

ROUNDUP

Lyndon B. Johnson
Space Center

NASA

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☆ Tests around site verify Orbiter & SPS equipment

It's cold and dark in Building 32, Chamber A. The environment at orbit 400 miles above Earth is being simulated by employees of Crew Systems with support from the Space Environment Test Division and contractor personnel. They are monitoring controls 24 hours a day, testing the Orbiter's Active Thermal Control System to verify design of heat collection and rejection devices and temperature control techniques.

During part of the testing, infrared lamps create heat of the sun or the heat reflected from Earth. Freon pumps through the walls. Every 90 minutes, the chamber goes through a cycle—the lights dim and go back up, temperatures change—to simulate an orbit of the Shuttle around Earth.

The ATCS will perform 3 major functions during missions: transport and control of thermal energy to and from vehicle subsystems; maintaining temperature of mechanical and electrical equipment; and vehicle rejection through radiation to Space, or evaporating stored fluids.

Employees call it "performance mapping" or "vacuum checkouts." They completed open loop testing, testing of the individual parts, and Tuesday, Feb. 20, they began closed loop testing, integration of the total system, which should be completed Feb. 23.

... Certification vacuum firings of the Orbit Maneuvering Subsystem Engine are continuing at JSC's White Sands Test Facility in Las Cruces. Last summer the OMS pod arrived from Aerojet. Firings should be completed by the end of April and they will qualify the Pod Assembly design for the first manned orbiter flight.

... Spacelab data processing hardware will arrive from the European Space Agency in March for testing by the Avionics Systems Division. The Data Processing Assembly will be tested for any design defects or signal incompatibilities at the Orbiter/Spacelab interface, and engineers from ESA will participate in the test work.

This is a follow-on to tests performed in the Data Systems Lab in Fall 1977. Data transfer in both system hardware and software will be evaluated in normal and anomalous operating conditions.

"Performance of hardware interfaces must be evaluated prior to Spacelab commitment of prototype designs to flight hardware," said Gene Rice of the Data Systems Lab. "Results from these tests will verify Orbiter/Spacelab compatibility or provide a basis for modification in enough time to not affect Shuttle flight dates."

Tests will take place in Building 16A, and will last 3-4 weeks, starting around April 17.

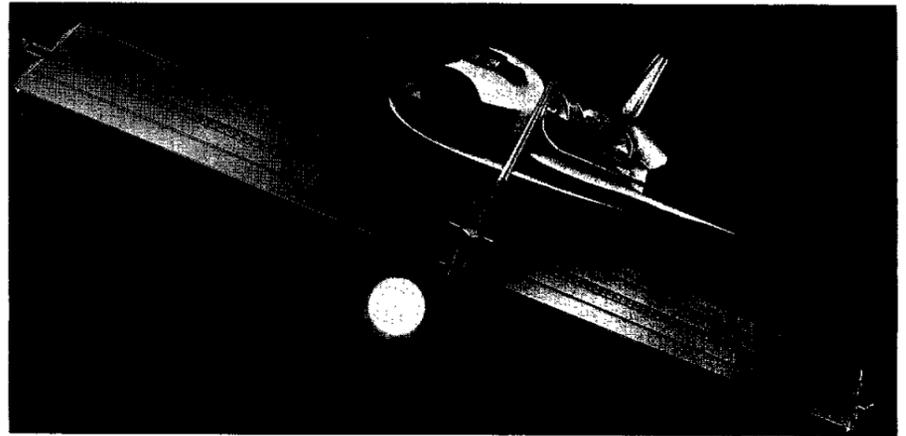
... Tests of thin sheet aluminum conductors for use on solar power satellites are scheduled to be completed in March. Tests are running in Vacuum Chamber D of Building 32, with simulated space conditions. Other tests that do not require a space environment are taking place in the Power Lab or Building 16.

The scale of the JSC model depended on availability of material and space. The sheets being tested are 60 cm wide, 3 m long, and .009 cm thick. Their surfaces are anodized, or painted, and they will

carry current of up to 600 amperes in order to cover a wide range of current densities in the tests.

These distribution buses can reach widths of over 30 m and lengths over 20 km with a thickness of only 1 mm. Experience with this type of conductor is still very limited, so scale model tests will verify the concept and provide configurations for future optimizing of conductor geometry.

The first blood drive of the year will be March 6 at the Rec Center. Donors' families are eligible for needed blood for one year.



