ZOOLOGY

Quiz Kids of the Ocean

A junior-sized whale, the bottle-nosed porpoise, is smarter than a dog, though not quite up to the chimpanzee. One has been trained to swim into a harness.

By HORACE LOFTIN

➤ ROD AND reel fishermen have contended long and vigorously that the denizens of the ocean are more intelligent than the average human—or average fisherman, anyway.

It seems they are wrong. The most brilliant ocean dweller yet studied by scientists is not really as bright as man. It is only smarter than a dog and somewhat less intelligent than a chimpanzee.

But the fishermen may defend their position. They were talking about fish that get away; the scientists referred to bottle-nosed porpoises, or dolphins, *Tursiops truncatus*, under observation and training in the oceanarium at Marineland, Fla. Like all whales, the bottle-nosed porpoise must breathe air to live, gives milk to its young, has hair at some stage of its life history, is warm blooded—and, in short, is a sea-going mammal, not a fish.

With the cautious, technical language of science, the porpoise has been described as follows: "In . . . his emotional and motivational behavior . . . the porpoise appears to fall somewhere in the range of development of a dog to chimpanzee." This means that porpoises are plenty smart.

Brain Is Convoluted

The brain of a six- or seven-foot porpoise averages somewhat larger than that of man. The porpoise brain is convoluted, a situation found in animals of a high order of intelligence.

The bottle-nosed porpoise colony of the Marineland oceanarium is a constant source of amazement to the thousands of tourists and dozens of scientists that come to observe them each year. These sleek, finned mammals, their mouths turned up into a perpetual, infectious grin, invent their own complicated games, and outwit the other inhabitants of the tank, and sometimes their "masters," with practical jokes.

The star boarder at Marineland is Flippy, the educated porpoise, who has been trained to perform a variety of almost unbelievable tricks.

At a word from his trainer, Adolph Frohn, Flippy will roll over and over in the water until signaled to stop. He will retrieve objects, honk a horn, ring his own dinner bell, and jump through a paper-covered hoop three feet above the water—all at the command of his trainer.

Flippy's (and trainer Frohn's) greatest achievement came, perhaps, when the porpoise allowed himself to be harnessed and then towed a surfboard on which was riding first a little fox terrier, Flippy's friend, then a young girl. The porpoise enjoyed this lesson so much that he learned to swim into his own harness.

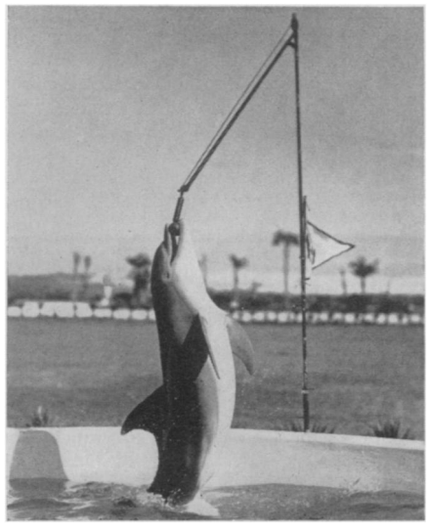
Most of the detailed study on porpoise behavior has been done on the bottle-nose, and especially those of the large Marineland oceanarium. There are 23 known species of porpoise-like whales along the Atlantic and Pacific coasts of the United States. Presumably these other species, as well as the larger whales, would show a degree of intelligence more or less similar to that of the bottle-nose if their I.Q. could be measured.

Porpoises are a noisy lot. Free-swimming schools send out a constant stream of sound ranging from bird-like whistles to a submarine Bronx cheer. A series of clicking sounds makes a good imitation of a door opening on rusty hinges.

So far as is known, these noises do not constitute a "language" for porpoises beyond advertising their presence or state of emotion. But Dr. W. N. Kellogg, animal psychologist with the Oceanographic Institute, Florida State University, believes that porpoises may utilize their sound-making ability in a sonar system to avoid striking objects in the water as they swim at high speeds.

