

Car Poolers Get Reserved Parking at JSC

JSC Director Christopher C. Kraft announced recently that organized car pools will be assigned reserved parking spaces on a "first come, first serve" basis.

To assist and encourage JSC onsite civil service and contractor employees in making car pool arrangements, the JSC Personnel Office has established a Car Pool Office, located in room 558, Building 45, X-4323.

JSC and contractor employees who desire assistance in forming car pools are encouraged to complete JSC form 162 and forward it to the Car Pool Office as soon as possible. The requests will be compared and assistance will be provided to employees in finding car pool partners.

According to Dr. Kraft, car pools consist of three or more JSC or contractor employees who plan to regularly commute to and from work together in one car. Where one or more of the cars to be utilized is a compact car, cars with two members will qualify as official car pools.

"The use of individual automobiles to transport employees to and from work," Dr. Kraft said, "represents a major use of energy in this nation. The fact that little or no public transportation exists to the Center makes the increased use of public

transportation difficult. Car pools, however, can substantially reduce gasoline consumption and assist the nation in meeting the current energy crisis."

To facilitate the forming of car

pools, most of the existing reserved parking spaces will be cancelled, effective December 10, 1973. Reserved parking spaces that will continue include those of the JSC Director and

Deputy Director; Special Assistants, Chiefs of Staff Offices, Program Managers and Functional Directors and their Deputies; handicapped workers; and key Center personnel assigned

to mission activities at the Control Center.

Employees who do not participate in car pools will continue to be authorized to drive individually and to park at JSC. However, these employees should be aware that they may be requested to park in undesirable locations in view of the assignment of preferable parking spaces to car pools.

Dr. Kraft stated that he "strongly encourages JSC employees to seriously consider how they can participate in car pools to help our current energy shortage."

"It is my belief," Dr. Kraft added, "that each of us through voluntary action, can do much to meet our current national energy problems. The Johnson Space Center shall use all means at its disposal to attempt to alleviate current energy problems while at the same time meeting our governmental responsibilities for aggressively carrying out our assigned missions."

Dr. Kraft said if the nature of a particular employee's duty assignment does not preclude changes in his official hours of duty, the Division or office concerned will adjust his official hours to make car pooling possible.

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REDUCED LIGHTING AT CENTER—The current energy crisis has resulted in a number of specific actions at JSC designed to reduce the use of energy. One of the measures taken has been reducing the use of lights. The photo above shows JSC at night before the reduced lighting took effect. The bottom photo shows the Center after light reduction.



ROUNDUP

NASA LYNDON B JOHNSON SPACE CENTER

HOUSTON, TEXAS



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Major Reorganization Plan to Be Implemented at JSC



KLEINKNECHT

A reorganization plan involving two key directorates is being implemented at JSC to adjust to the Center's evolving role in the post-Skylab era of manned space flight.

Center Director Dr. Christopher C. Kraft, Jr. announced the reorganization essentially combines two directorates—Flight Crew Operations and Flight Operations—into a single operations organization and establishes a new directorate, Data Systems and Analysis.

"The Space Shuttle program and the Apollo-Soyuz Test Project are our major manned space flight challenges in the upcoming years and the resources of the Center should be properly organized toward these goals," Dr. Kraft said. "At the same time, however, we intend to implement the reorganization in such a fashion that there is no adverse effect on the ongoing Skylab program."



KRANZ

Under the plan, Flight Crew Operations and Flight Operations will be combined into a new Flight Operations Directorate that will be entirely devoted to space flight and aircraft activities. The new Data Systems and Analysis Directorate

SL-4 Crew Adjusting Well to Zero-G

Skylab 4 astronauts Gerald Carr, Edward Gibson and William Pogue are responding well to their new mode of living in a weightless environment. Their schedule has emphasized earth resources, solar observations and medical experiments. Photographs of the Comet Kohoutek have also been taken.

Each crew member has time reserved for intensive physical training and personal hygiene.

In addition, a Skylab bonus of three unscheduled science demonstrations performed by the



TINDALL

will basically be responsible for providing institutional and programmatic data systems and related analysis. It will also have a primary responsibility for managing and providing the onboard software for Space Shuttle.

Pilot astronauts in the former

SL-3 crew in their spare time has resulted in plans for expansion of this activity by the crew of SL-4.

Twenty-six science demonstrations, designed to explain certain scientific principals or phenomena in the space environment, have been approved for crew performance as time is available during the SL-4 mission. Fifteen of the demonstrations were suggested by Marshall Space Flight Center scientists, nine by scientists at JSC and two were jointly proposed



DUNSEITH

Flight Crew Operations Directorate will be assigned to the Astronaut Office in the new Flight Operations Directorate. Scientist astronauts will be assigned to Astronaut Offices in the Science and Applications and Life Sciences Directorates,

by MSFC and JSC.

JSC scientists suggested Energy Loss and Angular Momentum, Bead Chain, Wave Transmission/Reflection, Wilberforce Pendulum, Magnetic Effects, Curved Ball Effect, Human Body Momentum, Body Dynamics and Perfect Gas Law.

