NOAA NEWS 9/16

VOLUME 2 NUMBER 20 SEPTEMBER 16, 1977

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Radioactive Burial Seen In Atlantic

The possibility that radioactive wastes from nuclear power plants could be safely buried in cracks in the Atlantic Ocean floor should be explored further, according to Drs. Peter Rona of ERL's Atlantic Oceanographic and Meteorological Laboratory and Karl E. Turekian of Yale University.

As debate over a safe, permanent disposal site continues, radioactive wastes are accumulating in temporary repositories. The search for a safe site is difficult because a place must be found where the wastes can lie undisturbed for as long as 250,000 years. During that enormous span of time, no earthquake may jar them, living creatures cannot be exposed to them, and they must not be carried away by ocean currents or underground streams.

Plutonium sealed in canisters and dropped into fracture zones in the eastern Atlantic, suggest

(Continued on p. 2)

Woman Officer to Highest Post

Richard A. Frank, NOAA Administrator, congratulates Lt. Pamela R. Chelgren, NOAA Corps, on her appointment to the highest shipboard post ever held by a woman of the U.S. uniformed services, as NOAA Corps Director, R. Adm. Harley D. Nygren, looks on.

A 28-year-old female officer has been appointed to the highest shipboard post ever held by a woman in any United States uniformed service.

Lt. Pamela Chelgren, of the NOAA Corps has been appointed Field Operations Officer aboard NOAA's 162-foot hydrographic survey ship Peirce. Her responsibilities as FOO include the scheduling of all the ship's hydrographic work and its review and accuracy.

The Peirce, attached to the National Ocean Survey's Atlantic Marine Center in Norfolk, Va., will leave on a hydrographic study cruise along the Atlantic coast on October 1. The 760-ton vessel carries 36 officers and crew.

Lt. Chelgren, of Port Orchard, Wash., holds a B.S. degree in engineering from the University of California at Berkeley, and was the first woman to join the NOAA Corps in 1972. Her first voyage, on the NOAA Ship Oceanographer, lasted four

(Continued on p. 2)

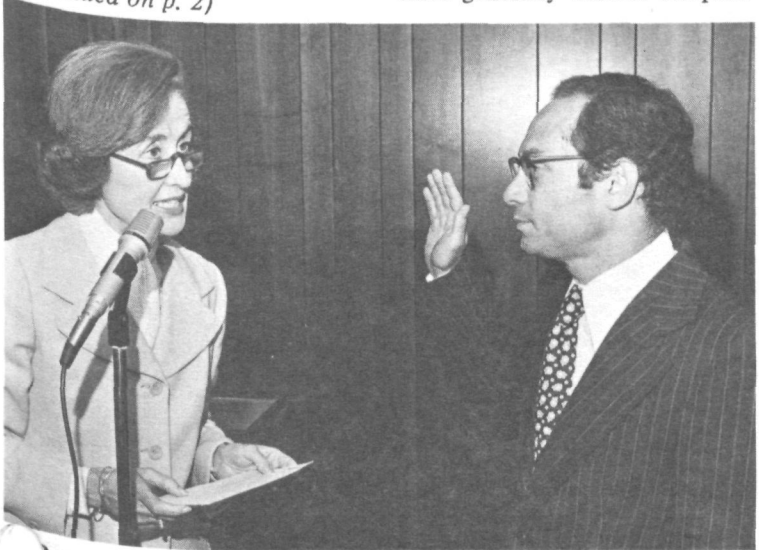
Less Natural Gas Needed This Fall, CCEA Says

EDS's Center for Climatic and Environmental Assessment (CCEA), noting outlooks for a milder fall season than last year, has estimated that as much as 16 percent less natural gas will be needed to heat private homes comfortably from now through November.

The weather outlook for September through November indicates generally warmer temperatures than those in the fall of 1976. CCEA developed a computer model linking nationwide temperature trends to natural gas demand to arrive at the gas use estimate.

By the end of September, NOAA's Environmental Data Service expects to have a natural gas consumption estimate for the entire winter. It would be

(Continued on p. 2)



Department of Commerce Secretary Juanita M. Kreps administers the oath of office to Richard A. Frank, NOAA Administrator, at the swearing-in ceremony in Washington, D.C., on September 12. (Photo of the Frank family on p. 2.)

