

## Morphological, Taxonomic, and Other Notes on Ants

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In his well-known book, "Ants," the late Professor W. M. Wheeler (1910, p. 123) stated at the beginning of Chapter 8: "Myrmecology has been more fortunate than many other branches of entomology in the men who have contributed to its development. These have been activated, almost without exception, not by a mania for endless multiplication of genera and species, but by a temperate and philosophical interest in the increase of our knowledge."

Since neither this statement nor its immediate context suggests sarcasm on Wheeler's part, it must be concluded that he really believed and meant these words. That such a viewpoint was extremely over-charitable becomes all too clear today. It need only be pointed out that ant taxonomy is now so ensnared in synonymy and the vicious pentanomial system<sup>1</sup> that it has become impossible to properly determine even the commonest holarctic ants without a partial generic revision of the groups to which they belong.

The *ejido* from this exasperating tangle lies with modern population taxonomy as formulated by Ernst Mayr and others. W. S. Creighton's book "Ants of North America," the publication of which is expected momentarily, will breathe a healthy fire into our ant systematics by eliminating all nearctic varieties as such. Where such scourging is needed most, however, is in the Euro-

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1. In order of rank, the categories employed by Wheeler and his contemporaries, and still used by many stubborn myrmecologists, are: genus, subgenus, species, subspecies, variety. Some European workers have still further regressed in adding a sixth, the "aberration"—presumably infravarietal. The system thus becomes hexanomial and reaches depths of absurdity equalling those of some systems used for the butterflies.

pean fauna; it is just there that the propagation of meaningless names has reached its greatest development. Since very many of the commonest ants of North America and Asia have been described as varieties or subspecies of prior European species, the exact definition of the European fauna by competent taxonomists using every tool and technique that modern systematics can bring to bear becomes the most immediately imperative problem for myrmecographers everywhere in the Northern Hemisphere.

If full-scale revision of each major group of ants is presently impossible, there is still one way that specialists with access to the larger collections can help. These large collections often contain types of forms which are questionably distinct from one another. Where such a situation exists, with a myrmecologist at hand, the questionable forms, particularly the varieties, should be compared and examined in the light of the original descriptions. In most cases I have so far tested, the variety concerned could be synonymized with little doubt. Since most of my examination of types has been restricted to those in the Wheeler Collection in the Museum of Comparative Zoology at Harvard University, I have treated mostly names set up by Professor Wheeler himself. Although Wheeler was one of the major offenders in the matter of synonymy, he should not be thought of as the only one. Forel, Santschi, Fred. Smith, Viehmeyer, Stitz, Menozzi, and several workers still describing have piled up a colossal synonymy which will occupy taxonomists for many years to come. To a lesser extent Carlo Emery did the same sort of work, yet he did occupy himself for much of his life with an attempt to prune and rationalize the classification of ants. Without the intervention of two men, Emery and the earlier Gustav Mayr, this classification would today be completely hopeless.

In the following pages, I have listed the names and references for various ant species occurring outside North America, and have put under them the forms belonging, in my opinion, in the "new synonymy." I have also discussed certain morphological features, especially palpal segment numbers, where these are either not reported or else little-known for the genera and species in question. The remarks on palpal segments, as well as those made on other features, are made with a view to clearing up certain questions of phylogenetic relationship. It is a regrettable fact that both palpal segmentation and such other

features as wing venation and male genitalia have received all too little attention in taxonomic works.

Also included here are a few records of interest obtained from a small collection of ants sent me by Dr. C. J. Goodnight. These were collected at Palenque Ruins, Chiapas, Mexico, during August, 1949, and are indicated by the notation after each species "Chiapas" with the notes "soil" or "sweeping" included in Dr. Goodnight's records, made at the time he collected them.

### **Prionopelta** sp.

Chiapas, soil. Dr. Goodnight's specimens could not with certainty be referred to any of the species named in the Wheeler Collection. This genus, while small, seems greatly in need of revision. Phylogenetically, it has been related by Wheeler and Emery to the Ectatommini. I would place it closer to the Amblyoponini, and provisionally include it in the latter tribe. It has "amblyoponine teeth" at the sides of the head anteriorly, and several species have the anterior clypeal margin denticulate as in *Amblyopone*. The structure of the alitrunk and especially the petiole also point to such a relationship. The mandibles seem only relatively slightly modified from certain types seen today among the amblyoponines.

A small, headless male specimen in the Wheeler Collection among unidentified miscellany, bearing Wheeler's handwritten label "*Prionopelta*," is probably correctly placed. The structure of the petiole and sculpture and pilosity are those of the worker. The venation in this specimen is unusually complete for such a small ant, and is further unusual in that  $Mf_1$  comes off well basad of cu-a.

