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Satellites Play Major Role In Hurricane Warnings

"Satellites are the cornerstone of the hurricane warning service," says Dr. Neil L. Frank, Director of the National Oceanic and Atmospheric Administration's Hurricane Center in Miami, Florida.

The center's weather-detecting ability recently was augmented by NASA's new Synchronous Meteorological Satellite-1 (SMS-1), launched May 17, 1974, which is used in conjunction with the older Applications Technology Satellite-3 (ATS-3), launched in 1967, and with polar-orbiting NOAA and Nimbus spacecraft.

Dr. Frank added: "There is no way a major hurricane or severe storm can strike the United States undetected."

Spacecraft such as the SMS and the ATS, in synchronous orbit at an altitude of 36,300 kilometers (22,300 miles), scan the whole Western Hemisphere every 30 minutes for NOAA's National Weather Service and National Environmental Satellite Service (NESS). They can pick up disturbances that represent a threat to the eastern United States as they form off the coast of Africa to move across the Atlantic Ocean.

That area seems to be the breeding ground for about half of the approximately 100 storms that may build in intensity to the status of tropical storms or hurricanes. Others fated to become severe storms originate in ocean regions closer to the Americas.

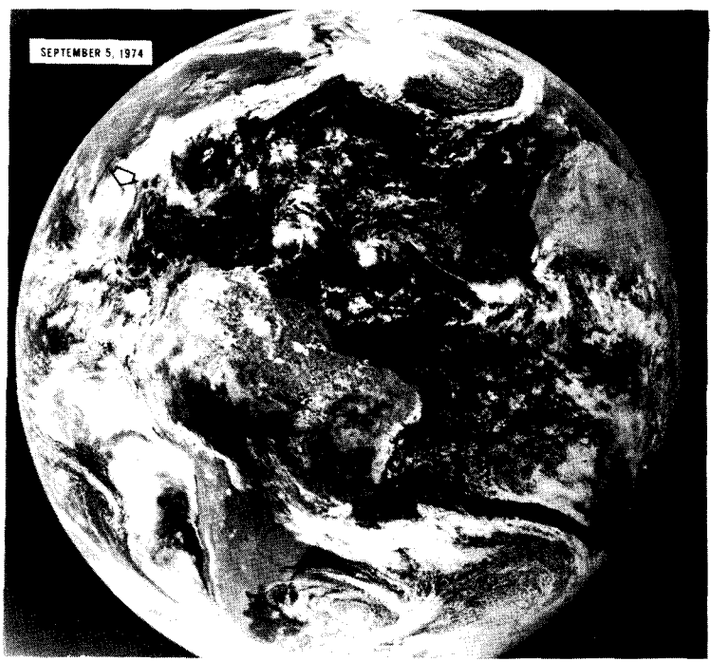
Satellites are extremely important because they provide early warnings and data to measure speed and the circulation of winds. Many hurricane seedlings are born over Africa's Sahara Desert and become tropical storms when the hot Sahara air meets the cool air along the coast of Africa.

Frank says the "dramatic impact of geosynchronous orbit satellites (they "hang" over one spot on Earth's equator by rotating at the same speed as that of Earth) was apparent with the launch of ATS-3 in 1967, which showed us, for instance, that there were about twice as many tropical storms forming off the west coast of Mexico as we had thought.

"Before 1966, we had spotted an average of only seven or eight potentially severe storms per year forming in the area, but after ATS-3 was up we saw an average of about 15 each year, west of Mexico."

Satellites obviously are not the only method used to spot and track hurricanes and tropical storms. The Hurricane Center has 400 kilometer-range (250 miles) radar and military aircraft on call to fly into the storms for precise measurements and computerized predictions of storm-surge heights expected from rapid water rise and high waves. Estimates show that nine out of ten hurricane deaths are from drowning. These occur because of the rapidity with which water rises to dangerous heights.

Adjacent to the Hurricane Center office is NOAA's NESS Satellite Field Services Station (SFSS) which receives satellite-observed sea-surface temperature readings from around the world to feed into the Hurricane Center's computer. NOAA and NASA satellites such as those in the Nimbus and NOAA series measure vertical temperatures over the oceans, which give sea-surface and upper-air temperatures over the oceans at about 30 mile intervals.



SMS-1 TRACKS HURRICANE. Hurricane Carmen (arrow) moves northward from Mexico's Yucatan Peninsula toward the U.S. Gulf Coast in this view from NASA's Synchronous Meteorological Satellite-1 (SMS-1). The satellite, stationed 35,786 kilometers over the equator off the east coast of South America, provides continuous coverage of much of the Western Hemisphere, returning full-disc pictures of Earth and data for selected closeups. In this view three other swirling tropical storms can be seen moving westward across the Atlantic between Africa and the Carribean area. Says Dr. Neil L. Frank, director of the National Oceanic and Atmospheric Administration's Hurricane Center in Miami: "The impact of the day-night SMS-1 time-lapse pictures has been most dramatic in helping our understanding not only of hurricanes and tropical storm but of the total weather pattern in the Atlantic." SMS-1 was launched May 17, 1974 from KSC and is controlled from Goddard.

The NESS SFSS staff keeps a careful eye on these readings to detect ocean heating or the development of a hot spot that could cause the air to rise and speed up air motion. In effect, the atmosphere "boils." The column of hot air bubbles up, the cold air spills down (much like water), and the continuous motion provides energy. Over a wide enough area, that portion of the atmosphere begins rotating and becomes a storm whose air motion can be seen and tracked via satellite. Thunderstorms, which can pack the energy of hydrogen bombs, may even look like the mushrooming clouds of H-bomb explosions on a series of satellite pictures.

Donald C. Gaby, SFSS manager, says his organization has a new tool, in SMS-1: "It's the first time we are able to see the whole hemisphere continuously day and night and in infrared." This day-night-infrared capability allows SFSS operational meteorologists to make analyses of cloud heights and movement and infer wind speeds. NOAA polar orbiting satellites see such things as eddies in the Gulf Stream, even spot the demarcation point of cold and warm water.

All this information, including reports from ships and meteorologists in other countries, is analyzed and then relayed to weather centers along the Guld Coast, Florida, and the East Coast for localized forecasts. At the same time the Hurricane Center provides similar information on request to Central American and Caribbean areas.

