ANTEATER: All right. Let's begin at the bottom. When ants need to get something done, they form little "teams," which stick together t~ perform a chore. As I mentioned earlier, small groups of ants are constantly forming and unforming. Those which actually exist for while are the teams, and the reason they don't fall apart is that there really is something for them to do.  
  
ACHILLES: Earlier you said that a group will stick together if its size exceeds a certain threshold. Now you're saying that a group will stick together if there is something for it to do.  
  
ANTEATER: They are equivalent statements. For instance, in food gathering, if there is an inconsequential amount of food somewhere which gets discovered by some wandering ant who then attempts to communicate its enthusiasm to other ants, the number of ants who respond will be proportional to the size of the food sample-and a inconsequential amount will not attract enough ants to surpass the threshold. Which is exactly what I meant by saying there is nothing to do-too little food ought to be ignored.  
  
ACHILLES: I see. I assume that these "teams" are one of the levels c structure falling somewhere in between the single-ant level and the colony level.  
  
ANTEATER: Precisely. There exists a special kind of team, which I call "signal"-and all the higher levels of structure are based on signal In fact, all the higher entities are collections of signals acting is concert. There are teams on higher levels whose members are no ants, but teams on lower levels. Eventually you reach the lowest-level teams-which is to say, signals-and below them, ants.  
  
ACHILLES: Why do signals deserve their suggestive name?  
  
ANTEATER: It comes from their function. The effect of signals is to traps port ants of various specializations to appropriate parts of the colony. So the typical story of a signal is thus: It comes into existence by exceeding the threshold needed for survival, then it migrates for  
  
some distance through the colony, and at some point it more or less disintegrates into its individual members, leaving them on their own.  
  
ACHILLES: It sounds like a wave, carrying sand dollars and seaweed from afar, and leaving them strewn, high and dry, on the shore.  
  
ANTEATER: In a way that's analogous, since the team does indeed deposit something which it has carried from a distance, but whereas the water in the wave rolls back to the sea, there is no analogous carrier substance in the case of a signal, since the ants themselves compose it.  
  
TORTOISE: And I suppose that a signal loses its coherency just at some spot in the colony where ants of that type were needed in the first place.  
  
ANTEATER: Naturally.  
  
ACHILLES: Naturally? It's not so obvious to me that a signal should always go just where it is needed. And even if it goes in the right direction, how does it figure out where to decompose? How does it know it has arrived?  
  
ANTEATER: Those are extremely important matters, since they involve explaining the existence of purposeful behavior-or what seems to be purposeful behavior-on the part of signals. From the description, one would be inclined to characterize the signals' behavior as being oriented toward filling a need, and to call it "purposeful." But you can look at it otherwise.  
  
ACHILLES: Oh, wait. Either the behavior is purposeful, or it is not. I don't see how you can have it both ways.  
  
ANTEATER: Let me explain my way of seeing things, and then see if you agree. Once a signal is formed, there is no awareness on its part that it should head off in any particular direction. But here the delicate caste distribution plays a crucial role. It is what determines the motion of signals through the colony, and also how long a signal will remain stable, and where it will "dissolve."  
  
ACHILLES: So everything depends on the caste distribution, eh?  
  
ANTEATER: Right. Let's say a signal is moving along. As it goes, the ants which compose it interact, either by direct contact or by exchange of scents, with ants of the local neighborhoods which it passes through. The contacts and scents provide information about local matters of urgency, such as nest building, or nursing, or whatever. The signal will remain glued together as long as the local needs are different  
  
  
from what it can supply; but if it can contribute, it disintegrates, spilling a fresh team of usable ants onto the scene. Do you see now how the caste distribution acts as an overall guide of the teams inside the colony?  
  
ACHILLES: I do see that.  
  
ANTEATER: And do you see how this way of looking at things requires attributing no sense of purpose to the signal?  
ACHILLES: I think so. Actually, I'm beginning to see things from two different vantage points. From an ant's-eye point of view, a signal has no purpose. The typical ant in a signal is just meandering around the colony, in search of nothing in particular, until it finds that it feels like stopping. Its teammates usually agree, and at that moment the team unloads itself by crumbling apart, leaving just its members but none of its coherency. No planning is required, no looking ahead; nor is any search required to determine the proper direction. But from the colony's point of view, the team has just responded to a message which was written in the language of the caste distribution. Now from this perspective, it looks very much like purposeful activity.  
  
CRAB: What would happen if the caste distribution were entirely random? Would signals still band and disband?  
  
ANTEATER: Certainly. But the colony would not last long, due to the meaninglessness of the caste distribution.  
  
CRAB: Precisely the point I wanted to make. Colonies survive because their caste distribution has meaning, and that meaning is a holistic aspect, invisible on lower levels. You lose explanatory power unless you take that higher level into account.  
  
ANTEATER: I see your side; but I believe you see things too narrowly. CRAB: How so?  
  
ANTEATER: Ant colonies have been subjected to the rigors of evolution for billions of years. A few mechanisms were selected for, and most were selected against. The end result was a set of mechanisms which make ant colonies work as we have been describing. If you could watch the whole process in a movie-running a billion or so times faster than life, of course-the emergence of various mechanisms would be seen as natural responses to external pressures, just as bubbles in boiling water are natural responses to an external heat source. I don't suppose you see "meaning" and "purpose" in the bubbles in boiling water-or do you?  
  
CRAB: No, but --  
  
ANTEATER: Now that's my point. No matter how big a bubble is, it owes its existence to processes on the molecular level, and you can forget about any "higher-level laws." The same goes for ant colonies and their teams. By looking at things from the vast perspective of evolution, you can drain the whole colony of meaning and purpose. They become superfluous notions.