In a recent paper (Brown and Nutting, 1950, pp. 116-121 and plate 8) it was stated that such basal displacement of the origin of  $Mf_1$  was more primitive than was an origin of this vein lined up with cu-a or apicad of cu-a. In a recent conversation, Dr. J. C. Bradley pointed out to me that this interpretation is questionable and cited examples in the Vespidae and other aculeate groups to prove his point. I had originally arrived at the conclusion cited in our wing venation paper through study of certain drawings by H. H. Ross of primitive sawfly wings, referred to in the homologization on the first few pages of our paper.

In Dr. Bradley's opinion, these primitive sawfly wings just happen to be specialized in origin of  $Mf_1$ . I am now willing to admit that in the ants, at least, basal displacement of this vein is probably derived. The true primitive position would then be the lining-up with cu-a, which checks with other primitive features as found in many myrmeciines and amblyoponines. The most important change this would make in our conclusions concerns the Dorylinae, which would seem to have arisen from within or near the amblyoponine stock instead of having arisen, as we stated in the paper in question, from a "pre-ponerine" stock. We most emphatically stand, however, on our conclusion that the cerapachyines cannot be considered as in the line of descent of the dorylines; the evidence of the wings and thorax shows that these two stocks are basically divergent. *Prionopelta* is an amblyoponine (or very close relative) with definite "doryline tendencies" in the venation of the forewing.

It may be mentioned here, in connection with the discussion of ant wing venation, that both Dr. J. C. Bradley and Dr. R. M. Schuster have communicated to me their belief that the vein we called "R<sub>5</sub>" in our wing venation paper cited above, the same element known as the "spurious vein" by mutillid specialists, is a secondary development in both ants and mutillid wasps forming at the bending of certain crossveins such as the second or third r-m. This interpretation seems reasonable to me, especially in the light of Schuster's recent (1949, pp. 69-75, pl. 13, fig. 9) discovery of the very primitive mutillid *Prototilla*, which lacks the spurious vein.

Returning to *Prionopelta* and relatives, the genera *Onychomyrmex* Emery, *Lithomyrmex* Clark, and *Examblyopone* Donisthorpe, which have been separated chiefly on the condition of the spurs of the middle and hind tibiae, must in my opinion also be included in the Amblyoponini despite present classifications which place them in separate tribes. *Onychomyrmex* (*O. hedleyi* Emery, *O. mjobergi* Forel, *O. doddi* Wheeler) in the Wheeler Collection actually possess very small rudimentary spurs. These genera, with *Prionopelta*, represent a developmental series with regard to the spurs of such continuity that it becomes evident that such a character in the Ponerinae may be accepted as of no more than generic significance. The same

applies to the spurs in some ponerine tribes other than the Amblyoponini, as will be seen under *Belonopelta* below.

### **Typhlomyrmex** Mayr.

This genus is represented by several closely related forms in the Wheeler Collection, and the species seem greatly in need of revision. Presently accepted placement in the Ectatommini does not seem very convincing, but neither does this form fit with the Amblyoponini. Morphological investigation is much to be desired, since this genus may prove to hold the key to some very interesting phylogenetic problems.

### **Belonopelta deletrix** Mann.

One worker from Chiapas, soil. Agreeing very well with Mann's description and figure, except that the size is a little larger than Mann's measurements. Mann designated *Belonopelta* as nominate subgenus to his new subgenus *Simopelta*. Wheeler later separated the two generically by means of abundant characters. It does not seem to have been noticed that *B. deletrix* has minute lateral spurs beside the larger medial ones on the middle and posterior tibiae. Specimens of *Simopelta jeckylli* Mann, *Simopelta williamsi* Wheeler, and *Simopelta manni* Wheeler all lack such lateral spurs completely, so this lack may afford an additional generic character.

### **Stictoponera bicolor** Emery.

*Ectatomma (Stictoponera) bicolor* Emery, 1889, *Annali del Museo Civico di Storia Naturale di Genova*, 27:493, worker.

*Ectatomma (Stictoponera) bicolor* var. *minor* Forel, 1900, *Journal of the Bombay Natural History Society*, 13:316, worker. (New synonymy.)

(See Brown, 1948, *Psyche*, 54:264.)

Series of this ant found in the Wheeler Collection miscellany show that individuals of a single nest may vary considerably in size, development of the vestigial propodeal lamellae, and color. The yellowish-tan workers which I took to be characteristic forms in the work cited above are obviously merely teneral in the present association. The last excuse for retention of Forel's variety is thus removed. *Stictoponera bicolor* has been

considered a subspecies of *Stictoponera menadensis* by several authors, but the two forms are distinct in India and Sumatra (Wheeler Collection) even where occurring at the same localities. The fully colored *S. bicolor* worker has a bright orange-ferruginous alitrunk, brownish head and jet-black gaster; it lacks the median smooth shining strip on the anterior dorsal alitrunk.

