

ANNUAL REPORT 1977-78

MARINE OPTION
PROGRAM
UNIVERSITY OF HAWAII

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Text by
Alan Okamoto and Laura Westbrook

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John J. McMahon
Director

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PREFACE

The Marine Option Program (MOP) at the University of Hawaii means different things to different people. It serves as a medium through which students of different backgrounds, origins, and capabilities--all bound by a common interest in the ocean--can work together. The Marine Option Program serves as a catalyst to stimulate this interest and to instill an orientation towards the marine environment.

Hawaii's limited land resources and the demands of a growing population encourage us to turn towards the ocean to seek alternatives to land-based systems. With the state's increasing focus on the ocean comes the need for environmental awareness and the need for proper management and development of our marine resources. An aware, knowledgeable citizenry is essential for proper decisionmaking as we turn toward the sea.

A major goal of the Marine Option Program is to provide undergraduate students with a marine orientation. Through the program, students are able to relate their academic course work to the real world through hands-on experience and exposure not otherwise possible.

This annual report covers the period from July 1, 1977 through June 30, 1978. It provides an overview of the students' experiences within the Marine Option Program as seen through the eyes of the students, staff, and supporters of the program. A unique insight into the program is given through strong emphasis on the students' perspectives.

During the summer of 1978, Alan Okamoto and Laura Westbrook got "involved" in the program and wrote this annual report under the advice and guidance of MOP staff. Alan was responsible for the structure and content of the report and Laura assisted him in all aspects. To keep the flavor and style of the writers, editing was minimized. Hence, this report is a student product of the Marine Option Program.

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INTRODUCTION



MOP STUDENTS IDENTIFY COASTAL PLANTS DURING A FIELD TRIP TO OAHU'S NORTH SHORE BEACHES WITH UH FACULTY

The Marine Option Program provides undergraduate students at the University of Hawaii with unique opportunities to gain an orientation as well as an increased awareness of marine affairs. Students work toward acquiring a Marine Option Program certificate, which represents the successful completion of marine-related courses and the acquisition of a practical marine skill. The program requirements at the University of Hawaii Manoa and Hilo campuses and at the Windward and Honolulu Community Colleges are simi-

lar. To complete the academic requirement, each student must take an introductory oceanography course, an interdisciplinary studies course (available at the Manoa and Hilo campuses), and two marine-related courses in the student's major or field of interest. Students are required to pass each of these courses with a grade of "B" or better. To complete the skill requirement, students must develop a high level of expertise in a marine-related area through practical experience.

This combination of high caliber academic work and acquisition of a practical marine skill has been very successful. Earlier annual or biennial reports have documented the progress of the Marine Option Program in its early stages. This report documents the progress of the Marine Option Program for 1977-78 as depicted by two MOP students.

AN OVERVIEW OF THE PROGRAM DURING FISCAL YEAR 1977 - 78

Marine Option Program students come from many fields of study at the University of Hawaii (Tables 1 and 2). Students were involved in many projects and activities during the past year. The Data Acquisition Project (DAP) team collected baseline data at Papohaku Beach, Molokai. Others acquired marine skills as interns with the state Office of the Marine Affairs Coordinator (MAC), as student assistants with the University of Hawaii Sea Grant College Marine Advisory Program (MAP), as cruise leaders for the Blue-Water Marine Laboratory (BML), and as

research assistants at the Hawaii Coastal Zone Data Bank (HCZDB) and the Naval Ocean Systems Center (NOSC). In addition, MOP students worked on projects at the University of Hawaii Curriculum Research and Development Group (CRDG), the National Marine Fisheries Service (NMFS), the Hawaii Division of Fish and Game, the Oceanic Institute, Look Laboratory of Oceanographic Engineering, and the state Anuenue Fisheries Research Center. Some students even initiated their own projects in damselfish behavioral research and prawn and mullet aquaculture.



UH STUDENTS AND CHILDREN SIDE BY SIDE AT THE QUARRY FISHING DERBY ORGANIZED BY MOPERS JANET SENAGA AND MARK SUIO

TABLE 1. UNIVERSITY OF HAWAII MARINE OPTION PROGRAM ENROLLMENT BY MAJOR FIELD OF STUDY

Major Field of Study	Manoa	Hilo	Windward	Honolulu	Total
Agriculture	5	4	--	--	9
Animal Science	1	--	--	--	1
Anthropology	1	--	--	--	1
Art	1	--	1	1	3
Biology	17	9	--	12	38
Business, General	1	1	3	--	5
Marketing	1	--	--	--	1
Chemistry	--	1	1	--	2
Communications	1	--	--	--	1
Data Processing	--	1	--	--	1
Education	4	1	1	--	6
Electronics	--	--	--	17	17
Engineering, Civil	5	--	--	--	5
Electrical	2	--	--	--	2
General	1	1	--	--	2
Mechanical	1	--	--	--	1
English	1	--	--	--	1
Environmental Studies	2	--	--	--	2
Fashion Design	1	--	--	--	1
Fine Arts	--	--	1	--	1
Food and Nutritional Science	1	--	--	--	1
Geology	--	--	1	--	1
Hawaiiana	--	--	2	--	2
Horticulture	2	--	--	--	2
Human Development	2	--	--	--	2
Liberal Studies	4	--	13	--	17
Marine Technology	--	--	--	7	7
Music	--	--	1	--	1
Nursing	1	1	--	--	2
Philosophy	1	1	--	--	2
Physics	2	--	--	--	2
Sociology	--	1	--	--	1
Zoology	30	--	1	--	31
Undecided	3	4	23	--	30

TABLE 2. UNIVERSITY OF HAWAII MARINE OPTION PROGRAM ENROLLMENT BY CLASS STANDING

Class Standing	Manoa	Hilo	Windward	Honolulu	Total
Freshman	1	1	28	6	36
Sophomore	8	8	11	26	53
Junior	35	10	--	--	45
Senior	36	3	--	--	39
Unclassified	11	3	9	5	28
Total	91	25	48	37	201

In other areas, MOP students volunteered as docents at the Waikiki Aquarium and assisted at the "Voyages into Ocean Space" lecture series, Makahiki Kai '78 exhibitions, and the Law of the Sea Institute Conference. University of Hawaii Manoa campus MOP students helped to set up a booth at the Earth Day Revisited event held on campus, while Windward Community College MOP students manned a booth at the campus' "Ho'olaulea." Manoa MOP students, in conjunction with the Campus Center Snack Bar, sponsored two Quarry Pond fishing derbies, which were open to the entire UHM student body.

MOP students enrolled in interdisciplinary marine-related courses to fulfill their MOP academic requirements. Among these courses were: IS 261, "Man, the Ocean and the Environmental Crises," taught by John J. McMahon during the fall 1977 semester; IS 461, "The Sea and Society," taught by Dr. John P. Craven during the spring 1978 semester; and IS 498, "Aquaculture: Biology, Technology, Economics," taught by Dr. Spencer R. Malecha during the spring 1978 semester. MOPers also participated in marine-related seminars and field trips to marine facilities.

On the lighter side of the ledger, MOP students organized several dive cruises throughout the year as well as participated in MOP-sponsored night dives and picnics. Manoa MOP students also competed in intramural sports, forming basketball and volleyball teams.

Individual Marine Option Program students received significant awards and recognitions during the past year. Holly Price was awarded a National Science Foundation Fellowship and will be pursuing a doctoral degree at the University of Georgia's Institute of Ecology after a summer at Woods Hole Oceanographic Institution. Lisa Boucher's article on the Blue-Water Marine Laboratory was accepted for publication in *Sea World* magazine. Tina DeJesus was the first runner-up in the "Maritime Queen Contest" spon-

sored by the Propellor Club, Port of Honolulu.

The past year also saw several crises in the program. The beginning of 1978 brought bleak prospects for the future as the possibility arose that state funding would no longer be received to keep MOP in operation after the end of the fiscal year (June 30, 1978). MOP students, however, rallied to the program's defense. They wrote letters urging legislators to continue their support of the program and even presented testimony before State House and Senate committees. As a result of their efforts and due to backing from the University administration legislative support was continued.

Another crisis that MOP faced was the departure of key personnel. Administrative officer Claire Nakayama moved to the Office of Marine Programs, leaving a tough position to fill. Fortunately, Yoshie Koba came onboard temporarily. Barbara Chang is now the administrative officer. When the Manoa MOP coordinator Dave Eckert left, MOP student Alan Okamoto served as the acting coordinator until Randy Nishimura, a spring 1978 MOP graduate, was hired. The Hilo MOP coordinator William Ebersole also left, and MOP graduate Del Dykes took over as coordinator. The patience and cooperation of the students helped to make the transition periods much easier.

During the 1977-78 fiscal year MOP received level funding compared to the previous fiscal years, 1974-75 and 1975-76 (Table 3).

TABLE 3. UNIVERSITY OF HAWAII MARINE OPTION PROGRAM FUNDING SUMMARY (SEPTEMBER 1, 1970 TO MAY 31, 1978)

Year	Source of Funding									Total
	UH ¹	WCC ²	UH Hilo	NOSG ³	ONR ⁵	MAC ⁶	NSF-SOS ⁷	BML ⁸	Other ⁹	
1970-71	\$ 11,000	\$ --	\$ --	\$ --	\$ --	\$ --	\$ --	\$ --	\$ --	\$ 11,000
1971-72	--	--	--	495 ⁴	--	--	24,000	--	15,000 ⁴	39,495
1972-73	23,603	--	--	18,323	--	--	17,000 ⁴	10,000 ⁴	--	68,926
1973-74	15,338	--	--	20,000	--	12,000	27,560	35,127	--	110,025
1974-75	26,088	--	--	27,861	79,893	10,243	--	79,967	4,700	228,752
1975-76	12,692	2,950	--	31,800	80,000	14,236	--	96,108	3,000	240,786
1976-77	5,260	1,367	1,387	64,900	60,001	18,481	--	65,300	--	216,696
1977-78	34,200	6,751	1,374	67,000	26,500	5,968	--	72,500	1,784	216,077
Total	\$128,181	\$11,068	\$2,761	\$230,379	\$246,394	\$60,928	\$68,560	\$359,002	\$24,484	\$1,131,757

¹ Additional funds from University of Hawaii Sea Grant College Program Management account, funding level not readily available, Director's salary not included prior to October 1, 1975

² WCC = Windward Community College

³ NOSG = National Office of Sea Grant

⁴ Estimated

⁵ ONR = Office of Naval Research; Funds for student help at Naval Ocean Systems Center (formerly Naval Undersea Center); Total funds received May 1, 1974 to June 30, 1976, \$159,983; July 1, 1976 to April 30, 1979, \$108,243

⁶ MAC = Marine Affairs Coordinator's Office, State of Hawaii; Funds for MAC Internship Program and student projects

⁷ NSF-SOS = National Science Foundation-Student Originated Studies

⁸ BML = Blue-Water Marine Laboratory (DOE, MAC, Sea Grant, lab fees, tuition, Ocean Charter Service, Inc., McInerney Foundation) records prior to 1973-74 not available

⁹ Funds from various agencies (Hawaii Department of Land and Natural Resources, Hawaii Department of Planning and Economic Development, Sea Grant) for MOP student projects



ADMINISTRATIVE PERSPECTIVES

Dr. John P. Craven

Dean, Office of Marine Programs,
University of Hawaii
Marine Affairs Coordinator,
State of Hawaii
Director, Law of the Sea Institute

John Craven sees two different educational approaches that colleges have taken in the area of marine-related study. Some educational institutions stress that each "student become proficient in his/her respective discipline," whether it be biology, physics, or engineering. If the student has an interest in the ocean, he learns how to apply his discipline to the marine environment on a graduate level. On the other hand, educational institutions with undergraduate marine majors may offer a student a broad ocean background, but insufficient depth in his specific discipline. At the University of Hawaii, the Marine Option Program enables students to become exposed to the marine area as undergraduates, while they are concurrently acquiring adequate depth in their major field of study.

Craven noted that there is a need for a program such as MOP because people being brought up in a land-based environment (although Hawaii is surrounded by the ocean) will develop land skills, but no marine skills even though, as he claims, "it is easier to learn to swim than to walk!" People also lack an understanding of the importance of the ocean. He pointed out that few people realize that 99 percent of Hawaii's imported goods are brought in by ship. In addition, many job opportunities in the maritime industry, such as underwater construction work, are passed up by the local people and mainland firms come into the picture. Craven also stressed that, "there is no reason Hawaii shouldn't be as oceanic a society as Norway!"

