

Space News Roundup

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National Aeronautics and Space Administration

News Briefs

Nelson to fly

U.S. Representative Bill Nelson (D-Fla.), Chairman of the Subcommittee on Space Science and Applications, House Committee on Science and Technology, will fly as a congressional observer aboard Shuttle Mission 61-C, now scheduled for launch no earlier than Dec. 20. Nelson has already been to JSC for medical tests and orientation, and is expected to report for training in late November or early December. Nelson's Congressional district includes the Kennedy Space Center. The Congressman said his grandparents once homesteaded early in this century on land which now is only a few miles from Launch Complex 39A at KSC. Nelson will be the second congressional observer to fly. Sen. Jake Garn (R-Utah), Chairman of the Subcommittee on HUD/Independent Agencies, Senate Committee on Appropriations, was a payload specialist on STS 51-D in April.

SST agreement signed

NASA has signed an agreement with Scott Science and Technology, Inc. (SST) of Lancaster, CA for the development of a liquid-fueled upper stage. Under the agreement, NASA will provide technical expertise to SST for development of the Satellite Transfer Vehicle, an upper stage capable of boosting satellites of up to 19,000 pounds to geosynchronous Earth orbit. In some types of missions, the stage would be recoverable. The upper stage has been in private development for two years. Engineers at JSC will monitor the progress of the program and consult with the SST staff on technical matters. SST will reimburse NASA for the use of any test facilities, salaries and travel by JSC personnel. Former astronaut David R. Scott is president of SST.

Tiles to be tested

Using an F-104 aircraft as a testbed, NASA's Ames-Dryden Research Facility will test Space Shuttle thermal protection system tiles for moisture impact damage and to verify techniques to record and measure atmospheric moisture. Adverse weather conditions such as rain, mist or ice particles can cause damage to Shuttle tiles. This possibility can force launch delays or landing shifts to another location during bad weather.

Reagan nominates Graham

A nomination hearing was held Oct. 3 for William R. Graham Jr., following his nomination by President Reagan in September to become Deputy Administrator of NASA. Graham, a Republican from California, currently serves as Chairman of the President's General Advisory Committee on Arms Control and Disarmament. He also is a senior associate with R&D Associates, an advanced technology corporation which he co-founded. In 1980, he served as a member of the President-elect's Department of Defense Transition Team.



What do spaceflight and parasails have in common? Not much, unless you happen to be an astronaut candidate engaged in water survival training. The 13 candidates in the class of 1985 participated in such training in August, and just returned from a September wilderness survival course in Washington State. (Photo by Otis Imboden.)

Portrait of a comet

Preliminary analysis of Giacobini-Zinner completed

U.S., French, West German and United Kingdom scientists have completed preliminary findings from the Sept. 11 encounter of NASA's International Cometary Explorer (ICE) spacecraft with comet Giacobini-Zinner. The encounter, which took place 44 million miles from Earth, was the first comet intercept in history.

Summarized by Dr. John C. Brandt, head of the NASA Goddard Space Flight Center's Laboratory for Astronomy and Solar Physics in Greenbelt, Md., the scientists' tentative conclusions both added significantly to and confirmed many predicted features of the scientific portrait of a comet.

One newly-found phenomenon still is puzzling the comet scientists. At least 300,000 miles before ICE reached the comet, the spacecraft detected high-speed, heavy-ion beams (made up of electrified

atomic or molecular particles) never before found in space.

ICE scientists are theorizing that these beams were actually low-speed molecules which had escaped from the comet, become ionized by solar ultraviolet light, and then turned around and accelerated back, by the supersonic solar wind, towards the comet as particle beams.

The comet Giacobini-Zinner did not have a sharply-defined bow shock. Instead, the comet was preceded by a broad, U-shaped, turbulent interaction region as it plowed through the solar wind of interplanetary space.

The ICE-gathered data confirmed what cometary scientists had postulated about the comet's plasma tail — that it was threaded by hairpin-shaped, magnetic-field lines captured from the solar wind, with its electrified gases both

denser and colder than those of the surrounding solar wind.

There also was some "touch-up" to the cometary model which the scientists had constructed earlier. The dust hazard associated with flying through the tail of comet Giacobini-Zinner was less than originally thought.

In the precedent-setting encounter, ICE entered the 14,000-mile-wide tail of the comet, 4,900 miles behind the cometary nucleus at approximately 6:50 a.m. EDT, Sept. 11. Traveling at 46,000 miles an hour, ICE emerged from the tail approximately 20 minutes later, apparently none the worse for wear. Midpoint of the tail encounter came at 7:02 a.m., when the spacecraft passed through a narrow region called the neutral sheet.

The encounter was a high point of a 7-year odyssey through space for ICE, launched in 1978 as the

JSC's goal rises for annual CFC

With JSC Director Gerald D. Griffin leading the effort for this year's Combined Federal Campaign in the metropolitan Houston area, the center's goal for giving has risen from last year's total of \$221,000 to \$245,000 for 1985.

"Houston's Combined Federal Campaign is number one and we plan to keep it that way," Griffin said.

The campaign, which benefits United Way agencies, kicks off at JSC on Thursday, Oct. 17. The center has long led Federal agencies in the Houston area for per capita contributions by employees.

As Chairman of the Gulf Coast Combined Federal Campaign, Griffin will be working to see that Houston's Federal employees continue to be the most generous in the nation. Last year, the local Federal workforce gave \$1 million to help the less fortunate through this annual charity endeavor.

Part of the impetus comes from goals set by the different agencies and from challenges they issue to one another.

At the Houston kick off meeting for CFC, slated for Oct. 11 at Tranquility Park, the directors of every major Federal agency in the Houston area were scheduled to gather. These leaders were expected to issue a number of challenges to one another.

The biggest involves JSC, whose lead in employee per capita giving is being seriously challenged this year by the Houston employees of the U.S. Postal Service. Postmaster Sam Green Jr. has issued a challenge to the Center to keep up with the 24 percent increase Postal Service employees have set for themselves — a whopping goal of \$600,000.

"NASA and the Postal Service have the same credo — 'We Deliver,'" Green said.

In coming weeks, JSC employees will be visited by group solicitors and asked to fill out donation forms. This year's motto is "Team Up — Work Wonders."