Fast Warning Now In Use With GOES-2

A specially designed communications device connecting a weather research aircraft with NOAA's GOES-2 satellite 22,000 miles (35,400 kilometers) in space is ready to provide near instantaneous information about the growth and movement of hurricanes in the Carribean and South Atlantic.

Developed by personnel at

(Continued on p. 3)

Clear Air Turbulence Test Slated

A new technique for detecting dangerous turbulence in the flight path of airplanes will be tested this fall by scientists from ERL's Atmospheric Physics and Chemistry Laboratory, Boulder, Colo.

Dr. Peter M. Kuhn and others from APCL will use two aircraft owned by the National Aeronautics and Space Administration (NASA), searching the skies over Colorado for clear air turbulence.

They will be expanding earlier research conducted by

(Continued on p. 2)

Time Capsule Donated by Boulder Labs

Three Commerce Department laboratories in Boulder, Colo.—NOAA, National Bureau of Standards (NBS), and the Institute for Telecommunication Sciences (ITS)—cooperated to present a time capsule as part of the dedication ceremonies of the city's new Boulder Valley Mall.

A gift from the laboratories, the stainless steel capsule, about a foot (30 centimeters) in diameter and 40 inches (102 centimeters) long, was built by ERL machinists. ITS contributed to the cost of materials.

After the capsule was filled with the things that Boulderites want to show to the citizens of 2075 (the year when it is to be recovered), NBS drew all the air from the capsule, filled it with argon gas to preserve the contents, and sealed it. The Bureau also engraved a plaque to mark the spot where the capsule is buried.

NOAA, NBS, and ITS each contributed something to represent the types of research they conduct. NOAA's package includes pictures of the 300-meter (985-foot) tower of the Boulder Atmospheric Observatory under construction near Erie, Colo., and of a balloon being launched into the stratosphere to measure fluorocarbons; microfilms of oceanographic reports; a snowflake preserved on film to study its composition; and a seismogram of an earthquake in Rumania.

The Bureau of Standards contributed microfiche of technical reports, an optical fiber, a piece of superconducting cable, a hologram (three- dimensional laser image) of three chess pieces, and some high-speed switches used in optical communications and computers.

The Institute for Telecommunication Sciences included photos of the Institute's managers and a copy of the latest progress report.

Jocelyn L. Morita

Girl's Nation Sends NOAA Administrator For A Day

Jocelyn L. Morita of Kaneohe, Hawaii, was chosen to serve on July 15, as Administrator of NOAA for a day by the American Legion Auxiliary's 1977 Annual Session of Girl's Nation. Girl's Nation is a youth citizenship training course developed to familiarize junior high school girls with the processes of the Federal government.

The duties and responsibilities of the NOAA Administrator were outlined to Ms. Morita by Theodore P. Gleiter, Assistant Administrator for Administration.

Ms. Morita was among 100 junior high school students, two from each state, designated by their school principals and peers as having demonstrated superior leadership qualities. She hopes to become actively involved in government service once her schooling is completed.

Chelgren *(From p. 1)*

months and took her to the South Seas on seismological and gravitational investigations. The next year, she served as a junior officer aboard the NOAA Ship Fairweather.

Lt. Chelgren was the first woman officer to conduct a full inspection of the NOS marine and navigational facilities from the Great Lakes to the Florida Keys in Alaska, gathering information to update a national maritime publication, the "Coast Pilot."

Burial *(From p. 1)*

Turekian and Rona, might be buried by sediments. Should the canisters someday leak, the materials inside would be imprisoned by chemical processes in the deep-ocean sediments and waters themselves.

Rona and Turekian believe fracture zones in the eastern Atlantic should be considered as such a place. Though more study is needed, say the two, what scientists now know of the geological, chemical, and oceanographic nature characteristics of the fractures suggest they might make a safe burial ground.

CAT *(From p. 1)*

Kuhn in which he found that fluctuations in atmospheric water vapor, detected in infrared radiometers, can be used to perceive turbulent areas ahead of an aircraft. That study was 81 percent reliable.

In mid-October, a five-month study, jointly sponsored by NOAA and NASA's Office of Aeronautics and Space Technology, will begin with modified infrared radiometers and an accelerometer—to measure the turbulence as the plane actually flies through it—installed on a NASA Lear jet. In January, the space agency's Convair 990 will join the study for three months.

Gas Use *(From p. 1)*

based on a seasonal weather outlook from NOAA's National Weather Service.

