

# Voice Of The Dolphins

By JC Ryan



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# Origin Of The Species

There are 43 species of dolphins in the world, ranging from 3-foot Hector's dolphins to 25-foot Orcas. They are generally found near coastlines in relatively shallow water.

Some scientists believe that dolphins evolved from wolf-like earth dwellers to life in the ocean. They suggest that dolphins began on land as a small-hoofed wolf, and then went into the water around 55 million years ago and became a monstrous creature with big teeth and not a very big brain.

About 35 million years ago, there was a radical physiological change: they became smaller, they developed high-frequency hearing, their brains became much larger and they started to hunt cooperatively — soon becoming the dolphins we know today.

Susan Casey author of the book, *Voices in the Ocean: A Journey into the Wild and Haunting World of Dolphins*, says, "So dolphins have done this incredible shape-shifting, and along the way, their brains developed two hemispheres just like ours, but with completely different wiring. We arrived at the same spot — we're both air-breathing mammals with large brains and high intelligence — but along completely different itineraries...There's more than one way to be smart here on planet Earth and theirs is much more ancient than ours."

Dolphins and whales belong to the scientific order of Cetacean. This order is divided into three suborders:

- Odontoceti, the toothed whales, which include killer whales, beluga whales, dolphins, and porpoises.
- Mysticeti, which includes blue whales and gray whales.
- Archaeoceti, which represents an extinct species.

The Cetacean are believed to have appeared 50 million years ago and colonized all seas.

The oldest fossil, named "Pakicetus", was found in the eighties near the Himalayan Mountains on the Pakistani border. Studies of this fossil have showed that it had four limbs, leading to the conclusion that that some mammals who were living on land had returned to the sea. Why? It is not known.

This group went extinct about 15 million years ago, when the "squalodonte" or first Cetacean (toothed whales from which the dolphin descended) appeared.

Legs were replaced by fins; one nostril has migrated to the top of the head and has become a blow hole; the body is long and narrow; and a long range of teeth have appeared. It is already closer to the actual Orca than the older specie.

Modern forms of odontocetes appeared four to five million years ago.

# Mutual Fascination

It's the elusive mystique of whales and dolphins that has been drawing humans to them, ensuring human and dolphin interaction since time immemorial.

Susan Casey explains that dolphins routinely keep company with boats, they've been conscripted by the military, and they've found a role in animal-assisted therapy. Dolphins have helped treasure hunters locate undersea treasure and saved surfers from shark attacks — and it just goes on from there.

She goes on to say that dolphins can understand human language, call each other by name, recognize themselves in reflections, count, pull pranks, mourn, throw tantrums, and rescue each other and humans.

Casey was struck by how interested dolphins are in humans.

Dolphins live in societies and cultures not unlike our own, Casey says. "They have communities, they have families, they learn socially like we do — so it fits the definition of cultural information being exchanged down through the generations."

These social organizations, called pods, even have their own dialects, which scientists believe evolved to protect against inbreeding. And dolphins have very distinct cultures throughout the world's oceans.

You can read the full article here:

<http://www.pri.org/stories/2015-10-18/why-are-we-fascinated-dolphins>

## From Mythology to Public Policy

Dolphins figure prominently in Greek mythology and art. As described in PBS's "Voyage of the Odyssey," the Greek Sun God Apollo described the dolphin as the "embodiment of peaceful virtue, undisguised joy and as a guide to another world. He sometimes exchanged his god-like status to assume dolphin form. He founded the Oracle at Delphi (dolphin-town) on the slopes of Mt. Parnassus - a respected prophetess named in the dolphin's honor."

Early Greek artists frequently adopted dolphin motifs. One of the earliest and best-known ornamentations is the 3,500-year-old dolphin fresco on the wall of the Queen's bathroom in the ancient palace of Knossos on the island of Crete.

The Ganges River Dolphin (currently an endangered species) is often associated with the goddess Ganga as the mount she used in her descent from the heavens.

Fast forward several thousand years to the television show "Flipper," broadcast from 1964-67. Flipper, a Bottlenose Dolphin, is the companion animal of the warden at a fictional Florida marine preserve, and his two sons. Dubbed an "aquatic Lassie" and spawning oceans of merchandise, the program may have had an influence on baby boomers, who have flocked (excuse the mixed metaphor) to the "swim-with" programs that began appearing in the early 1980s.

The reason for our fascination with these intelligent, social creatures is not hard to fathom. In their natural habitats, they live in large herds and have strong family ties. They communicate via sophisticated echolocation. They actually seem to like us humans. Stories abound of dolphins saving humans; for example, in 2004, a pool of dolphins circled protectively around several swimmers, thereby protecting them from nearby sharks.

The dolphin's intelligence has also been used to advance the legal argument for animal rights. Steve Wise's 2002 book *Drawing the Line: Science and the Case for Animal Rights* argues that some animals, particularly primates but also dolphins, elephants and parrots meet the criteria of legal personhood, and should therefore be awarded certain rights and protections. His criteria for personhood is fundamentally that an animal must have a sense of self, that is, know that s/he exists.

