

Birth and Zoological Structure of the Noosphere: Segment 3

David Sloan Wilson: We're here to talk about the concept of organism as something which is more general than just you and me bounded by our skins and you're a great person to talk to about that because you study social insect colonies as a superorganism and so how would you define the concept of organism in a way that's sufficiently general, that it can encompass more than just what we obviously think of as organisms?

Deborah Gordon: I guess the more we learn about biology, the more fuzzy the idea of organism becomes because we are learning that everything that we think of as an individual organism is actually composed of many different organisms. So it's very hard to say what an organism is. For an ant colony, we think about what reproduces. So an ant colony consists of one or more reproductive females who lay the eggs and then all the ants that are walking around are sterile female workers, but the ants can't make more ants, it takes a whole colony to make more colonies. So in that sense, the colony is a reproductive individual and we can think of it as an organism in the sense that it makes more of its own kind.

DSW: Right. And of course, also it's a highly cooperative unit. Right?

DG: Well, they all work together to function as a colony and to make more colonies.

DSW: Right. Although there is a concept of cheating, right? There is a sense in which natural selection takes place within a colony. Is that right to a degree?

DG: Well, there've been a lot of different efforts to partition out the fitness or contributions of each component of a colony, but it's very difficult to do because we don't really know how to measure how much each individual contributes and how much each individual gets. So it's very hard to take it apart because it's very difficult to parse out what an ant gives to the colony by going out to get food, as opposed to what an ant gives to the colony by laying an egg.

DSW: Well now there's a mental component to the superorganism, which is something that you study a lot. Right? So the concept of a group mind comes along with the concept of a superorganism. So in what sense is mentality a group process in an ant colony?

DG: Well, we don't really see ant colonies writing books or doing differential calculus, but we can see that colonies function as a collection of different independent entities that work together. You could call that a mind. I mean, that's also how a brain works, but whether an ant colony performs intellectual operations, I guess that would only be true if you define it in the barest Turing sense that it can distinguish between states and make decisions, but don't really see an ant colony as doing intellectual work.

DSW: Well, foraging decisions, for example, the same kind of decisions that an individual organism makes with optimal foraging theory, for example, within an individual is made by a social insect colony, right? But that the individual ants are playing a role in a distributed process. Is that-

DG: That's right. So colony adjusts its effort to different tasks. So for example, it could change how much it's foraging in response to how much food is available, in response to what it costs to go out and get the food. For example, the desert ants that I study have to manage a trade-off with water loss because they have to spend water because they lose water to evaporation. So they have to spend water to go outside and look for food. So you could say that the colony is making decisions about whether it's worth it today to go out and forage given how much food there is out there and how dry it is. Now would you call that the act of a mind? I don't know.