



NOAA WEEK

U.S. DEPARTMENT OF COMMERCE National Oceanic and Atmospheric Administration

Florida Straits Studied In Three-Man Submarine

A three-week investigation of the ocean floor in the Straits of Florida, using a research submarine, was started October 8, when scientists from the Atlantic Oceanographic and Meteorological Laboratories (AOML) left Miami on board LULU, the research submarine support catamaran of Woods Hole Oceanographic Institution. The Woods Hole research submarine ALVIN is being used for the dives, which began south of the Dry Tortugas.

The studies are designed to investigate the relationships between bottom currents, specific seafloor features, and geological processes in the Straits of Florida. Earlier studies broadly outlined the features of the seafloor, but certain anomalies were discovered that the AOML scientists hope to explore in detail and ultimately explain. Their efforts are

supported by NOAA's Manned Undersea Science and Technology (MUST) program, to make undersea facilities available for research.

Dr. George Keller, Director of AOML's Marine Geology and Geophysics Laboratory, heads the team, which includes scientists from AOML, Woods Hole, and the University of Miami. Specific underwater anomalies to be investigated by the team on ALVIN include: the Tortugas and Agassiz sea valleys south of the Dry Tortugas; Pourtales Terrace sediment ridges; Pourtales Terrace sink holes; Pourtales Terrace Knolls; South Bimini sand waves; and Little Bahama Bank sea floor undulations.

In addition to Dr. Keller, scientific team members include John Kofoed, Douglas Lambert, Cdr. Don Florwick, George Lapiene, and Terry Hood of AOML, Robert Ballard of Woods Hole, and Dr. A. Conrad Neumann of the University of Miami's Rosenstiel School of Marine and Atmospheric Sciences. Expedition leader for Woods Hole is William Rainey, and Robert Ballard of Woods Hole is surface controller for the operations.

The Woods Hole submersible ALVIN is a deep-diving research vessel with a length of 23 feet, eight-foot beam, and 15-ton displacement. Its top speed is three knots, and it has a submerged range of 10 to 15 miles, with a design operating depth of 6,500 feet. The pressure sphere accommodates a pilot and two observers, together with instrumentation and life-support equipment that provide an endurance of 24 hours or more.

LULU is the Woods Hole submarine tender and support vessel designed for use with ALVIN. She has a length overall of 102 feet, beam of 48 feet, and 500 ton displacement. Her catamaran hulls are 20 feet apart, providing total deck area of 2000 square feet.'



Submarine ALVIN on deck of catamaran LULU

\$1,164,000 Sea Grant Awarded To University of Hawaii

A Sea Grant of \$1,164,000 has been awarded to the University of Hawaii for its fourth year of integrated research, education, and marine advisory services in utilization of marine resources. Aquaculture has constituted a major part of the Hawaii Sea Grant program. It includes both the culture of marine algae (seaweeds) as a source of food colloids, and investigating a wide variety of finfish and shellfish for possible use in aquaculture. Much of the marine algae work has been done in the Philippines, and the major parts of the Philippine operations are expected to be completed during this year. Part of the NOAA grant will be used to shift efforts toward introducing into other areas of the Pacific some of the techniques they have learned in the Philippines. A major effort will be initiated under the new NOAA grant to study the quality of coastal waters around the Hawaiian islands. Director of the Sea Grant program at the University of Hawaii is Dr. Jack R. Davidson. Participating and cooperating institutions also include Leeward Community College--which is carrying out a training program for marine technicians--and the Oceanic Institute.

Awards Night Rescheduled

The first annual NOAA Awards Night has been rescheduled for Friday, December 3. when a dinner-dance will be held at the Indian Spring Country Club, 13501 Layhill Road, Silver Spring, Maryland.

The event will be highlighted by the presentation of \$1000 awards for outstanding public service, scientific research and achievement, engineering and applications development, and program administration and management.

