

## **Animal Communication Book Talk**

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[The Cultural Lives of Whales and Dolphins](#) by Hal Whitehead and Luke Rendell (2015)

Culture is another condition often used to distinguish humans from other animals. The authors opt for a fairly general definition: the process of learning from others. Within scientific communities distinctions are important and arguments must be presented as they are here. However, I found the description of cetacean behavior more interesting (and intelligible) than the quibble about semantics and qualification, and won't dwell on the latter. The opening section does offer a lengthy discussion. There is also an excellent synopsis of the evolutionary process leading to land mammals and then back to large ocean living mammals.

Mammals generally are opportunistic, adaptable, social, and intelligent. These characteristics developed in their terrestrial evolution and influenced their readaptation to a marine environment. The ocean is more dense and viscous than air. Size is less restricted; speed more so. Sound travels farther and faster. Water has higher heat capacity and lower oxygen levels than air. The ocean is a 3 dimensional world, often defined by depth, contrasting with the land environment. Seasonal and daily cycles are obscured. Resources are less evenly distributed. These are all significant influences in marine mammal advantages and adaptations. The ocean environment is the least explored portion of the earth's surface. The life of the mammals that live there is also less explored. Aside from whale hunting and random anecdotes little was known about their behavior until the 1960s when Ken Norris began his studies.

They cover vast distances and are difficult to track. Blubber insulates warm blooded animals and provides a store of food in the ocean's dearth or plenty cycles. Air breathers can take in large oxygen filled gulps that serve them well down into the most oxygen deprived depths. They have single young with slow development and low mortality. They have the highest absolute brain size and no pelvic birthing problems. They have developed amazing echolocation systems, an advantage in a world where sight is degraded. Their air passages have enabled sonar signals and have favored brain development.

They live long, mostly matrilineal, communal lives. Females live beyond childbearing, giving whales the grandmother advantage of parental assistance and cultural longevity. This social structure is conducive to sharing learned behavior and to cooperative strategies. Various feeding techniques are practiced. Three separate pods of NW Pacific coast dolphins depend upon distinctive foods. They share the same area but do not interbreed. They may even starve rather than eat the food of another pod. Baleen whales are the most specialized depending upon sieving huge quantities (50-60 tons) of sea water. One variety herds prey into a circle, then drops lower jaw and lunges forward.

The discovery of humpback whale songs stimulated popular interest and research. These songs seem to be modified by individual changes that others imitate. Dolphins in particular have demonstrated behavior that implies both emotional content and thought processes. They have been known to regularly participate in human fishing operations. One group would alert a whaler's station to presence of whales. The whalers in return would anchor their catch off shore to let the dolphins feed on the tongue and lips. (Thoreau's Indian guide first also savored the elk tongue and lips.) Anecdotes of assisting injured and stranded humans have persisted since Aristotle's time. It is difficult enough to observe and document such behavior. Even more difficult is substantiating something resembling purposeful action and motivation. The classic experimentation procedure has severe logistical, and perhaps ethical, problems. Dolphins, held in captivity, have been trained to do many, often synchronized, tricks. This is a controlled, artificial environment, not representative of wild behavior.

Life itself depends upon information being passed from one organism to another. Defining culture as the deliberate passing of information from one individual to another can be examined by looking first at the possible advantages of doing that. Morgan's canon says don't interpret an action as the outcome of the exercise of a higher psychical power if it can be interpreted by the exercise of a lower one. He added a caveat that it was okay if the subject had previously demonstrated the exercise of that higher psychical power. We assume that if a man picks up a rock to crack nuts he is using a tool. We're more reluctant to say that the otter hitting a mollusk with a rock is a tool user.

Studies demonstrate that these marine animals have specific vocal signatures which others recognize - and sometimes imitate. They work together and seem to need and enjoy each other's company. Calves are dependent upon learning from their mothers. There are even examples (the starving dolphins above) of what the authors call "stupidity" correlations, which parallel human prejudices and phobias. Complex feeding behavior such as herding prey ashore and deliberately beaching to capture that prey has been observed. Training for this risky technique has also been seen. It's all very fascinating.

