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**Do We Need More Ethograms?**

By DEBORAH M. GORDON

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SCHLEIDT et al. (1984) propose a detailed, systematic format for ethograms. A method of data collection implies a way of describing behavior, and each type of description is relevant to a particular set of theoretical questions (DRUMMOND 1981; GOLANI 1976). In advocating their ethogram format, SCHLEIDT et al. are also endorsing certain research questions in ethology.

Ethograms represent behavior as a collection of movements made by individuals. Much of current research in animal behavior is based on data of this type. We ask, for example, what are the physiological causes of a movement? How often is it performed by individuals of a given age, sex, or dominance status? How do the movements typical of individuals of one species compare with those of related species? And finally, how does a movement or act, its frequency, the type of individual doing it — affect the fitnesses of individuals or the relative fitnesses of species?

There is, however, an interesting class of theoretical questions in ethology that it is awkward to investigate using ethogram data: questions involving the relationship between behavior and its behavioral context. We know that each act of an animal is an element in a hierarchical complex of behavioral patterns. Movements are situated in larger sequences of behavior, in the ontogeny of the individual, in daily and seasonal cycles of interaction, and in a sphere of social influences. But when we think of behavior in terms of isolated acts, the relationship between behavior and context is neglected. For example, we record the frequency of an act without regard to the situations in which it is done. Or we inquire about the relative fitness of single acts by invoking a *ceteris paribus* argument regarding the fitness of other, related acts.

Some ethologists start with isolated “pieces” of behavior and try to re-connect them with their behavioral contexts. In this spirit, some have begun to investigate the relationships among the acts of individuals and longer sequences of behavior (HATZIOLOS and CALDWELL 1983), social situations (GOVE and BURGHARDT 1983), or the acts of other individuals (RASMUSSEN 1983). It has been argued, though, that such a reductionist approach is inappropriate (CROOK 1970; SCHNEIRLA 1972). It is difficult to characterize

higher-level phenomena, such as social organization, in terms of lower-level phenomena, such as the movements of individuals.

Can we undertake empirical studies based on context-dependent units of behavior? Affirmative answers are beginning to appear. To examine sequences of movements, is to study the relationships between movements, not merely the movements themselves (LEONARD 1984). To investigate social organization is to see individuals' acts as aspects of group behavior. That is, data are collected on the activities of groups, and on patterns in group activities, instead of on individuals' behavior (ROBINSON 1979; HUTTO 1981; HELFMAN and SCHULTZ 1984). Thus, in my work on harvester ants, the daily pattern of group activities is fundamental. The pattern, or daily round, has been used to predict chemical communication and foraging behavior by individuals (GORDON 1983 a, b), as a basis of comparisons among species (GORDON 1983 c), and as an experimental variable in the study of territorial behavior (GORDON 1984).

New methods of data collection should develop hand in hand with new theoretical questions. The construction of more ethograms is only as valuable as the theory that guides it. At this stage in its development, ethology needs theories of context-dependent behavior, supported by new kinds of data.

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