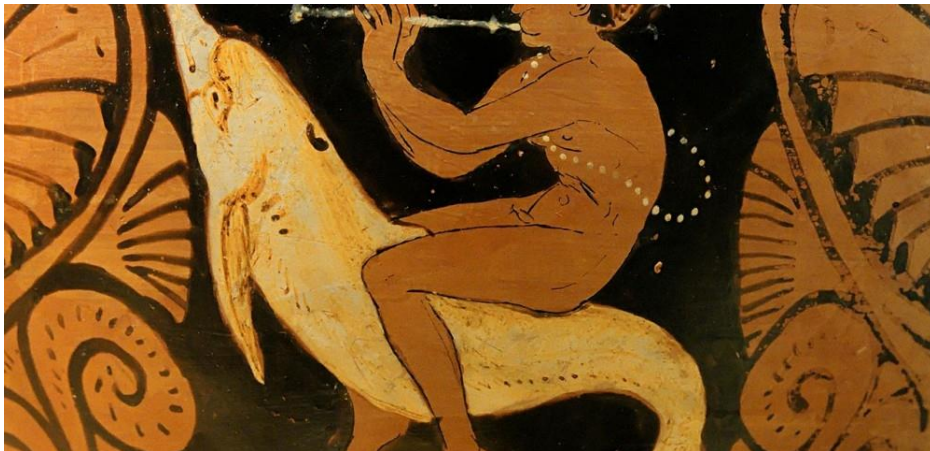
You can read the full article here:

<http://www.all-creatures.org/articles/ar-dolphinsfrom.html>

### **Dolphins In Human History & Present Day Culture**

Throughout the history of mankind, our fascination of these animals has always been an element of pop culture. In fact, images of dolphins appeared in art forms as early as 1500 BC! The first culture that seems to have mythology associated with the dolphin was the Minoan, a seafaring people in the Mediterranean. They

left few written records, but they did leave beautiful murals on the walls of their palaces, murals that show the importance of dolphins in their society.



Because they were strongly associated with Poseidon by the later Greeks, this probably explains why the sea god was so often surrounded by dolphins. In one myth about Poseidon, dolphin messengers were sent to bring him a nymph he loved, who he later married. As a reward, he set the dolphin in the sky as a constellation. And he was constantly accompanied by dolphins among other sea creatures.

This wasn't the last time the Greeks associated dolphins with romance. Aphrodite is often depicted with dolphins, riding them or being accompanied by them. Later, the god Dionysus transformed the way dolphins were perceived in Greek literature as well as human culture. He was attacked at sea by a band of pirates. Instead of simply destroying the sea raiders, he transformed them into a pod of dolphins, instructing them to rescue any distressed sailors in the ocean. Dolphins, in Greek culture, were often rescuers of humans, probably because they like to bring things to the surface and, well, because there's some really good evidence that they do indeed purposely rescue people in danger. But, it's got to make you think...you always hear about the people dolphins push to shore, you never hear about the ones they push further out to sea!!

This image of the dolphin continued in myth and legend as the world transformed around them. Byzantine sailors, Arab sailors, Chinese and European explorers, all had tales of dolphins rescuing sailors or ships in trouble. Dolphins could predict calm seas. And a ship accompanied by dolphins was sure to find safe harbor, fair

weather, and following seas. Just as with an albatross, it was terrible luck to harm a dolphin.

Today, in movies and in literature, we have our own legends of the dolphin. Almost any website or book about dolphins will speak of the amazing intelligence and wisdom they seem to possess, and though much of it is supported by scientific fact, it's still highly debated.

There are people today who see dolphins as intelligent aliens living right here in our oceans because, while most of us outside the scientific realm know that dolphins do communicate with each other and are among the most playful animals in the universe, we've never been exposed to the intricacies of the dolphin's brain. Consequently, you may be surprised to know that the dolphin brain is actually much larger than the human brain. Dolphins have two hemispheres just like humans. However, theirs are split into four lobes instead of three. The fourth lobe in the dolphin's brain actually hosts all of the senses, whereas in a human, the senses are split. Some believe that having all of the senses in one lobe allows the dolphin to make immediate and often complicated judgments that are well beyond the scope of a human ability.

You can read the full article here:

<http://awesomeocean.com/2014/07/07/dolphins-human-history-present-day-culture/>



# How Little We Really Know

We always knew whales and dolphins showed intelligence, but new research is revealing how little we really know. They're more like us than you might have suspected.



## Learning

For most animals, such as insects, the skills needed for survival are hard-wired into their genetic make-up, kicking in when they're needed. In some cases, such as with many mammals and birds, nurture is added to nature, so that each generation learns necessary skills – such as migratory routes, predatory abilities, awareness of danger and more – from their elders. In the case of humans, we've gone one step further. Rather than just passing on generic skills, each individual is able to educate others based upon their own experience. In this type of individual learning, we thought we were alone.

We are not. Research and observations in recent years have revealed that whales and dolphins not only have the ability to learn as individuals, but those individuals can then pass their new knowledge onto others. This is a rare intelligence in the animal kingdom.

