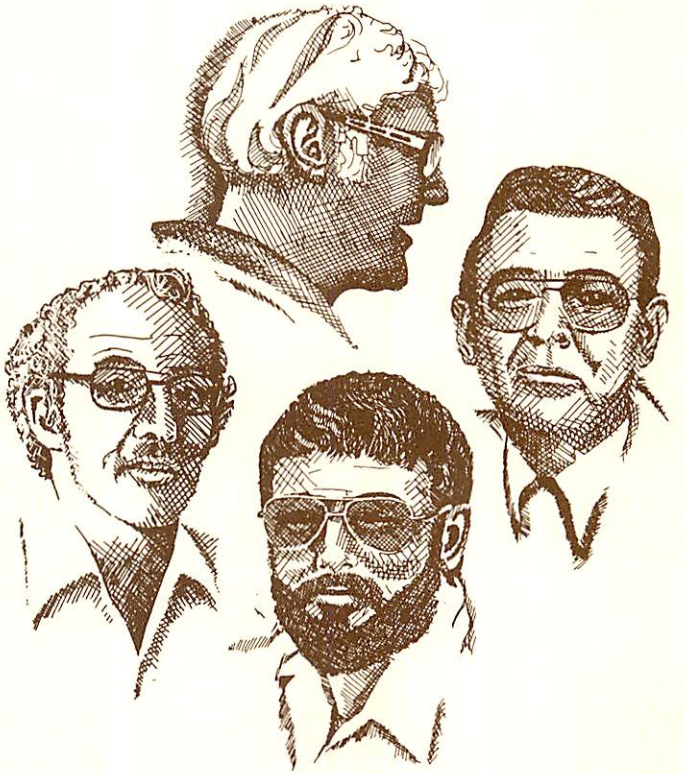
OSU Sea Grant



a report from the Oregon State University Sea Grant College Program

This OSU Sea Grant report was written by Martha Eliassen, Rob Phillips and Jim Bottom, with layout/artwork by Sarah Ligon. Edited and photographed by Jim Bottom and Jim Larison. This report is produced periodically by the OSU Sea Grant College Program, as required by the National Oceanic and Atmospheric Administration, Office of Sea Grant, Washington, D.C.

Our Work Is Valuable . . .

A periodic report about any organization or company is a typically American art form. It can come in many different styles, but is invariably designed to convince the reader that the product being peddled is the best in the world.

This is our tenth Sea Grant report during the dozen years of Sea Grant history in Oregon. And our reports have varied from notepads, to tabloids, to the slick style common to large corporations.

Though differing in design, the focus of the message has been remarkably constant:

Sea Grant is a people program, oriented toward our our linkage with the sea.

Sea Grant trains students to work on marine problems, conducts research to answer complex questions about the sea, then attempts to make pertinent information available to all who can use it.

This report is no different. It, too, is people oriented.

We have chosen to tell you about four of many very special people who are working-or who have worked in the OSU Sea Grant College Program. They represent several hundred others who are seeking solutions to ocean problems facing Oregon, the Northwest, and the nation.

Their work is valuable.

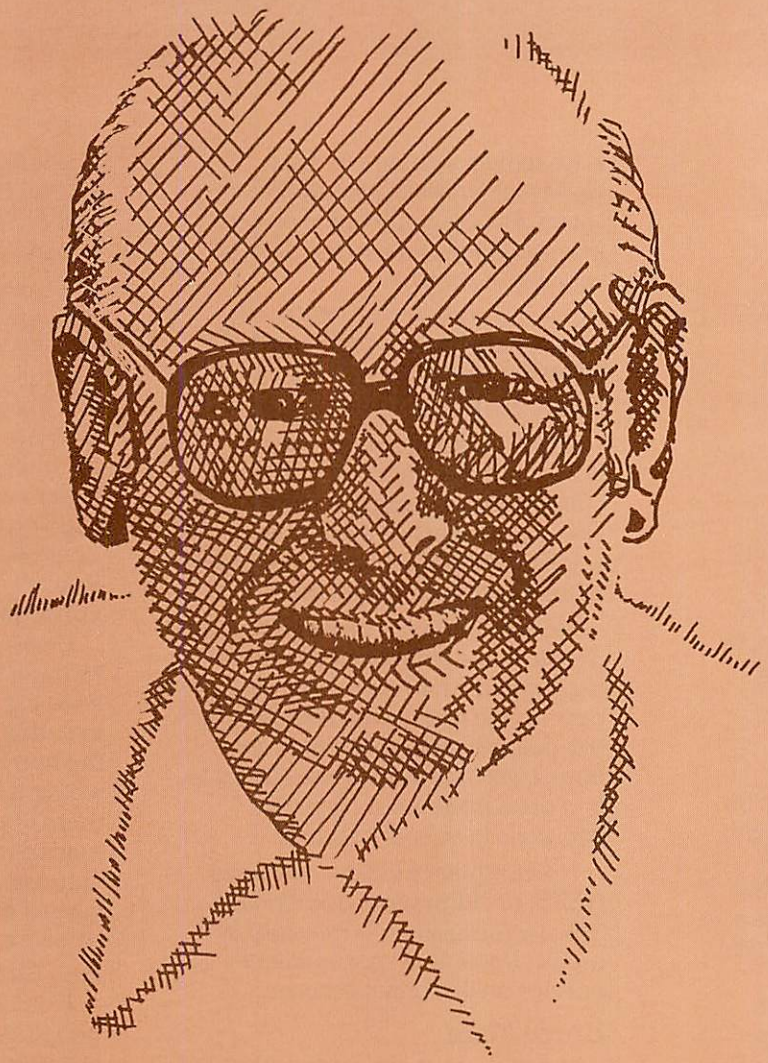
But the people themselves-working with other people-are even more important.

They are invaluable.

This report is dedicated to them, but also to those Oregonians who make their livings from the resources of the ocean.

Bob Wick

William Q. Wick,
Director
Sea Grant College
Program



Our People Are Invaluable

Ed Condon

There was something typically atypical about Ed Condon.

He was one of those rare individuals who had the capacity to see beyond a mountain of frustrations and conflicts. And in looking beyond, he was able to draw out answers from those he dealt with, simplifying what seemed to be impossibly complex questions.

But Condon, Sea Grant Marine Advisory Program oceanographer, wasn't out of the ordinary at Sea Grant — he just seemed to excel at such tasks. His dealings with people exemplified the program's philosophy and practice.

John Fryer

Though internationally known for his work in fish health management, OSU-Sea Grant microbiologist John Fryer isn't big on blowing his own horn. Since his early days as a summer fish hatchery worker, Fryer has come a long way, helping develop a center for studying fish diseases. Others have joined Fryer along the way to the betterment of fish health.

For years he and his co-researchers have been working on ways to help salmon ranchers worldwide produce healthy releases. His development of disease immunizations for fish has been invaluable to many.

But his willingness to work with people to solve their problems has benefited many more.

Court Smith

Court Smith has succeeded in doing the near-impossible. The cultural anthropologist and Sea Grant associate has merged social science, biology and computers to benefit fisheries management.

More importantly, he has merged people into a team of investigators exploring the human behavioral aspects in the highly emotional and bio-political process. He has functioned with that team of specialists to find out a lot about subjective decisions in scientific studies.

His computer model — known as NETS, or Northwest Educational Trawler Simulation — may help to predict impacts of management policies on important fisheries.

Bruce Mate

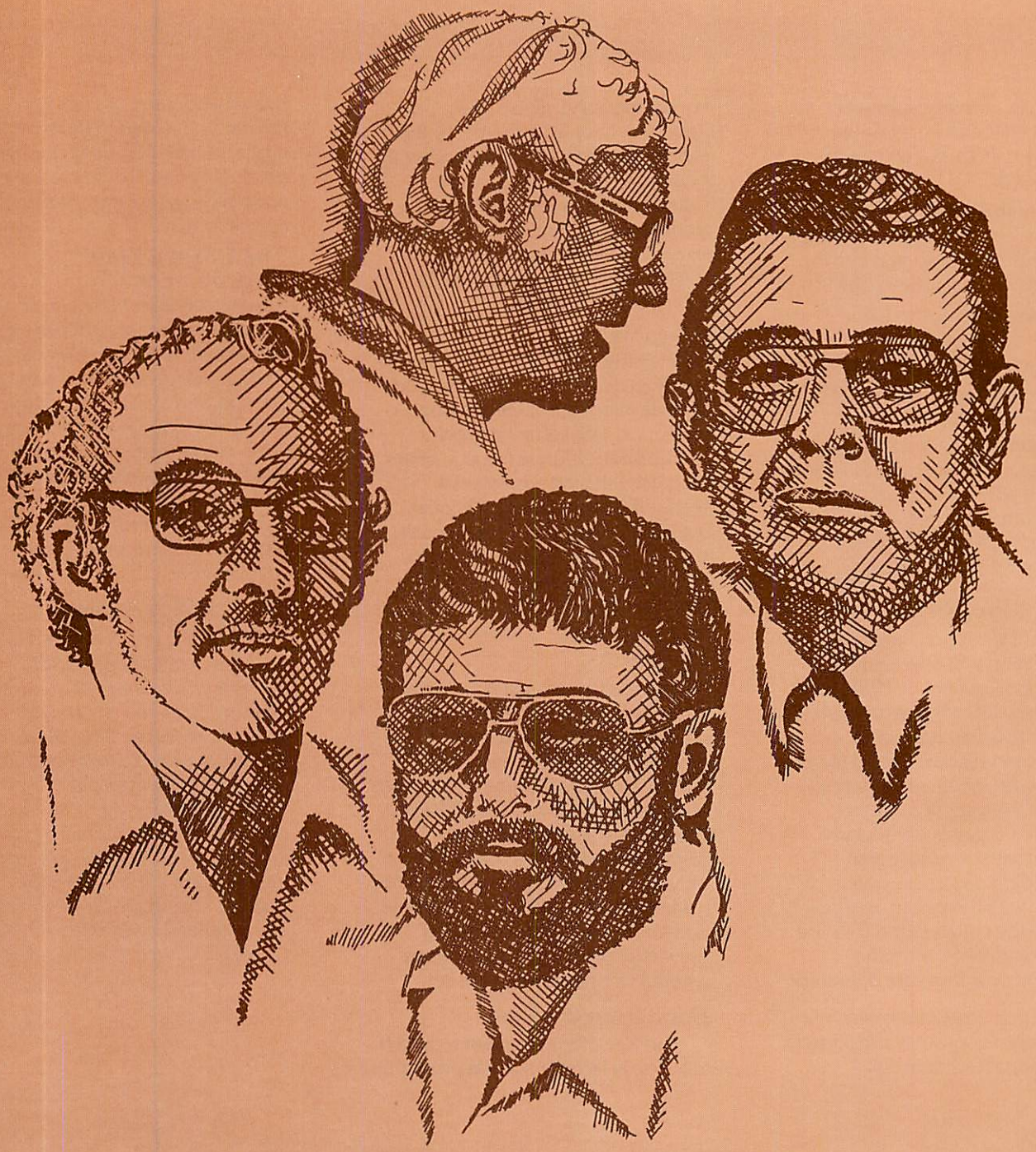
He's been called "sensitive" by those who have worked with him — known for his adaptability and flexibility. For sure, you can say that Bruce Mate, marine mammal expert and OSU-Sea Grant oceanographer, is concerned for the needs of people.

