# the astrogram

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National Aeronautics and Space Administration • Ames Research Center, Moffett Field, California


## Earth-like molecules discovered

NASA Scientists have uncovered more evidence that life on the primitive Earth may have been triggered by the Chemical Evolution of non-living matter.

In studies to find links between living and non-living matter, a team of researchers has discovered 17 varieties of fatty acids in two meteorites examined at Ames.

The fatty acids were found in tiny samples of the Murray and Murchison carbonaceous meteorites by Dr. Keith Kvenvolden, Chief of the Chemical Evolution Branch at Ames, and Dr. George U. Yuen, now with the Department of Chemistry at Arizona State University.

The fatty acids are similar to those used by plants and animals to produce even more complex biological molecules and are commonly found in household staples such as milk, margarine, fruits and vinegar.

Because the samples were taken from inside the meteorites under scrupulously clean laboratory conditions, the chances that the acids are results of terrestrial contamination are remote, according to the researchers.

Some of these basic building blocks of life have been reproduced in the laboratory by other scientists. In these experiments, energy was applied to a mixture of chemicals such as methane, hydrogen, ammonia and water, which is thought to be similar to the atmosphere of the newly-formed Earth. The product of the experiment was a mixture of relatively complex molecules including simple amino acids and at least nine of the 17 fatty acids isolated by Kvenvolden and Yuen.

The family of simple carbon-hydrogen acid molecules found in the meteorites has counterparts in biologically formed Earth materials, but they have never been found in non-organic sources like rocks. The mystery is how an extraterrestrial rock, a meteorite, could contain these materials which are basic to the biology of plants and animals.

Though the total amounts of the substances examined are extremely small – a ton of similar meteorite material might yield a half-pound of the fatty acids – their existence is a new clue to how the evolution of non-living chemical compounds has provided nature with the essential building blocks of living materials.

## Close-up view of Jupiter

*View of Jupiter taken by the Pioneer 10 spacecraft at 12:38 p.m. PST on Dec. 2, 1973, 29 hours and 28 minutes before closest approach to the planet. This photograph is a rectified view of the planet, and has been improved by computer processing of the raw picture data. This processing is necessary because of spacecraft speed on its trajectory, planet rotation at 20,000 mph, constantly changing camera angles and other factors.*

*The photograph was taken almost 14 hours closer to Jupiter than the previous closest picture of Jupiter released by NASA and the University of Arizona which has been computer improved.*

*In this closer view, individual cloud formations are becoming visible in greater detail as Pioneer 10 moves closer to Jupiter. The belts appear to become split up into detailed flow patterns of Jupiter's atmosphere and clouds, according to Dr. Tom Gehrela, University of Arizona, whose instrument took the pictures.*

## Space technology helps prevent oil spills

Hazard-analysis and quality control techniques developed by NASA in the Apollo program are helping to make delivery of oil from offshore wells safer and more efficient, a prospect that is equally pleasing to oil producers and environmentalists.

To reduce the chances of accidental oil spills and ecological damage to shore areas and the outer continental shelf, NASA experts were asked by the U.S. Geological Survey to assist in seeking ways to improve the reliability of safety and antipollution equipment used in offshore oil production operations.

As a result of NASA's recommendations, at the request of USGS, the American Petroleum Institute representing the oil industry has developed and is testing improved performance specifications for subsurface safety valves used in oil well casings.

Such cuttoff safety valves are of two basic types. One is velocity-actuated, automatically closing when it senses an increase in velocity caused by a rupture or leak in the oil delivery line. Other types installed in underwater oil wells are remotely operated from a surface location. NASA's recommended techniques resulted in specifications and testing procedures applying to both types.

When certification of the specifications and procedures is completed, USGS will require all such valves used under the continental shelf in areas under their jurisdiction to meet these standards.

In making its study of offshore oil well operations, NASA brought to bear its extensive experience in applying quality control and hazard-analysis procedures used to put men on the Moon a quarter of a million miles away and return them safely to Earth.

USGS and oil industry representatives say that the NASA contribution will help make it possible to proceed in the development of critically needed offshore reserves with greater safety and more protection to the marine and coastal environment. According to E. O. Bell, Mobil Oil's production manager for Gulf of Mexico operations: "The study made a positive contribution and was beneficial."

The NASA study to improve reliability of complicated safety and antipollution equipment was one of several triggered by the Santa Barbara oil spill and several other accidents in the Gulf of Mexico. USGS, which has primary responsibility for managing federal petroleum leases on the outer continental shelf, requested that NASA determine the feasibility of applying advanced engineering techniques and quality-control measures to offshore production operations.

## 26 launches for 1974

Twenty-six vehicles will be boosted into space during 1974 in a busy launch schedule planned by NASA.

For the first time in the agency's history more spacecraft will be launched for organizations outside NASA than launches for which the agency is solely or primarily responsible. NASA will be reimbursed for providing launching and tracking services for 15 corporations and governments or government-connected organizations, both domestic and foreign.

## Wanted-energy tips

Many individuals are taking steps to support the conservation of energy. Some of those steps are quite different and ingenious. The Astrogram is interested in gathering accounts of unusual and effective measures that Ames employees and contractors are taking to conserve energy.

Please mail in (241-4) or telephone (ext. 5422) any energy saving ideas you may be using and would like to share with others. Thank you.

## Lost, strayed or stolen

*A Unicom Model 1000P, Electronic Printing Calculator, Serial Number 181685, Decal Number 47048, pictured here, disappeared during the first week of December 1973.*

*It may have been inadvertently delivered to an incorrect delivery point. Please advise Supply Branch, Ext. 5206 or 5207 or Security, Ext. 5587 if you have any knowledge that will assist in locating or accounting for the lost calculator.*

# Four advisory groups formed under new EO Programs office

Four advisory groups were formed within the EO Programs Office. They are composed of Center employees and are to assist the EEO Committee of Counselors in dealing with the problems of Black, Asian, Spanish Surnamed, and women employees at Ames.

Each advisory group consists of 6 members and is chaired by an EEO counselor. The groups meet on a monthly basis.

The Women's Advisory Group is the first advisory group to be introduced and it is headed by Dr. Nancie Bell. Members include (see photo, seated, left to right) Sallie Rogallo, RKS, extension 6008; Elaine Munoz, LPD, 6179; Nancie Bell, LPB, 5968; Melba Jenkins, L, 5095; Denise Lucy, SP, 6645; Enid Pate, FAX, 5878; (and not pictured) Ann Teshima, SSO, 6564; and Meredith Moore, APT, 5422.

*WOMEN'S ADVISORY GROUP*

The advisory panel is very young and has met only twice to date. A definite set of objectives is in the process of being formed. An affirmative plan of action for helping women at Ames grow in their desired field of interest needs to be compiled.

At this time the advisory group primarily wishes to welcome the comments, thoughts and suggestions of all women at Ames on choosing guidelines for achieving equal opportunity goals. Any and all assistance is heartily welcomed whether in verbal or written form. The group, however, is not in existence for handling complaints; it is a positive action planning board in essence.

Please contact any of the above listed members with your suggestions.