The NOAA estimates are supplied to the Federal Energy Administration, and other Federal agencies involved in energy use and planning studies.

Natural gas consumption during the September through November period last year totaled 1,232.1 trillions British Thermal Units. NOAA's estimate for the same period this year is 1,036.5 trillions BTU's.

Richard A. Frank helps his son, Brian, hold the NOAA Administrator Presidential Appointment Certificate, while his wife, Jo Lakes Frank, holds the baby, Hilary. Among those present for the ceremony on September 12 were former Senator John Tunney (D-Calif.) and Sen. Warren Magnuson (D-Wash.).

Efficient "rain machine"

Big Thompson Flood Cause

Dr. Charles F. Chappell and [illegible] colleagues at ERL's Atmospheric Physics and Chemistry Laboratory, in Boulder, Colo., report that the intense thunderstorm responsible for Colorado's lethal Big Thompson flash flood last year was an unusually efficient atmospheric "rain machine," similar to the storm that triggered the disastrous Rapid City, S. Dak., flood of 1972.

"In both storms," Chappell explains, "we had surface weather conditions dominated by large polar highs to the northeast, with lower pressure south and west of the threatened areas. Strong easterly to southeasterly winds near the surface pushed abundant moisture into higher terrain. And, we had light winds aloft that produced slow-moving storms and tended to keep them over the higher terrain."

"One of the most remarkable features of the Big Thompson storm," Chappell said, "is that [illegible]ything conspired to improve [illegible]rainmaking efficiency. The triggering of the storm by moist air rising up the foothills combined with light winds at higher levels to keep the storm anchored in one place. Environmental air was extremely wet and was readily converted to precipitation as it ascended in the storm clouds. And, because the cloud base was nearly on the ground, there was very little loss of rain to evaporation as it fell."

This rainmaking efficiency is reflected by rainfall-rate data assembled in the report. The scientists estimate that at Glen Comfort, in the Big Thompson drainage area, 7.5 inches (191 millimeters) of rain fell between 7:30 and 8:40 p.m. local time. Twelve inches (305 millimeters) of rain were measured there for the 48-hour period ending the night after the flood.

GOES *(From p. 1)*

the Miami Research Facilities Center, the transmitter relays coded information on pressure, winds, temperature, and other hurricane-related data to NOAA's National Hurricane Center in Miami in only 15 seconds.

Transmitting the same information by voice radio from aircraft to a ground station—the procedure normally followed—takes anywhere from five to 15 minutes.

The device, in effect, is an airborne data collection platform which utilizes the data collection capabilities of the GOES satellite. A somewhat similar piece of equipment, still in the research stage, is in daily use aboard a Pan American 747 as it flies along the airline's worldwide routes.

During the 15-second journey from the hurricane-hunting C-130 airplane to the National Hurricane Center, the data moves from the aircraft to the satellite, down to a ground receiving station at Wallops, Va., on to NESS headquarters in Suitland, and then to the Satellite Field Services Station in Miami, adjacent to the National Hurricane Center.

The speed with which the digital information is provided NHC assumes maximum importance as hurricanes near populated areas, permitting NHC personnel to issue appropriate alerts.

NOAA NEWS

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Nancy Pridgeon, Editor
Warren W. Buck, Jr., Art Director

Shellfish Supply In Danger

The supply of oysters, clams, and mussels available to consumers is in jeopardy, because waters that grow shellfish are inadequately protected, and because of a tangle of Federal, State, and local regulations which threaten the industry.

So says a National Marine Fisheries Service report, "The Molluscan Shellfish Industries and Water Quality—Problems and Opportunities," issued in response to a requirement of the Coastal Zone Management Act Amendments of 1976.

The report notes that shellfish-growing waters continue to be closed at a rate of 0.6 percent each year. The closures are blamed on inadequate domestic waste treatment and on urban runoff, which pollute the shellfish waters.

The fragmented nature of the industry also causes problems. The molluscan shellfish industry consists largely of small businesses, many family owned. Most lack mechanization. A joint government-industry revitalization program and a way to address problems of overregulation are needed, the report says.

Cooperative Federal and State research also is needed to validate the criteria used to define "safe" harvesting areas. Present testing methods well may be restricting the use of resources that are, in fact, safe.

The report recommends that actions be taken and funding be provided to carry out programs authorized to protect shellfish-growing waters, and that Federal and State fish and wildlife agencies be given the resources they need to review permits and the effects of waste discharges. It also urges increased aquaculture and habitat rehabilitation.

