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SCHOOL OF SCIENCE OREGON STATE COLLEGE



NEHALEM R.
TILLAMOOK BAY

SILETZ R.

YAQUINA R.
ALSEA R.

SIUSLAW R.

UMPQUA R.
COOS BAY

COQUILLE R.

ROGUE R.

OSC

COLUMBIA RIVER

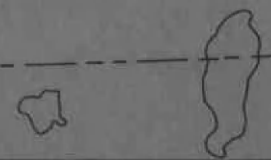
PRESENT RESEARCH, FACILITIES AND STAFF

by
June G. Pattullo

Office of Naval Research
Contract Nonr 1286(02)
Project NR 083-102

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Progress Report No. 1 December 1960
Reference 60-3



Oregon State College
Oceanography

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Department of Oceanography
SCHOOL OF SCIENCE
OREGON STATE COLLEGE
Corvallis, Oregon

PRESENT RESEARCH, FACILITIES AND STAFF

by

June G. Pattullo

Progress Report No. 1

Office of Naval Research
Contract Nonr 1286(02)
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Reference 60-3
December 1960

Wayne V. Burt
Chairman

ONR PROGRESS REPORT

INTRODUCTION

This report summarizes the present status of research work at the Department of Oceanography, Oregon State College, under Contract Nonr 1286(02) Project NR 083-102 with the Office of Naval Research. After this date quarterly progress reports will be submitted.

RESEARCH IN PROGRESS

Hydrographic Survey of Oregon Coastal Waters -- Mr. Bruce Wyatt.

From July 1958 through July 1959, with the cooperation of the U. S. Coast Guard and the use of a Coast Guard surf boat, monthly cruises were made along the parallel $44^{\circ} 38''\text{N}$. Water samples were collected for salinity and oxygen determinations at five stations spaced at equal intervals from 5 to 25 miles offshore, and temperatures were read from thermometers placed in the collecting bottles. Bathythermograph casts were also made. All analyses have been completed, including the drawing of sections showing the distribution of properties, under the direction of Mr. Wyatt and Mr. Richard Callaway.¹ A technical report on this work has been prepared and will be distributed within the next quarter.

Since July 1959, but continuing on a monthly basis only since December 1959, the line of stations along this parallel has been extended to 45 miles from the coast. Observations have been made using fishing vessels (from 45 to 80 feet in length) chartered locally. In addition to the standard line along the parallel named, two additional latitudinal lines have been run since June 1960 90 miles to the north (off Astoria) and 90 miles to the south (off Coos Bay). This work is still in progress. After enough cruises have been made to be representative of all seasons a report will be prepared on these data. Through November 1960, the observations have included 200 hydrographic casts and 230 BT observations taken during 83 days at sea. This does not include the estuarine surveys or the special cruises discussed below.

Special Cruises

From 29 June to 13 July 1960 a detailed study was made of hydrographic and biological conditions off the coast, in cooperation with the Oregon Fish Commission. The area covered was from 42°N to the mouth of the Columbia and from the coast to 127°W . Analyses of the data have been made by Mr. Robert Ayers of the Oregon Fish Commission, and by Mr. Wyatt; these will appear in the data report.

¹Present affiliation, U. S. Public Health Service, Portland, Oregon.

From September 11 through 18, in cooperation with the Department of Geology, a geological sampling cruise was made in and offshore from Coos Bay. Samples of bottom sediments in the area were collected by use of a Phleger corer, snapper, and scoop-fish, and six students were given training in sampling techniques.

Plankton Inventories -- Dr. Herbert Frolander.

Each week starting 20 November 1959, data have been collected in Yaquina Bay for a determination of the variations in the distribution and abundance of the plankton populations. Mr. Douglas Manske, research assistant and graduate student, assists with this observational program. Collections are made at two stations, one near the entrance and one representation of the central part of the bay. Quantitative samples are taken with a Clarke-Bumpus sampler, with numbers six and twelve mesh nets, and a half-meter net (number six mesh). Temperature is measured and a surface water sample taken for salinity determinations.