Some 18 Federal agencies are slated for participation in this year's campaign, including JSC.

(Continued on page 2)

International Sun-Earth Explorer. With two deep space exploratory missions already to its credit, the spacecraft was diverted to fulfill its comet rendezvous destiny at the suggestion of Goddard engineer Dr. Robert Farquhar. It was Farquhar who, after thousands of computer simulations, maneuvered ICE past the moon five times in 1983, using lunar gravitational assist to give the spacecraft the additional thrust necessary for the comet rendezvous.

ICE is now underway to its fourth space exploration assignment, this time to record solar wind measurements upstream of Halley's Comet on Oct. 31, 1985 and March 28, 1986.

A more detailed review of the ICE encounter results will be made public at the American Geophysical Union conference on Dec. 10, in San Francisco.

Bulletin Board

Commission to hold public forum

The Presidentially appointed National Commission on Space will hold a public forum in Houston Oct. 15. The forum will be comprised of two sessions — the first from 1:30 to 5 p.m. and the second from 6:30 to 9 p.m. The forum will be held at the Houston Museum of Natural Science, Brown Auditorium, at One Hermann Circle Drive. The purpose of the forum is to solicit opinions from the general public, industry and academia concerning long-range goals for the U.S. civilian space program to the year 2035. Commissioners Dr. Kathryn D. Sullivan and Dr. David Webb will be on hand to take testimony from interested persons.

NMA meetings scheduled

The next meeting of the NASA JSC Chapter of the National Management Association will be held beginning at 5 p.m. Wednesday, Oct. 23, at the Gilruth Recreation Center. The social hour will be followed by a dinner meeting at 6 p.m. At press time, the speaker was slated to be a representative of the Federal Bureau of Investigation's Houston office. The NMA chapter also reminds interested persons that the November and December meetings will be combined and held Dec. 11 at the Gilruth Center. For more information, call Lupita Armendariz at x3041.

Bus tours to festival set

The JSC Employees Activities Association is sponsoring two bus excursions to the 11th Annual Texas Renaissance Festival on Oct. 26 and Nov. 2. The price is \$15 for adults, \$10 for children ages 5 to 12, and \$7 for children under 5 who require a seat on the bus. The price includes transportation and admission to the festival. The buses will depart JSC at 7:30 a.m. and return at 5:30 p.m. Tickets are now on sale at the Bldg. 11 Exchange Store. For more information, call x4814.

NASA's Aerovan to visit JSC

The Aerovan, a large traveling exhibit designed to tell the story of NASA research in aeronautics, will be on display at JSC Nov. 1 to 3. The large walk-through trailer features nine exhibits that focus on current trends in aeronautical research, such as safety, energy efficiency and improvements in passenger comfort and convenience. Other exhibits address the future of aeronautical research and design. Aerovan lecturer William H. Gough will be on hand to answer questions.

Major conference about Mars planned

A major conference on the history, science and future exploration of the Planet Mars will be held next year in Washington, D.C. The three-day meeting will be held July 21 to 23 at the National Academy of Sciences. Persons interested in attending the conference should contact: The Mars Conference; Attn: Ms. Lu Agee; P.O. Box 416; Hampton, VA, 23669. The phone number is (804) 722-2595.

Gilruth Center News

Call x3594 for more information

Aerobics — A specialized program to develop total fitness, this class will consist of stretching and limbering exercises followed by a vigorous workout. The class meets Tuesdays, Wednesdays and Thursdays from 4:45 to 5:15 p.m. for 8 weeks beginning Oct. 8. The cost is \$30 per person.

Word processing — The production of such documents as legal letters and resumes, using Wordstar, will be covered in this course, which meets from 5:30 to 8:30 p.m. beginning Oct. 21. The duration is 6 weeks and the cost is \$190 per person.

Guitar — This 6-week class for beginners will focus on simple songs, chord strums and melodies. The sessions meet Wednesdays from 7 to 8 p.m. starting Nov. 6. The cost is \$25 per person.

Banjo — Learn to play a 5-string banjo in this class which meets Wednesdays from 8 to 9 p.m. starting Nov. 6. The class runs for 6 weeks and the cost is \$25 per person.

Country western dance — Classes for intermediates and beginners will be offered in this course which meets Monday nights for 6-weeks, starting Oct. 28. Intermediates will meet from 7 to 8:45 p.m., followed by the beginners, who will meet from 8:45 to 10:15 p.m. The cost is \$20 per couple.

Speedreading — Learn how to gain greater reading speed and comprehension in this class which meets Mondays from 6:30 to 8:30 p.m. beginning Oct. 23. The class meets for 7 weeks and the cost is \$70 per person.

Inter-Center run — Monday and Thursday evenings in October will see JSC employees pitted against runners from other NASA centers. Two races — the 10-kilometer and 2-mile — will be run. Contact the Rec Center for details.

Silk flowers — Make dried arrangements, wreaths and other crafts with skills gained in this 6-week class. The course requires scissors, wire cutters and a package of Boston fern. The class meets Tuesdays from 7 to 8:30 p.m. beginning Oct. 15. The cost is \$35 per person.

Calligraphy — Learn the basic italic and old English alphabet in only four 2-hour sessions. The class meets from 7 to 9 p.m. beginning Oct. 10 and runs for 4 weeks. The cost is \$24 per person and supplies are necessary for the first session.

Bicycle repair — Get a basic overview of bicycles and their repair in this 2-week course, which meets from 7:30 to 9 p.m. beginning Oct. 10. The cost is \$6 per person.

Astro specialists named

NASA announced Oct. 1 the payload specialists for Space Shuttle mission 61-E, an ultraviolet astronomy mission known as "Astro-1," scheduled for launch March 6, 1986.

Dr. Samuel T. Durrance, associate research scientist in the Department of Physics and Astronomy, Johns Hopkins University, Baltimore, and Dr. Ronald A. Parise, manager of Advanced Astronomy Programs, Computer Sciences Corp., Silver Spring, Md., were selected to fly the mission, which will perform Halley's Comet observations.