First Grant Made Under Coastal Impact Program

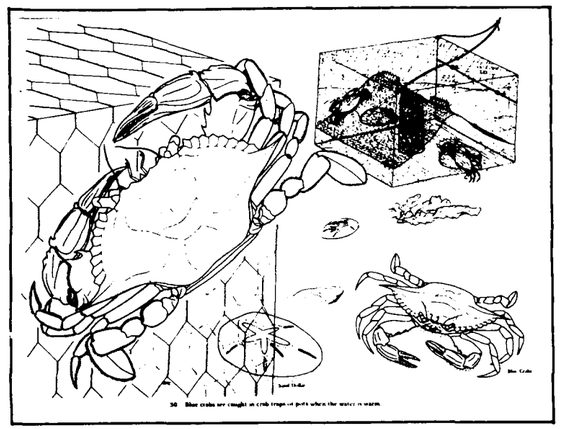
A $798,618 grant to the State of Louisiana—the first construction grant to be made under the Coastal Energy Impact Program—through the Office of Coastal Zone Management, will provide a critically needed water supply facility on Grand Isle in Jefferson Parish.

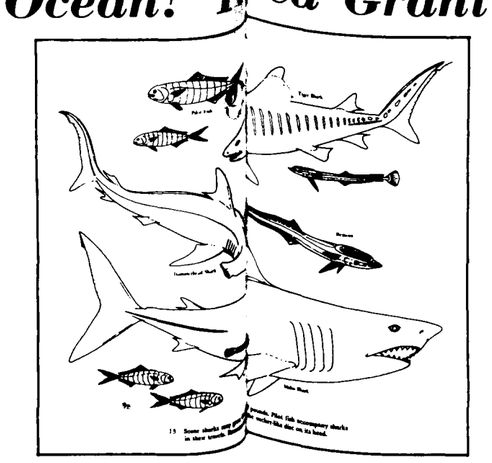
"Grand Isle is both an extremely appealing recreational spot and an important base for energy production," said OCZM Director Robert W. Knecht. "The island's water supply is adequate to handle the town's permanent residents, but cannot meet the increased recreational demand because of the coastal energy activity. This situation is one that the Coastal Energy Impact Program was designed to alleviate."

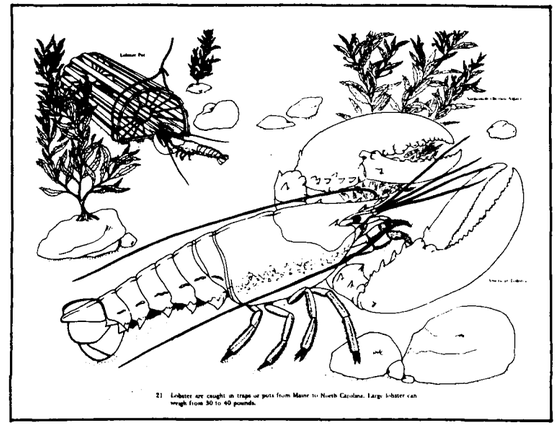
Under the grant, land will be acquired, a million gallon ground storage tank erected, and pumping, piping, and chlorinating facilities installed.

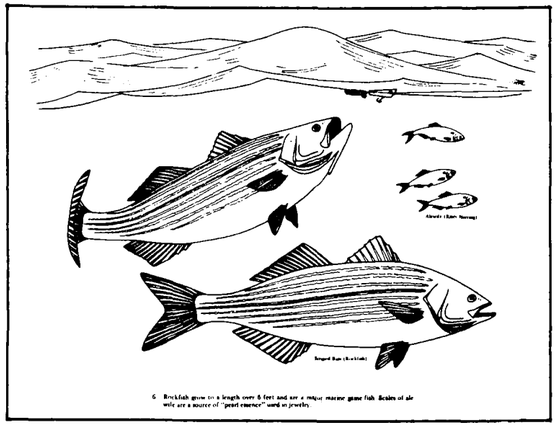
On one of the hottest days of the summer, the air conditioning failed at the luncheon meeting of the Marine Technology Society in Washington, D.C. But the speaker, NOAA Administrator Richard A. Frank, shed his coat and told the hundred or so persons assembled of the NOAA reorganization and of some of his hopes for NOAA.

