



noaa week

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Unit Citations Presented at Awards Luncheon

NOAA Unit Citations were awarded at the 1974 Awards Luncheon today, to groups of NOAA employees whose individual and collective efforts have resulted in substantive contributions to the programs or objectives for which NOAA was established.

Dr. Robert M. White, NOAA Administrator, presented the citations to the Directors of the various Principal Operating Elements, or their representatives, who will transmit them to the recipients.

For the combination of skill and dedication to duty displayed in the National Weather Service on April 3 and 4 of this year, when 90 tornadoes struck the midsection of the United States (the forecasts and warnings were outstanding, and many NWS people worked in the face of danger to their lives), Unit Citations were awarded to:

- The Weather Service Forecast Offices in
 - Atlanta, Ga.;
 - Louisville, Ky.;
 - Birmingham, Ala.;
 - Indianapolis, Ind.;
 - St. Louis, Mo.; and
 - Detroit, Mich.

- The Weather Service Meteorological Observatories in
 - Old Hickory, Tenn.;
 - Birmingham, Ala.; and
 - Centreville, Ala.

- The Weather Service Offices in
 - Cincinnati, Ohio;
 - Nashville, Tenn.;
 - Chattanooga, Tenn.;
 - Athens, Ga.;
 - Lexington, Ky.;
 - Evansville, Ind.;
 - Ft. Wayne, Ind.;
 - Springfield, Ill.;

(Continued on page 2)

FM-CW Radar Used in Study Of Clear Air Structures

Scientists with the Environmental Research Laboratories are using an unusual type of radar to look at the structures in the atmosphere that cause afternoon thunderstorms, and aggravate the pollution problem in many cities.

Dr. Earl Gossard of ERL's Wave Propagation Laboratory in Boulder, Colo., heads a team of researchers studying atmospheric boundary layers and temperature inversions with a frequency modulated/continuous wave radar.

The FM-CW radar, unlike conventional radar, whose waves must be reflected from solid or liquid particles, can detect structures in clear air. Only two such radars are in use for meteorological research (the other is operated by the Naval Electronics

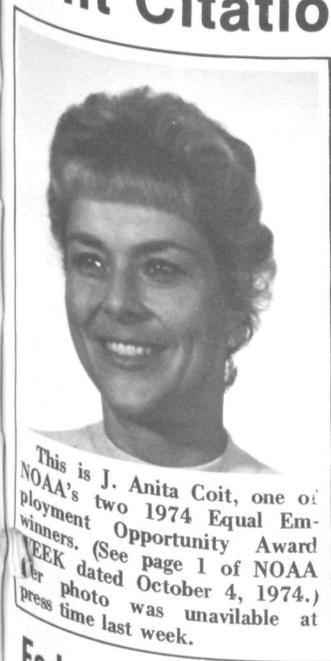
Laboratory in San Diego, where the radar was originally developed by J.H. Richter). The sender and receiver antennas of the NOAA radar, which resemble a pair of oversized kettle drums, are accompanied by a portable laboratory housing the transmitting, receiving and display apparatus, including a high-speed spectrum analyzer.

Conventional radar sends out a pulse that hits the target and returns. The distance to the target is calculated from the time the pulse takes to make the round trip. The FM-CW radar transmits a continuous signal that sweeps up and down a range of frequencies in a pattern called "chirping." Instead of measuring the delay in time

(Continued on page 7)



What were NOAAites (from left) John R. Mercurief, Kalochie Melovidov, Tikhon Stepetin, Vladimir Melovidov, and Jack Glastra doing when this photo was taken? To find out, see the Pribilof story on page five.



This is J. Anita Coit, one of NOAA's two 1974 Equal Employment Opportunity Award winners. (See page 1 of NOAA WEEK dated October 4, 1974.) Her photo was unavailable at press time last week.

Fed./State Survey Will Reestablish Mason-Dixon Line

Arrangements are being made by the states of Maryland and Delaware, in cooperation with the Federal government, to reestablish part of the historic Mason-Dixon line between the North and the South.

This is the portion of the line which separates the two states along a north-south boundary extending for some 82 miles south from a point about 20 miles below Philadelphia. The remainder of the famed line extends west from below Philadelphia almost to the Ohio boundary, dividing Pennsylvania from Maryland and West Virginia.

The Maryland-Delaware line, surveyed in 1768 by

(Continued on page 4)

NOAA Unit Citations Are Presented at Awards Luncheon

(Continued from page 1)

- Lansing, Mich.;
- Dayton, Ohio; and
- Huntsville, Ala..

-And to the National Severe Storms Forecast Center at Kansas City, Mo., for its exceptional performance in supporting the front-line stations, which helped make possible the saving of life on such a large scale.

