



the astrogram

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

Results of Ames Apollo 11 Experiments

Ames Apollo 11 experimenters participated in the Lunar Science Conference held in Houston in late January. The following is the final part of a two-part summary of their findings.

Building Blocks of Life Not Found -Dr. Cyril Ponnamparume, Chief, Chemical Evolution Branch.

Scientists found very little carbon (about 150 parts per million) and no organic carbon of biological significance in the material from Tranquility Base.

There was a higher proportion of the heavy isotope, Carbon 14, than is found on Earth or in meteorites from elsewhere in the solar system, reports Dr. Ponnamparume.

The scientists found traces of porphyrins, the basic structural molecule of chlorophyll, but these could be from the rocket exhaust.

Since carbon is the third most abundant element in the solar system, more carbon will probably be found in samples taken below the lunar surface, says Dr. Ponnamparume. Three billion years of solar particle and meteorite bombardment probably has converted most of the surface carbon into volatile compounds, which have "blown away" in the solar wind.

Scientists found ten times more carbon at the bottom than at the top

of the one-foot core sample taken at the Apollo 12 landing site.

"Some of the organic compounds which are building blocks of life probably will be found on the Moon," says Dr. Ponnamparume. "However, it now seems unlikely that this process ever proceeded very far."

DRY MOON

Moon Seems Dry, Differentiated, and Low in Oxygen-Dr. Klaus Keil, University of New Mexico, Principal Investigator, Drs. Theodore Bunch and Kenneth Snetsinger, Co-Investi- gators, Ames Planetology Branch.

The moon has been very dry probably for billions of years. Substantial differentiation of lunar material into various minerals has occurred, almost certainly through internal melting. Oxygen was less abundant when the Moon rocks formed than at the time similar rocks were formed on Earth, report the Ames-U. of New Mexico group.

The group discovered two new extraterrestrial minerals, one a titaniumchromium oxide, which they named titanochromite. The other is an iron-magnesium-titanium oxide (Fe,Mg) Ti₂O₅, to be named in the near future.

They concluded that meteorites have been largely vaporized by their impact on the Moon and lost into space because they found only about one percent of meteoritic material in the lunar soil.

The scientists identified some 20 minerals. These ranged from native iron to complex silicates, in roughly the same categories as Earth minerals.

There was no evidence of hydrous (water-bearing) minerals either in rocks originating at Tranquility Base, or in rocks believed to have been transported there by ejection from meteorite craters elsewhere on the Moon.

Since most of the rocks were 3.5 billion years old, the group inferred that the moon has been dry that long.

They found some rocks poor in silicon (one of the two principal ingredients in most continental Earth rocks), and other rocks similar to feldspar with silicon content as high as 50 percent. This proves substantial differentiation, almost certainly due to melting of the Moon.



NASA ADMINISTRATOR . . . Dr. Thomas O. Paine visited Ames last week to present in person the essential features of NASA's FY 1971 Budget. Following his talk Dr. Paine met with members of the Bay Area news media and discussed with them the Center's role as the space agency changes to broad programs of the 1970's. Dr. Paine is pictured here at the news conference.

Body Wastes Converted Into Food

Methods of processing the principal body waste from food (carbon dioxide and water) into palatable new food appear to have promise for long range duration space missions. The methods also may apply to food problems on Earth.

The processes, under development at Ames, turn the carbon dioxide and water vapor breathed out, and water recovered from the urine, into sugars and the sugar-like food, glycerol. Carbon dioxide and water are about 85 percent of the waste products of food eaten. The processes use only a series of chemical reactions. This work is being conducted by Dr. Jacob Shapira, Ames biochemist.

ENZYMES

Dr. Shapira is also working with Dr. John Billingham, Chief of the Ames Biotechnology Division, on the use of enzymes in the purification of sugars.

Rats have done well on diets containing large amounts of both the glycerol and the sugars. College students have been well-nourished by a diet containing quantities of glycerol alone.

It is probably feasible to feed humans a diet consisting of 85 percent sugars and glycerol with appropriate supplements of fat, pro-

tein, vitamins, and minerals, says Dr. Shapira.

Work is underway at Ames, and under a grant from Ames at Worcester Polytechnic Institute, Massachusetts, to develop a system able to make the chemical foods under space conditions, including weightlessness. Two industrial firms also are working on the system under contract to Ames.

SPACE STATION

Such a system could reduce food deliveries to an orbiting space station. Since 50 to 100 pounds of launch vehicle are required for each pound of payload on such missions, the weight savings are of major importance.

The processes convert carbon dioxide and water (up to 90 percent of the waste products of food eaten) into formaldehyde (HCHO). The formaldehyde then is converted into a family of sugars, and into simpler substances (trioses). The sugars are purified to be eaten as sugar. The trioses are treated with hydrogen to make glycerol.

Glycerol is a simple sugar-like substance, and makes up a small percentage of normal diets. It is sometimes fed in large quantities to

(Continued on Page 2)

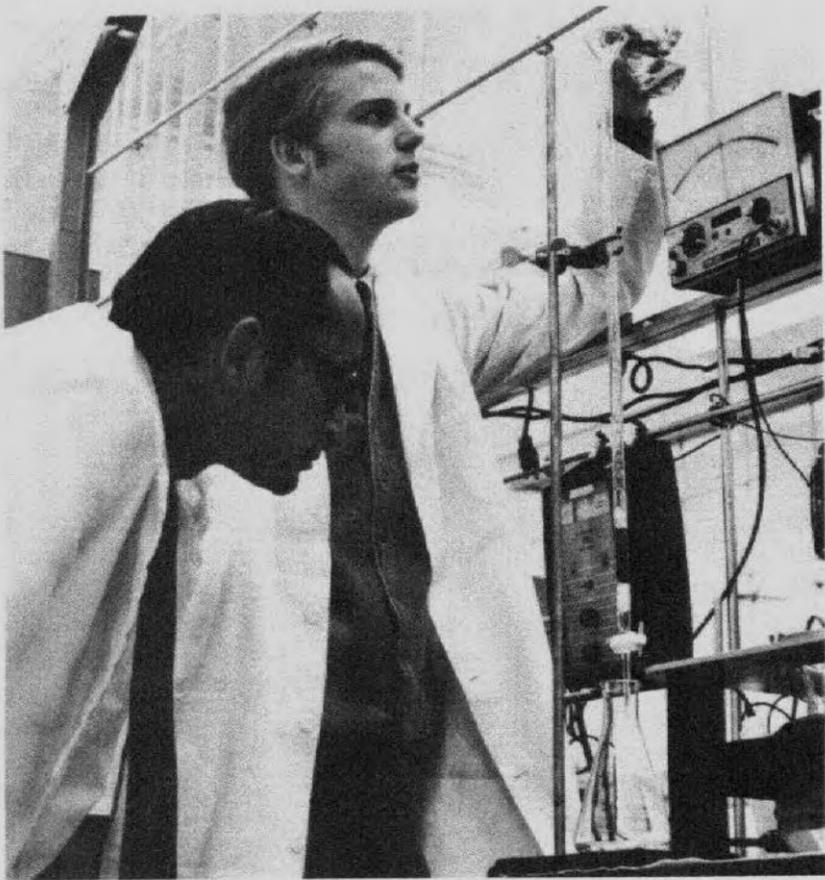
Ames Hosts National ION Space Meeting

"Space Navigation--Theory and Practice in the Post Apollo Era," is the theme of the National Space Meeting of the Institute of Navigation (ION) which Ames will host Feb. 17-19.

The Institute of Navigation, headquartered in Washington, D. C., was founded in 1945 in order to establish a common meeting ground for all of those who are professionally concerned in the science and art of navigation. The Institute encourages research in navigation and helps establish uniformity of practice in operations and education.