The cocktail hour--with an open bar--will begin at 7 p.m., and will be followed by a dinner featuring roast prime ribs of beef. Dancing will begin at 10 p.m.

To reserve tables for this gala event, call Mary Gearhart, 496-8134, or Mary Moore, 496-8347.

Spaceflight Meteorology Group Receives NASA Achievement Award

At a NASA-wide awards ceremony held at the Manned Spacecraft Center in Houston, Tex., on October 5, the National Weather Service Spaceflight Meteorology Group at the Kennedy Space Center was given a NASA Group Achievement Award "For exceptional performance of duty during the checkout and launching of Apollo 15. Their accurate assessment of the lightning risk, quick response to the need for warning, and cooperation with test managers during severe thunderstorm periods greatly facilitated the checkout and successful launching of Apollo 15."

Ernest A. Amman, MIC of the Spaceflight Meteorology Group section at Kennedy Space Center was flown to the Manned Spacecraft Center via NASA aircraft to accept the award for the group, which also includes James R. Nicholson, John C. O'Brien, John L. Harper (now at the Corpus Christi, Tex., Weather Service Office), and Sarah F. Greenfield.

Kenneth M. Nagler, Chief of the Space Operations Support Division at Silver Spring, Md., explained that, "During the 57 days Apollo 15 was on the launch pad, there were 45 thunderstorm days (41 during the last 49 days, seven storms on one day); on 26 days thunderstorms developed within an area of two miles of the pad; on six days lightning struck the mobile launch; 13 strokes of lightning were counted as affecting ground equipment; 57 lightning warnings were issued; and the launch pad area was under lightning warning for 103 hours.

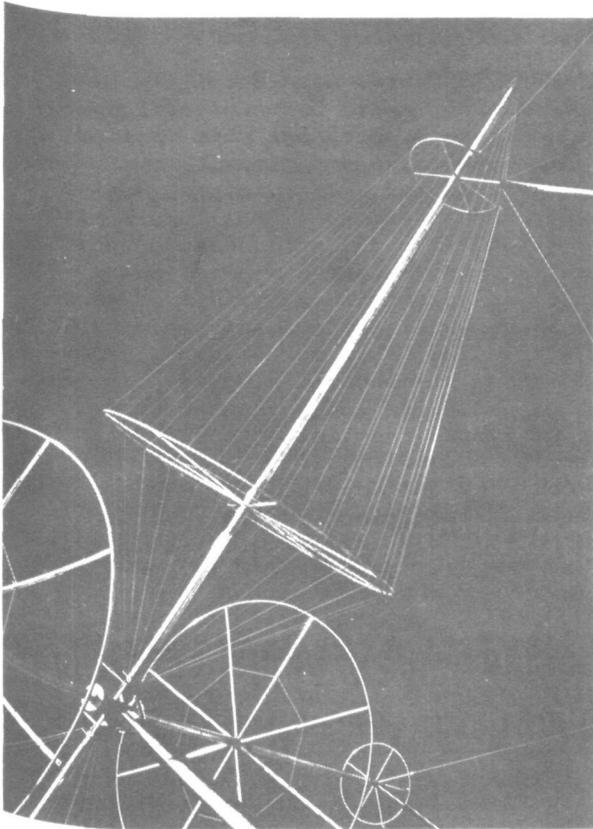
"Each of the above necessitated decisions on whether--or how much longer--work could safely proceed, and on how soon afterward it could safely be resumed, decisions pressured by both the time shortage and the safety factor."

Pennsylvania State Tax To Be Withheld

Pennsylvania state income tax withholdings will commence with salary checks dated October 27, 1971, for employees paid biweekly and semimonthly wage marine employees, and checks dated October 30, 1971, for commissioned officers subject to the tax.

The rate of tax will be 2.3% of gross wages for married and single employees.

Scientists Use Radio Transmitter To Create Ionospheric Bubbles



One of the 10 elements of the 360-foot-diameter radio transmitter array near Boulder, Colorado

Commerce Department scientists are creating immense, invisible, short-lived bubbles in the upper atmosphere in a new kind of investigation made possible by an advanced radio transmitter.

