

SPECIAL BACK-TO-SCHOOL ISSUE

theastrogram

VOLUME XIV
NUMBER 26
SEPT. 7, 1972

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



Through the Ames Training Office several courses are offered each term to Ames employees. The courses vary from Personal Financial Development and Introductory Astrology, to Air Environmental Engineering and Probabilistic Models in Decision Making. Any Ames employee may take one or more of the courses, which are given in various locations at Ames and Lockheed via television, and at participating schools.

Ames pays tuition if the course is applicable to the employees position. The Center does not pay for books or transportation.

To apply a completed form ARC 301 (Application for Training) with Branch, Division, and Directorate approval must be sent to the Training Office at Mail Stop 241-3.

UNIVERSITY of SOUTHERN CALIFORNIA

Institute of Aerospace Safety and Management
 Master of Science in Systems Management Program
 Semester begins September 18 and finishes January 16, 1973

Course	Day	Time	Place
Probabilistic Models in Decision Making (3)	TH	5:30 p.m.	L*
Man-Environment Factors in Systems Management (3)	W	5:45 p.m.	Ames
Man-Machine Factors in Systems Management (3)	M	7:00 p.m.	L
Aerospace Management Communication Theory (3)	T	7:00 p.m.	L

One elective from this program will also be given at Ames on Tuesdays at 5:45 p.m.

*Lockheed

DE ANZA - FOOTHILL

Quarter begins Sept. 20 and ends Dec. 14.

Dept.	Course	Units	Days	Time	Place
Ast. 10	Introductory Astronomy	5	MW	3:30-5:35	Ames
D.P. 1	Comp. Prog./Gen Educ.	4	MW	7:00-9:30	Fthl
Math 10	Elementary Statistics	4	TTH	3:30-5:35	Ames
Ethnc 49	Racial Cultural Minority	4	TTH	3:30-5:10	Ames

ASSOCIATION for CONTINUING EDUCATION

Two televised orientation programs for employees interested in the Golden Gate University MBA Program have been scheduled as follows: Wednesday, Sept. 6 at 12 to 1 p.m., channel 8; and Thursday, Sept. 7 at 4:30 to 5:30 p.m., channel 8. The overall program, the admissions requirements, and enrollment procedures for all interested employees will be described.

COURSE NUMBER	COURSE TITLE	DAY	START DATE	TIME	CHANNEL	UNITS OF CREDIT	INSTRUCTOR
GOLDEN GATE UNIVERSITY MBA PROGRAM							
QA 270	Management Information Systems	TTh	Sept. 26	7:00-8:15 am	8	3S	Podolsky
EC 294	Seminar in Current Economic Problems	TTh	Sept. 26	12:00-1:15 pm	8	3S	Fransum
HR 241	Seminar in Personnel Administration	MWF	Sept. 25	7:00-7:50 am	3	3S	Carey
CALIFORNIA STATE UNIVERSITY - SAN JOSE							
CYBS 218	International Telecommunications	Th	Sept. 21	5:00-7:00 pm	8	3S	Wallenstein
CYBS 212	Linear and Non Linear Systems Tools	T	Sept. 19	5:00-7:00 pm	8	2S	Buckley
SPECIAL INTEREST PROGRAMS							
MATH X10	Economic Statistics (UC Extension)	T	Sept. 5	4:30-7:30 pm	10	3S	Johnson
GEOL 822	Modern Sedimentation	TTh	Sept. 26	12:00-1:00 pm	12	--	Ingle
CE 812	Air Environmental Engineering	Th	Sept. 28	5:00-7:00 pm	3	--	Brinkley
CS 820	Introduction to Computer Communications	W	Sept. 27	5:15-7:15 pm	8	--	Linebarger
MGT 100	Counseling by Objectives	M	Sept. 25	5:00-7:00 pm	12	--	Jarrett
BA 10A	Basic Accounting	MW	Sept. 25	12:00-1:00 pm	12	--	Schmidt
COLLEGE OF NOTRE DAME MBA FOUNDATION PROGRAM							
BA C131	Financial Management -- Students may enroll in SM 804 to satisfy the foundation requirement in finance						
BA C153	Production Management	T	Sept. 26	5:15-7:15 pm	3	2Q	Medawar
SUPERVISORY MANAGEMENT PROGRAM							
SM 801	Introduction to Supervisory Management	T	Sept. 26	5:00-7:00 pm	12	2Q	Getz
SM 804	Finance for Non-Finance Managers	Th	Sept. 28	5:00-7:00 pm	12	2Q	Higbee
GENERAL INTEREST PROGRAMS							
EE 830	Microwave Tubes and Solid State Devices	M	Sept. 25	5:15-7:15 pm	8	--	Scott
MATH 100	Math Review - Algebra I	MW	Sept. 25	12:00-1:00 pm	8	--	Summerbell
COMM 100	Introduction to Business Communication	Th	Sept. 28	5:00-7:00 pm	10	--	LoGuidice
BA 140A	Industrial Traffic Management I	W	Sept. 27	5:15-7:15 pm	12	--	Ferrell
S 900	Personal Financial Development	MWF	Sept. 25	12:00-1:00 pm	10	--	BB&K
PR 814	Xerox Effective Reading	TTh	Sept. 26	12:00-1:00 pm	10	--	Hale

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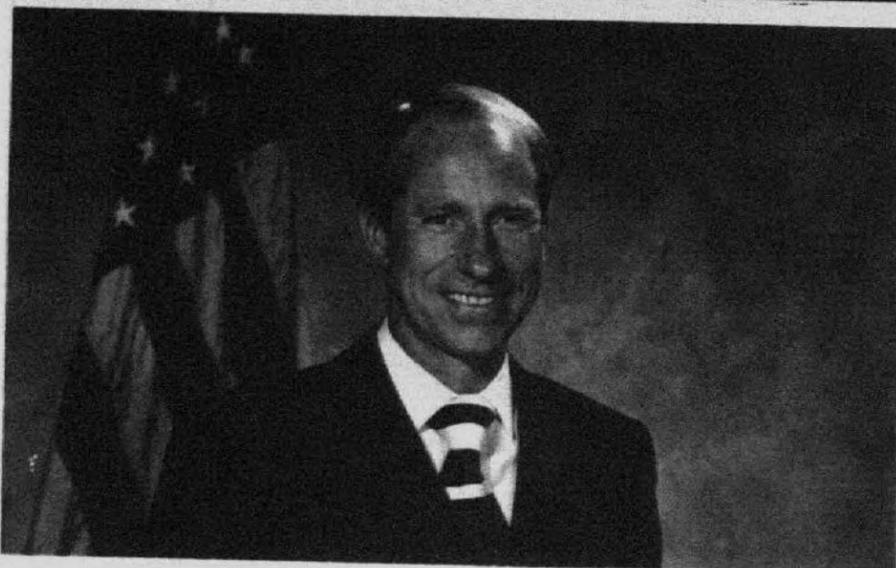
National Aeronautics and Space Administration • Ames Research Center, Moffett Field, California

get on the band wagon, transfer your old records

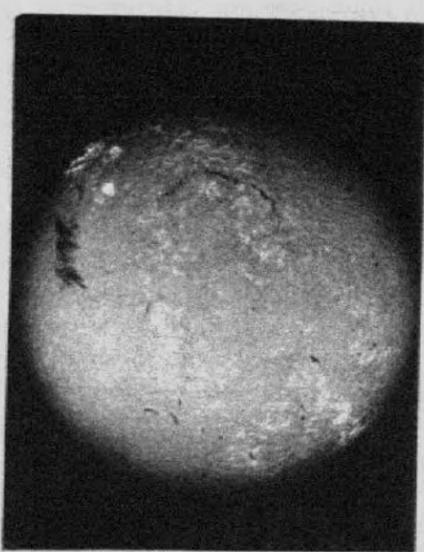
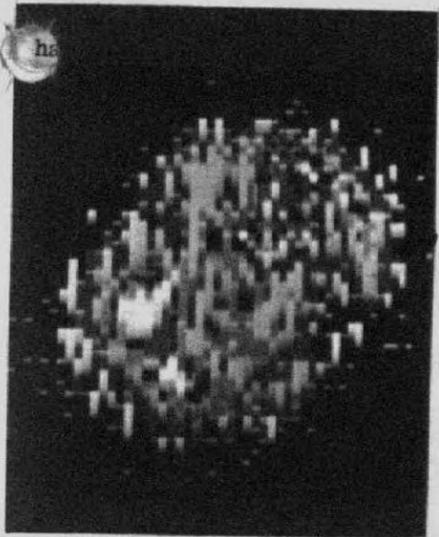
Change in Insurance Coverage

The Civil Service Commission advised Federal employees recently that Blue Cross-Blue Shield has agreed to pay Supplemental Benefits related to diagnostic admissions to hospitals in 1971 and 1972. Supplemental Benefits are subject to a deductible whereas Basic Benefits are not.

