antennal ("Fühlerschläge") code postulated by Wasmann in 1899 (171). More recent authors [e.g. (58, 59, 107, 138, 142, 155)] adduced evidence from behavioral and morphological studies that suggested the existence of elaborate systems of chemical releasers, but were not able to identify discrete substances. In the past four years, the isolation and identification of the pheromones and the location of their glandular sources has begun. The greatest progress has been made on the trail and alarm substances, as shown in Tables I and II.

TABLE I

SOURCES OF TRAIL SUBSTANCES IN ANT SPECIES

Species	Glandular Source	Dispensing Organ	Authority
MYRMICINAE			
Solenopsis geminata (Fabricius), *S. saevissima* (Smith), *S. xyloni* McCook	Dufour's gland	sting	Wilson (199, 200)
Pheidole fallax Mayr	Dufour's gland	sting	Wilson (203)
Acromyrmex octospinosus (Reich)	true poison gland	sting	Blum (9)
Atta cephalotes (Linnaeus), *A. texana* (Buckley)	true poison gland	sting	Blum and Moser (9)
DOLICHODERINAE			
Iridomyrmex humilis Mayr, *I. pruinosus* (Roger)	Pavan's gland*	posterior border of abdominal sternite VI	Wilson & Pavan (208)
Monacis bispinosa (Olivier)	Pavan's gland*	posterior border of abdominal sternite VI	Wilson & Pavan (208)
FORMICINAE			
Paratrechina longicornis (Latreille)	hind-gut	anus	Wilson (203)
Lasius fuliginosus (Latreille)	hind-gut?†	anus	Carthy (27)

* It is proposed here to use the term Pavan's gland to refer to the *organo ventrale* discovered in the Dolichoderinae by Pavan (121), in order to distinguish it from other ventrally located glands in the worker ant and to avoid further confusion with the ventral gland of the Orthoptera. See Miradoli Zatti & Pavan (116), Pavan & Ronchetti (123), and Wilson & Pavan (208) for morphological details.

† See explanation in text.

Odor trails.—Quite a new picture of the nature of trails has been obtained. It is now necessary to distinguish between "exploratory" trails and "recruitment" trails. The former are found in legionary (army ant) species among the Ponerinae and Dorylinae (137, 140, 197), and are laid more or less continuously by foraging workers. The contribution of the single worker appears to be relatively slight, but the accumulated contribution of the foraging columns is heavy enough to last for days or even weeks (141, 146, 197). To date, the glandular source of exploratory trail substances remains unknown. On the other hand, the recruitment trails are laid only by workers that are returning to the nest following the discovery of food, lost nest mates, superior nest sites, etc. They can be ephemeral or built up by accretion into persistent "trunk routes" (162). They are typical of the trail-laying Myrmicinae, Dolichoderinae, and Formicinae. In the cases thus far analyzed (Table I), the recruitment trail substances have proven to be strong attractants. Although most authors