Demonstrations suggested by MSFC scientists are: Diffusion in Liquids, Ice Melting, Ice Formation, Effervescence, Immiscible Liquids, Liquid Floating Zone, Silver Crystal, Liquid

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GARRIOTT

depending on their specialties.

The pilot astronauts are identified as flight crew candidates for the Space Shuttle program. In their new assignments, the scientist astronauts will serve as the crew operational interface with some designated and potential Shuttle payload users. The scientist astronauts will be candidates as payload specialists for Shuttle flights, and they may also be considered for flights as individual experimenters.

The new Flight Operations Directorate will also be responsible for flight control, flight planning, crew training and procedures, and aircraft operations.

Dr. Kraft announced the following key management personnel assignments involved in the reorganization:

—Kenneth S. Kleinknecht, present Skylab Program Manager, and Eugene F. Kranz, Chief

[Continued on Page 2]

VISIBILITY CONDITIONS FOR COMET KOHOUTEK IN HOUSTON

DECEMBER 8, 1973 THROUGH FEBRUARY 14, 1974

| DATE | APPROX. LOCAL STD. TIME (AM) | | | COMMENTS |
|------------|------------------------------|------------------------|-----------------|---|
| | RISE TIME COMET'S HEAD | BEGIN MORNING TWILIGHT | TIME OF SUNRISE | |
| 1973 DEC 8 | 4:38 | 5:38 | 7:05 | COMET HEAD BECOMES SMALLER WHILE TAIL CONTINUES TO GROW IN LENGTH. VISIBLE BRIEFLY IN SOUTHEAST MORNING SKY PRIOR TO AND PERHAPS DURING EARLY TWILIGHT. |
| DEC 12 | 5:02 | 5:41 | 7:07 | COMET BRIEFLY VISIBLE PRIOR TO AND PERHAPS DURING EARLY TWILIGHT AS IT RISES TAIL FIRST IN SOUTHEAST. TAIL WILL RISE PRIOR TO RISING TIMES LISTED FOR COMET'S HEAD. |
| DEC 16 | 5:31 | 5:43 | 7:10 | COMET VISIBLE IN EARLY PHASE OF MORNING TWILIGHT. TOWARD END OF MONTH, COMET MOVES MORE AND MORE INTO GLARE OF DAWN. |
| DEC 20 | 5:45 | 5:45 | 7:12 | COMET SHOULD BE VISIBLE IN EARLY SOUTHEAST MORNING TWILIGHT. COMET RISES APPROXIMATELY ONE HOUR BEFORE SUN. COMET TAIL VISIBLE EARLIER. |
| DEC 24 | 5:47 | 5:47 | 7:13 | COMET VISIBLE TO WEST OF SUN THROUGHOUT MORNING TWILIGHT. FROM DEC 24 THROUGH DEC 31, COMET IS WITHIN 10 DEGREES OF SUN AND SHOULD BE VIEWED ONLY BY EXPERIENCED OBSERVERS. |

| DATE | APPROX. LOCAL STD. TIME (PM) | | | COMMENTS |
|-------------|------------------------------|----------------------|-----------------------|--|
| | TIME OF SUNSET | END EVENING TWILIGHT | SET TIME COMET'S HEAD | |
| 1973 DEC 28 | 5:29 | 6:53 | 5:29 | COMET PASSES CLOSEST TO THE SUN ON THIS DAY. IT WILL RISE AND SET WITH SUN (APPROXIMATELY). COMET CHANGES FROM A MORNING TO AN EVENING OBJECT. AVOID LOOKING AT SUN |
| 1974 JAN 1 | 5:32 | 6:56 | 6:25 | COMET MAY STILL BE A DAYLIGHT OBJECT FOLLOWING SUN AND SHOULD BE MAGNIFICENT IN WEST-SOUTH-WEST EVENING TWILIGHT WITH TAIL EXTENDED UP FROM HORIZON. FOR FIRST TWO WEEKS IN JANUARY, COMET VISIBLE AFTER SUNSET. |
| JAN 5 | 5:34 | 6:58 | 7:07 | COMET MAY BE MAGNIFICENT IN WEST-SOUTH-WEST SKY DURING AND CONTINUING AFTER EVENING TWILIGHT. JUPITER, VENUS AND COMET ROUGHLY ALIGN ON THIS DAY. VENUS IS THE BRIGHTER OF THE TWO PLANETS. |
| JAN 9 | 5:37 | 7:00 | 7:46 | NEARLY FULL MOON RISES IN EAST WHILE COMET MAY BE MAGNIFICENT IN WEST-SOUTH-WEST SKY DURING AND CONTINUING AFTER EVENING TWILIGHT. COMET TAIL SHORTENS AND DIMS WITH EACH PASSING DAY. |
| JAN 13 | 5:41 | 7:04 | 8:27 | COMET STILL VERY IMPRESSIVE OBJECT IN WEST-SOUTH-WEST SKY AFTER EVENING TWILIGHT. JAN 10 THROUGH 20 BEST FOR PHOTOGRAPHY AS COMET APPEARS HIGHER ABOVE HORIZON AFTER TWILIGHT AND MOON IS WANING. |
| JAN 17 | 5:44 | 7:07 | 9:05 | COMET MOVING OUT OF AQUARIUS. IT SHOULD BE EASILY VISIBLE TO NAKED EYE ABOVE WEST-SOUTH-WEST HORIZON AFTER TWILIGHT. |
| JAN 21 | 5:47 | 7:10 | 9:39 | COMET TAIL CONTINUES TO SHRINK AS COMET GROWS LESS BRIGHT. STILL SHOULD BE NAKED EYE OBJECT DURING AND AFTER EVENING TWILIGHT. |
| JAN 25 | 5:51 | 7:12 | 10:08 | COMET CLOSE TO VERNAL EQUINOX, AND MAY REMAIN VISIBLE TO NAKED EYE IN WEST-SOUTH-WEST AFTER EVENING TWILIGHT. |
| JAN 29 | 5:55 | 7:16 | 10:33 | COMET TAIL CONTINUES TO SHORTEN WHILE HEAD GROWS DIM. COMET MAY STILL BE A NAKED EYE OBJECT IN WESTERN SKY AFTER EVENING TWILIGHT. BINOCULARS WOULD BE USEFUL. |
| FEB 6 | 6:01 | 7:21 | 11:04 | BINOCULARS OR SMALL TELESCOPE MAY BE USEFUL TO OBSERVE COMET IN WESTERN, DARK, EVENING SKY. |
| FEB 14 | 6:09 | 7:27 | 11:19 | COMET REACHES ITS HIGHEST ALTITUDE ABOVE HORIZON AT MID-MONTH. BINOCULARS OR SMALL TELESCOPE REQUIRED. |