Sensitive to the growing conflicts between sport fishermen and seals and sea lions of the Rogue River, for example, Mate undertook a study to find out just how serious the problem of salmon harvesting by the mammals might be. Mate saw fishermen and environmentalists aligning themselves for a battle over controlling pinnipeds in the Rogue with potentially serious consequences.

He also realized the sides were forming without everyone involved knowing all the facts. His work included counting sea lions found in the river, analyzing their diets and working with local people to help them understand his data. His marine mammal research, once compiled and presented in various coastal town hall meetings, will help resolve conflicts.

Sea Grant's Invaluable People

Ed Condon, one of Sea Grant's people-oriented individuals, died last year. His success as a mediator and instructor will not be forgotten. His annual conferences of maritime industries continue on (See page 8).



John Fryer continues working — behind the scenes, he says — to expand the science of fish health (See page 14).

Court Smith's work moves toward taking the computer model on fisheries out of the classroom and into the coastal fishing waters (See page 20).

And Bruce Mate furthers our knowledge about marine mammals so that the importance of mammals to man and man to mammals can be better assessed (See page 26).

This report is intended to give you a better understanding of Sea Grant at OSU and why we say that it's our people's work that is valuable — it's our people, working with other people, that are invaluable.

Sea Grant Program

Sea Grant's mission, established with the National Sea Grant Program and College Act of 1966, is to generate new knowledge, train students to help understand and develop ocean resources and to put our knowledge of those resources to work for the benefit of all. In Oregon, Sea Grant is particularly concerned with developing an understanding and appreciation of how to live with the ocean and how to manage the coastal zone. Toward this end, a variety of on-going projects and programs are operated.

The Oregon State University Sea Grant College Program is supported by the National Oceanic and Atmospheric Administration, U.S. Department of Commerce, by the State of Oregon and by participating local governments and private industry. It deals with primarily five areas: marine extension, education, research in foods from the sea, coastal resource research, and public policy analysis.

Advisory

Since the mid-1960's, Sea Grant management and funding support have developed marine advisory services at OSU. The advisory function of Sea Grant is a significant program fulfilling educational needs of Oregonians at the local level and contributing substantially to domestic and international educational programs throughout the Pacific rim.

Education

The need for educating and training personnel to understand and manage marine resources is obvious; the need to develop a society literate in marine matters is of equal importance. The OSU Sea Grant College uses the multidisciplinary skills of a major marine university to meet these needs. The underlying philosophy is to request Sea Grant support for initiating university programs and courses where important needs are set.

Food from the Sea

The Food from the Sea research division is large. It aims at programs that develop and provide new information needed to optimize the sustained yield and use marine products beneficial to man and animals — either commercially or recreationally.

The Coastal Zone Environment

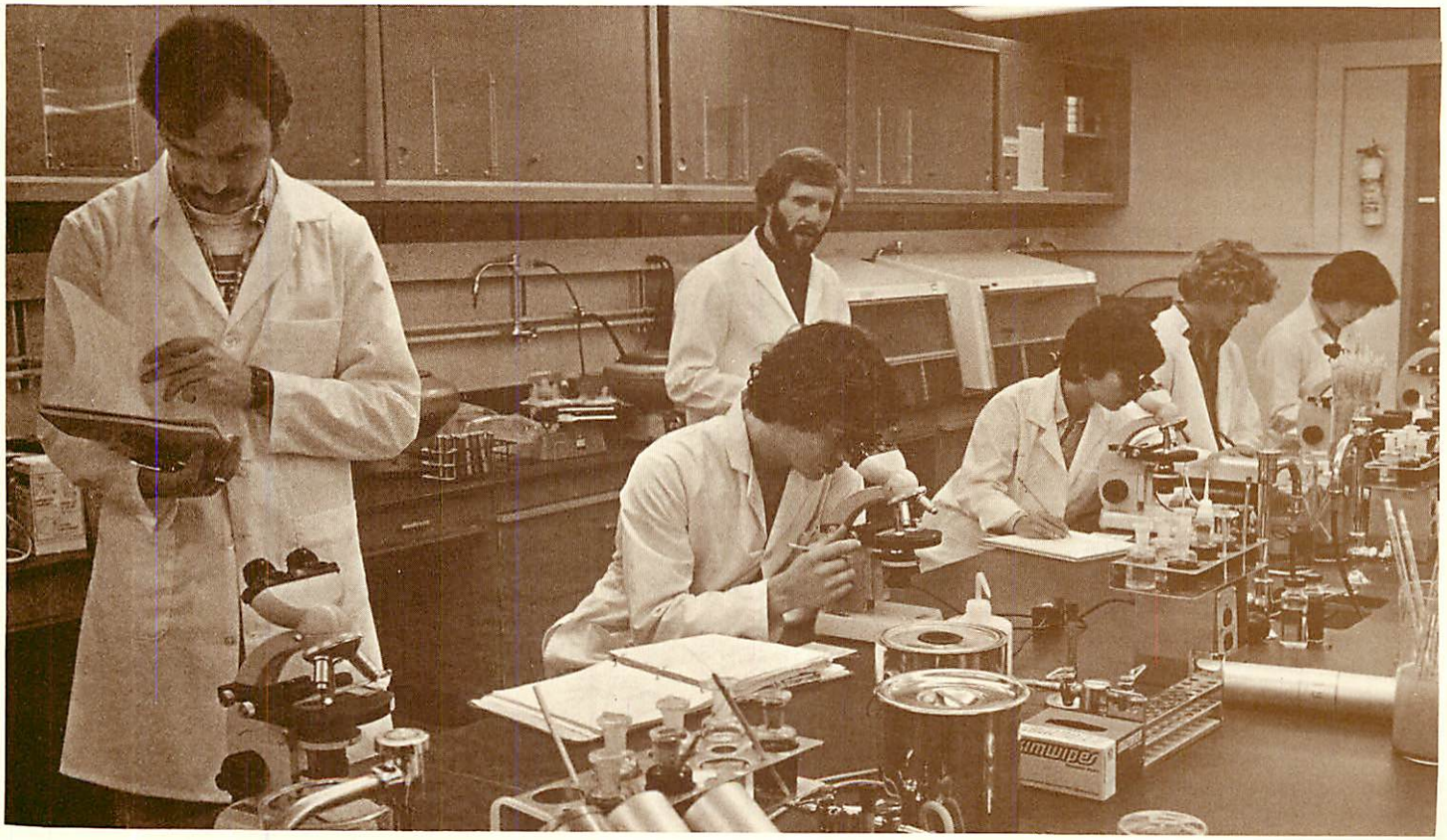
In this division of research, conflicts between man and nature are addressed, which develop as coastal resources are exploited in Oregon and around the nation. The Sea Grant College Program maintains a strong scientific and engineering research, education, and advisory effort to improve public understanding and participation in the complex coastal environment.

Public Policy Analysis

The public policy analysis program within Sea Grant's research mission emphasizes the relations between ocean and coastal resources. The existence of the National Sea Grant Program is a recognition that people in this country — and other countries — are turning more attention to the sea and its shores. People will remain interested in the oceans if the policies shaping its development are evaluated and improved. Sea Grant is taking part in this effort.

And Much More

There are many more people-oriented people to be found at OSU Sea Grant and many more projects helping to put the ocean's resources to work for the benefit of all. We have chosen to present just a few of over 50 on-going projects and feature four Sea Grant investigators. But we think you will understand a lot about Sea Grant at OSU by reading about the people involved with the projects described herein. If you are interested in knowing about the other projects, write us. We'll see you get the information you are seeking.



Condon — Best at Bringing People Together

Edward Condon was a people man.

Though he was a knowledgeable oceanographer, a retired Navy submarine officer — the author of a number of Sea Grant extension bulletins on boating and marine safety — Ed Condon was best at bringing people together.

Ask those in the maritime industry if they knew Ed Condon and chances are they'll say yes.

Ask them if they recall details of their first meeting and chances are they can't.

"I have no idea," says Dick Copeland of Merchants Exchange in Portland. "We started working together immediately. It was unusual chemistry."

Dick met Condon sometime between July 1972, when Ed joined the Marine Advisory staff, and May 1973, when Ed managed the first annual conference on the Future of Oregon Maritime Industries (FOMI).

Condon — twenty-one years a naval officer — knew the maritime business. What he lacked was contacts. Although he was the new kid on the block, within six months he knew enough people to form a program committee and had the temerity to call a conference of maritime industries in Oregon.

"Those program committee meetings — darndest brainstorming sessions I've ever been to," Copeland says. "Ed would gather people from diverse organizations at a luncheon — each of them with a pet project, each with an ax to grind. We'd sift through ideas and have enough for a program and a half. I'd come away amazed at what he'd come up with — and his ability to get to the right people."

That first conference in 1973 was a success — if for no other reason than because it was held — but it started out with an anxious moment.

As Copeland recalls: "We dragged our feet waiting for people to arrive. When we couldn't wait any longer, we got started. But the first speakers were talking to an audience of other speakers scheduled later in the day. We laughed about that for years."

Condon later concluded that the "only clear reaction" to the 1973 conference was that it should be repeated the next year.

It was, as Ed declared it, a "qualified success," marred only by the absence of organized labor. (One union threatened to boycott the conference if it wasn't moved to a union hotel. Ed moved it. The union boycotted anyway.)