The heated bubbles are formed in seconds at altitudes up to 200 miles by the action of a 100-million-watt radio beam.

They grow to their full 50-to-100-mile size in about 20 minutes under the influence of geomagnetic forces. Composed of the electrified gas of the ionosphere, the bubbles elongate upward and downward under constriction of "tubes of force" that are generated and shaped by the earth's magnetic field.

Within minutes or hours, depending on time of day and conditions in the high-level environment, the modified region of the ionosphere rebounds to its natural state.

Observations of these effects on the upper atmosphere should lead to better understanding of the ionosphere, to im-

provements in long-distance radio communications, and to the advancement of plasma physics, a science that has such potential applications as power production by nuclear fusion and magnetohydrodynamics.

Results of the first year of research were reported today in the journal *Science* by two Commerce Department scientists--Dr. William F. Utlaut, deputy director of the Institute for Telecommunications Sciences, Office of Telecommunications; and Dr. Robert Cohen, consultant to NOAA's Aeronomy Laboratory.

A new transmitter located at Platteville, Colorado, 40 miles east of Boulder, comprises a 360-foot, nine-element circular array of antennas, with an additional element in the center for beam focussing. It is capable of projecting effectively a 100-megawatt radio beam that is tunable between 5 and 10 megahertz, the usual range of ionospheric penetration frequencies.

The intense beam is transmitted straight up at very close to the penetration frequency--the frequency at which a radio wave passes completely through the ionosphere. The purpose is to deposit a maximum of radio energy in the ionosphere. The closer the transmitted beam approaches the penetration frequency, the higher it reaches before being bent back to earth, the more it is slowed down, the longer it remains in the ionosphere, and the more its energy is absorbed. Within about 20 seconds, electrons in the ionosphere are heated, raising their temperatures by as much as 35 percent. The heat bubble expands more slowly, but in 20 minutes or so, its dimensions may grow to 50 or 100 miles.

A major surprise in the experiment was the artificial creation of a natural phenomenon known as Spread F -- "F" referring to the upper layer of the radio-reflecting region of the ionosphere and "Spread" describing the patchy patterns of reflected signals. Under certain natural and as yet unexplained conditions, F-region echoes become diffuse, suggesting instabilities in the ionospheric plasma. If they do appear, it is almost always at night, generally after midnight. No one had predicted that the Platteville transmitter was capable of generating this Spread F, but it occurred repeatedly, in daytime as well as at night.

New System Provides Viewer Latest Weather Forecast on TV



Weather information displayed on television screen in new Florida service

A new system being installed this week by a cable TV company in Ft. Walton Beach, Fla., will enable its subscribers to tune their television sets to a particular channel and see displayed on the screen the correct time and the latest weather forecast for their area.

Called an automatic cablecasting system, it will be attached to the NOAA Weather Wire Service teletypewriter circuit, from which it will select automatically only those forecasts concerning the extreme northwest Florida area, storing each forecast until it is updated by a subsequent one.

It is expected that this service will expand to other areas served by cable companies in the future.

Schedule Announced for Payroll Deductions For 1972 Combined Campaign Contributions

For employees who authorize a payroll deduction for their contributions to the Combined Federal Campaign (CFC): Your first deduction on the biweekly payroll will be Pay Period number 2, check dated January 19, 1972. The last deduction for Calendar Year 1972 will be Pay Period number 1 of 1973, check dated January 3, 1973.

Employees paid on the semimonthly payroll will have their first deduction on Pay Period number 1 of 1972, and last deduction on Pay Period number 24 of 1972.