Regarding the practical aspect of the Marine Option Program which leads to acquiring a marine skill, Craven defines skill as "work acquired within the marine environment," stressing the importance of students being comfortable and competent in the water. The skill, he feels, should be "carried out under the guidance of a professional--like an apprenticeship."

Craven feels that the success of the Marine Option Program is shown by the many graduates who have continued their ocean-oriented activities. He would like to see more university students involved in the program. Areas that he would like to see more students active in are sailing, shipboard work, and underwater construction.

Dr. Jack R. Davidson

Director, University of Hawaii
Sea Grant College Program

Jack Davidson views the Marine Option Program as a very "exciting program." The type of leadership that past program director Barry Hill and present director John J. McMahon, as well as the student coordinators, have shown has helped to develop the program tremendously. This type of leadership, he says, "permits students to exercise ingenuity" in developing their own skill projects.

Davidson noted that MOP provides students with opportunities to undertake "exciting things that ordinarily they wouldn't have had a chance to do" and "to apply what they are learning." He cited some of the previous successful products that have come out of MOP. For example, Doug Pendleton, a 1973 MOP graduate, had an idea to teach students about the marine environment and that idea evolved into the Blue-Water Marine Laboratory. Another MOP graduate, Charles Rolison, was involved in



MOP DIVE CRUISE

organizing snorkeling tours which eventually evolved into a commercial venture.

An area in which Davidson would like to see MOP students become more involved is tilapia research. The worldwide potential for using tilapia as a food fish is great, but, like shark meat, people in Hawaii have been reluctant to accept it. Citing the efforts of MOP graduate Alvin Tachibana, who produced a pamphlet on the different ways to prepare shark, Davidson feels the stage is now set for a MOP student to pioneer efforts using the tilapia.

Currently, the UH Sea Grant College Program is a major funding source for MOP. Davidson would like to see more funding provided by the University, however. This would enable Sea Grant to direct funds primarily for student-initiated projects, such as the 1978 Papohaku Beach, Molokai baseline study.

John J. McMahon

Director, Marine Option Program,
University of Hawaii

Reflecting upon the highlights of the past year, the director of the Marine Option Program, John McMahon, commented, "We had some really significant advances and, perhaps, from my position, the administrative advances are almost as important as the advances that the students have made, simply because the administrative advances reflect on the future and add strength and continuity to the program." John views MOP as "something that the University is sincerely interested in." MOP was faced with possible termination at the end of the fiscal year (June 30, 1978), but, with the university's

support at the legislature, MOP was put back into the budget. "The administration's support for MOP, I think, is very significant," he stressed.

Where student advances are concerned, as John states, "the most important thing is what MOP did this year." He felt that it was significant that undergraduate students (Data Acquisition Project team members) taught the fish identification course which was offered through the College of Continuing Education and Community Service to undergraduate students as well as the general public. The limu (seaweed) identification course offered through the Waikiki Aquarium was also taught by undergraduates. "The Department of Education valued the course which enabled teachers to receive credits for in-service training," he said. He further commented, "To have students learn to teach a course, organize the material, and present it logically so other people can learn from it is very significant. The fact that we had students in MOP who were able to do this at a level which was considered adequate for professional training, I think, speaks very, very highly for the students involved."

Several MOP students worked as teaching assistants and cruise leaders for the Blue-Water Marine Laboratory. John feels that BML "provides an excellent opportunity for people to get sea experience, develop leadership and responsibility, learn some oceanography, and obtain some excellent educational experience." In the area of marine education, he mentioned, "Cheryl Sato's work with CRDG this summer comes from previous work Cheryl has done both there and with MOP. Janet Senaga assisted in developing marine curricula which came right out of previous work Janet had done a couple of years ago teaching children how to fish with bamboo poles. It's neat to see people like Janet building on their experiences. Cheryl has done the same thing." Along the line of education, he continued, "Dennis Yamase, with Brad Tarr, offered a teacher's workshop on

fish identification on Maui because the teachers requested MOP assistance. This was followed with a limu identification class offered by Doug Davis and Darcy Bailey one week later, also at the request of the Maui teachers. So it is good that we can make these ties with other programs and assist agencies like the DOE (Department of Education) on Maui, the [Waikiki] Aquarium, the DOE here [Oahu], the BML, and the Curriculum Research and Development Group." Relating the importance for making these ties he said, "We are growing, advancing; we are formalizing some of our ties, which is good and



LEARNING APPLICATION--
AFTER LEARNING ABOUT LIMU FROM
DOUG DAVIS, DENNIS YAMASE
CONDUCTS A LIMU WORKSHOP
FOR MAUI RESIDENTS

bad. It is good because it gives the program a little more legitimacy. It says that you have arrived. It is bad in the sense that it removes some flexibility." To clarify, he continued, "It is extremely important that the program retains the flexibility to help an individual student meet his own career goal. If we formalize too many things, then students who come in and do not exactly fit a pattern may be disadvantaged."

Claire Nakayama

Administrative Officer
(May 1975 to June 1978)

Claire worked for the Marine Option Program for three years and did a great job as MOP's administrative officer. In her work, she was in close contact with the students and commented, "The students were pleasant to deal with. They came in with innovative ideas." However, she found it necessary at times to be patient with the students and to bear with them. "Many [students] were not administratively inclined. They did not realize what it took to prepare a proposal [for student-initiated projects] and to budget funds," she said. Overall, she felt her experiences with MOP were good, and that they helped her to qualify for her new position as the administrative officer for the Office of Marine Programs.

Lynn Yoshie Koba

Administrative Assistant
(June 1978 to July 1978)

Yoshie filled in the vacancy at MOP as the administrative assistant when Claire Nakayama moved to the Office of Marine Programs. She was initially uncomfortable with the scope of her responsibilities, but readily adapted to her job and was kept extremely busy providing administrative and fiscal support. Part of her work involved processing the enormous amount of paper work through proper channels in order to place students in various internships and skill opportunities. But Yoshie said, "There is the satisfaction of knowing you get to the end result of getting students into something." When asked what her views on the Marine Option Program were, she said, "It's a good program." Her only regret was that she could not participate in MOP as an undergraduate.

Dave Eckert

Manoa Marine Option Program Coordinator
(September 1976 to March 1978)

As Manoa Marine Option Program coordinator, Dave was faced with the question, "What can the program do to meet the needs of the students?" In answering this indirectly, he said, "One thing that it did not do very well, that I think it is doing much better now, perhaps partly out of necessity, is involve the students in running it. We did not do well with seminars and things that were organized for students." He feels more effort should have been made at "arm twisting" to get the students more involved in running things. "Apparently, John McMahon and/or Randy [Nishimura], and maybe a little pressure of necessity, were enough to do it," he said. Recent student activities such as the luncheon for the Sea Grant site team visitors organized by Skippy Hau and this MOP 1977-78 annual report written by Alan Okamoto and Laura Westbrook are good examples of more student involvement.

The composition of the MOP program and its diverse activities made the job of Manoa MOP coordinator a challenging as well as hectic one. Dave was responsible for counseling and advising the students; making the connections necessary to get them in projects; running field trips and seminars; and producing the MOP *Hotline*. His hours had to be very flexible, as in conducting a field trip to the fish auction at 5:30 a.m. or holding a seminar at 7 p.m. But the challenge was again in planning the program to meet the needs of the students. Dave commented, "Students have been coming in with a great range of abilities and backgrounds. Some people know a lot coming in, some people do not know very much at all. You have local folks who have grown up around the ocean all their

lives and are pretty 'akamai,' and you have local kids who have grown up around the ocean and have not been in it." There are also students who come in from the mainland and do not stay long. "Aside from just background, you get people with a great range of capabilities," he said. "Some are very unsure of themselves and do not want to try anything new, they are really hesitant; while others are really gung-ho and are capable of handling themselves no matter what the situation."

He felt that one of the highlights of the past year was the Data Acquisition Project and had praise for the leadership. He also felt that efforts should be made to ensure that the veteran members can continue to offer the courses in fish, limu, and invertebrate identification to other MOP students. In addition, Dave commented that the recent change in the office layout "is a vast improvement" because the office looks more inviting. For the future he suggested having more social activities--planned and organized by the students--in order to stimulate student involvement.

Randall Nishimura

Manoa Marine Option Program Coordinator
(March 1978 to present)

Randy graduated from the University of Hawaii in May 1978 with a degree in business economics and a MOP certificate. He developed a marine skill in aquaculture economics by working with the state Aquaculture Development Program of the Department of Planning and Economic Development. When he became Manoa MOP coordinator after graduation, there was a moratorium on the acceptance of new members because of the large enrollment. Randy quickly took charge, removed students who were inactive, and concentrated his energy toward students who had a real interest in the program. "We have problems of communication, instability, visibility; as John [McMahon] says, perhaps a sign of the times...apathy within the student population itself." Randy's approach to the problems included instituting tougher requirements for entry, in an effort to get more motivated people into the program. Evidently, his approach has been effective. Concerned students have been inquiring about MOP and have been seeking marine skill support and advice.

John (Del) Dykes, Jr.

Hilo Marine Option Program Coordinator
(June 1978 to present)

Del, a recent Marine Option Program graduate, came aboard as the coordinator for the Hilo MOP in June 1978, when William Ebersole resigned. Del obtained his degree in marine ecology and is currently working on his teaching certificate. His plan is to strengthen the Hilo program by getting a nucleus of interested, committed individuals to expand student awareness of MOP and to recruit new members into the program. He also hopes that the bond between MOP and the University of Hawaii Sea Grant College Marine Advisory Program office in Hilo will result in opportunities for MOP students to acquire marine skills by assisting at the Richardson Ocean Center.

In terms of his responsibilities, he feels that it is important for him, or for anyone considering being a coordinator, to realize that the number of working hours are not set. He said, "It is more like you are in the office until the job is done."

What he finds enjoyable about his work is that it provides him with an opportunity to work with people within the UH system. "I enjoy working with students, meeting new people, and not only that, but watching their interests grow. We are limited by the budget, but we are not limited in personal creativity."



SKILL PROJECTS

SPONSOR AND STUDENT PERSPECTIVES

Blue - Water Marine Laboratory

The Blue-Water Marine Laboratory has roots which trace back to the Marine Option Program. Conceived in 1973 as a project by Doug Pendleton, a MOP graduate, the program has since matured and is currently under the directorship of John J. McMahon, assisted by Barbara Lee, another MOP graduate.

The Blue-Water Marine Laboratory provides opportunities for marine science classes throughout the state to embark on oceanographic cruises aboard the research schooner *Machias*. Onboard ship, the classes are divided into

small groups which learn about navigation, sediments, benthic organisms, water quality, or plankton under the guidance of high school cruise instructors. The cruise instructors in turn work under the guidance of a cruise leader who is responsible for the overall cruise.

An integral part of BML has been its summer training program, whereby high school students who are interested in becoming cruise instructors undergo rigorous training in oceanography, seamanship, Red Cross advanced lifesaving,



BLUE-WATER MARINE LABORATORY STUDENTS SIEVING SAMPLE

and standard first aid. In addition, they are required to pass a practical exam which consists of an actual training cruise.

MOP students have been an asset to the Blue-Water Marine Laboratory. They have served as teaching assistants during the summer training program as well as cruise leaders during the academic year.

During the summer of 1977, Leonard Torricer and Alan Okamoto were teaching assistants, while Danny Clifford went through the program as a student. In the fall, Lisa Boucher and Leonard Torricer were cruise leaders. In the summer of 1978 Leonard was a teaching assistant again, along with fellow MOP student, Burt Tanoue.

Barbara Lee

Cruise Coordinator

Barbara acquired her marine skill by working with the Blue-Water Marine Laboratory, which at that time was a student-initiated project of the Marine Option Program. After graduation she renewed her association with the Blue-Water Marine Laboratory and helped to develop it into the program it is today.

"Because BML is like the daughter of MOP," Barbara felt that "contacts should always be kept" between the two programs, noting that both operate out of the same office and use some of the same personnel. Recalling her earlier days, she said, "We tried to use MOP

BARBARA LEE POSING WITH A FRIEND DURING A MOP DIVE CRUISE



students as instructors the first year, but we found that they were taken away from classes too much." Now, high school students are trained as cruise instructors, with a few MOP students serving as cruise leaders. "This past year there was a real effort to get more MOP [student] involvement," she said, as MOP students are working as teaching assistants in the summer training program.