The genus *Rhopalopone* Emery is very close to *Stictoponera* and has the characteristic coxal spines of the latter genus, but supposedly differs in its erect, thick scale-like petiole, clubbed antennae, and smaller size. *Stictoponera panda* Brown and *Stictoponera taiwanensis* Wheeler have nodes and antennae much like those of *Rhopalopone*, and the small extra tarsal claws supposed to be absent in *Rhopalopone* are actually present but small in at least four species (*Rhopalopone dammermani*, Wheeler; *Rhopalopone relictata* Mann; *Rhopalopone malaensis* Mann, and *Rhopalopone luzonensis* Wheeler). This generic separation is thus considerably weakened.

### **Phrynoponera gabonensis** (Ern. André).

- Bothroponera gabonensis* Ern. André, 1892, Revue d'Entomologie Caen, 11:50, worker. Wheeler, 1922, Bulletin American Museum of Natural History, 45:76-77, fig. 11, worker, ♀, as *Phrynoponera*.
- Pachycondyla (Bothroponera) gabonensis* var. *striatidens* Santschi, 1914, Bollettino Laboratorio di Zoologia Generale e Agraria Portici, 8:315, fig. 4, ♀. (New synonymy.)
- Pachycondyla (Bothroponera) gabonensis* var. *robustior* Santschi, 1919, Revue Zoologique Africaine, 7:82, worker. (New synonymy.)
- Phrynoponera gabonensis* var. *esta* Wheeler, 1922, Bulletin of the American Museum of Natural History, 45:77-78, worker, ♀. (New synonymy.)
- Phrynoponera gabonensis* var. *fecunda* Wheeler, 1922, Ibid., p. 78, worker, ♀. (New synonymy.)
- Phrynoponera gabonensis* var. *umbrosa* Wheeler, 1922, Idem., p. 78, worker, (New synonymy.)

I have examined the types of Wheeler's three varieties and specimens of what he considered to be typical *P. gabonensis*. All of these specimens came from the Congo, mostly from the stomachs of species of *Bufo*. At least some of each series came from Medje, and most are represented from Akenge. The differences between these forms are very slight, and in spite of

careful examination, I cannot see the characters which Wheeler cites in several cases as points of differentiation. Where variation of perceptible degree does occur, it is extremely slight and seems to link Santschi's two varieties with the typical form. It seems to me that both Wheeler and Santschi were pushing even the weak varietal category to inexcusable extremes by placing names on these utterly insignificant variants. Though I have not seen specimens, I consider it at least a possibility that *Phrynoponera heterodus* Wheeler belongs in the synonymy of *Phrynoponera gabonensis*.

***Pachycondyla harpax* (Fabricius).**

*Formica harpax* Fabricius, 1804, *Systema Piezatorum*, p. 401, worker.

*Pachycondyla montezumia*, Fred. Smith, 1858, *Catalogue of the Hymenoptera of the British Museum*, 6:108, worker, ♂. (New synonymy.)

*Pachycondyla harpax* var. *dibullana* Forel, 1901, *Revue Suisse de Zoologie*, 9:347, worker. (New synonymy.)

*Pachycondyla harpax* var. *irina* Wheeler, 1925, *Arkiv für Zoologi*, 17A (8):5, worker. (New synonymy.)

*Pachycondyla harpax* var. *concinna* Wheeler, 1925, *Ibid.*, p. 5, worker, ♀. (New synonymy.)

I have examined many specimens of the *P. harpax* complex, including those in the Wheeler collection placed as *P. montezumia*, and types of *P. h. irina* and *P. h. concinna*. The north-south variation which has been claimed by Forel and Wheeler as the basis for retention of *P. montezumia* seems to me very difficult to demonstrate. I would call this situation at most a very weak cline. If I could pick a random series of this group from throughout the range and hide the labels, I feel sure that the percentage of determinations to the correct "race" by any competent entomologist would be little more than could be accounted for by chance. The bluish metallic reflections seen in many *P. harpax* workers constitute a widely distributed phenomenon among dark ponerines which is greatly overworked as a taxonomic criterion. State of preservation of specimens, presence of oil or dirt, and other factors can affect this metallescence to such a degree that its value is highly doubtful. Under a blue-white fluorescent lamp, it cannot be seen at all, even when clear under a yellow light. If *P. harpax* can be broken down into categories correctly bearing the names synonymized above, there

is presently no published proof of the fact that cannot easily be refuted by the proper survey of the series at hand in most large American and European museums. Additional collecting may change the interpretation here set forth, but if any of the names listed above are to be resurrected, it will have to be on a sounder basis than were the original definitions. The palps are segmented 4, 4.