EDS Now Computerizing Part Of International Exchange Data

The Environmental Data Service's National Oceanographic Data Center (NODC) now prepares the oceanographic portion of the U.S. Declared National Program (DNP) by computer. The National Marine Data Center Inventory (NAMDI), collected by the NODC from national oceanographic organizations, contains a notation on whether or not the inventoried data are DNP, i.e., available for international exchange. The NAMDI information is entered into the General Information Processing System (GIPSY), a computer retrieval system. A list of the DNP-declaring organizations is printed by the computer and forwarded by NODC to the State Department for approval and forwarding to the Intergovernmental Oceanographic Commission Secretariat.

Fall Tours Begin at Lake Survey Center

After a comparatively "tour-less" summer, Lake Survey Center began a busy fall schedule of tours with 81 geography teachers from the Canadian Province of Ontario in its first group. Dr. Walter M. Tovell of the Royal Ontario Museum of Toronto helped coordinate the tour for the Canadian association of secondary teachers.

After being welcomed by Louise M. Buszka of the Center's Marine Mapping and Charting Division, they were familiarized with activities of the Limnology Division by Dr. Arthur P. Pinsak, head of the Water Characteristics Branch, and subsequently guided to the Programming Branch, Engraving Section, Camera Section, Laboratory (chemical) Branch, Ice Laboratory, and to the printing presses area. The tour, lasting about two hours, shows comprehensively to the layman and student the methods of chartmaking, research techniques, and the necessary skills for these employments.

A similar tour, appropriately modified to reflect the younger age of the visitors, was given for 80 fifth graders and 17 parents and teachers from the Harrison School in Romulus, Mich.

In addition, two smaller tours have been scheduled for November, one for the Geography Department of Michigan State University in Lansing and the other for a St. Clair Shores elementary school.

Forecasts, Facsimile Information Used In Training FSS Briefers



National Weather Service and Federal Aviation Administration instructors at the FAA Academy in Oklahoma City have developed a system of training Flight Service Station preflight briefers in a laboratory program that makes use of the latest teletypewriter and facsimile information and weather forecasts from NWS. Pictured are (left to right) James C. Fidler, NWS meteorologist instructor; Miss Cheryl Wright, FSS student, Class 72-1 and Bob Major, FSS instructor.

Computer Technology Expert Appointed by Geodetic Survey

Harold J. Welch, retired University of Michigan professor and an authority on computer technology, has been appointed as a research geodesist in the NOS' National Geodetic Survey. Mr. Welch will assist the National Geodetic Survey in establishing a new procedure for expediting the processing of geodetic data. In his new position, he will consult with Federal and local agencies, technical organizations, and surveyors and engineers in the development of computer systems for storing and retrieving large geodetic data banks and analyzing and adjusting survey and photogrammetric measurements, and will perform geometric design calculations for urban development, highway construction, and other large projects which require surveying and mapping information.

Mr. Welch formerly served with the Ocean Survey as a research geodesist while on sabbatical leave from the University of Michigan in 1968. He was the originator in 1957 of AGILE, the first of a series of computer programming languages sometimes referred to as "problem oriented languages."

Kirkness To Represent U.S. On Fur Seal Commission

Walter Kirkness, acting associate director for resource management of the National Marine Fisheries Service, has been appointed U.S. commissioner on the North Pacific Fur Seal Commission. Mr. Kirkness' appointment is in addition to his regular duties, and carries no additional salary. He succeeds John I. Hodges, who has been transferred.

The Commission is made up of one member from each of the four member nations, Canada, Japan, the United States, and the USSR. The current agreement entered into force October 14, 1957. Purpose of the convention is to take effective measures toward achieving the maximum sustainable productivity of the fur seal resources of the North Pacific Ocean. The Commission also seeks to maintain the fur seal populations at the levels which will provide the greatest harvest year after year, with due regard to their relation to the productivity of other living marine resources in the area.

World Data Centers Panel Meets in Moscow; Plans Compilation of Data Exchange Guide

The first meeting of the International Council of Scientific Unions (ICSU) Panel on World Data Centers (Geophysical and Solar) was held recently in Moscow. The Panel was formed in 1968. The main decision of the group was to arrange for the compilation of a "Consolidated Guide for International Data Exchange," in the various disciplines represented.