In her position, Barbara has seen MOP undergo constant change and commented, "The program's been struggling along publicity-wise all this time, and I think this is one of the first years that I can remember that we've gotten such a good turnover of students and a good mix. More people know each other. It seems that people are crawling out of the woodwork and it's partly because of the communications systems that have been set up." She feels the "personalities [people] that have been involved with the program had a great deal to do with the final feeling of the program. These programs are people programs," she stressed, "no matter how structured the system gets, you still have to maintain the student contact." As to where the program stands, she added, "I think it has come a long way, and it is a pretty firmly seated program now."

Doug Seelig

First Mate of R/V *Machias*

As a student in the Marine Option Program, Doug was a cruise leader for the Blue-Water Marine Laboratory. He eventually worked his way up to become the first mate aboard the schooner R/V *Machias*. Doug has worked closely with MOP students Leonard Torricer and Lisa Boucher, who both served as cruise leaders last fall. Onboard ship, working in close quarters, he noted that "it is easy to get

to know people real well" during week-long cruises. He has found MOP students to be outgoing and energetic and "great to work with." As for the program, Doug feels that MOP is like an information center where students with similar interests can come together. His only complaint is that some students "expect the program to wait on them," when they should be the ones taking the initiative in opportunities that MOP provides.

Lisa Boucher

Cruise Leader

Lisa, a fall 1977 graduate in Zoology, was involved in a number of different Marine Option Program projects. After taking a fish identification course, she became a member of the 1976 Data Acquisition Project team which completed baseline studies of Papohaku Beach, Molokini Island, and Honolulu Bay. Then she received a stipend from MOP for training with Dr. Ernst Reese on a butterflyfish project and accompanied him to Enewetak to do her studies.

Lisa later became a cruise leader for the Blue-Water Marine Laboratory. She jokingly commented that being a cruise leader resulted in "a lot of seasickness." However, she learned a lot from working with the students onboard ship. Lisa feels that it is "difficult to be an authority figure when, at the same time, you want to be their friend."

Currently, she is working full-time for Dr. Thomas Clarke at the Hawaii Institute of Marine Biology on Coconut Island. Her job involves sorting trawled samples (dividing the fish into different families) and extracting larvae from plankton samples. Lisa believes that the exposure she got through MOP helped prepare her for her

present job. MOP, she said, "gave me what I needed to keep going in this field. If it were not for the Marine Option Program, I think I might have gotten discouraged and gone on to something else."

Leonard Torricer

Cruise Leader

Leonard, a zoology major, has been a very active member of the Marine Option Program, contributing great amounts of his time and effort to the program. Leonard, a veteran of two Data Acquisition Project baseline studies (1976 and 1978), is highly proficient in fish, limu, and invertebrate identification. His experiences have led to such opportunities as teaching a fish identification course and co-authoring two papers--a significant achievement for an undergraduate.

During the summer of 1977, Leonard was involved in the Blue-Water Marine Laboratory as a teaching assistant, helping set up labs, evaluating the students' performances, and teaching fish identification. Concurrently, he assisted Dr. Robert Johannes of the Hawaii Institute of Marine Biology in an islandwide stony coral survey. He went all over the island interviewing coral vendors to obtain information such as where coral was harvested, what kinds and sizes of coral were taken, how much coral was harvested, and whether it was sold for supplementary or primary income.

Due to the high calibre of work that he has done, Leonard, along with Geoffrey (Jeff) Akita, was chosen as a delegate to represent the Marine Option Program at the Fourth Annual Student Conference on Marine Affairs sponsored by Texas A&M University at Corpus Christi, Texas in October of 1977. At the conference student delegates from

all over the nation met to discuss relevant marine problems. Talking about his Texas trip, Leonard commented, "The trip was a worthwhile venture for me. The delegates demonstrated a genuine concern, if not desire, to contribute to the present knowledge of their respective aquatic environments and areas in order to improve and/or maintain them."

During fall 1977 and spring 1978, Leonard was again involved with the Blue-Water Marine Laboratory. He served as a cruise leader aboard the schooner R/V *Machias*, supervising all scientific activities onboard ship during cruises. A typical cruise involved exposing a high school marine science class to scientific studies of water quality, plankton, benthic organisms, sediment, and navigation. Leonard will continue working with the Blue-Water Marine Laboratory for another year.

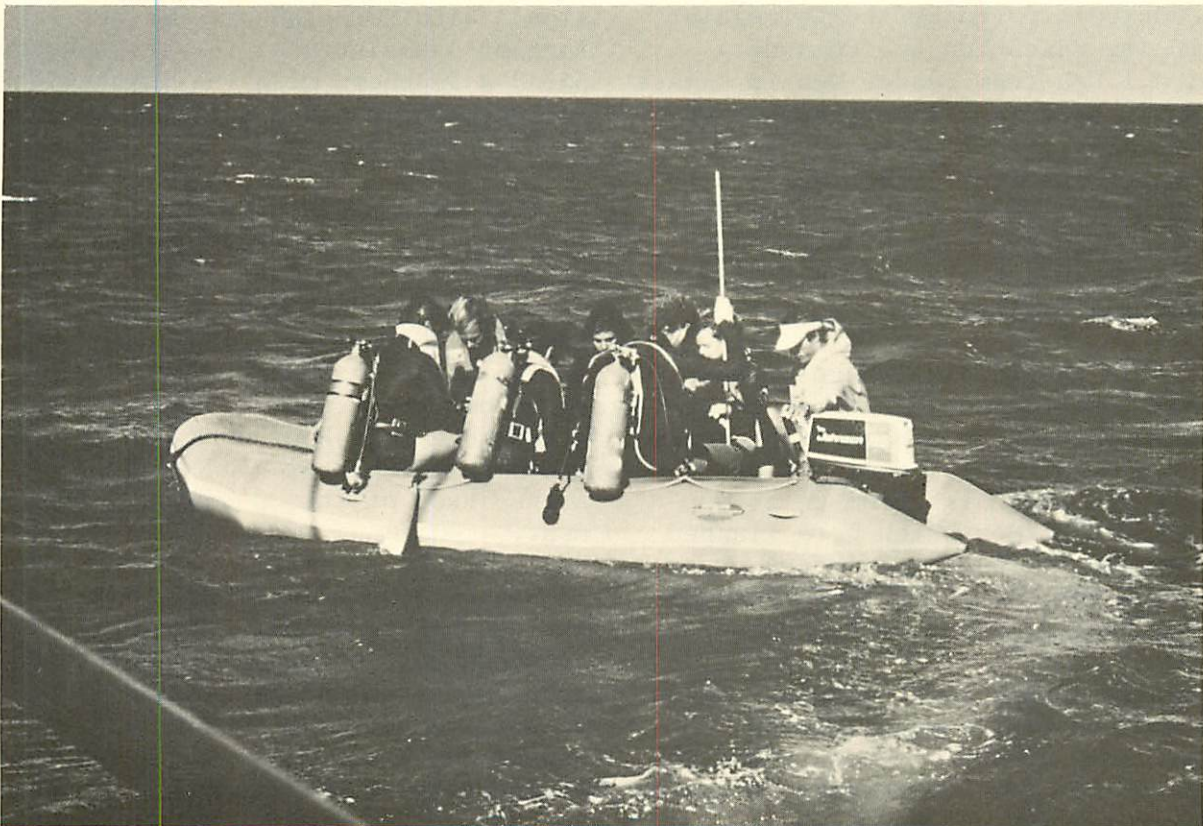
His total experience with MOP can be summarized in a brief passage taken from testimony which he presented at a legislative hearing in 1977. He stated, "Through the Marine Option Program, I achieved the unique experience of gathering primary research information and teaching basic oceanographic information to others. This experience has not only renewed my interest and concern for Hawaii's marine environment, but has given me insight into the problems facing Hawaii's coastlines. Without MOP, this would not have been possible."

Data Acquisition Project

Data Acquisition Project teams conducted baseline surveys of the invertebrate and vertebrate fauna and the benthic algal population of select Hawaiian inshore areas. The data collected are stored in the Hawaii Coastal Zone Data Bank. Several DAP teams have performed baseline studies of the marine flora and fauna communities of Papohaku Beach, Molokai (1974, 1976, and 1978); Honolulu Bay, Maui (1976); and Molokini Island (1976). Reports

generated from these studies have been published or accepted for publication as working papers of the University of Hawaii Sea Grant College Program. The information derived from baseline data collected by the 1976 DAP team of Honolulu Bay, Maui and Molokini Island aided the Hawaii Department of Land and Natural Resources in their decision to designate these areas as state marine life conservation districts.

A SURVEY TEAM FOR THE DATA ACQUISITION PROJECT
SETS OFF FOR A SITE TO CONDUCT TRANSECTS



Since its inception in 1974, the Data Acquisition Project has perpetuated a level of "selected excellence." Internal guidelines have assured the continuation of high standards.

The DAP team leader is responsible for creating a brand new DAP team. Among his duties are the recruitment of new members from the MOP student body, making sure that the recruits have sufficient knowledge of Hawaii's inshore marine biota, limu (seaweed), macro-invertebrates, and reef fish. He also supervises the writing of a project proposal and a final report.

For the MOP students attempting to qualify as DAP team members, the venture is demanding and often time-consuming. The experiences of the 1978 DAP team demonstrate the rigorous training and the accompanying frustrations.

In September 1977, candidates for the 1978 DAP team were chosen. During the months of October through December, these students successfully completed a 10-week Hawaiian reef fish identification course offered by the College of Continuing Education and Community Service. DAP team leader Dennis Yamase and MOPer Brad Tarr were the instructors. Formal classwork was supplemented by "in-water" training at Hanauma Bay, where students were able to get a fish-eye view of their subjects and ran a series of reef fish transecting drills.

To pass the initial phase of DAP training, candidates had to score at least 90 percent on a reef fish identification exam. This consisted of identifying reef fish from an assortment of 110 slides which were flashed on a screen at 15-second intervals. Each fish had to be correctly identified to family, genus, and species.

Besides taking their regular course load and the fish identification course, some of the students spent the months of October and November drafting a National Science Foundation (NSF)

Student-Originated Studies proposal. The sites selected for the proposed baseline surveys in the summer of 1978 were the north, east, and south coastlines of Molokai. Other students drafted another proposal which concentrated on the completion of a six-year study of Papohaku Beach, Molokai during the 1978 spring semester break. The proposal was submitted for joint funding to the University of Hawaii Sea Grant College Program and the state Office of the Marine Affairs Coordinator.

The candidates who survived the fish identification course continued training by enrolling in a Hawaiian limu identification course in the spring semester. Doug Davis, with Dennis Yamase and Brad Tarr as his teaching assistants, taught the month-long class at the Waikiki Aquarium. A major portion of the classwork centered on collecting, identifying, and pressing limu. The Natatorium seawall area and the reef in front of the Waikiki Aquarium were the primary collecting sites. The high-point of the course was the "edible limu ono kau-kau" session. With MOP graduate Heather Fortner's assistance, the students prepared a luncheon with the limu that was collected. It was a delightful occasion for everyone.

The next step of the candidates' training was to score a minimum of 90 percent on a limu identification final exam. The students had to correctly identify the phylum, genus, and species of 100 algal specimens. Finally, to round out the training, the students attended a four-hour workshop on reef macro-invertebrates conducted by Dr. S. Arthur Reed of the UH Zoology Department.

Having completed formal training, the new DAP team anxiously awaited announcements of proposal acceptance or rejection from the National Science Foundation and from the University of Hawaii Sea Grant College Program/state Marine Affairs Coordinator's Office. To ease the tension of waiting and to



MOPERS AT KUALOA PARK TRAINING FOR THE DATA ACQUISITION PROJECT LEARNING THE BASICS OF FISH, INVERTEBRATE, AND LIMU IDENTIFICATION

maintain their transecting skills the team members conducted fish transects and substrate surveys at Hanauma Bay and algal transects along the Ala Moana reef flat on weekends. Finally, in the middle of April, word came from NSF: there would be no funds. With their summer proposal unfunded, the DAP team became very nervous about the other proposal. Both Sea Grant and MAC withheld making a final decision until a few minor adjustments were made in the proposal. DAP leader Dennis Yamase and team member Leonard Torricer modified the Papohaku Beach, Molokai proposal and resubmitted it. After meeting with Dr. Jack Davidson, director of the UH Sea Grant College Program, and Dr. Stan Swerdloff of the MAC office, the revised proposal was accepted.