On each cruise, during the school term, one or two students are taken on the sampling cruise in order to train them in collecting methods and to teach them the rudiments of small craft handling. All analyses are made immediately upon return of the samples to the College, by Dr. Frolander and his assistants. Principal species are identified and counted; part of a sample from each station is frozen and preserved for future analysis of food value, and volumetric analyses will be begun shortly.

The forms usually found are types generally associated with waters found north of 40°N latitude. On occasion, however, appreciable numbers of a nonpermanent copepod usually representative of waters to the south of this latitude are taken. The water characteristics also change markedly at these times, becoming warmer and saltier, and even the optical characteristics are distinctive. The water appears green and cloudy to the unaided eye of an experienced observer. These events are apparently related to the northward flow of water along the coast as estimated from the distribution of properties in the ocean and from drift bottle tracks. Plans are being made to study these occurrences, as well as the more normal state, in considerably more detail.

Estuarine Studies -- Mr. W. Bruce McAlister.

A program has been established in Coos Bay to investigate the relationship of runoff to observed current flow patterns. This should yield more insight into the effects of boundary conditions and physical parameters upon the patterns of estuarine mixing.

During the past year Mr. McAlister has reported on his work at the International Oceanographic Congress in New York, and at the Twelfth General Assembly of the International Union of Geodesy and Geophysics in Helsinki. He participated in a Symposium on Oceanographic Pollution Problems held in Portland, Oregon. He has written the following papers:

"Recent Studies in the Hydrography of Oregon Estuaries," Wayne V. Burt and W. Bruce McAlister, Res. Briefs, Fish Commission of Oregon, 7(1):14-27, July, 1959.

"Predictions of Hydrographic Conditions at the Proposed Barrier Sites in the San Francisco Bay System," William B. McAlister, study for the Bay Barrier Project, 1-RB, Bureau of Sports Fisheries and Wildlife. Biological Laboratory, Bureau of Commercial Fisheries, Seattle 2, Washington, 31 March 1960.

"Dynamics of a Fiord Estuary," University of Washington, Technical Report.

FACILITIES

The department is housed in seven rooms, approximately 1500 square feet of offices and laboratory space, in the Food Technology Building on the Oregon State College campus. Investigation is being made of possible use of a bayside site on the shores of Yaquina Bay as a base for the ACONA. The department has a 16 foot Bell-Boy skiff used in the bay surveys, and a 26 foot diesel-powered work boat.

Research Vessel ACONA

Construction of this specially designed vessel was begun in late June, and work is now about 70 per cent complete. The vessel is expected to be in use by next spring. A report containing specifications and plans of the ship has been issued: Technical Report No. 10, Reference 60-2, Department of Oceanography, Oregon State College. Copies of this report are available, and will be sent to interested persons on request.

STAFF

The following personnel have worked on this project, part time, during the past year:

Dr. Wayne V. Burt, Professor, Chairman of the Department of Oceanography.
Dr. Herbert F. Frolander, Associate Professor, (Biological Oceanography).
Mr. W. Bruce McAlister, Instructor, (Physical and Chemical Oceanography).
Mr. Bruce Wyatt, Instructor, (Instruments and Field Work).
Mrs. Joanne Shiner, Secretary.

Temporary Research and Clerical Assistants

Barbara Morris, Barbara Thomas, Robert Staples, Richard Wallace, Daniel

Hennick, James Meehan, Allen Davis, R. Michael Laurs, Terry Holubetz, Leslie M. Kemp, George Ditsworth, Jackie Tandy, Lillie Muller, Edison Quan, Paul DuMont, Arvo Riikula, Richard Reynolds, Randall Brown, Roger Yorton, Edmund Sorman, Larry Morris, William Marker, John Bubb, Maurice Banning, Dorothy Gimbol, Gerald Davis, Dennis Duncan, Donald Duncan, and Alan Forrest.