VIEWING SUGGESTIONS:

1. CAUTION: BE VERY CAREFUL WHEN VIEWING COMET NEAR SUN; LOOKING AT THE SUN CAN RESULT IN PERMANENT EYE DAMAGE.
2. WIDE FIELD BINOCULARS AND SMALL TELESCOPES AT LOW POWER ARE USEFUL WHEN COMET IS DIM. NAKED EYE IS BEST WHEN COMET IS AT ITS BRIGHTEST.
3. PHOTOGRAPHY REQUIRES A TRIPOD FOR STABILITY. SET LENS WIDE OPEN AND USE INFINITE FOCUS. USE FAST COLOR OR BLACK AND WHITE FILM (ASA 500) AND TRY SEVERAL EXPOSURE TIMES, FROM A FEW SECONDS UP TO A MINUTE. TRY AND INCLUDE FOREGROUND OBJECTS (i.e., TREES, ROOFTOPS, ETC.) IN PICTURE SO THAT SIZE COMPARISONS CAN BE MADE.
4. ACCURATE SCALE DRAWINGS ARE VERY USEFUL FOR RECORDING THE COMET'S HEAD AND TAIL STRUCTURE. A SERIES OF DRAWINGS SHOWING THE EVOLUTION OF COMET'S STRUCTURE OVER SEVERAL DAYS WOULD BE PARTICULARLY INTERESTING.

Reorganization Plan

[Continued from Page 1]

of the Flight Control Division will serve as director and deputy director respectively of the new Flight Operations organization. They will also continue in their present assignments through the completion of the Skylab program. Alan B. Shepard, Jr. is Chief of the Flight Control Astronaut Office.

—Howard W. Tindall, Jr. and Lynwood C. Dunseith are named director and deputy director respectively of the Data Systems and Analysis Directorate. They served in the same capacity in the former Flight Operations Directorate.

—Astronaut Dr. Owen K. Garriott has been named Deputy to Director Anthony J. Calio of the Science and Applications Directorate. Dr. Harrison H. Schmitt will be Chief of the Science and Applications Astronaut Office.

—Astronaut Dr. Joseph P. Kerwin will be assigned additional duties as Chief of the Life Sciences Astronaut Office which will also include astronaut physicians Drs. F. Story Musgrave and William E. Thornton.

—In addition to their assignments as Shuttle crew candidates, three pilot astronauts are assigned additional duties in project management. They are Fred W. Haise, Jr., Technical Assistant to the Space Shuttle Orbiter Project Manager; Charles M. Duke, Jr., Technical Assistant to the Acting Manager for Space Shuttle Systems Integration; and Eugene A. Cernan, Special Assistant to the Apollo-Soyuz Test Project Manager.

Thirty-seven astronauts are currently on active flight status at the Johnson Space Center. Of

the 26 pilot astronauts, a total of 16 will be participating in Space Shuttle activities by the end of the Skylab program, with 10 assigned to the prime, backup and support crews for the Apollo-Soyuz mission, scheduled for 1975. Eight scientist astronauts will work in the Science and Applications Office and three in Life Sciences. All astronauts will continue to maintain their aircraft flight proficiency.

Astronauts Donald K. Slayton and Thomas P. Stafford, director and deputy director respectively of the former Flight Crew Operations Directorate, are in training as prime crew members for the Apollo-Soyuz mission, and with their designation as flight crew members, are assigned to the Astronaut Office.

Although the reorganization is effective immediately, it will not be completely implemented until February 1974, following the end of Skylab.

AFGE To Conduct Membership Drive

The American Federation of Government Employees, (AFGE), Local 2284, will conduct a membership drive during the months of December and January.