The 1978 DAP team conducted the nearshore surveys of Papohaku Beach, Molokai during the week of March 26,

1978. Information on algal population, substrate composition, and fish population was gathered. The base of operations was the R/V *Machias* from which four to five dives per day were made to complete a thorough survey of the area. After completing the field work, the students were faced with the arduous task of compiling the data and writing a final report. To minimize the amount of work and prepare a rough draft before spring semester finals began, the students, under the supervision of Bob Cunningham, keypunched the data and stored them in the Hawaii Coastal Zone Data Bank. After spring semester finals, the students revised the draft. Upon completion a manuscript was submitted for publication to the UH Sea Grant College Program.

A list of the students who participated in the 1977-78 Data Acquisition Project follows:

Julia Atwood
Dorothy Bailey
Douglas Davis
Tina De Jesus
David Gigle
Leslie Jensen
David Kawahigashi

Laurie Sanderson
Katie Savage
Mark Scheele
Allan Solonsky
Arthur (Brad) Tarr
Leonard Torricer
Dennis Yamase

for his experiences with MOP, he said, "I would like to see more people get involved because it has a lot to offer. A lot of people are in MOP, but they just are not taking advantage of the opportunities. It has opened up things for me and I got a lot out of it."

Dennis Yamase

Team Leader

Dennis, an education major, performed an outstanding job as the leader for the 1977-78 Data Acquisition Project team. In qualifying for the team, the members had to go through a rigorous training program and Dennis recalled, "We tried to get everybody proficient in each of the areas: fish, algal, and invertebrate identification so that we had good flexibility. If one of the fish identification people got sick, somebody else could do the fish identification." In evaluating the performance of this year's team, Dennis remarked, "They were all really good." As for his leadership role, he added, "It was really easy because everybody was willing to put in his own time; everybody just pitched in and did his share."

This summer, Dennis and David Kawahigashi, another DAP team member, are working for the Hawaii Division of Fish and Game. They are building eel and shrimp traps as well as doing transecting work off Diamond Head. Later, they will be heading for Puako on the Big Island, and in August they will go to the Northwestern Hawaiian Islands aboard the R/V *Townsend Cromwell* to assist Division of Fish and Game personnel with algal transects.

In terms of his past DAP experiences, Dennis said, "The things that you learn through dealing with something like this and working with people are valuable in anything you get into." As

Arthur (Brad) Tarr

Team Member

Brad, a history and religion major and a spring 1978 graduate, co-taught the fish identification course with Dennis Yamase, and along with Dennis worked with Doug Davis as a teaching assistant for the limu identification course. He and Dennis conducted fish identification workshops for teachers on Maui. In the workshop, classroom lectures were supplemented with slide presentations and reef walks. Two sites were compared to determine differences (if any) in fish species, invertebrates, and algae. Brad commented, "It was really neat. It was interesting to see that a lot of teachers over there really want that kind of workshop more often. They were very receptive to what we had to give them, even though it was on a very superficial level."

The highlight of the year for Brad, as well as his fellow DAP team members, was the baseline study conducted at Papohaku Beach, Molokai. "I had a chance to dive five times a day and use all that diving experience for something that was scientific, and it was really interesting to see how things worked out. I enjoyed it very much," he said. Commenting on being the leader of the fish identification team, he said, "That put a little bit of responsibility on me...to get everything together and organize everything...."

As a Marine Option Program student Brad also had the opportunity to work at the Hawaii Coastal Zone Data Bank where he became acquainted with the different types of marine studies that were carried out in the state. He also met a lot of people connected with the studies. His work also involved updating fish, algal, and invertebrate species lists. Finding the work exciting, he said "It is not just one job all the time, it is versatile...touches on a lot of different areas so it keeps my interest up."

This summer, along with Mark Scheele, Julia Atwood, and Leslie Jensen, Brad will be working with Environmental Consultants, Inc. on a study that will determine the major species of fish, algae, and invertebrates in areas around Oahu from sea level to a depth of 60 feet. They will also provide input as to how these sites should best be utilized.

Brad had a few words of advice to pass on to other MOP students. "Become aware of everything that is going on in MOP," he said. "Check out each little thing that there is. If you are interested in any one aspect of marine life just pursue that. Find out what is available and just stay with it. Something neat eventually comes from it."

Mark Scheele

Team Member

Mark Scheele, a zoology major, became involved in the Data Acquisition Project after talking with Doug Davis, who was a member of the DAP team at the time. Reflecting back on the Papohaku Beach baseline study, he felt that the fish identification course helped him a lot. "At first things were hectic," he said, but he felt that everyone had been well prepared by the courses taken beforehand. During the

survey, Mark served on the fish team as a primary counter or a line roller safety diver. DAP team members rotated jobs so each could get a chance to try something different. Although Mark was on the fish team, he was also proficient in limu and invertebrate identification. Mark said he got "a lot of experience, that's for sure. Learning to identify the fish was great--something I always wanted to do anyway and it [DAP] stimulated me to do that." He also felt that he benefited from the writing of the proposal and report, as well as learning how MOP works.

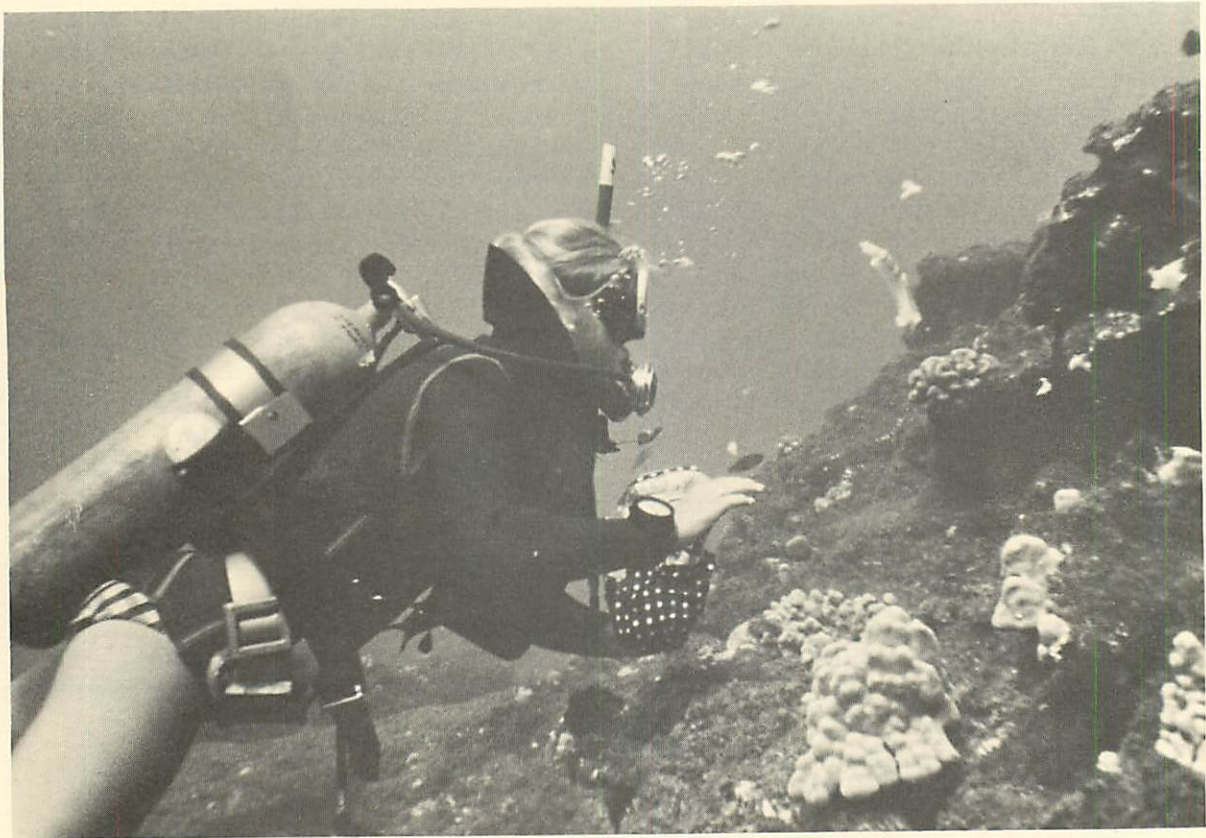
Mark is working at Dan's Dive Shop as a scuba instructor at present. In the future, he hopes to pursue graduate research work.

Laurie Sanderson

Team Member

Laurie, a zoology major, became interested in working on the Data Acquisition Project after attending an orientation meeting. She went through the DAP training course and became a member of the 1977-78 team that completed a baseline survey at Papohaku Beach, Molokai. She was in the fish identification team, and, when asked how the study went, she said, "The teamwork was good. Everyone knew what he was doing." In terms of experience, she learned how to do transecting with a team. She also learned about the time and effort involved in writing a final report.

Overall, she feels that MOP has helped her get practical field experience. Laurie commented that throughout the program she was able to obtain training in fish, limu, and macro-invertebrate identification as well as transecting.



LESLIE JENSEN COAXING SOME FISH OUT OF THEIR HOLE WITH FOOD

Laurie has been designated as the leader of the 1978-79 DAP team, as well as the instructor for the 1978 fish identification course.

Allan Solonski

Team Member

Allan, a zoology major, worked for two years in aquaculture in Israel before coming to Hawaii. With the Papohaku Beach baseline study now completed, he commented that the final report writing was a long and "time-consuming process." The report was written in rough draft form and submitted to different professors, each reviewing for accuracy in his area of expertise. The report was then revised

and a final draft will be submitted to the funding agencies.

This summer Allan and Laurie Sanderson are working in the laboratory of the National Marine Fisheries Service. As part of his job Allan will be involved with the NMFS study of the Northwestern Hawaiian Islands in August. Allan is also working with several other Marine Option Program students to develop a slide/tape presentation on aquaculture in conjunction with the Curriculum Research and Development Group.

In the future he hopes to work with the National Marine Fisheries Service and also dreams of "going around the world and working with Jacques Cousteau." In all, he feels that MOP has helped him obtain practical working experience and has also led him to meet interesting people.

National Marine Fisheries Service

The National Marine Fisheries Service's Honolulu Laboratory has the "task of assessing the resources both qualitatively and quantitatively up the island chain," said James Uchiyama, the acting task leader of insular resources. He added, "We are using different methods of sampling from the vessels to determine what resources we have. We try to determine various fisheries parameters which are needed for management and population dynamics."

In summer 1977, MOPers Douglas Davis and Jayne Fitzgerald worked aboard the R/V *Townsend Cromwell*. James Uchiyama said, "They helped us with our sampling --they pulled up traps and helped to sort the fauna as they came up." He also added that "Jayne, because she's interested in algae, made her collection of algae from the specimens brought back."

This summer, MOPers Allan Solonsky and Laurie Sanderson are working in the NMFS lab identifying some of the trawl catches that were brought back from previous cruises. Uchiyama said, "We hope to get them started on the reproductive study from which we hope to determine the spawning season and fecundity of the fish for the commercially important species. This will help the population dynamics people in making their management plans. After that, we hope to study the foraging habits of some of these species."

As for the experience that MOP students are getting he said, "We try to use their talents plus teach them new things they do not encounter in classrooms; you read about it but do not get the experience." Thus, the National Marine Fisheries Service provides MOP students an opportunity to supplement their academic work with practical "hands-on experience."

Office of the Marine Affairs Coordinator

With the many different marine-related agencies throughout the state, there is need for coordination among them and this is where the MAC office comes in. Dr. Stan Swerdloff, the Deputy Marine Affairs Coordinator, said, "Whenever you have more than one agency involved you have coordination problems. This office was set up legislatively to fill the role of coordinator, to make sure that the agencies that are responsible for various segments of marine activities do their job." He added, "The office was placed under the Governor as an advisor on all marine activities in the state."

The MAC office currently has a Marine Option Program internship program for two to five students. Swerdloff said, "The range of activities that the MOP students provide depends on their experience and their capabilities. We've had one MOP student [Geoffrey Akita] who has been with us two years and we give him a lot of program responsibility--drafting documents, reviewing projects. He has done some field work for us, including diving programs and bait culture."

The other students, Judith Murakami and Janice Hirata, are doing work such as computerizing a bibliography of state-supported marine activities which involves cataloging and library research. Another major role of the students has been liaison work with the legislature--keeping tabs on marine-related legislation during the session. Swerdloff said, "As they learn their job and become more familiar with the governmental side of marine activities, the interns are given higher responsibilities." Commenting about the internship program, he remarked, "It has worked out very well. The students learn about the real world of governmental marine activities."