The second advisory group is the Black Advisory Group and members include (see photo, standing, left to right) Larry Fewell, SC, ext. 5947; Chairman Lewis Turner, RSM, 5462; Jim Rabey, FLC, 5326. (Seated) Jimmy DeWitt, RSC, 5414; Barbara Manning, PA; and Jessie Mosier, ASO, 5632. Not pictured is Henry Mack, LPB, 5573.

The group has four basic and major goals which are:

(1) To serve in an advisory capacity to the EEO Committee of Counselors in areas of employee and work related problems throughout the Center.

(2) To establish community liaison with specific minority groups to emphasize job opportunity and recruitment at Ames for minority group members.

(3) To evaluate the performance of the EEO Office relating to Center Equal Employment Opportunity Programs and make recommendations.

(4) To make an in-depth study of the Center's Affirmative Action Plan and make recommendations for improvement.

Again, please contact any of the above members with any suggestions you may have which might help promote the goals of this group.

*BLACK ADVISORY GROUP*

The Spanish-Surnamed Advisory Group members include (pictured, left to right): Jacob Martinez, RSS, ext. 5335; Roger Hernandez, ATR, 5827; Chairman Ruben Ramos, PDS, 5913; Allison Ybarra, APT, 5622; and Bea Moralis, FA, 5853. Not shown is Eloy Martinez, FSA, 5034.

The group will act in an advisory capacity through the EEO Committee of counselors in following specific areas (which are similar to the Black Advisory Group but with this group will be Spanish Surnamed oriented).

The group will thus provide very useful and constructive feedback to the EEO Office from the viewpoint of the Spanish-Surnamed employees. This can only result in a more effective and relevant EEO Program here at Ames, according to Chairman Ramos.

*SPANISH-SURNAMED ADVISORY GROUP*

*Asian Advisory Group*

Members of the Asian Advisory group include (standing, left to right): Chuck Kubokawa, LTI, 6044; Chairman George Lee, STG, 6229; Gordon Mar, U, 5665; (seated) Warren Ahtye, FSA, 5045; Art Okuno, STE, 6622; and Sarah Ogata, ATP, 5577. Not pictured is Ann Teshima, SSO, 6564.

Chairman Lee says, "This group will serve as a communication link between the Asian-American employees who are the largest ethnic minority at Ames, and the EEO staff. We hope to serve as a sounding board and a vehicle to determine the Asian-American needs and ideas in the area of equal employment opportunity."

# Board declares dividends

The Board of Directors of the Moffett Field Employees Credit Union has declared a dividend to shareholders of 5-1/2% per annum for the period 1 July through 31 December, 1973.

This dividend has been posted to share accounts as of 10 January, 1974, and will appear on the First Quarter 1974 statements.

Funds in the account by the tenth of the month earn a dividend from the first of such month.

Dividends are compounded semi-annually for each member.

Life insurance is carried on all physically eligible members at no additional cost. The schedule of benefits is as follows:

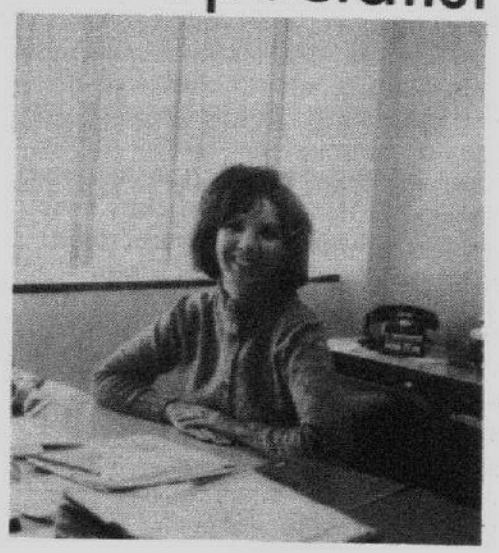
Schedule of Benefits

The maximum Insurable Balance of each Member upon which the below percentage shall apply shall not exceed the Maximum Individual Coverage. No Benefit shall be afforded on that portion of any Member's balance deposited after attainment of the Maximum Age of 70 years (70th birthday).

Table of Coverage

| Member's Age at Date of Deposit (or Subsequent Eligibility) | Per Cent of Insurable Balance Covered |
|---|---|
| 0 to 6 months | 25% |
| 6 months through 54 years inclusive | 100% |
| 55 years through 59 years inclusive | 75% |
| 60 years through 64 years inclusive | 50% |
| 65 years through 69 years inclusive | 25% |
| 70 years or Over | 0% |

# Marilyn Reynolds-Contract Specialist



Marilyn Reynolds is a Contract Specialist in the Procurement Division here at Ames.

When Marilyn first came to Ames, which was in March of 1966 after graduating from San Jose State College in January with a degree in Social Sciences, she discovered procurement work and has been with that division ever since.

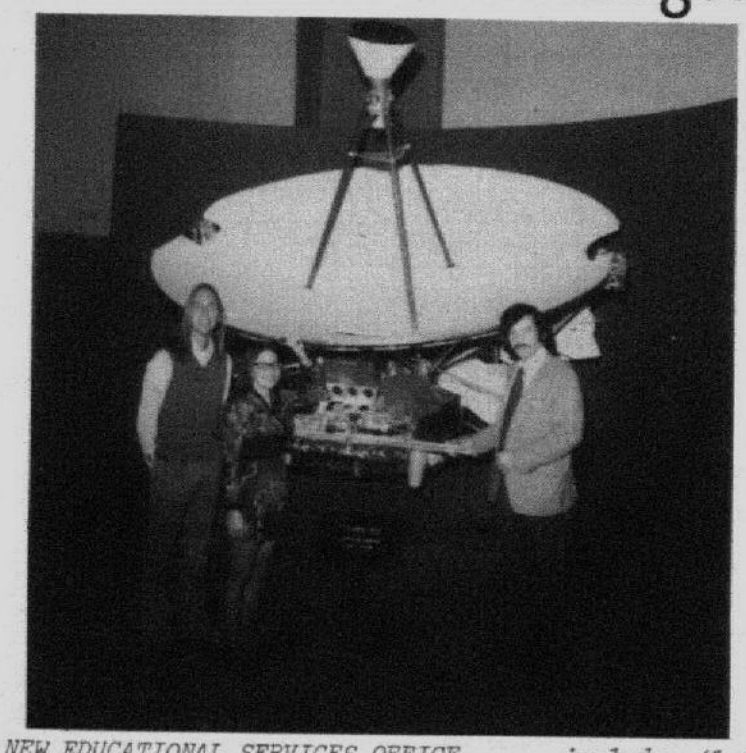
Marilyn's job consists of her negotiating and administrating contracts for Ames and working with technical people at Ames. Her field of specialty is research and development.

The Astrogram asked Marilyn if she thought Ames appreciated their women. In answering, Marilyn stated that in general "yes," Ames does appreciate their women. However, she does feel that professional women at Ames should be given greater opportunity for promotion and training for managerial positions.

"Very noticeably, there is much 'young blood' around Ames," states Marilyn. She thinks Dr. Mark believes in giving the young blood a chance for opportunity; however, it is for both the young men and women to meet the challenges and to prove their capabilities.