Dr. Kenneth H. Nordsieck, associate professor at Washburn Observatory, University of Wisconsin, Madison, will serve as backup in the event either Durrance or Parise cannot participate in the flight. As an alternate payload specialist, Nordsieck will occupy a principal position in the Payload Operations Control Center at the Marshall Space Flight Center, Huntsville, Ala., during the mission.

The payload specialists are experienced astronomers, which is considered crucial to the mission since they will be making decisions to ensure the best possible scientific data return.

Other members of the flight crew will be Jon A. McBride, Commander; Richard N. Richards, Pilot; and Mission Specialist Robert A. R. Parker, David C. Leestma and Jeffrey A. Hoffman.

The Astro-1 mission will study Halley's Comet and many other celestial objects through three ultraviolet astronomical instruments. In addition, a special visible-light wide field camera has been incorporated into the payload to augment the Halley's Comet studies.

Each payload specialist is a member of one of three science teams that developed the ultraviolet instruments. Payload specialists Durrance and Parise will operate the ultraviolet instruments, while astronaut mission specialists will operate the instrument pointing system (IPS), on which the three instruments are mounted. Designed for precise aiming at celestial targets, the IPS was developed by the European Space Agency and flew initially on the Spacelab 2 science mission in early August.

The Astro-1 flight is scheduled to coincide with the Halley encounter missions by the European Space Agency, the Soviet Union

and Japan. Dr. Burton I. Edelson, NASA Associate Administrator for Space Science and Applications, said: "The opportunities for science synergism between Astro-1 and the armada of Halley encounter spacecraft are significant. The scientific study of Halley's Comet will be an internationally coordinated effort."

The Astro-1 complement of scientific instruments is well suited for the study of a wide variety of other celestial objects in addition to Halley's Comet. The complement consists of the Hopkins Ultraviolet Telescope, which will study faint astronomical objects such as quasars, active galactic nuclei and normal galaxies in the far ultraviolet range; the Ultraviolet Imaging Telescope, which will record image-intensified photographs of faint objects such as hot stars and galaxies in broad ultraviolet wavelengths and with a wide field of view; and the Wisconsin Ultraviolet Photopolarimetry Experiment, which will study the polarization of hot stars, galactic nuclei, and quasars. Together, these instruments will make 200 to 300 observations during the Astro-1 mission, the first of three in a series scheduled for launch within the next 2 years.

McAuliffe's space lessons set

Live lessons to classrooms around the country and scientific demonstrations filmed for use in educational products are just some of the activities that will be involved with Shuttle Mission 51-L and the flight of the first Space Flight Participant.

Christa McAuliffe, the finalist in the NASA Teacher in Space Project, along with Barbara Morgan, the back-up candidate, reported to NASA's Johnson Space Center, Houston, on Sept. 9 to begin training which will continue until the flight of 51-L now set for launch no earlier than Jan. 22, 1986.

NASA is making plans for a direct satellite broadcast and schools will be able to observe lessons from space.

The first live lesson entitled "The Ultimate Field Trip" will allow students to compare daily life on the Shuttle with that on Earth. McAuliffe will take viewers on a tour of the Shuttle, explaining crewmembers' roles, showing the location of computers and controls and explaining experiments being conducted on the mission.

She also will demonstrate how daily life in space is different from

that on Earth in the preparation of food, movement, exercise, personal hygiene, sleep and the use of leisure time.

The second lesson called "Where We've Been, Where We're Going" will help the audience understand why people use and explore space by demonstrating the advantages of manufacturing in the micro-gravity environment, highlighting technological advances that evolve from the space program and projecting the future of humans in space.

Also during the 51-L mission, McAuliffe will be involved in several activities which will be filmed and later used in educational products. Potential activities include:

- Earth Magnetism — Photograph and observe the lines of magnetic force in three dimensions in a microgravity environment.
- Newton's Law — Demonstrate Newton's first, second and third laws in microgravity.
- Bubbles — Understand why products may or may not effervesce in a microgravity environment.
- Space Expressions — Gener-

ate from students creative works that reflect their interpretation of the space program/experience.

- Simple Machines/Tools — Understand the use of simple machines/tools and the similarities and differences between their uses in space and on Earth.

- Hydroponics in Microgravity — Show the effect of microgravity on plant growth, growth of plants without soil (hydroponics) and capillary action.

- Chromatographic Separation of Pigments — Demonstrate chromatography in a microgravity environment and show capillary action (the mechanism by which plants transport water and nutrients).

The educational emphasis on Shuttle Mission 51-L will be further enhanced with a program now in its 6th year at NASA. Three Shuttle Student Involvement Project experiments will fly onboard the Shuttle and McAuliffe will assist the mission specialists in conducting them. The experiments deal with using a semi-permeable membrane to direct crystal growth, studying chicken embryo development in space and the effect of weightlessness on grain formation and strength in metals.

PROFS, NOMAD updated

New features have been added to two of JSC's center information systems, PROFS and NOMAD.

In September, forced password changes were implemented on the PROFS system for improved security. The system automatically ages passwords. After 45 days, the system will issue a message ("Your password has expired — please enter a new password.") and prompt the entry of new passwords. Users will not be locked out of the system due to a password expiration, said John R. Garman, Chief of the Data Sys-

tems and Analysis Division and the JSC Computer Security Officer.

Another feature, installed on both the PROFS and NOMAD systems, is a set invalid password lockout. It will allow a user three attempts to input the proper password before a warning message will appear. After five invalid attempts, the user will be locked out of the systems. If the user is locked out of the systems, he or she must call the HELP DESK and request a password reset.

In August, a new feature called

automatic age/purge file capability was added. The feature automatically deletes or removes any print files that are over 14 days old and all reader files over 30 days old. Reader files include those notes or documents sent to a user that have not been read into the in basket, Garman said.

A generic reminder capability also has been added to all center information systems independent of PROFS and NOMAD. The feature allows users to set up reminders to themselves or others on the system.