The part played by governmental weather trackers responsible for providing information on the progress of potential killer storms to residents of the United States, Caribbean Islands, the Bahamas Islands, and Central American countries was well illustrated recently when Hurricane Carmen swept through the Atlantic Ocean. Satellites, reconnaissance aircraft, radar stations, and land-based scientists tracked the dangerous storm from the African coast beginning August 23, to its Gulf of Mexico point of entry into the United States on September 8.

Safety Management Seminar Held at Goddard

From September 16 through September 19, 22 Goddard employees attended a safety management seminar on safety responsibilities of the supervisor. The seminar was sponsored by the GSFC Health and Safety Engineering Office, with professional instructors being furnished through the University of Maryland.

The seminar was designed to educate the supervisor in his safety responsibilities on the job. Subjects covered were: the impact of occupational health and safety administration on the Federal establishment, safety responsibilities of the supervisor, managing safety performance, human factors, hazard identification and control, system safety analysis techniques, mishap reporting and investigation, safety communication, and motivating safe performance.

Speakers at the seminar were: John E. Albertson, Safety Engineer, U. S. Department of Labor; Harvey Clearwater, Ph.D., Assistant Professor of Health and Safety Education Center, University of Maryland; William H. Pope, Ph.D., Human Factors Officer, Air Force Systems Command, Engineering Management Division; and John P. Littlehales, CSP, Senior Loss Prevention Specialist, Nationwide Insurance Company. According to Leven B. Gray, Chief of the Health and Safety Engineering Office, at least two additional safety management seminars are planned for this fiscal year. This will enable additional GSFC supervisors to receive training on how to manage their safety responsibilities on the job. It is anticipated that the University of Maryland will again furnish the speakers for the seminars.

SAFETY MANAGEMENT SEMINAR ATTENDEES. Shown here are Goddard employees who completed the Safety Management Seminar held at Goddard from September 16 through 19. From left, kneeling are: R. V. Gallup (ARC Safety Officer); Thomas Ziegler, Code 532; Adam Thompson, Code 663.3; Robert Lively, Code 513; Bernard S. Coski, Code 271; and Keith Walters, Code 253.2. Standing are: Jack Eybel, Code 205; Robert Callens, Code 713.1; Lloyd Carpenter, Code 921; Kenneth Brown, Code 944; John Thompson, Code 564; Charles Mason, Code 863; Camillo Arcilesi, Code 321.3; Kenneth Kagy, University of Maryland Seminar Coordinator; Fred Taub, Code 751; William Hills, Code 844; George Bergen, Code 722.2; Ralph Strnad, Code 294; Garry Dennis, Code 810; Henry Maurer, Code 322; Bert Gagnon, Code 620; Donald Olverson, Code 951; Ben B. Pagac, Code 205; and Dr. Harvey Clearwater of the University of Maryland's Health and Safety Education Center.

ANS Now Operational

The first cooperative United States – Netherlands scientific satellite became fully operational on Saturday, September 15 following the completion of checkout tests. The satellite was launched by NASA aboard a Scout rocket on August 30 from Vandenberg Air Force Base, California.

"All three experiments are collecting excellent data in the star-pointing mode," says Emil W. Hymowitz, Goddard's ANS Project Manager.

Carrying X-ray experiments and an ultraviolet telescope high above the Earth's atmosphere, the Astronomical Netherlands Satellite (ANS) will seek information that could provide a better understanding of the anatomy of stars, galaxies and the universe itself.

The X-ray and ultraviolet regions of the spectrum, most of whose wavelengths are opaque to Earth's atmosphere, are among the least explored. Nevertheless, unexpected discoveries made by earlier satellites—notably NASA's Small Astronomy Satellite and Orbiting Astronomical Observatory 3—have given astronomers a strong motivation for carrying out an extensive survey of the sky in these wavelength regions.

The ultraviolet experiment aboard ANS will help scientists: refine a classification system for young stars; identify ages of massive stars in their early phases of evolution; learn more about the evolution and expansion of young star groups; define the detailed structure of the Milky Way by observing young stars; identify stars in binary systems by spectral types; and study interstellar grains—the material between the stars—especially in regions where new stars may be forming.

The X-ray experiments are designed to: detect faint X-ray sources; study the time variability of selected X-ray sources for periods of up to several days, especially such objects as X-ray pulsars whose emissions pulsate with periods as low as tens of milliseconds; observe silicon X-ray line emissions; Observe certain nearby galaxies and clusters of galaxies to ascertain the brightness of certain emission regions with high angular resolution; and to correlate X-ray, optical and radio observations of selected objects in space, such as binary star systems.

The scientific instruments include two provided by the Netherlands: a 22 cm. aperture Cassegrain telescope with a spectrometer and five ultraviolet-sensitive photomultiplers that cover the range of 1500 to 3300 Angstroms; and a two-detector soft X-ray instrument that covers the energy range from 0.3 to 5 KeV. The U.S. experiment consists of two essentially independent instruments in one package: a large area detector (LAD) for the study of X-rays in the range of 2 to 20 KeV, and a Bragg crystal spectrometer that is designed to obtain silicon X-ray line emissions around 2 KeV. This instrument is the first of its type to be flown on an orbiting spacecraft.

The spacecraft is three-axis stabilized, the first Scout-launched spacecraft to have this capability for scientific purposes. It provides a pointing ability that will permit a more detailed study of X-ray sources than obtained from the Small Astronomy Satellite (SAS-A) and other satellites and sounding rockets.

The Netherlands Agency for Aerospace Programs (NIVR) is responsible for that country's project management, and Goddard is the U.S. manager. The Scout launched vehicle is supplied by the Langley Research Center, and the Smithsonian Astrophysical Observatory is responsible for the U.S. experiment.

Goddard's ANS project team includes Emil W. Hymowitz, Project Manager; Theodore P. Stecher, Project Scientist; George Kowalski, Project Coordinator, and William F. Mack, Mission Operations Systems Manager.

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Jacques Cousteau Visits Goddard

CAPTAIN JACQUES YVES COUSTEAU, world renowned Ocean Explorer, visited Goddard on September 24, 1974, to meet with GSFC officials and tour the Center in connection with an upcoming expedition he is planning to the Carribbean Sea, Gulf of Mexico and coastal areas. Shown during the tour are (from left) Leonard Jaffe, NASA Deputy Associate Administrator for Applications; Dr. John F. Clark, Goddard Director; Captain Cousteau; Charles W. Mathews, NASA Associate Administrator for Applications; and Donald P. Hearth, Goddard Deputy Director. NASA plans to participate in a number of experiments involving Cousteau's ship Calypso. The Calypso would provide ground truth data for an Electronic Scanning Microwave Radiometer (ESMR), a Coastal Zone Color Sensor (CZCS), and carry a NASA-developed scatter meter.