POWER EXTENSION PACKAGE, solar panels carried to and from orbit by the Shuttle, could add 22 days' life to a mission. The panels unfold to a 200m-long supplement to the Orbiter's power supply, then collapse like an accordion to fit inside the Cargo Bay, taking up no usable space. NASA recently authorized continued study of the concept by JSC. Marshall is conducting a similar study, panels pictured in the Feb. 9 Roundup that would be deployed in orbit and captured on a later mission.

☆ NASA bringing in private sector Industries to increase role in remote sensing

In carrying out one of several actions directed by President Carter in his civil space policy statement, NASA and NOAA are jointly studying the extent to which private industry can take part in the nation's civil remote sensing program.

The two agencies are asking the

private sector to submit views on how they can increase participation, considering capital investment, system ownership, systems concepts, commercial product development, market assessments, incentives needed, and roles of the Government.

The study will consider private sector suggestions and opinions when

developing the plans and policies for private investment and participation in every aspect of remote sensing.

Submissions from the private sector should be sent to the Director of Government/Industry Affairs, NASA, Washington, D.C. 20546.

The study should be completed this summer.

☆ Spacelab: Life Sciences experiments ready for HQ judgments

Scientists and engineers in the Life Sciences Experiments Program have completed review of 363 Spacelab experiment proposals, and are ready to submit them to Headquarters March 27. This follows 8 months of review and rating.

35 of the experiments involve JSC employees.

"There are numerous cardiovascular and vestibular experiments using both human and animal subjects among the proposals," Program Scientist Ed Michel said. "There are also many that involve plants and cellular biology."

In February of 1978, the Announcement of Opportunity went out to the scientific community, soliciting experiments to fly on Spacelab. They arrived at

NASA in June.

In July, cost and management evaluations began at JSC and Ames. A peer review panel from the American Institute of Biological Sciences rated the proposals for scientific merit and turned their results in Oct. 1. Those receiving high scientific merit went on to in-depth cost and management evaluation.

Headquarters will have final review of the experiments, probably approving 60-100, Michel said.

Using JSC recommendations, Headquarters personnel will rate the proposals into 4 categories: high scientific merit, high merit but less priority, good merit but more work needed, and rejected. Headquarters should complete its review in

June, and acceptance/rejection letters will go out that month.

Scientific objectives of Spacelab experiments are: to study human health, safety, and performance in Space; to further knowledge in medicine and biology; to use space technology and environment for solving terrestrial medical problems; and to study the origin and distribution of life in the Universe.

Typical experiments are: studying changes in crew cardiovascular condition while in spaceflight; studying the effects of spaceflight on mineral and fluid balances in the body chemistry; studying neurophysiological reactions to spaceflight; and investigations into pharmaceutical manufacturing in Space.



ASTRONAUT JOHN YOUNG, first orbital flight commander explains features of a Grumman Gulfstream II Shuttle Training Aircraft to members of the House Space Science and Applications Subcommittee during field hearings Feb. 11 at White Sands. Left to right are Larry Winn, Jr. (R-Kans), Bill Nelson (D-Fla), Young,

Don Fuqua, Chair (D-Fla), and John W. Wydler (R-NY). The group watched Joe Engle fly Shuttle landing approach runs in an STA at Northrup Strip on the U.S. Army Missile Range prior to opening the hearings. Northrup Strip is abort-once-around landing site for Shuttle tests.

Photo by Terry White

Bulletin Board

Apollo Soyuz Book Available

When *The Partnership: A History of the Apollo-Soyuz Test Project* (NASA SP-4209) was printed, the covers on hundreds of copies were damaged. The Government Printing Office required a complete reprinting of the paperback at no cost to the Government. This center has received its portion of this reissue. Based on availability, employees of this center may send their (1) Name and (2) Mail Code on a slip in an SF No. 65-B (Mail Envelope) to Code BE-4 if they have not already received a copy of this book. NO PHONE REQUESTS, PLEASE.

Have You Forgotten Something?

The Federal Women's Program Committee recently distributed a "Survey to Determine Needs and Areas of Concern at JSC" to a random selection of 150 employees at the Center. In order to acquire valid results of such a survey, they need them returned. If you have received such a questionnaire, please complete and return it to Virginia Hughes AJ.

