

# The Astrogram

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## Viking: Research and results at Ames



Bonnie Berdahl and Marjorie Lehwalt, research scientists in Ames' Planetary Explorations Office, have put in a very busy summer in support of the Viking Mission.

Bonnie has been working at JPL processing flight data plus overseeing the lab version of the Gas Exchange Experiment, the Test Standards Module. It is almost an exact duplicate of the GEX package on the lander. All parts meet flight criteria — only the external "plumbing" systems are added.

Bonnie finds it very exciting to see some of the results of an effort that began for her in 1969 when she began working on the formulation of the nutrient or "chicken soup" that incubates with the Martian soil in the GEX experiment. This involved very complex testing of world-wide soils — from as far away as Antarctica — and even extra-terrestrial soil samples — a lunar sample underwent tests as well — in order to build a data bank with which to compare Mars data.

The Test Standards Module can handle only one sample at a time so most of this soils research is done in the lab using glassware. Marjorie Lehwalt runs duplication chemical studies with soil mockups. Selected soils that resemble Martian soil are subjected to high heat under vacuum to get rid of Earth contamination, are treated chemically or physically, exposed to Martian gas atmosphere and temperatures, then go through the same sequence of testing as the Martian soil undergoes in the Lander. The results are compared to see if the same gas exchanges are occurring.

Marjorie is a Microbiologist and has been at Ames for thirteen years. Bonnie Berdahl, a chemist, has eleven years service at Ames. They are both familiar faces to those inquiring minds at Ames who regularly stop by the bulletin board in Room 42 to check for interesting developments in the posted test results.

## Career Development Program

NASA, as part of its management development plan, annually participates in selected fellowship programs sponsored by leading universities, colleges, foundations, the U.S. Civil Service Commission, and the National Space Club.

Programs selected are for NASA personnel with a strong potential for executive assignment.

In early October, Ames management will be reviewing candidates for the following programs:

Stanford and MIT — Sloan Fellowships, Dryden Memorial Fellowship, Education for Public Management, Harvard PMD (Programs for Management Development), Maxwell Midcareer Development (Syracuse Univ), Woodrow Wilson (Princeton), Congressional Operations Fellowship, Industrial College

of the Armed Forces, Stanford Advanced Management College, and Santa Clara University Management Development Program. The grade levels for these programs range from GS-11 through GS-16.

Other development programs, announced earlier in the year, are the Harvard AMP (Advanced Management Program), Federal Executive Institute, Executive Seminar Institute, Brookings Institution Conferences, and the NASA Career Development Program (CDP).

Persons interested in being considered for any of the named programs may contact John Leveen or Meredith Moore, ext. 5623/5624, by Friday, Oct. 15. The details of each program will be outlined at meetings to be held in October.

## Spanish Heritage Week

The members of the Spanish Speaking Advisory Week report that the Ames Hispanic Heritage Week, September 20-24, was a resounding success. Dr. Hans Mark's opening remarks, Dr. Phillip B. Welch's multi-media presentation, Dr. Matt Meier's talk on the Historical Perspective of the Hispanic, and Alfonso Ludi's presentation on NASA's Spanish Speaking Program comprised a most enlightening opening session on Monday.

The film series on Wednesday, the Art Exhibit which was displayed in the Library all week, and the Mexican food featured in the Cafeteria all week added immensely to the Theme of the week's celebration — A Sharing of Cultures.

The week's activities were concluded with a most enjoyable Happy Hour which featured Mexican Folk Dancers, Mariachi Music (played by one of the area's leading Mariachi Bands — El Mariachi Nuevo Aztlán), and delicious Mexican Hors D'oeuvres.

The Spanish Speaking Advisory Group thanks all of you who supported the activities thus making the Hispanic Heritage Week a success.

## Gov't driver's licenses

Federal regulations require that all personnel operating Government-owned motor vehicles must have a U.S. Government Motor Vehicle Operator's Identification Card (Government Driver's License) in their possession while operating the Government vehicle. This applies to both Civil Service and Contractor employees at Ames operating Government cars, trucks, forklifts, etc.

Effective October 4, 1976, the Security Branch will assume responsibility for issuing Government Driver's Licenses. The location for obtaining the necessary forms will be changed from the receptionist in Building N-218 to the Badge and Decal Office, Building N-241, Room 119. Forms and instructions may be picked up any business day between 8:00 AM and 3:30 PM. Personnel applying for the Government Driver's License must possess a valid state driver's license. Instructions for completing these forms are attached to the application.

## Annual awards ceremony

The Ames Annual Awards Ceremony will be held Tuesday, October 26, at 2:30 p.m. in the auditorium. All Ames retirees are invited.

The ceremony will honor those who have completed 20, 25, 30, 35, and 40 years of service with Federal Government.

## Dental notice

The Dental enrollment period will terminate on October 15. The next enrollment service will be in the spring.

The representative will be at Ames in Building 241, room 147 from 12-1 p.m. on October 15 to answer questions and pick up final enrollment cards.

## Viking tests Einstein's theory

Scientists are using the Viking spacecraft on Mars to test Einstein's theory of general relativity. The experiment may be 10 times more accurate than any previous tests of the theory.

Both pairs of Viking Orbiters and Landers will be used in the test, which involves the measurement of roundtrip travel time of radio signals between Earth and the spacecraft. General relativity predicts that these signals will be slowed as they pass the Sun.

