

also the green is more tinted with yellow or sienna, especially in the later emerged examples. These green prolongations vary much in width and in the amount of yellow or sienna in them.

♀ slightly the larger as a rule: the orange patch at apex of fore-wing usually smaller, in a few examples yellowish, and in a few others altogether absent. Otherwise this form varies but little.

Locality: Left bank of the Dyala from 350 to 600 ft., in March and early April. Females seen ovipositing on young flower-buds of a mustard and a mauve flowered Crucifer.

Z. eupheme tigris Riley. ♂♂ 4, ♀♀ 2, from the right bank of the Tigris, taken March-April 1920, also exhibited for comparison.

(3) *Melitaeta trivialis*, subsp. *persea* Koll. A small series of each of three seasonal forms:—

(a) *Spring form*, from Mesopotamia and N.W.F., India, March and April; comparatively large and with black spots well-marked above and on underside, two females being especially large examples.

(b) *Summer form*, from Mesopotamia, June-July; averaging smaller, and with much less black above and beneath.

(c) *Autumn form*, from N.W.F., India, Sept.-Oct.; very similar to the Spring form.

THE SUBFAMILIES OF FORMICIDAE.

Mr. H. DONISTHORPE read the following communication:—

In all the recent works and catalogues on ants up to 1920, five subfamilies have been recognised—namely, Ponerinae, Dorylinae, Myrmicinae, Dolichoderinae, and Camponotinae, and this arrangement is the same as that used by Dalla Torre in 1890.

In 1920 Wheeler, after studying a great number of ant larvae of many genera and subgenera in all five subfamilies, proposed to raise two more subfamilies—the Pseudomyrminae, and the Cerapachyinae.

Let us see how far Wheeler is justified in this proceeding.

Pseudomyrmicinae.

In 1899 Emery had already proposed this additional subfamily, which he separated on account of the large heads and rudimentary antennae of the larvae, etc. [various other ant larvae, Ponerine, etc., possess short rudimentary antennae; I even found them, though in a still more rudimentary con-

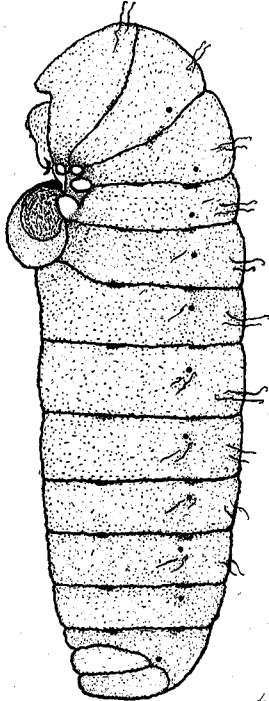


FIG. 1.—Lateral view of larva of
Pseudomyrma gracilis Fabr.

dition, in the genus *Myrmica*, as figured in "British Ants" (page 31)], but he subsequently withdrew this subfamily, and replaced the genera in the Myrmicinae. Wheeler has shown that in all the four genera—*Tetraoponera* (= *Sima*), *Pseudomyrma*, *Pachysima*, and *Viticicola*, which are embraced by the Pseudomyrmicinae—the larval characters are most important. They all possess long, straight, cylindrical, distinctly

segmented bodies, with blunt anterior and posterior ends, a large head ventrally placed, and short, rudimentary antennae. The thoracic and first abdominal segments are furnished with peculiar exudatory papillae, which form a cluster around the mouth. They have the form of extraordinary appendages, which in the first larval stage, Wheeler has called the trophidium; and the swollen ventral portion of the first abdominal segment just behind the mouth forms a pocket,

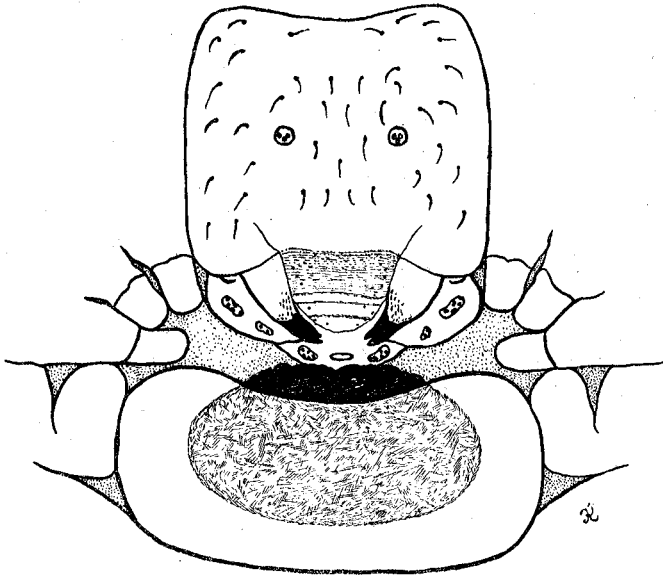


FIG. 2.—Head, trophothylax and exudatoria of larva of *Pseudomyrma gracilis* Fabr.

the trophothylax, in which the workers place the pellet from their own infra-buccal chamber.