The Space Symposium is under the General Chairmanship of E. V. Stearns of Lockheed; Technical Chairman is Jules I. Kanter, NASA Headquarters; and Gerald L. Smith,

(Continued on Page 3)



STUDENT RESEARCHER . . . Lon Tidwell (right) is pictured as he worked with Dr. Jacob Shapira (left) of the Ames Environmental Control Research Branch, on his project the synthesis of sugars from metabolic products during long range space missions.

Student Gives Paper at Scientific Meeting

Lon W. Tidwell, a senior at Peterson High School and a participant in the 1968-1969 Ames Student Space Biology Research Program, presented a technical paper recently at the Twelfth Annual Meeting of the Western Pharmacology Society held at the Hilton Inn in San Diego.

The paper, entitled "Extraction of Some Components of Formose Mixtures by Enzymatic Methods," was coauthored by Jean Lecocq and Herbert B. Chermisde of the Institute of Chemical Biology, University of San Francisco, and Dr. Jacob Shapira of the Ames Environmental Control Research Branch.

The researchers reported in the paper that preliminary experiments have shown that it is possible, by making use of the hexokinase reaction, to extract some specific sugars from the complex synthetic formose sugars. The formose sugars are complex, polyols, and related materials obtained from the self-condensation of formaldehyde in the presence of various basic catalysts, generally calcium hydroxide. Their compositions, which may vary according to the conditions of the condensation, have been the subject of many studies, and their possible use as a food in a closed life-support system has been considered.

GIFTED STUDENT

Mr. Tidwell has been working with Dr. Shapira on the synthesis of sugars from metabolic products for

well over a year. He was one of twenty-five gifted high school student scientists from the local area selected to take part during the 1968-1969 academic year in a research-oriented program conducted at Ames. The program was so successful that five students were chosen to receive scholarships to continue research at the Center during the summer of 1969. Mr. Tidwell was one of the five selected.

The Student Space Biology Research Program was established by the Life Sciences Directorate with the Educational Services Office of Public Affairs, in cooperation with the Santa Clara County and San Mateo County high schools, for students who demonstrate interest and proficiency in life science oriented research.

Now in its second year, the program, which is directed by Dr. Cyril Ponnampereuma, Chief of the Chemical Evolution Branch, is offering to a new group of science students the opportunity to work with an Ames scientist in a program mutually acceptable to both. Throughout the school year students devote a minimum of five research hours each week at Ames during the normal workday and attend weekly seminars conducted by members of the Life Sciences research staff. And it was because of this program that Lon Tidwell, a high school senior, was able to take his place in the scientific community and present the results of his research.

Major Ames Paper at AIAA Meeting

One of the major papers given at the Eighth Aerospace Sciences Meeting of the American Institute of Aeronautics and Astronautics (AIAA) held recently in New York City was authored by Ames research scientists Lionel L. Levy, Jr. and Murray Tobak of the Hypersonic Aerodynamics Branch.

The paper, presented by Mr. Levy at the session on Atmospheric Flight Mechanics 2, was entitled "Non-linear Aerodynamics of Bodies of Revolution in Free Flight." In the paper the authors discuss a non-linear aerodynamic moment system formulated for arbitrary motions of bodies of revolution in free flight. The total moment is shown to be compounded of the sum of contributions from four simple motions and a clear physical meaning is attached to each contribution.

Elliot D. Katzen, Chief of the Hypersonic Aerodynamics Branch, was chairman of a session on Entry Vehicles 1--Thermal Protection of Entry Vehicles. At this session a paper on "Heat-Shield Ablation at Superorbital Entry Velocities", co-authored by John T. Howe of the Thermal Protection Branch, and Eugene P. Bartlett and William E. Nicolet of the Aerotherm Corp. in Mt. View, was presented. In this paper the authors presented solutions for the ablation of various heat-shield materials subjected to superorbital entry conditions.

WASTE TO FOOD (Continued from Page 1)

people with metabolic problems.

Glycerol was chosen as a very promising food after a survey of many simple nutrients. It can be produced with the lowest temperatures, the lightest equipment, the fewest side reactions, and the least energy per pound of food.

Problems remain to be solved in purifying the sugars, which have a range of chemical structures. The edible sugars must be separated from those which have produced diarrhea and other difficulties in animals.

However, the Ames researchers are attempting by use of enzymes to separate out pure glucose, a highly nutritious food. The scientists also plan to devise ways to convert the glucose to starch to make food items.

The GARD Corporation has a contract to improve the carbon dioxide to formaldehyde process. Esso Research and Engineering is working on conversion of formaldehyde to glycerol.

Ames Hosts Science Teachers Conference

In cooperation with the Jet Propulsion Laboratory (JPL) and the National Science Teachers Association (NSTA) Ames was host last week to some 65 teachers representing 34 colleges and universities on the west coast and from as far east as Florida and Maryland.

Sponsored by the Committee on College Teachers Services of the NSTA in cooperation with participating organizations, four regional sessions have been planned for the year. Two to be held on the west coast and two on the east coast.

All sessions are planned to update college science teachers on developments in recent space and educational research which may be significant for introductory college science courses. The conference at Ames was under the direction of the Educational Services Office and emphasized new scientific information obtained from recent space research projects. Also stressed at the conferences is the interdisciplinary aspects of science as it can be illustrated by techniques and results of space research.

The conferees were welcomed to the Center by C. A. Syvertson, Ames Deputy Director; Dr. Al Eiss, Associate Executive Secretary, NSTA; and Garth A. Hull, Ames Educational Services Officer.

Guest speakers for the two-day conference and their topics were: Dr. William L. Quaide, Planetology Branch, "Lunar Geology -- Apollo Results"; Dr. A. R. Hibbs, Senior Staff Scientist, JPL, "The Exploration of Mars"; Vance I. Oyama, Life Detection Systems Branch, "Methods for the Elucidation of Viable Forms from the Lunar Sample"; Dr. Hans Mark, Ames Director, "The New Astronomy"; Dr. Dean R. Chapman, Thermo- and Gas-Dynamics Division, "Tektites"; and Dr. Cyril Ponnampereuma, Chemical Evolution Branch, "A Search for Organic Compounds in the Apollo 11 Lunar Sample."

At a small group discussion chaired by Dr. Eiss the subject was "Implications for College Science Teachers and Ways of Improving College Science Teaching."

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Editor Dot Evans
Reporters NASA Employees

Deadline for contributions:
Thursday between publication dates

Personnel Corner

Question. I am a civil employee of the Federal Government. If I am injured in the performance of duty, am I entitled to workmen's compensation benefits?

Answer. Yes. You are entitled to the benefits provided by the Federal Employees' Compensation Act.

Question. What is the Federal Employees' Compensation Act and how is it administered?

Answer. The Federal Employees' Act is a law to provide compensation for disability and death, medical care, and rehabilitation services for all civilian employees and officers of the United States who suffer injuries while in the performance of their duties. It is administered through the Bureau of Employees' Compensation of the U.S. Department of Labor under a delegation of authority from the Secretary of Labor. The act has provided relief for injured Federal employees for half a century since its enactment September 7, 1916. It is in effect a valuable insurance program which every Federal officer and employee should understand.

Question. If an employee is injured at work, what must he do to be eligible to receive the benefits of this law?

Answer. An employee injured at work should follow several simple rules required by the compensation law and the regulations of the Bureau:

(a) He should report his injury immediately to his supervisor and obtain first aid at the dispensary;

(b) If further medical treatment is needed, he should obtain an order from the dispensary for treatment by an authorized physician or hospital;

(c) He should make a written report of his injury within 48 hours on the Bureau's Form CA-1 which may be obtained from his supervisor. If such form is not available, a written report stating the name and address of the injured employee, the date, hour, when, and the place where the injury occurred, and the cause and nature of the injury is acceptable. The report must be signed by the employee or person reporting on his behalf.

Question. Suppose a minor accident occurs at work, say a scratched finger or bumped knee, is it necessary to report it?