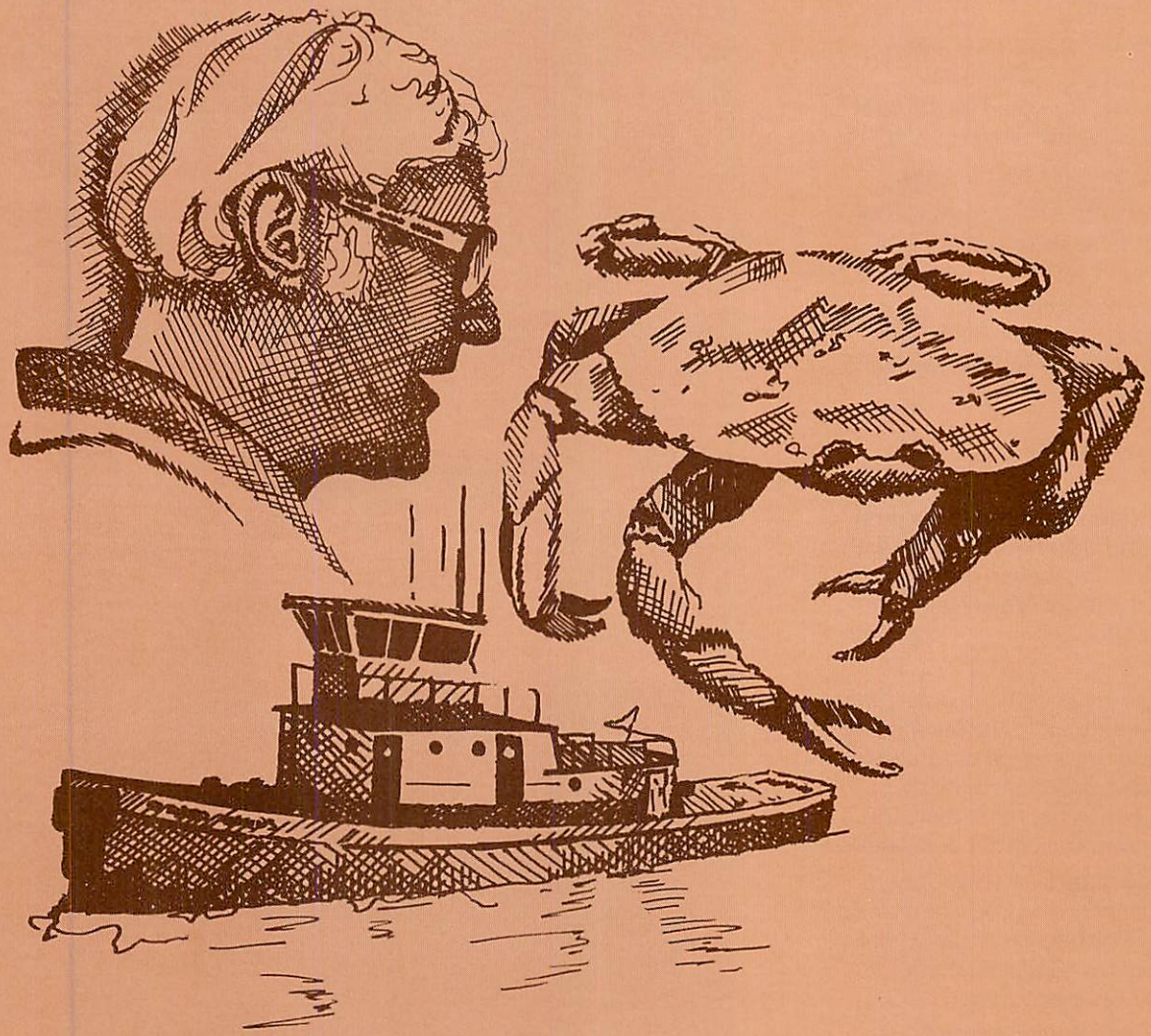
"Without participation by the onshore and offshore unions," Condon wrote that year, "our conference cannot really solve problems. It takes all members of a family, sitting and discussing together to solve problems."

Six annual conferences later (still without significant labor input), FOMI had become "a place to be seen," says Chris Kammer of the Port of Portland.

And Ed had contacts.

"The busiest people in town had time to talk to him," says Copeland. Moreover, after a two-year hitch on its Board of Governors, Ed was elected secretary of the influential Propellor Club in 1979. He was set to become its president in 1981, an honor no other academic person has achieved.

But now the question arises: Will FOMI continue? Can the conference designed to "help Northwest Maritime Industries share common goals, interests and problems" survive without Ed Condon's contacts and his special knack for



brainstorming and conference management?

It depends on whom you ask.

"Yes," says Chris Kammer emphatically. "It would be the best possible living memorial to him."

Maybe, says Dick Copeland.

"Some want it to," he says. "But the lack of that driving force . . .," and his voice fades.

"Remember this is your conference," Condon wrote in 1978. "Our future is what you want to make it."

Summer, 1979 . . .

Ed Condon is seated at his desk in the cramped office he shares with two others, one foot on the floor, the other in the lower drawer. His tan-orange coffee cup stands at parade rest.

Perhaps he stared that gray June day at the drift bottles on his window sill, then at the large photograph of tube worms that destroy dock pilings, then at the radar reflector hanging over the corner of his desk.

Whatever the true scene, only a close observer who knew him well and who saw him every day might sense that Easy Ed, the eternal optimist, was discouraged.

A few days earlier, he had conducted a meeting in Portland and it hadn't gone well. For the first time in several years, the coastal towboat operators and crab fisher-

men had failed to agree on where each could operate in order to stay out of the other's way.

The problem had existed long before Condon arrived. As one side had it: Those damned towboats were deliberately running through prime fishing grounds, separating crab pots from their float markers. (One pass could put a fisherman out of business.)

As the other side had it: Those damned crabbers deliberately set their pots where international law guaranteed full rights of passage.

Damages in the tens of thousands of dollars in lost pots and fouled screws were at stake. Threats of lawsuits and unsubstantiated rumors of violence recalled the ugly range wars in the Open West of a century ago.

It was a people problem — Condon's specialty.

He had been on the job only a few months when he and Paul Heikkila, marine extension agent from Coquille, went to work. Between them, they managed to get representatives of the towboat operators and the crabbers in the same room.

After several hours of looking at charts and "rapping," as Ed called it, both sides agreed to establish lanes along the coast where the boats could operate and beyond which crabbers were free to set their gear.

Says one observer, "There was a collective inaudible sigh of relief at the end of the day."

The agreement, modified each year between 1972 and 1975 on the basis of actual operating experience, worked.

But now it was 1979 and the agreement was coming apart.

There were more diverse voices to be heard and the pressure on the fishing grounds had increased dramatically. There were new incidents, more losses and threatened lawsuits.

The old hostilities surfaced again.

Condon Back at Work

Condon went back to work on it. Another meeting was called. More charts, more rapping. But this time he failed to bring off the consensus both industries needed but couldn't achieve.

Maybe, he wondered later, just maybe he had done it wrong. Maybe he should have done something different to secure the agreement. Maybe it wasn't worth the hassle.

At issue was the coast from Point Sur, California to Destruction Island, Washington. On July 30, able only to define the problem, Condon wrote a memorandum.

He showed a draft to Jim Leadon, Sea Grant Marine Advisory Program editor. Leadon tactfully suggested a revision of one paragraph. "To tone it down a bit," Leadon said.

The original Condon version does not survive. The Condon-Leadon paragraph reads: "The existing lane agreements have been working since 1973, with essentially no disagreements. To toss that heritage away would be foolhardy, in my opinion — perhaps even criminal."

Condon gave combatants 45 days to respond to lanes he suggested and threatened them with another meeting if they didn't "carefully study the charts, compromise a little and reach agreement."

By November only the area off Gold Beach was unresolved and crab season was due to open December 1.

Ed met again with Leadon.

"He was worried," Leadon recalls. "We were in the conference room taping footnotes on the last charts. Ed told me he still didn't have agreement on that one area."

"I recall his saying, 'This can't go on any longer. Since they can't make the decision, I'm going to have to make it for them. I realize the importance of what I'm about to do.'

"Then Ed took a felt pen and drew a four-inch line on the final chart," Leadon says. " 'There. I've done it.' Condon said. 'Right down the middle.' "

That was Vintage Condon: Right down the middle, after people who had the most to gain (and the most to lose) had had ample opportunity to resolve the problem themselves.

Perhaps Condon felt he had failed in his role as Advisor when he became Decision-Maker. Perhaps he sensed that a decision imposed by him would come apart in the face of mounting pressure.

Perhaps his memorandum of July 30 — born of discouragement and powered by the need to serve a greater good — will outlast all agreements and transcend all conflict.

But his message seems clear enough: "To toss that heritage away would be foolhardy, in my opinion — perhaps even criminal."

Early This Year . . .

A crusty port manager from the Oregon coast, reflecting on the work of his friend and colleague, asked, "Just what did Ed Condon do for Oregon State?"

The question is not easy to answer.

Condon didn't fit the standard mold. He was not merely a conference planner or a conflict mediator, not simply a teacher, a writer or extension agent.

He was a people man.

Yes. "A presence." "A constant." "Always there when I needed him."

Yes."A deep well."

Of course. "A mountain of life." "A counselor, a resource, a friend."

No shortage of labels that describe that part each witness knew. But a man is not measured by his labels, nor by the work he did. He is measured by the model he left for others.

Ask the maritime community.

Talk to the towboat operators and the crabbers.

Look at the results of his workshops in navigation and boat safety. (And note, just coincidentally, that boating fatalities in Oregon dropped 40 percent in 1977 and boating accidents the same year dropped 23 percent.)

Watch Vicki Rohrberg, Marine Resource Management graduate student, for whom Ed secured an internship in Toledo as that city's first Port Manager. ("Toledo benefits . . . Vickie benefits . . . OSU benefits," he wrote in October, 1979. It was Condon's kind of equation.)

Read his extension bulletins on preventing marine fires — on boat stability — on wood-boat maintenance that he wrote with Bob Graham — on radar reflectors for small boats ("Cheapest collision insurance you can buy.")

And note deep in an old Sea Grant file the draft of an article he wrote in 1973 during his first year on the job. It was titled "How Far to the Horizon." It wasn't very good and was never published, maybe because Ed's vision never stopped at the horizon.

Step Outside Yourself

Dangling from the center of the drop ceiling in Condon's office, fourth floor Oceanography, is a hangman's noose.

It's hard to explain just why Ed Condon had a hangman's noose dangling there, but people who knew him will tell you it was Pure Condon.

Strip away the literal meaning — he never intended that. Then think again. Ask him what it meant and he'd say with a warm smile, "I dunno. What's it mean to you?"

And whatever answer you'd give would be right.

It was Ed's way of inviting you to step outside yourself just for an instant and rethink whatever it was you were thinking. He'd do the same thing when he'd look at you and refer to you in the third person ("How's Rob today?").

Anyway, if you look carefully at Ed Condon's noose, you'll see that it forms a lopsided "O."

And Rob thinks it stands for a persistent Optimism that told people who dropped in (and people were always doing that) that if you had as much faith in yourself as he had in you, things were going to be okay

On November 29, 1979 . . .

At age 50, Ed Condon's heart — the great heart he shared with so many, who shared theirs in return — stopped.

Fryer — 30 Years in Fish Research

Thirty years ago John Fryer couldn't have told you a thing about bacterial and viral infections in fish.

The ex-Marine — working his first stint in a fish hatchery — only knew that some hatchery fish were dying and their deaths were all characterized by kidney lesions.

The bacterial infection killing them, he found, was neither named nor classified.

Fryer was intrigued. And that interest became a catalyst of sorts: Over the years it has drawn people and resources together and helped form what is now known as the Infectious Diseases of Fish (IDF) Program at Oregon State University.