Local 2284 is the exclusive representative for nonsupervisory professional and nonprofessional employees located in Houston (except for employees performing wood and plastic modelmaking) as well as wage and grade employees.

A spokesman for the Local has indicated that information and application forms are available from any AFGE official or member. According to the spokesman, the AFGE is the most active Federal union at the national level, representing over 600,000 Federal employees.

The Local's initiation fee is \$3.75 and dues are \$2.50 per pay period (income tax deductible). The dues may be paid either through payroll deduction or by direct payment to the Union.

An Executive Order assures that Federal employees have the right to join or refrain from joining labor organizations without fear of reprisal.

Christmas Concert

The Bay Area Chorus, accompanied by the Clear Lake Chamber Orchestra, will present its eighth annual Christmas concert in the JSC main auditorium at 8:30 p.m., Sunday, December 16. The public is invited free of charge.

Included on the program is "The Magnificat" by Giovanni Pergolesi; "Carol Fantasy" by Normand Lockwood; and "Jubilate Deo" by Flor Peters.

Milton Pullen is chorus director; Mrs. Nat Harvy Vaughn directs the orchestra.

Take stock in America. Give U.S. Savings Bonds.



SOVIET SCIENTISTS VISIT U. S. CLASSROOM—Professor Vladimir Syromyatnikov and Oleg Pershikov of the U. S. S. R. recently visited the Seabrook Intermediate School. The two men answered the students' questions about life in the Soviet Union.

Crew Adjusts To Zero-G

[Continued from Page 1]

Films, Lens Formation, Acoustic Positioning, Gyroscope, Cloud Formation, Charged Particle Mobility, Neutron Environment and Rochelle Salt Growth.

Scientists at the two Centers jointly proposed Water Drop and Orbital Mechanics.

Table Tennis Club Holds Meeting

A JSC Table Tennis Club Meeting will be held at the Gilruth Recreation Center, Room 204, Thursday December 13 at 7:30 p.m. The agenda includes election of 1974 officers and planning future club activities.

For more information contact Stephen Jacobs, club president, at x-3561.

Tennis Anyone?

All persons interested in playing tennis are invited to the first formal meeting of the JSC Tennis Club, Monday, December 10 at 5:15 in the JSC Recreation Building.

For additional information, contact John Norris, x-2788 or Walt Jaderland, x-6318.

ROUNDUP

NASA LYNDON B. JOHNSON SPACE CENTER

HOUSTON, TEXAS



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Astronaut Conrad Joins Cable Television Firm

Astronaut Charles "Pete" Conrad has announced his retirement from NASA and the U.S. Navy effective February 1, 1974. Conrad will become Vice-President, Operations and Chief Operating Officer of the American Television and Communications Corporation, a cable television firm based in Denver, Colorado.

Holding the rank of Captain in the Navy, Conrad retired after more than 20 years Navy service, 11 of which have been as an astronaut in the United States' manned space flight program.

Conrad's shift from space flight to private business "was a tough decision," he said. "There will be no way to match my last 11 years in space exploration. But cable television is a growing, exciting new field which uses satellites, computers and a great deal of space-developed technology."

Conrad will continue to serve as a member of NASA's Space Systems Committee, a group of experts within and outside the agency charged with planning current and future space projects.

Selected as a NASA astronaut in 1962, Conrad has flown on four space missions: as Pilot of the eight-day Gemini 5 flight in 1965, as Command pilot of the three-day Gemini 11 in 1966, as Commander of the second manned lunar landing on Apollo 12 in 1969, and as Commander of the first crew to visit and operate the Skylab Space Station in the spring of 1973. In-flight repairs to the space station solar cells and installation of the "parasol" sun shield by Conrad and his crew members kept Skylab operational for follow-on crews. The first Skylab mission lasted 28 days, bringing Conrad's total space flight time to 1,180 hours.

Conrad, 43, was born in Philadelphia, Pa. He earned a Bachelor of Science degree in



CONRAD

aeronautical engineering from Princeton University in 1953 and entered the U.S. Navy to become a naval aviator and test pilot until his selection as a NASA astronaut. He has logged almost 7,000 hours aircraft time, most of which was in jet aircraft.

Among Conrad's awards are two NASA Distinguished Service Medals, two NASA Exceptional

(Continued on Page 4)

JSCers Honored

As part of JSC's Manned Flight Awareness Program, 45 Center employees were honored with a trip to Kennedy Space Center to view the launch of Skylab 4.

Honorees include Eleanor H. Chady, Jean T. Taylor, Dorothy R. Wilson, Martha Taylor, Bonnie Smith, Homer Scott, Sharon Martin, Vada Ashwood, J.D. Atkinson, Dorothy S. Davis, R. F. Bazhaw, Rene Harrison, Frances Kennedy, Mary Lopez, H. A. Nirchke, Thelma Williams, Glenna Schisser, Marion Loveless, J. R. Fulton, E. A. Tarkington.

G. A. Nixon, Nina Maxey, G. S. Allton, G. L. Grow, M. L. Cox, C. C. Shrimplin, James West, James Ward, L. G. Cox, W. C. Douglas, J. R. Martin, Kirksey Collins, T. L. Howe, J. F. Stanley, Arthur Deaton, Patt Huber, J. D. Jenkins, Jean Brown, Mary Crocker, Sharon Cordes, Paula D. Hagan, Carolyn S. Lisenbee, Mary M. Nordin, J. L. Louis, and Mary M. Patino.