We have described this pellet and chamber in "British Ants" as follows: "The infra-buccal chamber is a spherical cavity situated below the pharynx, and forms a receptacle for the solid and semi-solid parts of the food rasped off by the ant's tongue and also for foreign matter scraped off the ant's body by its tongue and strigils. Any juices that remain in these substances are extracted and sucked into the pharynx,

the residue being ejected in the form of a solid body, the 'Boulettes de nettoyage' of Janet, which retains the shape of the infra-buccal chamber."

After the pellet has been ejected it must still contain a considerable amount of nutritious matter, for, as I have shown, it forms the chief, if not the only food of the larva of the Dipterous genus *Microdon*, and also forms part of that of the beetle larva of *Clythra 4-punctata*. But to return to the Pseudomyrminae, all four genera feed their larvae in

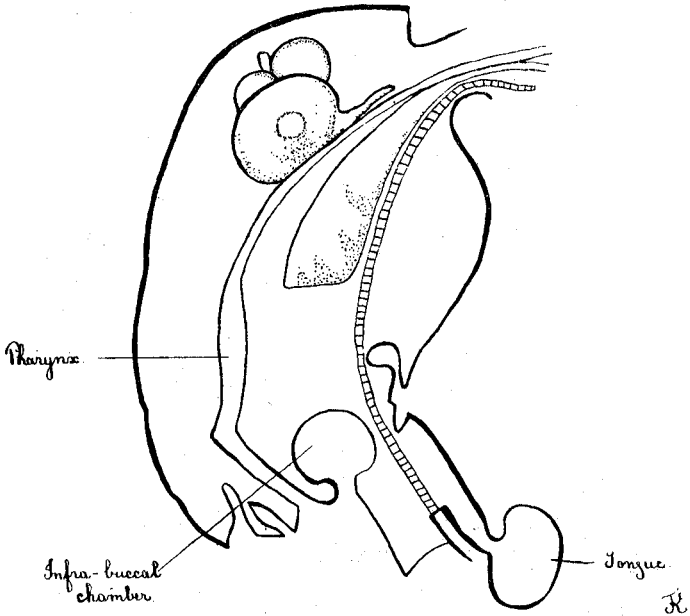


FIG. 3.—Head of *Myrmica* from "British Ants," p. 16.

this way; and no other ants have been observed to do so, but eventually spit them out. The mouth of the larva possesses a singular structure, the trophorhinium, with which they thoroughly grind up the pellet. This structure is also present in other ant larvae, and may be used as a stridulating organ.

In the adults the shape of the head in the ♀ and ♂, especially of the clypeus and frontal carinae, is unique; and the eyes

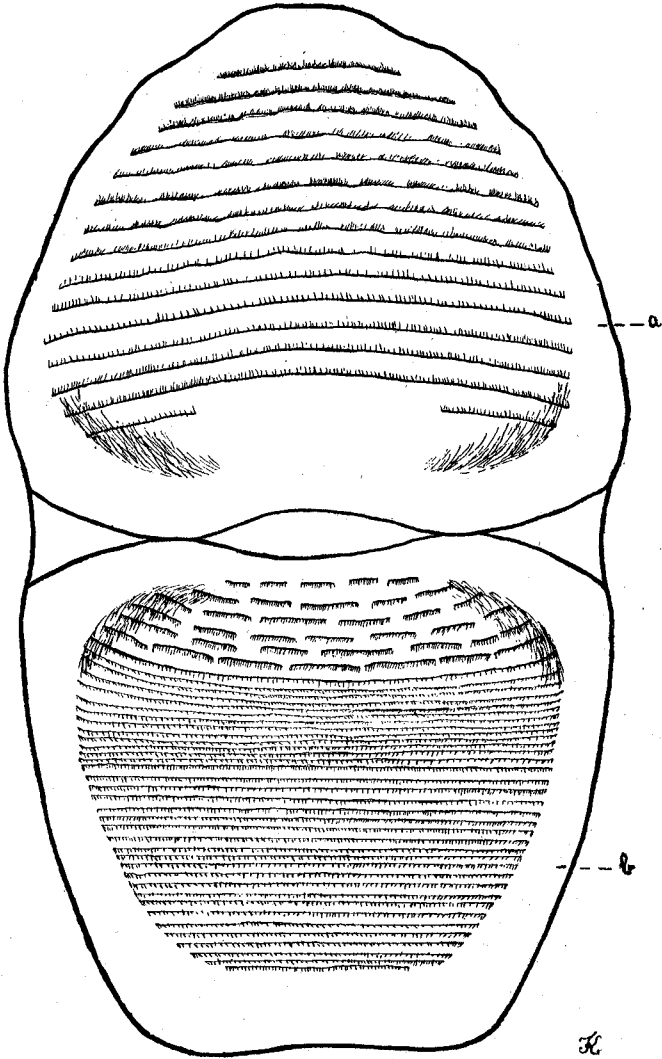


FIG. 4.—*Trophorhinium*.
a, roof. b, floor of mouth.