A Coloring Book on the Atlantic Ocean! Sea Grant Program and VPI Have One Ready









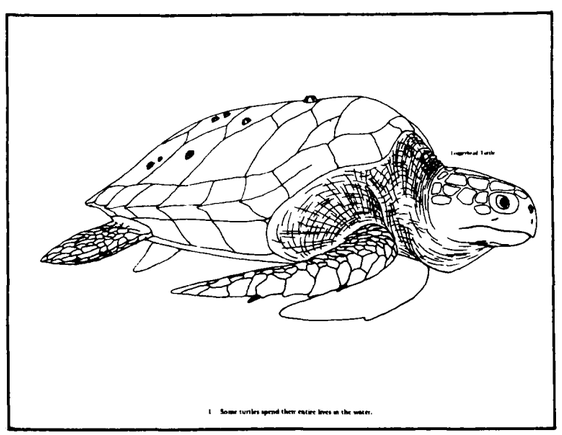
A 38-page coloring book for children has been produced by the Sea Grant program at Virginia Polytechnic Institute and State University.

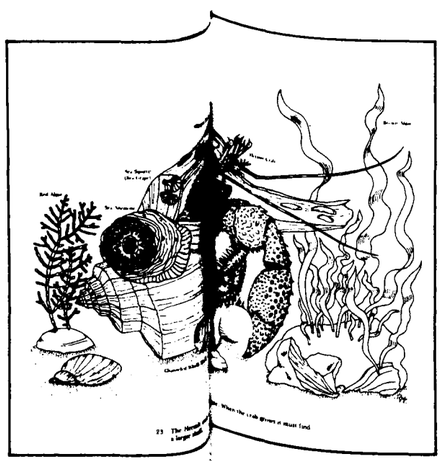
Entitled "Discover the Atlantic Ocean," the booklet pictures more than 79 animals found on the Atlantic Coast. Descriptive information is printed under each animal.

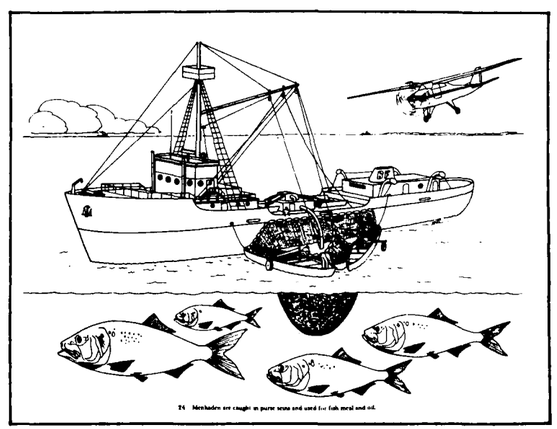
The names of the fish are listed in a special index, both alphabetically and by scientific names.

Additionally, the booklet has drawings showing the different ways that fish are caught, trapped and harvested.

The coloring books are available through the Extension Service at VPI&SU at Blacksburg for $1.50 each. Group orders cost less.







Sick Leave May Become A Retirement Benefit.

Have you heard how your sick leave may become a valuable fringe benefit if allowed to accumulate? Here's how:

Each eight hours of unused sick leave counts as one day of credit toward total length of service. Days are converted to months and years on the basis of a 260-day work year.

The service of an employee who: (1) retires on immediate annuity; or (2) dies leaving a spouse entitled to a survivor annuity, is increased by the days of unused sick leave to his or her credit.

The days of unused sick leave thus added are used in counting the number of years and months of service for annuity computation; they cannot be added in figuring the employee's high-3 average salary or for meeting the minimum length of service required for retirement eligibility.

To determine the length of service for annuity computation, all periods of creditable service and the time represented by the unused sick leave are added and any fractional part of a month in the total is dropped.

For example, an employee with 31 years, 5 months and 20 days service who has 1,124 hours (140 days, or 6 months and 14 days) of unused sick leave to his or her credit at retirement, is credited with 32 years (60¼ percent times his or her high-3 average equals annuity).

Following are a few common questions asked by employees about sick leave credit toward retirement:

Q: How is unused sick leave credited upon retirement?

A: A retiring employee increases his or her annuity by adding the time represented by the unused sick leave to the retiring employee's actual service. Since the amount of annuity is partly determined by amount of creditable service, adding sick leave to actual service increases the amount of annuity.

Q: What credit is given?

A: Generally, each eight hours of unused sick leave equals one day of service. Days are converted to months and years on a 260-day work year basis. On this basis, approximately 22 days equals one month.

