

foraging in workers. For instance, Lappano (101) found that in the army ant, *Eciton burchelli* (Westwood), the labial glands reach maximal development in all larval size groups at the beginning of the peak of raiding activity which occurs on the eighth or ninth nomadic day. This line of evidence is suggestive, but as Lappano indicates, its behavioral significance, if any, must be explored by experimentation.

The accumulated evidence has led to the view that most social behavior in ants is mediated by chemical releasers which are discharged at appropriate times from exocrine glands and cause stereotyped responses (196). It has indeed been proven possible to bioassay some of the substances by inducing the reactions *in vacuo*. But the deciphering of the chemical code has scarcely begun, and we seem to be entering "a field of research extremely interesting and varied, which will henceforth prove rich in information and abundant in surprises" (155).

*Queen and soldier control.*—When the queens of *Formica pratensis* Retzius are removed, the workers after a time (*a*) lay an increased number of eggs; (*b*) in certain times of the year rear sexual forms (7, 8). Twelve to 20 hr after the queen of *Eciton* is removed, the colony will readily fuse with another, queen-right colony. If deprived longer, the bivouac organization deteriorates (148). Bier (8) has proven that in *Formica pratensis* the queen odor is not responsible for suppression of the workers and that the inhibiting effect is distributed by the workers. His hypothesis is that the queen appropriates from the workers salivary-gland secretions [labial?, see (64)] that would otherwise contribute to worker fertility. The parallel with the queen substance of the honey bee is obvious, as Karlson & Butenandt (85) point out. Schneirla & Rosenblatt (148) favor a pheromone hypothesis in the case of *Eciton*. Brian & Carr (23) showed that in *Myrmica* the presence of the queen affects larval growth by causing an earlier start, an improved survival, a smaller pupal size, and a diminished production of queens. The possibility of queen-larvae competition was experimentally ruled out, and these authors present an exhaustive list of remaining hypotheses. A parallel inhibitory effect was found in *Pheidole morrisi* Forel by Gregg (66), who showed that soldiers inhibit to a limited extent the production of more soldiers. Gregg hypothesized but was not able to prove the existence of an inhibitor substance. At this point perhaps the most likely approach to the problem of caste control would be a direct test of the inhibitory pheromone hypothesis.

*Colony odor.*—It has long been known that in some species alien colonies can be freely mixed without a sign of hostility, whereas in others intercolonial hostility is shown. In the latter case, the survivors habituate to each other and in time acquire the same colony odor. The source and nature of such a highly specific odor has long been a mystery. Recently, Soulié (151) presented indirect evidence indicating that in *Crematogaster* the odor might be derived from the nest itself. This still left unanswered the question whether the ultimate source of the nest odor derived from