g) A Territorial Pheromone. As documented previously, workers respond to fresh surfaces by increasing the rate of deposition of anal spots, and the material was laid over the territorial surface at an approximately uniform rate of density. Is it possible that the anal liquid contains pheromones by which the ants recognize their own territories and avoid—or at least respond differently to—the territories of other colonies? If such conditions occur, the identification substances qualify as territorial pheromones, the existence of which would be of exceptional interest in ecology.

The ability of *Oecophylla* major workers to recognize their own deposits was tested by the following method. A colony was allowed to mark the papered floor of an arena for a period of several days. Then the ants were removed overnight, and the arena was shifted slightly to one side to make room for a second, identical arena that had been marked by an alien colony of *Oecophylla*. The alignment of the two arenas was the same as that of the original arena in its undisplaced position. The colony was then given access to both arenas simultaneously by the emplacement of thin wooden bridges. Four replications were performed, employing two colonies and both possible arrangements of the arenas (that is, experimental arena either to the right or left of the control arena). The results strongly indicated the presence of a colony-specific territorial pheromone. The first major workers to enter the alien arena displayed greater caution and a significantly higher rate of aggressive posturing, which consisted of opening the mandibles and raising the abdomen above the remainder of the body (Fig. 8). This response was obtained even though no alien workers had been in the arena for over 12 h and none were then even in sight elsewhere. The exploring ants showed a special interest in the anal spots, often stopping to inspect individual ones with their antennae. After a few minutes some of the foragers then returned to their nest tree while laying odor trails, and a full-scale recruitment to the alien arena began. Some recruitment to the familiar arena occurred simultaneously but at a significantly lower level.

A similar series of experiments was conducted with a third colony. In this case, however, we allowed the *Oecophylla* foragers to enter three different arenas: the home arena; a new arena, with a freshly papered floor; and an arena from an alien colony. Three replications were performed, with the spatial arrangement of the arenas being changed each time in order to minimize visual cues. The results, which are exemplified in Figure 17, clearly confirmed the previous findings: workers entering the alien arena responded with stronger recruitment efforts and more aggressive displays than did workers entering the new arena or the home arena.

In order to be certain that the ants were recognizing their own deposits and not some other feature of the particular arena unknown to us, we conducted the following additional experiment. Pieces of fresh paper 15×15 cm in area were placed on the floors of arenas occupied by *Oecophylla* colonies, and the ants were allowed to mark them with anal spots over a period of two or more days. The marked pieces were removed briefly and then reinserted into the original arena or in the arena of another colony. Freshly cut, unmarked squares were also offered as general controls. The behavior of the major workers approaching the various squares was then recorded in detail during four or