National Ocean Survey recipients were:

-The New Datum Section in the Horizontal Network Branch of the Control Network Division, of the National Geodetic Survey, for significant progress toward the new adjustment of the North American Datum in a year of changes in computer programming and traditional practices.

-The Marine Field Support Group of the Scientific Services Division in the Office of Program Development and Management, for effectively supporting and improving the software of the 15 hydroplot-hydrolog systems on NOAA's hydro-

graphic survey vessels.

-The Mobile Calibration Laboratory in the National Oceanographic Instrumentation Center of the Office of Marine Technology, for development and operation of the first sophisticated movable facility of its kind for servicing the broad range of oceanographic instruments used in the Marine Ecosystems Analysis program. The group delivered a quarter-million-dollar facility for approximately \$100,000.

National Environmental Satellite Service recipients were:

-The Supervisors in the Geostationary Spacecraft Support Section at the Command and Data Acquisition Station on Wallops Island, Va., for outstanding accomplishment in ensuring the operational readiness of equipment and systems used to support the SMS-A spacecraft.

-The Office of System Engineering, for establishing the SMS ground system, a task requiring a new level of sophistication in satellite

data handling, dissemination and display.

Environmental Data Service recipients were:

-The Systems Branch of the Technical Information Division of the Environmental Science Information Center, for outstanding work in conversion of the Oceanic and Atmospheric Scientific Information System from a pilot project to a fully operational program.

-The ENDEX Task Team, in recognition of its essential contributions to the development of an operational Environmental Data Index, a computerized, interdisciplinary system providing referral to historical, environmental data files, in EDS and elsewhere.

NOAA Headquarters recipients, from the Office of the Assistant Administrator for Administration, were:

-The Servicing Personnel Officers in the Operations Branch of the Personnel Division, for significantly improving personnel manage-

ment services to NOAA components throughout the Washington area and assigned field units.

The Environmental Search Laboratories recognized was:

-The Space Environment Services Center of the Space Environment Laboratory, Boulder, Colo., for outstanding contributions to the Skylab mission. The Center's performance was an excellent example of space operational use of space weather services to increase mission success.

Recognized from the National Marine Fisheries Service were:

-Personnel of the Southeast Fisheries Center in Miami, Fla., and its facilities in Pascagoula and Bay St. Louis, Miss., who participated in the Skylab Oceanic Gamefish Experiment. In cooperation with NASA, employees at the Center planned and carried out this unusual experiment, involving more than 10 fishing vessels and 10 oceanographic ships. A major objective was the correlation of fishing, oceanographic and satellite data, and the project proved a great success.

NWSTTC Commended by Army News Center

The National Weather Service Technical Training Center recently was awarded a certificate of appreciation from the Army Hometown News Center.

The certificate reads, in part, "for truly outstanding support of activities essential to the United States Army Hometown News Center

mission. Be it weather briefings, educational aids, or audio/visual requirements, your response has been timely, consistent, unflinching, and professional. The National Weather Service sets an example of inter-governmental harmony and cooperation which is admired by all of us on the News Center Staff."



(From left) Donald R. Whitman, Assistant Superintendent for Meteorology and Management, and Dr. Richard F. Myers, NWSTTC Superintendent, with Major Thomas P. Malloy of the Army Hometown News Center, who presented the award.

Russians Visit Johnson

John Stelt, skipper of the Lake Survey Center-operated NOAA Ship *Johnson*, and his crew hosted a team of seven Russian scientists on a goodwill tour recently. The visitors, guests of the Environmental Protection Agency, were taken on a cruise of Saginaw Bay to view work being carried on by the LSC in connection with an EPA project. Demonstrations of sampling and other techniques of interest were given and the visitors were provided copies of National Ocean Survey Chart No. 52, Saginaw Bay, as souvenirs of their trip.

Later, the Russian visitors attended a reception at the Bay City Yacht Club, where they were presented with gifts by the mayor of that city.

The event was covered by area TV and newspapers.

Channel 5, Bay City, is planning a half-hour documentary on the Saginaw Bay research.

noaa week

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Catherine S. Cawley, Editor
Anna V. Felter, Art Director

Carol Sondheimer and Eileen Mulaney Named Regional Coordinators by OCZM



Eileen Mulaney



Carol Sondheimer

The Office of Coastal Zone Management has appointed two new regional coordinators to work with State officials in managing the seashore—Carol Sondheimer for the Southeast region, and Eileen Mulaney for the Great Lakes States. Both will work closely with State government officials in developing comprehensive programs for managing the coastal zone, and coordinate Federal activities in the coastal zone to ensure that they coincide with State goals.