Wild Horses Could Tear You Away

The Clydesdale 8-Horse Team & Hitch will trot through the Space Center March 2, stopping at 10 a.m. for photographers at the Saturn Rocket parking area and then behind the Bldg. 2 auditorium. Also at 10, a hospitality van of exhibits will pull in to the area behind Bldg. 2. Key chains for grownups and lapel buttons for children will be given out, but sorry, folks, no refreshments.

Striking Out On Your Own

The Service Corps of Retired Executives and the Small Business Administration will sponsor a workshop on the "BASICS OF RUNNING A SMALL BUSINESS" at North Harris County College, Feb. 28, from 8-4:30. For further information, call 226-4945.

Aid for the April Anguish

The JSC Credit Union will sponsor a Personal Income Tax Seminar at 7 p.m. Feb. 27 in Gilruth Center, for members and non-members. Guest lecturer will be Professor Jerry Horvitz of the Dept. of Accountancy and Taxation at UHCC. His lecture will cover changes in tax laws that affect the individual, and he will review other aspects of tax filing that often prompt questions from taxpayers.

Texas Exes to Celebrate Texas Independence

To commemorate "the largest gathering ever of ex-students of The University of Texas at Austin" and Texas Independence Day March 2, local alumni and friends will hold a barbecue starting at 7 p.m. at the new Pasadena Rodeo Ground on Red Bluff Road. The public is welcome, especially people with college-age children and those interested in the University sports programs. The Dean of Students and a Longhorn coach will speak. Tickets are \$5.75 and are available at the door, or call 334-1982 for reservations. A concurrent festival will be going on that afternoon in Austin.

The flag of Texas will fly that day at the Space Center.

On Sale at the JSC Exchange Store

Dean Goss tickets - \$10 single, \$20 couple (Reg. \$14.50 each)
ABC Theatre tickets - \$2 each
General Cinema tickets - \$2.40 each
Magic Kingdom Cards - Free
The Country and Western Dance is scheduled for Sat. March 3 at the Rec. Center. Tickets are \$6.50 per person and go on sale Feb. 20.



RICHARD S. JOHNSTON, Director of Life Sciences, shown here with Al Cleveland AIAA President, received the Aerospace Contribution to Society Award from the AIAA last month in New Orleans. Johnston won the award for leadership in applying space flight technology to ground-based health care systems.



ASTRONAUT JOE ENGLE receives the Distinguished Flying Cross from former astronaut Lt. General Thomas Stafford at the JSC Honor Awards Program Jan. 29. "For piloting achievements that contributed significantly to the success of OFT," the citation reads. Over 80 employees were honored at the ceremony for Superior and Outstanding Performance and Group Achievements.

What's Going on Under the Hood?

A basic course in AUTO MECHANICS is being offered by the Gilruth Rec Center. Lectures take place March 15, 22, and 29 from 7:15 to 9:15 p.m., and there will be lab sessions Saturday, March 24 from 8-10, 10-12, or 12-2. Fee is \$15 and due March 12.

Or for those more advanced, INTERMEDIATE AUTO MECHANICS will be offered with lectures April 12, 19, 26, and May 3, 7:15 to 9:15 p.m. Labs will be April 21, 8-10, 10-12, and 12-2; and April 28, 8-12 and 12-4. Fee for new students is \$35. Former students, attending the labs only, pay \$17.50. Payment is due no later than April 9.

After the Ball You Can Disco

The JSC Dance Club is offering sessions in Ballroom and in Disco dancing. Ballroom classes begin Feb. 28 at Gilruth Rec Center. Cost of the 10-week session is \$40 a couple.

Disco dance lessons start March 6 both for beginners and intermediate dancers. Steps taught include the Night Fever, New Yorker, Victorian, and Bus Stop. Instructor is Candi Walker and the class costs \$21 a person.

To register for either class, you also pay \$1 per year per person dance club dues. Contact Lyyle Jiongo, x-3445, for more information, or to register.

The Exchange Will Sponsor You

The Exchange is again sponsoring membership in the Houston Area Federal Business Association (FBA) for any Government employee working at JSC.

Membership is open to any active

federal officer or employee within a 105-mile radius of Houston.

The Association backs position vacancy sharing programs, Federal Employee of the Year Awards, a Christmas program that helps needy Federal employee families, and a local national discount buying service.

To apply, put your name, employee number, office code, and office phone number on a sheet of paper and send it to BE5; or go to Opel Loden, Marion Johnson, or the JSC Exchange Store in Bldg. 11.