#### Voices in the Ocean by Susan Casey (2015)

The subtitle is "a journey into the wild and haunting world of dolphins". It might better be "into the disturbing world of how humans have exploited these possibly sentient creatures". The author obviously is well versed in dolphin behavior and her comments on their behavior in captivity and early brain experiments are informative. Dolphins are conscious breathers, for instance. This book's emphasis is on the fringes of dolphin research and associations. She travels far and wide, often for protests. She examines John Lilly's papers. He investigated dolphin brains by performing invasive experiments. (This was acceptable at the time and he also experimented on himself.) He even used LSD on them - and himself. Some subjects are

caring persons. Dolphinville in Hawaii caters to interactions with dolphins and New Age philosophy. Others persist in wholesale hunts or exploitive tourist attractions. The Navy has experimented with training dolphins to both monitor areas and for more nefarious purposes. It was more of a fringe aspect of the topic and not a pleasant book to read.

### Alex & Me by Irene Pepperberg (2008)

How a scientist and a parrot uncovered a hidden world of animal intelligence - and formed a deep bond in the process. Here is a very descriptive subtitle. The author spent 30 years training and experimenting with a Grey parrot. Her discoveries and scientific studies of the parrot's cognitive abilities are documented in The Alex Studies. This is a more personal account of her own life and the one she had with a very personable bird brain. Parrots can live very long lives and Alex did not. The first section describes her own emotional response when Alex dies and that of many others who shared her grief.

The second section recounts her progress from childhood budgie owner through theoretical chemistry major to the dubious realm of animal intelligence. Humans are a bit protective of their place in the hierarchy of life. Science strives for a truth based on proven facts and unclouded by emotion. Clever Hans, the horse who did arithmetic (but really responded to its owner's unconscious clues) had recently been exposed. Finding a position that could support her and would enable her research was a constant concern.

Alex himself and the long story of the care, the bonding, the devising of acceptable experiments, and the training of one special parrot are the basic subjects. Alex is capable of learning colors, shapes, names of objects, numbers, and phonemes. Alex also insists on being top parrot and plays jokes. He gets bored. He sulks. He helps train other parrots. One broadly illustrative of those characteristics occurred during a phoneme demonstration. Experiments often involve much repetition for statistically valid results. Alex became bored and, instead of responding, demanded his reward - "wanna nut" - repeatedly. Finally he answered "nu-uh-tuh". He showed those people, who apparently could not understand what HE was saying, that he knew his phonemes.

Pepperberg credits her success to the use of a two tutor training system used by a German researcher. Her dedication to her work and her insistence on its value have certainly been effective in a more general acceptance of other than human intelligence. She mentions other contributors - Konrad Lorenz, Bernd Heinrich, Washoe the chimpanzee. - and media events. She spent a couple of years at MIT's Media Lab which included work on a suite of videos from which an at home alone parrot could select. Richard Leakey's jacket quote is "The book is easy to read, charming, and very instructive". I heartily agree.

Animal Talk: Breaking the Codes of Animal Language by Tim Friend (2004)

The provision of information by a sender to a receiver and the subsequent use of that information by the receiver in deciding how to respond. That's another definition and the first demonstration of it occurred 3 billion years ago between bacteria through chemical signaling. One theory is that the symbiotic combination of aerobic and anaerobic forms led to mitochondria and multi-celled organisms - and the ultimate of information transfer, DNA. The book begins with an equally succinct summary of early views of animal communication, including several enticing book titles.

Later chapters are organized around general topics on the hows and whys of language. Friend progresses from slime molds to insects. It's helpful to recognize the rudimentary forms and benefits of information transfer, possibly insightful in today's information age. Genetic programming proves its value in insects. More flexible forms that convey complexity (grammar and syntax) can be combined with acquired knowledge. The honey bee dance is an example. Fish able to send electrical signals broaden the definition. Dawkins' selfish gene that is only concerned with reproducing itself is both explanatory and reductionist. Certainly much communication relates to reproduction (pheromones and bird songs) and when proposing cultural transfer of information a key concern is whether the communication benefits the receiver rather than the sender.