As for her hobbies, Marilyn likes to travel. She has been to Hawaii, Canada, Bermuda, Mexico and Europe. She is also a member of the Ames Ski Club. (Husband Don Reynolds, Research Scientist is President of the Ames Ski Club). Marilyn enjoys taking classes such as foreign language, bridge, and various lecture series on a wide range of current topics. But most of all, Marilyn enjoys cooking.

# "The name has been changed..."



*THE NEW EDUCATIONAL SERVICES OFFICE . . . includes (left to right): David Wilson, Michele Sterker and Dr. Kerry Joels. The three are pictured in front of the Pioneer 10 spacecraft model.*

The times they are a changing in the Tour Office. And so are the faces. The new one belongs to Dr. Kerry Joels who joins David Wilson and Michele Sterker on the Oklahoma State University (O.S.U.) contract.

The Name has been changed as well to Educational Services Office. The change reflects a now greater capability to serve the educational needs and interests of the Bay Area Community. In so doing, the Educational Services Office plans to develop additional programs emphasizing Ames' contributions in such diverse areas as Aeronautics, Airborne Sciences (Astronomy and Earth Resources), Space Medicine, Planetary Exploration, etc.

You will probably be seeing and hearing from David and Kerry as they explore research facilities, offices and labs to gain first hand information that can be used in the development of such programs. Unsolicited ideas, suggestions and resources from Ames' personnel would also be greatly appreciated.

The Educational Services Office is located in trailer 416 (behind building N-204) and the extention is 6497.

Lets work together in putting Ames' best foot forward in interesting and educational programs for our public sponsors.

# U.S.Bonds improved

The White House has announced an increase in the interest rate offered on U. S. Savings Bonds from 5½% to 6%, coupled with a shortening of the maturity period on E Bonds to 5 years. Previously the maturity period was 5 years 10 months.

The increase, which became effective December 1, 1973, will also mean an improvement on all outstanding Bonds. They will now earn an extra ½% for each semiannual interest period beginning on or after that date until their next maturity.

An estimated 23 million American families already own Savings Bonds with a current value of more than $60 billion. Thus for present owners as well as new buyers, the rate increase will have a substantial impact – and will benefit not only the individual owners but also the communities in which they live.

# You never know

The Cooperative Work Experience Program (CWEE), offered through the Foothill Community College District, not only provides great educational and vocational advantages, it also provides some social life, as John Newton and Susan Dildine Newton will verify. John and Sue, who both attend Foothill College, were acquainted before they joined the CWEE program. This casual acquaintance grew and before they knew it the flares and fireworks went off!!! They were married during the Thanksgiving weekend.

What started out as a few college credits and a job turned out to be a completely different way of life for the Newtons. It just goes to show you that you never know what's waiting for you just around the corner (or down U. S 101)!!

# "Thank you"

Dear Friends,

Maxine and I are still glowing from the warmth of your presence at my retirement send off. The party was perfect and we want to thank you all again for the marvelous presents. I have taken telephoto flash pictures of our cats for a trial run and found that both the zoom lens and the flash gun work great and are most easy to operate.

We were so pleased that we could chat with so many of you and since we intend to stay in the area hope to see you in the future. The friendship of all of you is really treasured by us.

Bob and Maxine Taylor

Many thanks for the wonderful gifts and "parties" for my going away. The biggest gift of all was in knowing all of the good friends that I have found while working at Ames.

Cecil S. Malmin
USN Ret. NASA Ret.

Just want to express my appreciation to my many friends for their time and energy spent in making my last day of work so pleasant with a lovely luncheon and then presenting me with a jigsaw and sander. I hope to put these tools to good use in the near future. Thanks again for everything.

Sincerely,
Denver Stapleton

## Speakers Bureau

Dr. David Winter (Deputy Director of Life Sciences) talked to the West San Jose Kiwanis at their meeting on January 30, about NASA's life science work related to the space shuttle program.

Herm Gloria (Contract Compliance Officer) was invited to participate in an inservice program for teachers of the Moreland School District (San Jose) on January 25. He gave the teachers some ideas about helping their students better understand environmental problems.

Mr. Gloria also talked on January 26 to some boys on a special Juvenile Work Program run by the Probation Office in San Jose. These young men are in the program because they need to learn that success needs to be worked for; it usually doesn't get "handed out".

Three telelectures were given to high school science students in Oklahoma City, Oklahoma. Each lecture was given to two high schools simultaneously, to students representing several schools, assembled at each of the two lecture points. On January 22 Dr. Sanford Kellman (Theoretical Studies Branch) lectured on basic concepts in astronomy; on January 23 Angelo Margozzi (Earth Science Applications Office) described NASA's work in earth resources, particularly the ERTS program; and on January 24 John "Jack" Dyer (Pioneer Project) discussed the Pioneer-Jupiter mission.

On January 22 Mr. Dyer gave another telelecture on the Pioneer-Jupiter mission to over 300 management and staff personnel of the Kennedy Space Center.

Dr. Kellman has been asked by both Los Altos High School and Awalt High School (Mountain View) to conduct a seminar on "Careers in Astronomy" for interested students. The two seminars are part of a series of career seminars sponsored by the school district. The seminars are Feb. 4 and 6, respectively.

And Dennis Cunningham (Personnel Division) will visit Mountain View High School on February 5, to discuss the general field of Federal Government careers in math and science, for their students.

Warren Winovich (Thermal Protection Branch), who is also Director of the Explorer Post #12 which meets at Ames, taught basic map reading to a troop of Girl Scouts in Mountain View on January 29. Assisting him were two of his Explorer Scouts: John Ralls and Steve Alejandro.

On February 6, Fred Witteborn (Chief of the Astrophysics Branch) will appear on Sunnyvale Cable TV to present a general discussion about the history and habits of comets.

On January 26, Susan Norman (Systems Studies Division) and George Xenakis (Guidance and Navigation Branch) were judges for the "Great Paper Aeroplane Derby of 1974" held at Kezar Pavilion, Golden Gate Park. The event was cosponsored by the Randall Junior Museum, the San Francisco Recreation and Park Department, and the San Francisco Examiner.

Horace Emerson (Chief of the Technology Utilization Office) discussed the technological spin-off benefits of the space program to the Northern California Society of Aerospace Material and Process Engineers at their meeting in Palo Alto on January 23.

Lt. Col. Alfred Worden (Chief of the Systems Studies Division) addressed members of Zonta International's District IX, Area III, at their Amelia Earhart Anniversary Luncheon on January 27, in North Hollywood. He discussed his experiences on the Apollo 15 mission.

## Toastmasters' officers

Three Ames employees have been elected as officers of the Jetstream Toastmasters Club for the Spring semester. They are Miles Murphy (Man-Machine Integration Branch) Administrative Vice President; Larry Evans (Space Exploration Branch) Secretary-Treasurer; and Jack Connolly (Electro-Systems Engineering Branch) Sergeant at Arms.

Toastmasters offers an inexpensive and enjoyable way to improve speaking and listening skills. The Jetstream Club has luncheon meetings every Wednesday at Kozy's Cuisine in Mountain View. Further information about the club can be obtained from the above members.