Answer. Yes. Report all injuries. Too often so-called minor injuries develop into serious conditions. It is important that you and your family be protected. Ask your supervisor for Compensation Form CA-1 on which to make this report. Complete this form promptly and give it to your supervisor.

Question. What right do I have to

GROUP INSURANCE CHANGES

The U.S. Civil Service Commission has approved the following changes in premium groups for optional insurance, effective with the first pay period in April 1970

Old Rates		New Rates	
Age Group	Bi-Weekly Rate	Age Group	Bi-Weekly Rate
Under 35	\$3.00	Under 35	\$ 1.30
35-54	\$6.00	35-39	\$ 1.70
		40-44	\$ 2.40
		45-49	\$ 3.60
		50-54	\$ 5.50
55 or over	\$20.00	55-59	\$17.00
		60 or over	\$19.00

There will be no January increase in premiums for employees who reached age 35 or 55 in 1969.

There will be a Federal Employees Group Life Insurance Open Season during the month of March 1970 during which employees will have an opportunity to obtain regular insurance coverage as well as the additional optional insurance.

New Procedure Speeds Delivery of Periodicals

Periodical subscriptions for retention by Ames employees have been renewed for 1970. Under a new plan such periodicals will now be addressed directly to the subscriber rather than being issued through the Library Branch contractor facility.

According to the library staff this new procedure should speed delivery of each issue by at least one day, but may cause minor problems since only the recipient will know if an individual issue is not delivered or if a subscription is unduly delayed or interrupted.

If you are receiving your subscriptions a little faster, the library staff is pleased. If you are not, and are having difficulties, please call Martha Gustavson or Diane Lively, Massey Technical Services, 964-1295 or 964-1296.

Mail stop changes should be reported to the Mail Room on ARC Form 156, but also notify one of the above named individuals, mail stop 202-17, so that they can have the address changed on periodical subscriptions.

medical care and how do I get it?

Answer. If the injury was sustained at work, you are entitled to first aid and full medical care for the effects of your injury, including hospitalization, without cost to you. Request your supervisor for prompt medical care. You must use the Government medical facilities and designated private physicians provided.

Further information concerning the subject of work injury benefits will be given in forthcoming articles in this column.

Armchair Travelog on British Columbia

Ames employees and their families are invited to view movies and slides of hunting, fishing and travel in British Columbia on Thursday evening, February 19, at 7:30 p.m. in the Ames Cafeteria.

Two 16 mm. sound films entitled "Tight Lines" and "Land of the Red Goat" will be followed by a showing of slides from the personal collection of Frank Lolich, a hunting and fishing guide. The slides are an account of fishing and big game hunting in Cariboo Country around Williams Lake and Lake Quesnel, B. C. Mr. Lolich will provide commentary and answer questions during and after the showing.

For further details call Larry Graham, ext. 2252.

ION MEETING
(Continued from Page 1)

Theoretical Guidance and Control Branch, is in charge of arrangements at Ames. Scientists from throughout the country will meet here to examine the progress made to date in space navigation. Four technical sessions will be held with space navigation the central theme of each. At Session II, "Space Navigation Near Future," Thomas M. Carson of the Theoretical Guidance and Control Branch will give a paper entitled "Navigation Near the Moon by Means of Lunar Based Beacons."

Beside the technical session there will be distinguished speakers featured at two luncheons in the Ames Cafeteria and at the symposium banquet. These will be open to all interested persons, whether or not they attend the technical sessions.

DR. EGGERS

Dr. Alfred J. Eggers, NASA Assistant Administrator for Policy, will be the guest speaker at the banquet which will be held at the Cabana Hotel, Palo Alto, at 7:30 p.m. on Wednesday evening, February 18. The subject of his talk is "Space Challenge of the 1970's". Toastmaster for this affair will be Dr. Harry Goett of Philco-Ford.

The guest speaker at the 12:30 luncheon on Wednesday will be Maxwell W. Hunter, III of Lockheed in Sunnyvale. The subject of his talk is "Space Shuttle--A New Era in Transportation." At lunch on Thursday, the 19th at 12:30 p.m., Dr. Dan Debra of Stanford will talk on "Drag-Free Satellites." Anyone interested in attending any of the meal functions may contact Mr. Smith, extension 3022.



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NASA - AMES RESEARCH CENTER

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Please send me _____ tickets At \$ 2.40

Date March 8 Time of performance 8 p.m.

My check for _____ is enclosed.

Name _____

Address _____

City _____ State _____ Zip _____

Please enclose remittance and a stamped self-addressed envelope.

All ticket requests must reach theatre by Monday, March 2 day and date

and tickets will be mailed by Monday, March 2.

Note:

Do not use this form unless your chairman has notified you of a set date.

For Theatre Parties, Groups and Student Shows call:

Group Sales 296-1263 Weekdays 9 a.m. - 4 p.m.

Ames Airings

... by Jane Kohler

Ed. Note: A holiday weekend is coming up. Anyone going on a fun vacation is asked to send the news to Jane, N-241-4.

ED GOMERSALL (MAD) received his private pilot's license in a Cessna 150 on January 24. Ed has been working towards this goal for one year and wishing for it for a much longer time. Congratulations, ... STEVE (Fluid Mechanics) and VICKI (Services and Supply) DEWERT recently spent three days of glorious skiing at Heavenly Valley. They said there was fresh powder snow every day and the view and weather were great. For Vicki it was her second time skiing but she managed to master the snowplow, which is a good thing, too. As a couple of novices (Steve is more or less of a beginner also) they got confused on directions and found themselves on an expert slope. They came down slowly but they did make it. Another of Vicki's triumphs was learning to get off the chairlift without falling. It was a great deal of fun for both and now a very bad ski bug has them as a result of the trip. . . DAVID SHARPE (AARL), his wife, Carolyn, and their three children recently drove to Canton, Illinois, taking the southern route to avoid the snow, to visit both sets of grandparents. The children and parents alike enjoyed playing in the snow; however, they parked their car while in Canton and let others do the "snow driving". Daniel Sharpe, 15 months old, after one sled ride, which ended in a cold bath in the snow, babbled something equivalent to "I can hardly wait to get back to sunny California". . . BARBARA GOFF (AARL) recently visited with relatives on a ten-day trip to Pontiac Lake, Michigan and then flew to Ellisville, Missouri for a few days visit with her sister and family. It had snowed quite a bit in Pontiac Lake so there was ice skating on the lake and long walks in the beautiful falling snow. In Ellisville, since Barbara's sister lives on a ranch, they had lots of fun horseback riding and attending local events. . . MILLIE MEDINA (typing pool) was honored last Friday at a farewell luncheon at the Estrellita Restaurant in Los Altos by her fellow workers. Millie is transferring to another Federal Agency. . . The engagement of MARTHA GARCIA (Graphics and Exhibits) to MOSES PARDO (Transportation) was announced recently by Martha's parents, Mr. and Mrs. Apolonio Garcia of San Jose. A summer wedding is planned.

BOWLING

... by Clark White

Current standings of the All-Ames Bowling League are:

DIVISION I	WON	LOST
Comets	9	3
4NI	9	3
Glitches	9	3
Keggers	8	4
Machine Shop	7	5
Road Runners	4	8
Splitters	2	10
Owls & Pussycats	0	12
DIVISION II		
Sterling Engineers	9	3
Killers	8	4
MAD	8	4
Hit & Mrs.	7	5
Double Trouble	6	6
Woodchoppers	4	8
Timber Topplers	4	8
Wal-Nut-O's	2	10

Bowled February 4:

Men's high series: Ernie Muselman, 618; Lou Polaski, 590; Dean Jaynes, 580; Howard Garrison, 542; Tony Astalfa, 537.

Women's high series: Ina Rathert, 486; Jan Konrath, 477; Jeanne Clemson, 477; Pauline Polaski, 465; Betty Rupp, 462.

Men's high games: Howard Garrison, 230; Lou Polaski, 228; Ernie Muselman, 224; Carl Roach, 212; Bill Ross, 211.