Geoffrey Akita

Student Intern

Geoff, a 1977 graduate in zoology, is a classic example of a student who was able to expand his experiences with the Marine Option Program into a post-graduate job. As a MOP student, he worked as an intern with the state Office of the Marine Affairs Coordinator. His internship first involved general office work, reading and filing marine-related bills, and attending hearings during the 1977 legislative session. After the legislative session was over he was involved in a major project--storing a "matrix of marine research" that was programmed by MAC, the University of Hawaii, and the UH Sea Grant College Program in a computer system. From these experiences Geoff gained a better "understanding of governmental mechanics and an overview of marine affairs in the state." Upon graduation, he continued to work in the MAC office on a full-time basis.

Janice Hirata

Student Intern

Janice, a zoology major, has been working as an intern with the Office of the Marine Affairs Coordinator since January 1978. She found out about this opportunity by reading about it on the Marine Option Program bulletin board. She said, "There was actually no training involved before I started working; I learned most of what I did on the job. My primary concern during the legislative session [January to May 1978] was working on a publication called *Marine Bills '78* which included a status report and synopses of bills and resolutions that went before the State Legislature for adoption."

At the end of the legislative session she was involved in a budget survey of marine agencies. Janice feels she obtained good experience from the work she did. "So far I have gotten a feel for what the bureaucracy is like and the channels one has to go through to get a piece of legislation acted upon. The everyday workings of an office, the things that must be done, such as budgets, became familiar to me."

Having completed her internship, Janice is now pursuing her interests in the field of aquaculture and is working at the Oceanic Institute. About MOP, she commented, "I think it is a good program; you get out of it what you put in. If you are interested, you will get a lot out of it."

Hawaii Division of Fish and Game

Mr. Kenji Ego, director of the Hawaii Division of Fish and Game, recognizes the potential for "mutual benefit" to Marine Option Program students as well as the state of Hawaii by involving students in biological surveys and resource assessments. He strongly supports the "hands-on kind of activity" which MOP stresses.

MOP students Dennis Yamase and David Kawahigashi are currently working with Fish and Game staff and will be going to the Northwestern Hawaiian Islands from August 4 to September 5, 1978. "They will be conducting transects along with our crew," said Henry Sakuda, a member of Ego's staff. "As far as field work is concerned this is the first time we have had MOP students working with us on the Leeward Islands survey," he said. "So far they are functioning very effectively."

Ego remarked that it was unfortunate that federal funding for the Data Acquisition Project's Molokai summer survey did not come through. "If we had funds that we could make available to the project, then there would be no problem," he said. "Surveys in these areas would be very, very helpful to us to provide information that we need." In the future, he stressed, "We will continue to seek funds for gathering information on our marine resources. Within the entire fisheries and aquaculture area, we are gearing up to put much more emphasis than we have in the past. So here again, we will have to get help from all over...and one of the groups that we will turn to would be MOP."

As an afterthought, he mentioned that it was Albert Einstein who said, "It is of great importance that the general public be given the opportunity to experience, consciously and intelligently, the efforts and results of scientific research. It is not sufficient that each result be taken up, elaborated, and applied by a few specialists in the field. Restricting the body of knowledge to...a small group deadens the philosophical spirit of a people and leads to spiritual poverty."

University of Hawaii Sea Grant College Marine Advisory Program

The Marine Advisory Program functions as an information link between marine researchers and the marine community for the University of Hawaii Sea Grant College Program. One of MAP's roles is to disseminate useful marine-related information to encourage wise use of marine resources. MAP has done this in various ways such as through one-to-one contact, publications, mass media seminars, lectures, and workshops. Thus far, Marine Option Program students have assisted MAP in various capacities. Under the direction of Toni Snellback, administrative officer, MOP student Skippy Hau has been cataloging marine-related films and slideshows. He has been finding out what kinds of films are available on Oahu and the accessibility for use by teachers.

Burt Tanoue and Debra Shiraishi provided assistance to the Marine Advisory Program marine studies lecture series which was held at the Waikiki Aquarium, while Allie Zirker helped with the series held at the Kaneohe Regional Public Library. Toni Snellback has found that MOP students are able to obtain "practical in-field experience" from their work with the Marine Advisory Program.

Other MOP students have been working under Ray Tabata, environment agent. Nancy Sorenson, for example, is currently assisting with the *Hawai'i Coastal Zone News* project, and MOP graduate, Janie Patch, has worked on the Marine Bills project in 1977 and 1978, as well as on the *Hawai'i Coastal Zone News* and a slide-show on Ka'ena Point. Tabata commented, "All in all, MOP students have contributed greatly to MAP."

Linda McCreery, marine recreation agent, made reference to MOP graduate Alvin Tachibana as "an example of a really well-motivated, successful MOP student" who compiled and edited a shark recipe booklet, *Ono Hawaiian Shark Recipes*, which became a "very popular item." Another MOP student, Deann Hawkins, helped put together several slide and videotape shows, and currently Athline Clark is assisting McCreery with scuba diving safety workshops. McCreery has many projects in mind concerning "ocean safety and awareness," in which MOP students could be of service by helping put together slideshows or displays, or by doing research or distributing materials. She reflected, "I think MOP is a really brilliant idea. I like to encourage people to get into the ocean because you start out as a recreator. You swim, then you start snorkeling, and you look at all the fishes and corals. You want to know the names of them; it makes you curious. So you get involved as a recreator and then it can grow into a scientific interest. But it really helps if you get your body in the ocean, you get wet."

That is exactly the philosophy which the Marine Option Program stresses to its students. Then, on a final note, as Ray Tabata phrased it, "We believe that if a MOP student is willing, able, and qualified, we would like to have that person working with us on mutually beneficial projects. MAP gains the services of a highly productive individual and the MOP students gain some practical experience in marine advisory services."

Deann Hawkins

Student Aide

Deann has been working with the University of Hawaii Sea Grant College Marine Advisory Program in producing videotapes as well as slide-shows. Thus far, she has produced videotapes of Waianae High School's "First Annual Surf Contest" (which she discussed and showed at a MOP seminar) and an "Improving Your Surfing Style Contest." She has also done a video documentary on "Oahu Ocean Rescues" under the guidance of Linda McCrerey, and a whale and dolphin slideshow.

In her work, she has picked up a lot of audiovisual experience and has gained a lot of exposure in "public relations" work by meeting new and interesting people. Deann said that she "enjoys her work" and would like to pursue work in environment-related areas. Currently she is drafting an environmental studies proposal and hopes to pursue her education in that field.

Nancy Sorenson

Student Intern

Nancy has been working since February 1978 as a student helper on the *Hawai'i Coastal Zone News*, a newsletter published monthly by the University of Hawaii Sea Grant College Marine Advisory Program. Under the guidance of Ray Tabata, she has been conducting interviews and doing research and writing. She is also involved with the compilation of fish recipes. All in all, Nancy has found her work to be "highly interesting."

Skippy Hau

Student Intern

Skippy, a biology major, has been instrumental in setting up the College of Tropical Agriculture's Pearl City Instructional Facility pond. Last fall, under the guidance of Susan Morita, Skippy and other students worked on the pond as part of a class assignment. In the initial phase of operation, students had to work in shifts to watch over the pumps. Skippy had to work the night shift and his comments were that those were "cold, lonely night watches." At that time the project was primarily for agriculture and involved the planting and harvesting of crops. Later, the pond was stocked with mosquito fish, and then with about 40,000 prawns. "A lot of hard work went into it," said Skippy, but he got the "satisfaction of finally being able to see the prawns reach maturity."

Skippy is also putting together a catalog of 16-mm marine-related films and slideshows for the University of Hawaii Sea Grant College Marine Advisory Program. Working under the supervision of Toni Snellback, he is cataloging films available on Oahu, gathering information as to what kinds of films are available, and providing information on the accessibility of these films for use by teachers. Basically, it is a film research project, and Skippy is positive that it is highly worthwhile because "people will use audiovisual materials more, once they know what is available to them."

Curriculum Research and Development Group

The main function of the Curriculum Research and Development Group at the University of Hawaii is to develop marine science curricula to meet those needs of the community. Development can take on the form of modifying existing programs or developing new materials. At the University Laboratory School, Barbara Klemm said, a "write-test-revise cycle" is employed whereby materials are written, tested on students, then modified, and so on. Along these lines there is need to train teachers to become acquainted with these materials; thus workshops, support activities, and services are needed. Here Marine Option Program students can be of valuable assistance.

According to Klemm, "There are so many neat things that you can do. It is important, however, to determine what it is we are trying to do educationally." That requires careful research, and Janet Senaga, a MOP student, has been involved in that aspect. Regarding Janet's research, Klemm commented, "She researched the situation, the problems and issues, and how it relates to concepts of chemistry, biology, and economics." Commenting on Janet's work, Klemm stressed that "Janet was really good at getting contacts. She even dug out a Ph.D. thesis."

Currently, another MOP student, Cheryl Sato, is assisting Klemm in running a National Science Foundation-sponsored Marine Studies Teacher Training Institute. One of her responsibilities is to help plan a "simulation game" in which the teachers will

be taken to a harbor area and asked to do "role playing" in land use planning. Klemm said, "It's been a delight working with Cheryl, because she is interested in education. She is also learning, behind the scenes, what goes on in teachers' workshops."

In another project, MOP students are attempting to put together a slide-tape show on aquaculture. Clark Probst, Dennis Yamase, Allan Solonsky, Debbie Hamao, and Cheryl Sato are involved in the project and are working with teachers who are testing CRDG marine materials in their high school science and social studies classes this year under Klemm's guidance.

Another area where MOP students would be of valuable assistance is that of teacher support. Many teachers have not had the "in-field" type of experience, or as Klemm worded it, "Most of our teachers did not have marine option programs...they don't have this background that you folks had and yet they are expected to teach materials and conduct field trips. I see a lot of interfacing if the MOP students are interested...working directly with the teachers." For example, MOP students who are familiar with the plants and animals of a certain area could help run field trips, do transect studies, or collect specimens for the class. The possibilities and potentials are numerous.

Janet Senaga

Curriculum Assistant

To acquire her marine skill, Janet coordinated and taught a recreational fishing course. "It was really interesting, and I feel it helped me a lot," she said. She knew about fish, but not about fishing, so it was a challenge to take on a teaching job. Before starting, she talked with many people about fishing and organizing teaching methods. Barbara Klemm of the Curriculum Research and Development Group helped her with the organization and preparation for classes, while John McMahon gave her direction and support. There were many others who helped. Her earlier involvement with organizing the first annual Marine Option Program fishing derby with Mark Suiso helped her in planning and preparing techniques for the fishing course.

Janet also worked on a Hawaii Marine Science Studies project which involved gathering information on the fishing industry of Hawaii, and she feels that Marine Option Program students could benefit by going on a field trip to the fish auction. There are many methods of fishing and processing for different types of fish. There is also so much to see and learn about the fishing industry.

Janet has just recently begun putting together some material on boats, types of fishing, crews, lengths of trips, baits used, etc. She is also doing research on fish habits and edible qualities of different fish species for Klemm to use for interested teachers.

Janet feels that MOP has definitely met her expectations and was very helpful in steering her when she needed direction. She feels it is really good because there is no pressure. You just

do what you can and "you get to meet different people in different fields." MOP has helped by giving her the courage to take risks and accept challenges, and she learned where to go for the things she needed. She hopes to continue teaching in marine-related areas.

Cheryl Sato

Curriculum Assistant

Cheryl, an education major, has been volunteering her time at least once a week as a docent at the Waikiki Aquarium. To qualify as a docent, she went through a training program involving lectures by guest speakers and field trips. Then she was required to write a short paper and pass an exam to see if she is able to teach others. She said, "The educational curriculum was set up for different age groups"; for example, kindergarten children would have a touch basket where they could handle and examine specimens, while older students would have slide-show lectures on different topics such as dangerous marine animals, sandy habitats, or aspects of Hawaiiana.

Cheryl is also involved with a "Sea Shore Life for Children" course taught by Jean Watson at the Waikiki Aquarium on Saturdays. This course is geared toward students in grades 3-6, and each Saturday the students are taken on field trips to different locations and given lectures about the marine life in the area.

Cheryl is concurrently working for the Curriculum Research and Development Group and has been involved with the NSF-sponsored Marine Studies Teacher Training Institute which is designed to train teachers in using marine-related curriculum. Her job is to help design a marine social studies game and to assist with the workshop. She has

found her work to be very interesting; being an education major, she "gets to learn different [educational] techniques from the CRDG staff." Cheryl said, "You obtain practical experience in working with teachers. You get to learn from the teachers themselves." Through this interaction she feels that she is gaining hints and important tips that will help her become a better teacher.