For some time, the Government-wide Service Benefit Plan (Blue
(Continued on Page 3)



AMES' NEW STAFF MEMBER . . . Lt. Col. Alfred M. Worden, pictured above, reported for duty at Ames Tuesday. He was reassigned from the astronaut corps at the Manned Spacecraft Center to Ames' Airborne Science Office, Space Science Division. Ames programs in airborne science and Space Shuttle Vehicle simulation studies will utilize Worden's space flight experience to develop and evaluate systems and procedures from an astronaut's point of view.



SUNLIGHT . . . Solar activity, left, reconstructed by computer from ultraviolet radiation detected by (OSO) 7, reveals the sun storm as a light pattern, lower left. Darker regions represent reduced activity. The picture at right, taken by the ground-based observatory at Goddard Space Flight Center shows the storm as a bulge, upper right, just about to pass from view on the edge of the sun.

Giant Solar Storm Recorded

The most intense solar activity ever measured was predicted, recorded, and measured by NASA satellites. Ames' Pioneer 6, 7, 8, 9 and 10, and Goddard's Orbiting Solar Observatory (OSO) 7 separately documented Earth-sized explosions on the Sun.

First indications of a vast storm system on the sun were observed by OSO 7 on July 26. Warnings were issued July 28, two days before the storm was visible from Earth.

Preliminary results from the University of New Hampshire experiment on OSO 7 indicate that the storm region produced the highest energy radiation ever recorded from the Sun.

During a one-hour period on Aug-

ust 7, the storm released enough energy to meet the United States' demand for electrical power for 100 million years at the present rate
(Continued on Page 4)

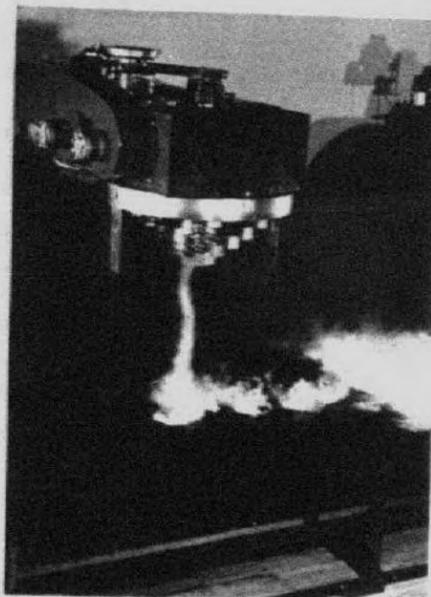
Conserve Power

To turn the wheels, move the cogs and light the hallowed halls of Ames Research Center primarily hydroelectric power is used.

It pollutes the environment and depletes natural resources less than any other available form of energy.

Ames consequently contributes little to the local pollution problem.

However, the great amount of electrical energy needed to make
(Continued on Page 2)



TORNADO -MAKER

Research May Limit Tornado Danger

A University of Chicago researcher is stirring up a storm that may help scientists to detect and eventually prevent destructive tornadoes.

Dr. T. Theodore Fujita has developed a "tornado machine" under a grant provided by NASA for the study of cloud behavior. His research is expected to permit more effective use of weather photographs gathered by satellite cameras.
(Continued on Page 3)

New Ames Responsibility

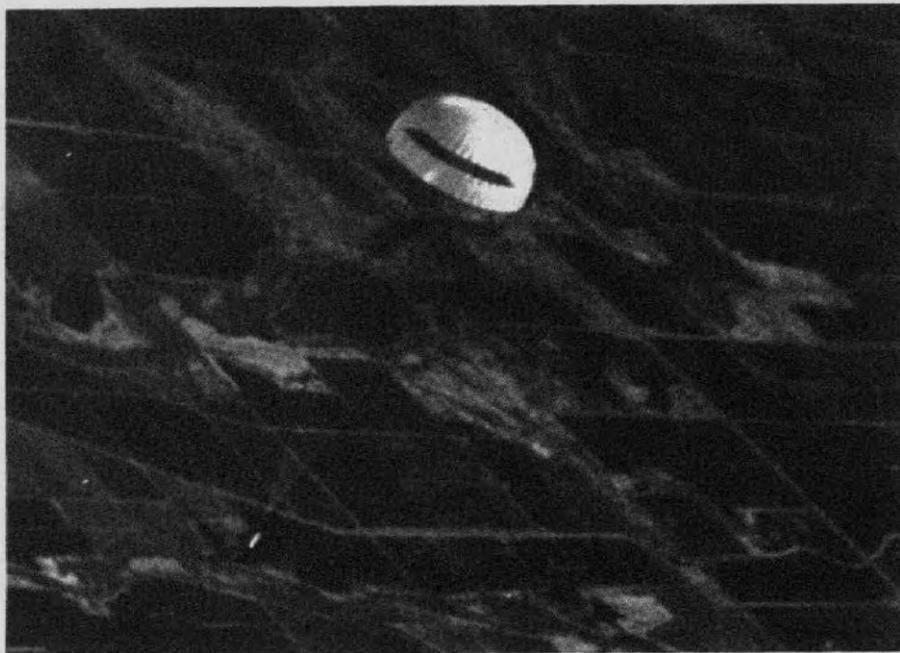
A new office, requiring 15 new positions, will soon be established at Ames. Called the Applications Aircraft Support Program Office (AASPO), it will be responsible for the management of NASA's Application Aircraft Program.

All NASA aircraft participating in the program will be coordinated through this office. Principally aircraft based at Ames and Manned Spacecraft Center are involved.

Presently four MSC aircraft and three Ames aircraft are dedicated full time to this research. Several aircraft at other centers support the program on a part time basis.

At Headquarters the Associate Administrator for Applications and the Associate Administrator for Aeronautics and Space Technology designated Ames the Lead Center for the Applications Aircraft Support Program on Aug. 30.

The new office will; "provide the Office of Applications (OA) with a field management office (AASPO) which would integrate, coordinate, and control, as delegated, the application and utilization of all OA aircraft resources so as to ensure overall effective support of OA sponsored programs and projects."
(Continued on Page 4)



A MARTIAN LANDING . . . is planned for the Langley-managed Viking mission in 1976. While part of the spacecraft orbits the planet a second part will make a soft landing on the surface to gather soil samples, take television pictures, and conduct a myriad of other experiments.

Ames' Learjet took part recently in tests of the Viking parachute deployment sequence (pictured above) which will allow Viking's lander to gently set down on Mars' surface. With photos like the above, taken from the Learjet, Viking project personnel were able to evaluate Viking's decelerator system performance.

The efforts of Ames' pilots and support personnel during the Viking tests at the Joint Parachute Test Facility in El Centro, Calif. were commended to Hans Mark, Ames Director by Edgar M. Cortright, Langley's Director.

Shuttle To Have Zero-Gravity Toilet

A bathroom commode designed for use aboard NASA's Space Shuttle will be operated like toilets now found on commercial airliners.

The new equipment is expected to overcome the major disadvantage of waste collection techniques now used aboard manned spacecraft. Present procedures are designed for male astronauts only, providing collection tubes for liquid wastes and plastic bags with adhesive opening for solid matter.

Though the space toilet looks very much like a home commode on the outside, it has been modified internally for use in the weightless environment of space.