Women's high games: Pauline Polaski, 188; Ina Rathert, 183; Jeanne Clemson, 169; Betty Rupp, 169; Jan Konrath, 168.

SOFTBALL

Those interested in playing on the NASA-Ames Softball Team please contact Bruce Ganzler, ext. 2748.

BASKETBALL

... by Phil Wilcox

The second half of the Ames basketball season is well under way and there have been some surprising results. The Beer Barrels won their first games by defeating the Madmen with a score of 36 to 32.

Results of the Feb. 5 games:

BCA	37	Beer Barrels	35
Jets	41	Madmen	31
Pumas	41	ARO	16

Team standings to date:

	WON	LOST
Jets	6	1
BCA	5	2
Pumas	5	2
Madmen	3	4
ARO	1	6
Beer Barrels	1	6

Next games are Feb. 19 at Sunnyvale High gym starting at 7 p.m.

Joggers Interest and Activity Growing

Walkers and joggers wishing to improve their general health hold discussions every two weeks in the EIB conference room at 12 noon, usually every other Friday. Due to many questions concerning equipment and health the first instruction session on the proper way to walk and jog will be held Tuesday, Feb. 17 at 12 noon in the Life Science conference room, Bldg. 239. In addition to the meeting and lectures on general health, Dr. John Greenleaf will help start this beginning group in a gradual improvement program.

Although there is now emphasis on competition, it is interesting to note that there was Ames representation in eight A.A.U.-sanctioned track meets this past year. The toughest 20-mile cross country run in the U.S. found Ted Passeau (EIB) placing 51st and Paul Sebesta 66th out of nearly 100 bay area distance runners. The race coursed through the Woodside hills with a 800 and 2000-foot pitch to be climbed and descended.

BEACHCOMBERS CLUB: The 1970 Beachcomber Club cards for special benefits at the Santa Cruz Beach and Boardwalk are now available for distribution.

GOLF

... by Kay Bruck

Contrary to the usual soggy beginning of each golf season, last Saturday's best ball two-some tournament was played in a glorious blaze of sunshine and balmy weather at the San Jose Municipal Golf Course. The tournament co-chairmen, Jack Lee and Russ Cravens, reported the following winners:

First flight: Paul Barisich and Otto Meckler, first place; Jim Rountree and Herb Hoy, second place; and Bob Carlson and Spencer Shaw, third place.

Second flight: George White and Espie Rowe, first place; Yukio Asato and Ron Denison, second place; Jim Silver and George Falkenthal, third place.

Third flight: Yvonne Sheaffer and Dave Sinnott, first place; Tom Polek and Paul Kutler, second place; and Fred Wirth and Ruth Richardson, third place.

The next Ames tournament will be at Oak Ridge on March 14 (Only 56 spaces allowed so sign up quickly). A flyer regarding the match tournament schedules (to begin in March) will be sent to all golf members.

WANT ADS

For Sale-1969 MGB Roadster, 6 mo. old, radio, heater, 155x14 rs Dunlop radial, standard wire wheel, less than 12,000 miles, (never been raced), will sacrifice for \$2600 or \$100 down and take over balance of \$2500. Call 293-6486 after 5:30 p.m.

For Sale-63 Falcon 'Futura', 6 cyl., excellent condition, \$480. Panasonic 4-Band All Wave portable radio, \$65. Call 961-7431 after 6 p.m.

For Sale-64 Chev Mal. SS, 66 trans. & carb. \$700. Below low blue book. Call B. Chin, 736-3925 after 6.

For Sale-1964 Pont. LeMans, power steering, automatic, V-8, air, Call 964-3415 7 to 8 p.m.

For Sale-1967 Ford Falcon, 2 dr., 6 cyl., std. trans., safe-size economy car in excellent condition. Asking Low Blue Book, \$1000. Call 961-3348.

For Sale-68 Corvette Coupe, four speed trans., p. steer., p. windows, p. brakes, fact. air cond., position, tinted windshield, excellent condition. Call 245-6972 after 5 p.m.

For Sale-67 Chev. 1/2T pickup, V8-283 eng., 4 spd., 5 ft. side, custom cab, h. d. springs, camper equip., radio, western mirror, Barden bumper, extra wheels for rear with wide hi floatation tires, low mil, \$1595. Will take older truck in trade. Call 356-9695.

For Sale-1961 Ford F100 pickup, V8, radio, heater, power brakes, good tires, aluminum camper shell, \$725. Call Ray Duke, 252-0386 after 5 p.m.

For Sale-Tire chains, \$10. Never out of box, for tire sizes 5.90-15, 7.00-13, 6.40-14, 6.50-14, 6.95-14, 165-15, 145-400, 6.00-15, 6.85-15. Call Resnikoff, 241-9833.

For Sale-Dachshund puppy, black and tan, AKC, male, miniature, beautifully marked, lovable disposition, paper trained, \$45. Call Irene Tharpe (Morgan Hill) A.C. 408-779-3022.

For Sale-Basset puppies, AKC, top quality, \$75-\$150, some tri-colored, some brown & white. Call 408-475-4681 (Santa Cruz area).

For Sale-Valentine presents. Lhasa Apso puppies, pure-bred, 8 wks old, good house dogs, excellent with children. Call 246-2687.

For Sale-Intercom system, \$20. Call 323-2080.

For Sale-Tuner/Amp., Sansui 3000A, 120 watts. Also Garrard Lab. turn table, never used, \$80 plus extras. Call 964-3415 from 7 p.m. to 8 p.m.

For Sale-Guitar, harmony, \$40. Call 967-1242 after 5 p.m.

For Sale-10" tilting Arbor table saw, 1 h.p. motor, with stand, excellent condition, \$150. Call 248-1706 after 4 p.m.

For Sale-4 Rattan victorian style chairs, \$3 each. 3 enameled white, 1 painted gold. Call 323-4848.

Wanted-Blue chip stamp books. Will trade S&H green. Call 248-6009.

Wanted-Musicians to play in a band (concert size) 7-10 p.m. Mondays and/or Tuesdays. Call Don Leforge, 293-4010.

Wanted-Rated pilot for membership in Moffett Aero Club, Inc. Inexpensive flying in beautifully restored Interstate Cadet. Call E. Fry, 251-6710.

Wanted-There are two openings for beginners in the N.A.S.A. Flying Club. No investment. Call Don Goodsell, 968-1200.

Wanted-Mattel's Vacuum forming toy. Call Andre Bogart, 867-3347.

Wanted-Car Pool--7:30 shift, want to form or join a car pool from the Cambrian Park area in San Jose. Call Curt Muehl, 2293.

Needle point-(Petit point) work done by hand; charged by the item. Call 734-2539.

Special Discounts Offered to Personnel at Ames

NEW ITEMS:

SEA WORLD: Ames employees can now receive reduced rate tickets to Sea World, on Mission Bay, San Diego, through Sea World's Dolphin Club plan. Under this plan employees may obtain coupons from "The Astrogram" office valued at 75 cents which may be exchanged at the Sea World box office for a reduction on \$3.25 adult tickets.

ARMSTRONG TIRES: Special group purchase plan



the astrogram

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

Pioneer F,G Contract Awarded to TRW

NASA has awarded a contract expected to total about \$38 million to TRW Systems Group, TRW Inc., Redondo Beach, California for the design, development, fabrication, assembly, test and delivery of two Jupiter-bound spacecraft, Pioneers F and G, to be launched in 1972 and 1973. Ames has direct project management under the overall supervision of NASA's Office of Space Science and Applications.

The contract is a cost-plus-incentive-award-fee type with multiple incentives for meeting costs and schedules as well as award fees for management and spacecraft performance.