Summing it up, Cheryl feels that this opportunity is valuable for her and she has slowly been gaining more and more educational experience. She feels, "that if MOP students let John [McMahon] know what their interests are, John is good at setting them up with opportunities. From then on it is up to them to take their own initiative."

Naval Ocean Systems Center

The Marine Option Program has a training contract with the Naval Ocean Systems Center at the Kaneohe Marine Corps Air Station. Students are involved in various projects including mammal training, bird-search training, and marine technician training with machinery and electronic applications.

MOP students Helen Goodhue and Malia Kamahoahoa have been involved in the projects involving birds; Nicholas Moore and Deborah Kersting have been working with porpoises; Grant Tanaka, Alan Umeda, Patrick Soares, Ernest Kim, and Mark Lancaster are electrical engineering majors who have worked on engineering-oriented projects; and Bill Sims has acquired skills in machinery operation. Other students who have worked at NOSC are Philip Guenther, Allen Kaneshiro, Owen Kobayashi, Frederick Lau, Larry Masaki, Kevin Mummery, Brian Oshima, Carl Suekawa, and Stanley Tanaka.

Patrick Soares

Engineering Assistant

Pat, an electrical engineering major, is working at the Naval Ocean Systems Center and has been involved in several projects which are relevant to his field of interest. One project involved work on a "decometer," a mini wrist computer worn by divers. The decometer tells the diver how much time is needed for decompression. Pat is also working on a navigation system for an "underwater work vehicle." The vehicle which is sent down to the ocean bottom is operated by remote control by a mother ship at the surface. Pat finds his work very interesting and hopes to engage in similar work after graduation.

R/V Kana Keoki Research Cruise

Onboard the University of Hawaii's research vessel *Kana Keoki*, Dr. Richard Young of the Department of Oceanography has been collecting midwater squid and conducting experiments with them. Trawling takes place off the Waianae coast because it offers the "nearest protected deepwater area." Because the trawls are operated around the clock for 10 straight days, a lot of manpower is required for the various shifts. This is where Marine Option Program students come in. They are "doing the backbreaking work of collecting the animals," said Young.

When a trawl is brought up, the live squid are sorted from the other animals and put through a variety of experiments involving bioluminescence. Young pointed out that the experiments are conducted in a cold, dark environment

to simulate the squid's natural habitat. Pressure is not assumed to be a problem as the squid are vertical migrators.

When not working on their shift, students are free to observe the other things going on around the ship. Reactions from students concerning the cruise have varied. "Some are very interested and ask lots of questions, trying to learn; others find it tedious," said Young.

A problem for the students has been that cruises are scheduled during the semester; thus, they miss some of their classes. There is, however, time for them to study between work shifts. Several MOP students who have taken advantage of the R/V *Kana Keoki* cruises this past semester are Jeff Carter, George Jones, and Dennis Kees.

Anuenue Fisheries Research Center

The main function of the state Anuenue Fisheries Research Center is to perform applied research on the Malaysian prawn (*Macrobrachium rosenbergii*). Marine Option Program students Kathy Tamada and Leila Miyamoto have been aiding in the care of prawns--feeding,

cleaning tanks, and measuring growth. Other MOP students, Debbie Stelmach and Mark Muranaka, have assisted Dr. Spencer Malecha with lab work detecting genetic differences of prawns by chemical analysis of their muscles.

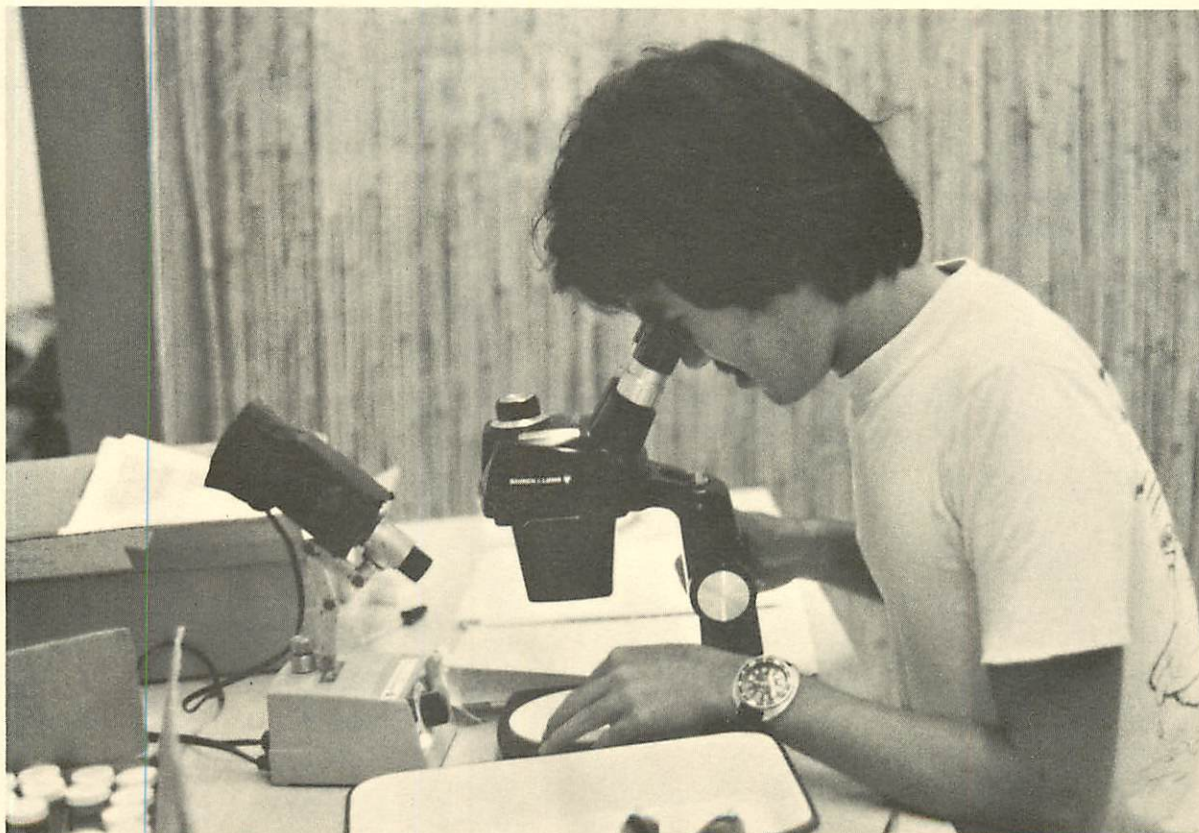
Damselfish Behavioral/ Ecological Research

Craig MacDonald, a doctoral candidate in the Department of Zoology, is working on damselfish reproductive biology. Working with him are two Marine Option Program students, Garret Miyamoto and Christopher Rogers. The MOP students are learning to determine the species and sex of the fish and the developmental stage of the gonads of both sexes, and to estimate fecundity in females. They are gaining experience in data transformation and basic statistical analysis using computers.

MacDonald is hopeful that the work will result in several publications.

MacDonald has been conducting field research at Enewetak and has brought preserved specimens back to the lab for study by the MOP students. In his research he has found that "the environment, the type of habitat the damselfishes are found in, is determining the kind of reproductive strategy or social organization that is being expressed." As for the MOP students,

GARRET MIYAMOTO EXAMINING DAMSELFISH GONADS



he gave them an overview of what was expected and instructed them in the skills that were needed. MacDonald commented, "I have just been thrilled with the response of the two MOP students. I just instructed them once. If they had any questions they would come and ask me. I would straighten them out, then they would go on and do it themselves." On a final note, he said, "If I were a professor here, I would certainly want them as graduate students."

Garret Miyamoto

Research Assistant

Garret, a zoology major, has been working with Craig MacDonald on the reproductive behavior of damselfish. He started in the fall of 1977 when he volunteered his services. As a lab assistant, he has been examining the gonads of preserved specimens from Enewetak in order to determine the developmental stage of the gonads and to count the number of ripe eggs. Garret has also accompanied MacDonald on dives in Kaneohe Bay and Hanauma Bay in order to observe the mating behavior of the damselfish. When asked what he got out of the work experience, Garret replied, "I learned a lot of lab techniques...and about gonads."

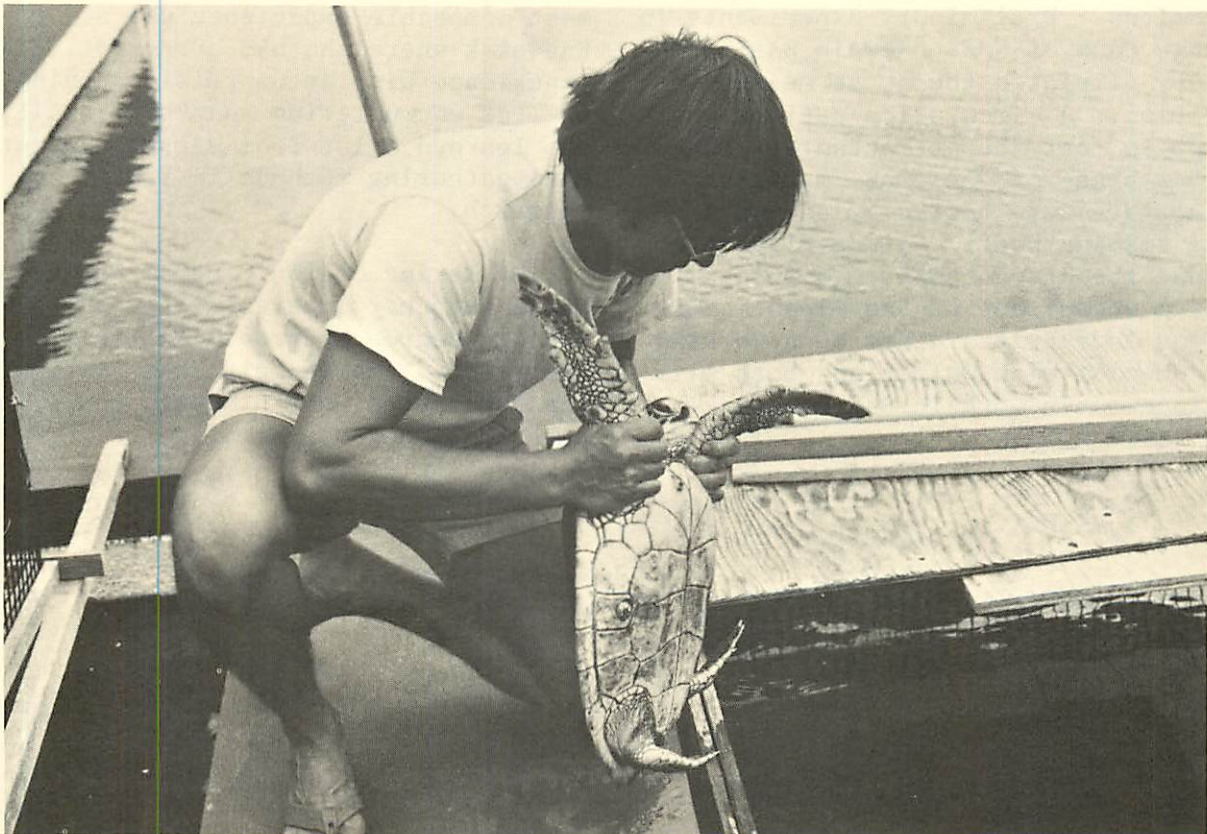
Through the Marine Option Program, he enjoys meeting new people and learning new things and recommends the program to "anyone interested in marine activities." As for the future, he is interested in continuing to do research work and pursuing studies on a graduate level.

Hawaii Institute of Marine Biology

The Hawaii Institute of Marine Biology is a research unit of the University of Hawaii which oversees and maintains facilities for faculty in several departments: Botany, Zoology, Oceanography, Microbiology, and Psychology. The primary laboratory site is Moku-o-Loe (Coconut Island) in Kaneohe Bay. Projects conducted at HIMB frequently accommodate undergraduates in MOP and provide an excellent training center for marine skill acqui-

sition. In FY 77 Marie Wuerker and Alan Kam both pursued opportunities here. Although little used as a formal classroom-teaching facility, weekend field trips to HIMB are part of Oceanography 201, a course required of all MOP students.