Ms. Sondheimer will work directly with officials in North Carolina, South Carolina, Georgia, Florida, Alabama, Louisiana, Mississippi, and Texas, and in the territories of Puerto Rico and the Virgin Islands.

Ms. Mulaney's region consists of Michigan, Wisconsin, Illinois, Ohio, Indiana, Pennsylvania, and Minnesota.

Before joining NOAA, Ms. Sondheimer worked extensively on coastal zone and environmental affairs with the New York State Office of Planning Services. She is a graduate of American University and the University of Wisconsin and a member of the American Society of Planning Officials.

Ms. Mulaney has had consulting experience in the areas of land and water resources management. She has worked on State and areawide water quality management planning for the U.S. Environmental Protection

Agency, the Army Corps of Engineers, and the State of Ohio Environmental Protection Agency.

She received a Bachelor of Science degree from Marquette University and a Master of Public Administration from George Washington University.

Rude, Heck Find Trash--Not Treasure As They Wire Drag in Gulf of Mexico

NOAA's wire drag ships, *Rude* and *Heck*, which have spent the past four months searching the bottom of the sea off the coast of the Gulf of Mexico, found—not treasure—only more evidence that coastal waters have become the dumping ground for unwanted material. They found also that some of the debris which clutters the bottom is becoming increasingly a hazard to shipping as vessels with deeper drafts are being constructed.

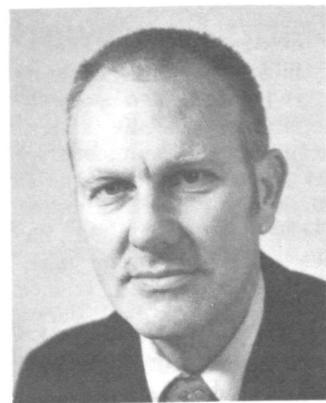
The ships determined the precise position, and the depth of the water above them, of several wrecked ships whose general location only had been previously known. Other items their search brought to light included an oil "Christmas tree"—a device used to cap an underwater oil well; a sea buoy; ship's anchors; a concrete block measuring three by four by four feet; a survey platform—presumably the floor of a temporary structure from which oil ex-

Dr. Glenn A. Flittner Heads NWS Ocean Services Division

Dr. Glenn A. Flittner has been appointed Chief of the Ocean Services Division in the National Weather Service Office of Meteorology and Oceanography. He succeeds Dr. William H. Quinn, who returned to Oregon State University at Corvallis last year.

Dr. Flittner is presently on leave of absence from San Diego State University, where he served as Professor of biology and Director of the Bureau of Marine Science. From 1957-1970, he was a fishery research biologist with the Department of the Interior. Earlier he served as a Navy weather forecasting officer in San Francisco and in the Philippines.

The NWS Division he heads collects, processes, and disseminates oceanographic data the NWS uses to predict



Dr. Glenn A. Flittner

real-time occurrences of ocean phenomena. It also administers NOAA's tsunami-warning service, monitors sea temperature, and will develop programs to provide essential information to the "marine user community," which includes the offshore oil industry, the tuna fleet, sunbathers and weekend anglers.

Dr. Flittner and James H. Johnson of the Pacific Environmental Group of the National Marine Fisheries Service developed the environmental monitoring and prediction system for the albacore tuna industry now under way at La Jolla, Calif.

Dr. Flittner received his bachelors degree in wildlife conservation and master's in zoology from the University of California-Berkeley, his Ph.D. from the University of Michigan at Ann Arbor, and attended Naval postgraduate school for a 12-month course in applied meteorology.

Since January 1972 he has been commanding officer of a Naval Air Reserve Division at North Island, Calif.

NOAA Corps in Line

According to the "Congressional Record" of September 11, 1974, page S-16390, four percent of the officers of the armed services are women.

NOAA Corps women officers also now equal four percent of the Corps.

Porpoise, Gear Research Report Being Reviewed

A draft report regarding gear research and porpoise populations in the eastern tropical Pacific prepared by the National Marine Fisheries Service Southwest Fisheries Center in La Jolla, Calif., has been given to several scientists within and outside NMFS and to the Marine Mammal Commission for final review. Their reports and suggestions are expected in October.

The report, together with review comments, will be made public as soon as the reviews are available. The NMFS thereupon will conduct a public hearing on the report, the time and place of which will be widely disseminated, including publication in the Federal Register. At that hearing comments will be sought from all interested parties on what changes, if any, might be required in the regulations concerning protection of porpoises during commercial tuna fishing.