Q: I am able to retire with enough years of service only if I add my unused sick leave to my actual service. Is that permitted?

A: No, sick leave is credited only for computing the amount of annuity. It is not used for figuring the High-3 average salary or for counting toward the minimum length of service necessary to retire.

Q: Is deposit of contributions to the retirement fund required to obtain retirement credit for unused sick leave?

A: No.

Q: My personnel office told me that generally the maximum annuity I can receive is an amount equal to 80 percent of my High-3 average salary. Does this limitation apply to annuity based on unused sick leave?

A: No. Additional annuity resulting from sick leave credit is allowable, over and above the 80 percent limitation. Although sick leave cannot be used to meet minimum requirement for retirement, crediting sick leave is not restricted by maximum allowable service limitations. Therefore, the more sick leave you as an employee are able to save, the more it will benefit you in retirement.

NOAA Personnel Division Lists Current Vacancies

Announcement No.	Position Title	Grade	MLC	Location	Issue Date	Closing Date
573-77	Supervisory Geodesist	GS-15	NOS	Rockville, Md.	9/1/77	9/16/77
866-77	Meteorologist	GS-13	NWS	Anchorage, Alaska	9/1/77	9/16/77
868-77	Computer Systems Analyst	GS-12	NMFS	Bay St. Louis, Miss.	9/1/77	9/16/77
869-77	Cartographer (Photo)	GS-12	NOS	Seattle, Wash.	9/1/77	9/16/77
871-77	Supervisory Meteorological Technician	GS-11	NWS	Garden City, N.Y.	9/1/77	9/16/77
872-77	Supervisory Meteorological Technician	GS-11	NWS	Cleveland, Ohio	9/1/77	9/16/77
875-77	Meteorologist (Leading Forecaster	GS-12	NWS	Reno, Nev.	9/7/77	9/21/7
876-77	Meteorologist (Forecaster)	GS-12	NWS	Oklahoma City, Okla.	9/7/77	9/21/77
877-77	Electronics Technician (Senior Electronics Technician)	GS-11	NWS	San Francisco, Calif.	9/8/77	9/22/77
878-77	Administrative Officer	GS-12	NOS	Rockville, Md.	9/8/77	9/22/77
880-77	Electronics Engineer	GS-11	NWS	Silver Spring, Md.	9/8/77	9/22/77
865-77	Fiscal Assistant	GS-9	NWS	Silver Spring, Md.	9/1/77	9/23/77
867-77	Oceanographer or Biologist (one position)	GS-12	ERL	Juneau, Alaska	9/1/77	9/23/77
870-77	Administrative Officer	GS-9/11	NMFS	Juneau, Alaska	9/1/77	9/23/77
873-77	General Engineer	GS-13	HDQS	Bay St. Louis, Miss.	9/1/77	9/23/77
881-77	Fishery Reporting Specialist	GS-7	NMFS	Beaufort, N.C.	9/9/77	9/23/77
882-77	Fishery Reporting Specialist	GS-7	NMFS	Savannah, Ga.	9/9/77	9/23/77
874-77	Trade Specialist	GS-12	NMFS	Washington, D.C.	9/7/77	9/28/77
879-77	Electronics Engineer	GS-7or9	NWS	Silver Spring, Md.	9/8/77	9/29/77

NOTES ABOUT PEOPLE

Dr. Robert G. Miller has assumed the duties of Chief, Objective Forecast Branch in the Techniques Development Laboratory of SDO, NWS. Dr. Miller has a master of science degree in meteorology and received his Ph.D. in statistics from Harvard University.

Dr. Robert G. Miller

He began his career in meteorology during World War II as a weather observer in the Army Air Corps and served as a weather observer on weather patrol in the North Atlantic for the U.S. Weather Bureau.

His professional career began in 1952 at the Massachusetts Institute of Technology where he did pioneering work in statistical meteorology on MIT's digital computer, Whirlwind.

In 1955, he joined the Travelers Insurance Company and was named director of the Mathematical Statistics Division. While there, he developed many of the terminal forecasting procedures presently in use by the National Weather Service and Air Weather Service.

From 1964 to 1966, Dr. Miller served in the Operational Research Department of Bell Telephone Laboratories.

Between 1971 and 1976, Dr. Miller was a senior scientist in market research at the Life Insurance Marketing and Research Association. He was responsible for designing a statistical computer system for market situational analysis.