Held subsequent to the ICSU Panel conference was the first meeting of the Solar-Terrestrial Physics World Data Center operators since the creation of the Centers during the International Geophysical Year (1957). The general opinions were that: data flow needs to be speeded up to provide more current data; data center work should be publicized to a greater extent than before; a reference book of stations should be prepared giving observing program, investigator, institute, and address; and catalogs should be in the same uniform style to facilitate data exchange. Alan H. Shapley, EDS' Acting Associate Director for Geophysics, and J. Virginia Lincoln, Director of EDS' Aeronomy and Space Data Center, Boulder, Colo., were principal participants in the sessions.

Floyd S. Anders, Jr., Named To NMFS Southwest Region Post



Floyd S. Anders, Jr., has been named Deputy Regional Director of the National Marine Fisheries Service Southwest region, headquartered in Terminal Island, California. The appointment is effective October 17.

In his most recent post, Mr. Anders was chief of the NMFS Office of Resource Re-

search's technical advisory division. He entered Federal service in 1955 with the Fish and Wildlife Service, Department of the Interior, and in 1958 joined the Bureau of Commercial Fisheries, which was transferred to NOAA last year.

Satellite Altimetry Committee To Hold Second Meeting Next Month

A second meeting of the Working Committee on Satellite Altimetry to examine the utility of satellites carrying active microwave sensors is scheduled for November 3-4 at the National Environmental Satellite Service Suitland, Md., headquarters.

Preliminary studies have indicated that active radar systems aboard spacecraft can provide world-wide all-weather monitoring and prediction of certain oceanographic variables. Sea state, surface wind fields, intense current flows, tides, and perhaps storm surge could be observed if sufficiently precise measurements of satellite orbital and radar parameters can be made. Success in this effort depends on first developing a very accurate model of the geoid over the oceans.

In addition to Dr. John Apel of the ERL Atlantic Oceanographic and Meteorological Laboratories, chairman, the committee includes E. Geoffrey Albert and Jack H. Puerner, Office of Systems Engineering, and Dr. Alan E. Strong, Environmental Sciences Group, NESS; Reed Armstrong, Technical Advisory Division, NMFS; Bernard H. Chovitz, Geodetic Research & Development Laboratory, and Dr. Hyman Orlin, Earth Science Activities, NOS; Robert O. Cole and Earl W. Estelle, NMC Analysis & Forecast Division, Dr. Duane S. Cooley and Robert W. McCaslin, Weather Analysis & Prediction Division, and Max W. Mull, Marine Weather Services, NWS;

Hydrographic Surveys Underway Off Hawaii and California Coasts

The National Ocean Survey has begun a two-month hydrographic survey of the coastal waters off the west coast of Hawaii Island. The survey is part of a long-range program begun in 1961 to provide modern, detailed nautical charts of the state's nine islands for commerce, industry and recreation. Surveys around the islands of Lanai, Maui, Molokai and Kahoolawe and off the northwest coast of Hawaii have been completed.

This year's project started at Puu Kuili, where surveys terminated last year.

The NOAA Ship FAIRWEATHER, commanded by Captain Richard H. Houlder, will chart shore facilities, water depths over submerged hazards and the general shape of the ocean bottom. The information will be used in compiling four new nautical charts covering Hawaii Island's approximately 250-mile coastline, and incorporated into the first small-craft nautical chart to be issued of the entire state following completion of the overall survey.

Also underway is an extensive hydrographic survey off the southern California coast to obtain up-to-date depth and oceanographic information of the sea bottom for the National Ocean Survey's nautical charts and bathymetric maps. The survey is being conducted in a 2500-square-mile area including San Pedro Channel and the waters around Santa Catalina and San Clemente Islands. The NOAA Ship RAINIER, commanded by Capt. Roger F. Lanier, is carrying out the three-month project. The RAINIER's mission is part of a long-range program now in its fifth year to rechart with modern equipment the entire west coast and to map the sea bottom along the continental shelf.