# Ames activities

## Jogging

The latest joggers to attain milestones in the "500" Mile Club are 2,000 miles Paul Sebesta... 1,000 miles Ted Passeau... 500 miles Jerry Christianson, Roy Wakefield and Don Kornreich... 250 miles Dick Willoughby, Ron Hruby and Alan Bakke... 100 miles Douglas Allen. If anyone is interested in participating in this activity please contact Bruce Ganzler x5169.

## ACE schedule

The following ACE television classes begin the week of February 4. Day and time of classes are shown in parentheses.

Policy Formulation & Administration (MWF 7:00-7:50); Seminar in Marketing Management (TTh 7:00-8:15); Probability & Statistics in Management Decisions and Planning (MW 12:00-1:15); Technology Assessment (TTh 12:05-1:00); System Dynamics (TTh 5:10-6:00); Behavioral Cybernetics (MW 5:10-6:00); Low Energy Society Alternatives (F 12:05-1:00).

For further information, contact the training and special Programs Branch.

## Photography

The NASA Ames Photography Club, in its third year, is conducting a membership drive for Ames' employees, contractors, retired employees, or dependents who are interested in photography. The club offers a number of interesting programs for members. Noted professionals have been enlisted to comment on their specialty areas. Experienced judges are invited regularly to critique prints submitted for club competitions. Access is also provided to a darkroom equipped for both black and white and color processing with funds provided by the Ames Recreation Association. Meetings are held regularly at 4:30 on the last Wednesday of each month (location is announced in a newsletter); training workshops are conducted depending on need (color developing is current topic). Membership blanks are obtained upon written request from Guy Wong 213-8.

## 2 trips

An 8-Day Tour of Mexico, May 4-11, 1974, will include Mexico City, Taxco and Acapulco. A 17-Day Tour of the Orient, August 8-24, 1974, will include Tokyo, Hong Kong and Bangkok. Detailed information can be obtained from B. Maggin, Code: RK at NASA Headquarters.

## Ski Club

The Ames Ski Club is offering a Washington's Birthday Ski Trip (February 15-18) to Squaw Valley and Alpine Meadows which includes 3 nights lodging at the Garni Motel, Northshore; round trip chartered bus transportation and a lift ticket discount.

The cost per person is: 2 per room - $46; 3 per room - $42; 4 per room - $39.

A $10 deposit is due NOW! Final payment is due February 7. Cancellations after February 1 are subject to a $10 cancellation fee if not resold. Please make checks payable to Ames Ski Club. Contact Linda Cox at ext. 5591/5587, mail stop 241-2.

## AIAA tour

The San Francisco section of the American Institute of Aeronautics and Astronautics is sponsoring a tour of Combustion Power Company, Inc., 1346 Willow Road, Menlo Park at 8:00 p.m. on Wednesday, February 6, 1974. Please call Irene Hagen at United Technology Center 739-4880, ext. 2561, before February 4th for reservations. Combustion Power Company, working under contract with the U. S. Environmental Protection Agency, has developed an economically and ecologically sound pilot plant to process municipal waste as well as other low grade fuels to recover electrical energy. Samuel Eveleth of Combustion Power Company will provide an illustrated talk of their development program and a guided tour of the pilot plant.

# Want ads

## Transportation

FOR SALE:

1968 Dodge Sportsman Window Van. 6 cyl. automatic, radio & heater. $1595. (firm). Call Reid-Selth 377-5080.

- - - - -

1967 Camero, V/8 stick shift. Make offer. 377-5080

- - - - -

1963 Cadillac Sed. Deville. All extras. Has been rear ended but is drivable and in otherwise excellent condition. $150. Call 867-1099.

- - - - -

1967 Mustang Fastback, power steering, automatic, new brakes, good tires, recently tuned. $850 or best offer. Carolyn Anderson, 325-3808.

## Housing

FOR SALE: HIDDEN GLEN NORTH VALLEY, 5 bedroom, 3 bath, 3 car garage, family room, formal dining room, walk-in closets, 2533 sq. ft., custom finished, large lot. $51,900. 259-8736

- - - - -

1958 Flamingo Mobile Coach - 10X42. Excellent Condition, skirting & awnings. 965-5021/967-2312/656-3335 after 6 p.m.

- - - - -

Mountain home for rent in high Sierras; ski Dodge Ridge 3 miles away, w/w carpeting, AEKitchen, fireplace, stereo. $60 weekend; $22.50 per day; $150 week. Call after 4 p.m. (408) 294-9289.

## Miscellaneous

FOR SALE:

Fremont Area - Centerville Hospital Area. Car pool or riders. Le Piane - Ext. 5210.

- - - - -

WANTED - 1/4 hp electric motor for power sander, by HIGH SCHOOL CLASS OF RETARDED CHILDREN. Doug Pearson 967-2970.

Sears Belt Massager, $35 or best offer. 298-5010 after 5 p.m.

- - - - -

Symphony (Toshiba) 17" Color TV. Works OK. $70. D. Brocker 377-9345.

- - - - -

Matching color twin bed spreads, used very little, both for $20, 321-1858.

- - - - -

Fancipan 2½ qts. very little used. $7. Sears 4 qts. stainless steel pressure cooker in good condition. $10. Call: 321-1858.

- - - - -

Non-religious stained glass windows. 30" x 42" - $175; 36" x 52" - $310. Damaged windows $2.50/ft$^2$. Vending machines for peanuts and other small particulate edibles w/heater $25. each. Call 321-2565.

- - - - -

Ironing, 25¢/piece, supply own hangers. Call Mrs. Barnes 255-1959.

# Guess what!

The Badge Office, located in building 241, rm. 119 is also the Lost & Found Office.

If you have lost an article of some sort, please contact the Badge Office at ex. 5590. Articles are held for 60 days.

# the astrogram

VOLUME XVI
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National Aeronautics and Space Administration • Ames Research Center, Moffett Field, California


## "Minimester" plan a success

In a continuing effort to expose talented college students to the research environment, NASA recently established a cooperative orientation and learning program tied in with colleges and universities which have adopted a so-called "minimester" (4-1-4-) plan. The plan allows students one month for non-academic effort between two four-month semesters.

Taking advantage of this potentially beneficial agency-student re-

(Continued on Page 3)

## Pioneer Venus contract awarded

NASA has selected Hughes Aircraft Company, El Segundo, California, for negotiations leading to award of a contract for continuing design of the Pioneer Venus spacecraft system.

