

Oceans, inhabited by a multitude of animals, cover three-fourths of the earth, yet little is known about the habit, life cycles, and diseases of ocean dwellers.

Until recently, marine animal study was left to the care of biologists and aquaculturists. This has changed as it has been recognized that, through the application of traditional skills and knowledge, veterinarians can contribute much to the care and study of marine animals. Veterinary medicine took to the water at Woods Hole, Mass., in 1976, when marine biologists, aquaculturists, and veterinarians met to formulate a program for Aquatic Veterinary Medicine which relied on a number of disciplines to study and maintain the well-being of marine animals and their environment. The program was named Aquavet.

The School of Veterinary Medicine at the University of Pennsylvania, together with the New York College of Veterinary Medicine at Cornell University, provided impetus and sponsorship for Aquavet, furnishing matching grants to the initial funding received from the New York Sea Grant Institute. From its inception, the program has been under the leadership of Dr. Donald A. Abt, Director, and Dr. Charles G. Rickard, Associate Director. Dr. Abt is Associate Dean and Professor of Epidemiology and Biostatistics at the School of Veterinary Medicine, University of Pennsylvania. Dr. Rickard is Associate Dean and Professor of Pathology at the New York State College of Veterinary Medicine. To make the program a reality, the cooperation of other institutions was needed. The Marine Biology Laboratory, the Woods Hole Oceanographic Institution, and the Northwest Fishery of the National Marine Fishery Service opened their facilities on Cape Cod and helped to make the program a success.

Participants in the four-week course, selected annually on a competitive basis, now number thirty-two per year. Admissions committees at Penn and Cornell select eight students each from the two schools. The other sixteen places are filled by Drs. Abt and Rickard from applications received from other schools and graduate veterinarians. Participants have come from twenty other schools representing almost as many states. Graduate veterinarians, participating in the program, are eligible for continuing education credits.

In May 1977 the first sixteen students arrived at Woods Hole to participate in Aquavet. Since then, students, veterinarians, and other professionals, 145 in all, have completed the course *Introduction to Aquatic Veterinary Medicine*. It is a demanding course of study, which explores all aspects of marine life. Lecture topics range from ecology to anatomy, to the study of disease conditions and their prevention and treatment. Classes, field trips, seminars, and laboratory sessions are held six days a week, beginning at 8 a.m.

Discussions often continue into the night at the Swope Center of Marine Biology Laboratory where students and faculty live. This environment allows interaction between program participants and resident and visiting scientists.

Aquavet is interdisciplinary and it takes about fifty researchers and teachers to cover the vast subject. These experts come from the nation's leading universities, research facilities, and industry. "We give a smorgasboard to those who are interested in bio-medicine," Dr. Abt said, "we let them taste what's available. Aquavet is a frontier in veterinary medicine. The biologist has studied what's there, bio-medicine goes to see what's there and how best to interact so as to prevent and eliminate diseases."

The course begins with the study of salt marsh ecologies, inter-tidal zones, and off-shore areas. Students apply the techniques of comparative anatomy and physiology to compare and contrast aquatic animals with those species commonly encountered by veterinarians. They explore the relationship between the marine animal and its habitat and learn how this environment may influence the interaction between disease-producing agents and the animal.

