Whale talk: Song and dialect

Eavesdropping on whales, always a challenging enterprise, has now yielded family dialects as well as evolving songs. At the meeting in San Francisco of the AAAS, Roger and Catherine Payne and colleagues continued their description of humpback whale songs (SN: 1/13/79, p. 26). However, a researcher from the University of British Columbia reported on a quite different vocal repertoire recorded among killer whales.

Groups of killer whales, even those with overlapping ranges, call with distinct dialects, says John K. B. Ford. The social organization of the whale has been described by Michael Bigg and co-workers at the Pacific Biological Station who identify individual whales from photographs showing the color pattern, nicks and scars on the dorsal fin. They find that the killer whales maintain stable family groups, called pods, which contain up to 40 individuals.

Loud screams, peer-toned whistles and echolocation-type clicks are included in the abundant underwater vocalization of killer whales. Ford has recorded from 12 different pods the screams of rapidly generated pulses that he calls stereotype calls. These S-calls make up more than 85 percent of the sounds emitted by foraging whales, which scatter over an area of up to 10 square kilometers and move at the same pace and in the same direction and exchange 20 or more calls per minute.

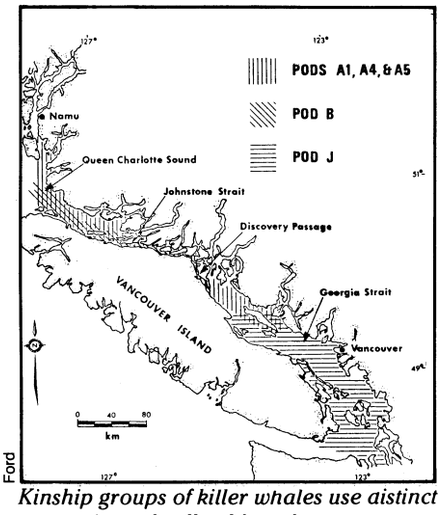
Each pod of killer whales has a repertoire of 10 to 15 different S-calls, Ford finds. Within each pod a few S-calls dominate, while others are emitted only sporadically. The calls often occur in series, as if the call of one animal triggers the same call from other whales in the pod.

Different pods call in distinct dialects. Three pods, called A1, A4 and A5, which often travel together and may represent one extended kinship group, share a repertoire of 13 S-calls. Another pod, called B, sometimes travels with one or more of the A pods and makes at least 9 S-calls, only one of which resembles an A-pod call. Even when the pods travel together, each adheres to its own stereotype repertoire.

Another pod of killer whales, pod J, has minimal contact with the A and B pods. "Pod J really does sound remarkably different," Ford says. It has 11 S-calls, none of which resemble those of the A or B pods.

The separate call repertoires, far more varied than those found between adjacent populations of birds, may permit members of a pod to maintain contact with each other while traveling with other pods and could help preserve group identity, Ford says. In eight years of observation, no whales have been seen to leave the pod into which they were born.

It is tempting to speculate that the calls communicate information to coordinate movement of the foraging whales, which



Ford

Kinship groups of killer whales use aistinct repertoires of calls although some groups (such as the A pods and pod B) often travel together.

are often out of sight of one another yet change direction in unison. Only one S-call so far has been associated with a particular behavior; one call of the A pod is only given during "group-resting," when the animals form a tight group and make long, slow, synchronous dives.

Unlike the songs of the humpback whale, the killer whale calls do not vary over time. Ford says that recordings from 1964 of whales in the range now inhabitated by the A pod contain the entire repertoire of the current A-pod whales and no other S-calls.

Continuing work on the much longer, more complicated and continually evolving songs of the humpback whale is focusing on the songs' relation to behavior. Mounting evidence indicates that only males sing. Photographs of patterns on the tails' underside has allowed the identification of more than 250 individual hump back whales, reports James D. Darling and Kenneth S. Norris of the University of California at Santa Cruz. By recording the activities of identified whales each time they are sighted, they deduced some sex roles for the whales. (Usually a whale's sex cannot be determined when the animal is observed in the ocean.) Most whale social roles, such as being alone or part of a trio or part of a larger group, are open to all individuals. However, in no case has Darling observed singing by any animal that was ever seen with a calf (and therefore known to be female). Similarly, Darling observes "escorting" of a cow and a calf only by animals (presumably male) never seen with a calf themselves.

Interactions of singing humpback whales and nearby animals are being described by Peter Tyack of Rockefeller University. He believes the song, as in other animals, acts to space males and to attract females for mating. Tyack and colleagues developed a new technique to chart whale song and behavior. Observers in small boats follow the whales and record their songs, while observers on a coastal hilltop trace the whale and boat movements with surveyors' instruments.

Most singing whales appear to be lone males and the singers are evenly spaced. They often pursue nearby non-singing whales and when they join others they stop singing. The singing role is interchangeable; a non-singing animal joined by a singer, for instance, may begin singing itself when again alone. Tyack has observed behavior associated with courtship after a singer meets with a female, and also aggressive behavior between singing and non-singing whales. The duration of song bouts is shortest when the largest number of receptive females is present, again suggesting a relation to reproductive behaviors. During their next observation, the scientists plan to play recordings of the songs to the whales in an attempt to identify any reaction. □

'Safe' sedatives and pregnancy

A pregnant woman's heavy use of certain drugs, alcohol, tobacco or other substances can have noticeable, and at times severe, effects upon the unborn child. Perhaps the most disastrous example of this was thalidomide, a sedative that triggered unanticipated, grotesque anatomical defects in newborn children. Since then, it has become apparent that use of everyday substances such as alcohol and cigarettes can contribute to the birth of smaller babies as well as to other deficiencies.

But what of the user of small or moderate amounts of today's "acceptable" substances? Can two or three glasses of wine with dinner, an occasional cigarette or sleeping pill do any harm? The answers are not yet known, at least among human beings. Newly reported animal studies, however, show that even minimal, three-day doses of what is believed to be a safe sedative can produce "striking and permanent effects upon reproductive functions," says Sumner J. Yaffe of the University of Pennsylvania and Children's Hospital in Philadelphia.

Yaffe administered phenobarbital to female rats for three days late in their 21-day pregnancy periods. The drug doses were smaller than those required to actually cause the animals to sleep, he says. Yet, after following the injected rats' offspring for 90 days (into adulthood), Yaffe reports that "close to 100 percent" of the offspring suffered some type of delayed abnormality in their development. "Even though these are animal experiments ... the implications are great," Yaffe says. "We think we've seen permanent effects by ... a commonly used drug in our society—[one of] a vast number of psychotropic drugs