"I became interested in that sort of thing and I've never really been interested in anything else," Fryer says about his early experiences with fish diseases.

Today, Fryer — OSU Microbiology Department Chairman — and his co-researchers are internationally recognized for their work in the field of fish health management. Developments such as vaccines and other methods of controlling fish diseases have made the OSU facility an integral part of salmonid aquaculture in the Pacific Northwest, and its efforts have made fish health a tangible science.

Fryer and others in the field became particularly concerned about large fish kills in Oregon in the early 1960's. No evidence of nutritional deficiency, parasites or bacterial infection could be detected.

The problem sparked research.

Viruses

At the time, virology (the study of viruses) was known only in human and veterinary medicine. Not much information was available about viral infections of fish.

One of the first challenges in the study of fish viruses was to figure out how to culture fish cells in the laboratory. To isolate them they must be grown in live tissue.

"That proved to be the most work," Fryer recalls. "The subtle differences between culturing human cells and fish cells didn't amount to much, but they were important."

It became necessary to keep the inoculum, or the number of starter cells, much higher than what was called for in mammalian cell cultures. A temperature variation for the cold-blooded fish cells also had to be considered.

When the cells finally began to grow and multiply in the lab, they did very well — and are still doing so. They were the first autonomous cell lines developed from the tissues of Pacific salmon, and are used today in many labs involved in virus research.

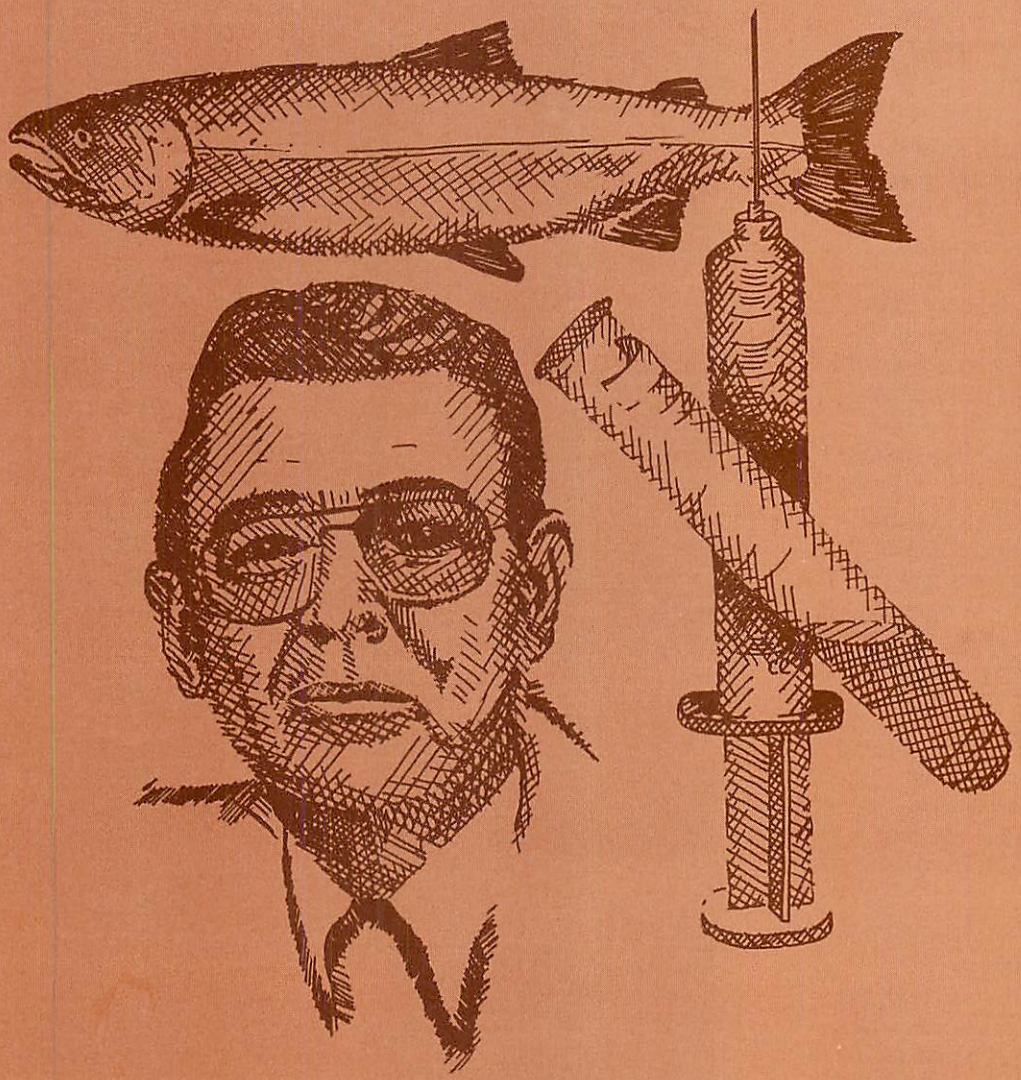
Hatcheries Don't Get Diseases

The stress and crowding in a hatchery provides an excellent environment for disease. But hatcheries can't take all the blame. Major outbreaks — epizootics, they are called — also occur in wild fish populations.

"Hatcheries don't get disease," stresses Fryer. "Fish do."

Disease agents are present to some extent in all populations of fish, wild and domesticated. An isolated outbreak is not uncommon in nature, but it is seldom observed — birds and crayfish do a very effective job of cleaning up.

Certain pathogens (disease-causing life forms) could have been introduced to hatchery fish back in the early days of fish farming,



according to one theory. Beef liver, horsemeat and similar meat products were fed to hatchery fish in those days. It's possible some bacteria could have mutated and transferred to the fish.

But Fryer doesn't agree with this.

"I think most pathogens were originally found in wildlife populations," he says.

One particularly villainous disease — vibriosis — is a great threat to salmon ranchers acclimating fish in saltwater ponds. Caused by the saltwater bacterium *Vibrio anguillarium*, outbreaks of the disease have wiped out 90 percent of some fish populations under culture.

Antibiotics have been of some use for treating vibriosis. Vibrio bacterins (similar to vaccine) and immunization techniques developed in part at the OSU facility, have been even more successful in controlling the disease.

To Immunize A Fish

Fryer says immunizing fish presents a unique challenge. Injection, though quite effective, isn't practical for millions of fry and fingerlings.

"Nobody would live long enough to do it," Fryer quips.

Bacterins mixed in with feed will help treat disease, but not as well as injecting them. Industry has widely adapted an immersion method of immunization — fry dipped in bacterin solution for a period of minutes — which is about as

effective as injecting the fish. The bacterin is absorbed by the fish, although the mechanisms involved are not understood.

But biologists working with Fryer got a better idea. Rowan Gould, one of Fryer's graduate student researchers and Bob Garrison, a biologist for the Oregon Department of Fish and Wildlife, proposed using a sandblaster or some similar device to shoot the bacterin inside the fish.

"We talked about it and I thought the idea was at least absurd, if not ridiculous," Fryer explains.

But they tried it, using 90 pounds per-square-inch pressure. It worked.

Another graduate student, Pat O'Leary, decided to investigate just how much pressure was actually needed to achieve effective immunization. O'Leary decreased the pressure gradually, finally using a plastic spray bottle — having practically no pressure at all. It continued to work.

"All this indicated was that the pressure didn't have a thing to do with it," Fryer says, with amusement.

The spray method has since proved very successful and practical for use in larger fish, though the immersion method is still used for small fish because it's a more efficient way to use the bacterin. (The research was funded by the U.S. Fish and Wildlife Service. Fryer was notified in January, 1980, that a patent for the spray method had been issued under the names of the inventors: Gould, Garison, O'Leary and Fryer. The vibrio bacterin for oral and injection methods is also protected under a U.S. patent.)

Carriers of Disease Cause Problems

Two viral-induced diseases commonly strike young fish, and outbreaks in hatcheries are especially damaging. The diseases, known as Infectious Pancreatic Necrosis (IPN) and Infectious Hematopoietic Necrosis (IHN) are difficult to control due to finned "Typhoid Marys"–disease carriers.

The IHN virus was originally isolated at the OSU lab and much about the characteristics of the virus were learned there also. The development of a vaccine looks promising, but present widespread treatment of IHN is limited, however. Detecting and isolating infected fish and their eggs is becoming a common method of controlling both IHN and IPN.

During an epizootic, many individual fish will die, but a large percentage of those that survive will be carriers of the virus. Unaffected by the disease themselves, they pass it on to other healthy fish who don't fare so well.

"We're convinced these fish are spreading these diseases around much more than the infected ones are," says Fryer.

Developing a complete understanding of the carrier state versus the infected state is an ongoing project at the IDF lab. Another challenge Fryer is facing is understanding the life history of the protozoan *Ceratomyxa shasta.* This organism causes a disease (ceratomyxosis) potentially devastating to fish stock. After years of research, Fryer and others have few answers to their questions and studies continue.

"We still don't know how it's transmitted," he says. "It's the most fascinating biological problem I know of."

Ceratomyxosis is of specific concern because it occurs in a rather limited range in the Pacific Northwest. Oregon, unfortunately, is right in the middle of that range.

Coooperation Aids Research

Research is a costly endeavor requiring outside cooperation and financial support. Many agencies have contributed to the IDF program over the years.

The ODFW, for example, has funded projects continuously since 1958.

"They work with us on a variety of studies," Fryer explains. "It's been a very valuable and useful working relationship."

Sea Grant entered the IDF picture in 1971. It has also become extremely

important to Fryer's program.

For some time Fryer and his group had conducted an unofficial extension service, diagnosing diseases in fish as asked. But as aquaculture became more viable the requests increased.

So, in 1973, Fryer and Sea Grant Director Bill Wick made provisions for an official diagnostic laboratory at the OSU Marine Science Center in Newport. Dr. R. E. Olson and Dave Ransom, another graduate student working under Fryer, set up the original lab. In addition to research, the lab performs a variety of services, from inspection and certification of eggs for various hatcheries, to investigating die-offs in farm ponds.

Additional funding and help has come from sources such as the Environmental Protection Agency, the Department of the Interior, National Science Foundation and the Department of Agriculture. Federal money has also been available through the Anadromous Fish Act on a matching basis with ODFW providing matching funds.

The work at the IDF lab has had widespread applications in aquaculture. One technique salmon ranchers have benefitted from is the lab's early work in development of the vibrio vaccine and methods for its application. Rearing salmon in saltwater depended greatly on its development.

"Our fish are transplanted during the time of year a vibrioisis epizootic would most likely occur," says General Manager, Bill McNeil of Oregon Aqua Foods (a Weyerhaeuser subsidiary). "Without the vaccine (bacterin), the risk factor would be unacceptable."