Dr. William O. Davis, Office of Plans and Programs, and Robert Junghans, Office of Environmental Monitoring & Prediction Hydrologic & Oceanographic Services Division, NOAA; Dr. David Halpern, Pacific Oceanographic Laboratories, George Maul, Atlantic Oceanographic Laboratories, and Dr. Donald J. Williams, Space Environment Laboratory, ERL; and D. D. Crombie, Institute of Telecommunications Science, U.S. Department of Commerce.

The committee expects to issue its report in November.

TOWNSEND CROMWELL Completes Extensive Bait Survey Trip



Thomas Hida demonstrates one of the various types of gear used to collect baitfish as he throws small-meshed cast net (used primarily for day sampling) in the shallow water of Helen Reef, in the Palau District.

The NOAA Ship TOWNSEND CROMWELL, assigned to the Hawaii laboratory of the Central Pacific Fisheries Research Center, returned to port recently after an extensive bait survey among the Caroline, Mariana, and Marshall Islands.

In addition, current systems of the Mariana Ridge area were investigated as possible mechanisms separating the central and western skipjack tuna stocks.

Traveling a total of 11,925 nautical miles, CROMWELL stopped at islands and atolls throughout the vast area to determine availability and abundance of baitfish species suitable for surface pole-and-line fishing of skipjack tuna and for live-bait/purse seining operations. The six-man scientific field party, under Fishery Biologist Thomas Hida, also collected baitfish specimens to provide biological information necessary for preliminary management of the bait resources by the people of the islands.

Bait surveys were conducted by walking and diving along the shoreline of the various islands, scuba diving in the deeper waters, and by night lighting. Local residents were also interviewed.

The party learned that most of the lagoons had fair-to-good amounts of round herring, *Spratelloides delicatulus*, which schooled under a night light. This

NWS Eastern Region Personnel Test Career Counseling Workshop



(From left) D. L. Coveney, WSFO New York, N. Y.; Hazel Tatro, WSO Greensboro, N. C.; W. T. Pogerman, ERH Garden City, N. Y.; G. L. Poole, AWP Boston, Mass.; C. E. Archambault, WSFO Boston, Mass.; Ken Hoss, NOAA, Rockville, Md.; S. G. Simplicio, Director, NWS Eastern Region; Frank Christhif, NOAA, Rockville, Md.; R. M. Laro, WSO Hartford, Conn.; R. E. Fleury, WSMO Portland, Me.; A. E. Craft, WSO Elkins, W. Va.; A. W. Roche, WSO Huntington, W. Va.; and R. B. Wassall, WSFO, Philadelphia, Pa.

Shown above are National Weather Service Eastern Region personnel who recently attended a Career Counseling Workshop at Plainview, L.I., N.Y., and Ken Hoss and Frank Christhif, of NOAA's Career Development Branch, Rockville, Md., who conducted the workshop.

The workshop was a test of a program of instruction designed to meet the need for practical supervisory training in basic counseling procedures and techniques -- especially for career counseling, an important aspect of all NWS Career Management Programs. The workshop challenged the participants with simulated counseling situations and provided feedback for individual guided evaluation. Participants have been requested to provide evaluations of the workshop to assist in its final development for future application at other NWS field locations.

was the most common species encountered during the survey of islands to the west of Truk. The best concentrations of baitfish were found in the southern Marshalls where, on Jaluit, the largest school of small sardines was estimated at more than 25 tons.

At many of the island stops, CROMWELL held open house and local residents were given guided tours of the vessel. For many of the guests it was their first experience aboard a modern ship.

New NOAA Charts, Maps, Publications Available

Among the new publications now available from NOAA are the following:

--A new edition of Lake Survey Center Chart 360, a recreational chart of the south shore of Lake Erie from Port Clinton to Sandusky, Ohio, including Sandusky Bay, Sandusky River, Catawba Island, Kelleys Island, and the Bass Islands. This convenient 11 by 17-1/2 inch loose-leaf style chart containing 35 pages of large-scale charts and four pages of information of value to the pleasure boater may be purchased for \$2.00 from the Lake Survey Center.