## Play

It is often said that play is the greatest expression of intelligence, and whales and dolphins are among the most playful of all in the animal kingdom. Dolphins often

follow ships in order to collect the fish churned up their wake, rather like gulls, which has a practical function... but they're not always behind the stern. Sometimes they can be seen to port and starboard, riding the bow-waves just like surfers. Why? Well, wouldn't you if you could?

In fact, when it comes to creating games, dolphins know few rivals. Many of them enjoy a game of catch, perhaps with a fish or even a turtle, throwing the animal back and forth to each other with no intention of eating it. Then there are activities that remind us of our games of tag. One dolphin will nudge another a few times to indicate its willingness for a game, then high speed pursuit will take place through the sea, as they take turns chasing each other.

Some dolphins have taken their play to, quite literally, extraordinary heights, and teamed up with other animals in the process. Film has been revealed of amazing games between bottlenose dolphins and humpback whales off Hawaii. The dolphins swim onto the nose of the whales, which then raise themselves out of the water to a great height, so that the dolphins slide down their heads with a great splash. As the game is repeated over and again, it seems clear that both individuals are enjoying it.

Just like humans, though, whales and dolphins only really want to play when the mood takes them.

### Feeding

Shark Bay, off the Australian coastline. A dolphin is sighted, and appears to be carrying something. Close inspection reveals it to be a conch, carried in the dolphin's beak like a trumpet. The dolphin swims beneath the water, then appears above the surface again. The conch is full, and the dolphin shakes it. The seawater drains out, leaving small fish trapped in the bottom. One deft flick of his beak, and the dolphin has earned himself a tasty snack.

This is just one of dozens of creative ways in which whales and dolphins have honed their feeding methods over generations, and each new discovery is rapidly passed onto their peers. The Australian bottlenose dolphins in particular have developed quite a range of tools and methods to aid mealtimes. One of these is known as sponging: the dolphins grab a sea-sponge and dive down to the bottom of deep channels with it. Holding the sponges tightly in their beaks, they then poke them into the sandy sea bed, disturbing small fish in hiding. The fish emerge,

the sponge is dropped, the meal eaten, and then the tool picked up once more for further foraging.

There are many other exceptional methods used by whales and dolphins to catch and find their prey, and each reveal great levels of intelligence and social cooperation.

### The Need To Be Free

‘They may take our lives, but they’ll never take our freedom.’ It’s the memorable quote from the 1995 film Braveheart, and it will stand the test of time. To humans, freedom is the ultimate right, and we’ll fight for it to our deaths.

Suffering under confinement is shared by whales and dolphins, too. Unlike many animals that live longer in captivity than in the wild, in the case of these marine mammals it’s the other way around. Life expectancy is considerably shorter across the species, while infant mortality is higher. Male orcas, for example, live an average 30 years in the wild, while females average 46 years, with some living to 80 or 90. However, in a recent analysis of orcas born in captivity or captured from the wild, their average survival rate is estimated at only 8.5 years.

Depression, physical illness and aberrant behavior have all been documented. It is therefore unsurprising that, from time to time, human trainers are hurt or even killed by captive individuals, such as orcas, that have become unnaturally aggressive from being held in stressful artificial environments. In addition, those taken into captivity from the wild are not the only ones that suffer. The groups that are left behind may depend upon them for many social reasons, and vital bonds necessary for orca survival can be broken as key members are taken from family groups.

### Rights

Whales and dolphins lead complex and fascinating lives.

We know that bottlenose dolphins are self-aware, because they can recognize themselves in a mirror.

We know that some whales and dolphins teach their offspring to do specific tasks and pass knowledge between generations in what we now recognize as unique cultures.

Some have complex ways of communicating with each other and enjoy the benefits of living in social groups and many seem to love to play. In fact, they rather remind us of ourselves.

You can read the full article titled, Brain Power, here:

<http://au.whales.org/whales-and-dolphins/brain-power>

# They Have Us Beat

Still Think Humans are the Most Intelligent Animals?

In the book **The Dynamic Human**, it is argued by a group of researchers from the University of Adelaide that humans aren't the brightest crayons in the box. Co-author and research fellow, Dr. Arthur Saniotis, said *"For millennia, all kinds of authorities — from religion to eminent scholars — have been repeating the same idea ad nauseam, that humans are exceptional by virtue that they are the smartest in the animal kingdom. However, science tells us that animals can have cognitive faculties that are superior to human beings."*

How can this be?! No other animal can think or communicate like a human, so clearly no other species can match our intelligence!

Well, while humans, as a species, are pretty smart, it's impossible for us to claim the title of "most intelligent" species.

While primates are often used in studies on animal intelligence because of their similarities to humans, cetaceans are frequently used as research subjects as well. Looking at the brain of a cetacean, it is clear that perhaps dolphins and whales are much more complex than previously thought.

## Speech Production

The Broca's and Wernicke's areas of the cerebral cortex are located in separate lobes of the brain (frontal and temporal lobes, respectively), but they are connected by their function in speech production and language processing. Most people believe that a human's ability to communicate is far more complex and evolved than that of other animals, but cetaceans may have us beat.