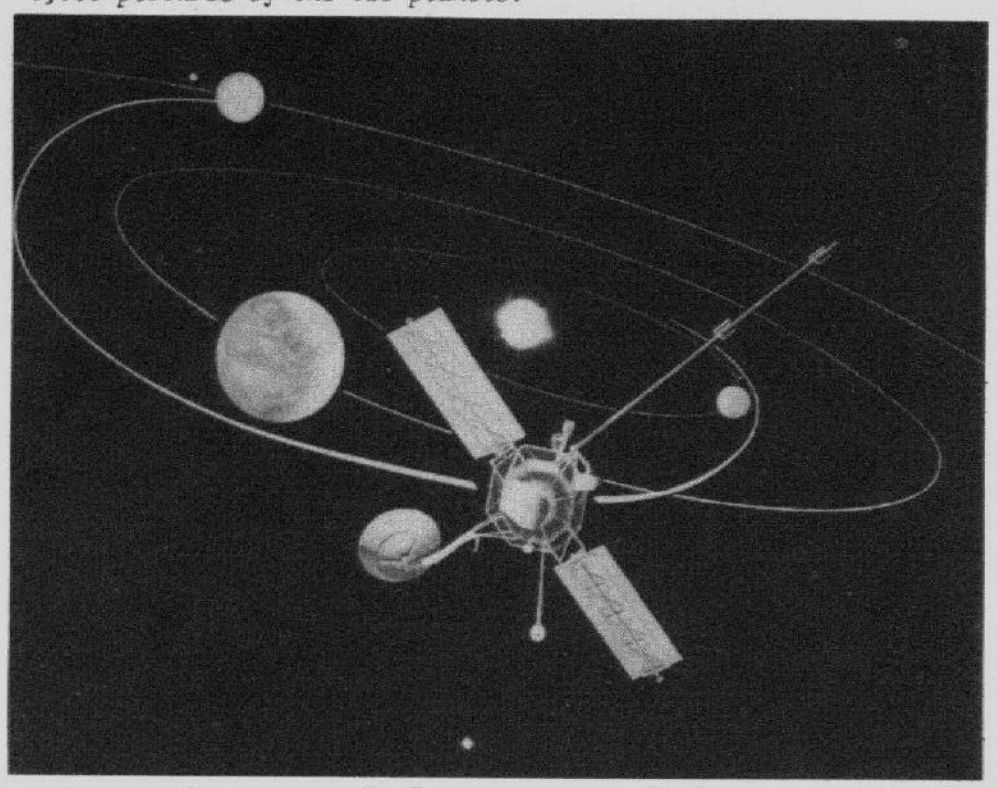
This selection follows the completion of competitively awarded definition studies by Hughes and TRW Systems Group, Redondo Beach, California.

The proposed cost of the conceptual design is worth approximately $3 million. The resulting contract will contain an option for further work including final design as well as development, fabrication, and testing of two flight spacecraft and launch support. The proposed cost of the optional effort is approximately $55 million. The contract will be a CPAF (Cost-Plus-Award-Fee) type.

The Pioneer Venus flight plan for 1978 will employ both spacecraft. One will orbit Venus in a highly elliptical trajectory transmitting data for a full Venus year of approximately 8 months. The second will explore the characteristics of the atmosphere of Venus down to the surface of the planet by ejecting one large and three small probes prior to Venus atmospheric entry by the spacecraft. These probes will transmit data to Earth during the hour-long descent through the hot, dense atmosphere. Pioneer Venus is anticipated to be one of the most scientifically rewarding programs ever proposed by the Office of Space Science. The atmosphere of Venus will be probed not only to increase our knowledge of Venus, but as a planetary laboratory in which some of the factors that determine Earth's complex environment can be isolated and examined.

Ames is assigned the project management of the Pioneer Venus missions under the overall direction of the Office of Space Science, NASA Headquarters.

*MARINER 10...will be the first spacecraft to use the gravity of one planet, Venus, to reach another. It also will be the first to explore Mercury, the smallest planet in the solar system and the planet nearest the Sun. Television cameras will take about 8,000 pictures of the two planets.*



## Mariner Venus Mercury Fly-by

Mariner 10 swept by Venus on February 5, completing the first leg of history's first two-planet mission by a single spacecraft.

As it curved around Venus, its two cameras photographed the cloud formations (the first time for a spacecraft), and its instruments probed the dense atmosphere.

Mariner will fly by Mercury on March 29 at a distance of about 1000 km. (621 miles).

The "gravity-assist" technique involves no cost of energy for a flight mission, substituting for additional rocket power. Without it, either a larger, more expensive booster or a smaller payload would have been required.

The Mariner 10 experience with a gravity-assisted multiplanet mission, with its attendant precision navigation and trajectory correction techniques, will be a forerunner for future flights such as the 1977-81 Mariner Jupiter/Saturn mission.

Two corrections were required for the Venus portion of the flight to provide the accuracy necessary to utilize the gravitational attraction of Venus to reach the primary target, Mercury.

At Venus, photography of the cloud deck will be at a resolution 200 times better than from Earth. Although the best photographs from Earth show only a featureless cloud layer, it is hoped that

(Continued on Page 2)

## Seminar for women set

The Federal Executive Board's Committee on the Status of Women is sponsoring a two-day seminar on "Social Responsibility and the Federal Executive." The seminar will be held from 8 a.m. to 4 p.m., on Thursday, February 28, and Friday, March 1, at the Holiday Inn, Bay Bridge, Emeryville. Registration fee will be $15 for one day's attendance and $25 for the two days. The cost includes all materials for the conference and luncheons.

Women employees at Ames are welcome to participate provided they have the concurrence of their Organizational Director. It will be necessary for such employees to pay their own registration fees and transportation expenses. However, they will be granted administrative leave.

Organizational Directors should furnish a listing of personnel who are approved to attend to Meredith Moore, co-coordinator of the Women's Advisory Group, Mail Stop 241-4, so ride groups can be formed and other arrangements can be made.

**And don't worry, the $25 is tax deductible.**

## Employees share energy-saving tips

Most Ames employees are taking steps to conserve energy, both at home and at work. In the last issue The Astrogram asked that employees share some of their energy saving ideas and practices. A few responses will be listed in this week's issue with the hope that more accounts of energy saving tips will be sent to m/s 241-4 before the next deadline publishing deadline, February 21.

One employee writes: "I have a waterbed and, because it is a powerful heat sink, I had always heated it with an electric heating mat. I bought a one-inch thick foam pad for insulation and turned off my heater. I also draped my sleeping bag over the bed as a quilt and cut back my apartment's thermostat."

Another concerned reader writes, "A number of Ames employees bicycle to work — about the ultimate in energy conservation. (However) of the large number of Lockheed, Navy and Ames employees who live within about six miles of their work, many more would bicycle to work if a safe bicycle crossing of Bayshore Freeway were provided. Ames should officially endorse and promote such a crossing. The existing crossing is extremely hazardous for both bicycles and pedestrians!"

And finally, a xeroxed page from the "San Jose Mercury" was sent to the Astrogram office during the week entitled "Energy-Saving Hints for Industry." "Industry," according to the article, "can make a much more significant contribution in energy conservation than the homeowner. . . . Although large industrial users consume only 14.1 per cent of the power fed through Pacific Gas & Electric Co. grids — compared to 37.7 per cent for residences — each plant far outstrips each home." A list of hints follows, many of which Ames is already practicing:

- Turn off all lighting in unused or infrequently used areas. Install a manual timing switch for rooms or areas used intermittently. Check where switching can be easily installed so lighting can be turned off when the space is unoccupied.

