

THE LANGUAGE OF THE BEES: AN INTERVIEW WITH HUGH RAFFLES

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The western honeybee, misnamed *Apis mellifera* ("honey-carrier") by Linnaeus who erroneously thought bees simply cull honey produced by flowers, is probably the most loved of all insects. And as one of the few "social insects," it has been incorporated into folklore, mythology, poetry, and even political paradigms. Although the Egyptians were already keeping bees by the third millennium BCE, it was not until 1788 that the dance bees perform in the hive after finding a food source was finally observed. That the dance indicates precisely the location of food often miles away was not understood until the Austrian zoologist Karl von Frisch deciphered its meaning in the 1940s. In 1973, von Frisch was awarded the Nobel Prize for his work.

Hugh Raffles, professor in the Department of Anthropology at the New School, is currently writing *The Illustrated Insectopedia* (forthcoming, Pantheon), an ambitious book in the form of an abecedarium exploring our variegated relationship with insects. The chapter on "L" is dedicated to "Language," specifically to von Frisch's work on decoding the dance of the bees. Sina Najafi met with Raffles to discuss his research.

What is happening in animal behavior studies when Karl von Frisch starts to do his work on how bees communicate?

Ethology is a soft science in the way ecology is a soft science, so it has always been a little suspect as "real science." And when von Frisch starts out, the mood was one of heightened skepticism. Part of this was because of Clever Hans, the German celebrity horse who was a bit of a math whiz. He would tap his foot to indicate the answers to problem sets. All sorts of celebrities and scientists came to witness this. Eventually in 1907, a psychologist called Oskar Pfungst recognized that Hans's talent lay not in mathematics but in his uncanny sensitivity to the nonverbal cues of his unwitting trainer.

But even that is already pretty impressive!

It was a debunking, and it discredited the entire idea of animal intelligence. But, like you say, you can look at this and think about other kinds of intelligence, and the sensitivity here is something we can only aspire to. Though that wasn't how it was read then. So when von
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the idea of animals having reasoning abilities has been seriously called into question.

To make it worse, the great figure in animal behavior studies before von Frisch was Jean-Henri Fabre, the popularizing French naturalist. Fabre, who died in 1915, became a celebrity at the end of his life, but he was a literary celebrity, not a scientific one. He was an advocate of what we'd now call Intelligent Design and militantly hostile to Darwinism. Most scientists refused to take him seriously and—apart from in Japan—he fell into obscurity after his death. That said, he pioneered life-studies of animal behavior. He'd done outdoor experiments and observations since the 1850s, and was very good at developing field methods to study behavior. But again, it was a very compromised intervention. When von Frisch and others come along, they try to establish ethology on a strongly objectivist, scientific basis. Von Frisch is especially interesting because his scientific approach is undercut by the way he gets seduced by his bees.

I'd like to come back to the nature of this seduction. Can you first tell us about von Frisch's experiments?

In 1914, von Frisch demonstrated that honey bees—whose livelihood after all depends on flowering plants—are able to discriminate by color, despite being red-blind. A few years later, he worked on bees' sense of smell. His work on the "language of bees" starts in the 1920s at the Institute for Zoology at Munich University, where he became a professor in 1925. Although beekeepers and naturalists had known for centuries that bees communicated the location of food sources to each other, no one knew how. Von Frisch was the first to make the distinction between what he called the "circle dance" and the "waggle dance" performed by bees returning to the hive. He tracked the movements of their bodies and realized that communication of some kind was taking place. Initially, he thought that bees used the dances to indicate different kinds of food, but when he resumed his experiments in 1944, he realized that both dances communicate location. When the food was more than 100 meters away, the bees used the waggle dance to indicate the far more complex information of location. This communication required a bee to register the details of its flight, recall its content hours afterwards, and, of course, translate and perform its significant information to a comprehending audience. It's a complex and beautiful thing. The bee has to figure out how to use the sun as her directional reference while dancing in complete darkness inside the hive!

Von Frisch's experiments were truly elegant. He developed observation hives, feeding stations, and special food dispensers. He devised an ingenious coding scheme that allowed him to identify hundreds of individual bees, marking them with colored lacquer while they fed from his sugar water. He even put different kinds of obstacles in their way or attached weights to them to figure out if their experience of distance was linked to time or to actual physical distance.

If you see footage of the dances, you realize at once how difficult it is to see the things von Frisch describes. He was patient, self-critical, and tremendously methodical as well as creative. But most of all, he had this natural-historical eye for bee ecology, temperament, and habit, and this deep affinity with what I'd call bee ontology. He talked about his bees as personal friends, but he thought of them also as profoundly mysterious. He warmed them in his cupped hands when the cold stiffened their wing muscles. They were his bees in the same way an anthropologist of the past may have fancied the remote tribe amongst which he lived to be his tribe—the same mix of science, sentiment, and proprietorial pride. So even as he took such care over their welfare, he had little hesitation about snipping their antennae, clipping their wings, slicing their torsos, shaving their eye-bristles, and painting shellac over their eyes. Whatever the experiment demanded.