Ice Report Available

The latest in the Lake Survey Center's Great Lakes ice cover reports, "Great Lakes Ice Cover Winter 1972-73" (NOAA Technical Memorandum NOS LSC D 7), is available for sale at \$1.25 from its office at 630 Federal Bldg., Detroit, Mich. 48226.

The publication, tenth in a series, contains twenty ice charts which show data collected by the LSC, the Coast Guard, and the Canadian Department of the Environment on ice reconnaissance flights. Sixteen summary ice charts showing short-interval ice distribution patterns are also included, as well as a written descriptive summary for each of the Great Lakes.

This series has been extremely popular with scientists, engineers and students working on the Great Lakes.

Federal/State Survey To Reestablish Mason-Dixon Line

(Continued from page 1)

Charles Mason and Jeremiah Dixon, was resurveyed in 1961-62 by the Coast and Geodetic Survey, predecessor of the National Geodetic Survey. Of the original 82 border monuments which were spaced one mile apart by Mason and Dixon, 15 could not be found and five were substantially out of line. Further operations were suspended after the survey pending a decision by the States on reestablishment of the stones that were missing or out of line.

Last June 6, a meeting was held at Delmar, Md., between representatives of the NGS, Maryland and Delaware. On the basis of agreements reached at this meeting, a Memorandum of Understanding was drafted on reestablishment of the missing and out-of-line boundary monuments. Upon approval of this agreement by the state boundary com-

missions, Federal and state surveyors will determine where the markers are to be set on the basis of the 1961-62 survey. The state bodies are headed by Dr. Kenneth N. Weaver, Director, Maryland Geological Survey; and Dr. Robert Jordan, chairman of the Delaware Boundary Commission.

B.K. Meade, Chief of the NGS Control Network Division, using the data from the 1961-62 survey, has delineated in general the correct boundary by drawing a "mean curve" between each end of the north-south boundary. The line represents the average location of all existing boundary monuments. The memorandum provides that the state boundary commissions will accept all monuments lying within four feet of this curve as delineating the boundary and that four monuments found to be more than four

feet from the mean line will be reestablished. The monument was restored in 1968.

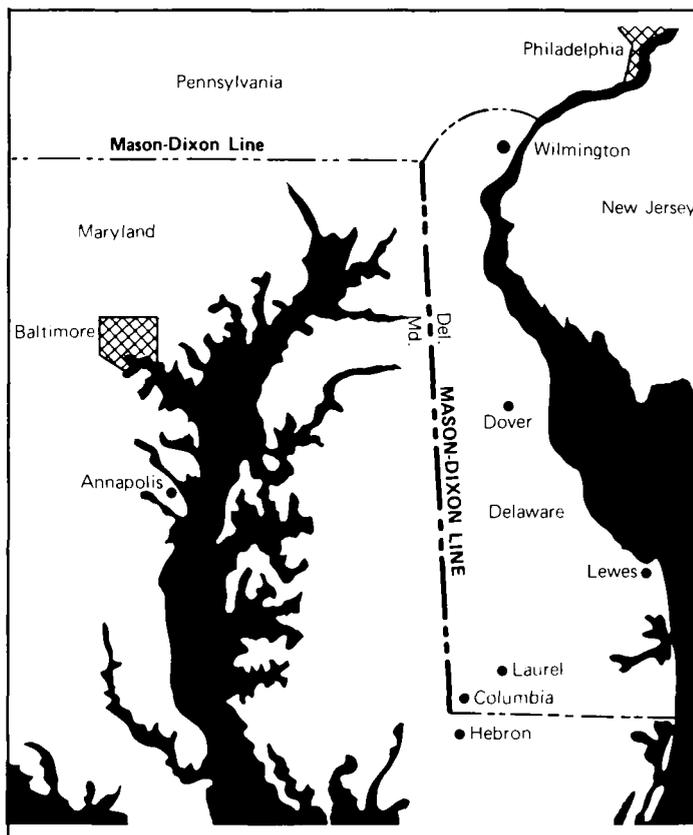
The 15 missing monuments would be replaced by NGS markers which would indicate the date of replacement and the Delaware and Maryland sides of the boundary. Some of the missing monuments, which may have fallen down and been covered by more than 50 years of debris, may still be recovered and restored to the boundary. Others were probably removed from their original sites. One is reportedly being used as a step for a corner, another as a doorstep at a farm house.

The original limestone monuments were impressive. Each was 34 inches long, 14 inches wide and 11 inches thick. They were quarried, cut and carved on the Isle of Portland, Dorsetshire, England, and then transported to the colonies as ballast on the ship *Beaumont Lloyd*. They bear the armorial shields of Baltimore's family and the Penns of Pennsylvania.

