Table 4. Number of workers laying odor trails over bridges to arenas in which visual and chemical cues had been left unchanged (control) or shifted 90° in alignment, changing visual cues without replacing the paper covering the arena floor (experimental). Compare with Table 3, pertaining to arenas in which the chemical cues but not the visual cues had been changed

Control	Experimental
33	81
44	77
36	103
12	26
4	35
1	40
3	81
$p < 0.01$	

and all ants were returned from the arena to the tree. After 30 min the arena and nest tree were reconnected and all trailing ants moving over the bridge were counted during eight consecutive 5-min periods. The experimental test was conducted in the same way, except that the arena was rotated through 90° with reference to the nest tree and the numerous other visual landmarks present in the laboratory room. Now the ants had the same strong odor environment as before, but in traveling to the arena they were moving out at an angle of 90° from the original line of departure. As Table 4 shows, the number of trailing ants increased significantly ($p < 0.01$) after the arena's alignment had been changed.

In a second series of experiments two arenas were arranged next to the nest tree so that their long axes diverged 90°. For several days *Oecophylla* were allowed access to one of the arenas (arena A) and were allowed to see but not to visit the second arena (arena B). In a control experiment, the ants were removed from arena A the evening before and the arena floor was freshly papered, removing most or all of the odor cues. Then on the following morning the ants were allowed back into arena A, and the number laying odor trails on the arena floor, as well as the total number present there, were recorded during the first 30 min. The *Oecophylla* were still denied access to arena B. On alternate days the visual environment was changed in the following way: the procedures of the control experiment were repeated, except that now arenas A and B were switched in position, and the bridge was joined to arena A in its new position (arena B, now in the position occupied previously by arena A, was still left unconnected to the nest tree). Now the ants had the same odor environment as before (in case some odor cues were left after freshly papering the arena), but in traveling to arena A they were moving out at an angle of 90° from the original line of departure.

The data show that the *Oecophylla* workers lay odor trails at a higher rate when presented with this simple alteration in visual stimuli. The rates of trail-laying in four control experiments were 0, 0.23, 0.23 and 0.42, respectively, where the numbers given are the trail-laying episodes/ant/30 min. The rates of trail-laying in two rotation experiments were 0.76 and 1.80, respectively. The differences in rates between the control and rotation experiments are significant at the 95% confidence level. The number of workers accumulating in the rotated arenas was also much higher.