Communication using unrecognized senses, or light and sound ranges outside human range, is difficult to evaluate. Elephants, giraffes, and whales all make far ranging sounds in low frequencies. Mimicry is another ambiguous aspect in communication studies. Is it mindless imitation or aware of meaning? Many expressive displays mimic actual interactions and possibly become less expensive substitutes for actual fighting, for instance. Body language, vocal pitch, and facial expression all convey information. The horse Clever Hans may not have known how to do math but he certainly understood what his trainer was telling him to do.

Survival of not just the fittest depends upon reproduction. Finding and attracting a mate instigates a lot of communication. This seems to be the purpose of the amazing humpback whale songs and the elaborate constructions of male bower birds. There's a lot of saying "here I am and I'm ever so appealing". That's the male speaking because he has lots of cheaply made sperm and can afford to spend energy on advertising. The female generally provides an energy intensive egg plus post insemination care and needs to be particular about its survival. Friend's emphasis is on birds and their songs.

There's a final chapter on cetaceans which feels a bit thrown together. There are also a few rather disruptive "out in the field" sections. Overall it's very good with summaries and insights and little perky tidbits, supplied by someone who knows his way around the topic.

### Elephant Talk by Ann Downer (2011)

I didn't pick this as a juvenile book but it is an excellent example of the quality (and availability) of science books for younger readers. Proboscideans have been around for 37 million years. African elephants descended from mammoths 7.6 million years ago and Asian elephants a million years later. The author profiles a young African elephant in a Kenyan national park, a forest elephant in Central Africa Republic, and an Asian elephant in a North American zoo.

Elephants are long lived, large brained, social animals who live in matriarchal family groups. They have developed a communication system of vocalization, body language, smell, and low frequency ground vibration. Female calves stay with their mothers while male calves join bachelor herds a decade or so after birth. Females can live decades beyond childbearing which enables them to share cultural memory and care of the young. The bulls also form strong bonds and moderate the aggressive behavior of the "teenagers". Groups merge and divide over time, responding to environmental conditions.

Elephants practice group defense, and cooperative rearing. They use tools, self-medicate and mourn their dead. Their brains contain spindle neurons which are thought to enable efficient operation in larger brains (and which are wiped out in humans by Alzheimer's disease). They have a vocalization system similar to humans with a ten octave range. Their trunk is a structure formed by the nose and upper lip, 500 x more sensitive to smell than a bloodhound and 1500 muscles within capable of picking a single blade of grass. Their feet contain fat structures that can focus sound vibrations. They bark, grunt, roar, and rumble and can produce 70 distinct calls. Rumbles can be detected over 115 square miles. Researchers have listed 205 gestures which you can find on [ElephantVoices.org](http://ElephantVoices.org).

That's all very impressive and more expressively told with photographs and diagrams. There's a concluding chapter on their relationship with humans that looks at their domestication, religious significance, and possibilities of survival.

### The Song of the Ape by Andrew Halloran (2012)

The author, excited about attempts to teach primates human language, began working at a park in the Everglades as a grad student. (Washoe who was raised as a human child and Koko who reputedly learned sign language are examples of those attempts.) The book is centered on the behavior and communication system of a group of chimpanzees, naturally housed at that park.

Chimpanzees are very strong and can weigh up to 200 pounds and can be aggressive. Care is accomplished by setting up a feeding station on an empty island and then lowering a drawbridge for the chimpanzees to cross. An early experience has the unmoored keeper's boat drifting to the current residence and seized by a small group of chimpanzees. Over time he

becomes convinced that the study of animal language should be on their natural communication with each other rather than attempting to teach them to communicate with people. His reports center on a specific island housing several chimpanzees with definite personalities and relationships.

Perception is the way our brains are genetically hard wired to combine bits of information and transform them into an idea. That perception can be turned into a signal and is transmitted to another. Perceptions are specific to a species. We can't expect that the world we perceive is identical to the one a chimpanzee perceives. Primates have the ability to form, use, and change an array of behaviors. They have traits that enable modification of behavior in a changing environment. Chimpanzees in the wild have a greeting ceremony. They use nonlethal violence to communicate rank, alliances, and social politics. Groups are led by an alpha male who maintains dominance by regular displays of his strength and control.