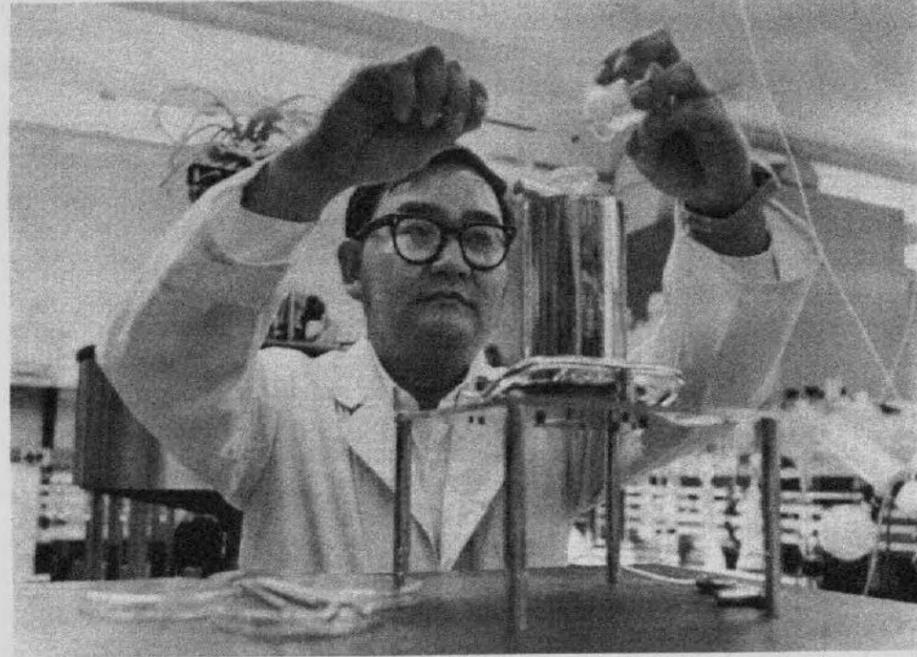
Mission objectives of the two spacecraft include receiving, for the first time, direct scientific information on the interplanetary medium beyond the orbit of Mars; observations of the asteroid belt; and exploration of the environment and atmosphere of Jupiter. In addition, the two spacecraft will make the first close-up pictures of the planet. A secondary objective is to develop the technology for long-duration flights to the outer planets.

The contract is a follow-on to a previous contract with TRW Systems for Pioneers 6 through 9. These four spacecraft, launched in 1965 through 1968 and designed to last six months, are still operating in solar orbits. Pioneer 6 was launched in 1965.

Dr. Reinisch Named Fellow of The AIC

Dr. Ronald F. Reinisch of the Materials Research Branch at Ames has been elected a Fellow of The American Institute of Chemists (AIC).

The AIC has more than 7000 members in 26 chapters throughout the United States and is the only chemically-oriented American organization whose main purpose is to develop the professional and economic status of chemists and chemical engineers. Membership is limited to those whose principal education is in these fields.



VANCE I. OYAMA . . . Chief of the Ames Life Detection Systems Branch, seeks an explanation for the puzzling contradiction of the lunar soil. He is studying samples returned from the Moon by the Apollo 11 astronauts.

Scientist Explains Puzzles of Lunar Soil

Soil from the Moon appears to kill Earth microorganisms, but is known to promote the growth of plants.

An explanation for this puzzling contradiction has been advanced by Vance Oyama, Ames biochemist.

He believes the lunar soil from the Apollo 11 landing site is lethal to Earth microorganisms because the salts in the nutrient media essential for growth of bacteria leach out the various metallic ions found abundantly in the lunar soil. These metals such as titanium, chromium, and nickel are very poisonous to most microscopic life forms.

However, some of these same metal ions are the trace elements needed by many plants. They may account for the surprisingly high growth rates attained by some plants which were grown in the lunar soil, as reported by NASA's Manned Spacecraft Center, Houston.

Strong indirect evidence for the lethal effects of Moon soil on bacteria has come from 3000 experiments by Mr. Oyama, who is the only scientist chosen to look for extraterrestrial life in the lunar sample returned by the astronauts. He and his associates at Ames, Drs. Edward Merek and Melvin Silverman reached conclusions about the nature of the lunar soil while looking for life in it.

They tried to grow microorganisms from their samples of the lunar

material, using 3000 cultures in 300 environments.

The fact that they did not find a single organism of any type while finding metals in lethal concentrations may explain why Moon soil seems to kill bacteria but pushes plant growth, says Mr. Oyama.

The researchers were not surprised to find no lunar organisms in material taken from the hostile environment of the Sea of Tranquility on the lunar surface.

Lunar organisms may yet be detected. But if found, they are expected to be identified in samples taken from at least a yard below the Moon's surface, protected from constant bombardment by meteorites, cosmic and solar particles, and from the lethal ultraviolet light of the sun.

However, the researchers were extremely surprised to find no contaminating Earth microorganisms since countless numbers of them are everywhere, and contamination by these organisms was expected to be the principal problem in doing the experiments.

For example, the astronauts' space suits spew out a thousand microorganisms a minute. Millions of microorganisms coat every person and every object on Earth.

Despite extreme precautions, the scientists had been sure they would find Earth organisms in the Moon dust, traceable either to the

President Cites Three from Ames

The modification of a test pilot's G-suit for a hospital patient suffering internal hemorrhaging has resulted in a commendation letter from President Nixon for member of the Ames staff, Dr. Alan Chambers and Hubert Vykukal of the Environmental Control Research Branch, and Richard Gallant of the Flight Operations Branch.

In the letter Mr. Nixon cited the three men for the timely and effective manner in which they modified the G-suit and for "... your excellent work. I understand the pressure suit was effective and the patient has resumed her normal activities. I know that you look forward with me to the results of further research into the use of pressure suits in the medical field.

"It is a pleasure to congratulate you and your associates on this successful innovation and to wish you continued success in the days ahead."

The letter is the result of President Nixon's program to recognize outstanding contributions by both individuals and organizations made in the general improvement of life in the United States.

astronauts or to the spacecraft interior.

Instead, they found "life-like colonies" of metals around the grains of Moon material. These were metal ions exchanged for salt ions from the growth medium. They were identified by two chemical tests and by atomic absorption tests.

Why don't Earth soils kill Earth bacteria?

"Because the poisonous metal ions have been leached out during millions of years of rain and flow of nutrient solutions in the ground," explains Mr. Oyama.

So far there is no evidence of any water ever having been on the Moon, he adds.

Any life on the Moon, he believes arrived there from somewhere else embedded in meteorites. This is the

(Continued on Page 4)

Mr. Hansen to Give Paper in Europe

Q. Marion Hansen, Chief, Vehicle Guidance and Control Branch and Manager of the Solar Pointing Aero-bee Rocket Control System (SPARCS) Project is enroute to Toulouse, France, to present a paper and film on advanced developments for SPARCS at the Third International Federation of Automatic Control (IFAC) Symposium on Automatic Control in Space to be held March 2-6. Co-sponsor of the symposium is the International Astronautical Federation (IAF).