DURING HIS VISIT, Captain Cousteau talked with some of Goddard's experimenters. From left here are Frederick L. Hyman, President of the Cousteau Society, Inc.; Dave Nace of Goddard; Jacques Cousteau; and Tom Wilheit, ESMR Principal Investigator. The Calypso will have an ATS transmitter/receiver and APT receiver on board. Charles H. Vermillion is coordinating installation of the ATS and APT equipment with the aid of David A. Nace, Locke M. Stuart, and John Kamowski. Principal Investigators for the project are Thomas T. Wilheit, ESMR; Dr. Warren Hovis, CZCS; and Dr. W. Ross McCluney, Scatter Meter.

CFC Needs Your Help To Help Others

The 1975 Combined Federal Campaign got underway on October 1 and will continue through November. The overall goal, established by representatives of the Federal government and leaders of employee organizations, is $9.4 million. Goddard's share is $173,000.

The CFC provides funds for more than 100 health and welfare agencies. These are briefly described in the brochure available from your keyman.

A CFC contribution is directed to all participating agencies, unless a donor designates a particular agency. In this case, the agency receives all designated dollars, even if they are in excess of the CFC established amount for that particular charity.

The CFC organizations need our help. Someday we may need their help. Help will be available only because we supported the campaign. If you have not contributed, do it today, and do so the most convenient way – through the payroll deduction plan. The CFC is an opportunity for all of us to share in a common humanitarian cause.

Margaret Tindal Appointed to Education Post

Margaret A. Tindal

Margaret A. Tindal has been appointed Education Specialist in the Educational Programs and Services Branch of Goddard's Office of Public Affairs.

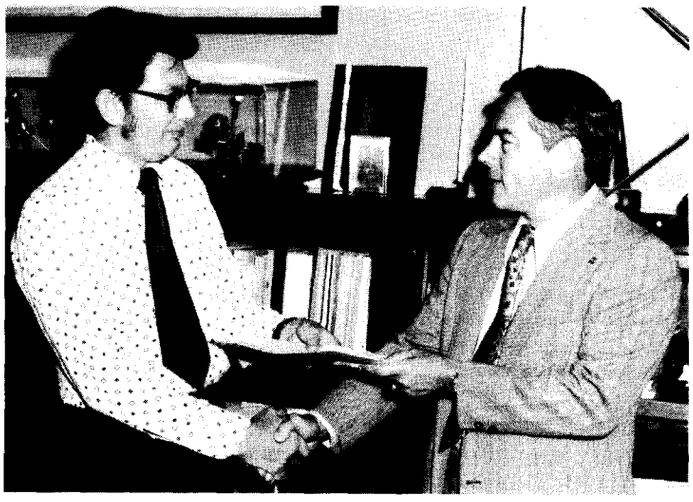
In her new post, Ms Tindal will participate in all phases of Goddard's educational activities, with special emphasis on the development of instructional materials using imagery obtained from Goddard's Earth Resources Technology Satellite.

Her contributions will provide educators at the elementary school, secondary school and college levels with an immediate source of current information resulting from NASA's research and development activities in both aeronautics and space.

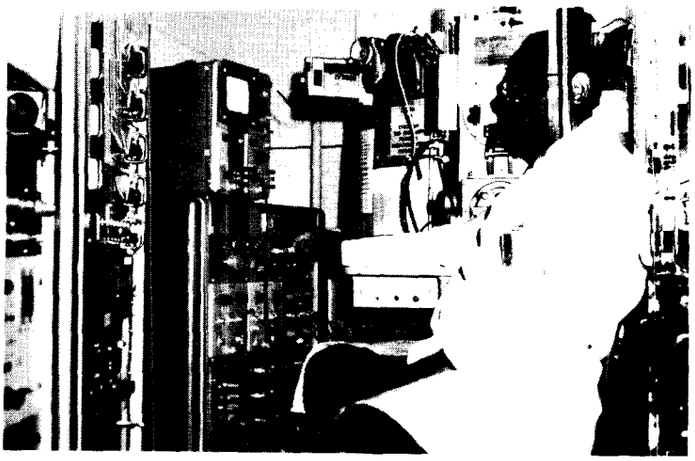
Other assignments will involve conferences for educators at the field center; teacher aerospace education workshops; publications; films; a lecture-demonstration school visit program popularly known as the "Spacemobile"; and other related programs in Washington, D.C. and the eleven Northeastern states.

Ms Tindal is uniquely qualified to handle her new responsibilities. She was selected for the Outstanding Young Women of America, 1974-75 and at the same time was selected an Outstanding Educator of America, 1974-75.

She received her B.S. degree in Elementary Education and Social Science at Coppin State College, Baltimore, Md., an M.A. in Geography at the Clark University Graduate School of Geography, Worcester, Massachusetts, and engaged in advanced studies at Oregon State University, and the Morgan State/NASA Research Program. She is a member of Circulus Scholarum Honor Society, Alpha Kappa Mu National Honor Society, Association of American Geographers, and the American Association of University Women.



PATENT AWARD. Robert Baumann (right), Deputy Director of Engineering, presents a patent award certificate and check to Ewald Schmidt for his invention of a piezoelectric actuator. Mr. Schmidt's piezoelectric actuator is an ultra-sensitive positioning device possessing substantial load-carrying capacity and positioning range capable of producing motions of one micro-inch or less with accuracy. It is expecially adapted for supplying forces and displacements required to change figures of optical mirrors, structural elements of optical polishing beds, and other mirror deflection devices.



JOHN TARPLEY uses an electron microprobe analyzer to determine compositional uniformity of colored-glass filters developed by the Materials Engineering Branch.

WALTER VIERMANN determines the spectral lumenescence of a photomulplier tube face plate with an optical pulse-height analyzer while the face plate is exposed to beta electron radiation.

Materials Engineering Services

This article by Dr. Guy Eubanks, Head of the Inorganic Materials Section, is the third in a series of articles about the services and people of the Materials Engineering Branch.

