

from it. Thus in one day three nests were discovered and by late afternoon pupae were being brought from all three over the Castle trail. As might have been predicted, after such a successful day, ants were still on the trail at 7:45 in the dusk and chill of the evening.

These permanent trails were not tried out and abandoned successively but were returned to, time after time, throughout the season as can be seen by the chart which shows daily records for part of the summer.

*Numbers of Ants on the Trail.*—The number of ants on a trail at any one time varies tremendously, as does also the proportion of those leaving the home nest and those returning to it. A set of counts made on a Dock Nest trail may be considered typical. At 3:30 the afternoon raid was just beginning along an old trail and was densely populated with a steady stream of ants. The line was narrow, 6 or 8 inches wide, and was progressing about 14 feet in 5 minutes. In half an hour the column had progressed and spread out into the typical exploratory one four feet wide, with a fan-shaped end over eight feet in width. Thirty-five minutes after the raid began, many ants in the front were starting to return to the home nest; evidently a nest that might be raided had been located, and individuals were returning apparently for reinforcements. At this time only 61 ants were going out while 133 returned to the home nest during a five-minute period. Forty-five minutes after the retreat began the direction of flow had changed once again and many more ants were going out than back. The line had now ended beneath a cedar tree where the raiding ants were exploring all crevices. Within an hour, pupae were being carried from the nest discovered beneath this cedar, and by 6 P. M., no more ants were coming from the home nest, but a steady stream were returning to it. At this time, in 5 minutes, 163 crossed the line, 20 of which carried pupae. At 6:40, in 5 minutes, only 105 ants returned home, 3 carrying pupae; however, this still made a fairly good column, a steady stream of ants moving rather slowly.

At no time did all the ants returning home carry loot. A strong line, at the height of looting activity, was checked for number. The column was narrow (7 inches across) with little obstruction, so that ants were moving steadily and rapidly. In 15 minutes, 376 ants were counted going toward the nest being raided, while 392 ants were counted returning home from it. Of those returning 136 were carrying pupae, 26 had larvae, and one black adult was being transported. Thus fewer than 42% of the returning ants were carrying brood.

The speed of individual ants carrying pupae was recorded for intervals of one minute. This varied from 24 to 36 inches traveled per minute. The distance traversed depended largely on whether the individual found a bit of bare ground or whether it had to manipulate the pupa through impeding grass stems. The ants did not follow a rigid path, but each picked its own course within the width of a foot.

*Nests Raided.*—The numbers of nests raided were few in comparison with the numbers of forays made. In 1939, between July 14 and August 20, the Walk Nest made 42 observed forays and raided 16 nests. The Dock Nest, in this period, made 36 observed forays and raided 10 nests. Distances traveled to these nests varied considerably, the