What happens to von Frisch's work on bees after the Nazis come to power?

The bees become his refuge. He gets caught up in the Nazi remaking of the universities, and the Nazis' attempt to appropriate the language of science and scientific ideology. Under the Civil Service Laws, academics had to produce documentary proof of their Aryan ancestry. One of von Frisch's grandparents was Jewish. At first, you couldn't teach in the university if you were a quarter Jewish, then it moved to one eighth. He was shielded for a while, in part because he was an important scholar but also because there was a lot of protection within the university. In October 1941, he was finally forced out. The campaign against him was led by Ernst Bergdolt, a lecturer in botany at the Institute, who wrote to the Ministry of Education calling for von Frisch's dismissal on grounds of his failure to make his research on bees do ideological work for the Nazis.

Part of this was fairly standard professional jealousy, but part was also because von Frisch really did refuse to extrapolate from bee society to human society. You can think of how hives have histori-

cally been interpreted in terms of order, conformity, hierarchy, leadership—all elements that could easily be employed to provide naturalistic support for National Socialist ideology. Ethologists like Konrad Lorenz, who was an active member of the Nazi Party and a key figure in its Office for Race Policy, were making arguments about the relationship between race and species that appealed to the Nazis but which von Frisch just ignored. Lorenz, in particular, was arguing at the time for instinct to be understood as the engine of racial progress.

Going back to the Nazis' desire to draw parallels between bees and themselves, you would have to contort things quite a bit to get Nazism out of the bees. For one thing, the supposed leader is female, and decision-making is quite decentralized. How did the Nazis deal with these problems?

By simply not paying attention to any of those aspects and by operationalizing those other aspects, like order, social organization, hierarchy, strict division of labor, and sacrifice on behalf of the greater good. I think that we could sit here and write it for them. It's not so different from the hive described by the sociobiologists actually.

The question of instinct in Lorenz is interesting because I can imagine all the different ways that it could run as far as the needs of the Nazi party are concerned. Instinct could mean a machine-like, non-thinking set of responses, or it could mean an inborn, inalienable way of responding, and be used to claim that Aryan instincts are different from others' and cannot be learned or copied. How did the question of instinct play itself out?

Instinct was a key question for all these people. Fabre is very important in terms of setting the agenda, and of course Darwin is crucial in this because of his work on animal behavior. We tend to think now that the critical distinction is between instinct and learned behavior, nature and nurture. But in the mid-nineteenth century, the central debate was whether instinct is innate or learned. For Darwin, instincts were inherited but they were inherited learned behavior. He claims that the most developed instincts would be found in the most intelligent animals, meaning that instinct wasn't automatic behavior but was the expression of intelligence, flexibility, and the ability to learn. You can see how this becomes important now in relation to Intelligent Design. For instance, one of the great trophies for the

proponents of Intelligent Design is the mammalian eye, the claim being that the eye couldn't evolve in stages because it would be functionally useless unless it was perfect. This is demonstrably untrue, but the same argument is often used (also erroneously) to claim that a given behavior couldn't evolve through trial and error. Fabre's favorite example of this was the ability of a parasitic wasp to paralyze the prey it provides for its larva with just enough force to make it immobile but not so much that it dies and becomes inedible.

This is the tradition that Lorenz draws on. He experiments with birds, and, as for Fabre, complex repetitive acts suggest to him that instinct works through a sequence of preprogrammed, inflexible, codified behaviors. In fact, both Lorenz and Fabre draw a rigid distinction between instinct and learning. This isn't so surprising in Fabre the Creationist, but it's more complicated in Lorenz who was fully committed to natural selection.

And does von Frisch's work on bees show them as having a certain kind of adaptability? Is that part of the distinction?

Yes. To me, a good reason to look closely again at von Frisch's work is his emphasis on the bees' flexibility and adaptability. Von Frisch, and the many people who've followed him down this road, are able to identify all kinds of complex mental operations not only in bees but in many insects. People are often nervous about using terms like intelligence or rationality in relation to animals, and perhaps rightly because you can see where that leads—to the kinds of research where people struggle for decades to prove that gray parrots can learn to spell, or that chimps can use sign language.

What notion of language operates in those kinds of research projects?

The question is, why would language be taken as the index of some kind of interior life at all? And why does that interior life have to be on the model of our own? If we imagine our intelligence as being language-based, why do we ask other beings to demonstrate that particular capacity as a sign of intelligence? It just points to how our dependence on language has limited our imaginative capacity.

I'm struck in all this by our constant impulse to interpret in terms that are already intelligible to us. Of course, this raises the question of what other

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let's start from the position that we have certain limitations in our capacity to understand, rather than that these other beings have limitations in their capacity to become us. Then maybe we can begin to think productively about our relationships with them based around some kinds of difference which aren't—like language, at least as we define it—distinctively human.