ALAN KAM WITH A TURTLE AT A HAWAII INSTITUTE OF MARINE BIOLOGY HOLDING PEN



Walter Ikehara

Student Research Assistant

Walter, a Marine Option Program graduate and now a research associate of the Hawaii Institute of Marine Biology working at the National Marine Fisheries Service's Kewalo Basin laboratory, recalled that in his senior year he heard through MOP that Dr. John Bardach needed someone to look into "amino acid activators of feeding behaviors in tuna." He began by investigating chemosensory attraction in kawakawa (*Euthynnus affinis*), then became involved in a project which was to "ascertain the olfactory capabilities of yellowfin tuna. "We would look for some attractant that would lure tuna," he said. This work eventually led to the idea of testing the attractants onboard a purse seining vessel to separate tuna from porpoises and reduce porpoise mortality during seining operations. Preliminary experiments in a large tank at NMFS' Kewalo Basin laboratory simulated the purse seining operation. A circulation pattern was set up to test the attractants. In another phase of the experiment, the attractants were tested at sea on a local fishing boat. Future plans are to test the attractants on a purse seining vessel out of San Diego. MOP student Andy Brittain has been working as a chemist with Walter and both will continue their work in San Diego.

Marie Wuerker

Student Intern

Marie volunteered to help out on the baitfish project at the Hawaii Institute of Marine Biology on Coconut Island after hearing about the opportunity through the Marine Option Program. She worked at odd jobs, taking specimen samples and learning to work with a computer. Later she was hired to feed and harvest fish in the large tanks.

When John Harrison said that he needed a diver to help work on his coral biology project measuring nutrient fluxes and calcification rates of corals within an ecosystem in Kaneohe Bay, she volunteered. Marie's first day was quite an experience. She recalled that she could not "see her hand in front of her in the murky water" and her mask kept flooding! Her most memorable experience was at Enewetak where she had her first experience with decompression diving as well as encountering sharks. In all, she learned a lot from Harrison about data gathering methods in field research.

The Marine Option Program has helped Marie keep her interest in pursuing a zoology degree by providing field work experience. Marie felt that, without the experience, she probably would not have continued her studies.

apply their knowledge in situations which involve marine affairs decision-making.

Alan Kam

Student Research Assistant

Alan Kam, a spring 1977 Marine Option Program graduate, has been working at HIMB with George Balazs as a research assistant on the green sea turtle project, which is funded by the MAC office and the UH Sea Grant College Program. Alan notes that the turtle population has been decreasing as the human population begins to infringe upon the turtle's habitat, with the result being that French Frigate Shoals has become the last viable reproductive population in the Hawaiian Archipelago.

Alan's work involved the capture, tagging, and release of turtles at Bellows Beach on the windward side of Oahu as well as on Kauai, the Big Island, and Midway Islands. He is currently continuing his work of tagging and recovering turtles, as well as doing a population study.

When asked to comment about MOP, Alan said, "The Marine Option Program is an organization that is able to develop individual talents with particular emphasis on our marine environment, namely Hawaii and the sea. Students from all over the mainland and Hawaii come to partake of an education that is relevant to their interests in marine activities." He added, "Through the leadership of the staff, MOP students are guided towards realizing their ideals and goals." He feels that since the ocean can be viewed from different perspectives, whether it be for recreational or commercial use, there is a vital need for understanding the potential of our marine resources, and to provide for better planning and management. "MOP," he says, "helps to build leaders, as students develop expertise in marine-related areas." Thus, in terms of the future, Alan feels that MOP students could readily

Look Laboratory of Oceanographic Engineering

The University of Hawaii Look Laboratory of Oceanographic Engineering near Kewalo Basin provides facilities for developing and testing instruments and structures to be used in the ocean. Various wave tanks and pressure vessels simulate aspects of the marine environment and are used in experiments to test the performance of equipment. This lab also serves as a teaching base for students to acquire "hands-on" experience while participating in the studies. One Marine Option Program student this year bridged the biology-engineering gap by investigating means to improve the quality of tuna delivered to the fish market.

Cedric Ota

Student Research Assistant

Cedric, a civil engineering major, is currently working at the Look Laboratory of Oceanographic Engineering. He is supervised by Director Edward Noda and is working on a project concerning the "burnt tuna problem in the Hawaiian fisheries." This problem deals with the edible portion of the tuna turning a paler color and having a softer texture than normal after it is caught, making it less desirable for raw consumption. "The meat gets burnt; it turns white due to the struggling of the fish and improper chilling," said Cedric.

At Look Lab, he is involved with developing a mathematical model to predict the heat transfer through the body of a tuna. The model will be used to design a refrigeration unit to chill the fish quickly and eliminate the problem. He is also helping to design a mechanical device such as an explosive charge to immobilize the fish as quickly as possible after being hooked.

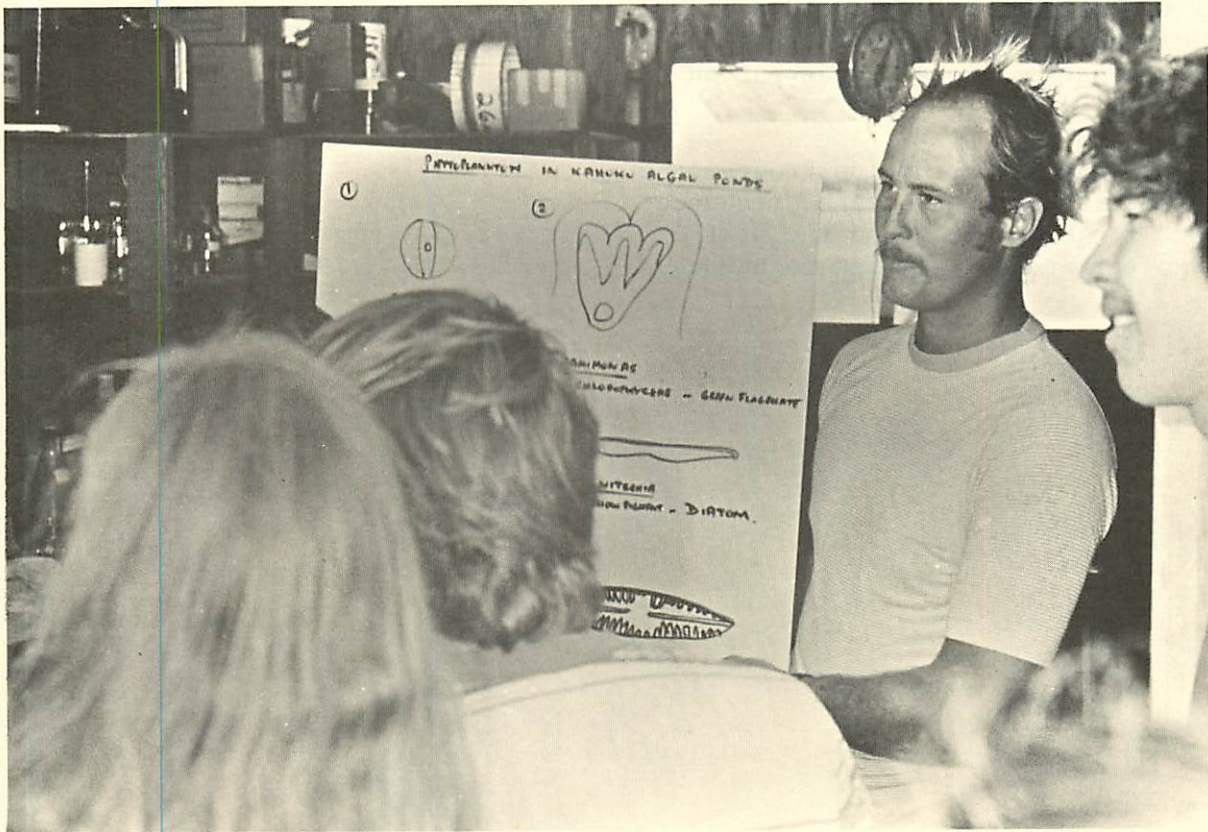
Oahu Oyster Farms, Inc.

Oahu Oyster Farms, Inc. is a firm operated by Taylor A. Pryor at the end of the Makai Range pier. An office/lab supports the research efforts centered about a set of tanks holding oyster larvae. Hatching methods are being developed to provide a dependable supply to stock the Kahuku Seafood Plantation. One Marine Option Program student studied as a hatchery aide here during FY 1977.

Vernon Sato

Student Research Assistant

Vernon, a biology major, has been working at the oyster larvae hatchery at the Makai Range pier for about two years. He is responsible for



MOP STUDENTS TOURING FACILITIES AT AQUATIC FARMS
IN KAHUKU DURING ONE OF SEVERAL FIELD TRIPS

raising the phytoplankton that is used as food for oyster larvae. When the larvae mature, they are transported to the Kahuku Seafood Plantation to be raised.

Vernon was originally in the Windward Community College Marine Option Program. He heard about this project through Dr. Gary Stice. At that time, he was also taking Jeff Hunt's Botany 181 course, Plant Life of the Sea, and became interested in phytoplankton studies. When Vernon started working he found that he had to learn about the job on the spot and by doing research on his own at the library. Vernon said, "The manager [Syd Kraul] was the only one with previous hatchery experience."

Other opportunities arose for him while working; he was able to collect specimens from the Maui Divers of Hawaii, Ltd. docking facility on the Makai Range pier. In rummaging through the rubble that is brought back from their operations, he collected a crab specimen and took it down to the Waikiki Aquarium where it was put on display.

As for the Marine Option Program, he felt that it has been like a "resource center" for him. He found the staff easy to talk to and willing to help.

Waikiki Aquarium

The Aquarium, located in a beach park in Waikiki, serves as a research and teaching facility for the University of Hawaii in addition to being a popular educational tourist attraction. Displays and fish exhibits emphasize various Hawaiian marine habitats. The flow-through seawater system provides excellent quality water for both public and research tanks. An educational role this facility fills is as a center for public marine lectures. One Marine Option Program student assisted in presenting a lecture series sponsored by the University of Hawaii Sea Grant College Marine Advisory Program.

Continuing to be active in MOP, Debra volunteered to assist with the marine studies lecture series held at the Waikiki Aquarium. She was able to sit in on the lecture series and found it to be "very interesting."

She will be a teaching assistant for an aquaculture course that is scheduled to be taught in the fall by Susan Morita. Right now, as a volunteer at the state Anuenue Fisheries Research Center, she is getting background information from Morita about the course. She is also doing research and supplementary reading on aquaculture. On Saturdays she helps out at the College of Tropical Agriculture's Pearl City Instructional Facility pond.

Debra Shiraishi

Student Aide

Debra, a zoology major, was accepted into the Marine Option Program during the spring semester and immediately got her first exposure to the program by assisting onboard the schooner R/V *Machias* while the Data Acquisition Project team was conducting its baseline study at Papohaku Beach, Molokai. It happened that Captain Bill Austin, skipper of the *Machias*, was short one crew member and needed someone to help fill scuba tanks for the DAP team; thus, Debra was chosen to fill in as one of the "crew." She was able to gain shipboard experience and also an insight into the work done by the DAP team.

ACKNOWLEDGMENTS

We would like to acknowledge the hard working Marine Option Program staff who contributed their time, effort, and talents to the program. During this year some key individuals left MOP to move on to other opportunities. Sorely missed will be Claire Y. Nakamura, administrative officer; Yoshie Koba, temporary administrative assistant; David B. Eckert, Manoa coordinator; and William C. Ebersole, Hilo coordinator. We wish them well. We also wish to welcome aboard the new staff: Barbara Chang, administrative officer; Randall T. Nishimura, Manoa coordinator; and John D. Dykes, Hilo coordinator. In the Manoa MOP office, our student helpers, Linda M. Axtell, Cynthia N. Katano, and Mercedes B.K. Fong provided administrative services. MOP coordinators, Jeffrey Hunt of Windward Community College and Dr. Kakkala Gopalakrishnan of Honolulu Community College provided guidance for students. Last, but not least, Director John J. McMahon provided guidance for the entire program.

Finally, we would like to acknowledge the diligent efforts of Leonard Torricer who contributed to the DAP section. MOP students Vincent Li, Alan Kam, and Marie Wuerker contributed the photographs.