In the absence of gravity, the commode uses an airstream to direct the flow of waste materials away from the body. The toilet seat has two separate openings, each connected to an independent waste processing facility.

While gases are filtered and returned to the shuttle interior, liquids are conducted to a stainless steel holding tank, and solid matter is vacuum dried, chemically treated to prevent bacterial growth, and stored.

All waste materials are removed

from the shuttle after it returns to Earth, as is done on commercial airliners.

With a maximum of four crew members and six passengers, the waste system has sufficient storage capacity* for at least four days.

US-USSR Working Group Results

NASA and the Soviet Academy of Sciences have approved recommendations developed at their second Joint Working Group of Space Biology and Medicine, held in May at Manned Spacecraft Center.

The group continued its exchange of information on manned space flight experiences.

The U.S. report included pre- and post-flight aspects of the Apollo 16 flight, and the Russian report contained autopsy findings on the fatal Soyuz-Salyut mission.

The report confirmed that death of the three cosmonauts was caused by sudden decompression of the spacecraft.

POWER SHORTAGE

(Continued from Page 1)
the Center go adds to the national problem of electrical power shortage. During fiscal year 1972, 311,410,726 kilowatts of electrical energy were used at the Center.

Employees are reminded that there are several things they can do to help conserve electrical energy and reduce operating costs. For instance;

1. Utilize minimum artificial lighting during daylight hours in rooms provided with adequate windows or skylight illumination.
2. Keep unnecessary lights turned off such as in storerooms, closets, or other space not being occupied.
3. Shut off lights, appliances, and instruments when leaving the office or other work area for periods exceeding 15 minutes.
4. Keep windows and outside doors closed when air conditioning units are in operation.
5. Draw or partially close blinds, shades, and draperies on the sunny side of the building to reduce the solar heat loads.
6. Schedule the operation of all large electrical loads for times other than during which the Center is running at peak demand. Scheduling assistance may be obtained by calling Mr. Richard C. Madison, FAX, ext. 5875.

Andy Bogart Recieves Special Achievement Award



AWARD WINNER . . . Andre T. Bogart (left) chatted with Louis H. Brennwald (back to camera), Director of Administration, in his offices after Brennwald presented Bogart with a NASA Special Achievement Award and a \$250 check. The award, signed by Hans Mark, Ames Director, was given to Bogart "in recognition of his excellent performance during his assignment to the Foothill Community College District.



NASA-Army Award Design Contracts

Two firms have been selected by NASA and the US Army for negotiation of contracts to design VTOL (Vertical Take Off and Landing) tilt-rotor research aircraft.

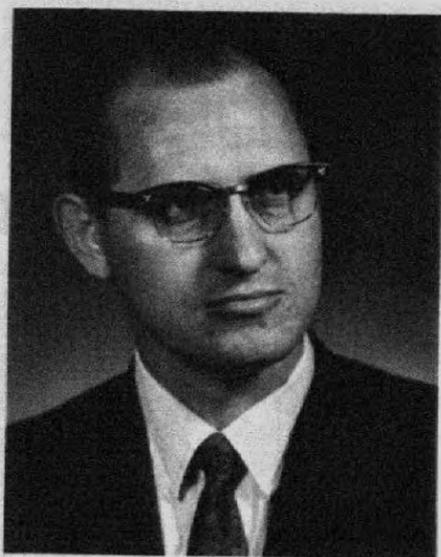
The tilt-rotor system uses wing tip rotors for direct vertical lift to take off like a helicopter; the rotors then tilt gradually forward cruise flight. For landing, the sequence is reversed. The concept shows promise for quiet, versatile VTOL air transportation for military and commercial use.

Contract negotiations for the two \$500,000 fixed price design con-

tracts will take place with the Bell Helicopter Co., Ft. Worth, Texas, and the Boeing Company, Vertol Division, Philadelphia, Pa. The contracts are the first phase of a two-phase joint program of Ames and the US Army Air Mobility Research and Development Laboratory.

After completion of this phase, one contractor may be selected for a production contract to build two research aircraft.

The phase one studies are scheduled to be completed late this year.



Q. Marion Hansen, Chief of the newly established Flight Project Development Division.

New Division Chief

Q. Marion Hansen has been appointed by Dr. Hans Mark to be Chief of the new Flight Project Development Division.

Mr. Hansen said of his appointment and the new division; "The objective of the new organization is to develop and conduct new flight projects at Ames. The division encompasses a wide range of talents in systems engineering and in project management to cover all technical and management aspects of flight projects." He added "It is one of my personal goals to encourage an atmosphere of cooperation with other divisions at Ames, as well as to achieve a united effort within my own organization."

Prior to his appointment, Mr. Hansen was Chief of the Vehicle Guidance and Control Branch in the Systems Engineering Division and also Acting Chief of the Aeronautical Projects Office in the Development Directorate. He has gained broad personal experience in developing and managing flight projects for aircraft, sounding rockets, and spacecraft.

The Assistant Chief of the new division is Mr. Bonne C. Look, who has had extensive experience managing the development of a large spacecraft in addition to numerous other flight projects.

Mr. Hansen was born and raised in Snowflake, Arizona. He came to Ames in 1959 as an Air Force ROTC graduate with a Bachelor of Engineering Science degree from Brigham Young University. He completed his Master of Science degree in Electrical Engineering in 1964 under the Honors Cooperative Program at Stanford.

He and his wife Maline, live in Cupertino with their three sons and three daughters.

How To Resign

Ames employees planning to resign from their present positions are asked to follow the procedure outlined below.

1. Two weeks prior to resignation date give verbal notice to supervisor.
2. REPORT IMMEDIATELY to Records and Reports Branch to initiate Standard Form-52 (written notice of resignation.)
3. Records and Reports will complete the SF-52 and brief the employee on remaining clearance requirements.

Insurance

(Continued from Page 1)

Cross-Blue Shield) has been denying claims for certain hospital costs connected with admissions solely for diagnostic tests. Claims denied have been for hospital room and board and related medical care when the diagnostic tests could have been made on an out-patient basis without adversely affecting the person's health or the quality of medical care provided. Payments have been made under Basic Benefits for the diagnostic tests themselves.

Federal employees or annuitants whose claims for benefits related to diagnostic admissions have been rejected by Blue Cross-Blue Shield should now submit a Supplemental Benefits claim for these expenses to their local Blue Cross-Blue Shield plan, the Commission said. Claims for such expenses incurred in 1971 and 1972 must be submitted no later than December 31, 1973. Forms for submitting Supplemental Benefit claims may be obtained from any local Blue Cross-Blue Shield plan.

The Commission has received reports from about 140 employees whose claims have been rejected and will contact each of them promptly to advise them on re-submitting their claims.

The Blue Cross-Blue Shield plan for Federal employees and annuitants does provide basic benefits for expenses related to diagnostic hospital admissions when the confinement is medically necessary. Any Federal employee or annuitant who has had a claim for Basic Benefits rejected in such cases may also ask the Plan to reconsider the claim for basic benefits if the claimant believes the hospital admission was medically necessary that is, that the nature of the tests or the patient's health required him to be admitted to the hospital as a bed patient. Requests for reconsideration of such claims should also be submitted to the local Blue Cross plan.

Tornado Research

(Continued from Page 1)

Dr. Fujita built his tornado machine so that the characteristics of tornado-producing clouds might be studied more easily. Though all thunderstorms appear to rotate, he says, only one in a hundred actually causes a tornado. His task was to identify those rare exceptions so people might have advance warning of approaching tornadoes.

But not all of Dr. Fujita's research takes place in the laboratory. While observing a thunderstorm from a jet aircraft, he discovered evidence that upsets the conventional explanation of how tornadoes are created.

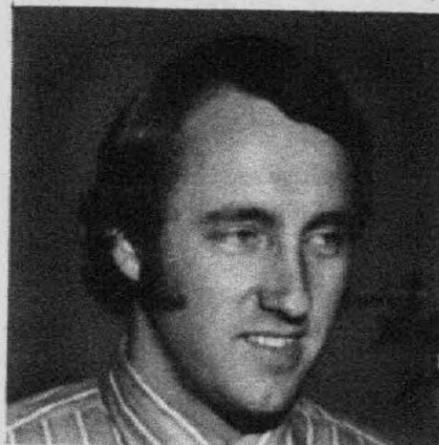
Until recently, most scientists believed that tornadoes were produced as thunderclouds expanded rapidly. But, in fact, Dr. Fujita says, tornadoes seem to be created during

a pause in the growth of the thundercloud.