TRIP TO KSC—Pictured above are the 45 JSC employees who were honored with a trip to Kennedy Space Center to view the liftoff of Skylab 4. The trip was in recognition of their outstanding support to the Skylab Program.

Roundup Swap-Shop

Swap Shop advertising is available to JSC and on-site contractor personnel. Articles or services must be offered as advertised, without regard to race, religion, sex or national origin. Ads should be 20 words or less, including home telephone number. Name and office code must accompany, but need not be included in ad copy. Typed or printed copy must be received (AP3 Attn: Roundup) by Thursday of the week before publication.

VEHICLES

Credit Union Repos- 73 Pinto, 9,600 miles, xint cndn, 70 Cadillac Eldorado, recent top end overhaul, gd cndn, 70 Pontiac LeMans, nds body work, 70 Oldsmobile, 98, not running, 67 Buick Riviera, nds work, but running, cars may be inspected Dec 10-13 at parking lot opposite fire sta from 11 am-1 pm, bids close Dec 13 at 5:30 p.m.
69 Cougar, air auto, AM/FM stereo, pwr, nw polyglas tires, 1 owner, clean \$1400, Voight, 482-2158.
68 Plymouth Sedan, std shift, xint gas mi, gd wk car, \$450, Davis, x-5176.

71 Toronado, loaded, xint cndn, \$2700, Davis, 5176.

71 19' self-contained travel trailer, new air cndn, xint cndn, 473-0117 aft 3.
69 Ford 1/2ton pick-up, v-8, LWB, styleside, overdrive, 1250# Springs, frame gas tank, \$1450, Currie, 585-8676 (Alvin)

70 Mercedes 280 S, xint cndn, low mi, pwr str/brks, air, AM/FM/SW Sampsel, 471-0172.
69 Ford Torino, 2-dr, ht, \$1200, 64 Ford Galaxy, loaded, a/c tape deck, \$450, Alford, 334-2844.

71 Honda 350 CB., gd cndn, \$450, Rupp Roadster Minibike, \$100, 472-5243 aft 5 pm.
60 Chevy, 67000 mi, 18 mpg, mechanically prfct, \$200, Gary 482-2723.

68 Firebird, loaded, gd cndn, real steal, Sue, 944-3647, aft 6 pm.
New 5-spd women's bike, \$50, Wain, x-3138.

67 Chevelle Malibu, sp. cp. V8, auto, air, nw tires, clean, 5575, 481-2535.
62 Dart, nds repair, Honda 50, mini bike, parts, 483-2660.

72 Jayco ht. fold-down camper, kitchen, ice box, sleeps 8, \$10/day, \$57/wk, (\$25 max) Kilbourn, 482-7879.

61 VW, hit in left rear, \$100 as is, can be towed away, xtra wh and tire, engine not hit, Muhly, 471-3761.

70 Honda trail 90, prfct for work, hunting, camping, \$225, Millican, x-3901, 488-2384.
Utility trailer, 6 x 8, metal construction, nw tires, \$150, Millican, x-3091, 488-2384.

60 Chev, \$100, Hector, 488-0217.
70 Chrysler New Yorker, low mi, nw tires, stereo, FM/AM radio, Chauvin, x3977.

74 Chevy Custom 10, V-8, standard, hd springs, gauges, fact air, radio, reasonable, 482-3964 aft 6 and wkends.

72 Ford Maverick, stan trans, gd gas mi, take ovr pymnts of \$80. mo, x-2146 or 559-2790.

72 Plymouth Satellite, 9 pass sta wgn, 20,000 mi, extra, \$3,000, 991-2120.
Montgomery Wards trailer size, 4 x 7 for camping, fold-out tent size, 7 x 15 storage compartments 1.5 x 2 x 3.5, \$250, 471-0778.

67 Plymouth Fury III, loaded, nw tires, \$500, 471-4694.

17' travel trailer, self contained, sleeps 4, air awning, car mirrors, jacks, full hookups, equalizer hitch, sway bars, elect brk controls, \$1,500, Schmidt, 472-8908 aft 5:30.

68 Olds Cutless, 2-dr, air, \$200 under retail, \$1050, 333-3830.

69 Dodge Charger, auto, air, vinyl top Rainey, 488-4384.

70 Cadillac Deville, xtra clean, all pwr, nw steel radials, cruise cntrl, J. D. Williams, 488-2309 or 483-5800.

Italian 10 spd bike, li nw, \$55, Perroni, 921-0369 aft 5.
Go-cart racing slicks, gd cndn, \$125, Sampsel, 471-0172.

MISCELLANEOUS

3 mag 7" Chevy wheels chrome, \$25 for all 3, Alford, 334-2844.
Tent 10 x 14 Camel, xint cndn, \$80, Fishmaster, water temp. meter (0-50 ft) li nw, \$18, Price, 471-3314.

Bell and Howell Focustronic autoloader super 8 camera, used, 3 x, \$95, Wain, x-3138.
Argus super-8 zoom movie camera, xint cndn, \$25, Sylvania movie light, \$5, Baia 8 mm editor \$5, 488-3966.