JSC's goal for CFC rises

(Continued from page 1)

the Postal Service, the Federal Bureau of Investigation, the Social Security Administration, the Internal Revenue Service, the Veterans Administration, the U.S. Customs Service, the Secret Service, the Small Business Administration, the

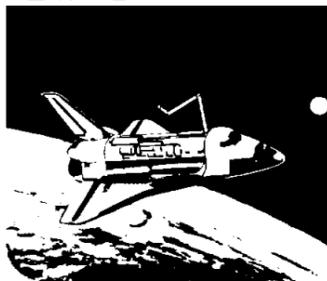
Federal Aviation Administration, the Department of Housing and Urban Development, the Department of Immigration, the U.S. Army, the U.S. Coast Guard, the Food and Drug Administration, the Equal Employment Opportunity Commission and the General

Services Administration.

This year's CFC Vice Chairman is Douglas Gow, Special-Agent-in-Charge, Federal Bureau of Investigation. Houston City Councilwoman Eleanor Tinsely is the 1985 Campaign Chairman for government. — Janet Ross

NASA
Lyndon B. Johnson Space Center

Space News Roundup



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Editor..... Brian Welch

Mars, a dessicated planet, where

Once the waters flowed



Ice, snow, flowing rivers and vast lakes may have played a major role in shaping the ancient Martian surface and climate, a panel of scientists reported Oct. 8 at NASA's Ames Research Center.

Their scientific presentation grew out of research discussed at the "Water on Mars Workshop," which brought 83 scientists to Ames last winter and included more recent work in this active field.

Early in the planet's history, according to Bruce Jakosky of the University of Colorado, Boulder, the Martian poles were tilted more directly toward the sun than they are today. As a result, the polar ice caps may have sublimed (changed directly from a solid to a gaseous state) into the atmosphere during the continual daylight of polar summer.

Vapor from the caps would have been carried by Martian winds to the equatorial regions. At equatorial latitudes, where night always alternates with day, the chill of nightfall would have precipitated water vapor as snow, Jakosky said.

Gary Clow of the U.S. Geological Survey, Menlo Park, Calif., reported that an equatorial snowpack could have been heated by sunlight trapped inside the snow fields. A reflective, insulating blanket of snow can trap sunlight, much as a greenhouse holds the sun's warmth. Thus, even if the surface of Mars had still been cold, melting beneath an insulating snowpack could have let water escape to carve the "valley network" channels of Mars. These valley network channels as well as larger outflow channels — both strongly resembling dry riverbeds on Earth — were photographed by Mariner 9 in 1972.

The larger outflow channels are thought to have been created by sudden release of enormous amounts of subsurface water, which may have dug the channels in a matter of weeks. The valley network channels, which Clow has studied, are smaller and indicate the existence of a more moderate climate on early Mars, allowing liquid water to flow for long periods of time.

Huge ice-covered lakes also may have existed on the ancient Martian surface in the immense Valles Marineris canyon system, according to Steven Squyres of Ames. Viking photographs of the floor of these canyons, Squyres said, reveal thin, flatlying layers of sediments which appear to have been laid down in standing bodies of water.

Today, Mars is so cold that all water on its surface freezes. Although the Martian atmosphere is 95 percent carbon dioxide (an effective infrared absorber), it is so thin that it cannot trap the heat of the sun.

Dry ice (solid carbon dioxide) covers the polar regions of Mars. Water-ice lies underneath the northern cap and perhaps under the southern polar cap as well. The water-ice at the northern pole

is revealed when the overlying dry ice vaporizes each summer.

Water-ice in the Martian polar caps does not melt because temperatures rarely climb above freezing, except at the equator. It sublimates directly into the atmosphere, forming wispy clouds on Mars. Earth's billowy clouds are formed by tiny droplets of liquid water.

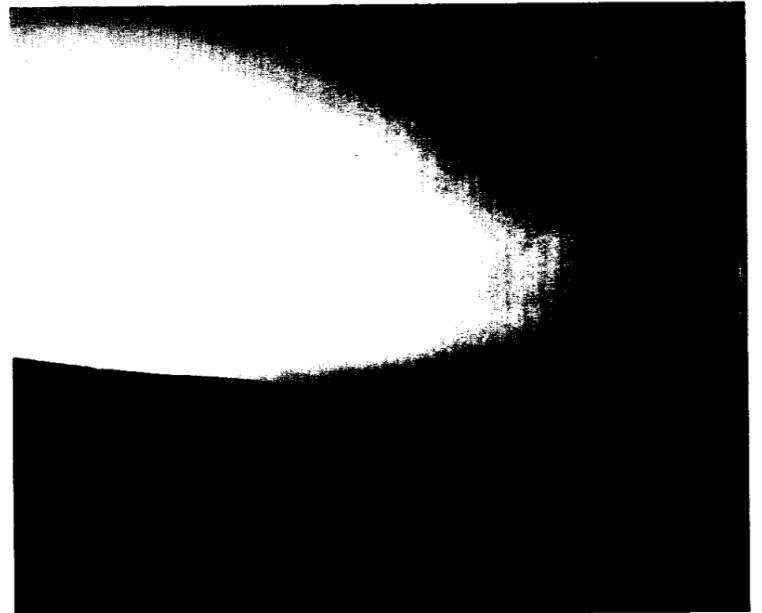
Today, ice is present in the Martian ground in regions above 30 degrees latitude, according to Squyres and Michael Carr of the U.S. Geological Survey. Examining Viking photographs of impact craters, Squyres and Carr found evidence of "terrain softening" — a rounding off of features indicating water activity beneath the surface.

Terrain softening of smaller, more recent craters suggests that ice remains present in these northern and southern regions.

depositing a layer of mingled ice and dust. This layer then becomes cemented into place by water-ice and remains when the carbon dioxide evaporates again in the spring. Periodic changes in the Martian climate, caused by fluctuations in the planet's tilt toward the sun, can alter the amount of gas which condenses, thus creating layers of varied sizes.

According to James Pollack of Ames, the Martian climate in the past may have been warmer and wetter. An earlier atmosphere may have been much thicker with more carbon dioxide available to hold the sun's warmth. Rivers and lakes of liquid water could have dotted the ancient landscape.

This earlier, warmer climate actually may have destroyed itself, Pollack says. The presence of liquid water would have accelerated weathering of rocks, enhancing chemical reactions that take carbon dioxide out of the



Sunset on Mars

Evidence points to an ecological sunset as well.

Like the tundra of Alaska, this deeply-frozen ground never thaws.

