INTRODUCTORY NOTE: Edward O. Wilson is a biologist at Harvard University. The following passage is adapted from an article that he published in 1985.

ANTS AND COOPERATION

In a sunlit clearing on Mexico's Yucatan peninsula, a giant black worker ant, a female like all members of her caste, leaves her earthen nest and climbs a nearby shrub to a glistening cluster of dew. She's on a mission of survival for herself and her clan. Opening her mandibles, her jawlike mouth parts, she collects a drop of dew, then returns to the nest. After pausing at the entrance to allow another worker to drink some of the water, she descends through vertical galleries until she reaches the brood chambers where the colony's immature young are kept. There she daubs some of the water onto a cocoon and passes the rest to a thirsty larva.

During dry periods the ant colony, like those of all social insects, is in mortal danger of drying out. Many of the workers make repeated trips back and forth to sources of water wherever it can be found. Some deliver the water directly to nestmates, while others place the drops on the ground inside the brood chambers, keeping the soil and air moist and thus protecting their young sisters from dehydration during the most vulnerable period of development. Through such cooperative behavior, the colony is able to survive and grow even during the hardest of times.

Those water carriers of the insect world belong to one species of giant tropical stinging ant, *Pachycondyla villosa*. Half an inch long when fully grown, they can inflict on humans a throbbing pain that lasts for days. But it's their water-sharing that especially interests scientists. In my view, the sharing of food and water is a more important component of advanced social behavior than dominance, leadership, or any other kind of interaction. When sharing is extended beyond offspring to include siblings and less closely related individuals--in other words, when it becomes truly altruistic--it tightens social bonds and leads to the evolution of some of the most complex forms of communication in the animal kingdom.

Similar patterns of altruistic sharing may have played a key role in the evolution of human social behavior. Limited fossil evidence indicates that 2 million or more years ago, the earliest "true" humans, *Homo habilis*, lived at African campsites to which they carried food and distributed it to others. Anthropologists think this arrangement, which persisted and intensified throughout prehistory, favored complex communications, long-term reciprocal agreements, and thus ultimately a uniquely rich social existence. Today virtualy all cultures share food as part of their bonding rituals and rites of passage.

Procedures of sharing are also at the heart of social life among insects. Besides carrying water, for example, *Pachycondyla* worker ants also gather drops of nectar and carry them home between their mandibles. Then they distribute the nectar to their nestmates. What began as a single large drop when the forager first entered the nest finally ends up as tiny droplets to feed

ten or more workers. The ants also get food by hunting other insects, which they transport home to be torn into small pieces and shared among colony members.

Researcher Bert Holldobler has found that drop-carrying is widespread within the group of primitive ants to which *Pachycondyla* belongs. These mostly tropical ants, constituting the subfamily Ponerinae, originated as far back as the late Mesozoic era, 70 million years ago. Almost all are stinging insects that capture live prey. A few even organize formidable raiding parties that overwhelm colonies of termites and other species of ants, a sophisticated form of insect behavior. And in a pattern paralleling that of mammals, the species whose workers hunt in groups are also by and large the ones that possess the most complex societies and modes of communication.

At about the same time that Holldobler conducted his studies, Thomas Eisner of Cornell and I used radioactively labeled sugar water to trace the distribution of liquefied food through a colony of common black ants (*Formica subsericea*). We found that portions of food brought in by a single worker reached every other worker in the colony within 24 hours, after prolonged bouts of reciprocal feeding. Within a week all the colony members were carrying approximately the same quantity of the radioactive material. We had confirmed earlier entomologists' belief in the "social stomach." This is the belief that what an individual worker ant has in her stomach at any given moment is approximately the same as what all the other ants have, too. So when the colony as a whole is hungry, the same is true of each of the foraging workers. The ants' sharing of food and water is important because it binds the colony members together and coordinates their activities. When everyone shares roughly the same stomach content, individual decisions become similar, and a more harmonious form of mass action is possible.

ESSAY TOPIC

According to Wilson, what is the most important kind of behavior found among enduring social groups? To what extent do you think Wilson's claims about ants are convincing when applied to other societies, including those of human beings? Write an essay responding to these two questions; to develop your essay, be sure to discuss specific examples drawn from your experience, your observation, or any of your reading—including "Ants and Cooperation" itself.