International Cooperation on the Increase

During a 1978 egg certification trip to Russia arranged by Oregon Aqua Foods, Fryer and several others noted a lack of bacterial diseases in Russian hatchery-raised chum salmon fry.

McNeil was along on the egg-buying trip and observed: "The Russians said their fish didn't even have bacterial infections. We were skeptical, but found it was true. They were clean (of infections)."

The reason is unclear, but the observation points out that more international cooperation is needed and desirable, explains Fryer. Sea Grant researchers, like Fryer and others, are more and more becoming involved with scientists from other countries — sharing knowledge about the sea.

In the last five years this has been particularly noticeable. Many valuable contacts have been developed with countries in the Far East and Europe. (During his Russian trip, Fryer attended a four-nation meeting sponsored by the Soviets. Japan, Canada and the United States — the major salmon producing nations, along with the USSR — were hosted.)

Fryer returned from Russia with chum salmon tissue samples for study at OSU. Six weeks later some 10 million eggs were shipped from the Soviet Union to the U.S. for eventual release as fry into Oregon streams.

McNeil says Weyerhaeuser hopes at least some 1 percent chum return to Oregon sites next year as mature adults ready to spawn. He hopes to develop a brood stock from these.

"The trip was an attempt by private industry to get an aquaculture exchange going," says Fryer. "I'll always be glad I made it."

Today, Fryer plays down his own role in research.

"I've got some super people with me and they do the research," he says. "Much of the credit for success in recent years is due to them. Without them, you just wouldn't get anywhere at all."

Postscript Update

And that bacterium that killed those hatchery fish and caught Fryer's attention so strongly thirty years ago? Appearing in the April 1980 edition of the *International Journal of Systematic Bacteriology* is a paper co-authored by Fryer and Jim Sanders. It talks about the bacterium *Renibacterium salmoninarum*, a new genus and new species, named and classified by the authors.

Smith — Melding Anthropology with the Sea

"Help — quick!"

A simple, to-the-point note scribbled on a blue office routing slip by OSU Sea Grant Director Bill Wick said it point-blank.

The All-Coast Fishermen's Marketing Association wanted Sea Grant support to challenge a salmon fishing management plan cutting back the trolling season. Wick, in a semi-serious plea, was asking for added insight.

And, Court Smith, OSU anthropologist and Sea Grant researcher, found himself back in a well-worn role.

Smith's advice, as always, was taken to heart by Wick — mulled over, well-chewed and completely digested. Then a response to the fishermen's association was prepared.

"I see Court as a sort of conscience for Sea Grant," says Wick. "His training provides him with talent to look at people's interactions. So I've tried to use him.

"He'll analyze who came to a meeting and why. (And who should have been there.) He'll analyze the charge given to the group (was it clear?). Then afterwards, he'll meet with me to analyze what happened. His knowledge of people is an important and vital dimension of Sea Grant."

On the surface, anthropology and Sea Grant simply don't gel. Somehow cultural studies and ocean resources aren't usually filed on the same shelf. But Smith has successfully brought them together, Wick says, though the marriage may be a first.

"The unique thing about Sea Grant is that it's people-oriented," he explains. "It's one thing to collect data from our research, but collecting it and getting it applied are two different things. If you want to get your results used, you must understand your audience — who the information is intended for. That's where Court Smith comes in. He's articulate enough to convince our people of the importance of knowing your audience."

Doing What Comes Naturally

Smith says the role he has been asked to play for Sea Grant by its director is simply doing what comes naturally for an anthropologist.

"It's doing what anthropologists do well," he says. "You go in as a participant-observer. You participate in the meeting and watch what's going on, then provide a report that says, 'these are the people who could have been involved but weren't. This or that group worked well because of certain factors, group dynamics, and so forth.' It's a method that provides helpful suggestions on how to structure meetings."

But Wick thinks Smith's contribution as an anthropologist to Sea Grant goes beyond just doing what anthropologists are supposed to do well.

"He's fearless," Wick explains. "He'll walk into a panel on the rights of fisheries (for example) when all along he knows he's walking into a bear's den. Then he'll sit it out and bring back his comments. He doesn't hide behind research — he applies it."

Smith says he contributes to the program in two areas: First, he says he tries to educate the public on fisheries-related matters by producing informational publications and by public speaking. Then he involves himself in research dealing with technical issues — only with human values incorporated into them. He looks to see how these values influence people's adaptation to resources.

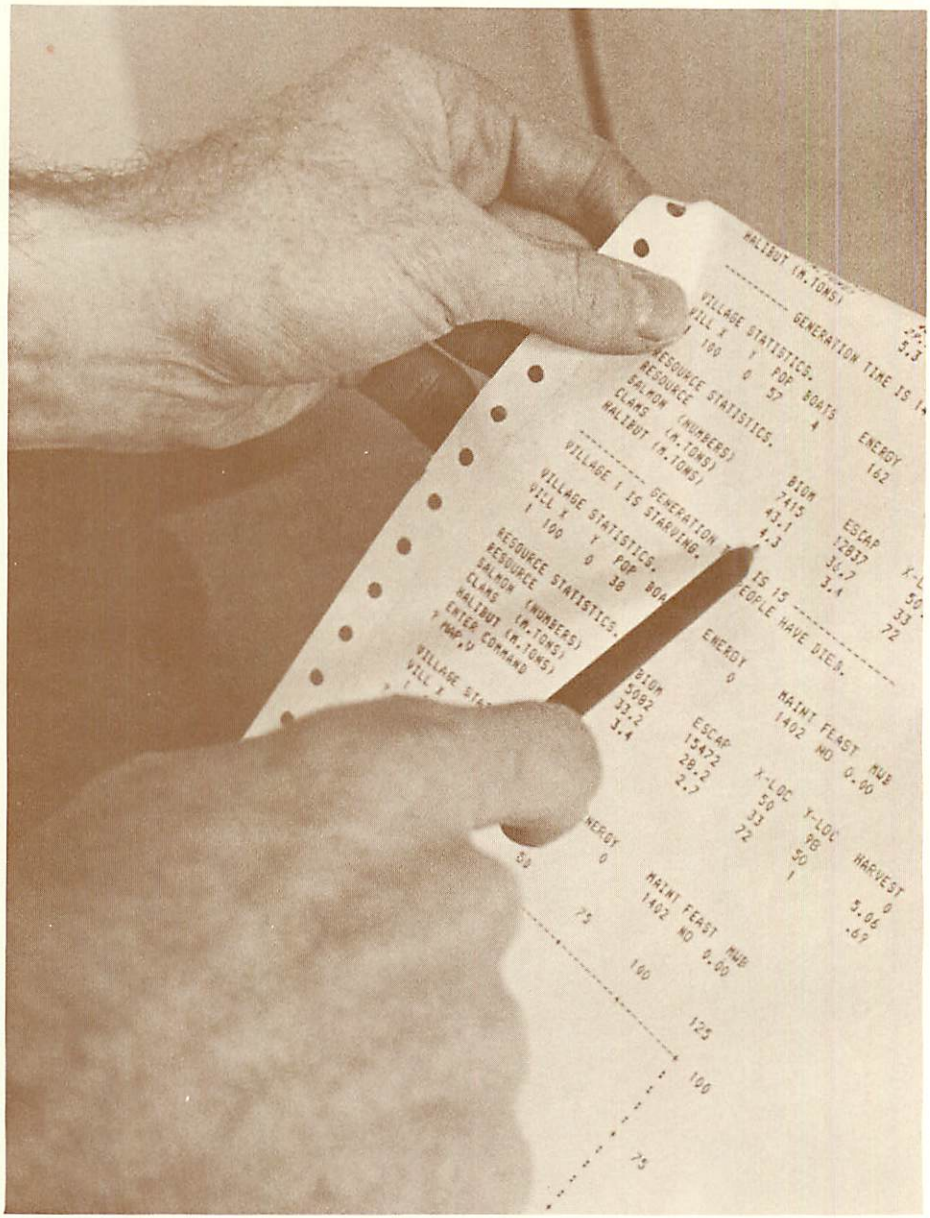
"As a cultural anthropologist, I'm interested in how people think about things and in trying to make decision-makers more aware of an important fact: That how they perceive a problem could make a difference in the solutions they work out," he explains.

In this vein, there's a group of more technically-oriented journal articles Smith has written that attempt to draw biology, economics and socio-cultural factors together... works like, "Attitudes About the Value of Steelhead and Salmon Angling" published in *Transactions of the American Fisheries Society* and "Management Provoked Conflict in Fisheries," appearing in *Environmental Management* in January, 1980.

Smith's more general interest publications, like "Fish or Cut Bait" (1977), which traces the history of commercial fishing in Oregon and "Oregon Fish Fights" (1974), which describes major conflicts among fishermen and between fishermen and legislation, entertain and inform anyone who relates to the ocean.

"What I'm trying to contribute most to Sea Grant is a cultural and historical perspective," says Smith.

He says he and his fellow researchers — particularly Jeff Stander, an ecosystems modeling specialist, and Al Tyler, a fisheries biologist — are trying to incorporate some of the cultural factors in with the biology and economics to come



up with a more complete fishery representation.