Biographical sketches of some of the newer department members follow:

Dr. Herbert F. Frolander, Associate Professor (Biological Oceanography). Dr. Frolander joined the staff at the beginning of the academic year, 1959-60. Before coming to Oregon State he was on the faculty of the Department of Oceanography of the University of Washington. His research there was in the study of the zooplankton of the Gulf of Alaska and Puget Sound; he has taken part in major oceanographic explorations and has served as Chief Scientist. Dr. Frolander has instituted a continuing program of sampling of zooplankton populations of Oregon coastal waters through which he has discovered the intermittent presence of a nonpermanent copepod apparently indicative of the presence of warm saline water from the south (see Work in Progress). He has developed several courses in biological oceanography and teaches the popular, nontechnical introductory course in general oceanography.

With the use of the new vessel, the R. V. ACONA, Dr. Frolander plans to extend the sampling program and hopes to be able to relate the distributions observed to water motions observed by other techniques. Together with Dr. William Percy (q.v.) he will study the food-chain relationships in Oregon waters.

Dr. Frolander took his bachelor's degree at Rhode Island College of Education and received his Master of Science and Ph.D. in biology at Brown University. He is a member of the ASLO, Phi Sigma Biological Society and Sigma Xi. During World War II he served in the United States Army. He is married and has four children.

Mr. William Bruce McAlister, Research Associate (Physical and Chemical Oceanography). Mr. McAlister has been with the department since its formal organization; he joined the staff of Oregon State College (in the Department of General Science) in the fall of 1957. Before coming to Oregon State he had been with the University of Washington working on estuarine problems, and he has published a number of papers concerning hydrographic conditions and flushing of estuaries in Washington, Oregon and California. His interests include general descriptive oceanography, chemical oceanography, marine hydrodynamics, and estuarine circulations. Since coming to Oregon he has studied various local estuaries and is presently measuring runoff and current flow in Coos Bay in order to determine the diffusion coefficients in that body of water. In cooperation with Dr. Burt, Mr. McAlister has been very active in establishing and teaching several of the courses offered in our teaching program: the basic three-term sequence in physical oceanography, a course in chemical methods, marine hydrodynamics, and waves and tides.

Mr. McAlister took his B.S. in Mathematics at the University of Washington

in 1949, and his M.S. in Oceanography also at Washington in 1957. He expects to complete his doctorate at Oregon State College shortly. For four years he taught high school mathematics and physics in the Seattle Public School System. He is a member of Sigma Xi, Pi Mu Epsilon, ASLO and the Oregon Marine Biological Society.

Mr. Bruce Wyatt, Research Associate (Instruments and Field Work). Mr. Wyatt joined the staff in the fall of 1959. He had been with the Texas Fish and Game Commission in Rockport, Texas, working on bay studies and tracking the migration of the white shrimp population. He has had wide experience in observational work: in 1954 he spent three months in Alaska working with the U. S. Fish and Wildlife Service on stream improvement surveys connected with the sockeye salmon investigations. In 1955, he participated in the NORPAC project on board the HUGH M SMITH of the Pacific Oceanic Fisheries Investigations (now Bureau of Commercial Fisheries). During February of this year, he participated in the Pacific track of the maiden oceanographic voyage of the U. S. Coast and Geodetic Survey ship the EXPLORER.

Since he has been at Oregon State, Mr. Wyatt has been in charge of the monthly hydrographic surveys offshore and, with Dr. Frolander, of the weekly plankton surveys in Yaquina Bay. He has also coordinated the special cruises made in conjunction with other departments and organizations (see Work in Progress). He has supervised the preparation of a data report on the results of the offshore surveys. In conjunction with other department members he is now working on revised cruise plans for both the charter boat observations and the ACONA cruises, in order to explore fully the features suggested in the results to date.

Mr. Wyatt received his B.S. in Fisheries Biology from Humboldt State College in 1956, and his M.S. in Fisheries Biology from Oregon State College in 1959. He is a member of the American Fisheries Society. He has completed a tour of duty in the U. S. Army.