According to a comparison of cetacean to primate brains from Michigan State University, *"They have the distinct advantage over us in that their primary sense is the same as their primary means of communication, both are auditory. With primates, the primary sense is visual and the primary means of communication is auditory."*

Communication is so great in cetaceans that there is a strong possibility they are able to project (yes ... literally project) an "auditory image" that replicates a sonar message they may receive. The process is a bit confusing, but MSU describes it in

this circumstance: *“So a dolphin wishing to convey the image of a fish to another dolphin can literally send the image of a fish to the other animal. The equivalent of this in humans would be the ability to create instantaneous holographic pictures to convey images to other people.”*

If they are in fact able to do this, there would have to be a natural tendency to break down stylized and abstracted images into words. Meaning, cetaceans, like people, use a series of signifiers to discern the exact objects they want to communicate about. We might say “tree” and think of a picture of a tree in our minds, but cetaceans can skip this step by simply projecting the image to other cetaceans.

Not fascinating enough? Well did you know that, with several sound producing organs, cetaceans are capable of conveying and receiving “20 times the amount of information as we can with our hearing”? This surpasses the amount of information we can perceive based on vision (a human’s primary sense).

### Emotions

Have you ever been so happy that you feel like you can conquer anything the world throws at ya? Well, you have the limbic system to thank for that. The limbic system is a combination of multiple structures in the brain that deal with emotions and the formation of memories. When it comes to comparing the limbic system of whales to that of humans, we may need to rethink our emotional awareness.

Lori Marino, a neurobiologist who helped co-write **“The Declaration of Rights for Cetaceans,”** finds the limbic system of whales to be the most intriguing part of their brains, as they may be more complex than our own. In her research of killer whales, she found that the limbic system of a whale is *“so large it erupts into the cortex in the form of an extra paralimbic lobe.”*

Since the lobe merges with the cortex, it is believed that the lobe may create a mixture of both emotional and cognitive thinking. The placement may also suggest that secrets about social communication and self-awareness may also be located in this part of the whale brain.

## Advanced Cognition

Specialized brain cells called spindle neurons are most often associated with an organism's ability to "recognize, remember, reason, communicate, perceive, adapt to change, problem solve and understand."

Though this "advanced ability" is most often associated with organisms that are deemed to be the most intelligent, (\*cough\* humans \*cough\*) the truth is that spindle neurons have been isolated in the brains of both whales and dolphins, which suggests that whales do a lot more thinking than previously thought.

Dolphins, for example, have been known to recognize themselves in mirrors, solve problems, follow recipes, and associate a part of their anatomy with that of a human's (such as when a dolphin waves its fin whenever a trainer waves their arm).

Recent studies even indicate that dolphins are capable of creating personalized whistles that act as names for individual members of a pod. With this name, dolphins are able to communicate more efficiently while roaming the open seas.

You can read the full article here:

<http://www.onegreenplanet.org/animalsandnature/human-intelligence-versus-whales-and-dolphins/>

# The Social Life Of Dolphins

## Dolphins Cooperate by Talking It Out

[http://blogs.discovermagazine.com/inkfish/2016/06/08/dolphins-cooperate-by-talking-it-out/#.WHXHf\\_I96Uk](http://blogs.discovermagazine.com/inkfish/2016/06/08/dolphins-cooperate-by-talking-it-out/#.WHXHf_I96Uk)

By Elizabeth Preston | June 8, 2016



How do you know when animals are working together? Just because two animals got something done jointly doesn't mean they cooperated. They might have succeeded by dumb luck, or trial and error. Scientists who study animal minds, though, would really like to know when cooperation happens on purpose—and how animal partners manage to communicate with each other.

Studies in capuchin monkeys and chimpanzees hinted that the primates coordinated their actions by glancing at each other. Baboons smacked their lips while working together. Lionfish used certain fin displays before hunting together.

Dolphins often cooperate to hunt. They may use regionally specific tricks to trap prey—dolphins in Florida, for example, slap their tails to scare fish out of the water and into their partners' mouths.

Researchers from the University of Southern Mississippi and a Florida facility called Dolphins Plus studied captive dolphins to learn how they might communicate while working together. They did their experiments in a lagoon holding six Atlantic bottlenose dolphins, three male and three female.



The researchers challenged the animals using a device similar to a Christmas cracker. It was a PVC cylinder with a loop of rope at either end. The tube came apart in the middle and was stuffed with snacks: fish, ice, cubes of gelatin. The easiest way for dolphins to get at the goodies would be for two of them at a time to grab the rope loops and pull.

For each experimental trial, the researchers dropped the snack-filled tube into the lagoon and waited to see what happened. They did this 24 times, making video and audio recordings at the same time.

Only two of the six dolphins, both male, were interested in the PVC container. In four trials, a dolphin managed to get the container open on his own. The other 20 times, the two dolphins worked together to open it.

From the audio recordings, it wasn't possible to tell which whistles and clicks came from which of the six dolphins in the lagoon. But the researchers saw a distinctive change in the chatter when the two males were working together to open the tube. There was significantly more noise while the dolphins were cooperating, compared to when one dolphin was working on the tube alone, or when no one was interacting with it.