During 1976-77, Dr. Miller was the Chief Scientist, Headquarters, Air Weather Service.

William Winkert, senior instructor at the NWS Technical Training Center, Kansas City, Mo., completed the Aerospace Education Leadership Development Course conducted by Middle Tennessee State University, Air University, and Hq. Civil Air Patrol-U.S. Air Force, Maxwell AFB, Ala., in July.

Dr. P. Krishna Ras has been named Chief, Atmospheric Energetics Branch at NESS. He joined the Meteorological Satellite Laboratory in 1961. From 1971-72, he was a Dept. of Commerce Science and Technology Fellow. He served as a program manager of the Environmental Systems and Resources Division, RANN Program, National Science Foundation. From 1974-76, he was on an assignment with the World Meteorological Organization (WMO), advising various WMO bodies, international organizations, and

Dr. P. Krishna Ras

WMO members on the use of satellite data and products. Dr. Ras also serves as the Executive Secretary of the Research and Development Council, a NESS interoffice review and policy-making body. He is a fellow of the Royal Meteorological Society (U.K.), and a member of the American Meteorological Society and the New York Academy of Sciences.

Cdr. James G. Grunwell, formerly chief of the Marine Engineering Division in the Office of Fleet Operations in Rockville, Md., is the new commanding officer of the NOAA Ship Surveyor. Grunwell joined the commissioned corps of the Coast and Geodetic Survey (now the NOAA Corps) in 1964 and has served aboard the Bowie, Surveyor, and Researcher. The Surveyor is based in Seattle and recently completed Leg II of the Outer Continental Shelf Environmental Assessment Program (OCSEAP) in Alaskan waters.

Arno Perlow, CCEA, (left), receives his Special Achievement Award from Dr. Norton Strommen, CCEA Director.

Arno Perlow, EDS' Center for Climatic and Environmental Assessment (CCEA), was presented a Special Achievement Award and Quality Step Increase for his outstanding performance as a meteorological technician on the Large Area Crop Inventory Experiment (LACIE) project at Johnson Space Center in Houston, Tex. The project will improve the timeliness and accuracy of major crop assessments by combining current and historical weather crop information with data from surface sources and satellites. Perlow prepared and presented all the weekly briefings on global climate and its impact on agriculture to managers and scientists of NASA, USDA, and NOAA. Perlow recently transferred from CCEA, Houston to CCEA, Columbia, Mo.

NWS Eastern Region Headquarters, responsible for Weather Service offices in the northeastern quarter of the United States, reports that 15 of its Weather Service personnel have accumulated more than 3000 hours of sick leave each.

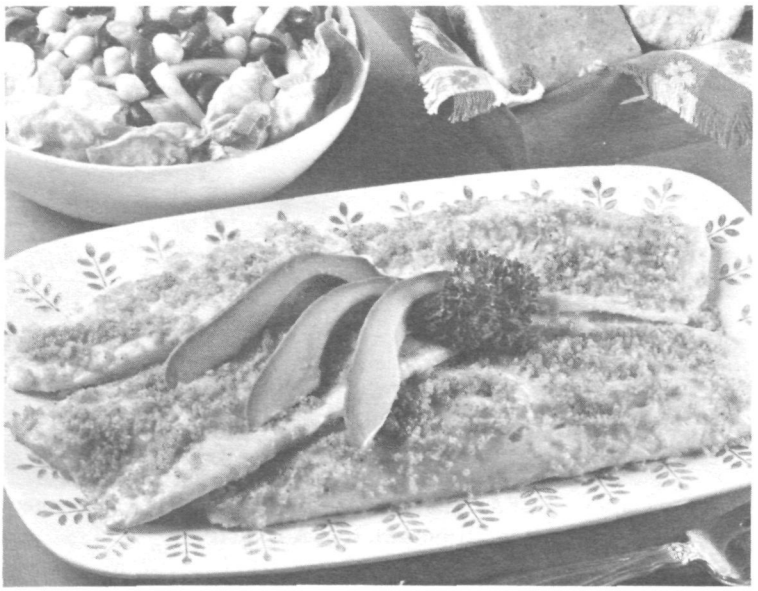
OBITUARY

Locke L. Cranford, Jr.