The tests are being conducted as Mars passes directly behind the Sun, as seen from Earth. Radio signals take 42 minutes to travel from Earth to the spacecraft and back. The predicted relativistic slowdown of the signals will have reached a maximum on November 25, causing an increase in the travel time of about two-ten-thousandths of a second.

Because of the precise Viking radio communications system, the 42-minute roundtrips of signals can be timed with an error of only one-ten-millionth of a second.

Einstein's theory of general relativity is the fundamental theory of gravitation, one of the known four basic forces in nature. Although it is the weakest force, gravitation governs all large-scale motions of matter and radiation in the universe, and bears on the question: Will the universe continue to expand forever, or will it eventually reach a maximum size and collapse?

Gravitation is also a key element in understanding the formation and evolution of such diverse astrophysical objects as galaxies, black holes and neutron stars.

Despite its importance to astrophysics, general relativity has been subjected to the fewest tests of fundamental theory. Laboratory experiments cannot accurately measure effects predicted by general relativity; experiments must encompass the solar system. The four Viking spacecraft are well suited to this test, both because they enable round-trip delays to be measured with great accuracy and because they can be used to determine other contributions to delays well enough to separate the relativistic contribution. Other contributions stem from two sources: the orbits of Earth and Mars, and the Sun's corona, through which radio signals must pass.

A special Viking Project group, headed by W. F. Cuddihy of NASA's Langley Research Center, which manages Viking, is coordinating all planning activities for the experiment.

## Viking biology lab



Bonnie Dalton



John Calamoris

Bonnie Dalton of Ames Research Center leads a busy life giving Viking presentations to groups ranging from the Soroptimists to the Kiwanis. Manager of the Biosystems Viking Biology Laboratory in Bldg. 236 since Jan. 1974, she is in charge of the experiments run on two of the Test Standard Modules used to design the biology package for Mars. Testing soils specially incubated under a strong drying agent and loading them in the Pyrolytic Release Module enables the Biology Lab to mimic conditions found on Mars. Most of the operations of the PR instrument have been performed primarily to test variability of the unit's organic traps.

Among tests run on the Labeled Release unit were experiments to determine the levels of evacuation which might be run on a soil sample to prevent soil blowing, and tests of lunar soil. Currently, tests of peroxidized soils are being compared with the Martian results.

Although Ms. Dalton is by training a Microbiologist, her assistant, Bill Ashley, a Histopathologist, and John Calamoris, a Biochemist, all three feel like qualified mechanical engineers after two years of manipulating valves, wires and connectors. Tracing down a gas leak in the test modules means looking for a lead of  $10^{-7}$  cc per minute. Much credit goes to Bill Chung and Dwight Moody, skilled in working with microminiature parts.

As the Biosystem Lab's role in the Viking Mission begins to wind down this spring, the team will begin to gear up for the Space Lab experiments it is in the process of designing. This time the biology will involve life forms ranging from fruit flies to monkeys being tested for reaction to space flight.

## Smoke detectors safe

The National Fire Prevention & Control Administration and the National Bureau of Standards support the Nuclear Regulatory Commission's determination that radiation from ionization smoke detectors represents a negligible exposure level.

"Instances have been brought to our attention where people either did not purchase a smoke detector or removed in-place detectors from their homes out of fear of radiation," said Howard D. Tipton, NFPCA Administrator. "While the risk of

radiation from a smoke detector is negligible, the risks of failing to purchase a detector, or of removing one already installed, are very real. Of the 12,000 persons who die from smoke and fire each year, and of the 300,000 persons who are seriously injured, the great majority fall victims at home at night. Smoke overcomes them before they can awaken and escape. Where people are not protected by smoke detectors, the likelihood of fire-deaths and injuries is increased."

## Foothill students receive phase



The above Foothill/DeAnza students recently received Phase Certificates from Lee Stollar, Chief of Technical Services Division, for completing specific phase work in the Machine Tool Technology Program at Ames Research Center. They and their job sites are (l. to r.): Fabrication Shop-Mike Guerreiro, Sam Borland, Tom Gibertson, Tim Hickey. Wood Model Shop-Steve Hays. Machine Shop- Ron Lamica, Don Rodgovich, Robert Stahl.

## Lee and McCroskey honored

Prof. Erastus H. Lee of Stanford University and William J. McCroskey, an engineer at the Ames Research Center in Mountain View, have received medals from the American Society of Mechanical Engineers.

Lee received the Timoshenko Medal for his contributions in solid mechanics over a 30-year period. The award was named for Prof. S. P. Timoshenko of Stanford, under whom Lee studied.

Lee was born in Britain, and he headed a solid mechanics division of the British armaments research department during World War II. After the war he was assistant director of the British atomic energy department. In 1948 he joined the Brown University faculty, and in 1962 he became a Stanford professor.

McCroskey received the Freeman Scholar Award. He delivered a speech on current research on aerodynamics at the society's annual meeting.

McCroskey received a Ph.D. in aeronautical and mechanical engineering in 1966, and he joined the U.S. Army Aeronautical Research Laboratory. He now heads the fluid mechanics group of the Army Air Mobility Research and Development Laboratory at Ames. Helicopters are a specialty.