3 x 4 ft wide frame glass windows, \$0.50 ea, ideal for cold frames, greenhouse, sunporch, etc, R. W. Bricker, 471-2999.

Polaroid Camera, Model 100, case, flash attachment, portrait and closeup lens, plus timed shutter release, \$85, Brookes, 488-2795.

Heathkit transistor tester, \$19, Motorola transistor radio, \$10, projector screen, \$10, walnut coffee table, \$15, house plant \$4 to \$50, 482-1179.

61 VW wh and tire li nw, \$15, 477-3761.
Car radio, Delco, AM/FM \$30, Millican, x-3091, 488-2384.

Rollaway dbl bed, \$10, Lattier, 534-2756.
5-piece Apollo drum set, xint cndn, \$100, Glover, 334-2317.

Ham gear, 15 megacycle, oscilloscope, xint, \$50, 3-band beam, \$25, Drake 2-c receiver, \$190, heavy duty rotor, \$35, Hallcrafters keyerm \$50, Linosey, 488-0517.

Baby items, bed, playpen, car seat, walker, others, Vibbart, 488-0582.

Antique washstand and occasional table, reasonable, Turpin, 487-0820.
Golf starter set, Spaulding, 3 woods, 5 irons and bag, gd cndn, \$20, cart, \$2, 481-3223 aft 5, or x-3003.

Volunteer firemen, policemen: 3-lite car/truck tip rack, 2 strobe lights w/ Xenon bulbs, 1 amber revolving lite, wired, use in 12 volt neg ground electrical system, \$85, Statz, 5381.

Electric lawn mower, Blic and Decker, twin blade, w/ grass catcher, new belts, blades, runs well, Vibbart, 488-0582.

PROPERTY & RENTALS

Lot on Lake Livingston, Prince, 483-2171 or 991-4537 aft 5 pm.

House for sale, Seabrook Miramar Park, nice 3-2-2 on cul-de-sac, fence, blt-ins, elem and int schools, shopping etc near, Assume 6 1/2 percent FHA loan with \$171 payments, \$5900 equity or bst ofr, 2320 Nassau Dr, 474-5081 or 474-3706.

PETS

Paint Shetland pony w/ saddle and bridle, on pasture in Webster, Lindsey, x-5258, or 332-2079.

5-year old male Bordu Collie, x-4321
Free, jet black kittens, Siamese mother, 9 wks old, 333-3368.

BOATS

GC 20 sailboat w/ trailer, xint cndn, race equipment w/ top racing record, \$2,850, Blount, 333-4609.

14' Lido sailboat and trailer, sails, cover, life jackets, etc gd cndn, \$1800, Palmer, 334-2918, 5589.

14' fiberglass, V-hull fishing or ski boat, 55 hp Johnson, xint cndn, nw wiring, lights, bearing buddies, battery, tank, must sell, \$100 or best ofr, Allgeir, 333-4627.

72 Chrysler, 85hp outboard motor, fully equipped, li new, \$800, 442-2213 or 448-8737, aft 5:30.

71 Johnson 100 hp outboard motor, hydro-drive, w/o controls, li new, \$695, 442-2213 or 448-8737 aft 5:30.

70 Glastron v-177 swinger w/ sportsman trailer, Volvo I/O, loaded, xint cndn, \$3,475, McCreary, 946-5285.

LOST AND FOUND

Lost Spaulding softball glove, Nov. 8 at NASA field 3 following Marvels-Kegtappers playoff game, Berthiaume, x-3584 or 482-3963.

HOUSEHOLD ARTICLES

Baby bed and mattress, \$12, play pen and new pad, \$8, gd cndn, Smith, 488-3238.
Heathkit 23" color tv kit, model GR 295, (vacuum tube, no cabinet,) \$275, Overton, 6478 or Dickinson, 534-2476.

Lady Kenmore Washing machine, \$25, Glover, 334-2317.
Piano, Fisher baby grand, \$600, Voight, 488-1931.

Tappan dishwasher, \$20, 1 bike, 20", banana seat, \$20, Beverly, 3031 or 555-6139 aft 1 p.m.

WANTED

Ho Guage train set in xint cndn, preferably made by MARKLIN, 2261, 2262 or 946-7028.
Riders, Gessner & Westheimer area, 610 to Gulf Freeway and NASA, 8:00-4:30 shift, \$1.00/day, Arnold, 483-2596 or 785-5915.

Carpool from Southwest Houston to JSC, 8:30-5 Joan 3041.
Carpool from League City (S.E.) to JSC, 8:3 to 5 shift, 483-2281 or 554-2434 aft 5:30 pm.

Join or form carpool from Broadway/Park Place or Gulfgate areas, Hours, 8:30-5:00 Ed, x-3258.
Share-A-Ride, Liverpool/Alvin area, to JSC, 8-4:30, Howard, 2291.

Delegation Visits White Sands

A number of Center officials, including JSC Director Christopher C. Kraft, recently visited NASA's White Sands Test Facility (WSTF) at Las Cruces, New Mexico.

WSTF Manager Jesse C. Jones reviewed the Facility's test programs and progress at a dinner held in honor of the JSC group.