When Mason and Dixon surveyed the line more than two centuries ago, it became the boundary between the British provinces of Pennsylvania and Maryland. A few years after the historic survey, the State of Delaware was formed from the lower three counties of Pennsylvania and the north-south portion of the Mason-Dixon Line became the Maryland-Delaware boundary.

In 1954, Maryland and Delaware officials agreed on a plan for the restoration and maintenance of the boundary. Under this plan, the position of each boundary marker was to be located as accurately as possible and each marker was tied to the national horizontal network maintained by the NGS.

It was in accordance with this plan that the 1961-62 survey was conducted and the geographic position of terminated of all existing boundary monuments.



The heavily-dashed line denotes the part of Mason-Dixon Line being reestablished after generations of neglect. The rest of the line at top, goes west almost to Ohio, dividing Pennsylvania from Maryland and West Virginia.

Computer Model for Hatchery Operations Is Developed Under NMFS Contract

The Washington State Department of Fisheries, working with funds provided under contract by the National Marine Fisheries Service Office and in coordination with the National Bureau of Standards, has completed work on a hatchery computer model to be used to optimize salmon hatchery programs.

The model allows automatic computation of the management policy that maximizes the benefit:cost ratio of a hatchery. A linear program option can be used to determine the species

mix, number of fish released, and the size and time of the releases which produce the maximum dollar contribution to the fisheries per unit cost.

In addition, an automatic routine plots the portions of the hatchery occupied by each species at each time interval. These features greatly reduce the effort required to program a hatchery and to easily visualize the overall implications of each scheme.

Also, the program has been modified to produce an estimate of the amount of pollutants produced at a hatchery based on food fed and the relationships between food and pollutants, to more conveniently estimate the environmental impacts of hatcheries.

Finally, a User's Guide has been produced as a convenient reference for program operation and descriptions of equations and logic.

A data base necessary for the application of HATCH was created for seven Federally-funded hatcheries managed by the Washington Department of Fisheries, and will also be used at 21 of their own stations.

Pribilof Maintenance Men Attend Oil-Fired Heating Unit Training

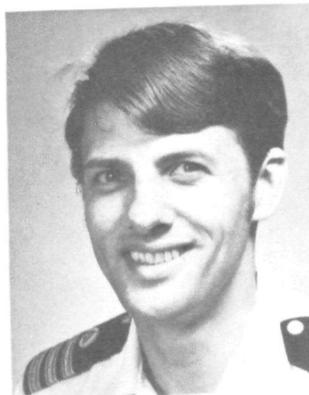
In the photo on page one, the men—National Marine Fisheries Service maintenance employees on the Pribilof Islands of St. Paul and St. George in Alaska (except for Jack Glastra)—were conducting an experiment in mixing waste crankcase oil with diesel fuel in a training session on oil-fired heating units.

Mr. Glastra, heating engineer from Seattle, provided classroom and on-the-job instruction on how to check the efficiency of a boiler or furnace, and to make whatever corrections may be necessary to achieve optimum efficiency.

It is estimated that a 20 percent reduction in the use of heating fuel will result when technology learned in the class is applied to all NMFS heating units on the two islands.

Others who attended the classes but are not in the photo were: Agafangel Mercurief, Andronik Kashevarof, Andronik Kashevarof, Jr., Innokenty C. Lestenkof, Alexis Prokopiop, Anthony Kanof, William Mercurief, Peter Mercurief, Terenty Mercurief, Larry Philemonof and John Mercurief.

Ganse Named To Command Rude & Heck



Commander Robert A. Ganse has been appointed Commanding Officer of the NOAA Ships *Rude* and *Heck*.

Commander Ganse has been a commissioned officer since 1962. He has served aboard four NOAA ships in various capacities and with other units of the NOAA organization, most recently with the Theoretical Studies Group of Environmental Research Laboratories in Boulder, Colo.

He received a civil engineering degree in 1961 from Pennsylvania State University and a doctorate in geophysics in 1974 from St. Louis University.

U.S., Mexico Extend Weather Agreement

The United States and Mexican Governments have exchanged diplomatic notes extending until July 31, 1976, a long-standing program of cooperation in meteorological observations. U.S. Ambassador Joseph John Jova and Foreign Secretary of Mexico Emilio O. Rabasa signed for their respective Governments at the Secretariat of Foreign Relations in Mexico City.

The Cooperative Program has been in uninterrupted operation since 1942. Under the terms of the Agreement, the Mexican National Meteorological Service operates a network of ten upper-air (rawinsonde) observation stations, supported by the National Weather Service. The NWS provides all electronic and other equipment, expendable materials and technical guidance.