The presence of ice indicates that liquid water exists deep within the planet, according to Carr. Half a mile beneath the surface, water in the pores of Martian rocks is liquid, Carr says. It is heated by the high temperatures present at these depths in the Martian crust.

Robert Haberle of Ames, studying water distribution on Mars using data gathered by Viking orbiters, has found that water lost by the north polar cap during summer is not fully recovered in the winter. He wants to determine where this water goes.

Movement of water and carbon dioxide to and from the polar ice caps and movement into and out of the rubbly Martian ground may be responsible for the mysterious "layered terrains" that fringe the polar caps.

In winter, carbon dioxide condenses over the polar region,

atmosphere and incorporate it into minerals. With the loss of carbon dioxide from its atmosphere, heat would have escaped the planet's surface, cooling the planet and locking up its water as ice.

However, not all scientists accept this theory on how Mars lost its originally-thick atmosphere. A new theory, suggested at the workshop by Peter Schultz of Brown University, is that the cataclysmic impact, that created the immense Argyre basin on Mars, may have perturbed its climate by blowing into space a significant part of the atmosphere. Schultz noted that Martian terrains, formed after the Argyre impact, have fewer dry channels than older terrain, a feature that suggests a major climatic change at that time.

Besides Earth, Mars is the only planet in our solar system that experiences cyclical changes in climate. Understanding past and present conditions on Mars will help scientists decipher Earth's climate, said Haberle.

NASA renews call for global habitability study

Dr. Burton I. Edelson, NASA Associate Administrator for Space Science and Applications, has called on the worldwide scientific community to accelerate its study of planet Earth.

Addressing the Global Habitability seminar Oct. 7 at the 36th Congress of the International Astronautical Federation in Stockholm, Edelson warned his audience that the Earth's environment, as we now know it, may be in jeopardy. He said, "Resources, once thought to be limitless, are slowly being depleted, Earth's atmosphere is changing, and some of its life forms are threatened. It is imperative that we, as scientists and engineers, take action now to maintain the quality of life on our planet and improve its biological productivity."

Edelson cited the many accomplishments of planetary science since the beginning of space flight

28 years ago. "We have examined most of the planets in the solar system at close range and have performed systematic studies of our closest neighbors, Venus and Mars, through telescopes and more recently, through data and imagery received from planet-orbiting spacecraft. But we have a great deal to learn about our own planet. We still lack synoptic, systematic and temporal knowledge, predictive skills, and an understanding of the mechanisms underlying Earth's global processes," Edelson continued.

Calling for an international study effort, Edelson said, "Our sophisticated spacecraft, new air, sea and space-borne sensors, and enormous computing capability will enable us to measure, monitor, model and finally begin to understand the Earth as a system. This mission to planet Earth could unlock the secrets of life itself.

Mysteries, that have puzzled great natural philosophers for centuries, are at our fingertips and waiting to be solved, thanks to modern science and space technology. This quest for knowledge may well prove to be the most important ever undertaken by humankind. For what could be more important than the preservation of planet Earth?"

Edelson noted, "that Earth has a great capacity to restore itself, but it is a finite capacity. More than ever the biological productivity and the continued habitability of our planet, as we know it, is being threatened by the pressures of an expanding population and the reduction of natural resources."

Edelson called particular attention to the problems of water pollution in rivers, lakes and streams; potential depletion of the ozone layer; growing atmospheric concentrations of carbon dioxide;

and a sharp increase in the levels of carbon monoxide, methane and nitrous oxide.

"Economic developments over large portions of the Earth have significantly changed the patterns of land and water use," according to Edelson. "The results have been mixed — while in some cases the benefits have been significant — we have paid a substantial price. We must study the land and learn to use it properly."

Emphasizing the importance of his proposal, Edelson said, "The U.S. National Academy of Sciences has reviewed the scientific merit of the global habitability concept and has found it to be both sound and worthy. The Academy is now participating in the broader efforts of the International Council of Scientific Unions in a program called Global Change. NASA and several other government agencies, notably the National Oceanic

and Atmospheric Administration and the National Science Foundation, also will participate."

Under Dr. Edelson's concept, investigations would be multifaceted, with oceanographers, meteorologists, biologists and foresters studying the land, sea, atmosphere and the air-sea and solar-terrestrial environments.

Calling for an all-out effort by the world's scientific community, Edelson concluded, "The only action we can take, in the face of such evidence, is to put the world's scientific tools and knowledge together to explore the complexities of Earth and find a way to maintain the health of the planet. This truly is an international challenge, involving many scientific disciplines. Everyone on Earth has a stake in our success."

NASA's global habitability proposal was first put forth at the Second Unispace Conference in 1982.

Roundup Swap Shop

All Swap Shop ads must be submitted on a JSC Form 1452. The forms may be obtained from the Forms Office. Deadline for submitting ads is 5 p.m. the first Wednesday after the date of publication. Send ads to Roundup, AP3, or deliver them to the Newsroom, Bldg. 2 Annex, Room 147. No phone in ads will be taken.

Property & Rentals

Lease: Galveston 1 BR furnished condo, on Seawall, avail. 1 Oct., \$425/mo. Stromme, x5665 or 280-8644.

Sale/lease: The Landing lakeside condo, 2-1, on tennis courts, pool, 5 min. to JSC. Carol, 486-0697.

Sale: 25 wooded acres, near Center-

ville, largely undeveloped setting, deer abound, \$1,400/acre. Musgrove, x3566 or 488-3966.

Sale: Timeshare, The Landing at Lake Conroe, 1 wk., 2 BR, club membership, RCI privileges, \$8,999. 498-1224.

Sale: Lakefront investment property, Bar-X Ranch, Brazoria Cty., low \$30's, 12% assum. Don, 280-6307 or 554-6205.

Sale: Middlebrook 4-2-2A, contemp. design, open floor plan, FPL, fenced, \$88,900. Ron, x3821 or 488-7387.

Lease: Egret Bay 1-1-2 condo, FPL, W/D, ref./icemaker, pools, covered parking, \$350/mo. Actkinson, x3781 or 482-7061.

Lease: El Dorado Trace 2-2, FPL, W/D, ref., \$400/mo. + deposit. No pets. 481-8364 or 554-6779.

Lease: University Trace condo, 1 BR, FPL, fans, overlks. pool, \$325/mo. James, x4878.