Inorganic Materials Analysis

The Inorganic Materials Section carries out a variety of materials engineering activities from *analyzing* unknown (and unwanted) reaction products on circuit boards with an electron microprobe to determining the various properties of inorganic paints pigmented with *zinc oxide.*

Included in this A to Z coverage are materials engineering support to Goddard's space programs, materials list reviews, failure analysis, mechanical and physical property determinations, and so on. Members of the Section also provide consultive services on such inorganic materials as graphites, optical glasses, infrared materials, and other ceramics. Additional services include thermal conductivity and thermal expansion measurements, thermogravimetric analysis, refractive index determination, surface topography measurements with a profilometer, and electron microprobe analysis. Radio frequency sputtering is also a capability. Although these services are generally used to assist Code 755 materials support engineers assigned to flight projects solve materials problems, they are available to others at Goddard who might need them.

Despite the varied work-load just described, engineers in the Section, ably assisted by technicians Ron Hunkeler and Ed Sanford, find time to do a moderate amount of space-flight related research and development on new materials and to determine as yet unmeasured properties of old ones.

For example, a new material recently developed by A. G. Eubanks and T. M. Heslin is a radiation-resistant colored-glass filter for the ultraviolet region. In the program under which this glass was developed, the goal is to prepare a series of glass filters, each of which will transmit light at a different wavelength and which will have better transmission than the thin-film interference filters presently utilized.

Another interesting project is Walter Viehmann's investigation of the luminescence of optical materials. Luminescence is a phenomenon in which light is emitted when a material is subjected to particulate and/or electromagnetic irradiation. Not all materials luminesce, but most optical materials do. This task was initiated because of increased interest in the detection of low-intensity light by spacecraft attitude control devices and by certain space experiments. In some instances space researchers found that the light they wanted to measure was obscured by luminescence from the optics they were using to detect it. Up to the present, Mr. Viehmann has determined the luminescence characteristics of a number of materials and is continuing his investigations on others. Mr. Viehmann's quantitative determination of the luminescence spectra and decay times of optical materials will enable attitude control engineers and space investigators to select suitable materials from which to make their optical elements for any particular application.

Contamination, which was mentioned in an earlier article in this series, is a problem which continually plagues experimenters and spacecraft engineers. The Materials Branch has an on-going program to determine the sources of contamination and to minimize the amount that occurs. One facet of this program is being carried out by Ernest Mielke. Mr. Mielke uses a specially designed experimental set-up incorporating a laser beam to determine the growth rate and optical effects of thin films of known spacecraft contaminants. So far, Mr. Mielke has investigated such undesirable compounds as aromatic and aliphatic hydrocarbons, silicone oils, water, and other outgassed products from various materials used in space applications. From the data obtained, Mr. Mielke can not only determine actual film thicknesses and their growth rates but their total normal emissivity, visible-light scattering effects, reflectance, and refractive index. Interestingly enough, frozen water is one of the worst contaminants encountered in spacecraft insofar as its effect on the optical properties of reflecting surfaces and transparent materials is concerned. Water is, unfortunately, one of the contaminants hardest to eliminate.

Although "in-house" research projects, like those described above, are necessarily carried out on a low-key basis because of the higher priority of direct materials engineering support to Goddard's flight hardware programs, they are aimed at solving materials problems that are closely related to flight projects. And, through them, members of the Materials Engineering Branch are better able to contribute to the NASA's objectives by developing new materials and by determining better ways to utilize the old ones.

THE EFFECT OF CONTAMINATION on the optical properties of reflecting and transmitting surfaces is determined by Ernest Mielke by using a specially-built apparatus incorporating a laser beam.

Bringing People Together Via ERTS

By Ben B. Pagac

There is one achievement of the ERTS program which is not often mentioned, but perhaps should be. This is its ability to bring people together. From the day the Earth Resources Technology Satellite was launched on July 23, 1972, scientific investigators from around the world have marveled at ERTS imagery and exchanged ideas about its meaning.

Who are these people, and how does ERTS bring them together? Almost without exception, they are people drawn together by common interests and a thirst for the new knowledge which ERTS provides. This is the story of two of them: Mademoiselle Sophie Alexandra des Clers of France and Professor Joseph Otterman of Israel.

Mlle. des Clers of Paris is a student who spent the summer at the Patuxent Wildlife Research Center studying U.S. methods of migratory game bird management. She was engaged in this project for her father, a researcher for the International Waterfowl Bureau in cooperation with the Paris Museum of Natural History. Although she is a Parisienne, Mlle. des Clers holds derivative U.S. citizenship through her American mother. Her major at the University of Sciences in Paris has been ecology, and she plans to enter the University of Orleans to work toward a Ph.D. in that field.

One of her primary interests has been the study of possible ecological causes of the five-year drought in the Sahelian Zone of Africa, a 3,000 kilometer area along the southern edge of the Sahara Desert. During her studies, she has made a trip to the Sahel for on-the-spot observation of the effects of the drought.

Her interests in the Sahel became known to her co-workers at the Patuxent Research Center, and one of them suggested that ERTS might be a source of climatological information on Africa. Mlle. des Clers accepted the suggestion and she and her co-worker turned to Goddard. Here they found not only ERTS material on the Sahel, but also an eminent investigator who is greatly interested in the subject of desertification. That investigator is Dr. Joseph Otterman of Israel.

Dr. Otterman is an Associate Professor of Planetary Sciences in the Department of Environmental Sciences at Tel Aviv University, Ramat-Aviv. He was Israel's principal investigator for ERTS-1 and is currently working as a NAS-NRC Resident Associate in the Atmospheric and Hydrospheric Applications Division of Goddard's Application's Directorate. His current interests with respect to ERTS imagery are: reflectivity (albedo) of vegetation versus overgrazed soil and the climatological implications of this phenomena; reasons for temperature changes in desert lands; and observation of cloud cover as related to temperature changes.

Dr. Otterman explains that an important benefit of the ERTS program is the opportunity to scientifically study desertification and seek ways to reverse it. Since the desertification of the Sinai and the Gaza Strip areas might be in many respects similar to that of the Sahel, Dr. Otterman is interested in both. In a paper presented at the XVI International Technical and Scientific Convention on Space held in Rome in March of this year, he discussed the effects of overgrazing as dramatically illustrated by the very clear line of demarcation which is visible on ERTS imagery of the area between the Negev where grazing is controlled and the Sinai/Gaza Strip area where it is not.

In this paper, he hypothesized that climatic desertification can be a result of overgrazed area, basing his theory on measurements which show that overgrazed surfaces under clear sky conditions are colder than surfaces with vegetation. This same surface demarcation between overgrazed land and fence-controlled areas in the Sahel was previously observed on ERTS imagery and reported by Professors Norman McLeod and Darrell Randall of American University. The concept of overgrazing as a potential contributing cause of desertification offered a whole new field of study to Mlle. des Clers and she was invited by Dr. Otterman to come to Goddard to observe the phenomenon at first hand as it is disclosed in the ERTS facility's imagery.