The information from these stations is needed by meteorologists in both countries in the preparation of weather forecasts for the general public, for aviation operations, agriculture and industry.

Both countries share in the benefits of this technical program—one of the oldest and most successful. The extension of the Agreement is in recognition of the continuing need to work together in this important endeavor.

The NOAA Representative, Michael Sunray, supervises NOAA's participation in the activities under the agreement.



Manning the NOAA booth when this photo was taken at the North American Sail and Power Show in Sandusky, Ohio, recently, were Community Preparedness Specialist James Sims (left) and Great Lakes Ice Forecaster Daron Boyce, of the National Weather Service Forecast Office in Cleveland, Ohio.

Other WSFO Cleveland employees who manned the NOAA booth during the three-day event were Meteorologist in Charge Richard Fay (along with Mrs. Fay), Principal Assistant Robert Hamilton, Marine Focal Point Homer Dyck (and Mrs. Dyck), Weather Service Evaluation Officer Cecil E. Simmons, and Meteorological Interns Terry Schaeffer and Lynn Maximuk.

Approximately 15,000 persons attended the show—the country's largest in-water boat show.

Invest in
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recipe of the week



TIMELY TROUT

- 6 pan-dressed or boned rainbow trout, fresh or frozen (6 to 7 ounces each)
- 1/2 cup butter or margarine
- 2 tablespoons lemon juice
- 1/2 teaspoon basil
- 1 teaspoon salt
- Lemon wedges

Thaw frozen fish. Wash and pat dry. Arrange fish in well-greased shallow baking pan. Combine butter or margarine, lemon juice, and basil. Heat just until butter melts. Brush inside and outside of each fish with butter mixture and sprinkle with salt. Place in oven set at moderate, 350° F.; bake 30 minutes or until fish flakes easily when tested with a fork. Brush cooked fish with remaining butter mixture just before serving. Serve with lemon wedges. Makes 6 servings.

next week's best fish buys

According to the NMFS National Consumer Educational Services Office in Chicago, the best fish buys for the next week or so are likely to be breaded shrimp and fresh cod fillets along the Northeast Seaboard; fresh bluefish and spot in the Middle Atlantic States,

including the D.C. area; smoked Spanish mackerel and breaded shrimp in the Southeast and along the Gulf Coast; fresh whitefish and smelt in the Midwest; black-cod steaks and canned tuna in the Northwest; and fresh sea bass and frozen squid in the Southwest.

Dorothy J. Chapman Receives Commerce Bronze Medal

Ms. Dorothy Jean Chapman, Principal Assistant at the Weather Service Office in Norfolk, Va., has received a Department of Commerce Bronze Medal. She was cited for "30 years of exceptional

service to the National Weather Service and outstanding contributions to historical information." Meteorologist in Charge Terry A. Ritter presented the Award to Ms. Chapman.



ERL Personnel in Hawaii Participate In Equality Day Commemoration

More than 100 Federal Managers, Federal Women's Program Coordinators, Civilian Personnel Officers, and EEO Officers met at a program co-sponsored by the Honolulu-Hawaii Federal Executive Board and the Federal Women's Council to commemorate the passing of the 19th Amendment on August 26, 1920 (Women's Equality Day).

Dr. Gaylord R. Miller, Director of the Joint Tsunami Research Effort at the Environmental Research Laboratories' Pacific Marine Environmental Laboratory in Honolulu, was on the panel which discussed "Responsibilities of Managers for the

Federal Women's Program. Other panel members included Admiral Paddock, Commandant of the 14th Naval District; Colonel W. E. Y. Paxton, Commander of the Air Force 15th Air Base Wing; Robert M. Cutsler, Honolulu District Director of the Internal Revenue Service; Scott Wolfe, Civil Rights Officer of the Federal Aviation Administration; Teru Sasaki, Director of Employment Relations of the Honolulu Post Office; and Marilyn Bohren, Area Manager of the Civil Service Commission in Honolulu, was the Moderator.



(From left) Patricia K. Putman, Associate Dean of the University of Hawaii School of Medicine; Jean Chong, President of the Hawaii-Pacific Federal Women's Council; Jack Webb, Director of the Pacific Asia Region of the FAA and Chairman of the Honolulu-Pacific Federal Executive Board; Colonel Paxton; and Anna Brown, Administrative Assistant at the Joint Tsunami Research Effort and Vice-President of the Hawaii-Pacific Federal Women's Council.

NOAA Ships Rainier, Fairweather Battle--for Surveying Records

The NOAA Ship *Rainier* has established a new record by a nautical chart surveying more than doubling the record established only seven weeks earlier by the *Fairweather*.