Sale: El Cary 3-2-2, FPL, lg. patio, hi-eff. heat pump/gas furnace, oak floor, many features, \$79,900. Hoover, x3138 or 996-7716.

Rent: Room in Heritage Park home, sep. bath, share kitchen, all utilities included, \$250/mo. Jack, x3089 or 280-1500.

Lease: Pebblebrook condo, El Lago, 1 BR, 2nd fl., W/D, \$310/mo. + deposit. Lindemann, 488-3300 or 532-2218.

Lease: CLC 1 BR condo, W/D connections, FPL, appliances, one week free. Briley, x2546 or 488-7901.

Sale: Heritage Park 4-2-2, 1,850 sq. ft., FPL, fans, fenced, deck, miniblinds, well landscaped, \$79,950. Robert, 996-9455.

Sale: 4 cottages near Galveston Bay, furnished, \$49,500, 10% down, balance to be financed at 11% for 15 years. 339-1951.

Lease: Victorian, fully furnished, 1 BR condo in Galveston, \$425/mo. Glen, x5665 or 280-8644.

Rent: Baywind I, 2-1-5-2, furnished, \$470/mo. plus deposit, 333-3992.

Sale/lease: Nassau Bay 4-2-2, 2,200 s.f., owner financing til your house sells, \$114,900. Jerry, x3561.

Countryside North 3-2-5-2, two-story, \$55,850. Ted, x7484 or 554-7234.

Sale: 3-2-2 brick, 1 acre, off FM 517, Dickinson-Alvin area, Santa Fe schools, quality built. 337-2680.

Lease: Baywind II townhome, 2-2-5-2, 1,130 s.f., FPL, W/D, fans, pool, tennis, exercise room, \$480/mo. Jeff, x5595 or 280-8608.

Colorado ski vacation, timeshare week, all amenities, avail. Jan. 4-11 and Jan. 11-18, \$600/wk. D. Smith, x6455 or 280-0027.

Sale: 2 BR mobile home, new carpet & tile, perfect starter, \$7,500. 332-4116.

Sale: League City/Newport 3-2-2, FPL, cathedral ceiling, workshop, redecorated in and out, new roof, \$69,900. 996-8471.

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payments. Mavis, x7451 or 489-7498.

'79 Omni, AT, PS, stereo, AC, \$1,100. Glen, x6541 or 486-0462.

'77 Buick Skylark, loaded, original owner, excel. cond., \$3,250. 474-3839.

'77 Mercury Cougar XR-7, loaded, orig. owner, 2 dr., excel. cond., \$2,200. 474-3839.

'84 GMC S-15 pickup, Sierra Classic, 4 spd. auto overdrive, cruise, bucket seats, AM/FM/cassette, tow package, 24K mi. 486-0253.

'80 Corvette L82, red w/T-tops, auto, AC, power windows, AM/FM/cassette, 58K mi., \$9,600. Linda, x4921 or 326-2294.

'83 GMC High Sierra shortbed, AC, auto, straight 6, cruise, 30K mi., SONY AM/FM/cassette, \$6,800. Linda, x4921 or 326-2294.

'80 Monark bass boat, 50 HP Evinrude, trolling motor, depth finder, galv. trailer, \$4,100. Don, 280-6307 or 554-6205.

40' Hughes Columbia ketch, center cockpit, Sparkman & Stevens design, beautiful liveaboard cruiser. \$85,000. David A., x2991 or 486-4764.

16' Hobie Cat, trailer, all accessories, \$2,500. Dick Snider, x5291 or 332-3280.

Rent: IFR Piper Warrior, PA-28-1161, \$38/hr. wet, based Houston Gulf. 946-1750.

'79 Suzuki GS 1000L, new battery, rear tire, rear brakes, vetter, full face helmet, \$1,000. Craig, 332-4812.

20" super Mongoose bike, perfect gift, all chrome, like new, \$160. McNeely, x6347 or 482-5837.

'74 Yamaha on/off road, 100cc, orig. owner. \$395. 482-4260.

'83 Kawasaki 550 Spectre, 4 cyl., 4K mi., excel. cond. \$1,400 OBO. 482-1569.

'73 Honda CL350, rebuilt engine and new wiring harness, great for parts, partially assembled, \$90 firm. 538-1281.

'73 Honda CB350, looks and runs like new, crashbars, luggage rack and backrest, \$500 firm. Harold, x6353.

Men's 26" 3-spd. bicycle, Sears, \$25. 488-5445.

'80 Suzuki 850 GSL, luggage rack, rairing, like new. 488-8919.

Men's 5-spd. bicycle, like new, \$65. 488-5564.

Shure V-15 type III phono cartridge, new "micro-ridge" stylus, perfect condition, tracks great, \$35. Musgrove, x3566 or 488-3966.

Color TV, 19", nonworking, needs minor repairs, \$20; stereo 8-track, with tapes and converter, \$50. Ream, x2146.

CB radio, Cobra 25GTL, 40-channel, antennas included, \$75. Ed, x5489 or 480-0273.

Apple II+ w/48K, disk drive, green screen monitor, includes software and manuals, \$800 OBO. David A., x2991 or 486-4764.

RCA 13" color TV, new, never been used, \$200. Linda, x4317.

SONY SL-HF400 Super Beta stereo HiFi VCR, 1 mo. old, still under warranty, \$425. Tom Rich, 280-1742 or 334-4728.

Commodore color composite monitor, 13", like new, \$150. Gary, x2191 or 482-1290.

TRS-80 color computer, cassette for storage, 64K, never used. 532-3308.

SONY Betamax SL-5800, 4 events/14 days, remote, cable compatible, cost \$1,100, sell \$250. 484-5366.

Sylvania 25" color TV, console, beautiful, like new, \$349. Earl, 326-3396.

Pioneer HPM-100 speakers, 100 watts/Ch., 4-way bass reflex, \$150/pair; B&O MMC3 cartridge, like new, \$75. 748-5044.

Akai GX-635D open reel tape deck, 6-heads, auto reverse, \$695. Blaine, x2411 or 488-4890.

Speed control chip for Tandon 8" floppy disc drive. Keith, x3643 or 332-8251.