Dr. Fujita has also developed a new theory to explain why tornadoes may completely destroy a house while leaving neighboring buildings untouched.

Within each major funnel, he says, there are several smaller funnels which spin with much greater force. These "suction vortices" dance about the base of the main funnel, leaving an erratic path of destruction.

Using the tornado machine, and testing his theories against real tornadoes and thunderclouds, Dr. Fujita says it may soon be possible to predict the onset of a tornado two hours before it descends from a cloud.



DRS. CURTIS W. PARKIN (left) SSS, AND RONALD GREELEY (right) SSP . . . together will teach a course entitled "Introduction to Planetary Geology and Geophysics" at the University of Santa Clara, Fall Quarter. The course is an introduction to the origin, structure and description of the surface features of the Moon and Mars and considerations of the internal properties of planetary bodies as determined from manned space probes.

Further information about the course may be obtained through the University's School of Engineering, 984-4467.

Aluminum, Calcium Found On Moon

blast furnace.

One Moon rock of special interest is coated with a reddish brown material that appears to be common rust. Though iron is abundant in lunar rocks, rust is extremely rare, presumably because the moon lacks water.

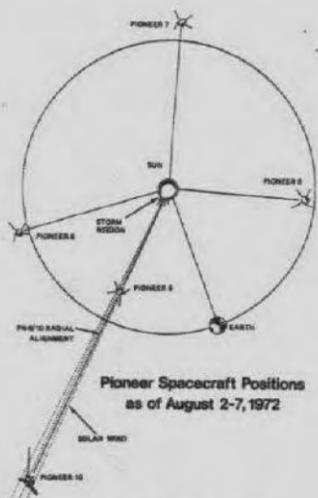
While scientists feel that some of the rust may be due to moisture encountered by the rock after leaving the Moon, the distribution of the coatings leads them to believe that this is not the sole cause of the rust.

Results of preliminary studies will be used in distributing Apollo 16 rocks to nearly 200 scientific teams, including the Ames team, in the United States and 15 foreign countries.

Scientists at MSC report that many of the rocks picked up from the surface of the Moon by Apollo 16 astronauts are rich in aluminum and calcium.

Dr. Paul W. Gast, Chief of the Planetary and Earth Sciences Division at Houston, said that as much as 90 per cent of the material collected contains large amounts of the minerals. Instruments flown in lunar orbit showed large areas of the lunar highland to be rich in aluminum.

The low-density rocks are believed to have been created when the crust of the Moon was melted to a great depth, permitting the lighter aluminum and calcium to float to the surface like slag in a



Solar Storm

(Continued from Page 1)
of consumption.

Scientists with experiments aboard Pioneers 9 and 10 say they made measurements which "are absolutely unique." Their quick-look data shows that the solar wind, the continuous flow of ionized gases out from the Sun, did not behave as expected, moving outward 132 million miles between the two spacecraft. For some reason it converted its motion energy into thermal energy; the gases lost half their speed but increased in temperature dramatically.

Since the only star man can study at close range is the Sun, the data should help in understanding all Sun-like stars.

During the peak of the storm on August 2, the two spacecraft happened to be on a direct radial line straight out from the Sun. Pioneer 9 was 72 million miles from the Sun.

Pioneer 10, a third of the way on its trip to Jupiter, was 204 million miles from the Sun.

A radial line-up of Pioneers 9 and 10 was planned to measure masses of solar wind gases in a quiet state as they passed the two spacecraft. Pioneers 9 and 10 were 132 million miles apart at the time. The storms were a tremendous bonus for the experiment.

During the storms Pioneer 9 saw the highest solar wind speeds ever recorded, and Pioneers 6 and 9 the greatest numbers of high energy particles ever seen in space.

"We expect other unusual findings from further comparisons of particle and magnetic field measurements by these two spacecraft, one near and one far from the Sun," commented Dr. John Wolfe, Pioneer Project Scientist.

The five interplanetary Pioneer spacecraft, managed by Ames operate outside the Earth's magnetic envelope (the magnetosphere). Their observations of this month's storms will be augmented by those of Earth satellites and ground stations.

ERTS Photos Available To Public

Many people across the nation and in other countries after seeing Earth Resources Technology Satellite-1 (ERTS-1) pictures in their newspapers and on television are asking how they can get copies of the photos and what they cost. The answer? From a number of sources, imagery dissemination centers at Departments of Interior, Commerce and Agriculture.

These centers serve all persons and groups not qualified as ERTS principal investigators to receive the imagery directly from NASA.

Public and private sector organizations participating in NASA's Technology Utilization program may also obtain photography, analyses, and related background material, when available, from the six Regional Dissemination Centers sponsored by NASA. The Center which particularly specializes in remote sensing technology is the Technology Applications Center, University of New Mexico, Albuquerque, N. Mex. 87106.

To aid in selecting the data desired, NOAA has established public browse files at 22 locations around the nation where ERTS data is available. The closest browse file to Ames is located in Tiburon.

New Office

(Continued from Page 1)

The OA aircraft are used for many different types of research, including support flights for the Earth Resources Satellite, Skylab, and regional problems. For instance, Ames Earth Resources Aircraft were recently used to aid in California fire-fighting efforts.

The new office will be staffed through reassignments using the Merit Promotion Plan.

SKI CLUB

The Fourth Annual Moffett Field Ski Show will be held in the Ames Auditorium Sunday, Sept. 17 from 1 p.m. to 3 p.m. For the first time the Ames Ski Club will take part in the festivities.

Equipment displays, films and door prizes, including clothing, lift tickets and ski accessories, will be part of the snow rites.

A fashion show will begin at 2:30 p.m.

For more information contact Phyllis Hayes at extension 5114.

Happenings

SPEAKERS

Friday, Sept. 15, at 3 p.m.

Professor Renwick E. Curry, MIT will speak on Flight Management Displays in Building 239, Room B39.

Thurs., Sept. 14, at 10:30 a.m.

Dr. Ariel Cohen, Hebrew University will speak "On the Remote Measurement of Turbidity and Aerosol Properties by Use of Laser Radars" in Building 245, Auditorium.

Monday, Sept. 18 at 8 p.m.

Dr. Freeman Dyson, Professor of Physics at The Institute for Advanced Study will speak on "Intelligent Life in the Universe" in The Palace of Fine Arts Theatre, San Francisco through the Cosmic Evolution Lecture Series.

Monday, Sept. 18 at 10:30 p.m.

Dr. Edwin Salpeter's, Cornell University, talk on the "Birth and Death of Stars" (fourth in the Cosmic Evolution Series) will be broadcast over KQED, Channel 9.

Monday, Sept. 25 at 10:30 p.m.

Dr. Ichtiague Rasool's, NASA Deputy Director for Planetary Programs, talk on "Genesis of Planetary Systems" (fifth in the Cosmic Evolution Series) will be broadcast over KQED, Channel 9.

FUN

Ames Family Picnic

Sat., Sept. 30 at 10:30 a.m.

Saratoga Springs (Tickets available at the ARA Store, Tues. and Thurs. 11:45 to 12:45).

WANT ADS

AUTOMOBILES

For Sale-64 Dodge v-8 stn. wgn, \$250. Call 243-5895.

For Sale-62 Chev. stn. wgn., pwr brks, pwr stg. (fact. air) \$350, 227-5307.

For Sale-71 VW Beetle, ex. cond. \$1,450, call 253-8832, 6-9 p.m.

For Sale-69 Datsun wgn., 30,000 miles, cln, gd cond., \$1395. Call 245-3188.

For Sale-65 Ford Gal. 500, recent valve job & tune up, 70 k miles, cln, \$600, Reller, 967-7459.

For Sale-A.H. Sprite parts, engine 1100 (also fits MG) windows, soft top, bumpers, etc. Before 7 p.m. 736-7984, Ken.

