

followed at trail's end: that of a compact mass of ants digging in around pebbles, leaves, and grass. When no nest was found, the group began moving in widening circles, out as much as 3 feet. After 2 to 7 minutes of futile search some ants turned homeward, while others dug for another 10 to 20 minutes before giving up. Some of the wrong spots seemed quite evidently places where ants had been living. One had a pile of excavated soil before a wide open entrance into which the ants plunged. Once a colony which had been raided 3 times previously erected such a good barricade that the *Polyergus* never did get in, although they did not give up for 22 minutes. (Later I dug the nest and found the colony still there.) During the 2 years 11 failures occurred in 63 observed raids. Thus, 17.6% of the raids ended in failures which seemed to be due to misinformation. One ended in disaster because the terrain was too severe. The ants started up an almost perpendicular bare bank, but many lost their footing and could not get to the top. The whole group became disorganized, and eventually all returned home without going any farther.

#### SPEED OF TRAVEL AND TIME REQUIRED FOR A RAID

The time of an entire raid was considered as the interval between the starting out of a raiding column and the return of the last ant. This varied greatly, depending on distance traveled, time required to get into a nest, amount of brood to be brought out, and the length of time that some ants delayed at the nest before starting home. For 51 raids the mean time was approximately an hour (63 minutes). The extremes were 20 minutes for a raid on a colony 15 feet away, to 2 hours and 19 minutes for one on the most distant colony 286 feet away. June raids took a shorter time, averaging 47 minutes in contrast to 73 minutes for both July and August and indicating again that near colonies were raided first.

The preraid organizing, when many ants were moving about on the nest, took from 2 to 25 minutes and averaged 9.6 minutes. The time taken to reach a raided nest averaged 23 minutes and varied from 5 to 65 minutes. The opening of a nest, its penetration, and the emergence of the first ants with loot averaged 4.4 minutes. If the entrance was not obstructed, they could enter immediately; if it was barricaded or guarded, they might require as much as 13 minutes to free it. Once the ants entered, they would have the first brood out within a minute or two. The journey back took a shorter time than the outward one had required. The mean time required for the first ant to reach home was 15.9 minutes with a variation of 3 to 47 min-