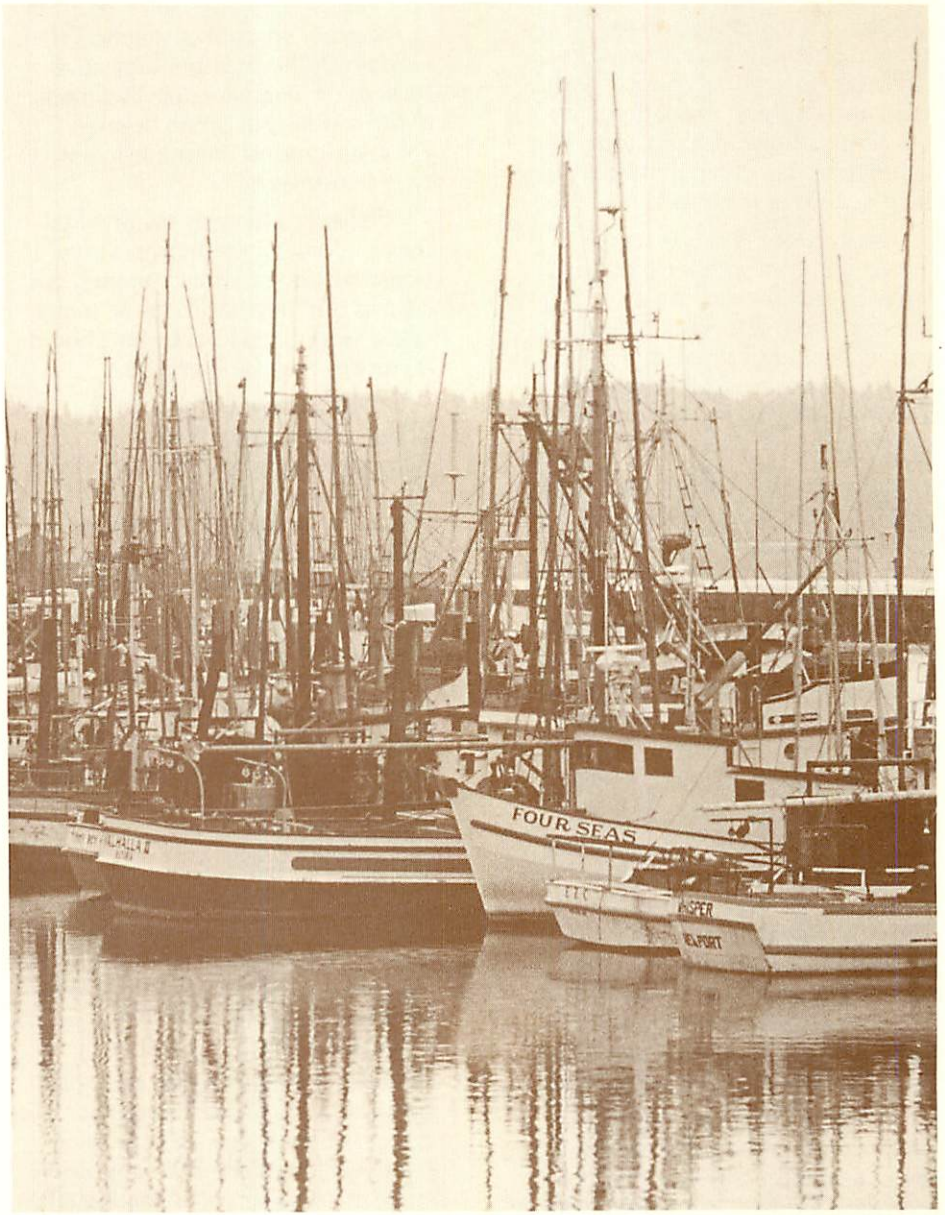
"It's done ultimately with the hope that you will have more knowledgeable decisions being made about the fishery," he says. "But it also helps people to understand better their position in the whole thing."

Fish, Fishermen, and NETS

One attempt to contribute to this understanding is a unique research project known as NETS, which tries to look at all interacting factors in a fishery: the fish, the fishermen and the community. NETS, or Northwest Educational Trawler Simulation, is a computer model constructed to show researchers possible impacts of various decisions people make on fish and fishing.

NETS is unique because it has succeeded in bringing fishery biology and social science together from their separate extremes. The model — an attempt to use mathematical language to describe the fisheries system — takes information about fish and people and breaks them into understandable parts, then describes those parts and how they interact.

Its practical applications are worth thinking about, though currently NETS is solely a classroom venture. Smith explains management decisions suggested by NETS can be applied to coastal fishing cultures, even without hauling an expensive computer terminal to the Oregon Coast. He



says it's a matter of taking various samples the computer has developed on make-believe cultures and fisheries from "scenarios" fed into it and applying those to match real-life situations. Hopefully, then, better, more balanced management decisions will result.

"The purpose is to link up the human behavior with the biological behavior to show you can incorporate both of them successfully in a single study," says Smith. "It's based on certain assumptions we have made about how fishermen behave."

He explains that one of the things which makes NETS different from other computer models is that it includes decisions fishermen make as they respond to fishery management and other problems. The researchers have built decision-making into the computer program, based on how they assume fishermen act.

Conclusions reached by NETS (for example, what effects joint ventures might have on a particular fishing community and what impacts those cooperative programs might have on fish populations) usually come in the form of a graph or curve. The curve displays consequences to the industry and fish species (over time), based on the simulation used.

"We call it 'computer ethnography' — a computerized description of a culture," says Smith. "the computer model is our biased view of what the fishermen are doing."

A certain amount of skepticism exists over the possible subjectiveness of the behavior data included in the model, but Smith believes value judgments are made in any type of research.

"Fishery managers assume that they're doing something in a very objective and scientific manner, but it turns out that they make as many value judgments about what should be as anyone else," he says.

Unfortunately, Smith says he doesn't see current fishery managers being intrigued with this management tool to the point of making much use of it today. He sees adoption of it as a gradual process, brought on by education.

"We're working with future managers at the university level," he says. "The concept of NETS is such that we have to back up and get people educated first. They will be going out into the world someday to manage fisheries."

Changing The Way They Think

One of the things Smith would like to achieve through his Sea Grant research and teaching at OSU is to get the fisheries managers to look at things a little differently — change the way they think.

"Take aquaculture, for example," he says. "One of the things that concerns me is that we're developing new technologies to supposedly solve the problem of an inadequate food supply. But most evidence seems to indicate that a shortage of food is not the problem. Rather, it's the way in which food is distributed."

He says that implies a socio-economic solution rather than a new technology. But, he says, technology is the usual way our culture tends to react to such problems.

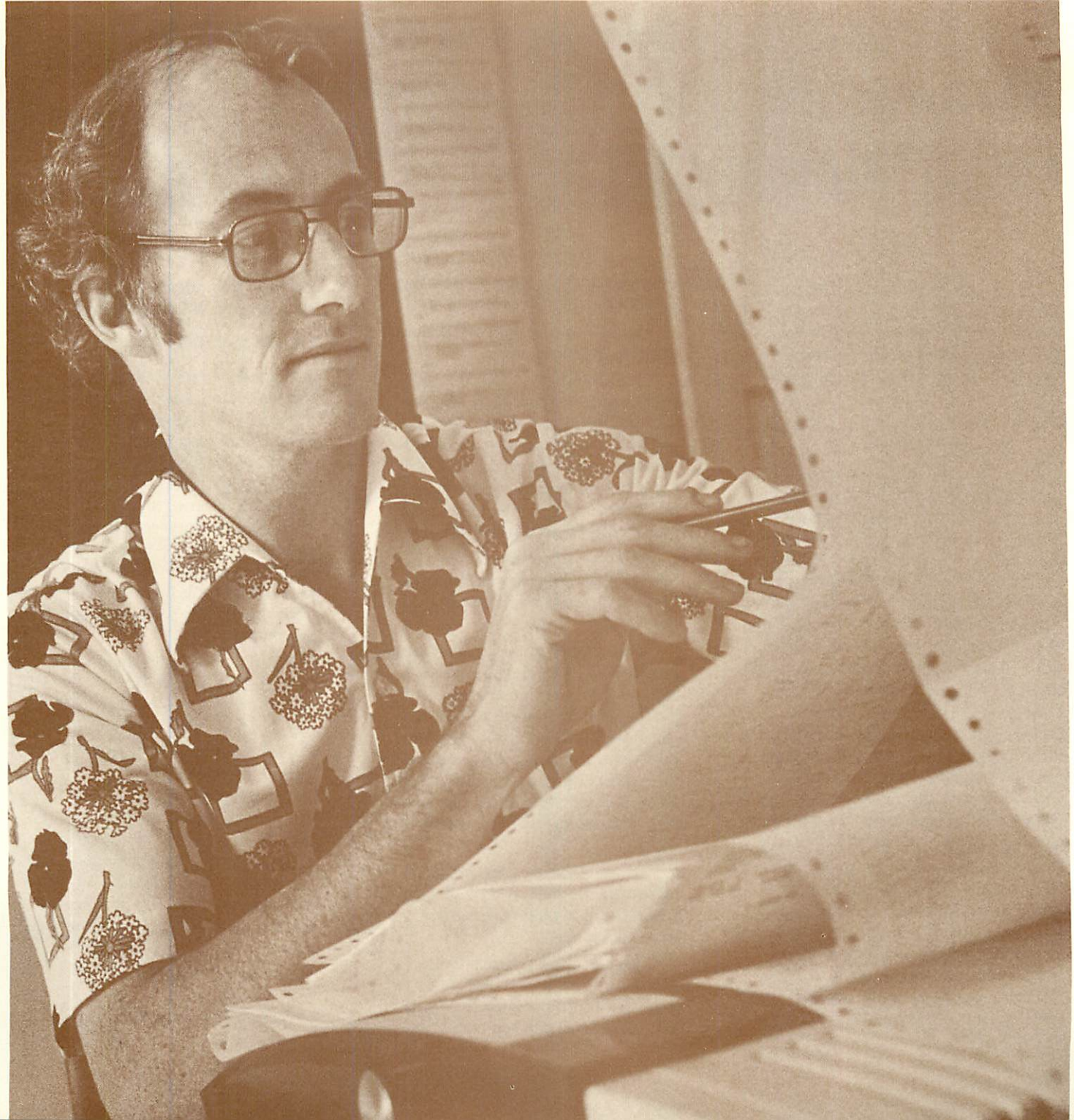
"In fisheries management I think we spend most of our efforts on the biology of things, when the problems are in the market system and the interaction between the fishermen," Smith continues.

As an example, he says, economists assume people will stop fishing when the dollar costs equal the dollar revenues.

"But as it turns out," Smith says, "some people subsidize those costs — accept a lower price for fish — because they are getting a great deal of pleasure from the fishing itself."

Smith claims this is the type of thing his anthropological research can show when it is teamed up with biology. It may surprise some, but it's something Bill Wick has realized for a long time — at least since Smith began his association with Sea Grant eight years ago.

"You won't find many who are interested in anthropology and fisheries biology," Wick says, "Court may be the only one in the country doing this kind of work. He's been a leader in that sense and still is. His work has really opened some doors for Sea Grant."



Mate — Mixing Marine Mammals with Mechanics

His 14 miscellaneous sports cars stored in garages all over Newport, Oregon might lead you to believe that Bruce Mate is either a used car salesman, a mechanic or a race car driver.

He's none of these, though he has been all three in the past.

Mate, an assistant professor of Oceanography at the Oregon State University Marine Science Center in Newport, is far better known today as a marine mammal expert. But he says his mechanical aptitude helped put him through school and still comes in handy — like the time he made repairs to a disabled four-wheel-drive transmission lying on his back in the sand in the Baja, Mexico desert using only rubber cement, which he had packed at the last moment. The makeshift repairs complete, Mate continued on his way to begin tagging gray whales (with radio transmitters) in the warm Baja waters near San Ignacio.

The incident says a lot about Mate. His mechanical abilities and his resourcefulness have more than once helped turn pending disasters into smiling successes. But then marine mammal research demands such talents. Much of it is untried. That's why you'll find much of the equipment Mate uses he has designed or adapted himself.

"Being inventive with science is exciting," Mate explains.

Mate's interest in marine mammal research began when he was an undergraduate student at the University of Oregon. He heard a speaker comment on the lack of knowledge concerning the migration of sea lions. He decided something could be done about it.

"There's a lot we don't know about marine mammals," he says. "Anything you can find out is noteworthy."