For Sale-63 Rambler classic, re-

blt motor, trans. & brakes, 2 new tires, \$225. Thompson 379-2385. HOUSING

For Rent-Tahoe City cottage near lake and private beach area. Slps 6. Autumn rate \$60/wk or \$30/wknd. 964-9848 or 967-3845.

MISCELLANEOUS

For Sale-Boat, mahogeney, 14.5' Scott 40 hp. Gd for fishing and ski. Gd cond. \$395, Phone 245-3188.

For Sale-Girl's bike, 26" Schwinn 1-spd, in gd cond. \$25 or best offer. Call Dave Reese, Jr. 321-4789.

For Sale-Cassette Tape Deck, Ampex Micro 86 w/out spkrs, ex. cond. \$75. 326-4423.

Ride Needed-From near Fair Oaks Drive-in, in Sunnyvale, to Ames & back, 8-4 p.m., John Salto, 734-2042.

For Sale-Rug, gold & grn, beige drapes w/ traverse rods & accent table. Call 656-6325.

For Sale-71 Kawasaki mtrcycle, cc, 3 cyl. KI Model in ex. like-new cond. 3500 miles. \$700, 964-2474.

For Sale-Slide projector 35mm, B & H cube, bike rack for car, 2 port. typewrtrs, Smith-Corona & Olympia desk lamp, floor lamp, metal desk & secretary chair, Chinese rug 9 x 12, water pick. 739-9228.

For Sale-Elec. ice cream maker, Proctor 6 qt. never used, \$12.50. Hi-fi stereo components. Top qual. works fine, trntable, pre-amp, tuner all for \$50. Antique roll top desk, oak, many cubbyholes, ex. cond. 48" hi and wide. Beautiful, \$395. Clarinet, Boosey and Hawkes, hardly used, good tone and qual. \$70, H. Asch 736-6999.

For Sale-Polaroid Camera Model 230 w/ Cold Clip Devel. Timer and Flashgun, over \$110 value, ex. cond. \$65. Intercontin. 17 trans. multiband port. radio w/ AFC, BFO and many other spec. features. Hardly used. \$60. Tap shoes, size 6, like new, \$6. Recording tape, Scotch Dyna-range series #203, 1/4 x 1800" reel, 1 mil. polyester back. never used, \$5, call 321-1858 after 5 p.m.

Photography Club

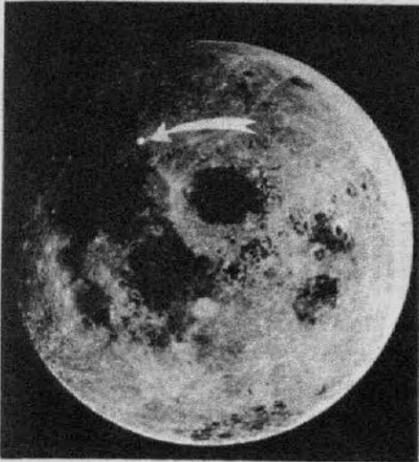
The Ames Photography Club is offering an interesting lecture to Ames employees on "How to Take Better Travel Pictures" on Sept. 27 at 4:45 p.m. in the Private Dining Room.

Further information about the club's activities may be obtained by contacting one of the officers.



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

Last Apollo - Night Launch



An arrow indicates the Taurus-Littrow region.

What may be man's last journey to the Moon in this century is scheduled to begin with a night launch, the first in the manned space pro-

gram, on Dec. 6 at 9:53 p.m. EST.

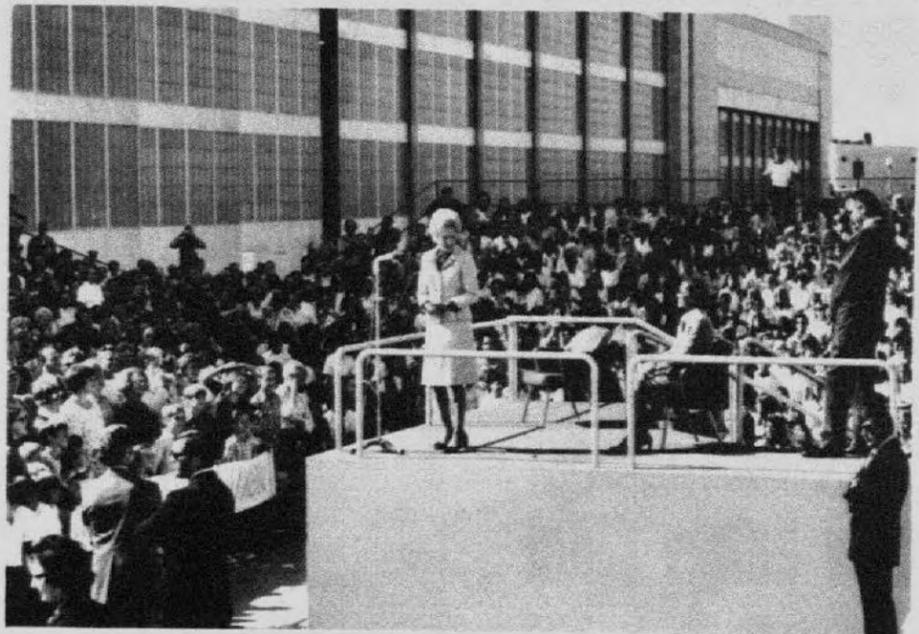
The final Apollo mission will be the longest in the series. The trip will last 12 days, 16 hours and 31 minutes.

Following the return of Apollo 17, the United States, like the Soviet Union, will restrict its manned space exploration to orbits around the Earth.

One of the last two men to visit the Moon aboard an Apollo spacecraft will be a civilian scientist - the first to make the journey.

Dr. Harrison H. "Jack" Schmitt, a specialist in lunar geology, will pilot the lunar module. Dr. Schmitt received 53 weeks of flight training at Williams Air Force Base, Arizona.

Before joining NASA as a scientist (Continued on Page 2)



FIRST LADY . . . Mrs. Pat Nixon greets a crowd of Ames employees and local school children in front of the "big hangar" as Mrs. Hans Mark (seated on podium) and Dr. Mark (behind Mrs. Mark) look on.

Ames Mouse Experiment on Apollo

Light flashes the astronauts have reported "seeing" during Apollo missions are now known to be due to the passage of heavy cosmic ray particles through the retina of the eye, stimulating the retinal nerve cells as light would.

Now the question is; "Will the passage of numerous heavy cosmic particles through the brain and retinal nerve cells of astronauts during extended space travel be injurious?"

To find the answer Dr. Webb Haymaker, LVX, (Principal Investigator) and Dr. Delbert E. Philpott, LVX, (Co-investigator) have devised a unique experiment that will send six pocket mice to the Moon and back on Apollo 17.

Sandwiches of lexan and cellulose nitrate (plastic detectors) have been implanted beneath the mouse scalps. As the heavy cosmic ray particles move through the Command Module and penetrate the heads of the mice and the detectors, they will leave tracks on the detectors indicating the trajectory of their passage through the brain and eyes.

Later, Drs. Eugene Benton and Michael Crutz, Physicists of the University of San Francisco, will closely study the tracks made in these detectors to determine which areas of the brain and eyes are affected, and to what extent. It is

calculated that approximately 20 heavy cosmic ray particles will pass through each mouse's brain, and far fewer through the eyes.

When Apollo 17 splashes down a race against the clock will begin. If any damage has been done to the many mouse tissues during the (Continued on Page 2)

Mrs. Nixon Visits Ames

Dressed in its Sunday-best and primed as for a celebration, Ames welcomed Pat Nixon last Wednesday with bands, banners and jets.

There were, of course, speeches by dignitaries. Dr. Hans Mark, Ames Director, introduced; California Lt. Gov. Ed Reinecke; the mayor of Sunnyvale, Mrs. Etta Albert; the mayor of Mountain View,

Ross Wollard; and Moffett Field's Commanding Officer, Capt. Gambrell.

The "Buffalo," Ames' Augmentor Wing Jet STOL Research Aircraft, piloted by Robert C. Innis, Chief of the Flight Operations Branch, made a demonstration take-off and landing.