VEGETATION BOUNDARY. Dr. Joseph Otterman of Israel points out to Mlle. Sophie des Clers of Paris the plainly visible vegetation demarcation line between the Negev and the Sinai/Gaza Strip areas as it appears on an ERTS transparency. Photo was taken in the ERTS Browse facility at Goddard.

From the time she first visited Goddard in July, Mlle. des Clers continued to come to the ERTS facility once a week until she returned to Paris in September. As a result of her introduction to the ERTS program and Dr. Otterman, Sophie enthusiastically speaks of ERTS as a "new and revolutionary tool in the study of the environment which provides far more documentation and observation of climatological changes than have ever been possible before. Before coming here," she said, "I sought mainly in my studies to learn the causes and effects of the drought. But now, as a result of working with Dr. Otterman, I know that we may also seek ways to reverse the desertification stemming from the drought. Perhaps ERTS will give us the knowledge necessary to do so."

ERTS Helps Protect Florida Everglades

Satellite technology is helping to preserve Florida's Everglades National Park through environmental assessments made possible by teamwork between the U.S. Geological Survey and Goddard.

Under the direction of Aaron L. Higer, of the USGS in Miami, the ecological balance of the 3,600-square-kilometer (1,440-square-mile) area is constantly surveyed by 20 small data collection platforms (DCPs) situated strategically for water resource management. The DCPs radio their readings to NASA's Earth Resources Technology Satellite (ERTS-1) when it passes overhead, and the satellite relays the reports to a ground station.

The information is important not only to the animals and vegetation of the Everglades, but to the 2.5 million human inhabitants of southeast Florida, including those in densely populated Miami.

Until the platforms were emplaced it was difficult to get accurate readings of the amount of water in surface storage because of the large area involved, the shallow water depths, the flat terrain, and the large amount of vegetation. Except for a few radio microwave reports, all readings were made as a result of personal visits to individual stations in the Everglades about once a month. The analyzed data reached users about two months after initial recording.

Now that the DCP network is operational, Higer says users can have data from the most inacessible regions in the Everglades – even from the middle of Lake Okeechobee at the top of the water-feeding chain to Everglades – usually within 25 to 40 minutes after measurements are taken. In addition, malfunctions in a platform are known immediately and a maintenance man can be dispatched by truck, airboat, or helicopter to make repairs.

The DCP measurements include amount of rainfall, water levels, water flow, evaporation rates, humidity, water and air temperatures, salinity, oxygen content, pollutants present, and soil moisture.

"There is probably no limit on the types of measurements we can make with the DCPs," Higer says.

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A Mexican Student's Unique 'People to People' Experience at Goddard

Science, Engineering and computer programming were but three areas of study for a sixteen-year-old Mexican boy at Goddard this summer. J. Eduardo Vazquez Espinola spent six weeks at Goddard working with employees in all directorates in a special "people to people" program coordinated by the Educational Programs Office. At the same time he was learning such difficult subjects as FORTRAN, a complex computer language, Eduardo was also learning and improving his English.

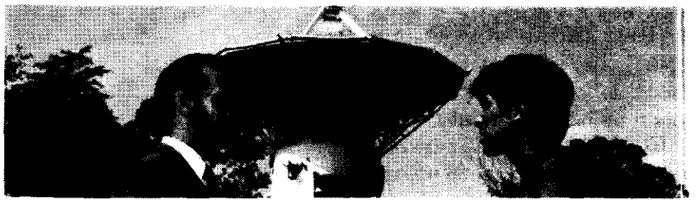
Eduardo won his Goddard experience by winning first place in a contest sponsored for high school students by the Lions Club in his home town of San Francisco del Rincon, Mexico. The Lions Club financed his round-trip transportation and Joseph J. Lopez of Goddard's Health and Safety Engineering Office opened his home to Eduardo during his stay in Maryland.

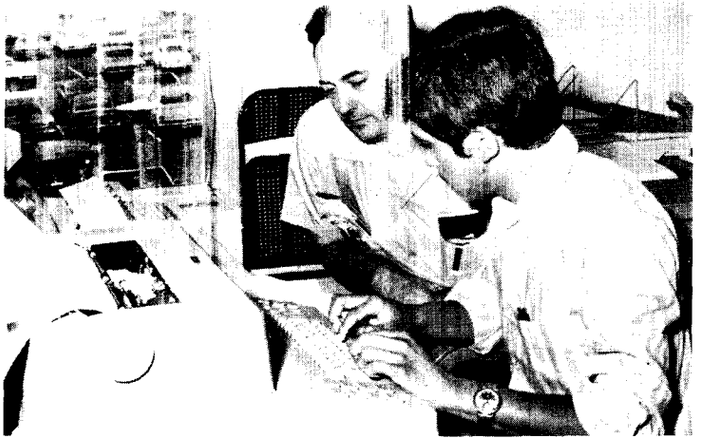
The program was initially conceived by Mr. Lopez, whose ancestors came from San Francisco del Rincon. Although born and educated in the U.S., Mr. Lopez has over the years maintained close personal ties with relatives and friends in this town. He is also familiar with an EPO program at Goddard that, without expenditure of funds, introduces high school students to the real world of work. He asked the Educational Programs Office if a student from Mexico could be placed in a comparable learning experience. EPO agreed and obtained permission for the project, and arrangements were made through the San Francisco del Rincon Lions Club.

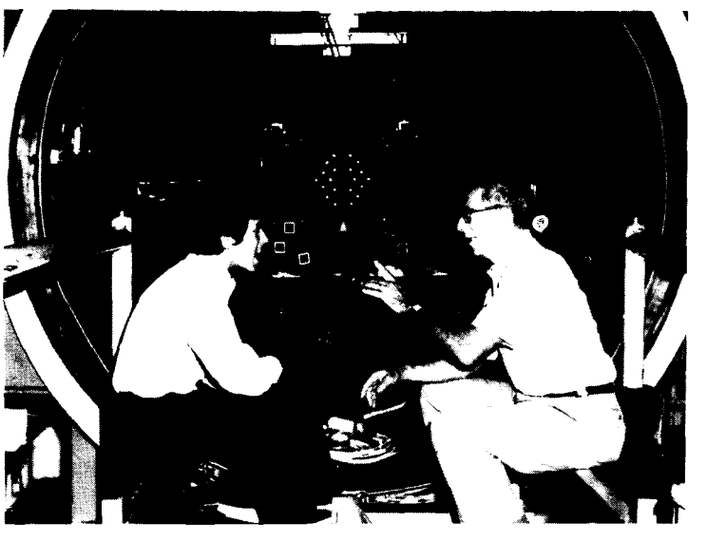
At Goddard Eduardo Vazquez Espinola has received first-hand experience in what it is like to be an engineer or scientists. He completed 100 hours of computer programming training, and assembled a radio transmitter as part of a soldering course at the NT&TF. He learned to read ERTS imagery, and calculated solar radiation and solar temperature as part of another project. Perhaps his most unique experience was the taping of a ten minute videotape for which he wrote his own script.

