

From these domains the ants glean a wide variety of food items while warding off the intrusions of rival colonies. We report here the results of a laboratory study of this remarkable species which reveal what we believe is the most complex such system hitherto reported in ants. The *Oecophylla* employ various forms of recruitment to alarm nestmates, to defend the foraging area, to collect food, and to explore and dominate new terrain.

Materials and Methods

1. General Biology. *Oecophylla* is an exclusively Old World genus with a long geological history. Two species are known from the Oligocene Baltic amber of northern Europe, where the ant fauna consists of a mixture of elements allied both to the modern temperate Eurasian fauna and the fauna of tropical Asia. A third species, *O. leakeyi*, has been described from the Miocene of Kenya; the fossils constitute a portion of a single colony, the allometry and size-frequency distributions of which match the unique patterns of the living members of the genus (Wilson and Taylor, 1964). This circumstance, combined with the fact that the colony lived in a tropical forest environment and possessed naked pupae (a condition almost limited within the Formicinae to arboricolous species), suggests that *Oecophylla* has not changed its basic way of life since Miocene times, at least ten million years ago.

Two species of the genus are alive today. *O. smaragdina* ranges from India across almost all of tropical forested Asia to the Solomon Islands and Queensland, Australia. *O. longinoda* is widespread in the forested portions of tropical Africa (Wheeler, 1922). Over most of their ranges both species tend to be common, and in many localities they are among the several most abundant elements of the arboreal ant fauna. At least some of the success of the *Oecophylla* must be due to the ability of these large ants to construct nests directly from leaves still attached to the nest plant. As their popular name of weaver ants suggests, they bind the leaves together with silken threads spun by the larvae, which they hold between their mandibles and move back and forth like shuttles.

The most detailed general account of the natural history of *O. longinoda* has been provided by Way (1954). Other aspects of the life cycle, ecology, and behavior have been added by Ledoux (1950), Leston (1969, 1970, 1973), Room (1971), Gotwald (1972), Hemmingsen (1973), and Bradshaw et al. (1975). The ants nest exclusively in the canopies of living trees. In general only one colony occupies a given tree, while large colonies often extend their domain to more than one tree. Multiple silken nests are constructed in widely scattered sites through the canopy, with the workers running back and forth between them. Way (1954) recorded an exceptionally large colony on Zanzibar Island that occupied 151 nests spread over twelve trees and contained at least 480,000 workers and 280,000 immature forms. This colony, like all *O. longinoda* colonies that have been carefully dissected, was found to contain only one mother queen. New colonies are founded in the conventional claustral method by recently fecundated queens who shed their wings, seclude themselves on an unoccupied host plant, and rear a first brood of workers from the reserves carried in fatty and muscle tissue within their own bodies. There are two distinct castes: major workers, which do virtually all of the foraging, defend the colony, care for the queen, and assist in the care of the brood, and much smaller minor workers, most of which remain inside the leaf nests and function as nurses of the brood.

Oecophylla longinoda major workers are strongly predaceous, using their considerable strength and cooperative ability to capture a wide range of insect prey that venture onto their territories, including honeybees (*Apis*) and driver ants (*Dorylus*). The ants also assiduously attend homopterans for their 'honeydew' secretion. Although the foragers remain mostly on the trees and surrounding low vegetation, they also venture extensively onto the ground. The laboratory colonies studied at Harvard were exclusively diurnal in their foraging activity, with the population of foragers reaching a peak in the late morning. This matches the diel pattern observed in the field by Leston (1973).

The *Oecophylla* are highly aggressive toward intruders, including nearly all kinds of other ant species. As a consequence, these and other dominant ants show a mosaic distribution with