Activities at the WSTF include Shuttle Orbital Maneuvering Engine Design Feasibility testing; site and facility preparation for Shuttle Orbital Maneuvering System and Reaction Control Systems testing; Skylab, Apollo-Soyuz Test Project, and Shuttle materials testing; special materials testing for Kennedy Space Center, Marshall Space Flight Center, and the NASA Aerospace Safety Research and Data Institute; Cryogenic filter testing; component qualification testing for Skylab and ASTP; and engineering test programs conducted at the Department of Army managed White Sands Missile Range.

WSTF previously contributed significantly to the Apollo program. The site was used to perform development and verifi-

cation testing of the Command and Service Module propulsion system, the Lunar Module ascent and descent engine systems, and reaction control systems.

In addition, the Apollo astronaut launch escape and earth landing systems were tested and qualified at the White Sands Missile Range. The WSTF laboratories performed extensive materials testing for determina-

tion and elimination of flash, fire, and other potential spacecraft hazards to astronauts.

Test programs also included special laboratory tests, Apollo flight anomaly testing, Skylab reaction control system tests, environmental testing of equipment for Skylab, Lunar Receiving Laboratory support, and several special tests for the NASA Aerospace Safety, Research and Data Institute.



JSC DELEGATION VISITS WSTF—Members of the JSC Delegation and some of the WSTF officials pose for a photo on front of an Altitude Test Chamber. Left to right are Archie Beckett, Gene Lundren, Bailey Chaney, Martin Raines, Maurice Clelland, Robert Tillet, Ben, Sjogels, Dr. Christopher Kraft, Jerry Hammack, Jessie Jones, John King, Sigurd Sjoberg, William Kelley, George Abbey and William Easter.

Nuclear Powered Stations Enhance Knowledge of Moon

Scattered across the face of the Moon, five experimental stations relay a steady stream of scientific information—the energetic remnants of Man's first escape from his problem-plagued Earth.

Apollo 12 astronauts Alan L. Bean and Charles "Pete" Conrad Jr. placed the first of the automatic stations on the Moon during a four-hour exploration of the surface on November 19, 1969. It is now in its fifth year of operation.

With four other nuclear-powered stations scattered across the Moon's face, the Apollo 12 outpost reports its findings from a world where men no longer walk.

Nearly two dozen scientific instruments keep tabs on the Moon's pulse and respiration, expanding the wealth of knowledge gained by surveys made from orbit and from the surface in the first years of intense lunar investigation.

While seismometers register tremors caused by meteoroids, tidal forces, and internal changes in the Moon, other sensors record particles found in the extremely rarefied lunar atmosphere and measure the heat flowing from within the body. Yet another device detects the size and speed of micrometeoroids striking the surface.

Man's knowledge of the Moon has advanced markedly during recent years. Changes have come so quickly that few can remember our great ignorance in the days before the first spacecraft probed the Moon's mysteries.

Before the first flights to the Moon, our sketchy knowledge was based almost entirely on visual observation. With telescopes we could prepare rough maps of the Moon's near side, we could name its features, we could distinguish the dark plains from the rugged highlands. The size, mass, and shape of the satellite—these were the limits of our firm knowledge.

Less than a decade ago, virtually nothing was known about the Moon's distinct chemical makeup, the geological structure beneath its surface, its age or evolution. No one could say for certain whether life—even limited to the simplest viruses—existed on the Moon. From the Earth, we could not tell whether water or oxygen were hidden beneath the surface, nor if they had perhaps been abundant long ago.

Whether the Moon had a magnetic field now or in the past was unknown. We had not yet learned to distinguish between craters produced by volcanoes and those left by meteoroids.

In the 1960's world of ignorance, speculation was king. Some reputable scientists argued plausibly that the Moon's plains were once washed by great oceans—a theory that had

led Galileo to the Latin name "mare," or sea, for the broad, dark basins he saw in his telescope.

The first spacecraft to land on the Moon, another scientist warned, would sink beneath the dusty surface. The lunar rocks would burst into flame, some believed, when brought into the pure oxygen atmosphere aboard the Apollo lunar module.

Many people believed that the Moon had been pulled from the

that of the Earth's crust.

For the first 600 million years, the Moon was battered by large meteoroids. The battering culminated in a gigantic cataclysm, as a huge body smashed in to the Sea of Rains, melting rocks and showering the Earth and Moon with debris.

The great collision produced a basin hundreds of miles across, the right eye of the Man in the Moon. No one can be certain now whether the whole solar

on the Moon.

Because certain seismic waves are transmitted by solid material, we can be certain that the Moon is solid to a depth of at least 800 kilometers, about halfway to its center.

Other seismic evidence indicates that the Moon is partially molten below 1000 kilometers (600 miles).

Just as the Moon is not entirely solid neither is it completely cold. Heat flows outward

been detected there.

There is no water on the Moon, nor has there ever been. Not a drop of water can be found on or near the lunar surface. The famed "seas" of the Moon are far drier than the driest deserts on Earth. The Moon is so lacking in water that most iron found there shows no rust at all.

The Moon has so little atmosphere that it may be considered a vacuum. But particles are detected above the surface—many of them produced directly or indirectly by the Sun, which radiates matter outward in a "solar wind."