With the beginning of the new academic year, the following people have joined the department and will be working, half time, on this Project:

Dr. June G. Pattullo, Associate Professor (Physical Oceanography). Since 1948 Dr. Pattullo has been on the staff of Scripps Institution of Oceanography doing research on the study of temperature structure of the ocean, heat and water budgets, and seasonal variations in sea level. For the past four years, she has been principal scientist for the planning and operation of the U. S. IGY Island Observatories Program for sea level studies in the Pacific Ocean. During the observational period of this project, Dr. Pattullo spent six months on Tahiti supervising two observatories in French Polynesia and effecting liaison with the French IGY officers in the Pacific area. The results of this program have been reported on at various international and regional conferences and in several papers which have been submitted for

publication. Dr. Pattullo will be studying the hydrography of the waters off the Oregon coast, the distribution of properties and their variations, and the relationships between the features observed locally and the oceanographic and meteorological patterns in the Pacific Ocean as a whole.

Dr. Pattullo received a B.S. degree in Meteorology from the University of Chicago in 1948, an M.S. (1950) and a Ph.D. (1957) from the University of California at Los Angeles, in Oceanography. She is a member of the AAAS, ASLO, AMS, Phi Beta Kappa, and Sigma Xi. She is also a member of the Committee for Mean Sea Level of the International Association of Physical Oceanography. During World War II, Dr. Pattullo served with the U. S. Marine Corps, Women's Reserve, as an aerographer.

Dr. John V. Byrne, Associate Professor (Geological Oceanography). Dr. Byrne comes to Oregon State from the Humble Oil and Refining Company, Houston, Texas, where he worked for three years in the Geologic Research Section on studies of recent sediments. Included among these studies were field surveys and laboratory investigations of the textures, structures, and faunas of shallow-water sediments of the Gulf of Mexico, as well as laboratory studies of cores of deep-sea sediments from various parts of the world. A method developed by Byrne and his associates at Humble makes it possible to preserve core sections of unconsolidated sediment in clear plastic without altering the original properties of the sediment. Field work undertaken prior to his work at Humble includes coral reef studies in the Bahamas and the geological mapping of the atoll Raroia (of Kon-Tiki fame). Dr. Byrne plans to initiate a thorough survey of the topography and bottom-sediment types off the Oregon coast, where very little mapping has been done. He also plans detailed investigations of Astoria submarine canyon off the Columbia River, including sub-bottom surveys across the shelf.

Dr. Byrne received his B.A. in Geology from Hamilton College in 1951, his M.A. from Columbia in 1953, and his Ph.D. from the University of Southern California in 1957. He is a member of the AAAS, GSA, AAPG, SEPM and Sigma Xi. He is married and has three daughters, including a set of twins.

Dr. William G. Percy, Assistant Professor (Biological Oceanography). Dr. Percy has been working at the Bingham Oceanographic Laboratories with Drs. Riley and Merriman, studying the population ecology of larval and juvenile stages of a common species of flounder. Dr. Percy plans to conduct research on the distribution and abundance of the nektonic populations off the Oregon coast, using the Isaacs-Kidd midwater trawl as well as sampling devices for demersal species. This will be integrated with the overall biological and physical programs for the purpose of improving our knowledge of marine productivity and food-chain relationships.

Dr. Percy received his B.S. in Zoology, in 1951, and his M.S. in 1952, both from Iowa State University. He took his Ph.D. at Yale in 1960. In addition, he spent a year at the University of Hawaii studying biological

oceanography. He served three years in the U. S. Navy, principally in the Mediterranean area. He is married and has one daughter.

Miss Elizabeth Strong, Research Associate. For the past twelve years, Miss Strong has been assistant to Dr. Walter Munk of the University of California at La Jolla, California. Recently, much of her work has been in the reduction and analysis of ocean wave records by high-speed electronic computer. In 1951 she was a member of the field party led by Dr. Charles Cox on Maui, in the Hawaiian Islands, studying the characteristics of sun glitter on the sea, in order to determine the properties of sea surface ripples at various wind speeds. She will assist the department chairman in research and contract administration.

Miss Strong received her B.A. in Mathematics (with a minor in Biology) from New York State College for Teachers in 1937. She is a member of the AAAS. She served three years in the U. S. Marine Corps Women's Reserve during World War II.

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