Table 3. Number of workers laying odor trails over bridges to arenas in which visual and chemical cues were left unchanged (control) as opposed to those in which fresh paper was placed on the arena floor changing the chemical cues (experimental).
A, original paper had remained in place until heavily spotted, then was replaced with fresh paper; B, original paper had remained in place a shorter time resulting in much lighter prior spotting

A		B	
Control	Experimental	Control	Experimental
11	103	14	27
72	138	15	23
1	94	2	6
13	77	14	78
18	59	11	18
17	108	9	10
9	38	5	12
$p < 0.001$		$p > 0.1$	

30 min the bridge between the tree and arena was returned to its original position and all trailing ants traveling over the bridge were counted during eight consecutive 5-min periods. Then the procedure of returning the ants from the arena to the tree was repeated and the heavily marked paper was replaced by a fresh one. After 30 min the bridge was put back in place and again the number of trailing ants moving over the bridge was counted. As shown in Table 3 (part A), the number of trail laying ants increased significantly ($p < 0.01$) when the marked paper floor was replaced by an unmarked one, although the position of the arena remained the same. However, this effect was weaker when a paper less intensively marked by anal spots was replaced by a fresh paper. For example, when the colony had been allowed to mark a paper during a two-day period prior to the experiment, the paper had an average spot density of 18.9 ± 4.7 spots/25 cm^2 ($n = 7$ experiments). After this marked paper had been replaced by an unmarked one, the number of trail-laying ants did not significantly increase (Table 3, part B). This last effect indicates that when pheromones are weaker, the ants use cues in other sensory modalities, for example, landmarks, to identify their home range.

4. Visual Cues in Home Range Recognition

It had been apparent from the earliest casual observations that *Oecophylla* foragers remember the direction of the established foraging areas. When the wooden bridges to the arenas were removed at night, the foragers could be found the next morning crowded on the side of the nest from which the bridges had led, even when the nest tree had been rotated in order to exclude chemical orientation. A series of experiments revealed the role of learned visual orientation in the recogniton of occupied as opposed to unexplored terrain. Our procedures firstly addressed the question: can a change of the positional orientation of the arena alone release increased trail laying and recruitment in *Oecophylla* foragers? For several weeks a colony was connected with an arena in which the paper floor had been initially heavily marked with anal spots (165.2 spots/25 cm^2). For the control test the arena was disconnected from the nest tree