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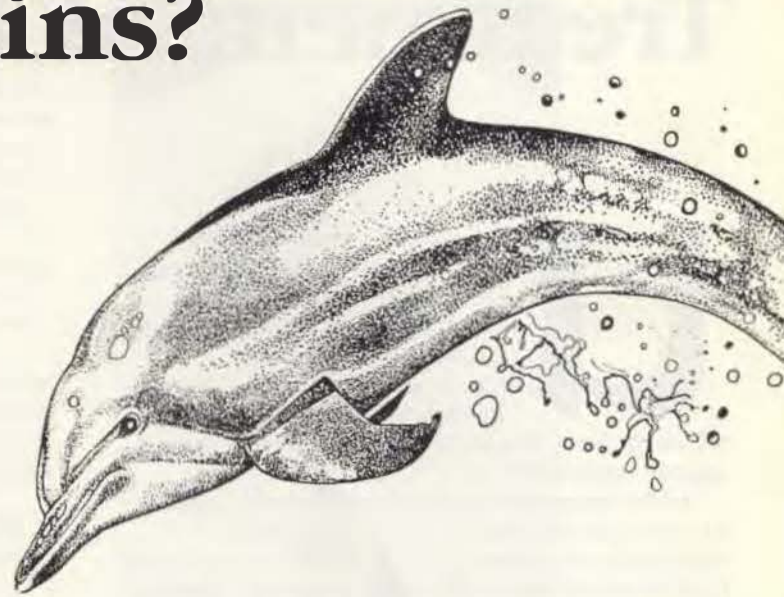
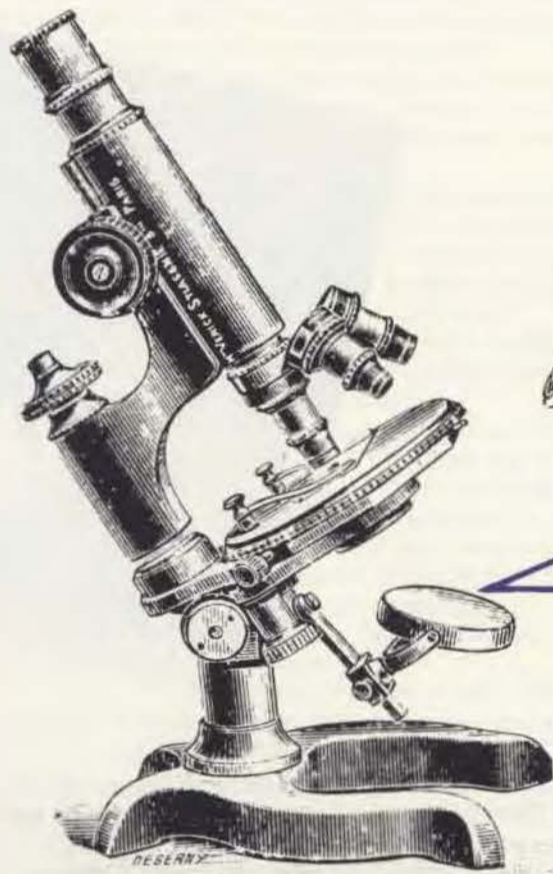
What Killed the Dolphins?

Many seashore vacations this summer were marred by beach pollution, and people grew fearful when unusually large numbers of dead dolphins were washed ashore. "The Marine Mammal Stranding Center in Brigantine, NJ, reported 60+ dead dolphins," said Dr. William Medway, professor of clinical laboratory medicine at the University of Pennsylvania School of Veterinary Medicine. "Many were badly decomposed and had been mutilated by sharks."

Medway, who has worked with marine mammals since 1962, assembled a team here at Penn in an effort to determine why dolphins were dying in such large numbers. "Drs. Tom van Winkle, Virginia Pierce, Mattie Hendrick, Gail Heyer, and I got together to cooperate with Bob Schoelkopf, director of the Marine Mammal Stranding Center. It was a voluntary effort on our part."

Schoelkopf would contact Dr. Medway whenever he had newly dead animals, and the team would travel to Brigantine to perform necropsies. Most of the dolphins were too badly decomposed or mutilated to draw conclusions. The break came in early August when a recently dead dolphin was washed ashore. "The dolphin looked septicemic and it had a number of skin lesions," said Dr. Medway. "We took tissue samples and sent some to the USDA laboratory at Ames, IA, for further study. I had a hunch that we might be dealing with a *Vibrio* infection and requested that cultures for *Vibrio* be done. Many came back positive."

Vibrio, a group of bacteria, are found in the ocean. There are a number of species: *V. alginolyticus* and *V. vulnificus* are known to cause disease and, in some cases, death in people. "In 1979, we isolated *V. alginolyticus* from the blood and organs of a dead Atlantic white-sided dolphin," said Dr. Medway. "This animal had acute necrotizing hepatitis and acute focal bronchopneumonia." Many of the dolphins washed ashore in New Jersey showed signs of pneumonia. *Vibrio* bacteria flourish during the summer months with



Inclusion body in the cell of tissue removed from a dead dolphin. The inclusion body is evidence of dolphin pox.

the highest concentrations during July and August, the period when most of the dolphin deaths occurred along the New Jersey coast.

"It has been reported that people who had cuts or other open wounds have become ill with *Vibrio* infections after bathing in the ocean," said Dr. Medway. "The dolphins we examined, and those seen by scientists elsewhere, all had skin lesions. The lesions were typical of dolphin pox, a virus disease first identified in dolphins in the late seventies. Usually the disease is benign and the mortality rate is low." Researchers believe that pox outbreaks in dolphins are related to stress and the general health of the animals. It was found, for example, in one aquarium that the animals

showed signs of pox only when being moved to another tank at the end of the season. "We don't know whether the dolphins along the Atlantic coast were stressed. But we do know that water conditions have changed. The Gulf Stream has come closer to land, changing the habitat area of inshore dolphins. We have also noticed an apparent increase in the shark population, which might put pressure on the dolphins. In addition, there is the pollution which has greatly increased. All these factors could account for the outbreak of pox among the dolphins."

Dr. Medway explained that pox lesions provide the *Vibrio* organisms with an ideal access to the dolphin's system. "The dolphins could get infected and then develop general septicemia and die." One other clue that points to *Vibrio* is that the number of dead dolphins has decreased dramatically since the end of August in New Jersey waters: ocean water temperature drops at the end of summer.

Trying to determine the causes of death of the dolphins is not easy, as the researchers can only work with dead animals. "Dolphins are protected under the Marine Mammal Protection Act, and it is prohibited to catch a live dolphin and then kill it to study it. One of our graduates, Dr. J. R. Geraci, a marine mammal specialist from Guelph University, Canada, did get permission to collect blood samples from dolphins. This was done with the help of the Navy off the Virginia coast."

Dr. Medway believes that *Vibrio* infections killed the dolphins. "But at this point we do not know why the organism affected the animals in such a fatal way this year. Were the dolphins weakened by the pox, or was there another factor in addition to pox disease, such as pollution? Only further study will tell."



Lesions on the jaw of a dead dolphin.