Then, at 3:30, Air Force 2 with Mrs. Nixon aboard, landed to the exuberant playing of the Sunnyvale and San Leandro High School bands.

Dr. and Mrs. Mark escorted Mrs. Nixon to the podium set up before the "big hangar." The crowd welcomed her warmly, but was outdone by the enthusiastic cheering of a large group of local 6th, 7th and 8th graders.

Invitations to attend the festivities were extended by Ames to Sunnyvale, Whisman, Mountain View and Los Altos elementary school districts. Seven parochial schools were also invited.

Introducing Mrs. Nixon to Ames, Dr. Mark said; "Ames is one of the smallest of NASA's laboratories, but one of the best." To this the crowd and Mrs. Nixon applauded.

Mrs. Nixon stepped to the microphones and said it was "nice to be back home." She commended Ames for its research and added; "a personal note of thanks to the people who work here at Ames for the community service you provide."

She was then shown to the "ro- (Continued on Page 3)



PIONEER PRESENTATION . . . Replicas of the plaque attached to the Pioneer 10 spacecraft were presented by Charles F. Hall, Project Manager, to Dr. Hans Mark, Ames Director, and C. A. Syvertson, Deputy Director last week. The dark-framed replicas read; "On the occasion of the launch of Pioneer 10 to Jupiter on March 2, 1972," and are signed by Charles F. Hall. An explanation of the plaque's message to extraterrestrial beings is engraved on each.



AMES HAS A NEW CHIEF . . .
 Dr. Lewis Hughes was appointed Chief of the Health and Safety Office by Dr. Hans Mark, Ames Director on Sept. 8.

New Safety Chief

Dr. Lewis Hughes, recently appointed Chief of the Health and Safety Office by Hans Mark, Ames Director, is well qualified for his new position and enthusiastic about coming to Ames.

"Ames is on the frontier of breakthroughs," he said during a recent interview, "and has extensive ongoing environmental programs. The Center presents an opportunity to continue research I have been involved with at Berkeley."

He comes to the Center from the University of California at Berkeley where, for the past six years, he has been Campus Radiation Safety Officer. He earned a Ph.D. from the institution this year in Environmental Health Sciences.

Before joining the Berkeley staff he was a Health Physicist at the Lawrence Radiation Laboratory in Livermore for five years. Then, from 1961 to 1965, he was the Laboratory's Health and Safety Engineer. In 1965 he went to Berkeley to head the Campus radiation safety program.

Dr. Hughes was born in Hilltop, West Virginia in 1928. He earned a Bachelor of Arts degree from West Virginia State College in 1951 and a Masters of Science degree from the University of West Virginia in 1956.

Before entering the University of West Virginia to work on his Masters degree he served three years with the Army, the last of which was spent in Germany.

Dr. Hughes and his wife, Constance, live with their children, David and Dana, in Oakland. Mrs. Hughes teaches Remedial Reading at McClymonds Senior High School in Oakland.

Apollo Launch Set Mice' on Apollo

(Continued from Page 1)
 tist-astronaut in 1965, Dr. Schmitt worked for the U.S. Geological Survey. The 37-year-old bachelor instructed earlier Apollo crews in lunar geology, surface navigation, and feature recognition on the Moon.

Apollo 17 will be commanded by Navy Capt. Eugene Cernan who piloted the lunar module in its initial flight test during Apollo 10.

Aboard the command module orbiting the Moon will be Navy Commander Ronald E. Evans.

Cernan and Schmitt will spend three days exploring the Moon. Using the lunar roving vehicle for seven-hour trips on Dec. 11, 12, and 13, the team will investigate the Taurus-Littrow region.

The valley in which the lunar module will land is covered with a dark material very different in appearance from most of the Moon's surface. Scientists believe it may be composed of volcanic ash.

Surrounding the valley are mountainous highlands. The Apollo team will collect samples from the steep sides of the mountains.

Geologist Schmitt explained at a recent interview that the last Apollo mission is expected to fill in gaps in our knowledge of the recent history of the Moon.

While the first five expeditions collected materials dating from 3 to 4.5 billion years ago, photographic and chemical evidence gathered during earlier missions indicate that the Taurus-Littrow region may contain rocks less than two billion years old.

Splashdown for Apollo 17 will be in the Pacific Ocean south of the Samoa Islands on Dec. 19 at 2:24 p.m. EST.

Combined Federal Campaign Oct. 2-6

Dr. Hans Mark, Ames Director, appointed Karrell W. Reynolds, Chief of the Services and Supply Branch, Chairman for this year's Combined Federal Campaign recently.

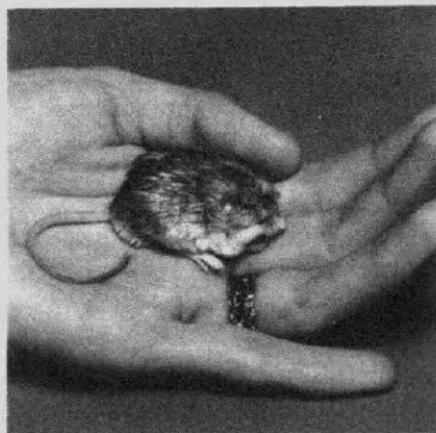
The CFC will be conducted from October 2 to October 6 this year. Give generously when your division captain visits you.



**thanks to you
 it's working**

(Continued from Page 1)
 flight it must be detectable before the damage has time to heal. So, Dr. Haymaker and Dr. Philpott and other biologists will be positioned at a Naval Air Base on Samoa to receive the mice as soon as possible after they are released from the Apollo capsule. They will prepare the mice for later study.

Pocket mice, so-called because they store seeds in "pockets" in their cheeks, are used because they are hardy, small (a third of an ounce), and drink no water. They get water from the seeds they eat.



During the mission the mice, each in a perforated plastic tube, are housed inside an aluminum canister, 12-inches long and 7-inches in diameter. The tubes are small so that the mice cannot float in the zero G environment.

The mice will have ample seeds in their individual tubes as food.

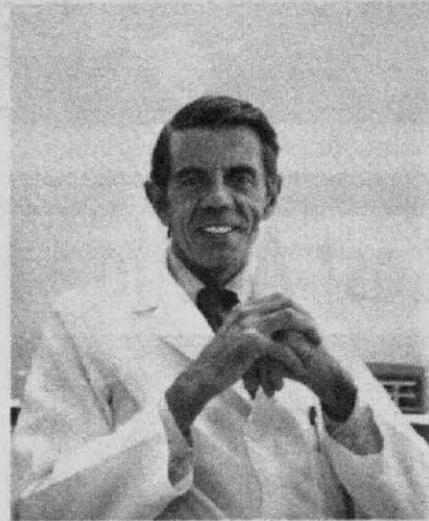
A central tube in the canister contains potassium superoxide which, when the animals breathe, uses the moisture and carbon dioxide coming from their lungs to produce oxygen. Enough oxygen is given off by the superoxide to sustain the animals throughout the flight.

Bonne C. Look, PEF, Chief Engineer for the project, designed the canister. It is a self-sustained, closed unit, not requiring any attention by the astronauts.

"Many people ask us why we don't simply go to an accelerator, like the one at Lawrence Radiation Laboratory in Berkeley to run the test," said Katherine P. Suri, LVX, Dr. Haymaker's assistant. "The accelerators," she said, "can't provide near the energy acquired by cosmic ray particles in actual space."

The particles come from many stars in our galaxy, of which our solar system is only a tiny part. They are the nuclei of elements, such as carbon and iron, accelerated to the speed of light by the magnetic fields they pass through.

Whether or not the cosmic par-



New M.D. at Ames

The next time you visit the dispensary you may be greeted by a new face. His name is Dr. Norm Sherwood.

He comes to Ames from Milpitas where he has been in general practice for nine years. "I had been looking for a position like this for quite a while," he said during a recent interview. "Basically it is the same kind of work as private practice, but without the late-night phone calls and emergencies, or disrupted weekend plans," he said.

"I couldn't ask for a nicer place to work," he continued. "There is a fine group of people here and a lovely, well-equipped dispensary."