Porpoises emit sounds of very high frequency, detectable by their ears but beyond the hearing range of man. These sound waves, traveling at great speeds, echo back when they strike an object. A single click can travel to and return from an object two and a half feet from a porpoise in a thousandth of a second.

If, as Dr. Kellogg suspects, porpoises actually use their sound-making equipment as a sonar system, this means that a fast-swimming porpoise could, for instance, detect a submerged log in absolute darkness and still have time to turn safely aside.



THE EDUCATED PORPOISE—Flippy is shown here raising a flag to begin his routine of tricks. The porpoise retrieves objects, honks a horn, rings his own dinner bell, jumps through a paper-covered hoop three feet above the water at commands from his trainer.

Name Is Misleading

A cetaceologist, or whale expert, would fret at calling the bottle-nose a "porpoise." But more people would fret at using the technically precise term "dolphin," which to most Americans means a kind of fast, voracious game fish, *Coryphoena*.

To set the record straight, the bottle-nosed "porpoise," as it is almost universally called in America, is technically the bottle-nosed "dolphin." In the language of the experts, dolphins are small, toothed whales of the family *Delphinidae* that have a pronounced beak or snout, like our bottle-nosed. True porpoises are whales of the same family that lack this pronounced beak generally. Other members of this family, like the killer whale, conform to neither of these two general groups.

As a practical matter, though, the general acceptance of the term "porpoise" to include all members of the *Delphinidae*, and the term "dolphin" to refer to the fish *Coryphoena*, makes the fine splitting of difference between dolphin- and porpoise-whales of little value to anyone except the expert. And to fishermen, it is only a source of confusion.

Cousins Are Whales

The familiar, friendly porpoises of our coasts are first cousins to the vicious killer whale; the tusked narwhal, or "unicorn of the sea," and the 60-foot-long sperm whale. These are all in the sub-order of toothed whales. Second cousins of the porpoises are those of the sub-order of toothless, or whalebone, whales. This group includes the blue whale, the largest animal ever found on earth, surpassing the monstrous prehistoric dinosaurs.

Blue whales are about 23 feet long at birth; two years later, when they are sexually mature, they average about 72 to 74 feet long. Full grown blue whales sometimes measure over 100 feet in length and may weigh over 115 tons—about 230,000 pounds.

Yet these leviathans cannot swallow anything much bigger than a shrimp or a herring, so small is their throat. Their food is mainly minute plankton material, which they obtain by straining hundreds of gallons of water through the hair-like whalebone that lines their jaws.

Suited to Water Life

All of the whales, from the four-foot harbor porpoise to the 100-foot blue whale, are admirably adapted for permanent life in the water. In the course of millions of years of evolution, their bodies have become streamlined to offer least resistance to water. Their nostrils have migrated upward to a position on top of their skulls, from which they can breathe while floating at the surface. Their young are born and are nursed in the water.

They have lost their hind limbs, except for stubs of bone internally. Their forelimbs have developed into fins, and a great fluke or tailfin has been evolved to propel their great mass at high speed through the ocean.

Incidentally, you can always tell a whale from a fish—if you have any doubt—by the position of the tail. The tails of fish are lined up vertically; the tails of whales are horizontal.

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GERONTOLOGY

Artery Trouble May Be Tied to Heparin Lack

➤ PATIENTS WITH a severe form of artery hardening may be suffering from a deficiency of a body chemical just as diabetes patients suffer from deficiency of insulin.

The first evidence suggesting this was presented by Dr. H. Engelberg of the Cedars of Lebanon Hospital, Los Angeles, at the meeting of the Gerontological Society in San Francisco.

The chemical the people with sick arteries lack is heparin. This substance has the power to keep blood from clotting and has been used in recent years as treatment for persons suffering from blood clots that threaten life.

As insulin plays a part in the body's use of sugar and starches, heparin may play a similar part in the body's use of fats, Dr. Engelberg thinks.

Defective handling of fats and fatty substances, such as cholesterol, is believed by some scientists to be the cause of the artery disease doctors call atherosclerosis. The layman would call it hardening of the arteries, but actually it is a form of artery hardening in which there is fatty degeneration of connective tissue of artery walls.