Locke L. Cranford, Jr., former NOS chief engineer, died Sept. 4, in Norfolk after a lengthy illness. He retired Mar. 31, 1967, after 37 years of service. He began his career with the National Ocean Survey in 1946 on the Ship Pioneer and subsequently served as chief engineer on the Surveyor, the Explorer, and the Davidson. He is survived by his wife Clara.

Selected for full-time university training, Audrey Primas, Office of Coastal Zone Management's Office of Policy and Program Development, is shown receiving the notification and a NOAA Special Achievement Award from Acting Associate Administrator for Coastal Zone Management Robert W. Knecht, at a ceremony on July 28.

FROM THE GALLEY



Mexican Fish Dinner

2 pounds fish fillets, fresh or frozen
2/3 cup dry bread crumbs or cornflake crumbs
1/4 cup grated onion
1 teaspoon chili powder
1 teaspoon salt
1/4 teaspoon ground thyme
Dash cayenne pepper
Paprika
Lemon wedges

Thaw fillets if frozen. Place fillets in a singular layer, skin side down, on a well-greased bake and serve platter, 16 by 10 inches. Combine remaining ingredients except paprika and lemon wedges. Spread crumb mixture over fillets. Sprinkle with paprika. Bake in a moderate oven, 350 degrees F., for 20 to 25 minutes or until fillets flake easily when tested with a fork. Serve with lemon wedges. Makes 6 servings.

If desired, avocado wedges may be used as a garnish.

BEST FISH BUYS

According to the NMFS National Fishery Education Center in Chicago, the best fish buys for the next week or so are likely to be fresh cod fillets and frozen fish sticks along the Northeast Seaboard; fresh whole croaker and gray seatrout in the Middle Atlantic States, including the D.C. area; fresh mullet and gray seatrout fillets in the Southeast and along the Gulf Coast; frozen dressed whiting and frozen Dungeness crab in the Midwest; frozen shrimp and canned tuna in the Northwest; and frozen Pacific red snapper fillets and frozen mahi mahi fillets in the Southwest.

"Buy Bonds"

Booklet on Temperature Extremes Ready from EDS

The highest temperature ever officially observed in the United States was 134 degrees Fahrenheit at Greenland Ranch, Calif. The lowest, -79.8 degrees F., was observed at Prospect Creek Camp in the mountains of northern Alaska. These highest and lowest temperature statistics and those for the remaining 49 states are listed in the recently revised publication, *Temperature Extremes in the United States.*

Published by EDS' National Climatic Center, the booklet contains updated tables, listing by State the extreme temperatures, date they occurred, and station name and elevation. The recorded temperature extremes depend on several factors: elevation, latitude, condition of the earth's surface, local effects of terrain, density of observational network, and length of observational record.

Greenland Ranch station is 178 feet below sea level and recorded the 134 degrees F. on July 10, 1913. The station is located in Death Valley, which has the hottest summers in the Western Hemisphere, and is the only known place in the U.S. where nighttime temperatures sometimes remain above 100 degrees F.

Prospect Creek station is at 1,100 feet and recorded the -79.8 degrees F. on Jan. 23, 1971. The lowest temperature ever recorded in the conterminous 48 States, -69.7 degrees F., was observed at Rogers Pass in Lewis and Clark County, Mont., on Jan. 20, 1954.

The booklet also lists some rapid temperature changes associated with hot downslope winds. For example, the temperature rose 49 degrees F. in 2 minutes at Spearfish, S. Dak., on Jan. 22, 1943. The change was from -4 degrees F. at 7:30 a.m. to 45 degrees F. at 7:32 a.m.

Two maps show the highest and lowest temperature and location for each State.

Copies of the booklet are available from National Climatic Center, Federal Building, Asheville, NC 28801.

National Weather Service's Technical Training Center in Kansas City, Mo., held its second Upper Air Observations Class, March 15-April 21, 1977. Attending were: Seated, left to right: Richard Schulz, WSMO Stampede Pass, Wash., Regina Kriete, WSO King Salmon, Alaska; Rebecca Bates, WSFO Boise, Ida., Charlene Gross, WSFO Bismarck, N.D.; Bobbye Brewer, WSFO Oklahoma City, Okla. Standing, left to right: Bill Winkert, Instructor; Jerry Orchanian, WSMO Fort Totten, N.Y.: Mike Bender, WSFO Bismarck, N.D.; Lloyd Smith, WSO El Paso, Tex.; Mauri Ward, Instructor.

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National Oceanic and Atmospheric Administration

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