(Continued on Page 2)

## Attention Veterans

Veterans Affairs Counselors from DeAnza College will be at Ames on Tuesday, February 19 at 12 noon to 1 p.m. Employees who have questions concerning their veterans benefits may come to room 147 in building 241.

# Mariner Venus Mercury

(Continued from page1)

Mariner 10 pictures might reveal structure in the clouds, somestratification that will yield information on atmospheric processes.

Photography of the clouds at the boundary between the day and night side may yield shadow details not otherwise visible. Infrared red temperature measurements will be made of the cloud tops.

The cameras will also photograph the clouds through ultraviolet filters as a follow-on to ultraviolet observation from Earth that show blotchy patterns that apparently circle Venus once every four days. This phenomenon will be studied through several rotations and may add to our understanding of atmospheric and cloud processes.

Sensitive measurements of the interaction of the Venus atmosphere with the solar wind will be made by the plasma science experiment and the magnetometer. Other experiments, the charged particle telescope and S-X-band radio science, can be collated with the plasma science results.

The extreme ultraviolet experiment will provide a new look at the Venus atmosphere at short ultraviolet wave lengths not possible from Earth observations as most ultraviolet radiation is caught or intercepted by Earth's possessive atmosphere.

During the cruise phase from Earth to Venus, Mariner 10 calibrated its camera systems by photographing the Earth and Moon.

Later in the mission, the TV heaters came on when other heaters on the circuit no longer required, were turned off. This had been expected. Heating of the camera systems required new exposure settings based on prelaunch thermal testing.

The cloud cover of Earth was used to simulate Venus conditions photography, and the Moon's rugged surface and its reflectivity simulated Mercury. More than 1000 photographs were taken, including calibration pictures of stars in the Pleiades cluster.

Observations of Comet Kohoutek were made during this period by scanning with the ultraviolet spectrometer.

# Group Achievement Awards

Group Achievement Awards were presented to Ames staff members who participated and contributed to the development of the Lunar Magnetometer November 30. Two teams were involved: The Lunar Surface Magnetometer Experiment Team and the Lunar Portable Magnetometer Experiment Team. Pictured are members from both teams.

Row 1, left to right: Thomas R. Pochari, SSO; Donald R. Mulholland, SSO; Margaret B. Roszell, ASP; Joe F. DeRose, SSO; John S. Keeler, FQ; Emma V. Thiemann, SSS. Row 2: Bruce F. Smith, SSS; Robert M. Munoz, SSG; Ralph W. Decker, RSE; Robert L. Pike, AP; Mickael G. Dix, SSA; Carle A. Privette, SSS; George E. DeYoung, PR; Curtis Parkin; Charles E. Duller, SS. Row 3: Dr. Hans Mark, D; C. P. Sonett; Palmer Dyal, SSA; Robert A. Steinhauer, RSE; David S. Colburn, SSS; Richard P. Soulages, RSS; Fred F. DeMuth, PR.

Not pictured are: John C. Arvesen, SSG; David F. Englebert, RFE; Ernest J. Iufer, PDS; Owen L. Koontz, SSA; M. John Prucha, SSS; C. A. Syvertson, DD; Robert H. Davidson, FSO; Charles E. DeMarco; Earl O. Menefee, RFE; William H. Vanderbeck, RSS.

A lecture series called "Science and the Quality of Life" is being held at Flint Center, DeAnza College. The Monday evening series is sponsored by the Lockheed Bay Area Chapter of the National Management Association.

The February 18 program is entitled "Pioneer Mission to Jupiter and Beyond" and will be presented by personnel from the Pioneer Project Office at Ames.

Any proceeds over the cost of the series will be donated to the Galileo Scholarship Fund at Ames.


# "Shoemobile" visits Ames

Safety shoes, manufactured by Hy-Test Inc., the largest safety shoe manufacturer in the U.S., were here last week aboard a "Safety Shoemobile." For those who were unaware of its existence and were unable to order shoes, here are the facts:

Safety shoes are available to Ames personnel who qualify because of their occupation. If you believe your job qualifies you for safety shoes, check with your Branch Chief and have him/her fill out a newly revised ARC form No. 169, or contact John Habermeyer, Safety Officer (m/s 201-7, ext. 5602) regarding your order.

The shoemobile man stocks 1800 pairs of safety shoes in thirty-six different styles, ranging in sizes from 6 to 14 and widths AAA to EEE. All employees are eligible to purchase their own safety shoes at the same government prices plus tax.

Our Safety Officer suggests that if you're looking for a new pair of hiking boots to make that trek across the Sierras this summer or just a pair of oxfords for everyday use, consider ordering a pair of safety shoes.

# 19-inch television fire hazard

Zenith Radio Corporation has announced the following 19-inch diagonal color television receivers may have a serious fire hazard:

| | |
|---|---|
| D29 40 L6 | D40 30 W6 |
| D40 24 W6 | D40 32 W5 |
| D40 26 W6 | D40 34 P6 |
| D40 30 W5 | T28 38 W6 |

Personnel who own one of the above model number sets must consider it unsafe until it has been inspected and, if necessary, repaired. The model number and the serial number can be found on the white label on the back of the set. Owners of sets identified as defectives should contact the Zenith dealer where the set was purchased or any authorized Zenith Service Center. They will arrange to inspect your set in your home and to correct the safety problem if present, at no expense to you.

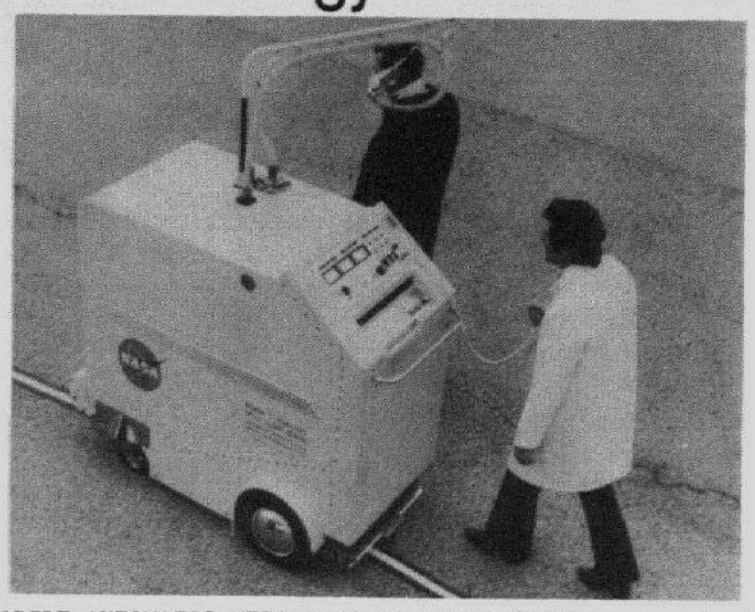
MEANWHILE, FOR YOUR OWN SAFETY, UNPLUG YOUR SET AND DO NOT PERMIT ANYONE TO RECONNECT IT OR ATTEMPT TO OPERATE IT.