APPENDICES

APPENDIX A. CALENDER OF EVENTS BY CAMPUS
(September 1977 to June 1978)

SEPTEMBER 1977

Manoa

08 DAP: Initial organizational meeting
 13-22 Research cruise onboard R/V *Kana Keoki*
 16 Night dive and beach party at Hanauma Bay
 28 DAP: Information and recruiting meeting

Hilo

09 *OFS: "Cloud Over the Coral Reef"
 16 OFS: "Attack Patterns of Sharks"
 23 OFS: "Hunters in the Reef"
 23-24 †STO: "Hawaiian Coral Reefs and Reef Invertebrates" by
 Dr. S.A. Reed
 30 OFS: "Life on a Coral Reef"

Windward

09 Night observations of animals at Ft. Kam mud flats
 17 Phytoplankton tow of Kaneohe Bay
 24 Field trip to Makai Range and coral industry facilities

OCTOBER 1977

Manoa

04 MOP seminar: Doug Davis on work done with NMFS aboard
 the R/V *Townsend Cromwell* in the Leeward Islands
 08-10 Dive cruise
 19 DAP: Hawaiian reef fish class
 26 DAP: Hawaiian reef fish class film--"Behavior and
 Ecology of Coral Reef Fishes"

*OFS = Ocean Film Series

†STO = Selected Topics in Oceanography

Hilo

- 07 OFS: "Waves on Water," "Tuna Fishing in Hawaii," Tuna
Packing"
14 OFS: "Fire Under the Sea," "Heartbeat of a Volcano"
21 OFS: "Carnival of the Sea"
28 OFS: "Great Barrier Reef"

Windward

- 08 Survey of Kualoa Beach organisms
14 Kahana Bay fish survey

NOVEMBER 1977

Manoa

- 01 MOP seminar: Pamela Ching and Cindy Baldwin on an
ecological survey of south Kona
02 Quarry pond fishing derby, co-sponsored by the Campus
Center Snack Bar
04 Law of the Sea Institute 11th Annual Conference
09 DAP: Hawaiian reef fish class lecture on sharks by Dr.
Leighton Taylor
MOP seminar: Lisa Boucher on behavioral ecology of
butterflyfishes
16 DAP: Hawaiian reef fish class slide presentation--
"Ancient Hawaii in Harmony with the Sea" by Margaret
Titcomb
30 DAP: Hawaiian reef fish class

Hilo

- 04 OFS: "Coelenterata"
05-06 Diving and camp-out at Kapaa
Field trip to Pacific Tropical Fish Company's holding
facility at Kailua-Kona
18 OFS: "Crustaceans and Echinodermata"

Windward

- 11 Night survey of Kaaawa reef animals
12 Field trip to the Oceanic Institute
19 Picnic at Kualoa Beach Park
21 Field trip to Honolulu Fish Auction and Fish Market

DECEMBER 1977

Manoa

- 01 Earth Day Revisited event
06 MOP seminar: Slideshow of Waikiki Aquarium's marine study
tour of Ponape, Guam, and Palau
07 DAP: Hawaiian reef fish class

14 DAP: Hawaiian reef fish class
17 MOP graduation party at the Waikiki Aquarium
21 DAP: Hawaiian reef fish class final exam

Hilo

02 OFS: "Challenge of the Oceans"
02-03 STO: Biology 194--Salt Water Aquarium Management by
Bruce Carlson
09 OFS: "Whaling," "The Northern Elephant Seal"

Windward

03 Survey of tidepool organisms at Makapuu and Sandy Beach
10 Field trip to Kahuku Seafood Plantation
11 Fish survey and picnic at Hanauma Bay

JANUARY 1978

Manoa

07-09 Dive cruise
21 DAP: Hawaiian limu class
28 DAP: Hawaiian limu class

FEBRUARY 1978

Manoa

04 DAP: Hawaiian limu class
06 Field trip to United Fishing Agency auction
11 Field trip onboard R/V *Machias* (oceanographic cruise)
DAP: Hawaiian limu class
13 Legislative hearing on MOP--House Committee on Ocean and
Marine Resources and House Committee on Higher
Education
13-17 Makahiki Kai
18-20
15 DAP: Hawaiian limu class
22 DAP: Hawaiian limu class
28 MOP seminar: Terry Morin on underwater scenery in
Indonesia

Hilo

14 Meeting with the state Division of Fish and Game to
discuss baseline study of Waiakea pond

Windward

11 Phytoplankton tow of Kaneohe Bay and tour of the Hawaii
Institute of Marine Biology's facilities
13 Field trip to Anuenue Fisheries Research Center

18 Field trip onboard R/V *Machias* (oceanographic cruise)
25 Field trip to Kahuku Seafood Plantation

MARCH 1978

Manoa

07 MOP seminar: Deann Hawkins on video documentation of
North shore surfing
13 Alan Okamoto comes aboard as the acting Manoa coordinator
15 MOP seminar: Mark Scheele on scuba diving
21 MOP seminar: Film--"Things That Go Bump in the Nite"
Quarry pond fishing derby, co-sponsored by the Campus
Center Snack Bar
23 Night dive and beach party at Hanauma Bay
26-April 1 DAP: Baseline studies at Papohaku Beach, Molokai
29 Marine studies lecture series at the Waikiki Aquarium

Hilo

08 OFS: "Deeply Submerged Terraces," "Buoyant Transport
Vehicles," "Decade of Discovery in the Depths," "A
Navigation System for Dives," "To Sink a House"
25-27 Dive and camp-out at Manuka
29 General membership meeting for all MOP students with
John McMahon

Windward

04 Field trip onboard the glass bottom boat at Kaneohe Bay
STO: Oceanographic techniques workshop at HIMB
11 STO: Oceanographic techniques workshop at HIMB
18 STO: Oceanographic techniques workshop at HIMB

APRIL 1978

Manoa

11 MOP seminar: Scott Johnson on Hawaiian nudibranchs
12 Marine studies lecture series at Waikiki Aquarium
20-29 Research cruise onboard R/V *Kana Keoki*
21 Field trip to the Diver and Escape Training Center at
Pearl Harbor
26 Marine studies lecture series at Waikiki Aquarium

Hilo

08-09 Dive cruise
22-23 Dive cruise
29-30 STO: "Introduction to Hawaiian Reef Fish" by Dr.
Leighton Taylor

Windward

01 STO: Oceanographic techniques workshop at HIMB
15 MOP display booth at Windward Community College's
Ho'olaule'a
19 Field trip to GasCo cooking demonstration utilizing
limu
24 Limu luncheon

MAY 1978

Manoa

19 Combined Manoa, Windward, and Honolulu MOP graduation
party
22 Randy Nishimura comes aboard as the Manoa MOP coordinator
23-24 Dive cruise organized by Athline Clark and Mark Scheele
26 Renovation of MOP office

Hilo

20 Hilo MOP graduation
30 Del Dykes comes aboard as the Hilo MOP coordinator

JUNE 1980

Manoa

10 Silk screening of MOP t-shirts
13-15 Sea Grant site team visitation
22-31 Research cruise onboard the R/V *Kana Keoki*

APPENDIX B. MOP SKILL-PROJECT REPORTS, 1977-78

- *Akita, G.Y. 1977. *Internship with the State of Hawaii*. Office of the Marine Affairs Coordinator.
- Baldwin, C.L. et al. 1977. *Kauai Coastal Zone Resource Survey*.
- *Botello, M.C. et al. 1977. *The Rearing of Topminnows in Richardson's Pond*.
- *Brittain, A.M. 1978. *Chemosensory Attracting and Guiding of Yellowfin Tuna*.
- *Carter, J.W. *Fido VII: 12-4 Watch, July 26 - August 4, 1977*.
- *Carter, J.W., and J. Higham. 1978. *A Method for Examining Visual Discrimination in Muraena pardalis*.
- *Clark, A.M., and D.B. Eckert. 1977. *The Second Annual Quarry Pond Fishing Derby*.
- *Cowles, L.E. 1977. *Status of Damselflies (Odonata: Zygoptera) in Hawaii in 1977 with Special Reference to the Endemic Genus Megalarion*.
- *Fitzgerald, J.L. 1978. *Skill Report of Assignment to the National Marine Fisheries Service, Honolulu, Hawaii*.
- *Gibson, H.K. 1978. *A Reconnaissance Study of Lokoaka Pond*.
- James, M.J. 1977. *The Comparative Morphology of Conus Radulaei Observations with Scanning Electron Microscopy*.
- *Kam, A.K.H. 1977. *A Survey of Green Turtles at Select Locations in the Hawaiian Archipelago*.
- *Kim, E. 1977. *NOSC Employment Summary*.
- *Lancaster, M.S. 1977. *Apprenticeship at Naval Ocean Systems Center*.
- *Ma, J.S. 1977. *Skills Learned from Canoe Paddling*.

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- *Muranaka, M.T. 1977. *Starch Gel Electrophoresis of Prawns*.
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- *Price, H.J. 1977. *Student Intern Report: Marine Affairs Coordinator's Office*.
- *Rawlins, D., and P. Ching. 1977. *Stomach Content Analysis*.
- Senaga, J.H. 1977. *Evaluation of Three-Day Fishing Clinic, August 1977*.
- Sinai, J. 1977. *Sediment Study in Kaneohe Bay*.
- Stahl, K.I. 1977. *The Feeding Intensity of Larval *Moi*, *Polydactylus sexfilis*, on *Artemia nauplii**.
- Stellmach, D. 1977. *Genetic Identity of *Macrobrachium rosenbergii* populations*.
- Stellmach, D. 1977. *The Technique of Zone Electrophoresis with *Macrobrachium rosenbergii**.
- Suiso, M., et al. 1977. *The First Annual Quarry Pond Fishing Derby*.
- *Suiso, M. 1978. *Journal of a Fish Production Technician*.
- Tachibana, A. 1977. *Ono Hawaiian Shark Recipes*.
- Takemoto, R. 1977. *Internship in the Coastal Zone Management Program*.
- Tamaru, C.S. 1977. *Aspects on the Biology of Selected Commercial Fish Species, with [comments on] the Use of the Fish Market as a Source of Material*.
- Wright, L., and M. Lay. 1977. *Investigation of the Green Sea Turtle at Ka'u Hawaii*.

APPENDIX C. GRADUATES (1977-1978)

Graduate	Skill	Major
Fall 1977: Manoa		
Akita, Geoffrey Y.	Ecological baseline survey techniques and marine programs coordination	Zoology
Beasley, Kim P.	Scuba instruction	Geography
Boucher, Lisa M.	Ecological baseline survey techniques, analysis of reef fish behavior, and teaching at sea	Zoology
Ching, Pamela J.	Ecological baseline survey techniques and fish diet analysis	Psychology
Ma, Josanne M.	Canoe handling and navigation	Tropical Agriculture
Muraoka, Gordon Y.	Ecological baseline survey techniques	Zoology
Stelmach, Debbie	Prawn genetics	Biology
Tanoue, Dwight T.	Fishpond operations	Zoology
Fall 1977: Honolulu Community College		
Matsukawa, Michael	Food-fish culture	Biology
Mochizuki, Eric A.	Marine electronics	Electronics Technology
Shintani, Michael M.	Marine electronics	Electronics Technology
Spring 1978: Manoa		
Brittain, Andrew M.	Chemical analysis of tuna attractants	Biology
Carter, Jeffrey P.	Sailing instruction and ethology	Chemistry
Kam, Alan K.H.	Marine turtle studies	Sociology

Muranaka, Mark T.	Prawn genetics	Zoology
Nakagawa, Neil N.	Fishpond aquaculture	Tropical Agriculture
Nishimura, Randall T.	Aquaculture economics	Business Economics
Price, Holly J.	Baseline studies	Zoology
Takenaka, Steven M.	Baseline studies	Zoology
Tarr, Arthur B.	Baseline studies	Religion/History
<hr/>		
Spring 1978:	Hilo	
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Dickson, Debbie A.	Marine curriculum development	Education
Dykes, John D., Jr.	Baseline studies and marine education	Liberal Studies
Sitan, Peter	Fish identification	Biology
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Spring 1978:	Windward Community College	
<hr/>		
Fullard-Leo, Betty J.	Topminnow (<i>Polydactylus sexfilis</i>) and mao mao (<i>Abudefduf abdominalis</i>) aquaculture	Liberal Arts
Neill, Janice A.	Moi (<i>Polydactylus sexfilis</i>) and mao mao (<i>Abudefduf abdominalis</i>) aquaculture	Liberal Arts
Rasmussen, George T.	Meteorology and oceanographic data acquisition	Liberal Arts
Roper, Gail	Olympic and masters swimming and aquatics coaching	Liberal Arts
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Spring 1978:	Honolulu Community College	
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Potter, William	Marine Biology	Biology
Sims, Bill	Marine Mechanical Technical Training	Machine Technology