Even our visual knowledge of the Moon has advanced tremendously. Cartographers have mapped substantial portions of both the near and far sides of the Moon in great detail using the photographs taken by Apollo mapping cameras.

Space flights showed us that the far side of the Moon is markedly different from the face we can see, with more rugged craters and highland regions, and fewer lowland plains.

While investigators continue to study the vast treasure of lunar samples and the continuing flow of data from the Apollo experimental stations, the thousands of pieces of knowledge gathered about the Moon are being combined in new ways to reveal ever greater secrets.

This synthesis of knowledge is expected to flavor the Fifth Lunar Science Conference scheduled to meet in Houston March 18-22, 1974.

Five experimental stations still pulse their messages through space despite years of searing heat and freezing cold—a symbol of man's desire to reach beyond confining Earth, and a proof that he can do so.

Conrad

[Continued from Page 3]

Service Medals, Navy Astronaut Wings, the Navy Distinguished Service Medal and two Distinguished Flying Crosses. He is a Fellow of the American Astronautical Society and the New York Academy of Science, Fellow Elect of the American Institute of Aeronautics and Astronautics and an Associate Fellow of the Society of Experimental Test Pilots. He holds an Honorary Master of Arts degree from Princeton, an Honorary Doctorate of Laws degree from Lincoln-Wesleyan University and an Honorary Doctorate of Science from Kings College, Wilkes-Barre, Pa.

Car Pools

[Continued from Page 1]

Any questions regarding car pool arrangements, should be addressed to your Personnel Specialist or Dawn Hoyle, X-43 23.



APOLLO 11 ON MOON—Close-up view of an astronaut's foot and boot—print in the lunar soil, photographed with a 70mm lunar surface camera during the Apollo 11 lunar surface extravehicular activity. Astronaut Michael Collins, command module pilot, remained in the Command and Service Module in lunar orbit while Astronauts Neil A. Armstrong, commander, and Edwin E. Aldrin Jr. lunar module pilot, explored the Moon.

Earth's side, creating the Pacific Ocean.

A large number of scientists were confident that the Moon was cold, dead body composed of material much like that of the Earth. Most believed that unlike the Earth, the Moon would not reveal the effects of any magnetic field present during its evolution—a belief that seemed to be reinforced by the first crude measurements from space.

These myths—once vigorous evidence of man's desire to understand something he saw but could not touch—are now memorials to scientific progress.

Though the flights to the Moon were conceived to develop a new technology that would allow men to venture beyond the Earth, the scientific benefit they have brought is remarkable. We understand our own planet and solar system far better than a decade ago because we have pierced the mysteries of the Moon.

Continuing investigation of the Moon has produced findings that fill thousands of pages in scientific journals.

The Moon was created at the same time as the Earth, about 4.6 billion years ago. Although its origin is uncertain, scientists now have convincing evidence that the Moon was not pulled from the Earth to create the Pacific Ocean. Born long before the Pacific, the Moon's chemical makeup is clearly different from

system ran amuck then, or if the event was confined to the Earth-Moon system.

Since the cataclysm, the Moon's face has been scarred again and again by smaller meteoroids. Most scientists are now convinced that active volcanoes have not played an important part in the developments of the past 3 billion years.

Beneath the surface of the Moon, distinct layering can be detected—a surprise to many scientists.

Where Apollo 12 landed, for example, about a kilometer (0.6 mile) or more of broken material lies at the surface. Below this is 20-25 kilometers (12-15 miles) of solidified lava. The next 40 kilometers (24 miles) are of another type of rock, probably rich in feldspar. Still further down are rocks that have properties similar to the magnesium and silicon-rich rocks believed to exist in the region lying beneath the Earth's crust.

The Moon experiences tremors or moonquakes, most of which originate at a depth of about 800 kilometers (500 miles) beneath the surface. Most are caused by the tidal pull of the Earth and Sun, but some are the result of meteoroid impacts. Even the greatest moonquakes are far weaker than the powerful tremors sometimes felt on Earth.

Every year, earthquakes release a trillion times as much energy as the quakes occurring

from the interior at a rate slightly lower than that of Earth, but surprisingly large for such a small body.

Substances on the Moon were exposed to a weak magnetic field during its early history—a field whose source is unknown. Because the remnant magnetism is weak, the first measurements from space failed to detect it.

The chemical composition of the Moon is unique. It is unlike certain meteorites believed to be similar in composition to the original material that formed the solar system, a finding that disappointed some expectations. Neither is it like the Earth.

The Moon has less gold, carbon, hydrogen, nitrogen, free oxygen, lead, mercury, sodium, cadmium, and zinc at its surface than Earth does.

On the other hand, the mountains of the Moon are noticeably richer in aluminum and calcium than the Earth. At some dark plains sites, the surface is surprisingly rich in titanium.

Although the first astronauts to return from the Moon were carefully quarantined to protect Earth from microorganisms that might have lived on the Moon, we now realize that such precautions are unnecessary for visitors to the satellite.

The essential pre-cursors to amino acids, which form the basis of life on Earth, have been found in samples returned from the Moon, but neither amino acids nor primitive life have