--A new edition of Lake Survey Center Chart 17 of the Cape Vincent Area covering the section of the St. Lawrence River from Bartlett Point to Cape Vincent, N.Y., at a scale of 1:30,000, with an inset of Cape Vincent at 1:10,000. It shows Howe, the Admiralty, the Lake Fleet, Grindstone, Wolfe, Carleton, and Bayfield Islands; shoals in the area; Bateau Channel; and the Wolfe Island Cut, and contains latest information on lights, buoys, landmarks, and other features of interest to the mariner. It, too, may be purchased from the Lake Survey Center, for \$1.00.

--National Ocean Survey nautical chart 683-SC covering the Snake River between Lower Monumental Dam and the Little Goose Dam in Washington, 50 miles north of Walla Walla. This chart, the first for the area, joins existing chart 682-SC, was requested by the Army Corps of Engineers for commercial and small craft traffic in the Lower Monumental Reservoir, and may be purchased for \$1.50 from NOS.

-- The first edition of World Aeronautical Chart, WAC CD-10, scale 1:1,000,000, covering the western part of Alaska, St. Lawrence Island, and the Bethel area, conforming to Inter Agency Air Cartographic Committee specifications. This, the second of seven new World Aeronautical Charts covering Alaska programmed for publication this year, may be purchased from NOS for eighty cents.

--The first editions of the Los Angeles and New York Visual Flight Rule (VFR) Terminal Area Charts, scale 1:250,000, conforming to Inter Agency Air Cartographic Committee specifications. Five VFR Terminal Area Charts have now been published, fulfilling an FAA requirement to depict controlled airspace at major traffic hubs, designated as Terminal Control Areas,

Seminars Given by NWS For Corps of Engineers

The Hydrometeorological Branch of the National Weather Service's Office of Hydrology completed its second two-week seminar on basic meteorology and hydro-meteorological practices for Corps of Engineers hydrologists. A total of 54 participants from Corps of Engineers Districts throughout the country completed the course, which was planned because it was decided that increased understanding of the procedures used in the Branch's studies of rainfall potential would result in better application to Corps of Engineers field problems.

John Riedel, Chief of the Branch, and his staff handled most of the classes, with guest lecturers for special topics from the Office of Hydrology and Environmental Data Services. A tour of the National Meteorological Center and the National Environmental Satellite Service in Suitland and the accompanying lectures provided one of the highlights of the course.

This is the first time such a course has been offered. Favorable opinions expressed by the attendees suggest that future classes may be desirable.

which provides for the control or segregation of all VFR and Instrument Flight Rule (IFR) aircraft within the terminal control area. The new charts are available from NOS for fifty-five cents each.

--The fourth of a series of fifteen bathymetric maps (topographical maps of the floor) of the Chesapeake Bay, entitled "Rappahannock River Entrance," is now available from NOS for \$2.00. This was an Atlantic Oceanographic and Meteorological Laboratories project done in cooperation with the NOS.

--A revision of the Lake Survey Center's "Great Lakes Ice Atlas," a publication resulting from a continuing investigation of ice on the Great Lakes being carried out by the Lake Survey and including use of information obtained from the U.S. Coast Guard and the Canadian Department of Transport. The Atlas describes the material being collected and contains a series of 33 charts showing ice cover on the Lakes for three classifications of winter--mild, normal and severe. The Atlas, NOAA Technical Memorandum NOS LSCR 1 by Donald R. Rony, is available from the Lake Survey Center.

Items to be considered for publication in NOAA WEEK should be submitted to:
Office of Public Affairs, NOAA, Room 221, Bldg. 5, Rockville, Md. 20852. Phone (301) 496-8243.

National Oceanic and Atmospheric Administration

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