Honey, I got the bees right!

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Dancers and their followers: (Left to right) The round dance and the waggle dance.
the world. The only sobering fact is that we are not quite alone, at least in our ability to use a symbolic language.

The only other example of a well-developed system of associating environmental stimuli in an arbitrary and symbolic manner with "universally understood meanings" is seen in the dance language of the honey bee. The claim is not that honey bees come anywhere near humans in their communication skills but that no other non-human animal can match even the bee dance language.

Honey bees live in extremely populous colonies and maintain organisation. Every colony has a single queen, a few hundred drones and tens of thousands of workers. The queen is an egg-laying machine and a chemical factory. She is responsible for all eggs laid in the colony and she manipulates the behaviour of the workers through various pheromones that she releases from time to time. The workers take on the responsibilities of nest construction and maintenance, brood care and foraging for nectar and pollen from the environment. The drones do nothing for the colony itself and are chased away (often with limited success) during times of food scarcity.

The ability of honey bees to maintain such large colonies can be attributed to their ability to efficiently harvest large but ephemeral sources of pollen and nectar from flowers in their neighbourhood. This, in turn, depends crucially on the unique ability of a successful forager bee to quickly recruit large numbers of naive workers from the colony to a newly found food source. After decades of painstaking observations and many false starts, Austrian zoologist Karl Von Frisch discovered and developed the waggle run, a dance that communicates the direction and distance of a food source to other bees in the colony.

The waggle dance consists of a run phase, a waggle phase, and a finish phase. The run phase is performed in the direction of the food source, and the waggle phase is performed at an angle relative to the direction of the food source. The angle of the waggle run is directly related to the azimuth (horizontal angle) of the food source from the bee's location. The distance of the food source is indicated by the duration of the waggle run. Karl Von Frisch won the Nobel Prize in Physiology or Medicine in 1973 for his work on the waggle dance.

The waggle dance orientations for three different positions of the food source. When the food is in the direction of the sun as in I, the run is upwards and when the food source is in the direction opposite to the sun, it is downwards. When the food is 80 degrees to the sun's left, the waggle run is 80 degrees to the left of the vertical.