Wards stereo component system, \$165; Sherwood receiver, needs transformer, \$50; Garrard turntable, \$20; 45-pc. china set, \$60; '71 Rancho, \$400. Norma, x2796 or 532-3644.

Day bed, \$45; chair foam cushion bed, \$18; antique rock maple head-

board and frame, \$35. Claire, 474-4310.

Water bed, queen, frame, headboard, heater, mattress pad, \$100. Bob, x5293.

Early American queen sofa bed, rocking chair, \$125 OBO. 334-4894.

Foam-backed draperies, 72" x 61", burnt orange, like new, \$10. Ed, x5489 or 480-0273.

Kingsize waterbed, canopy top, mirror, padded rails, bookcase headboard, sheets & comforter, \$400 or trade for regular kingsize bed. 486-9760.

Kingsize waterbed, headboard, pedestal, heater, padded rails, excel. cond., \$50. Diane, x5266 or Jeff, x5378.

Like new French provincial double headboard, triple dresser w/mirror and night stand, \$175; matching desk w/chair, \$150. Phyllis, x2267 or 333-9173.

Danish modern walnut dining room suite, 45" round table w/leaf, 4 chairs, \$200. 331-5751.

Kingsize metal bed frame, 3 rollers, \$25. 333-2395.

Penny's gas range, electric start, continuous clean, almond, good condition, \$200. 486-7315.

Royal Doulton Old Colony china, 6-place setting, minus 4 salad plates, never used, \$100. Linda Maddox, x7250 or 455-7587.

Couch, rust tweed, excel. cond., \$100. Dorothy, x3176 or 966-8750.

Antique small china cabinet, dated 1875, 30" wide, beautiful condition, \$375. 488-5564.

Kenmore refrigerator, needs repair, best offer. 474-3839.

Antique balloon back rococo style chair, 2 for \$300; mahogany wall bar w/full set of crystal, \$795. Brett, 333-6047 or 532-1537.

Bach trombone, good condition, \$450. 488-0323.

Gibson electric guitar, Les Paul/Mary Ford model, case, amplifier, \$595 OBO. Gary, x2651 or 486-8168.

Aeolian contemp. European console piano, 2 yr. old, excel. cond., must sell, \$1,000 OBO. Norma, x2796 or 532-3644.

Spencer flute with case, excel. cond., great for beginner, \$200. Alex or Barbara, 488-6521.

Want technical data on Lunar Module, post flight reports, system handbooks, etc., for historical research project. Jeff DeTroye, x5378.

Roommate to share 2 BR condo, non-smoker, \$250/mo. + 1/2 util. and \$75 deposit. Rick, x5341 or 480-8223.

Want to buy MT-310 Casio keyboard, working or not, others considered; also, equalizer bars for trailer hitch and hitch to fit receiver, installed on '83 Olds Ciera. Alison, x5827.

Roommate to share spacious 3 BR house, quiet, wooded neighborhood near JSC, garage, W/D, private park on Clear Lake, \$275/mo. + util. Ashwal, 486-2147 or 532-1713.

Want to carpool from Fairmount Pkwy. to Beltway 8, 8 a.m. to 4:30 p.m. Carolyn, x5996.

Want extremely cheap, small TV or computer monitor, for use in classroom. Ramsell, x5028 or 488-6142.

Roommate for large 2-2.5 Baywind II townhome, next to NASA, cable, W/D, private bath, \$240/mo. + 1/2 util. 488-8919.

Want roommate or couple to share 4 BR house near San Jacinto College, 20 min. to JSC. 479-6002.

Want piano player for 18-piece band, must be able to read and improvise, must provide piano. Ray, x6327 or 554-5434.

Want piano tuning tools, small B & W TV, and back issues of "Dragon" magazine. Wiede Koop, x6156 or 486-1923.

Want snow skiing bibs, men's large or ladies 18. Curley, x3026 or 944-3522.

Want to babysit for one child, age 1 to 2, in my home, Camino South, Christian home. 486-5094.

Roommate to share League City 3 BR home, \$210/mo., all bills paid, furnished, no smoking/pets/kids. Full privileges. Keith, x3643 or 332-8251.

Desk w/64" metal/wood laminated top, \$60; bookcase w/light, \$50; four 14" rims, \$15 ea.; tennis rackets. Michael, x5576 or 484-7527.

Car seat, good condition, \$15. Tam, x2997 or 534-3376.

Garmont Omnilite ski boots, women size 9, black, almost weightless, \$40 OBO. Karen, x6156 or 520-8348.

Portable electric typewriter, \$45; bumper pool table, \$380; child's desk, \$15; maple twin beds, no mattress or box springs, \$70. 482-4260.

Coleman catalytic camping heater, \$10. 488-5445.

20 ga. Winchester O/U shotgun, 3" chamber, \$500; Fox 12 ga. dbl. bbl. shotgun, good cond., \$195. Jim, 280-3521 or (409) 925-3036.

Security alarm system, Heathkit, wireless, two CPUs, ultrasonic detector, 8 additional modules, \$150. Ken Goodwin, x2881.

Regulation 4' x 8' pool table, slate bed, \$500 firm. Mike Williamson, x2805 or x2806.

I-H Cub tractor, hydraulics, mower and assorted garden tools, \$1,500. Jim, 280-3521 or (409) 925-3036.

Rebuilt engine, '74 Volvo 4 cyl., 3,500 mi., \$300. Dan, 749-4802.

Bathroom vanity top, beige formica, white sink, chrome fixtures, 64" x 23", \$50. Tony Smith, x4061.

Garage doors w/hardware, two complete single size doors with row of windows, \$50 ea.; 5 aluminum softball bats, \$5 ea. Steve, x6128.

Camper shell for S-10 longbed truck, shutter/tinted windows, like new, \$150 OBO. Armstrong, x2576 or 326-5225.

Size 9 wedding dress, beautiful, handmade veil, worn once. Paul, x4824 or 486-6813.

Enkei rims, centerline look, two 15 x 7" w/Firestone tires, and two 15 x 5"

for \$275. Jeff, x4028 or 488-6246.

Manlicher 30.06 rifle w/variable scope. M. Villars, x5461.