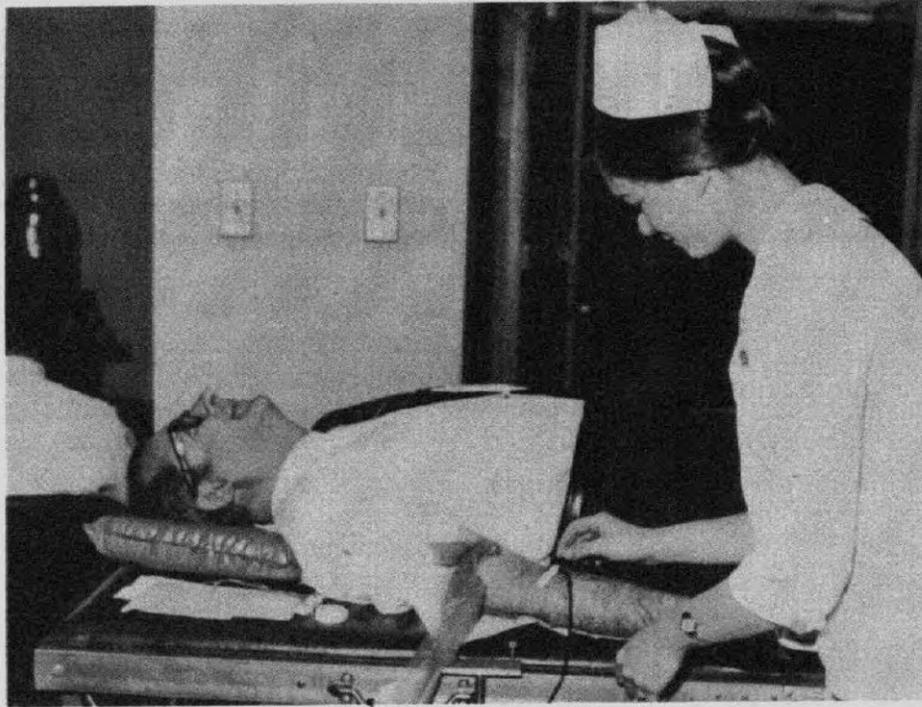
The success of the Ames developed SPARCS system, including nine flights to date, has aroused a significant amount of international interest. One of the two leading competitors for the original development of SPARCS was Elliott Brothers, near London. SPARCS V is now being built for the Canadian Black Brant V with the first launch scheduled for next December. The Swiss are considering using SPARCS to control payloads for their Zenit Rocket, which is launched from Sardinia, Italy. In addition, plans are now being made to fly SPARCS with payloads being developed in Hawaii. The low cost and versatility of sounding rockets has resulted in wide use throughout the world for conducting astronomical observations in space.

To further develop international interest and to discuss technical approaches and problems for rocket attitude control systems, Mr. Hansen will be visiting with technical contacts in several organizations which are now flying sounding rockets.

TECHNICAL PAPER

At the IFAC Symposium, Mr. Hansen will present a paper entitled, "A Gyroless Control System for Sub-arc-second Solar Pointing of a Sounding Rocket Payload," which he coauthored with Edward A. Gabris, Assistant SPARCS Project Manager, and Stanley J. Rusk, SPARCS Project Manager, Lockheed (Sunnyvale). He will precede his paper with a film on the development of SPARCS which was produced at Ames and is available from the film library. Symposium papers and verbal presentations will be simultaneously translated into English, French, and Russian. Mr. Hansen's paper has also been selected for publication in the September issue of the AFAC Journal, "Automatica".

The paper discusses several advanced concepts which are unique to SPARCS. The concepts use relatively simple electronics and pneumatics to provide attitude control from despin through sub-arc-second



BLOOD DONOR . . . NASA Administrator, Dr. Thomas Paine, kicks off the 1971 blood drive by donating the first pint at Headquarters. Ames employees will have an opportunity to do their part for the blood drive when the Santa Clara County Bloodmobile visits the Center on Friday, March 6, from 9 a.m. to 1 p.m. According to staff members of the County Blood Center there is an urgent need for blood and all who can donate are asked to sign up now, or call ext. 2411 for an appointment. Employees are reminded that blood on at the County Blood Center is available to all Ames personnel and members of their immediate family, regardless of whether or not a donation has been made.

Dr. Philpott Elected

Dr. Delbert Philpott, Experimental Pathology Branch, has been elected Director of Biology on the Executive Council for the Electron Microscope Society of America. At present he is serving as vice president of the Northern California Society of Electron Microscopy and is the president-elect for next year.

pointing without the use of rotating components, such as gyros and inertia wheels. New pneumatic concepts for SPARCS include the use of Fluidic Proportional Thrusters, Differential Pulse Width valve drive electronics, and a Variable Pressure Regulator with adaptive control electronics.

A patent is pending for the Fluidic Proportional Thruster (FPT), which was originated by Dean M. Chisel of the Vehicle Guidance and Control Branch. Two fluid systems, designated SPARCS IV, are now being built using the FPT.

The Lockheed-originated Differential Pulse Width valve drive electronics are now being built into four flight systems, designated SPARCS II. Modular construction allows an easy interchange of electronics and pneumatics between SPARCS II and SPARCS IV.

Library Circulation Procedures Change

The procedure for checking out materials from the Ames Main Library has been changed effective this month. All library materials are now being loaned to employees for a definite period of time rather than for vague, indefinite periods as in the past.

There are several reasons for the procedural change and among them are the suggestions made by those who responded to a recent Center-wide survey on library services.

The new procedures will have virtually no effect on the way in which material is circulated by the Life Sciences Library, but as a result of the change the two library facilities at the Center have been brought into uniform practice.

Procedures for ordering "branch copies" of books have not been changed. Such copies will not be circulated by the library and will have no due date. Procedures for purchase of "retention" books within the Life Sciences Directorate also remain the same.

Those persons who have "circulation copies" of books from the Main Library are asked not to return them en masse because of limited shelf and storage space. As space becomes available a call for their return will be made. For details call the Library, ext. 3312.

FPC Scholarships Announced

The Federal Personnel Council of Northern California has announced the establishment of the ninth annual college level scholarship fund. As in the past the scholarships are for children of Federal employees, and has been extended to include youth hired under the President's Stay-in-School Program

CONTRIBUTIONS

As a result of the generous contributions from participating agencies and employee organizations, the Council will be able to grant at least two or more awards. Winners will be announced in May.

The one-year scholarships for outstanding high school graduates will be paid to the winners upon their enrollment in any authorized course of study in a recognized junior college or accredited college or university, public or private.

To be eligible, the applicant must be a son or daughter of a career civilian employee presently employed in a Federal agency located in Northern California; or a son or daughter of a retired or deceased employee who had been a career civilian employee of a Federal agency in Northern California; or must be currently employed in a Federal agency in Northern Calif. under the Stay-in-School program; or must have been employed during the summer of 1969 under the YOC program; and must be a high school senior graduating in January or June 1970.

The \$350 scholarship will be based on scholastic ability (from high school records and results of scholastic aptitude tests of the College Entrance Examination Board); leadership potential (from an autobiography and letters of endorsement from references and teachers); and a 1200-word essay based on "The Role of Youth in Meeting the Challenge of Today."

Deadline for making application for the scholarship is April 1. Applications forms may be obtained by contacting Mrs. Evans or Mrs. Kohler, Room 134, Admin. Mgt. Building, ext. 2385.

The Astrogram

Room 134
Admin. Mgt. Building
Phone 2385

The Astrogram is an official publication of the Ames Research Center, National Aeronautics and Space Administration, Moffett Field, California, and is published bi-weekly in the interest of Ames employees.

Editor Dot Evans
Reporters NASA Employees

Deadline for contributions:
Thursday between publication dates

Personnel Corner

The Director of the Regional Office of the U.S. Civil Service Commission has asked all Federal agencies throughout the region to encourage Federal employees to make use of agency personnel offices in case of need for information or assistance. The commission's staff continues to receive a large number of inquiries, primarily phone calls, but also visits, from Federal employees on routine personnel matters which can be answered by agency personnel offices. It is the Commission's view that they can make a better contribution to Federal employees if they can concentrate their efforts on the more unusual or complex questions rather than on routine questions which can be answered locally.

ON-THE-JOB INJURIES

To follow up on the last article in the "Personnel Corner" concerning on-the-job injuries, some new procedural information has been received directly from the San Francisco office of the Bureau of Employee Compensation (BEC).

All injuries occurring between 8:00 a. m. and 4:30 p. m. should be reported immediately to the supervisor and to the Ames Health Unit (Dispensary).

Completion of Form CA-1 is not required as long as the injury has been reported to the Health Unit and documented in the employee's medical file.

Injuries occurring after the above hours requiring outside medical treatment will require completion of a CA-1.

The Employee's Report of Injury (CA-1) must then be completed at the Health Unit at the beginning of the next shift (swing) or the end of the next shift (grave).