Both ships are conducting hydrographic survey operations in Cook Inlet, Alaska, and the competition between the vessels is keen. On June 20, the *Fairweather's* Launch FA-5, with Lieutenant

(junior grade) Alan Anderson in charge, conducted 156.6 nautical miles of hydrographic surveys during a 14-hour period, bettering the record of 132.3 miles it had set the previous day in an 11-hour operation. During two consecutive days and 25 hours of operations, the FA-5's nautical charting surveys totaled 288.9 miles.

Not to be outdone, on August 9-10, the *Rainier's* Launch RA-5 accomplished

326.7 nautical miles of hydrographic surveys in a 24-hour period. Continuous operation was maintained, except for stops for calibration of instrumentation, refueling and changes in crew.

The *Rainier* launch used three crews. Although the *Rainier* established a launch record, the *Fairweather* retained the record for the amount of surveying accomplished by a launch with

a single crew in one day. In doing so, the *Fairweather* bettered the record established in 1950 of 120 miles of more time-consuming visual, not computerized, surveying established by a single crew off Alaska's North Slope in a 24-hour period.

The *Rainier* is commanded by Commander K. William Jeffers, the *Fairweather* by Commander Charles A. Burroughs.



Rainier



Fairweather

NOAA Scientists Study Clear Air Structures With FM-CW Radar

(Continued from page 1)

between the outgoing and return signals, the FM-CW radar measures the difference in frequency.

If there is only a single, discrete target, the FM-CW is a very simple kind of radar. But where there's a broad or distributed target, such as raindrops, "you get a whole smear of frequency returns," that is almost impossible to interpret, says Dr. Gossard.

The breakthrough came only a few years ago, when high-speed spectrum analyzers became available on the commercial market. This instrument can untangle the FM-CW signal in a fraction of a second.

With the addition of the spectrum analyzer, the FM-CW radar has tremendous advantages over conventional radar for atmospheric studies, says Dr. Gossard. For example, it has almost no "blind spot" or minimum range. The pulse radar, by its very nature, has a minimum range of roughly 1,000 to 1,500 feet (300 to 450 meters). "What you have to do is send the pulse,

then open the receiver to catch the return. There's always a lag between the time you send the pulse and the time you open the receiver." During this lag time, the signal can travel 1,000 feet or more, so return signal from anything closer than that is lost. Unfortunately, many of the atmospheric structures meteorologists are interested in occur or develop close to the ground. The FM-CW radar doesn't have that problem, because you're transmitting all the time and receiving all the time. You can see practically

all the way down to the ground."

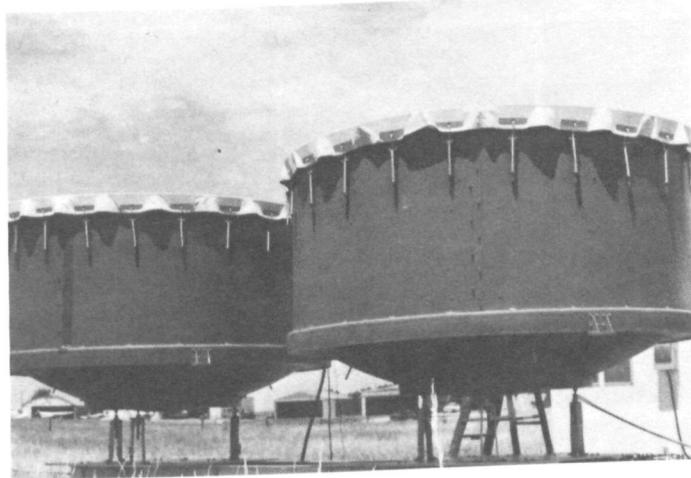
The other main advantage is the frequency band width. The greater the band width, the better the resolution. "The best resolution that can be expected from a conventional pulse radar is about 300 feet (90 meters)," points out Dr. Gossard. "With the FM-CW radar, you can get a resolution of three feet (one meter). It can be made very sensitive. An insect the size of a house fly and a mile away can be detected easily.

In fact, the radar detects a

lot of things it isn't supposed to, such as insects flying through the beam, which scatter specks across the radar picture. A more serious problem is "ground clutter"—buildings, shrubs, bushes, trees, telephone wires may obscure what the researchers really want to see.

This sensitivity, and the radar's ability to detect targets at close range, are what enable it to see structures in clear air. What the radar actually "sees" is backscatter from humidity fluctuations caused by turbulence.

Last summer, the WPL team used the FM-CW radar in the National Hail Research Experiment in north-eastern Colorado. The NOAA researchers will also be monitoring the height of elevated temperature inversions in the lower atmosphere. Such inversions control the formation and dissipation of stratus clouds and fog, for example near airfields, and contribute to deterioration of air quality in cities like Los Angeles by trapping smog and holding it down over the city.



