

were these early Tertiary ants highly differentiated morphologically, but as Wheeler has shown (1914) the Lower Oligocene forms (Baltic amber) had a social life as highly developed as the recent species, some of the amber workers being even polymorphic (*Pseudolasius* and *Dimorphomyrmex*). "That many of them had learned to attend plant-lice and had therefore become 'trophobiotic' is shown by a block of amber in the Königsberg Coll. containing a number of workers of *Iridomyrmex goepperti*, together with a lot of their Aphid wards. That the amber ants kept myrmecophiles in their nests can scarcely be doubted, for at least three genera of Paussidae¹ (*Cerapterus*, *Pleuropterus* and an undescribed genus) are cited by Klebs in his list of amber Coleoptera. That these ants also had Acarine parasites is shown by two workers of *Lasius schiefferdeckeri* in the Königsberg Coll., each bearing a mite attached to the base of the hind tibiae. These specimens also show that the mites had already acquired the peculiar habit of affixing themselves to very definite regions of their host's integument." It is clear, therefore, from the specialized social habits of the Oligocene ants, and the high differentiation of those of the Eocene, that the family must have originated well back in the Mesozoic. While, of course, the Cretaceous period is almost a blank as far as any group of insects is concerned, it seems hardly possible that the Formicidae could have reached such a high state of development by the early Tertiary, if they had originated in the Cretaceous period, as suggested by Handlirsch (1908), or even in the Upper Jurassic, as proposed by Emery (1920). And although it may be difficult to imagine ants included within the same fauna as the gigantic Protodonata of the Permian, which Wheeler suggests as the possible time of their origin, the discovery of comparatively highly specialized Hymenoptera in the Jurassic of Turkestan (Martynov, 1925), leads us to believe that the ants were similarly developed during that period of the earth's history. Probably the chief reason why they have not already turned up in this formation is that the primitive groups, as the Dorylinae, Cerapachinae, and Ponerinae, are either subterranean or terricolous and consequently not likely to be entombed in a lake deposit. At any rate, the problem of the origin of the Formicidae, both in time and space, must wait for its solution until ants have been discovered in pre-Tertiary deposits.

¹ Wasmann (S. J.) has more recently described the amber Paussidae. (Zool. Anzeiger, 68 (1/2), p. 25-30, 1926.)