# Employees share energy tips

(Continued from Page 1)

- Reduce lighting in hallways and passageways to no more than the level required to meet safety regulations.
- Reduce general illumination in work areas to a minimum level consistent with task requirements. Utilize available natural light in appropriate areas.
- Reduce or turn off (during non-operating hours) all lighting not required for safety, security, or maintenance work being performed in the immediate area. Where possible, schedule cleaning crews to overlap with regular working hours.
- Identify lighting switches and indicate hours to be operated in the on-off position.
- Reduce or turn off decorative lighting.
- Turn off exterior and sign lighting during non-business hours.
- Check reflective surfaces and repaint darker areas with higher reflective paint.
- Maintain parking area lighting levels consistent with safety regulations and reduce or turn off during non-business or non-operating hours. Reset timer once each week as hours of daylight change.
- Check all plant and office lighting and clean fixtures regularly. Remember, use of fluorescent lighting instead of incandescent lighting reduces power consumption by more than 60 per cent while maintaining the same illumination level.

# Space technology aids medical field



*THE MOBILE AUTOMATIC METABOLIC ANALYZER (MAMA) . . . is a new medical device which measures the amount of energy expended by ambulatory patients. Here the unit is shown in a trial run at Marshall Space Flight Center.*

Technology derived from the Apollo and Skylab programs has been adapted by the NASA Marshall Space Flight Center to produce a new medical device called a Mobile Automatic Metabolic Analyzer (MAMA) which will be used to measure the amount of energy expended by ambulatory patients.

This instrumentation provides accurate measurements of metabolic activity of both normal and severely disabled subjects during actual working conditions. It will also be used to gauge the progress of severely disabled persons through the several phases of their rehabilitation training programs.

The unit will be turned over to the Spain Rehabilitation Center, University of Alabama Medical School, Birmingham, for evaluation.

MAMA utilizes a metabolic analyzer similar to the one developed for and being used by astronauts in the Skylab program. This and other instrumentation is mounted on a battery-powered cart, designed and fabricated using knowledge gained by Marshall during the development of the Lunar Rover Vehicle used in the Apollo program.

The motorized cart and instrumentation system will enable rehabilitation doctors and physical therapists to gather accurate workload information.

*Lieutenant Colonel Daniel C. Dugan, U. S. Army Air Mobility R&D Laboratory (AMRDL) experimental engineering test pilot, is presented his Master Aviators Badge by Colonel Norman L. Robinson, AMRDL deputy director. Lt.Col. Dugan, a fifteen year Army aviation veteran, acquired 3,000 hours of flight time and received special instrument qualification to win the award. He is presently serving as a NASA/Army test pilot at Ames.*

## Speakers Bureau

Robert Cameron (Airborne Sciences Office) participated in an all-day "Day of the Comet" program sponsored by the Extension Office of the University of California/Berkeley, on January 26. During his part of the program Bob discussed "Far-Out Astronomy," astronomy from aircraft, balloons, rockets, and satellites.

Dr. Seymour Stein (Retired Chief of the Ames Medical Office) presented "Another Side of the Moon," a discussion of the medical benefits of the space program, at Grand Rounds of Children's Hospital in San Francisco, on January 22. "Grand Rounds" is the professional staff meeting held at hospitals for medical staff officers. Dr. Stein is currently a Guest Scientist at Ames.

On January 17 David Colburn (Space Physics Branch) talked to a class of third and fourth graders at Walter Hays Elementary School, Palo Alto, about the Pioneer-Jupiter program and mission results.

Louis Haughney (Airborne Sciences Office) gave two presentations to students at Arundel School, San Carlos, one to grades 1-3, and the other to grades 4-6. Lou discussed Comet Kohoutek.

Hubert Drake (Chief, Aeronautics Division) presented "What NASA is Doing for General Aviation" to members of the California Aerospace Education Association at their all-day conference on February 9. The conference was held in Morgan Hill at "Hill Country."

Daniel Bencze (Aerodynamics Branch) talked to one of the biology classes at Lynbrook High School on February 8. He described his own professional background, gave an overview of Ames' work in aerodynamics, and discussed the asymmetrical wing aircraft concept developed by Dr. Robert Jones.

Michael Wash (Avionics Research Branch) traveled to Sacramento for the February 13th meeting of the American Society of Heating and Refrigeration Engineers. He talked to the engineers about NASA's manned space programs.

Walter Reinhardt (Computational Fluid Dynamics Branch), on February 8, talked to "The Peddlers" about NASA's Earth Resources Technology program. The Peddlers is a San Francisco group which includes railroad managers and railroad supplymen dealing in heavy railroad equipment.

## You're invited

You are invited to the 16th Annual Meeting of the Moffett Field Employees' Credit Union. It will be held on Saturday evening, 9 March 1974, at the Napredak Hall, 770 Trimble Road, San Jose, California.

A no-host cocktail hour will start at 7:00 p.m., followed by a business meeting and election of officers at 8:00 p.m. Hors d'oeuvres will be served – with dancing 'til midnight.

Admission is only $2.00 – so come in and get your tickets at the Credit Union office. We have a limited number of tickets left.

Reserve your tickets by calling us at 966-5494.

## ACE course

ACE is planning to offer a course titled "Technical Russian for Non-linguists." The course is intended primarily for technical employees who translate technical papers.

Contact the Training Branch for further information (m/s 241-3, ext. 5622).

## "Minimester" plan a success

*COL. ALFRED M. WORDEN...talks to Minimester students, l-r, Warren C. Benson, Edward L. von Dohlen, Loren Quan, Steven P. Hoffman, and Debra L. Angel.* (Continued from Page 1)

lationship, Ames responded favorably to the concept and the "Minimester Program" became a reality during the month of January.

Five students selected to participate in the trial run of the Program came from the University of the Pacific in Stockton, and the University of Puget Sound, Tacoma, Washington. Although they worked without compensation, the students were afforded an opportunity to gain pertinent study-related experience in a professional research organization under the guidance of a research advisor.

Reporting on the results of the Program for the Training and Special Programs Branch, stated that the students and university officials were equally enthusiastic about its success. Mrs. Evans also said that the rapport established between the two universities will be invaluable as new work/learn programs are developed and others expanded.

Students taking part in the Program from the University of the Pacific and their assignments were: Warren C. Benson, geology major, Airborne Science Office; Steven P. Hoffman and Loren Quan, physics/chemistry majors, Materials Science Branch; and Edward L. von Dohlen, geology major, Planetary Science and Applications Branch. Debra L. Angel, an economics and math major from the University of Puget Sound, worked in the Scientific Applications Analysis Branch.

*JACK M. POPE . . . is awarded a check in the amount of $500 for his invention entitled "Miniature Ingestible Telemeter" by Dr. Leonard Roberts, Director of Aeronautics. Dr. Roberts acted on behalf of the Inventions and Contributions Board for Pope's "creative efforts in receiving recognition and to transmit to him a tangible expression of NASA's gratitude for his achievement."*

*THOMAS B. FRYER . . . (seated, left) accepts a check for $500 for his invention "Devices to Measure Deep-Body Temperatures" from Loren G. Bright (standing, left), Director of Reasearch Support; B. H. Beam (standing, right), Assistant Chief of Research Facilities and Instrumentation Division; and Boris Ragent (seated, right), Chief of Electronic Instrument Development Branch.*

# "Thank you"

It was a pleasure to see so many of you at my retirement.