NWS Holds 4th Formal AFOS Experimentation Session

The fourth formal experimentation session at the Automation of Field Operations and Services (AFOS) Model Facility at National Weather Service Headquarters, was held September 10-13. (The three earlier sessions involved field forecasters and the AFOS MIC/HIC Working Group).

Again, primary emphasis was placed on evaluating the design and performance of the forecaster's console. Secondary emphasis was placed on evaluating the utility of the systems software for presenting and manipulating the information in the data base.



Participants were (seated, from left) Michael Mark, RFC Harrisburg, Pa.; Richard Lay, WSFO San Francisco, Calif.; Alan Johnson, WSFO Lubbock, Tex.; (standing, from left) Danny Foster, Systems Development Office, Systems Experimentation Branch, NWSH; Dr. J. Richard Lepkowski, Behavioral Sciences Group, National Bureau of Standards; Marvin McQuate, WSFO Cheyenne, Wyo.; Thomas Beitel, WSFO Philadelphia, Pa.; Thomas Crossan, WSO Fresno, Calif.; and Robert Derouin, Systems Experimentation Branch, NWSH.

Harvey R. Bullis Honored by Tulane University Scientist

Dr. Emily H. Vokes of Tulane University, New Orleans, La., has honored Harvey R. Bullis, Jr., Director of the National Marine Fisheries Service Southeast Fisheries Center in Miami, Fla., by naming after him a new species of gastropod

mollusk. The mollusk is one described in her July 1974 paper, "Notes on Chicoreus (Mollusca:Gastropoda) From the Cenozoic of the Western Atlantic Region, With the Description of New Species." Mr. Bullis has been similarly honored by various

Aerial Color Photography Used To Measure Water Depths

Aerial color photography is now being used to measure water depths for nautical charting surveys of some coastal waters.

The technique was perfected by the National Ocean Survey and is employed in near and along-shore waters clear enough for aerial color film emulsions to record images of the bottom.

Dubbed "photobathymetry" by NOS scientists, tests were conducted for several years in Puerto Rican and Virgin Island waters, the Florida Keys and at Beaufort Inlet, N.C. Now operational, current plans include photobathymetry at Oregon Inlet, N.C., and the lower Florida Keys.

When it can be used, photobathymetry speeds up nautical chart surveys, and reduces costs in comparison to the conventional method of obtaining soundings with launches and ships. Also, safety of the survey vessel and its crew is improved significantly when they need not enter areas containing dangers such as submerged rocks and coral or may re-

main out of the surf zone. Data from the aerial photos will be used in the preparation of NOS nautical charts. Eleven NOAA ships and one aircraft are employed in nautical chart surveys along the Atlantic, Gulf of Mexico and Pacific coasts and on the Great Lakes.

A new type experimental film specifically made for enhancement of underwater detail is now being tested.

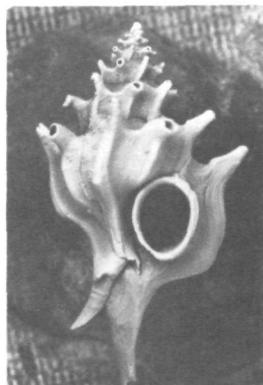
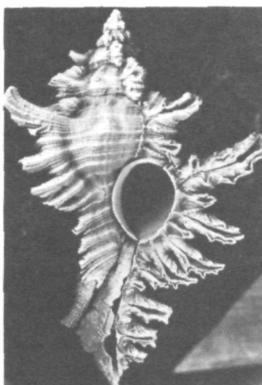
Arnold Heads Party G-20



Lt. Russell C. Arnold

Lieutenant Russell C. Arnold has been named Chief of National Geodetic Survey Party G-20. The party is now conducting a triangulation survey in Maine.

Lieutenant Arnold joined the NOAA commissioned corps in 1970 and previously served aboard the NOAA Ship *Davidson*, with the NOAA Data Buoy Center and with geodetic parties G-37 and G-19.



Dr. Bullis with some of the species named after him: (from left) the new gastropod mollusk, another species of gastropod mollusk, and the bivalve mollusk.

obituary

William W. Brown, Jr.

William Ward Brown, Jr., Third Assistant Engineer aboard the NOAA Ship *Mitchell*, died in Washington, D.C., on September 9.

He had served for more than 27 years in the Army, the Navy and as a civilian.

In keeping with his wishes, and those of his widow, his only survivor, he was buried at sea.



National Oceanic and Atmospheric Administration

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