Presumably, the increased noise was coming from the two dolphins who were working together. The researchers saw that one particular type of sound increased, called a "burst pulse." This is a rapid set of clicks. Other sounds, like whistles, didn't increase while dolphins were opening the tube. So for these dolphins, burst pulses seem to be the language of cooperation.

The finding is also a good clue that the dolphins really were cooperating. If each dolphin were just focused on his own work, there shouldn't have been any change in their vocalizations when two animals were pulling on the ropes, as opposed to one. The researchers hope to eventually figure out which sounds come from which dolphins. That could tell them more about dolphin cooperation and communication (besides just how to say "Pull harder!").

**Dolphin Social Structure**

<http://www.dolphins-world.com/dolphin-social-structure/>

**by Dolphins-World | Jan 28, 2014**



Many researchers agree that dolphins are extremely social creatures and actually depend on this interaction for hunting, mating and defending themselves and their pods.

Typically, dolphins live and travel in groups ranging from 2-40 dolphins. But scientists have found dolphin pods as large as several hundred members.

These groups are actually called herds or schools. In some cases, these larger groups have been known to include more than one species that seem to interact well together.

The species that usually associate in this multi-species group are the Spinner and the Spotted Dolphins. As the feeding habits of these two species are quite the opposite, they are able to travel together without competing for food.

### **Lasting Relationships**

Most experts believe that the social relationships formed by dolphins are actually long lasting and it has been reported that when dolphins meet other pods or groups, they often engage in a sort of greeting ceremony that suggests they are renewing old relationships.

While large groups of dolphins usually have a varied mix of age and sex, the smaller pods tend to be made up of either a single adult, male and female, a group of females and their young or a group of adult and young males. Males are

dominant in all groups but there is no evidence of strong social bonds between males and females.

A common example of social interaction and high intelligence, is the constant play that dolphins seem to engage in. Scientists report that juvenile and adult dolphins often chase each other and toss items such as seaweed back and forth.

### **Day To Day Relationships**

Dolphins often have close body contact with other dolphins through rubbing, petting, and even hitting each other. Dolphins often swim extremely close to each other, often resting fins on the other dolphin. Scientists believe this behavior actually indicates a close friendship. Dolphins also have been watched rubbing pectoral fins as if this was a handshake.

Another way that scientists identify social interactions between dolphins is by their behavior. When aggressive, dolphins tend to approach from a direct or perpendicular line. When the approach is non-threatening, a dolphin usually comes from behind or in an oblique angle.

### **Communication, The Ground For Socialization**

Dolphins communicate with their pods and large groups usually through whistles. Many scientists and dolphin researchers believe that each individual dolphin actually has a unique whistle that identifies him to other members of his pod or group.

Dolphins in distress seem to use a special whistle that indicates help is needed. The pod or group usually responds quickly.

### **Social Activity Beyond Limits**

While we seem to expect that dolphins should be socially involved only with their own kind, the dolphins' interest in interacting with humans is clear.

In the wild, dolphins are extremely curious and they will often engage in contact with humans if a chance comes up. In captivity, dolphins are very attached to the people they usually interact like trainers or researchers.

The developed intelligence of dolphins, their advanced capabilities to communicate combined with their need for social interaction make dolphins a unique animal in the nature.

### Socialization Behavior Of Dolphins

<http://understanddolphins.tripod.com/dolphinsocializationbehavior.html>



In "Social Behavior in Bottlenose Dolphins" (Shane Watson, unpublished research report, University of Nevada Las Vegas, 2009) socialization behavior of captive Bottlenose dolphins was studied. A summary of this report yields the following information on this topic:

The development of individual behavior in dolphins acts to mold their social structure and how they cooperate with each other. They live in complex social societies. These societies differ dramatically between genders. In the wild, these developments may have evolved as a way in which dolphins could meet the requirements of their challenging and ever-changing environment. Yet in captivity, with its more stable and less challenging environment, dolphins exhibit the same collection of behaviors as those living in the wild.

A dolphin spends a majority of its time and energy each day seeking out relationships. Its standing in its society is determined by its interactions with other dolphins. As its group composition changes, its rank and social standing may change. In the wild dolphins live in what is termed a fission-fusion society,

meaning their group composition is constantly changing. The way in which these groups form and reform is influenced by a variety of factors including gender, age, familial relationships and reproductive status. Dolphins use sexual encounters (as many as 10 per day) as a means of affirming social relationships within their group.

The study of dolphins has revealed specific behaviors are often associated with specific actions. An example of this is those behaviors associated with group travel. A communication to begin travel is often initiated by breaching (jumping out of the water and landing on one's side). A communication indicating the travel is over is often done by upside-down lobtailing (rolling over to expose the ventral side at the water surface, lifting the flukes above the water, and then slapping them down onto the water surface). Such communication within dolphin groups has its rules, though. Only the dominant animals are allowed to demonstrate group control. In this example of group travel, breaching is almost always performed by males; upside-down lobtailing is almost always performed by females.

