Similar results were obtained when a nest tree was connected simultaneously with two new arenas, of which one replaced the colony's home arena and the other diverged from its long axis by 90°. In five replications a significantly larger number of ants laid recruitment trails into the latter arena (new position) which in turn caused a stronger invasion by nestmates into this space. A representative example is provided in Figure 13.

Finally, we devised a test to learn whether a mere extension of the available terrain, unaccompanied by a rotation in the direction of the accessible space, would also induce an increase in trail laying. This was achieved by simply adding arena A onto the end of arena B, with both leading away from the nest tree in the direction familiar to the ants. The two arenas were connected by a broad bridge. The rates of trail laying in the far arena (arena A) in the two experiments performed were 2.9 and 5.0, respectively, where the numbers represent number of trail-laying episodes/worker/30 min. The rates observed in the extension experiments were furthermore higher than in the rotation experiments. The difference appeared to be due to the attraction of the ants for the elevated paper bridge connecting the two arenas. The foragers accumulated there to a large degree, were apparently excited by the area, and conducted intense trail-laying in the vicinity. We have noted that *Oecophylla* workers in general are more attracted to elevated structures than to flat surfaces while exploring, and they most of all prefer to move along ridges.

In still more tests we measured the rate at which the exploring workers deposited anal drops during the first 7 h. When colonies were presented with a fresh paper surface only, and no change was made in the position of the arena, the rate of deposition (in drops/ant/7 h) was 0.63, 0.24, and 0.77 in three colonies, respectively. When the same colonies were presented with fresh paper in arenas that had been rotated 90°, the rate of deposition was 1.16, 1.01, and 1.24, respectively. The difference is significant at the 95% level. Thus the workers approximately doubled the rate of anal spotting when given a novel spatial stimulus. Later, in section 7g, we will show that the anal marks contain a colony-specific identification pheromone.

5. Emigration

When colonies brought from Kenya were given the opportunity to move from their original, now dried-out leaf nests to potted trees in the laboratory, they responded promptly and decisively. A well-organized emigration began within minutes in most instances and was all but completed within several hours. We followed four such episodes in close detail. In each case the ants treated the fresh tree essentially as new terrain: exploring workers investigated it quickly and returned to recruit nestmates with rectal-gland odor trails. Masses of major workers accumulated on certain leaves and branch tips of the trees, and the ants then proceeded to fold the leaves and to pull them together in a complex sequence of movements (for a description of this behavior, see Wilson, 1971; Hemmingsen, 1973). Very soon major workers began to carry larvae in the middle-size class able to spin silk, and used them to bind the leaves together at the new nest sites.