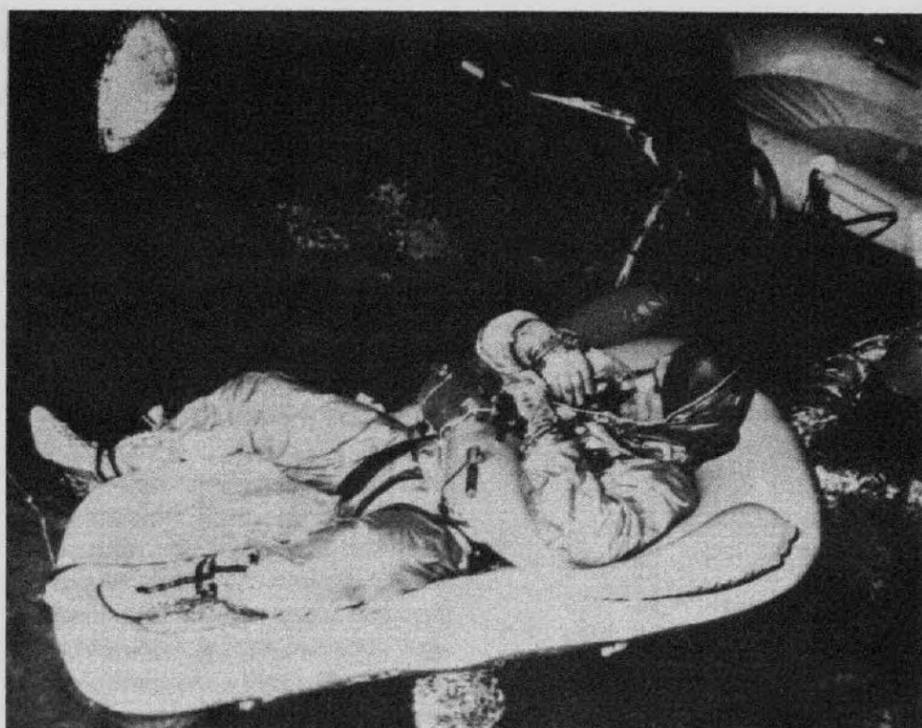
Because of manpower shortages the BEC is frequently delayed in reimbursing employee hospital medical bills. If an employee receives a collection notice from a hospital relating to a BEC claim he should contact John Habermeyer on extension 2988.

If there are any questions regarding the above, please call the Health Unit at Ext. 3036.

Special Discounts Offered to Personnel at Ames

NEW ITEM:

AUTOMOBILES: Buy on lease any new automobile at fleet prices from Rancar Inc., Los Altos. All makes available. Discount offered to Ames employees starts at \$175 over dealers cost.



LIFE RAFT . . . Astronaut Richard F. Gordon, Jr., Command Module Pilot on Apollo 12, undergoes training in the life raft developed by NASA. Robert J. Perchard of Bourne, Mass., as an individual entrepreneur, has obtained an exclusive, royalty-free patent licensd from NASA to manufacture and sell the raft.

Tragedy Spurs Man's Search For Nautical Survival Gear

A man who lost his aviator son at sea and has since dedicated himself to the development of water accident and survival equipment, plans to market the special life raft carried aboard all U.S. manned spacecraft.

His long search for equipment that might have saved his son's life ended with the discovery that NASA holds a patent for just such a life raft.

Now Robert J. Perchard of Bourne, Mass., as an individual entrepreneur, has obtained an exclusive, royalty-free patent license from NASA to manufacture and sell an inflatable life raft developed for use in the manned space flight program.

The inflatable, non-tippable raft with a radar reflective surface was developed by NASA during 1959-61 for the future needs of astronauts' safety. The raft, not yet on the commercial market, was part of the personal survival equipment aboard all NASA manned spacecraft vehicles in the Mercury, Gemini and Apollo programs.

PATENT

NASA applied for a patent Sept. 5, 1962, and the patent was issued Nov. 11, 1964.

Under NASA patent policy the agency can grant an exclusive royalty-free license if the commercial use of the invention has not occurred within two years after the patent was issued.

Perchard became interested in developing a new type of life raft

several years ago when his son, Lt. Robert Anthony Perchard, was lost off the coast of Alaska during a Coast Guard air rescue mission in 1964. Commander Edward L. Murnane, U.S.C.G., a pilot in the Air Rescue Service, who took part in the search for the missing plane, became close friends with Mr. Perchard.

Cdr. Murnane and Perchard then concentrated on the development of survival equipment, particularly equipment to locate individuals lost at sea. Their search of technical literature on the subject led to the NASA-owned patent for the life raft.

Pursuing the matter, Perchard obtained the exclusive license with the understanding that he will begin early manufacture and sale of the life raft. He has negotiated with Rubber Fabricators, Inc., of Grantsville, W. Va., for the manufacture and Hydro-Space Corp., of Lincoln, R. I. for the marketing of the life rafts.

With its radar reflective surface the raft can be detected easily by ship or aircraft and is non-tippable because of specially designed water ballast containers attached to the underside, and it provides protection from exposure.

While NASA astronauts have practiced repeatedly with this life raft only Scott Carpenter made emergency use of it when his Mercury spacecraft, Aurora 7, splashed down some 250 miles away from the recovery ship in May 1964. He remained afloat for some six hours while the raft was tethered to the spacecraft.

QUERIES ANSWERED

No Plans for Flu Shots

The ARC Medical Office has had numerous inquiries from employees regarding the advisability of being inoculated against influenza. Although there is no reason to advise against your doctor giving such injections, Dr. Stein, Chief of the ARC Medical Office, states that Ames does not plan to immunize its employees.

Influenza viruses come in a multitude of varieties; and they continuously change their characteristics. Material prepared to fight last year's virus usually does little good against this year's disease. Even under the most optimal of conditions, influenza vaccines have only conferred about 60% protection. Further, the administration of the vaccine causes a certain amount of discomfort and some illness, since the idea of vaccination is to produce a defense by causing the subject to get a mild case of the disease. The U.S. Public Health Service has advised that no major epidemic is expected this year, and cases that do occur will probably be mild. Persons who are chronically ill (heart, kidney, and lung disease), and those in the over-65 age group who are somewhat debilitated, should speak to their personal physicians about inoculations against influenza.

Joggernaut Activities

The Joggernauts, the Ames running club, will meet during lunch on Friday, March 13 at 12:30 p.m. in the Instrumentation Building (213) Conference Room, to adopt bylaws and to elect officers, and to hear a short talk on running and health. Ames employees, other Federal employees at Ames, and on-site contractor employees are eligible and welcome. For information call Jim Woodruff, 2066.

PHYSICAL FITNESS CLASS

Dr. John Greenleaf, Biomedical Research, will start a class in exercise for physical fitness on Monday, March 2, at 11:30 a.m. in back of the Structural Dynamics Building, 242. The class will meet three days a week, Monday, Wednesday, and Friday. Regular attendance is not required. Emphasis will be on individual attention to help each person start an exercise program to reach his own physical fitness objectives. It is recommended that clothes appropriate for exercise be worn. Call Jim Woodruff, 2066, for more details.

LUNAR SOIL
(Continued from Page 1)

theory of panspermia, which holds that life originated at a few points in the universe and spread outward to other planetary bodies favorable for life.

If such living material in a dormant or spore state is to be found in future lunar samples, new methods of culturing it will be needed. Dormant organisms will need to be washed out of the lunar sample before the lethal metals have had a chance to kill them. This will have to be done with "neutral" liquids such as glycerol, or by other methods.

Data Managers Form Local Chapter

The Computer Operations Management Association (COMA), a group of Bay Area data processing managers, has formed a Peninsula chapter and two Ames employees have been named to help administer the new unit.