It's a really straightforward question, and it derives from a basic anthropological one about how to understand other beings. For many people this is an epistemological question about finding and accessing the truth of an object or the truth of another person. But there are other ways of approaching this through thinking about what it is that things do—a more ontological set of questions. Thinking of other things—it could be a table or a cup or it could be you or me, or a bee—you can think about what it is that gets contained in those things at a particular moment, not in a trans-historical, trans-geographical, trans-cultural kind of way, but what gets contained in those things at the particular moment that you are paying attention to it. And then what happens through it and in relation to it, what it does in the world.

So if you're thinking about von Frisch and his bees, what is contained there includes the Nazi party at that moment in the 1940s, it includes his collaborators, and it includes the affect that he brings to his research. And it also includes all the things the bees are doing to deflect all that and to create a world around them that brings all these people in to pay attention to them in their own particular ways—people like us sitting here talking about them!

In what sense do the bees deflect all this?

Well, it's clear that without the bees none of it would happen in the way that it does. And the bees' capacities create the possibilities for certain types of activities and analyses, and close off others. I like to think that these other beings are able to constrain the rather imperial power that humans like to think they exercise over them. For instance, von Frisch's experiments evolved in the way they did because of certain capacities of bees. They were extremely sensitive, say, to individual researchers and would form connections to them. They could smell them and recognize them, so that meant von Frisch had to be very cautious about trying to make sure they didn't bond with himself or any of his

overleaf: Worker honey bees identified with colored, numbered tags glued to their thoraces. Courtesy Kenneth Lorenzen, University of California, Davis.





collaborators in some way. The bees were able to think through the experiment, and so von Frisch was always having to think beyond their thinking. The bees constrain his experiments and push him to do them better! The bees—and this goes for any animal—are not always going to do what he wants them to. They might have other ideas. We don't really have a language for this. We can't necessarily call it intentionality, even though there's something parallel going on.

Would switching from epistemology and the questions of language and consciousness toward ontology allow us to change our material practices toward animals away from what you call the imperial mode?

It is important to acknowledge the astonishing violence that people inflict on animals, but I don't think we should let that fact limit our analysis. What strikes me over and over again, even with insects, is the level of ambivalence in our relationships to them. Part of the reason I chose to work on insects—apart from their fabulousness!—was because, with the exception of bees (and perhaps ants), they're so hard to domesticate in an intellectual sense. Von Frisch is an interesting person in that respect because he's utterly torn. But he's torn in a direction that most of us aren't. He's committed to insects as equivalent beings, but he also lets himself be professionally constrained not to reveal these feelings too explicitly. I don't think these feelings are that unusual, but von Frisch allows them to guide his work in ways that others don't. Take Thomas Hunt Morgan's work on fruit flies described by Robert Kohler. Between 1919 and 1923, Morgan's lab "processed" between twenty and thirty million fruit flies to develop the fruit fly genome, and they developed a whole private language around these animals, referring to them as "noble beasts," etc.

Are we capable of taking animals, insects for example, to be absolutely Other to us, and imagine a huge chasm between us and them without wanting to fill that void with symbolic meaning *and* without continuing our devastating material practices toward them. Is that a viable position for you?

The Werner Herzog view of nature! For me, no, because I'd say that rather than making that kind of programmatic statement, I would rather think about the ways in which people refuse that chasm: through the language of science, through our histories of approximation to animals, in their treatment in literature, and so on.

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ing difference. They are all thoroughly problematic, which is why it's useful to make the distinction between thinking about this epistemologically and thinking about it ontologically.

Which shifts the question of language completely.

Exactly. The question of the gap, and what kind of gap it is and how we overcome it—that is a question that leads nowhere. Because actually that's a question that just leads to annihilation; for one thing, it enables us to put other people out of the category of the human. We have Rwanda, Nazi Germany, and so on. In one of his essays on animals written soon before he died, Jacques Derrida tries to clear the ground on which to establish something like cross-species sympathy. And for him the question to ask about animals is, Do they suffer? Which of course is the same question that is asked by the animal rights people. It's a hopeful question, but I'm not convinced it's a helpful one.

I know that question from Bentham, and Peter Singer also uses it as his point of departure. It assumes that you're in a position to read that suffering and then that you will sympathize. After all the genocides of the last century, you might be skeptical that witnessing suffering would prevent us from imposing our will on another living being.

How would we know they suffer? What if they don't have a central nervous system resembling ours? So, yes, I agree, it doesn't really solve anything. For one thing, at best, it's fundamentally paternalistic.

At one point in your book, you table a position that you describe as a humanism that would be large enough to include animals in fact. Can you elaborate?

That would be, with some ambivalence, the kind of position that I would move towards if I had to work at this level of abstraction. It's a position that would ask for a certain equivalence so that the kinds of analytical and affective ways of making sense of these animals would be similar to the ones we might use to make sense of other people. Bees have a difference that we'll refuse to structure hierarchically. We'll assume it's a difference, an interesting difference. And we'll accept that this difference indexes a limit to our understanding, possibly long-term. There's a lot to be said for beginning from a position of humility.