

In aggregate the five systems constitute the most complex and sophisticated such repertory yet discovered in any ant species. Given that this is a real distinction and not just the product of more careful research on *O. longinoda* in comparison with that previously devoted to other ant species, the question of interest is why the African weaver ant employs more complex communication. We suggest that it is a combination of the large worker size and strongly arboricolous life characteristic of the species, which two modifications have made it advantageous for *O. longinoda* colonies to maintain total and strict control over the areas surrounding their nests.

A smaller species than *O. longinoda* might be able to coexist with other ant species on the surface of trees by appropriating its own microhabitat and leaving other microhabitats to its competitors. Thus, like certain species of *Leptothorax* and *Melissotarsus*, such a form might specialize for life within and upon the bark, leaving hollow twigs and the upper surface of the tree to other small specialists. *O. longinoda* does not have this option. Its large size virtually dictates that it rely in part on larger, scarcer food items. Consequently a colony, unless it is to remain very small in population, must range widely over its nest tree—and beyond. The surface area of the tree is limited, and the biomass of potential prey in grams per unit area is less than on the ground, which is composed of complex layers of leaf litter, humus, soil, and large pieces of rotting wood. The weaver ant colony will find considerable advantage in excluding competitor colonies of all but the smallest or dietarily most different species. This exclusion *Oecophylla* accomplishes, as we have seen in the introductory section. The African weaver ant is exceptionally aggressive, and its territorial behavior is well organized and efficient. With this consideration in mind it is perhaps not surprising to learn that the *Oecophylla* workers utilize special communication systems both to speed the occupation of new terrain and to defend it once converted into territory.

These systems are distinctive, yet all except short-range recruitment to enemies still share many features with each other. It appears as if a basic, primitive system (food recruitment?) has been modified by slightly mutated replications of the behavior patterns. This case provides one more example, added to a number already elucidated (Wilson, 1971) of signal economy, that is, the utilization of the same or similar signals and behavior patterns, in differing combinations, to achieve different functions. Although *Oecophylla* may have occupied the same life style for over ten million years, it has differentiated four of its recruitment methods (to food, to territory, to new nest sites, and to enemies at long range) only slightly. On the other hand, it has invented one wholly new form of communication—short-range recruitment to enemies. Our interpretation of the significance of this novel method is that it serves to shift the foragers from an essentially random spatial pattern to one of moderate clumping, in which it is easier to subdue larger and more formidable opponents. The *Oecophylla* do not use short-range recruitment and do not clump in the presence of small intruders that can be handled by single defenders; they continue to move so as to maintain a random or at most slightly clumped pattern, which is more efficient for sweeping out small objects.