Daniel Kirk of the Science and Applications Computing Center tutored Eduardo in computer programming for two hours or so late each afternoon during his entire stay. William Cahill presented Eduardo a certificate of achievement on the last day for his accomplishment in the 100 hour course.

During his last day at Goddard on September 13, Eduardo Espinola met with Dr. Leslie H. Meredith, Goddard Assistant Director, who presented him with a specially embossed album which contained photographs summarizing all phases of his Goddard experience. When he left for Mexico the following day, he took this album plus the TV tape describing his experiences with him to show the folks back home.







Affirmative Action Pays Off

Mary Tucker

Betty Pettus

Equal employment opportunity has become more than a slogan under GSFC's affirmative action plan. Goddard has participated successfully in a number of training and development programs – the most successful being the one conducted by Prince Georges General Hospital within the provisions of the Manpower Development and Training Act, and coordinated on Center for the past two years.

The first five graduates of this course are presently completing their first year of career conditional employment in responsible jobs at Goddard. They are Mary Tucker, Betty Pettus, Wanda Frasier, Sharon McLeod, and Mary Nabinett. Four additional graduates – Delores Robinson, Joyce Stewart, Elsie Fortune and Lessie Lee – are beginning their first year at similar jobs.

Goddard became involved in this program in the fall of 1973 when the training coordinator at Prince Georges General Hospital asked if Goddard could provide on-the-job training to five outstanding students. Funded under the Manpower Development and Training Act at no cost to NASA, the program provides clerical training in office procedures to unskilled or under-utilized persons referred by public agencies. Goddard was asked to give the candidates actual job experience for a six-week period, four days a week, four hours a day, with no guarantee by the agency of permanent job placement after the candidates completed their training period.

After the plan was approved, Goddard's Personnel Services Branch located jobs on Center for five students. Shirley Kammerer, who coordinated the program for Goddard, maintained close contact with the students and their supervisors as well as with the program coordinator at PG Hospital. Upon completing their training, all five students took the Civil Service clerk-typist test and all passed with high scores. Their supervisors recommended that they receive permanent appointments at Goddard on the basis of their performance and attitude, and all of the students received career-conditional appointments.

In view of the success of the first group, the hospital again requested Goddard's participation in the spring of this year. Of the second five students to take the Goddard course, four have received career-conditional appointments, the other student having moved out of the area.

All these students have reflected credit on the program in the quality of their work and their attitudes as evidenced by the many favorable comments of their supervisors, and the program has proved to be an excellent source for recruiting.

In addition to the Prince Georges Hospital program, Goddard has cooperated with other training and development programs including the Work Incentive Program (WIN), Prince Georges County's Manpower Administration Program, and the Manpower Development and Training Act programs in Prince Georges County, at Howard Community College, and at the Opportunities Industrialization Center (OIC) in Silver Spring.

Wanda Frasier

Mary Nabinett

New Club's Interest Is Airplanes-Airplanes-Airplanes

If you are driving past the Antenna Range on any given evening or weekend, you might see a group of "adult juveniles" engrossed in the preparation and flying of model airplanes. They are members of the latest club to be sponsored by GEWA—the Goddard Model Aircraft Club. Membership consists of frustrated pilots, backyard mechanics and enthusiasts of the art of model aircraft flying.

At one time many Goddard employees got together on an informal basis to discuss and fly model planes. To take full advantage of this background in model aircraft fabrication, the club was formed.

George Bergan, the club's first president, says, "We wish to emphasize that you don't have to be an experienced modeler to join. If you are slightly interested, just beginning or having problems flying or building model airplanes, we encourage you to join and enjoy the fellowship and benefit from the experience of our 'veterans.' If you are tired of watching TV on cold winter nights, consider buying and building a model airplane and flying it next spring."

The club is presently in the process of obtaining a permanent flying field located on the Antenna Range. It is hoped that eventually there will be a trailer or small shack for the preparation and repairing of models. Members can give expert advice on the selection of airplanes, building techniques and also give flying lessons whether it be for "U" control, radio control or free flight.

If you are interested in joining, contact any of the following club officers: George Bergen, President, extension 5281; John Sites, Vice President, extension 5606; or Tom Plummer, Secretary/Treasurer, extension 4711.

MODEL AIRCRAFT CLUB members discuss their planes during a recent meeting. From left are George Bergen, Club President; Bill Reed; Tom Plummer, Secretary/Treasurer; George Glunt; Jim "Scotty" Houston; John Sites, Vice President; and George Kambouris.

GODDARD AROUND THE WORLD

Bowie Fire Truck Donated to Chile

Text by Lorel Foged

The "Cuerpo de Bomberos," or Corps of Firemen, Colina United States of America Company Number 1 now owns a 1947 Oran Brockway Pumper, previously the property of the Bowie Volunteer Fire Department and Rescue Squad.

Representing the people of Bowie, Maryland, the Honorable David H. Popper, American Ambassador to Chile presented the pumper to the Colina Fire Department, near Santiago, Chile, on Friday, May 3, 1974. Padre Rosendo Galvez Ilabaca of Colina conducted the opening benediction, followed by the joint raising of the American and Chilean flags.

District Fire Commissioner Beiza expressed thanks and warm regards to the people of Bowie, and Mrs. Morton M. Berndt, wife of the NASA station director in Colina, blessed and properly christened the engine. Finally, a parade was conducted for 1100 citizens with the Chilean Air Force Band in the vanguard.

It all started in June, 1972, when George W. Morgan Formerly of Goddard and now of NASA Headquarters conducted a fire and safety survey of the Space Tracking and Data Network (STDN) Tracking Stations. He was advised of the status of fire protection in Colina, Chile, and of the need for equipment there. Particularly needed was a replacement for their undependable 1929 fire engine which was difficult to keep in operating condition.

