

to the crop. On one occasion I saw a minor worker 'cough up' such a pellet and immediately place it on the head of a larva, holding it in place for about two minutes. Then it pulled the object away and licked it for a minute longer, during which time the pellet diminished somewhat in size. Other pellets were observed on several occasions while being held in place on the heads of larvae or in the process of being partially consumed by workers. But this is not the invariable fate of the pellets. In one case I saw a worker discharge a pellet and proceed immediately to the nest entrance, where the object was dropped onto the floor of the foraging arena. Wheeler & Bailey (1920) observed workers of the arboreal ant genus *Pseudomyrmex* feeding infrabuccal pellets to larvae, while R. R. Snelling (personal communication) has recorded an instance of the same behaviour in *Camponotus rasilis*. I suggest that this behaviour, which so far has been seen only in arboreal ants, is a device used primarily for the conservation of water.

**Meconium removal.** On a single occasion, in the second of the two colonies monitored, the removal of a prepupal meconium was witnessed. There is no reason to believe that the act is exceptional for ants, but it has been so seldom noted in the literature as to deserve mention here. Two minor workers were observed to pull a large, black, spindle-shaped meconium from the hindgut of a minor-worker prepupa. As it emerged, they licked the meconium vigorously, and other minor workers occasionally joined them in licking but not pulling the object. The meconium evidently lost liquid by this action, because it shrank somewhat in size. However, no solid material appeared to be taken from it. After it was pulled free, the meconium was passed along the nest tube from one ant to the next. Eventually, 10 min 17 s after it was seen to be in an early stage of emergence from the prepupa, the meconium was deposited outside the nest 5 cm from the entrance.

**Cannibalism and necrophoresis.** On four occasions I saw dead larvae being consumed by minor workers. One of the corpses was also placed on the head of a live larva for a short time. The cause of death of the larvae was not ascertained. Dead adult *Zacryptocerus*, in contrast, were never consumed; their bodies were carried away from the vicinity of the nest and discarded.

**Recruitment.** The recruitment of nestmates has never been recorded previously in the

cephalotine ants. I evoked it repeatedly in *Zacryptocerus varians* by depriving laboratory colonies of honey for several days to a week and then providing them with a sizeable droplet outside the nest. The first minor workers to encounter the bait fed extensively on it, then returned to the nests dragging the tips of their abdomens over the floor of the foraging arena. Nestmates encountered were able to follow the trails outward for at least 10 cm and without further assistance from the recruiter. The trails remained active for only a few minutes. Furthermore, no evidence of orientation along persistent trunk trails was detected, even when long-lasting food sources were left in the foraging arena. Therefore the trail pheromone appears to serve primarily if not entirely for recruitment. It was possible to draw workers from the nest tubes using artificial trails drawn with crushed poison and Dufour's glands; following was nearly perfect for distances as great as 25 cm. The method was not precise enough to determine which of the two glands contained the trail pheromone. These artificial trails, like the natural ones, were short-lived.

**Adult transport.** It is a remarkable fact that no instance of adult transport was ever observed in the laboratory colonies, even on the numerous occasions when the colonies were spilled out into the foraging arenas and thus forced to find their way back into the nest tubes.

**Defence.** The conventional view of polymorphic ants generally, and of cephalotines in particular, is that the major worker caste responds most vigorously to intrusions of the nest. *Zacryptocerus* majors have been considered to fill their main function simply by blocking the nest galleries and pushing intruders out of the nest entrances. But this is only a small part of the story. In fact, both minor and major workers of *Z. varians* proved to be very active. The minor workers have a lower response threshold, forming the 'early warning system' of the colony and disposing of minor intruders. Majors respond less readily, but once activated are individually more effective. The defence responses of the colony as a whole can be conveniently classified into two levels according to intensity:

(1) Low Intensity. The minor workers seize the intruder and drag or carry it out of the nest. The major workers may investigate briefly but do not otherwise participate. This is the form of response shown toward alien *Zacryptocerus* minor workers (and a worker of the tiny,