Noel Delany, Chief of the Computer Operations Branch, is secretary-treasurer of the organization, and Toby Gonzales, of the same branch, will serve as public relations director. Mr. Gonzales hopes other computer operators, managers and supervisors will join the group. Meetings are held the second Wednesday of each month. For details call Mr. Gonzales, ext. 3182.

BOWLING

... by Clark White

DIVISION I	WON	LOST
Comets	16	4
4NI	15	5
Keggers	12	8
Machine Shop	11	9
Glitches	10	10
Owls & Pussycats	5	15
Splitters	3	17
DIVISION II	WON	LOST
Double Trouble	13	7
Sterling Engineers	12	8
MAD	11	9
Killers	11	9
Woodchoppers	11	9
Timber Topplers	10	10
Hits & Mrs	8	12
Wal-Nut-O's	4	16

Bowled February 18:

Men's high series: Dick Parker, 617; Tony Astalfa, 602; Otto Meckler, 562; Joe Marvin, 549; Dennis Riddle, 538.

Women's high series: Ina Rathert, 510; Winnie Malloy, 490; Jan Konrath, 490; Betty Rupp, 466; Judy Long, 462.

Men's high games: Tony Astalfa, 234; Joe Marvin, 226; Cal Eddleman, 214; Dick Parker, 212; Hank Cole, 212.

Women's high games: Ina Rathert, 198; Judy Long, 189; Winnie Malloy, 186; Yetta Paquette, 178; Jan Konrath, 177.

Bloodmobile to Visit Ames Mar. 6

Ames Airings

... by Jane Kohler

On the evening of February 6 members of the Computation Division ushered in the Chinese New Year with a dinner party at the Imperial Palace in San Francisco. Arrangements were made for the unique party by native San Franciscan, PEARL LOUIE (Programming Branch). Amid silver platters filled with Imperial Beef, Peking Duck, Roc Cod Imperial, and other Chinese delicacies to tempt the palate, the attendees mixed conversation with gourmet dining. Members of Pearl's family were present and provided appropriate translations and interesting background information on the festivities. The favors distributed to the guests were packages of firecrackers which everyone planned to take home until they were told that it is bad luck not to set off the firecrackers the evening that they are received. Hence, the finale of the party found many "proper" members of the Division lighting packs of firecrackers in the middle of Grant Avenue. . . HARRY BAILEY (Theoretical), his wife, Katharine, and son, Ted, 12, recently went on their "annual trek" to the L.A. area to visit their daughter, Christine, who is attending Pomona State, and a visit to Disneyland, which is as great as ever. . . NOEL DELANY (Computer Operations), his wife, Lua, and daughter and son-in-law, Pam and Tom Austin, recently spent a week skiing at Heavenly Valley. Noel said they skied hard all day and spent the evenings in the well-known night spots. They skied in a blizzard on one day and in powder snow the next, but all together, as Noel put it, "Heavenly was divine". . . JOAN RZUCIDLO (Experiments Engineering) recently hosted a baby shower for BARBARA VITRANO SMITH (formerly of Project Biosatellite). There were several Ames employees in attendance. An interesting note was that the surprise shower was on February 6, and on February 7 Barbara and her husband, Jim, were happy to announce the birth of David Michael who weighed 6 pounds and 8 1/2 ounces. Congratulations to the proud parents. . . Although the news is late coming, BOB CHRISTIANSEN (Experiments Engineering) and his wife, Shirley, are proud to announce the birth of Erik who was born on December 21 and weighed 7 pounds and 1/2 ounce. Erik joined two brothers, Kurt, 13 months, and Jack, 3. . . LEE JONES (Photo) and his wife, Alberta, are very proud to announce the birth of

WANT ADS

For Sale-Dunetuggie, '68, top, side curtains, roll bar, Judson supercharger, other extras, \$1400 or trade for pickup. Call 244-8632.

For Sale-1967 MGB, extras, excellent cond., \$1800 or offer. Call 864-3140.

For Sale-1965 Corvair Monza, 110 hp., 4 speed trans., good condition, \$600 or offer. Call 657-0736 after 6 p.m.

For Sale-68 Toyota-Corona, 4 dr., stick shift, radio, low mileage. Call 253-1703 after 6 p.m.

For Sale-1964 Ford station wagon. Call 739-1464 after 5 p.m.

For Sale-Dodge 440, \$600. Call 356-5648.

For Sale-64 Ford Galaxie 500, 2 door, R&H, power steering, 74,000 miles, very good condition, make offer, available the end of March. Call 961-9540.

For Sale-Ford 1967 Custom 500, 4 dr. sedan, 240 cu. in., auto. trans., pwr. steering, dual brakes, nearly new tires and lifetime shocks, heater, radio, factory installed stereo tape player, 3 speakers, clock, lap belts, add on head rests, blue vinyl interior, WW carpets, white exterior, 27000 miles, balance of factory warranty, \$1195. Call 296-5695 after five.

For Sale-1964 Chev. Impala, P.S., P.B., excellent condition, one owner, \$895. Call 1. Lang, 349-4098.

For Sale-1968 Ford Country Squire wagon, air cond., stereo, side brakes, power locks, roof rack, 70 tags, like new condition, \$2950. Call 252-6489.

For Sale-66 Oldsmobile Cutlass Supreme, 4 door, V8 320 engine, automatic trans., power brakes, power steering, radio and heater, excellent condition. Call 967-5348 after 5:30 p.m.

For Sale-65 Ford Mustang, 289 engine with 4 barrel carb., four speed trans. (on the floor), radio and heater excellent condition. Call 967-5348 after 5:30 p.m.

For Rent-Cabin in the Donner Pass area. Snug, warm, and cheerful. Furnished with every conceivable appliance. Four major ski areas within five mile radius. Perfect location for ski touring or ski-dooing. Call Leo Poppoff, 323-2375.

For Rent-Ski cabin, West Tahoe, Chamberlands, 3 bdrm., 2 bath, sleeps 9, washer & dryer, frpic., avail. Easter week and month of April. Call 255-1882.

For Sale-Twin-size box spring and mattress set, firm, good condition, \$35. Call 323-7070.

For Sale-Lady Kenmore, 800 series, washer and dryer, \$175. Call 244-8632.

For Sale-Record player, Capitol, 16, 33, 45, 78 rpm, manual change, Monaural, suitable for 8 to 12 year old, good condition, \$5. Soldering gun, Weller \$100, 125 watts, \$2.50; pencil soldering guns, Crafrite and Wall, 25 watts, \$1. each. Call Harry E. Blomquist, 252-6229.

For Sale-Yashica-44 twin lens reflex camera, just like new, \$25. Konika 8 mm zoom movie camera, electric eye, 16, 24, and 48 FPS, excellent condition. Cost \$160 new, \$40 with case and pistol grip. Call Jerry Barrack, 263-1683.

For Sale-Roto-Broil "400", infra-red Rotisserie, fine condition, \$15. Call 948-5602.

Wanted-Room for single man starting about March 9. Ames employee reassigned from Philadelphia. Call D. Schilling, ext. 2023.

For Hire-Three-man combo formed by enterprising Ames NYC enrollees. The "Stained Brown Soul" will play for parties, dances and any special function: blues, jazz, soul and rock. Also looking for a manager. Call Art, 286-9778, or Tony, 293-4368.

their first grandchild, a 9 pound and 9 ounce baby girl named Ronna Lee Akrabowi, born on February 18. The parents are daughter, Pat, and son-in-law, Dr. Salim Akrabowi of the University of California at Davis. The new parents are both on the staff of the University, Pat in the Food Sciences Technology Department and Salim is a chemist in the Nutrition Department. Congratulations to the parents and grandparents.



OAKLAND SEALS

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OAKLAND SEALS vs DETROIT RED WINGS
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TOTAL AMOUNT ENCLOSED: \$ _____ Please make check payable to the Oakland Seals.

NAME _____ ADDRESS _____

CITY _____ ZIP _____ PHONE _____

MARCH 20 GAME