Information by itself is incomprehensible. A language needs to have not just words but grammar and syntax. A linguistic structure relies on its conscious usage. The author's concluding research documents socially induced change in calls. Loud chimp's calls have an introduction, buildup, climax, and descent. He records calls of Higgy's group which remain at the park, analyzes them with spectrographs, and identifies 25 consistent phrases. He compares these with Hank's group which had been separated from Higgy's in relation to developing dialect and direct environmental adaptation.

The book discusses many aspects of language and communication and their possible relation to animal communication. This can be thought provoking, and also quite technical. The observations are much more personal and record changing relations among the one island's inhabitants.

#### The Soul of an Octopus by Sy Montgomery (2015)

Brain power and language seem to go together and are particularly associated with long lived social animals. Then there is the octopus - a short lived, solitary invertebrate who exhibits an extraordinary amount of intelligence and is able to communicate feelings toward specific people whom it remembers. Intelligence is shaped by the survival requirements an animal must face and there is some thought that intelligence compensated for the defenseless lack of a shell. It's an interesting puzzle and a delightful book.

The author is a science writer who goes about her own investigation with the help of the New England Aquarium. She is not the only octopus groupie who gains an intimate acquaintance with a series of giant Pacific octopuses over a few years. Members of the group also have a relationship with each other. She learns to scuba dive and enhances the aquarium experience with a glimpse of their life in the ocean.

Octopuses come in 250 species and the giant Pacific is the largest. It can weigh 40 pounds, lives up to 5 years, has three hearts, blue blood, and 8 independently functioning arms lined with double rows of suckers that can individually lift 30 pounds and can be regenerated. Its bite contains a neurotoxic venom and its saliva can dissolve flesh. It can also change both the color and texture of its skin and squeeze through a silver dollar sized hole. The male gives the female a packet of sperm which the female can retain for months before fertilizing her thousands of eggs. She guards the eggs without eating until they hatch which can be years. Then she dies, like Charlotte the spider. And each octopus has a personality.

We get to know Athena first, Octavia through her life and Kali and then Karma. The aquarium staff and volunteers directly related to octopus care (including the man who developed three nesting puzzle boxes for octopus enrichment) have their part. The entertainment takes place in a setting that is undergoing a major renovation. The complexity of its operation is unfortunately illustrated as Octavia lingers on, guarding her infertile eggs. A much needed larger space is arranged for Kali who escapes and dies outside the tank. Karma arrives as the story ends. The experience isn't equivalent to having an octopus playfully squirt you with sea water or letting its tentacles examine your arms but it's an enjoyable armchair trip.

#### What a Fish Knows by Jonathan Balcombe (2016)

This may be everything you want to know about fish and their sensory world. There are any number of interesting facts dispersed throughout including a diversity of sexual behavior. One quarter of reef fish can change their sex and they have 32 different breeding systems. One fish communicates with farts. There's a fish that makes mandalas on the ocean floor to attract females. Von Frisch, who discovered the honey bee dance, also documented the ability of fish to hear and smell. They may use ambient infrasound for migration orientation along with odors and wave patterns. Schools of fish coordinate their rapidly changing movements. Parrot fish patronize preferred cleaner fish. Fish brain structure differs from the standard human comparison but so does that of birds and comparable structures in both animals reinforce evidence of each other's capabilities. Anecdotes of consciously planned behavior include a captive fish which would hold a pebble in its mouth and rap on the aquarium wall for attention. The author is quite sensitive to fish mistreatment and you may become so too after reading the concluding comments on wholesale destructive fishing practices and the contaminated products of our polluted oceans. Having a goldfish as a pet could have enhanced appeal also.

#### The Complete Doctor Doolittle by Hugh Lofting Vol. 1 (1920s)

I've been neglecting juvenile and fiction books and "the man who could talk to animals" seemed like the ideal component. Vol. 1 was hefty enough and appears to be only a portion of the stories. Lofting wrote to his children from WWI trenches, preferring the fanciful to the realty he was experiencing. The doctor is introduced to animal talk by his pet parrot and his profession

and generous curiosity create a demand for his services around the world. The tales are very fanciful: a trip across the Atlantic bottom within a gigantic sea snail's shell, a post office with migrating birds providing service, and an interlude as a king. I don't remember these from my childhood and not sure what children today would think of them but it was an interesting read.