Eighteen years ago Dr. Sherwood was Flight Surgeon with the CAG 15 Carrier Air Group, stationed at Moffett Field. "That place," he smiled, "hasn't changed a bit. It's grown a couple of blocks, but that's all."

Dr. Sherwood did his undergraduate "pre-med" work at Bucknell College in Lewisburg, Pennsylvania. He received his M.D. degree from the University of Pennsylvania Medical School and interned at Philadelphia General Hospital. He then went to Saint Vincent's Hospital in Erie, Pennsylvania for a year of residency in General Medicine and a year in Surgery.

A sailor and amateur photographer by hobby, he prefers ocean racing to almost anything else.

Dr. Sherwood and his wife, Patricia, make their home with their daughters, Cheryl, Jana and Mari-kay in Los Altos.

Mrs. Sherwood teaches art at Foothill and De Anza Colleges, and is in the Masters Program at Mills College.

Articles present a hazard to space travelers may soon be known, thanks to Dr. Haymaker, Dr. Philpott, Mr. Look, their collaborators, and six pocket mice.



"A CHECK FOR \$270 . . . and a letter of commendation were presented to Donald E. Carter, RSM, (right) by his Division Chief, Leonel S. Stollar (left) at a small ceremony in the Technical Services Building Sept. 12. Carter received the Suggestion Award for his innovative method of reboring valve bodies in the 3000 psi air and helium storage system of the 3.5-Foot Hypersonic Wind Tunnel without removing the valves. He not only devised a method which was an inexpensive solution to a potentially expensive and time consuming job, but he added safety features to a potentially hazardous job.



"THIS IS THE FUTURE? . . . It may not have the sleekness of a 240Z, nor the comfort of a Rolls, nor the power of a Lotus, but it has something they don't; an electric engine. While other cars drink gallons of nasty smelling gasoline then belch back noxious fumes, Michael Dix's, SSS, electric Lizzy daintily whurs down the road emitting nothing but the gentle sounds of the future.

The Look of the Future

"Electric cars will be cheaper to operate, maintenance will be a fraction of the cost it is for a gas engine, and they won't pollute the environment," said Michael Dix, SSS, during a recent interview. He was talking about the car he just built.

It took Dix, an electrical engineer, only six weeks to build his 15-horse power electric engine automobile. It has twelve six-volt 200 ah batteries, giving 72 volts to the motor. Top speed is about 50 miles per hour.

He can drive it twenty-five miles from his home and back without having to recharge the batteries.

This reporter was given a dem-

onstration ride that was quite a trip. The car sounds something like a loud golf cart, or a very large toy. Each time it comes to a stop the engine stops running, but it starts right up again, as smoothly as before, when the driver steps on the gas.

Other Ames electric car owners are; Darrell D. McKibbin, SSS; Roger C. Hedlund, RFD, and Warren Winovich, STM. Hedlund, with the help of Ted Brown, RFD, built his car for racing. The car, which uses automobile batteries, cannot be driven on the street as Dix's can. He hopes to eventually enter it in local competition.

Thank You

I would like to thank all my friends for the wonderful retirement luncheon on Sept. 8. It was a wonderful sendoff and an occasion I will remember as one of life's good experiences. Eve and I are very grateful for the gift of the camera and other small items which we will use on our travels.

Maurice V. Gowdey

Chinese Fair

Stanford Area Chinese Club and Multicultural Education Office of Palo Alto Unified School District are cosponsoring a Chinese Cultural Fair on Sunday, Oct. 8 from 11 a.m. to 4 p.m. at the Cubberly High School Pavilion, 4000 Middlefield Road, Palo Alto.

Admission is free.

The Fair will feature; exhibits, including art and crafts, calligraphy, and Chinese inventions; entertainment, including full length Chinese cartoons, and Gung Fu; and foods, including a demonstration of Mandarin and Cantonese cooking.

Toastmaster Club

The Jetstream Toastmaster Club #2624 will hold its annual awards and humorous speech contest in Mac's Tea Room, 325 Main Street, Los Altos, tonight, Sept. 28 at 7 p.m.

Ames participants include; Art Okuno, STM; Frank De Rosa, ASM; Myles Murphy, LTI; Dick Shaupp, MS; and Cal Fenrick, ASO.

Toast master for the affair will be Jim Rogers, RFE, and Guy Ferry, DTM. The District Governor will present the awards.

First Lady Visits Ames

(Continued from Page 1)

tunda" area of building 243 where eight of Ames' projects were displayed.

Dr. Gladys A. Harrison, LTB, and David Leaffer, a student-worker, explained the Space Shuttle atmosphere research and how it applies to "black lung" disease, prevalent among coal miners.

Dr. Webb E. Haymaker, LVX, and Katherine P. Suri, LVX, described their work with pocket mice. The experiment, (see story on this page) to detect possible cosmic ray damage to brain and eyes, will be on Apollo 17.

Mrs. Nixon gamely let Dr. Harold Sandler, LTB, use her arm to demonstrate a cardiovascular-monitoring device.

Next, Dr. Joan Danellis explained studies on the effect of weightlessness during long-duration space flight. Joseph Barrios, who was shot in the head during a 1968 hold-up was introduced and the use of the centrifuge to reposition the bullet lodged in his brain was described.

Mrs. Nixon then allowed Dr. Hubert C. Vykukal, LTC, to put her arm in the Ames Manipulator Arm, demonstrating how the oper-

ator-controlled movements of one arm are reproduced precisely in another arm. The device, or similar devices, has many possible applications.

While Dr. Vykukal described the device's many possible applications in space and medicine, Mrs. Nixon commented on the device's similarity to a robot. Dr. Vykukal joked that, "We are working on a maid."

Dr. Michel Bader, Chief of the Space Science Division, used high-altitude photographs taken from Ames' Earth Resources Survey Aircraft to explain their use in land planning and forest fire control.

A picture of Western White House at San Clemente taken from an altitude of 65,000 feet from the aircraft was presented to the First Lady before she departed.

Mrs. Nixon was next briefed on Ames' aeronautical research techniques and computer graphics work by Marcelline C. Smith, RI, and Dr. Leonard Roberts, Director of Aeronautics and Flight Systems.

Dr. Roberts, using a diagram of the 40-by 80-Foot Wind Tunnel also described that facility.

The First Lady was then taken for a ride in the Flight Simulator for Advanced Aircraft. Fred J. Drinkwater, III, FOS, "flew" the simulator around the Bay Area, then brought her down for a rather bumpy landing.

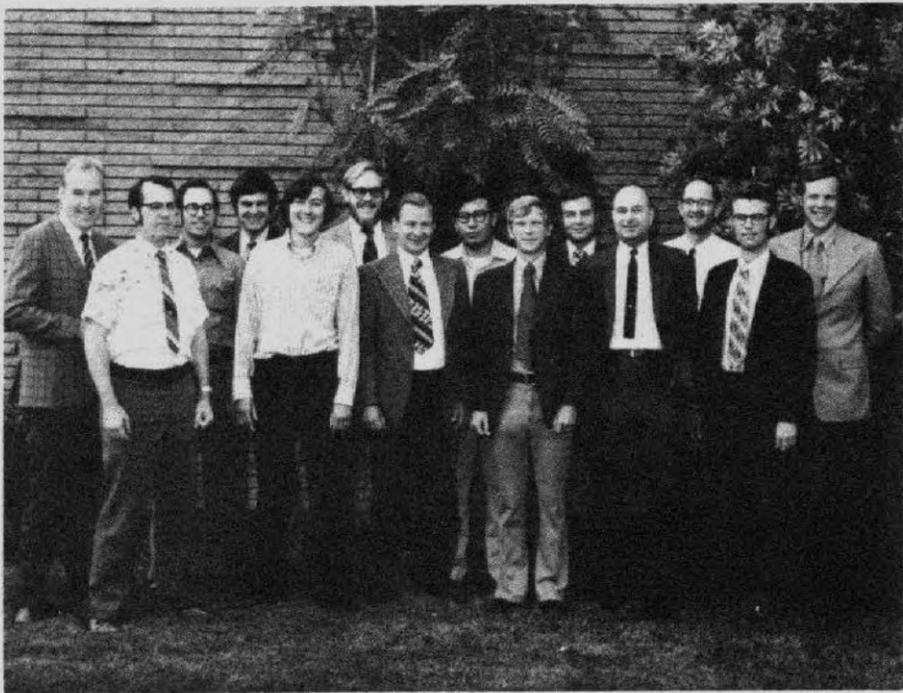
Before saying goodbye Mrs. Nixon watched as Jim Barnes, a Lockheed contract employee, piloted the Earth Resources Survey aircraft in an impressive 60 degree takeoff.