Mate's marine mammal work has involved a lot of meetings, public workshops and rigorous field studies over the past seven years. His research has taken him as far north as the arctic ice edge above the Soviet Union, and south to Baja, Mexico. Those who know him say he is dedicated, and hard to keep up with.

Fortunately, Mate says he has a skilled and dedicated crew of researchers to help cover all the bases of his work.

"The common characteristic of everyone I work with is dedication to marine mammal research, coupled with an interest in good conservation and management practices," he says, with obvious pride.

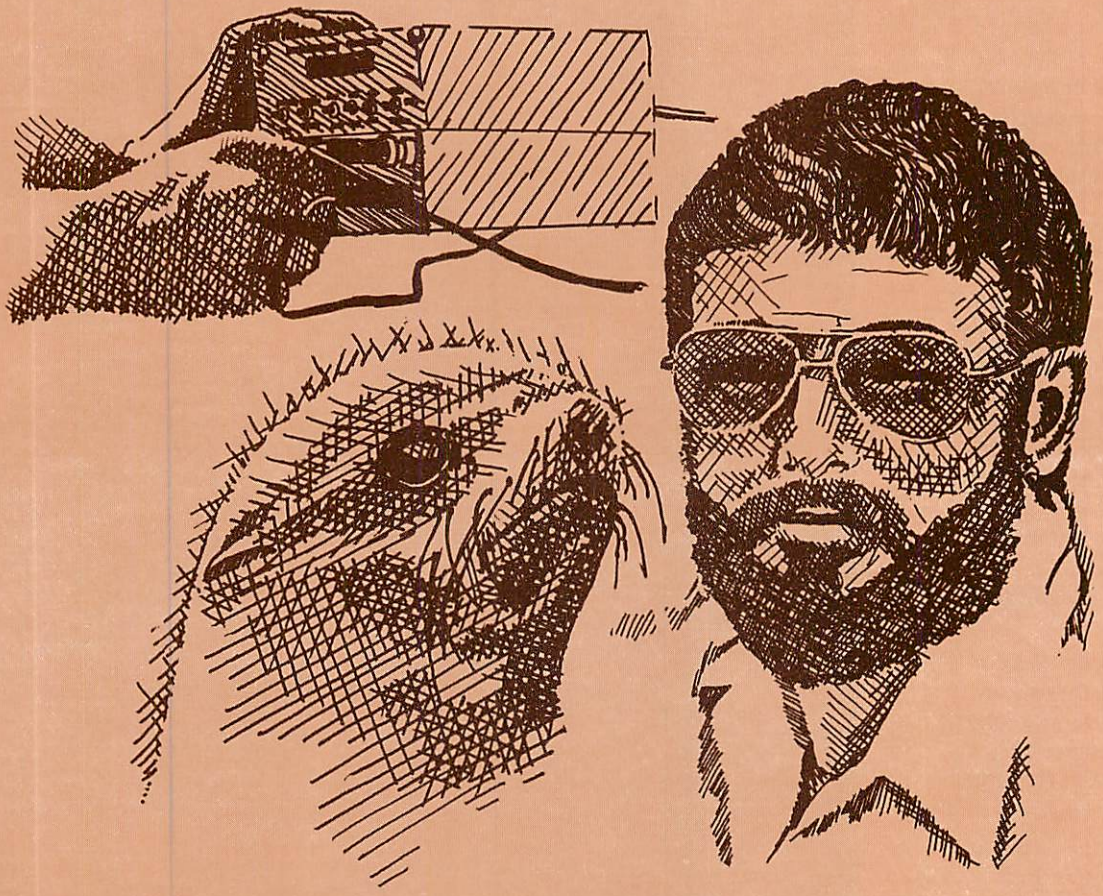
Conflicts Developed

Since the Marine Mammal Protection Act was passed in 1972 — and the subsequent increase in seals and sea lions found in coastal streams — conflicts have developed between fishermen and environmentalists. Some fishermen want seals and sea lions controlled, claiming they are eating too many fish. Protectionists want the pinnipeds left alone. Issues such as these have made Mate's research particularly important.

In 1976 Mate and his assistant Tom Roffe began research to find out how many marine mammals were using the Rogue River, when they visited the river and what they ate while they were there.

The research yielded some surprising results. Analysis of seal and sea lion stomach contents and droppings showed that lamprey eels (not really an eel at all, but an eel-like fish parasite) make up as much as 95 percent of their Rogue River diet. Steelhead trout and chinook salmon appeared to be only a supplement to the seal-sea lion diet.

It's possible, based on this



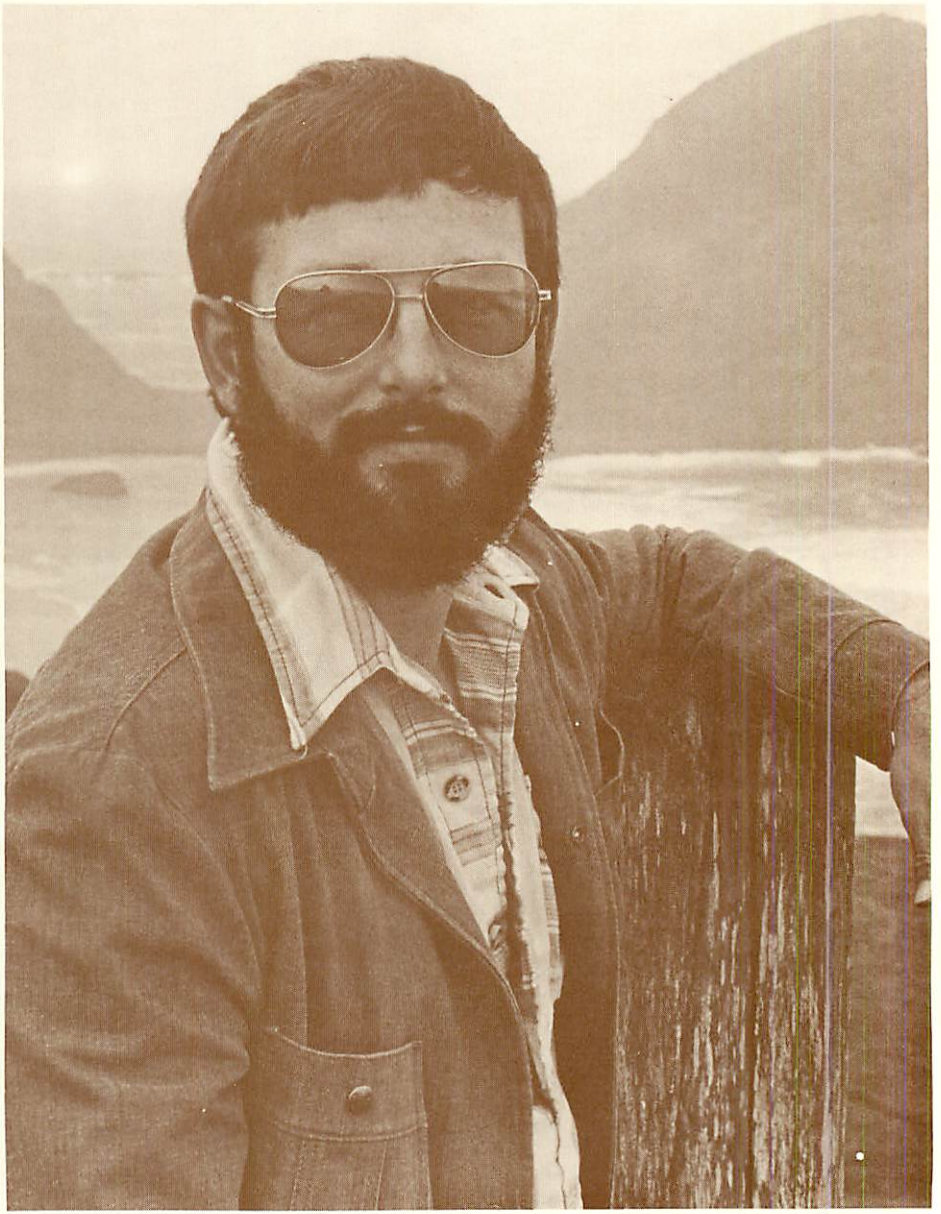
information, that pinnipeds might even be helping salmon populations in the Rogue, since the Lamprey are salmon parasites. But too little is presently known about lamprey biology, to be sure, says Mate.

In May, 1977, Mate and researcher Robin Brown began conducting field studies of the behavior of harbor seals in Netarts Bay. They're also trying to determine the impact of harbor seals on the chum salmon run at Whiskey Creek.

The Oregon State University experimental chum salmon hatchery at Whiskey Creek has been helping build the chum run for some time. Once native stocks were almost depleted here. But while the hatchery is increasing the salmon stock, the number of seals in Netarts Bay has increased several-fold. The increase has been most noticeable since the passage of the Marine Mammal Protection Act. Some fear the seals could seriously damage the run further.

Using the data he's collected so far, Brown estimates the seals may eat approximately 10 percent of the Whiskey Creek run. Whether or not that is a significant amount remains to be shown.

Seals have been captured (using huge nets) as part of Mate's and Brown's work. Small transmitters are being fastened around the rear flipper of the larger seals, allowing 24-hour monitoring of the animals' movements. The researchers hope



to learn where seals feed, whether they return to the same feeding areas and, if so, how often.

Following the Grays

For the past two years, Mate has been tracking migrating gray whales along Oregon's coast. Using space-age technology and a fascination with mechanics and electronics he has designed a radio tagging device for the 40-ton mammals. Research assistant Jim Harvey is helping. The tag will tell scientists more about the gray's migration patterns and may one day be used for studying other whales, like the endangered bowhead.

"You have to adapt technology if you're going to learn new things," Mate says about his design.

Stranded Whales

It was already drizzly-gray when Bruce Mate and other scientists arrived on the sandy foredune above the lonely stretch of Oregon beach on the morning of June 17, 1979.

Though unaware immediately of the magnitude of what lay below at the water's edge, Mate's worst fears were quickly realized. Indeed, there were whales there — lots of them. A count at daylight revealed 41 huge *sperm whales*. (Initial reports had claimed 30 or more beached gray whales.)

As with any marine mammal beach stranding, he knew time would be everything. So he and his team of researchers got right to work. In fact, Mate had already taken action the night before when he got that first call claiming a large number of whales aground south of the Siuslaw River near Florence.

First he verified the reports from his Newport home. Then he phoned a number of scientists and volunteers, looking for needed help and equipment. On the scene before dawn, the team waited for enough light to go to work.

Once among the massive hulks Mate was confounded. But the 34-year-old mammalogist is not one to wait to be told what to do.

"The situation required a lot of quick thinking and quick action," says assistant Robin Brown. "He's going 100 miles per hour all the time anyway and in this situation he was really at his best. He started making initial contacts with the authorities on the beach, then assigned group leaders with responsibilities for certain tasks. He got things together."