Mr. Morgan, an active member of the Odenton Volunteer Fire Company, learned that the Bowie Volunteer Fire Department and Rescue Squad would soon get a new engine to replace an older unit. Upon Mr. Morgan's request, the older model was donated to Colina.

However, the engine needed a new wiring system because of its age, and it also needed a temporary home while shipping arrangements were being made. Chief Jerry Griswold of the Kentland Fire Department offered to house the engine in his station, and James Boswell of the Bowie Fire Department, who had driven the engine for many years, assisted in moving the engine.

The Brockway Motor Truck Corporation of Cortland, New York, agreed to assume the cost of rewiring because both the 1929 and the 1947 engines were of Brockway manufacture. Arrangements were made for the work to be done at Brockway's Baltimore branch.

Driving the engine to Baltimore proved to be quite a task. The troublesome wiring caused seventeen breakdowns en route.

Meanwhile, arrangements were being made to ship the engine via the Chile National Steamship Lines, which had consented to defray 50 percent of the cost.

But the transport negotiations fell through when Mr. Morgan was informed that the vehicle would need new brakes, a new clutch, and new kingpins. Fortunately, the engine and pump had been recently overhauled, and the tires were in excellent condition.

Robert Schaeffer of the Bendix Field Engineering Corporation (BFEC) of Columbia, Maryland, announced that his company would assume the cost of these additional repairs. BFEC's interest in the project stemmed from the fact that the United States nationals in Colina were Bendix employees.

However, the engine still needed a way to reach Chile. Mr. Morgan contacted Representative Majorie S. Holt, who made the necessary arrangements via-care. With Jim Boswell at the wheel for the last time, the engine was delivered to the Baltimore docks on March 20 for shipment on the Grace Prudential Lines on March 23.

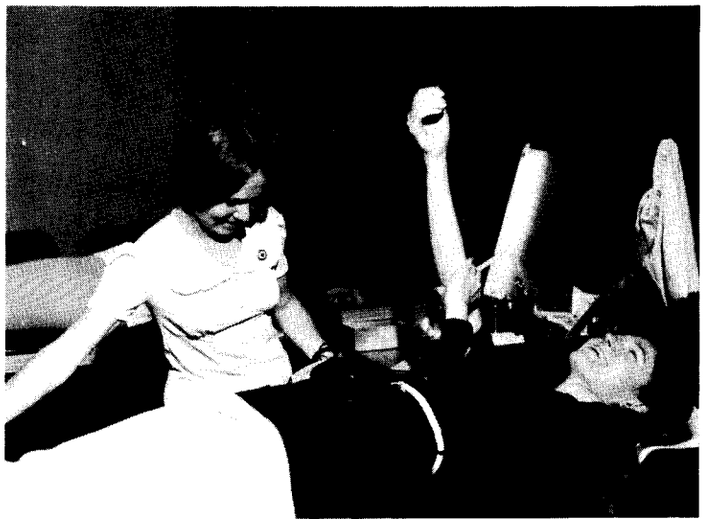
The engine was safely delivered to Colina. In the Santiago area, each of several separate fire companies is named for the nationality which supports it. For example, one would notice a German unit with German equipment, or an Italian unit with Italian equipment. The Colina Fire Department is the only unit of United States support and will fly the Stars and Stripes. Inscribed on the station plaque is the phrase, "Fidelity and Sacrifice."

Bloodmobile Honors

The American Red Cross held an annual Blood Awards Dinner at the Elks Lodge on September 9, 1974. Goddard donors had another successful year and received an award for exceeding over 100% of their quota. Two of Goddard's members, Clarence B. House and Robert M. Porter received Special Recognition Awards. Mrs. House is now a fourteen Gallon Donor and Mr. Porter a Thirteen Gallon Donor. The people listed below have met their Gallon category by giving at Goddard.

Unfortunately, Goddard has slipped behind during the beginning of this Fiscal Year's blood drive. A good turnout is needed for the next scheduled Bloodmobile on November 27 to help us meet out quota and go "over the top" again this year.

For more information, contact Goddard Bloodmobile Coordinator Gertrude Law on extension 4757.



Goddard Gallon Donors
July 1, 1973 to June 30, 1974

ONE GALLON

Gerald L. Anderson
Maurice F. Beazley
John P. Castellano
Elizabeth G. Clark
Charles M. Cosher, Jr.
Brian R. Dennis
Melvin Denwiddle
Eileen M. DePietro
Claude H. Edwards
Charles M. Fleetwood
Charles S. Freeman
Marjorie E. Gustafson
Charles M. Hunter
Wilber B. Huston
Dennis E. Kilroy
Joseph H. King
James Livesay
Stanley D. Manuel
Paul L. McConnel
John J. McKenna
David R. Mengers
G. Morey, Miller, Jr.
Wayne H. Montag
James A. Nagy
Peter Edward O'Neill
Wayne X. Palmer
John C. Pearl
Charles J. Petruzzo
Stuart D. Portas
Robert D. Price
Carolyn K. Purvis
Patricia R. Quimby
Ralph D. Ryder
Margaret R. Saunders
Thomas J. Schmugge
Ronald A. Seiss
Allan Sherman
Joseph R. Thompson
Jack E. Urion
Robert C. Wigand, Jr.
Samuel T. Willis

TWO GALLON

Andrew G. Barr
Thomas A. Cygnarowicz
Vernon C. Eisenhardt
William M. Hocking
Herbert Lee Kyle
Charles M. MacKenzie
Louis W. Martin
Robert D. Miller
Burree Richardson
Merrick E. Shawe
Philip T. Smith
Philip A. Studer
Ronald E. Sweeney
Thomas T. Wilheit

THREE GALLON

Robert S. Anderson
William M. Daniels
Leo R. Davis
Carol L. Geiger
Warner H. Hord, Jr.
Richard S. Marriott
Gary F. Meyers
Stephen J. Paddack
Michael J. Prokopchak
Jan M. Turkiewicz
Roland L. Van Allen
Charles E. Vest

FOUR GALLON

Arthur Green
Robert D. Miller
Donald H. Grove
James R. Hagemeyer
James C. Novaco
Carol L. Wagner Jr.

FIVE GALLON

Charles V. Anderson
Alfred J. Babecki
Earl D. Ellis
Lester H. Wentz, Jr.

