p. 329) believes that it may refer to a *Strumigenys*, possibly to *S. clypeata*, Emery, but it would agree even more closely with a small specimen of *Atta* (*Trachymyrmex*) *septentrionalis*, McCook. It is certainly one of the most exasperating descriptions in the series.

62. *Ecodoma texana*; male, female, worker. Tex.

This, of course, refers to *Atta fervens*, Say, the common "leaf-cutting ant" of Texas.

63. *Myrmica* (*Monomarium*) *molefaciens*; female, worker. Tex.

Now known as *Pogonomyrmex barbatus*, Smith, var. *molefaciens*, Buckley (Emery, '94, p. 308), the common Texan "agricultural ant."

64. *Ecodoma pilosa*; worker. Tex.

Emery ('94, p. 330) referred this species to the group *Atti*, but was unable to give a more precise determination. It cannot refer to either of our species of *Cyphomyrmex* (*C. rimosus*, Spin., and *C. Wheeleri*, Forel), nor to the form included under Buckley's next description; so that we can only suspect that there is in Texas still another fungus-growing ant which, to judge from Buckley's description, must resemble *Apterostigma* or *Sericomyrmex*. Northern Texas, however, would seem to be a very improbable locality for such a form.

65. *Ecodoma tardigrada*; male, female, worker. Tex.

Mayr, after comparing some of Forel's specimens of *Atta* (*Trachymyrmex*) *septentrionalis*, McCook, with a type of Buckley's *A. tardigrada* in his possession, pronounced the species to be the same, so that Forel ('84) and subsequent writers have relegated McCook's specific

name to the synonymy. This I believe to be an error. *A. septentrionalis* is known to occur only in the Atlantic States (from New Jersey to Florida). I have never found it in Texas, but instead have taken another species of *Atta* (*Trachymyrmex*) which agrees fairly well with Buckley's morphological description. This is a dark brown species with pointed posterior angles to the head. It occurs near Austin (Walnut Creek), and I have seen dozens of its nests while riding through three of the large counties of the Trans-Pecos. Specimens examined by Prof. Emery were pronounced to belong to an undescribed species. Although this may be the *Atta tardigrada* of Buckley, I nevertheless hesitate to regard it as such, since its nests differ widely from Buckley's description. These ants do not throw "the excavated earth in the form of a crater," nor do they descend to cells "two or three feet beneath the surface by a hole about half an inch in diameter." These dimensions are also far too great for McCook's species (*Cf.* his figure and description, '80). His specific name should therefore be restored for the eastern *Trachymyrmex* and Buckley's name should be abandoned, at least for the present. In further support of this conclusion I may add that there is in the State (in Brewster County) still another *Atta* (*A. [Acromyrmex] versicolor*, Pergande) which would also meet the requirements of Buckley's description. The new Texan *Trachymyrmex* will be described in a subsequent paper.

66. *Ecodoma (Atta) arborea*; female, worker. Tex.

This species was regarded as a synonym of *Cremastogaster lineolata*, Say, by McCook ('79, p. 187), and this determination was accepted by Mayr and Emery. I believe that it is possible to go still further, and to refer the form to the subspecies *leviuscula*, Mayr., var. *clara*, Mayr., since the queen of the subspecies *lineolata* has the head and thorax black or dark colored, whereas the queens of *leviuscula* have a yellowish red head and thorax and the latter merely streaked with black. Buckley describes some of the queens as having a yellow head, others as having the whole body black, "excepting the abdomen, which is banded with yellowish white." This is either arrant carelessness or confusion of several species. His notes on the habits of *C. arborea*: "has cells in the decayed parts of trees and when disturbed often turns up its abdomen into a nearly vertical position; often seen going in ranks up and down trees," together with the size leave no doubt that the form is *leviuscula*, var. *clara*, which is a very common and conspicuous ant throughout Central Texas. Mayr's name, though later than Buckley's must be retained, however, as F. Smith published a *C. arborea* as early as 1858.

67. *Ecodoma (Atta) bicolor*; worker. Tex.

This form is regarded by Mayr ('86, p. 463) as a synonym of *C. lin-*

eolata, subsp. *laviuscula*, var. *clara*, and Buckley's name was dropped because Smith had previously published a *C. bicolor*. I am confident, however, that this is not the form designated by Mayr, but either a variety of *C. opaca*, Mayr, which I have taken in North Texas under stones, or *C. punctulata*, Emery, which has a similar habitat in Central Texas and New Mexico. Buckley's species, however, is too vaguely described to be recognized with any degree of certainty.

BIBLIOGRAPHY.

- '66-'67. Buckley, S. B. Descriptions of New Species of North American Formicidae. Proc. Ent. Soc. Phil., Vol. VI, 1866-1867, pp. 152-172, 335-350.
- '93-94. Emery, C., Beiträge zur Kenntniss der nordamerikanischen Ameisenfauna. Zool. Jahrb. Abth. f. Syst., Bd. 7, 1893, pp. 633-682, Taf. 22; and Bd. 8, 1894, pp. 257-360, Taf. 8.
- '84. Forel, A. Etudes Myrmécologiques en 1884. Bull. Soc. Vaud. Sc. Nat., Vol. 20, 1884, pp. 1-65, Pl. XI.
- '01a. Forel, A. Fourmis Mexicaines Recoltées par M. le professeur W. M. Wheeler. Ann. Soc. Ent. Belg., Tome XLV, 1901, pp. 123-136.
- '01b. Forel, A. Variétés Myrmécologiques. Ann. Soc. Ent. Belg., Tome XLV, 1901, pp. 334-382.
- '79. McCook, H. C. Formicariæ (pp. 182-189, in J. H. Comstock's Report upon Cotton Insects), Washington, 1879.
- '80. McCook, H. C. Note on the New Northern Cutting Ant, *Atta septentrionalis*. Proceed. Acad. Nat. Sci., Phila., Part 3, Oct. to Dec., 1880, pp. 359-363. 1 Fig.
- '62. Mayr, G. Myrmecologische Studien. Verhand. k. k. zool.-bot. Ges., Wien, Jahrg. 1862, pp. 649-776, Taf. XIX.
- '86. Mayr, G. Die Formiciden der Vereinigten Staaten von Nordamerika. Verh. k. k. zool.-bot. Ges., Wien, Bd. 36, 1886, pp. 419-464.
- '86a. Mayr, G. Notizen über die Formiciden-Sammlung des British Museum in London. Verh. k. k. zool.-bot. Ges., Wien, Jahrg. 1886, pp. 353-368.
- '01. Wheeler, W. M. The Compound and Mixed Nests of American Ants. Am. Nat., Vol. XXXV, Nos. 414, 415, 417, and 418. 1901.
- '02. Wheeler, W. M. A New Agricultural Ant from Texas with Remarks on Some of the Described Species. Am. Nat., Vol. XXXVI, 1902.