After the nursing period (1-2 years), dolphins markedly reduce associations with their mothers and form long-term associations with other dolphins. Male calves exhibit such disassociation more quickly than do female calves.

In forming new associations, the Bottlenose prefers to do so with animals of its own gender. This is most likely due to the differences in reproductive strategies between males and females. Females show less aggressive behavior between each other than do male dolphins. Male fighting skills, often practiced between juveniles, may be necessary in order to be successful at some time in the future in obtaining females with which to breed.

Aggressive behaviors may include biting, teeth-raking, jaw-popping, fluke-slapping, head-butting and ramming. The outcome of aggression is dominance. Head-butting is a particularly aggressive behavior between two dolphins. A male ramming a female, although an aggressive behavior, it is usually associated with the initiation of sexual activity.

Juvenile males and females exhibit social play. This play, similar to adult conflicts, may be practiced in order to provide the skill to respond to others and to predict how others will respond to them when they are mature and off on their own. It is

also through these repetitive playful and aggressive behaviors that the social hierarchy and order of dominance are established. Dolphins rarely inflict long-lasting physical damage on each other. This would be counter-productive as it would remove a member from their cooperative group.

Less aggressive behaviors such as gentle contact and contact swimming provide bonds between animals. Gentle contact between animals includes using the pectoral fin to pet or rub any body part of another dolphin. Contact swimming involves two dolphins synchronously swimming while one animal lays its pectoral fin on the flank of the other. This unchanging contact and synchronous swimming then continues over an extended period of time. Contact swimming is more often seen between females than between males. The prevalence of contact swimming between females may be part of a female's nature to provide, as a new mother, assisted locomotion to its newborn (where the new calf swims rather effortlessly in its mother's slipstream).

Dolphins demonstrate a type of "grief" (I use this term at the risk of appearing anthropomorphic, or attaching human behaviors to animals) when family or pod members die. They often stop eating, become lethargic, distance themselves from and don't associate with other dolphins and become unresponsive. This behavior lasts for a few days, at which time they appear to recover and resume their typical activities, almost as if forgetting the event occurred. This is true even when a mother's calf dies.

# Interspecies Communications. Is It Possible?

## Extensive And Complex Communications

Communication in bottlenose dolphins appears to be extensive and complex. Dolphins hunt together to find food. Pods of dolphins coordinate their movements to herd prey, and then take turns swimming into the middle of the assembled fish to eat.

Sound travels 4.5 – 5 times faster through water than through the air. For this reason, dolphins rely on sound for communication more than any other mode. Scientists believe that every bottlenose dolphin develops a distinctive high-pitched whistle, called a signature whistle (Tyack, 2000). This whistle appears to serve as a means of individual identification, much like a name. It may let the rest of the pod know which pod members are around, where they are, and, perhaps, something about their mental state. Dolphins in distress sometimes emit their signature whistles very loudly. Whistles may serve to establish or maintain vocal or physical contact between dolphins. Dolphins often respond to another dolphin's whistle by whistling themselves or moving toward the whistler. If they become separated, a young calf and its mother whistle frequently until reunited. Dolphins also whistle when separated from other group members.

Dolphins do not always respond immediately to another dolphin whistling. Sometimes, many dolphins in the group whistle at once, repeating their signature whistles over and over. In this case, the whistling may help the dolphins keep track of each other.

Dolphins are capable of imitating certain sounds very accurately and often learn other dolphins' whistles. One reason for imitating another dolphin's whistle may be to get its attention within a large group. Preliminary research seems to support this idea although details of the exact reason for imitation are still under investigation.

Dolphins may use other sounds besides whistles to communicate. Courtship behavior can yield pulsed yelps. When under duress, dolphins emit pulsed squeaks. Aggressive confrontation can produce buzzing click-trains.

Dolphins do not generally rely on visual communication, however, when close to each other, body language may play a role in dolphin communication.



To some extent, dolphins may also communicate by touch. Calves swim close to their mothers, brushing their bodies with their flanks and pectoral fins. This may serve to strengthen their bond and promote or strengthen social ties. On the other hand, dolphins use touch in rough, aggressive ways during courtship and when establishing dominance. They use their teeth to make parallel scratches, called rake marks, on each other's skin.

You can read the full article here:

<https://www.dolphins.org/communication>

### The Discovery of Dolphin Language

Researchers in the United States and Great Britain have made a significant breakthrough in deciphering dolphin language in which a series of eight objects have been sonically identified by dolphins. Team leader, **Jack Kassewitz of SpeakDolphin.com**, 'spoke' to dolphins with the dolphin's own sound picture words. Dolphins in two separate research centers understood the words, presenting convincing evidence that dolphins employ a universal "sono-pictorial" language of communication.

The team was able to teach the dolphins simple and complex sentences involving nouns and verbs, revealing that dolphins comprehend elements of human language, as well as having a complex visual language of their own. Kassewitz commented, *"We are beginning to understand the visual aspects of their language, for example in the identification of eight dolphin visual sounds for nouns, recorded by hydrophone as the dolphins echolocated on a range of submersed plastic objects."*

The British member of the research team, John Stuart Reid, used a CymaScope instrument, a device that makes sound visible, to gain a better understanding of how dolphins see with sound. He imaged a series of the test objects as sono-pictorially created by one of the research dolphins.