SIX GALLON

Ralph Cosme
Morton L. Friedman
Walter J. Gates
Donald M. Gordon (C&P)
John F. Unger

SEVEN GALLON

Frank J. Trama

THIRTEEN GALLON

Robert M. Porter

FOURTEEN GALLON

Clarence B. House

ERTS EVERGLADES . . . . From Page 5

The data obtained are transmitted direct from the DCP to ERTS, which passes within 2,414 kilometers (1,500 miles) on either side of the DCP, at 917 kilometers (570 miles) altitude. ERTS relays the messages to tracking stations located at either Goddard in Greenbelt, Maryland, (where the ERTS Project is managed), or Goldstone, California. From these stations the data are teletyped to the Geological Survey's Miami office, processed through a small computer into suitable format for users, and retransmitted by land line to the U.S. Army Corps of Engineers, Central and Southern Florida Flood Control Districts, the United States Park Service, and the Florida Fish and Wildlife Office.

ERTS imagery also can provide information on the real extent of water surface, but procedures are not yet operational because picture processing is too time consuming. It requires as much as eight weeks, for delivery of pictures to users. The imagery has been useful, especially during the 1973-74 winter-spring drought situation, in comparing the surface water area with the range of water levels to calculate the amount of water stored in the various lakes, canals, and conservation areas.

Knowing the surface inflow and outflow, makes it possible to calculate the amount of seepage and evaporation and the surface water distribution. Knowledge of such hydrological conditions is necessary for the management of water resources by state and federal agencies.

Higer says he is now installing sensors on the DCPs that will report when a lack of sufficient soil moisture reaches a point indicating a fire potential. As everglades muck dries in a drought situation, it becomes a peat-like soil easily set afire by human carelessness or even through a form of spontaneous combustion. Monitoring the soil moisture daily will make it possible to prohibit human entrance into danger areas, to pump in additional water, or to increase fire surveillance.

Some 22,500 kilometers (14,000 miles) of canals and levees in the Everglades watershed, as well as numerous dams and pumping stations, regulate the water supply, especially in drought and flood situations. The problem is to keep a good balance by allotting water from lakes such as Okeechobee (north of the Everglades) to farmers for irrigation purposes; keeping a sufficient flow of canal water for animals, fish, and vegetation; preventing salt water intrusion; and making certain there is sufficient water to recharge the underground water supply from which the city of Miami draws fresh water.

"This ERTS data-relay system has been very reliable," says Higer, "and by coupling the ground information with ERTS imagery, a modeling technique is available for water resource management in southern Florida."

The Federal Women's Program: Why Have It? What Is It?

By Ann Merwarth
Goddard Federal Women's
Program Coordinator

Most people know that women constitute 51% of the total population, but how many people know that 44% of all women are employed outside the home?* Studies show that nine out of ten women will work outside their homes at some time during their lives. Nobody questions why a man works. He works to earn a living. The question is "why does a woman work?" A popular myth is that most women work only for extra pocket money and they are not seriously attached to the labor force. The fact is that most women in the labor force work because they or their families need the money they earn. That is, they are either single, widowed, divorced or married to a husband earning less than $7,000 per year. A fortunate minority have the option of working solely for personal satisfaction. Yet, the median salary of women in every skill code is considerably less than that of men in the same code. The median salary of working women with four years of college is less than the median salary of men with only a high school diploma.

Presentation of statistics always engenders rationalizations. However, there is no escaping the fact that a very high percentage of women in this country have been or will be working because of compelling economic need and they will earn, on the average, substantially less than their male counterparts. Individual concern about this situation tends to vary with personal circumstances. It would seem that 51% of the population which is female will at some point in their lives become concerned. It would also seem that this concern would be shared by most fathers with daughters who will some day grow up and enter the labor force.

The Federal Women's Program became a special emphasis program as a result of a growing concern about statistics such as these. The general intent of the program is to help create an atmosphere in which a woman can compete equally with a man in attempting to realize career goals consistant with her abilities and ambitions.

Specifically what is the status of the Federal Women's Program at Goddard? The Center's work force is approximately 18% female with 84% of the women in grades seven or below. The work situations of these women vary widely as a function of their skill and organizational codes. For that reason, a Women's Advisory Group was selected in April 1974 to meet with the part-time Goddard Women's Coordinator and assist her in understanding the concerns of women throughout the Center. Employees volunteered for service on the committee, and final selections of 16 persons were made by the Goddard Equal Employment Opportunity Coordinator to insure representation from most grade levels and directorates. The committee devoted its energy initially to identifying obstacles faced by women in pursuing their career goals. The next step will be to recommend to management through the Women's Coordinator what actions could be taken to help women overcome these obstacles.

*All Statistics used in this article are from the U.S. Department of Labor, Employment Standards Administration.

EEO Notice on Age Discrimination

"Public Law 93-259 extends coverage of the Age Discrimination in Employment Act of 1967 to include Federal, state and local governments. With regard to the Federal government, the law requires that all personnel actions affecting employees or applicants for employment are free from discrimination based on age. Any employee or applicant for employment who believes that he or she has been discriminated against because of age and who was at least 40 years of age, but less than 65 years of age at the time of the action complained of, should consult with a Center EEO counselor."

MAD Presents OKLAHOMA!

THE CAST of "Oklahoma!" pauses during rehearsal. (Photo by Gilbert Bullock.)

Turn back the pages of time to 1907 and visit Music and Drama (MAD) Productions' Old-Time Music Hall in the Goddard Recreation Center from November 1 through 23. There you will find thirteen evenings of dinner theater which includes not only a hearty western meal starting with steamship round of beef (carved to your order) and ending with apple pie and cheese wedge, but you'll be entertained by the "Burleyque Queens" and other Music Hall Bits. This will be topped off by the evening's main attraction, Rodgers and Hammerstein's hit musical, "Oklahoma!" Principal players and understudies are:

Aunt Eller: Catherine Lacey (Code 490) and Ginny Zanner (Code 626)
Curly: Jerry Hodge (692) and Bill Draper (206)
Will Parker: Ralph Durbin (751) and Chuck Wende (601)
Ali Hakim: Gene Smith (565) and Jack Libby (714)
Laurie: Shirley Thomas (571) and Jeanne Kahn (563)
Ado Annie: Heidi White (726) and Sue Martin (603)
Jud Fry: Bill Cruickshank (743) and Mike Jourden (236)

The show leadership includes Mary Lou Smith (251), Director; Jeanne Sanner, Music Director; Karen Berger, Choreographer; and Jaylee Mead (671), Producer. Bill Cruickshank (753) is President of MAD Productions. For ticket information, contact Laura James (100), extension 4498.

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