The amount of heparin in the blood plasma, Dr. Engelberg finds, declines with age. Also, the amount of heparin in the blood of healthy normal persons is higher than that in the blood of the majority of patients with atherosclerosis.

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NUTRITION

Map Human Starvation

➤ MAPS THAT can help chart a course for economists, statesmen, nutritionists and doctors seeking the treasure of food and health for all the world have just been published.

They are world starvation maps prepared from the "Study in Human Starvation" just completed by the medical geography department of the American Geographical Society. The study is sponsored by the Office of Naval Research.

One map shows areas of the world where the people have an adequate diet, areas where the diet is lacking in calories or protein or vitamins or other essential nutrients, and where diseases resulting from inadequate diets afflict the populations.

A companion map shows areas of the world where various foods, from beef to yams, are produced and how much of each.

Dr. Jacques M. May, author of the maps and head of the society's medical geography department, says the map show many factors contribute to the overwhelming prevalence of malnutrition throughout the world. And, he says, there does not seem to be one single solution to world starvation. The problem each country faces is different.

Some facts shown by the maps: Almost two-thirds of the world's people today are starving though world production, if properly distributed, seems to be enough to feed everyone.

India, Ceylon, China, Indonesia, Pakistan and the Philippines seem to be the only countries in the world unable to provide each person daily with the necessary amount of food adequate in energy and protective (vitamin and mineral) values.

The only countries in the Western Hemisphere enjoying an adequate diet are the United States, Canada, Uruguay, Paraguay and two-thirds of Argentina.

The people of Western Europe, except those in Portugal, Spain, Italy and East Germany, have adequate diets.

Data released by the U.S.S.R. seem to indicate that Soviet Russia provides an adequate diet, but the American Geographical Society has gathered data showing the location of numerous forced-labor camps where starvation diets exist.

The only other countries with adequate diets are: Greece and Turkey in the East; Kashmir, Nepal, Tibet, Thailand, Cambodia and Formosa in the Far East; Somaliland and Portuguese Guinea in Africa; Australia and New Zealand.

The rest of the world subsists on diets lacking in both energy and protective values, or in protective, tissue-repairing value.

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CHEMISTRY

Turn Garbage to Humus

➤ A FAST, practical method of turning garbage and other organic refuse into humus to enrich farmlands has been developed by University of California scientists.

They set up a compost heap composed of refuse, maintain the right conditions, and micro-organisms present in the refuse effect the conversion. No esthetic nuisance or smell is created in the operation.

No decomposing agents or chemicals are required. The compost heap, properly manipulated, has all the elements required to convert itself into humus—in 12 to 21 days, at a cost of from $12 to $15 a ton.

In addition to the right micro-organisms, the refuse has all the nutrients, moisture and acid requirements needed. Proper handling of the heap allows it to generate enough heat to promote optimum decomposition and to destroy harmful bacteria and flies.

Aeration by turning the heap is required to promote bacterial action and meet other requirements. Special equipment for this job has yet to be designed, but the scientists believe these problems can be worked out for commercial composting.

Primitive, small-scale composting has been practical all over the world for centuries. It is carried on to some degree on a municipal scale in Europe, South Africa, Australia and India—in each case by methods fitting the conditions peculiar to the area.

The method developed by the Berkeley sanitary engineers, under the direction of Dr. Harold B. Gotaas, is considerably faster than any other large-scale method.

Composting has been of little importance in the United States because the need for new methods of refuse disposal has become urgent only recently, and the shortage of organic matter in the soil has never been as acute as in Europe and Asia.

The scientists say composting has many advantages. In addition to providing a cheap soil enricher, it is a better method of disposing of garbage and other organic refuse. It promises better sanitation. It should be a boon where existing sites for refuse disposal by land-fill are being taxed by explosive population growth. And it avoids the burning which adds to the smog problem in some communities.

Participants in the project were Bradley J. Card, Clarence Golueke, L. G. Riche, P. H. McGauhey and W. F. Langelier.

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