are very large. The construction of the petiole, post-petiole, and tibial spurs is peculiar. Wheeler has recently shown the antennae are 12-jointed in the ♂, ♀ and ♂ of all four genera, and he has also proved that the gizzard is much more specialised than in other Myrmicine ants.

I do not know what my colleague Mr. Crawley's views are on the subject, nor have I yet seen any opinions expressed by any other of the first myrmecologists, but personally I consider that all the above points taken together justify Wheeler in raising these four genera to the rank of an independent subfamily.

Cerapachyinae.

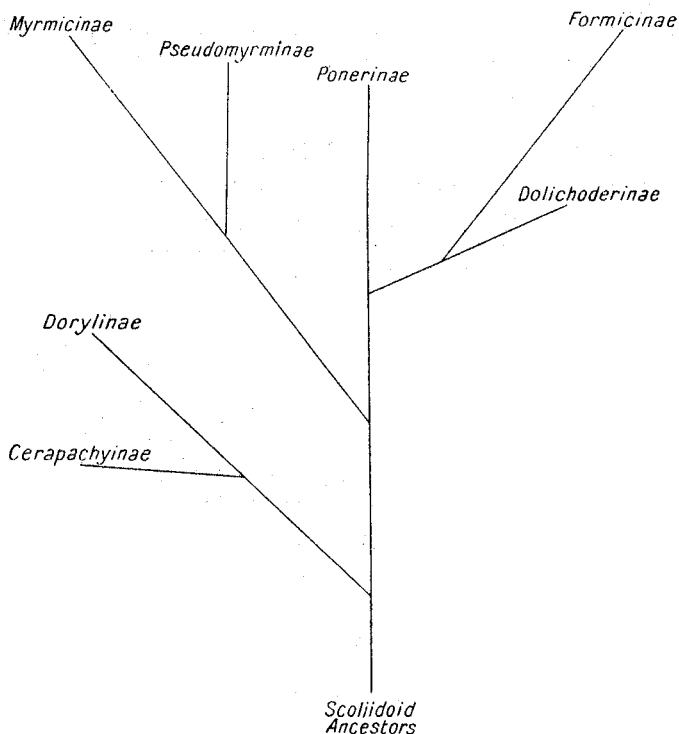
In 1895 Emery transferred the tribe Cerapachyini from the Ponerinae to the Dorylinae, a proceeding with which both Forel and Wheeler disagreed. He subsequently returned them to the Ponerinae with the rank of a section which he called Prodorylinae.

The larvae are extremely like those of the Dorylinae, and the foraging habits of certain of the adults are similar. The worker, on the other hand, has a Ponerine habitus, but the female characters in the various genera are very diverse, some being very Ponerine-like, others being so like a Doryline ♀ that they might be taken for a dichthadiigyne. The same is the case in the males—a male of the genus *Acanthostictus*, which has been recently discovered in the Argentine by Gallardo, might easily be mistaken for a male *Dorylus*. Other males are very Ponerine like, though they do not possess penicilli.

It will thus be seen that these ants are intermediate between the Ponerinae and the Dorylinae and might easily be united to either. Wheeler therefore prefers to treat them as a subfamily; and this certainly has its advantages. Emery's name Prodorylinae, which otherwise might become the name of the subfamily, cannot be used, as there is no genus named *Prodorylus*.

We reproduce the diagram in which Wheeler indicates the phylogenetic relations of the seven subfamilies. It will be seen that he uses the name Formicinae for the subfamily

usually called Camponotinae. Forel (1878) divided Mayr's subfamily Formicidae (1855) into Dolichoderinae and Camponotinae, and he justified this because Formicidae was already in use as a family name. According to our present rules, and the use of "inae" as a suffix for subfamily names, he should have retained Mayr's name, and restricted it to the group containing *Formica*. I am indebted to Miss Kirk for



the beautiful reproductions of the figures used to illustrate this short paper.

Mr. E. B. ASHBY, F.E.S., exhibited an example of *Papilio machaon*, ♀, ab. *rufopunctata* Wheeler, captured on Les Voirons, a range of mountains near Annemasse, Haute Savoie, July 6, 1920. Distinguishing characteristics of this aberration of *P. machaon* are the orange-red spots in yellow lunules of border upper side hind-wings near the costa.