Electric guitar, never used, \$75; 8" B&W TV, \$20; Royal portable typewriter, case, \$25. Kellie, 488-1621 or 484-0463.

Name brand golf balls, hit once, 50¢ ea., all others 25¢ ea. Brad, 488-2442, 5-7 p.m.

Coleman canoe, 12 ft., green Ramex plastic, 2 paddles, \$300. 488-0323.

West Loop park & ride van pool, daily/weekly/monthly rates. Richard Heetderks, x4651.

Heavy duty utility trailer, 15" tires, chain, lights, jack, \$500 OBO. 488-6697.

Family size dome tent, 6 ft. high, 11 ft. across, sleeps 5, new, never used, light weight, \$75. Gary, x2191 or 482-1290.

Rolux GMT master watch, totally overhauled, like new, \$675. Blaine, x2411 or 488-4890.

Sewing machine & cabinet, \$50; easy chair rocker, \$35; cordless phone, \$40; brass rail queensize headboard, \$20; swag lamp, \$10. Allgeier, 488-0397.

100 National Geographics, \$30; 8-track portable player with tapes, \$25. 488-5564.

Vivitar 70-150mm zoom lens, for 35mm SLR, F 3.8 CF, \$100. 474-3839.

Prince Graphite oversize tennis racket, excel. cond., \$125 OBO. 488-9005, x268, or 486-7674.

Cookin' in the Cafeteria

Week of October 14 — 18, 1985

Monday — Columbus Day — Holiday.

Tuesday — Beef Noodle Soup; Baked Meatloaf, Liver & Onions, BBQ Spare Ribs, Turkey & Dressing (Special); Spanish Rice, Broccoli, Buttered Squash.

Wednesday — Seafood Gumbo; Broiled Fish, Tamales w/Chili, Spanish Macaroni (Special); Ranch Beans, Beets, Parsley Potatoes.

Thursday — Navy Bean Soup; Beef Pot Roast, Shrimp Chop Suey, Pork Chops, Chicken Fried Steak (Special); Carrots, Cabbage, Green Beans.

Friday — Seafood Gumbo; Broiled Halibut, Fried Shrimp, Baked Ham, Tuna & Noodle Casserole (Special); Corn, Turnip Greens, Stewed Tomatoes.

Week of October 21 — 25, 1985

Monday — Chicken Noodle Soup; Wieners & Beans, Round Steak w/Hash Browns, Meatballs & Spaghetti (Special); Okra & Tomatoes, Carrots, Whipped Potatoes. Standard Daily Items: Roast Beef, Baked Ham, Fried Chicken Fried Fish, Chopped Sirloin. Selection of Salads, Sandwiches and Pies.

Tuesday — Beef and Barley Soup; Beef Stew, Shrimp Creole, Fried Chicken (Special); Stewed Tomatoes, Mixed Vegetables, Broccoli.

Wednesday — Seafood Gumbo; Fried Perch, New England Dinner, Swiss Steak (Special); Italian Green Beans, Cabbage, Carrots.

Thursday — Cream of Chicken Soup; Turkey & Dressing, Enchiladas w/Chili, Wieners & Macaroni, Stuffed Bell Pepper (Special); Zucchini Squash, English Peas, Rice.

Friday — Seafood Gumbo; Baked Cod, 1/4 Broiled Chicken w/Peach Half, Salisbury Steak (Special); Cauliflower au Gratin, Mixed Vegetables, Buttered Cabbage, Whipped Potatoes.

Week of October 28 — November 1, 1985

Monday — Chicken & Rice Soup; Wieners & Sauerkraut, BBQ Ham Steak, Steak Parmesan, Beef & Macaroni (Special); Green Beans, Carrots, Au Gratin Potatoes. Standard Daily Items: Roast Beef, Baked Ham, Fried Chicken, Fried Fish, Chopped Sirloin. Selection of Salads, Sandwiches and Pies.

Tuesday — Tomato Soup; Potato Baked Chicken, BBQ Spare Ribs, Mexican Dinner (Special); Squash, Broccoli, Ranch Beans, Spanish Rice.

Wednesday — Seafood Gumbo; Baked Turbot, Liver & Onions, BBQ Ham Steak, Baked Meatloaf w/Creole Sauce (Special); Beets, Brussels Sprouts, Green Beans, Whipped Potatoes.

Thursday — Beef & Barley Soup; Chicken & Dumplings, Corned Beef w/Cabbage, Smothered Steak w/Cornbread Dressing (Special); Spinach, Cabbage, Cauliflower au Gratin, Parsley Potatoes.

Friday — Seafood Gumbo; Pork Chop w/Yam Rosette, Creole Baked Cod, Tuna & Salmon Croquette (Special); Brussels Sprouts, Green Beans, Buttered Corn, Whipped Potatoes.

Week of November 4 — 8, 1985

Monday — Cream of Celery Soup; Braised Beef Ribs, Chicken a la King, Enchiladas w/Chili, Italian Cutlet (Special); Navy Beans, Brussels Sprouts, Whipped Potatoes. Standard Daily Items: Roast Beef, Baked Ham, Fried Chicken, Fried Fish, Chopped Sirloin. Selection of Salads, Sandwiches and Pies.

Tuesday — Beef & Barley Soup; Turkey & Dressing, Country Style Steak, Stuffed Cabbage (Special); Corn Cobbette, Okra & Tomatoes, French Beans.

Wednesday — Seafood Gumbo; Catfish w/Hush Puppies, Roast Pork w/Dressing, Pepper Steak (Special); Broccoli, Macaroni & Cheese, Stewed Tomatoes.

Thursday — Cream of Tomato Soup; Beef Tacos, BBQ Ham Slice, Hungarian Goulash, Chicken Fried Steak (Special); Spinach, Pinto Beans, Beets.

Friday — Seafood Gumbo; Liver & Onions, Deviled Crabs, Roast Beef w/Dressing, Tuna & Noodle Casserole (Special); Whipped Potatoes, Peas, Cauliflower.

AT BUILDING #3

On Wednesday we feature The Reuben: Corned Brisket, Swiss Cheese on a bed of Sauerkraut, Poupon Mustard on Rye and 1/4 Pickle. Delicious! Monday and Thursday check out our French Dip Sandwich.