Seeing each of you brought back many fond memories of all the experiences we've shared in the past many years.

You couldn't have chosen a better gift than the travel certificate. Thanks a million!

Miss you all very much and plan to get out to the Field to see you soon.

Sincerely,
E. J. Gustafson
"Gus"

My family and I graciously thank each of you who had a part in the memorable retirement luncheon at L'Omelette and the lovely gifts of a silver tea service and Apollo series glasses. Ed and I will enjoy these beautiful gifts when entertaining and hope that you will share them by visiting us. I will miss very much all the pleasant associations I've had at Ames but hope that we will keep in touch from time to time.

Sincerely,
Vi Norcio

***

# AIAA to meet

The AIAA (American Institute of Aeronautics and Astronautics) will hold its February Dinner meeting at the Plaza Del Oro Room, San Jose Hyatt House, 1740 North First St. (at U.S. 101) in San Jose on February 22 at 7 p.m.

A no-host social hour will be held at 6 p.m. Please call Sharon Selisker at Lockheed Missiles & Space Co., 742-4430, on or before February 20.

# Want ads

## Housing

FOR RENT: Cabin, So. Lake Tahoe, near casinos & beaches, sleeps 10, for reservations call 274-4285.

## Transportation

FOR SALE;

69 Ford 4-door custom. New brakes, shocks, 6-ply tires. P.S., A.T., air conditioner. Very good condition. Good mileage. $750. or best offer. Call 736-5393.

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63 Parilla motorcycle, 125cc 4-stroke single, 1974 lic., new tires, $60.00. Call F. Thompson, 379-2385.

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WANTED: Girl's 3 or 5 speed, 26" bicycle. 965-3564 after 4 p.m.

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Boy's 20½", 10-speed Falcon bicycle. Exc. condition. $75.00 or best offer. M. Firpo, after 6:00 p.m., 732-1641.

## Miscellaneous

FOR SALE;

FREE: Hamsters. 245-2881.

Genuine silver and turquois jewelry, handmade by Navaho Indians. Wholesale prices. Lewis, 257-1921, after 5:30.

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Portable sewing machine, good condition, $20.00. 965-5021.

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FOR SALE: 240-Z 73, AM FM radio brn. air cond. 4-spd excel. cond. $5000.00, call evenings 5 to 7 p.m. 258-6422.

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Lady Kenmore Portable Dishwasher, good condition. J. D'Urso, 253-4181.

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FOR SALE: Thayer baby crib: frame, spring and mattress. Good condition, $50; 735-8680.

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WANTED: Need witness to accident 1/29/74 a.m. on 101 North involving truck and Corvette; call 266-0947, or ext. 5922.

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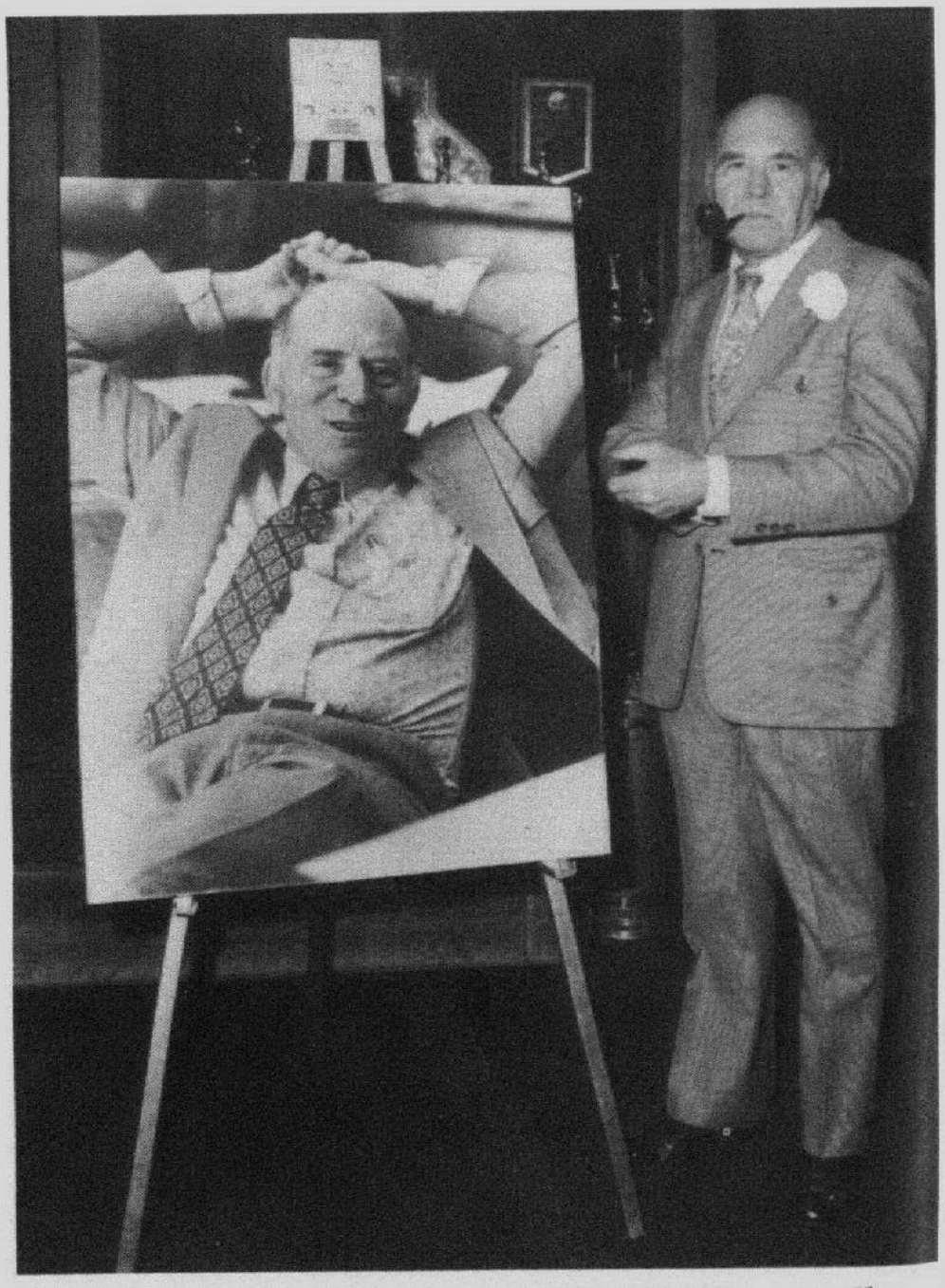
9' couch & 5' loveseat, contemporary oranges/reds, exc. condition, asking $300. 736-7439.



*COMPLETING A DISTINGUISHED 30 YEAR CAREER WITH NASA, . . . Glen Goodwin can point with pride to his technical and managerial achievements which culminated in his 5 year tour of duty as Director of Astronautics at Ames. Mr. Goodwin is moving to Phoenix, Arizona, where he will mix an enjoyable retirement with technical consultation to governmental and industrial organizations concerned with aerospace.*