Jack Kassewitz designed an experiment in which he recorded dolphin echolocation sounds as they reflected off a range of eight submersed objects, including a plastic cube, a toy duck and a flowerpot. He discovered that the reflected sounds actually contain sound pictures and when replayed to the dolphin in the form of a game, the dolphin was able to identify the objects with



86% accuracy, providing evidence that dolphins understand echolocation sounds as pictures. Kasowitz then drove to a different facility and replayed the sound pictures to a dolphin that had not previously experienced them. The second dolphin identified the objects with a similar high success rate, confirming that dolphins possess a sono-pictorial form of communication. It has been suspected by some researchers that dolphins employ a sono-visual sense to 'photograph' (in sound) a predator approaching their family pod, in order to beam the picture to other members of their pod, alerting them of danger. In this scenario, it is assumed that the picture of the predator will be perceived in the mind's eye of the other dolphins.

When Reid imaged the reflected echolocation sounds on the CymaScope it became possible for the first time to see the sono-pictorial images that the dolphin created. The resulting pictures resemble typical ultrasound images seen in hospitals.

Reid explained: *"When a dolphin scans an object with its high frequency sound beam, emitted in the form of short clicks, each click captures a still image, similar to a camera taking photographs. Each dolphin click is a pulse of pure sound that becomes modulated by the shape of the object. In other words, the pulse of reflected sound contains a semi-holographic representation of the object. A portion of the reflected sound is collected by the dolphin's lower jaw, its mandible, where it travels through twin fat-filled 'acoustic horns' to the dolphin's inner ears to create the sono-pictorial image."*

The precise mechanism concerning how the sonic image is 'read' by the cochleae is still unknown but the team's present hypothesis is that each click-pulse causes the image to momentarily manifest on the basilar and tectorial membranes, thin sheets of tissue situated in the heart of each cochlea. Microscopic cilia connect with the tectorial membrane and 'read' the shape of the imprint, creating a composite electrical signal representing the object's shape. This electrical signal travels to the brain via the cochlea nerve and is interpreted as an image. (The example in the graphic shows a flowerpot.) The team postulates that dolphins are able to perceive stereoscopically with their sound imaging sense. Since the dolphin emits long trains of click-pulses it is believed that it has persistence of

sono-pictorial perception, analogous to video playback in which a series of still frames are viewed as moving images.

Reid said, *“The CymaScope imaging technique substitutes a circular water membrane for the dolphin's tectorial, gel-like membrane and a camera for the dolphin's brain. We image the sono-picture as it imprints on the surface tension of water, a technique we call ‘bio-cymatic imaging,’ capturing the picture before it expands to the boundary. We think that something similar happens in the dolphin’s cochleae where the sonic image, contained in the reflected click-pulse, travels as a surface acoustic wave along the basilar and tectorial membranes and imprints in an area that relates to the carrier frequency of the click-pulse. With our biocymatic imaging technique we believe we see a similar image to that which the dolphin sees when it scans an object with sound. In the flowerpot image the hand of the person holding it can even be seen. The images are rather fuzzy at present but we hope to enhance the technique in future.”*