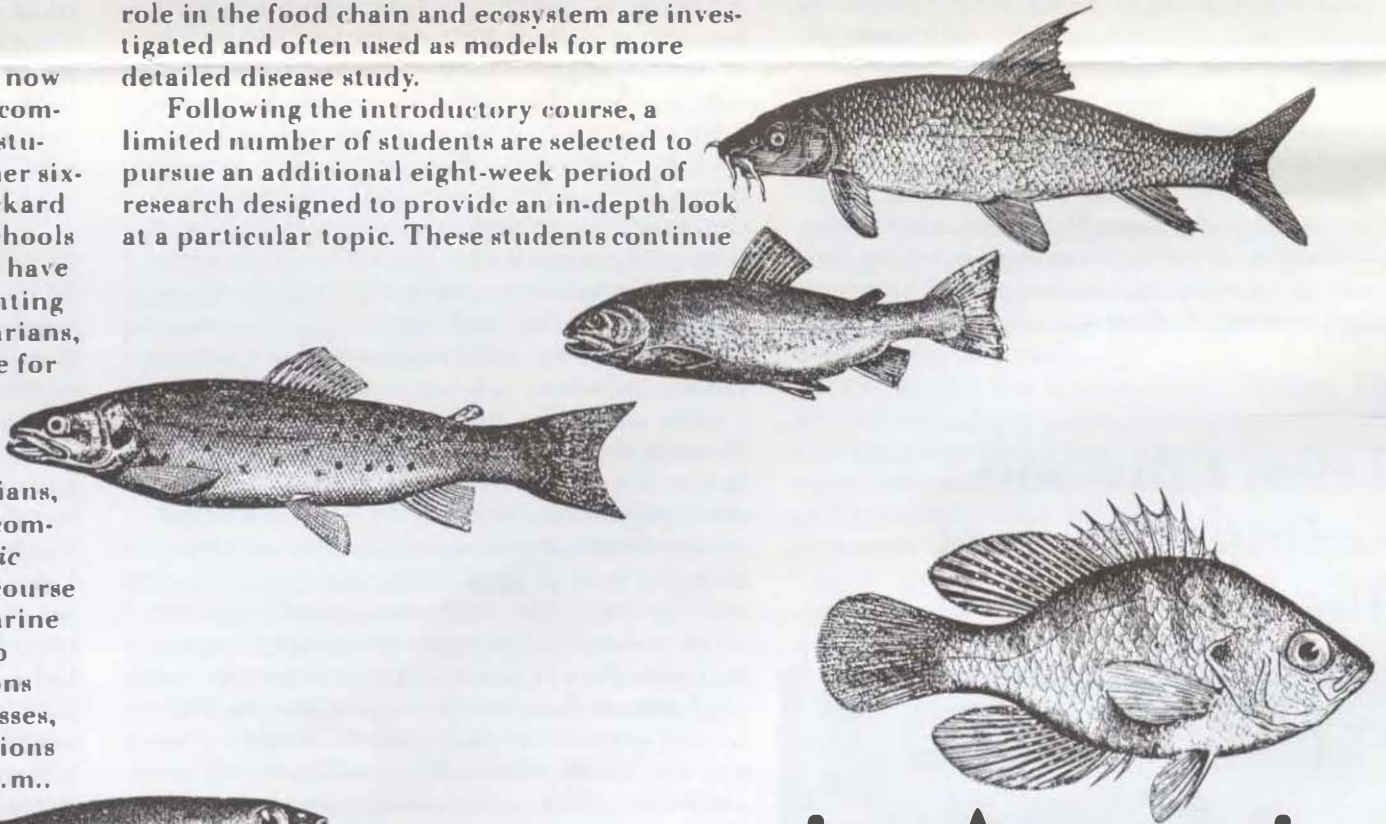
They are encouraged to apply the veterinary viewpoint to problems encountered in the rearing of water-dwelling animals in aquaculture systems. Drawing on their knowledge of epidemiology, parasitology, genetics, nutrition, toxicology, and other fields, students seek solutions to the problems which afflict marine animals and their habitat. Diseases are studied, and compared with those found in land animals. The animals examined vary greatly. They may be starfish or marine mammals, snails, mussels, or birds. Their interaction and role in the food chain and ecosystem are investigated and often used as models for more detailed disease study.

Following the introductory course, a limited number of students are selected to pursue an additional eight-week period of research designed to provide an in-depth look at a particular topic. These students continue

to work at Woods Hole or begin to study at a cooperating institution in another part of the country.

The concept of Aquavet is important with respect to future food supply. Fish are a vital resource, yet they have been harvested without much thought to replenishing or protecting the supply. Man has altered the environment of the once fertile coastal fishing grounds by carelessly dumping industrial wastes into the waters of rivers, lakes, and oceans. Many species have been pursued so relentlessly that their survival is threatened. Pollution has wiped out marine animal populations or has fostered an environment which can only support a small sickly population. Aquavet, through the application of veterinary medicine, may be able to help raise a healthy marine animal population. Already solutions have been found to combat some diseases of fish, raised in aquaculture conditions, with vaccines.