***Ponera nitidula* Emery.**

Chiapas, soil. This is a handsome black ant displaying often quite brilliant satiny blue metallescence. A greasy specimen from Guatemala in the Wheeler Collection shows none of this blue reflection, and Emery did not mention it in the original description. The habitus is quite different from that of species like *Ponera opaciceps* Mayr, and *Ponera trigona* Mayr, and it would not be surprising if *Ponera nitidula* were eventually shown to represent part of a distinct subgenus.

***Viticicola tessmanni* (Stitz).**

*Sima tessmanni* Stitz, 1910, Mitteilungen Zoologisches Museum in Berlin, 5:131, fig. 2, worker.

*Viticicola tessmanni* var. *castanea* Wheeler, 1922, Bulletin of the American Museum of Natural History, 45:112, worker, ♀. (New synonymy.)

Wheeler cited the color as "pale chestnut brown." The present color of the types, which may have faded a little, is light yellowish brown, or only a little darker than other Congo specimens of *V. tessmanni*. Since both the light and dark forms were taken from the same plant, *Vitex staudtii*, from the same very uniform area in the Ituri Basin, the very slight difference in color does not appear to be sufficient evidence for the separation of races or species from the present meager material.

***Solenopsis (Solenopsis) gayi* (Spinola).**

*Myrmica gayi* Spinola, 1851, In Gay, Historia Fisica y Politica de Chile, Zoologia, 6:242, worker, ♀, ♂.

*Solenopsis gayi* var. *fazi* Santschi, 1923, Revue Suisse de Zoologie, 30:261, ♀, (New synonymy.)

Santschi merely described the slightly darker, sympatric female form of *S. gayi* as a variety, as is evident from series received from Angol, Chile (D. Bullock).



**Lachnomyrmex scrobiculatus** Wheeler.

Chiapas, one specimen, soil. In Wheeler's original description and figure, the number of antennal segments is given as twelve. Dr. M. R. Smith and Dr. K. Yasumatsu have both called this count to question (*in litt.*), and the types in the Museum of Comparative Zoology show that there are really only eleven segments. The specimen taken by Dr. Goodnight compares well with the types in every respect. Wheeler related this genus to *Agraecomyrme* from the Baltic Amber, but *Agraecomyrme* seems entirely different, and possibly intermediate between the Ectatommini and the Myrmicini. *Lachnomyrmex* seems more closely related to *Rogeria* by virtue of the thoracic structure and the eyes, sculpture, and pilosity.

**Dolichoderus** Lund.

This genus has been accepted as containing several subgenera but it appears that generic rank is indicated for certain of these. In the New World, at least, *Dolichoderus*, *Monacis*, and *Hypoclinea* appear distinct as good genera. The Indo-Australian forms probably can be split into several good genera along approximately the present subgeneric lines. The best provisional treatment would be that of according generic rank to all present subgenera. *Dolichoderus* (*s. str.*) appears the most distinct of all these groups and possibly the most primitive. Specialists in the Indo-Australian fauna can best decide for the present what the status of their part of the fauna is to be, but it does not seem logical to involve any of the Old World forms with any group occurring in the New World except *Hypoclinea*.

**Gesomyrmex luzonensis** (Wheeler).

*Dimorphomyrmex luzonensis* Wheeler, 1916, Proceedings of the New England Zoological Club, 6:16-18. fig. 4, ♀.  
*Gesomyrmex luzonensis* var. *chapmani* Wheeler, 1930, Psyche, 37:35-40, fig. 1, all castes. (New synonymy.)

Female types compare very well, except that in *G. chapmani* very slight fading is apparent but insignificant as a point of differentiation.

***Pheidole neolongiceps*** Brown, new name.

*Pheidole longiceps* Aguayo, 1932, Bulletin of the Brooklyn Entomological Society, 27:218-219, soldier; preoccupied by Mayr, 1876, Journal des Museum Godeffroy, 10:106.

Aguayo described this homonym from a single soldier, the holotype of which is now in the Museum of Comparative Zoology. It is entirely possible that it is synonymous with some tropicollan or neotropical tramp species in the enormous genus, although a very hasty and superficial search in the Wheeler Collection failed to reveal any exactly similar form among the West Indian *Pheidole* deposited there. The entire dorsal surface of the head is regularly set with well-spaced, predominantly longitudinal rugules. Dr. Aguayo has failed to answer three separate letters regarding this form, so I feel justified in suggesting a new name for it.

## REFERENCES CITED

BROWN, W. L., JR., and W. L. NUTTING

1950. Wing venation and the phylogeny of the Formicidae (Hymenoptera). Transactions of the American Entomological Society, 75:113-132, pls. 8 and 9.

SCHUSTER, R. M.

1949. Contributions toward a monograph of the Mutillidae of the Neotropical Region. III. A key to the subfamilies represented and descriptions of several new genera (Hymenoptera). Entomologica Americana, 29:59-140, pls. 12-16.

WHEELER, W. M.

1910. Ants. Columbia University Press, New York. xxv + 663.