The Astrogram Admin. Mgt. Building
Phone 965-5422

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Editor Jeanne Richardson
Reporters NASA Employees

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THE 1972 SOFTBALL CHAMPIONS . . . The Thermo-and Gas-Dynamics Division softball team finally halted the Puma Dynasty on Aug. 16. The Pumas had won the Ames Intramural Softball League championship for three consecutive years, but the TGD team came through to beat the Pumas in the championship game for 1972 by a score of 6 to 0. The championship was won as a result of a solid team effort with all members of the TGD team contributing key plays during the season, but one outstanding statistic deserves special mention: Dick Lind had a slugging percentage of 1.381 for the regular season and playoff games. The team members are: (front row, l to r) Dick Hanly, Paul Rotschi, Bill Carlson, Ron Bailey, Lionel Levy, Ev Maynard, (back row, l to r) Bob MacCormack, Mike Green, Jack Franklin, Bob LaMere, Mike Kodani, Fred Schmitz, Bill Pitts, and Dick Lind.

JOGGERNEWS

The recent weeks have been very busy for the Joggnauts. Aug. 20, Jim Woodruff braved the 13.1 mile and 7000 foot climb to the top of Pike's Peak in the Pike's Peak Marathon. Jim ran this grueling race in 3 hours and 38 minutes, finishing 7 out of 16 in his age group. His only complaint was feeling dizzy the last 2 1/2 miles at the 14,000 foot elevation!

The Joggnauts were well represented by Vito Daloia, Jim Woodruff, and Dale Shute on Aug. 27 at the 62nd Annual Dipsea 6.8 mile race from Mill Valley to Stinson Beach over rugged mountain trails.

Out of about 1500 starters, Vito finished a tremendous 144 after losing 40 places because he took a wrong turn and ran a longer course. Jim finished 147 and Dale 343.

The fall and winter jogging and running activities are about to begin with intra-club, one-mile handicap races beginning on Oct. 4 All interested participants should call Jerry Barrack at 6093 for details.

FELLOWSHIP

Come and join us for fellowship and study of the Word each Tuesday and Thursday at 12 - 12:45 p.m. in room 102 of building 237. For information call 5835. Dewey Hodges, Co-ordinator.

BASKETBALL

Teams and persons interested in playing basketball in the All Ames Basketball League please call Bruce Ganzler at ext. 5169. The league will play its games at Sunnyside High School on Wednesday evenings and will start play around the end of October.

GOLF

. . . by Kay Bruck

The tournament held at DeLaVeaga, Santa Cruz, was on an individual low net score. Don Dust and Jerry Dickson, Co-Chairmen for the event, reported there were winners in four flights:

First Flight-Tied were Jack Lee and Frank Lazzeroni for 1st place; Ed Stepnoski, 3rd place; and Steve Hing, 4th place.

Second Flight-Paul Kutler, 1st place Mick Martin and Vance Oyama tied for 2nd place; and Mitch Radovich, 4th place.

Third Flight-Ben Tyson, 1st place; Jim Silver, 2nd place; Sal Tardio 3rd place; and Tom Polek, 4th place. Fourth Flight-Bill Sutton, 1st place; Edie Watson, 2nd place; Sal Tardio, 3rd place; and Tom Polek, 4th place.

The next regular tournament will be at Pleasant Hills on Oct. 14.

Happenings

SPEAKERS

Monday, Oct. 2, at 8 p.m.

Dr. Philip Morrison, Professor of Physics, MIT

The Context of Mankind: A Summation

The Palace of Fine Arts Theatre San Francisco, Cosmic Evolution Series

Sunday, Oct. 1, at 3:30 p.m.

Television Broadcast of the Cosmic Evolution Series

Channel 9, KQED

Check local TV listing for precise time and lecture.

Wed., Oct. 4 at 3 p.m.

Dr. James Pollack and Dr. Ronald Greeley of Ames

"Physical Properties and Geology of Mars as Indicated by the Mariner Series"

Building 239, room B39

FUN

Ames Family Picnic

Sat., Sept. 30 at 10:30 a.m.

Saratoga Springs (Tickets available at the ARA Store)

ARA Store Grand Opening & Happy Hour

Friday, Sept. 29 at 4:30 p.m.

Ames Cafeteria

WANT ADS

AUTOMOBILES

For Sale-1964 Buick LeSaber 4 D HT, AT, R&H, good rubber, Needs head gasket, muffler, & ex. pipe. \$50, 948-4145.

For Sale-70 Toyota Corolla, 2-dr. sedan, stick ex. driving cond., good tires, 31,500 economical miles, must sell \$600, 738-3098.

For Sale-63 Rambler Classic, 6-cyl. stick shift, all mech. rebuilt, \$225. F. Thompson, 379-2385.

For Sale-4-bdrm, 2 1/2 ba., fmly rm, Cupertino School Dist., Lynbrook High, very well kept, prof. landscp. \$39,500. 1169 Countess Court, S.J. (near Saratoga) 257-6817

For Rent-House in Sunnyvale, 3-bdrm 2-ba. Immediate occupancy, Call 245-7060 after 6 p.m.

For Rent-Room in Mt. View, \$60 mo. furnished, 961-6450 or 964-5425 after 6.

MISCELLANEOUS

For Sale-Overcab cmpr, homemde, sink, frig. slps 4, make offer, reasonable. 245-8670.

Wanted-Lady to share lovely 2-bdrm home in Mt. View, dog allowed. 961-6835.

For Sale-Antique Marine Sextants, \$75 each. Call 885-6897 p.m.'s. ask for Bobbitt.

For Sale-Complete darkroom, \$400 Call 961-7662.

Free- 1 adorable male kitten, 6-wks old, 9/21/72. Will deliver anywhere. Judy Molica, 967-4522.

Wanted-Shop Manual for 1963 Ford Passenger car, any condition, call 379-4305.

For Sale-1 pair hi-fi basic amps. from Ampex APX3 theater sound sys. (require rack mounts), incl. operation and main. manuel \$40, Roger Craig, 657-9296.

Free-1 med. size unattractive dog, house, 253-4475.

For Sale-10-spd bike, very gd cond. \$45, 253-4475.

Duck Cabin-N. of Alviso on S.P. R/R right of way, \$85. 964-5425.

For Sale-60 Ford Fairlane, runs gd. \$75 or best offer, work car. 734-2042.

Free-Lovable male Lab. 3, free to family w/ big yard. 272-1492.

For Sale-Hi-Fi equipment, monophonic, 50 w. amp., pre-amp, fm tuner, turntable, 3-way spkr, (grt. for electronic organ). Make offer, Denardo, 968-4168.

For Sale-Large Philco refrig., 12 yrs old, works grt. \$30, 793-6502

For Sale-470 cu.ft. utility trailer, (12x6x6 1/2), enclosed, heavy duty springs, \$250. New oval braid rug, \$30, Jack Addison, 969-3846.

Wanted-Upright freezer in gd run. cond. Will pay \$50, call 328-3409.

For Sale-Edmunds scientific 6-inch reflector telescope w/ clock drive, almost new, \$195. 264-8473.

For Sale-New 4 1/2 x 4 1/2 ceramic tile, golden spice. 6 boxes (576 tiles; 75 sq. ft.) \$20, call 259-8736.

For Sale-Girl's 3-spd. bike, needs a tire. \$25, 961-4182.

For Sale-George Lenehan wants to sell his 71 Kawasaki mtrcycle, 500 cc., 3500 miles, \$700. 964-2474.