Aquavet is not only vital to the role of marine life as a food source, it also contributes to establishing marine animals as models for the study of body functions and disease control. Much that is known about the transmission of nerve-impulses was learned through the study of the giant axon of the squid, begun in 1933. Yet, for all of the years that the squid has been studied, scientists have never found a way to raise it in a laboratory setting. Ideally, a researcher should have a colony of animals from a known strain, such as are available in laboratory mice and rats, but too little is known about marine animals' life cycles, breeding habits, and development phases to permit systematic reproduction of laboratory strains. An Aquavet student tackled the problem and attempted to raise very young squid in a laboratory setting. He found that the

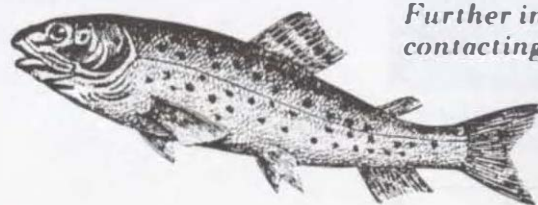


in Aquatic

A Program

AQUAVET:

Participation in Aquavet is open, on a competitive basis, to students from all veterinary schools, and to graduate veterinarians. Further information may be obtained by contacting:



young animals lacked the ability to detect the boundaries of the aquaria used in a laboratory setting, and continually bumped into the walls. This caused abrasions which became infected and caused the death of the young squid. The student was able to reduce the mortality rate somewhat by covering the walls of the aquaria with opaque material, but the problem is still not solved and much more research remains to be done. "We have to develop a body of knowledge, and this has to be constantly expanded," Dr. Abt explained, while telling the squid story.

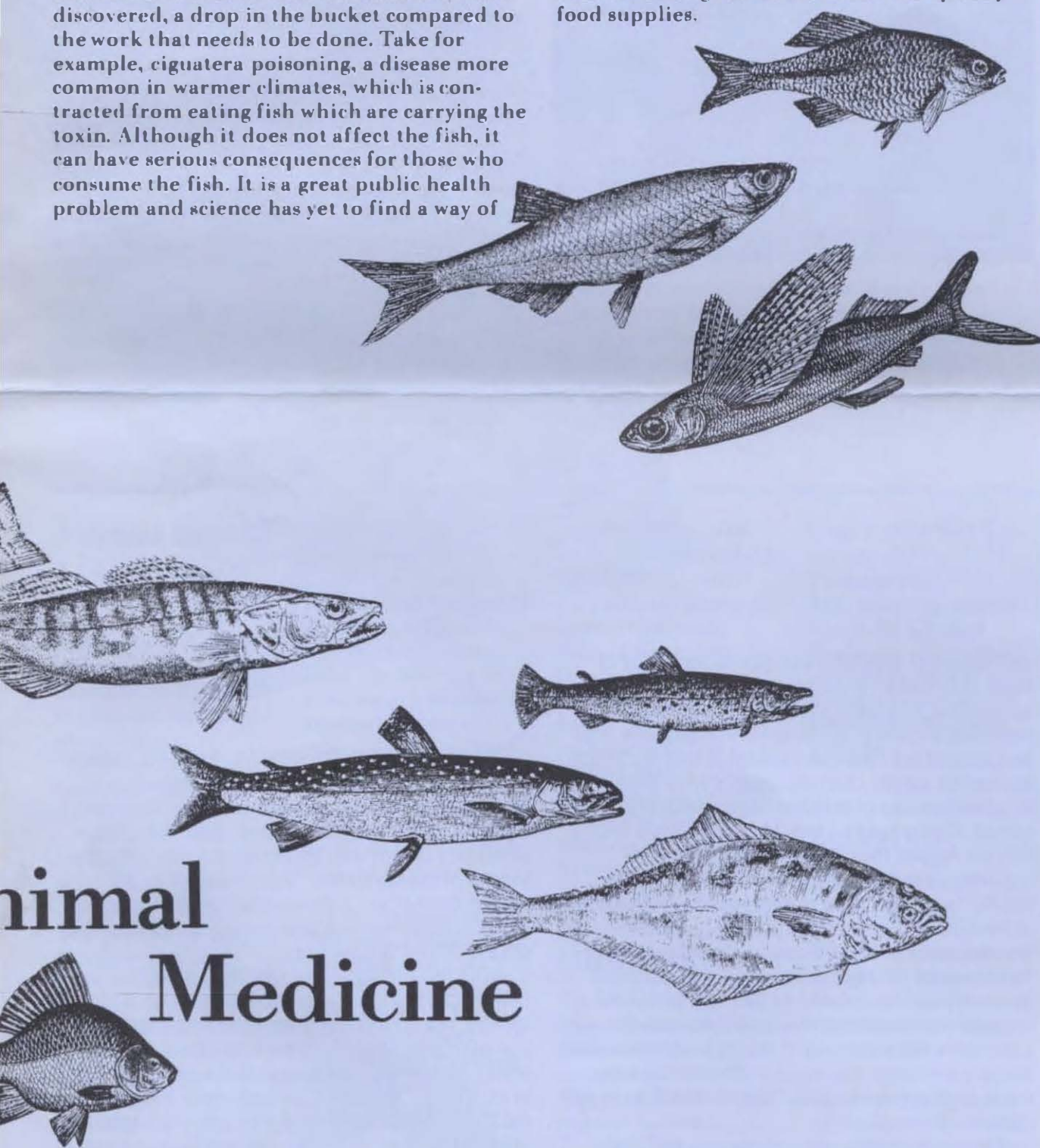
The work with marine animals has not only improved the understanding of such vital functions as neurotransmissions, it also has helped to provide insight into the mechanism of fertilization and cell development. Sea urchin research has contributed greatly to the basic knowledge of sperm-egg interaction and has proved relevant to cancer research and fertility regulation.