In spite of all the best efforts of scientists and non-scientists alike, nothing could be done to save the whales. By the second or third day, most died, victims of their own massive weight that crushed internal organs.

The sperm whale beaching, the fourth largest ever recorded, was unusual. It required unusual thinking, unusual action.

For one thing, little is known about the great sperm whale, which reaches lengths of 60 feet and weights of 50 tons. They are normally deep ocean dwellers. What we do know of them has come from whalers and slaughter houses.

Never before have scientists had such an opportunity to study an entire pod of whales. Some were still living. This meant tissue and blood samples to be used in trying to find out what caused the beaching would be fresh.

Furthermore, the beaching occurred not in a remote area, inaccessible to scientists, but near a major highway; not far from the small Florence airport. Scientists could get to the scene — along with thousands of onlookers — before decomposition caused complete tissue damage. (And only a couple hours away by car were members of the American Society of Mammalogists, beginning their annual convention.)

Throughout the week-long ordeal of attempts first to save live whales and then to save fresh tissue, Mate did more than research. He also handled the difficult job of coordinating people, Brown says.

"Bruce played the role of an overseer and it was a valuable one — one that someone had to play," Brown explains. "He kept in contact with the press and various authorities on the beach. He was good at talking with people and good at getting things done."

And he did get things done. When concern for saving those whales still living turned to saving the area residents from a potential health hazard, Mate got things moving fast. Carcasses, already rotting in the sun, had to be disposed of.

He ordered huge rented bull-dozers to be brought in (paying out of his own pocket, in hopes of being reimbursed) to bury the animals. (The carcasses were also burned to avoid potential health problems in nearby Florence, should winter storms uncover them later.)

"I know there were conflicts between the various authorities," Brown says. "They wanted to get it over and done with as quickly as possible. And of course the scientists wanted to see as much done on the whales as possible. There was some smoothing out of

interests to be done and Bruce handled it all on a 20-hour-a-day basis for that entire week."

Facts, Not Emotion

Although Mate's contributions to marine mammal research are invaluable, some of his most notable talents lie in the area of extension, or public information, say OSU Sea Grant officials.

"It's important to have information readily available to the public so that policy can be based on facts rather than emotion," Mate claims.

He strongly believes the public should be kept up to date on scientific developments, and like other Sea Grant investigators, he is conscientious about his work.

"The things I find with public funds belong to the public!" he says emphatically.

Mate also has a knack for bringing together conflicting viewpoints on management issues and obtaining a rational compromise.

"Bruce is a rare combination of a good scientist and a good diplomat," says Jim Larison, director of Sea Grant Communications. "He's very sensitive."

Mate often finds himself in the middle of controversy, simply because the nature of his work can be controversial. But he doesn't seem to mind. He says he loves his work.

He adds, a broad view of things is what is needed to keep a wise perspective.

"You have to look out for the whole system for man's long-term benefit," Mate says. "Our generation has a responsibility to future generations."

Program Summary

PROGRAM STATUS REPORT

N-New, C-Continuing, F-Finished, R-Redirected

		Fiscal Year 76	77	78	79	Principle Investigator
Advisory						
A/EMAP-1	Extension Marine Advisory Program			N	C	K. S. Hilderbrand
A/FSD-9	Detection, prevention and control of diseases in fish and shellfish	N	C	C	R	J. L. Fryer
A/PD-10	Seafood science research result applications and information transfer	N	C	C	C	D. L. Crawford
A/CM-11	Operational marine data display		N	C	F	W. H. Quinn
A/CM-12	Small ports advisory program		N	C	F	W. E. Schmisseur
Education						
T/T-5	Maritime training materials development			N	C	J. A. Flickinger
E/M-1	Marine and maritime studies program		N	C	C	P. J. Copek
E/AQ-1	Management-oriented aquaculture training (Master of Agriculture in Aquaculture)			N	C	C. E. Bond
E/Ex-1	Graduate curriculum in marine extension			N	C	G. A. Klein
E/MRM-2	Education for effective management of marine resources				N	V. T. Neal
Food From the Sea						
Aquaculture						
R/AQ-19	Selective breeding of oysters	C	C	C	F	J. E. Lannan
R/AQ-26	Biological feasibility of intensified oyster culture	N	C	C	F	W. P. Breese
R/AQ-27	Feasibility of the production and marketing of seafoods reared by aquaculture	N	C	C	F	R. S. Johnston
R/AQ-30	Interrelationships of dietary lipid and protein on the growth, quality and production of cold water cultured fish			N	C	R. O. Sinnhuber
R/AQ-31	Enhancement of coastal chum salmon resources			N	C	J. E. Lannan
R/AQ-32	Biological feasibility of clam hatcheries for recreational harvest in the Pacific Northwest				N	W. P. Breese
R/AQ-33	Commercialization of recent advances in oyster technology				N	W. P. Breese
R/AQ-36	Relationships between institutional arrangements and aquacultural developments				N	R. S. Johnston
R/AQ-38(D)	Imprinting in salmon: odorant recognition, effects of pollutants, and artificial cues in salt water				N	C. B. Schreck
Fish and shellfish diseases						
R/FSD-3	Microsporan diseases of shrimp and clams	N	C	C	F	R. E. Olson
R/FSD-4	The immune response in Pacific salmonids		N	C	R	J. L. Fryer
R/FSD-5	Detection, prevention, and control of diseases in fish				N	J. L. Fryer

N-New, C-Continuing, F-Finished, R-Redirected

		Fiscal Year 76	77	78	79	Principle Investigator
Ocean productivity and fisheries program						
R/OPF-1	Pleuronectid production system and its fishery	N	C	C	C	A. G. Carey R. L. Demory W. G. Pearcy S. L. Richardson A. V. Tyler C. E. Warren
R/OPF-2	Fishing gear and methods development	N	C	C	R	E. R. Kolbe
R/OPF-4	Assessment of the northern anchovy population off Oregon	N	C	C	F	S. L. Richardson
R/OPF-7	Fisheries engineering				N	E. R. Kolbe
R/OPF-9	Modeling studies of ecological process in the subarctic Pacific Ocean				N	C. B. Miller B. W. Frost
Marine product development						
R/PD-24	Seafood market structure and performance	N	C	C	F	R. S. Johnston
R/PD-25	Seafood utilization and process concept development	N	C	C	F	J. K. Babbitt
R/PD-26	Nutritional quality of seafoods	N	C	C	F	D. T. Gordon
R/PD-29	Microbial quality improvements of seafoods			N	C	J. S. Lee
R/PD-32	Seafood's role in human nutrition				N	D. T. Gordon
R/PD-33	Seafood processing and utilization				N	J. K. Babbitt
R/PD-34	Economic implications of the international marketing of Pacific Coast seafoods				N	R. S. Johnston
Coastal Zone Environment						
Coastal processes						
R/CM-18	Biology and conservation of neritic reef fishes		N	C	C	H. F. Horton
R/CM-19	An assessment of sea lions in the Rogue River area		N	C	C	B. R. Mate
R/EM-3	Improving the performance of wooden waterfront structures and boats	C	C	C	F	R. D. Graham
R/EM-9	Subtidal clam populations: ecology, distribution, abundance and management	N	C	C	F	D. Hancock
R/CP-1	Assessment of Oregon populations of the green sea anemone, *Anthropleura xanthrogrammica*, for harvest potential			N	C	J. J. Gonor
R/CP-2	Sea cliff erosion on the Oregon coast			N	F	P. D. Komar
R/CP-4	Population growth and feeding habits of harbor seals in an aquacultural-enhanced environment				N	B. R. Mate
R/CP-5	Harbor entrance visibility				N	W. H. Quinn
R/CP-6	Preventing and stopping deterioration of wood in the marine environment				N	R. D. Graham
R/CP-11	Sediment transport and deposition in Oregon estuaries				N	P. D. Komar

N-New, C-Continuing, F-Finished, R-Redirected

		Fiscal Year 76	77	78	79	Principle Investigator
Coastal engineering						
R/CE-1	Design criteria for horizontal plate breakwaters			N	F	T. Yamamoto
R/CE-2	Wave reflection and attenuation at pile supported harbor facilities			N	C	C. K. Sollitt
R/CE-4	Waves and currents on a beach in the presence of a jetty			N	C	R. T. Hudspeth
R/CE-6	An evaluation of coastal sand and gravel and marginal rock as construction materials				N	R. G. Hicks
R/CE-10(D)	Analysis of materials handling at marine container terminals				N	E. McDowell T. West
Public Policy Analysis						
R/PPA-6	Current developments in ocean law: Pacific Northwest and Alaska			N	C	J. L. Jacobson
R/PPA-7	Refining calculations in fishery management plans: capacity and optimum yield			N	C	R. B. Rettig
R/PPA-8	A model of the interactions between the Oregon ground fishery and the coastal community			N	C	C. L. Smith
Program Management						
M/A-1	Program administration	C	C	C	C	W. Q. Wick
M/A-2	Program development	C	C	C	C	W. Q. Wick
M/A-5	Sea Grant communications			N	C	J. R. Larison
Columbia Regional Sea Grant Program						
R/CU-2	The Columbia-Snake navigation system's role in intermodal ocean transportation		N	C	F	J. R. Jones
R/CU-4	Mathematical programming models for projecting cargo movements via Snake-Columbia River ports				N	K. H. Lindeborg
R/WSU-1	Socioeconomic impacts of slack water navigation and access to Pacific ports in the Northwest		N	C	F	J. R. Davidson S. K. Bhagat
R/WSU-2	Improving transportation of maritime commerce on the Columbia-Snake system				N	K. L. Casavant

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BUDGET SUMMARY 1978-1979

	NOAA Sea Grant Funds	University Matching Funds
Marine Resources Development		
Aquaculture	$ 146,100	$141,500
Living Resources, other than Aquaculture	295,700	122,400
Mineral Resources	47,100	800
Marine Biomedicinals and Extracts	21,200	0
Socio-Economic and Legal Studies		
Marine Economics	10,200	9,900
Ocean Law	59,900	35,200
Marine Recreation	24,500	11,500
Socio-Political Studies	116,700	82,400
Marine Technology Research and Development		
Ocean Engineering	84,100	33,700
Resources Recovery and Utilization	177,500	117,100
Transportation Systems	39,100	21,500
Marine Environmental Research		
Research and Studies in Direct Support of Coastal Management Decisions	47,000	18,100
Environmental Models	69,500	5,400
Applied Oceanography	53,300	39,600
Marine Education and Training		
College Level	78,000	43,300
Vocational Marine Technician Training	21,000	10,500
Advisory Services		
Other Advisory Services	101,300	73,100
Program Management and Development		
Program Administration	57,200	111,400
Program Development	28,000	20,100
Communications	62,300	35,200
	$1,539,700	$932,700

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