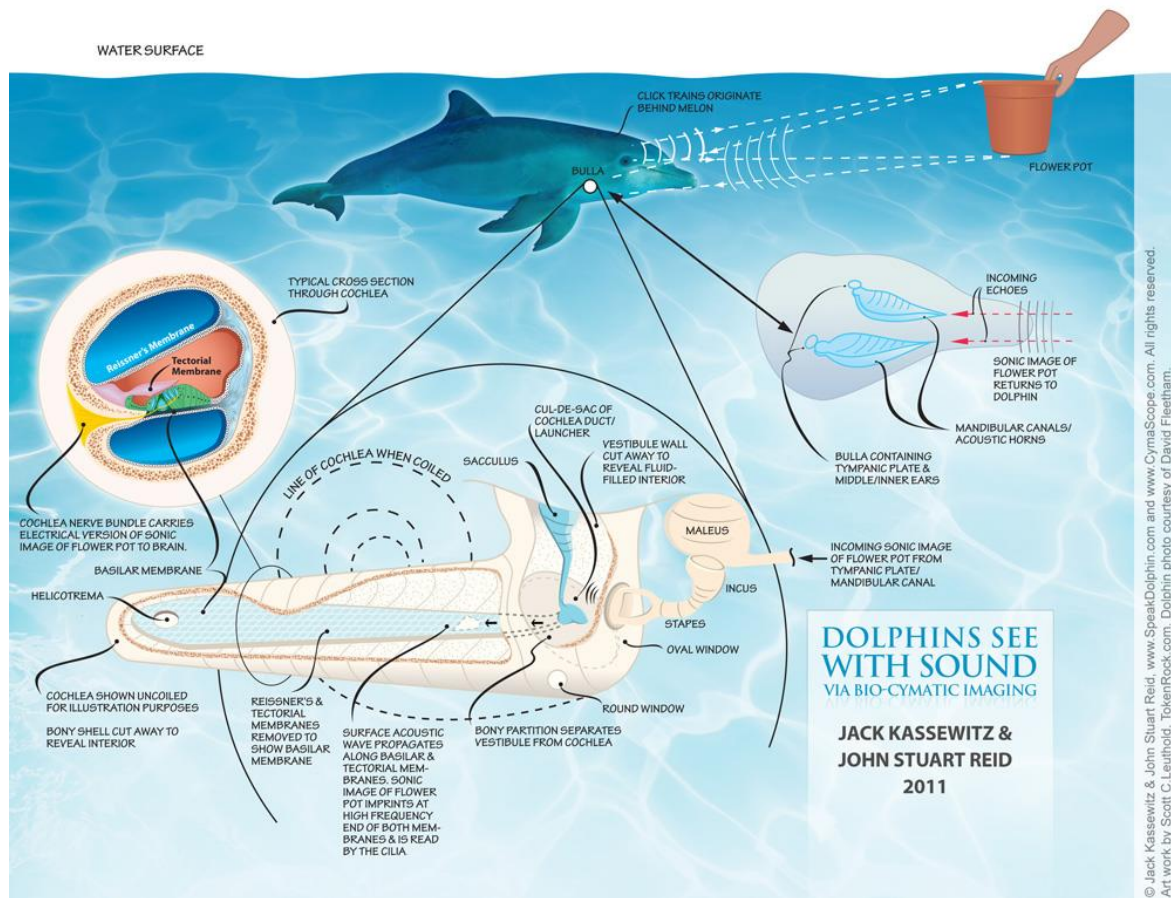
Dr Horace Dobbs is Director of International Dolphin Watch and a leading authority on dolphin-assisted therapy. *“I find the dolphin mechanism for sonic imaging proposed by Jack Kassewitz and John Stuart Reid plausible from a scientific standpoint. I have long maintained that dolphins have a sono-visual language so I am naturally gratified that this latest research has produced a rational explanation and experimental data to verify my conjectures. As early as 1994, in a book I wrote for children, Dilo and the Call of the Deep, I referred to Dilo's ‘Magic Sound’ as the method by which Dilo and his mother pass information between each other using sonic imaging, not just of external visual appearances, but also of internal structures and organs.”*

As a result of Reid’s bio-cymatic imaging technique Kassewitz, in collaboration with research intern Christopher Brown, of the University of Central Florida, is beginning to develop a new model of dolphin language that they are calling Sono-Pictorial Exo-holographic Language, (SPEL). Kassewitz explained, *“The ‘exo-holographic’ part of the acronym derives from the fact that the dolphin pictorial language is actually propagated all around the dolphin whenever one or more dolphins in the pod send or receive sono-pictures. John Stuart Reid has found that any small part of the dolphin’s reflected echolocation beam contains all the data needed to recreate the image cymatically in the laboratory or, he postulates, in*

*the dolphin's brain. Our new model of dolphin language is one in which dolphins can not only send and receive pictures of objects around them but can create entirely new sono-pictures simply by imagining what they want to communicate. It is perhaps challenging for us as humans to step outside our symbolic thought processes to truly appreciate the dolphin's world in which, we believe, pictorial rather than symbolic thoughts are king. Our personal biases, beliefs, ideologies, and memories penetrate and encompass all of our communication, including our description and understanding of something devoid of symbols, such as SPEL. Dolphins appear to have leap-frogged human symbolic language and instead have evolved a form of communication outside the human evolutionary path. In a sense we now have a 'Rosetta Stone' that will allow us to tap into their world in a way we could not have even conceived just a year ago. The old adage, 'a picture speaks a thousand words' suddenly takes on a whole new meaning."*

David M. Cole, founder of the The AquaThought Foundation, a research organization that studied human-dolphin interaction for more than a decade said, *"Kassewitz and Reid have contributed a novel model for dolphins' sonic perception, which almost certainly evolved out of the creature's need to perceive its underwater world when vision was inhibited. Several conventional linguistic approaches to understanding dolphin communication have dead-ended in the last 20 years so it is refreshing to see this new and highly-nuanced paradigm being explored."*

Dolphins enjoy constant auditory and visual stimulation throughout their lives, a fact that may contribute to their hemispheric brain coordination. The dolphin's auditory neocortical fields extend far into the midbrain, influencing the motor areas in such a way as to allow the smooth regulation of sound-induced motor activity as well as sophisticated phonation needed for production of signature whistles and sonopictures. These advantages are powered not only by a brain that is comparable in size to that of a human but also by a brain stem transmission time that is considerably faster than the human brain.



Kasewitz said, *“Our research has provided an answer to an age-old question highlighted by Dr Jill Tarter of the SETI Institute, ‘Are we alone?’ We can now unequivocally answer, ‘no.’ SETI’s search for non-human intelligence in outer space has been found right here on earth in the graceful form of dolphins.”*

You can read the full article titled, *The Discovery of Dolphin Language - We Are Not Alone*, here:

<http://www.speakdolphin.com/ResearchItems.cfm?ID=20>