And the expansion of knowledge continues. Last year, at the year-around laboratory for the student of diseases of marine animals, established under Aquavet, five previously unidentified diseases of marine animals were discovered, a drop in the bucket compared to the work that needs to be done. Take for example, ciguatera poisoning, a disease more common in warmer climates, which is contracted from eating fish which are carrying the toxin. Although it does not affect the fish, it can have serious consequences for those who consume the fish. It is a great public health problem and science has yet to find a way of

identifying the toxin carriers. A bit closer to Pennsylvania, another problem has been Red Tide, a parasitic disease which caused the closure of many Eastern oyster and clam beds. Ciguatera and Red Tide are just two examples of the mysteries which need to be unraveled as man looks to the oceans as a continuing food source. Aquavet will play a vital role in solving those and many other problems.

Many of Aquavet's participants have graduated. Some are pursuing further studies in the field, some are doing research, and others are using the skills and knowledge gained at Woods Hole in private practice. Dr. Aht tells of two graduates who have devoted their practice to exotic animals and he envisions an increasing demand for veterinarians interested in aquatic animals as food sources, laboratory animals, or as companion animals.

To supply this demand, plans are being made to introduce courses on marine animals in the regular curriculum of the School of Veterinary Medicine. This will broaden the base established by Aquavet, and perpetuate knowledge in a specialty of great importance, if marine animals are to continue their vital role in meeting the world's needs for quality food supplies.



Animal Medicine

Donald A. Abt, D.V.M.,
Director of Aquavet
School of Veterinary Medicine,
University of Pennsylvania
3800 Spruce Street
Philadelphia, PA 19104
215-243-5783

Charles G. Rickard, D.V.M., PhD.
Associate Director of Aquavet
New York State College of Veterinary
Medicine
Cornell University
Ithaca, NY 14853
607-256-3215

Open Wide Please

The School of Veterinary Medicine, in collaboration with the School of Dental Medicine, have inaugurated a new program of Veterinary Dental Medicine. Courses in Comparative Oral Form and Function and Comparative Oral Pathology and Treatment are being offered to familiarize students with the hard and soft tissues of the head and neck and with dental functions in different mammalian species. The courses provide information on the pathology and treatment of oral problems in humans and animals. In addition, a veterinary dental clinic is open at the Veterinary Hospital of the University of Pennsylvania (VHUP), staffed by members of both faculties. Students will have the opportunity to observe and practice basic dental care on both companion and exotic animals. A large animal dental service is being planned at New Bolton Center for a spring 1982 opening. The third component of the program is interdisciplinary research in dental medicine with an emphasis on technology transfer, development of new animal models for human disease, and improved understanding and treatment methods for animal oral problems.

Information about the program may be obtained by contacting the Program Director, Dr. David Roberts, School of Dental Medicine, Clinical Research Center, 4001 Spruce St., Philadelphia, PA 19104.

Sculpture Gift



At a meeting of the Veterinary School's Board of Overseers on September 18, 1981, Dr. David E. Rogers, a new member of the Board, presented a striking wood sculpture to Dean Robert Marshak. Carved by Dr. Rogers from a solid block of buttonwood, it represents the relationship between man and his companion animals.

The sculpture, titled *The Bond*, may be seen in the reception area of the new Veterinary Hospital of the University of Pennsylvania.

Dr. Rogers is president of the Robert Wood Johnson Foundation and a former dean of the Medical School of Johns Hopkins University.