How to Defend Yourself on the Gulf Freeway

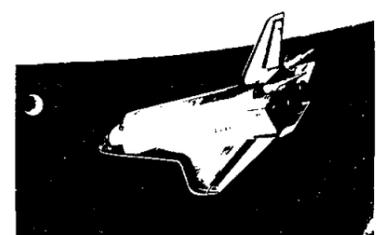
By popular demand, the EAA is sponsoring another Defensive Driving Course, to be held on March 5 and 7, or March 6 and 8, from 6-10 p.m. at the Rec Center. The Safety Council of Greater Houston provides the instruction, and cost for the 8-hour course is \$12, including materials. Sign up before March 2 (class size is limited) at the Bldg. 11 Exchange Store from 9-2, or at the Rec Center. A 10 percent insurance discount certificate will be issued upon completion of the course. Any questions, call x-4921.

It's Not Too Late to Learn Scuba Diving

The Lunarflins Scuba Club is still taking names for its next class in scuba diving. Cost of the 6-week course is \$65 and it covers the instruction manual, pool fees, and use of tank, regulator, and backpack. First meeting is March 1, Room 204, Gilruth Center, at 6:30 p.m. For more information, call Rodney Rocha, 333-4606, after 5.

NEBA Fact

In 1911, the first group life insurance for employees of a particular employer was issued.



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Photographer: A. "Pat" Patnesky



Photo by Carmelo Sustaita

Members of the EAA Picnic Committee stop for a photo after a work session.

Picnic Fever Rampant

The picnic committee is in high gear—working feverishly—to make this year's EAA picnic the best ever. The date

is Saturday May 5 at Camp Manison from 11-5. In keeping with this year's theme "Saturday Afternoon Fever" the band will be replaced by a disc jockey playing disco for all ages. There is enough room at Camp Manison for everyone to enjoy

their "Fever" — games for the kids, athletic events for the macho persons, bingo and entertainment in the pavillion, or a quiet shady area to sip and talk. Make plans now for May 5 and your Saturday Afternoon Fever.

What's cookin' in the JSC cafeteria

Week of February 26 - March 2

MONDAY: Chicken & Rice Soup; Texas Hots & Beans; BBQ Ham Steak; Veal Parmesan; Beef & Macaroni (Special); Green Beans; Carrots; Au Gratin Potato. Standard Daily Items: Roast Beef; Baked Ham; Fried Fish; Chopped Sirloin. Selection of Salads, Sandwiches and Pies.

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

WEDNESDAY: Clam Chowder; 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 Beet w/cabbage; Smothered Steak w/cornbread dressing (Special); Spinach; Cabbage; Cauliflower Au Gratin; Parsley Potato.

FRIDAY: Seafood Gumbo; Pork Chops; Creole Baked Cod; Yam Rosette; Tuna & Salmon Croquette (Special); Brussels Sprouts; Green Beans; Buttered Corn; Whipped Potatoes.

Week of March 5 - 9

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

TUESDAY: Beef & Barley Soup; Turkey & Dressing; Country Style Steak; Beef Ravioli; Stuffed Cabbage (Special); Corn Cobette; Okra & Tomatoes; French Beans.

WEDNESDAY: Clam Chowder; Catfish w/hush puppies; Roast Pork w/dressing; 8 oz T Bone Steak; Chinese Pepper Steak (Special); Broccoli; Macaroni w/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 w/onions; Deviled Crabs; Roast Beef w/dressing; Seafood Platter; Tuna & Noodle Casserole (Special); Whipped Potatoes; Peas; Cauliflower.

A Roundup has rules, too Advice on getting it into print

So, you want to get an article in the *Roundup*. It helps if you follow these tips:

Spreading the Words

Everyone who works on site should receive a copy of *Roundup* in the mail—including on site contractor employees. Branch secretaries, please review your section. If everyone is not receiving a copy, including contractor employees, fill out another JSC Form 2271 and send it to Distribution JM86. Any questions on this, call the *Roundup* editor at x5111.

- Type and double space all copy, using a 60-character margin.

- Deadline is the first Wednesday after publication, but the sooner you turn it in the better.

- If there is a holiday in the cycle, deadline moves up one day.

- COPY WILL BE EDITED for clarity and space. If this makes you angry, you will have a chance to dunk the editor at the EAA picnic this Spring.

- To avoid editing of your crucial points, keep announcements down to 10 lines. Include a phone number of a contact person.

- Please follow instructions for turning in Swap Shop ads. Ads turned in improperly may not run.

- Photos and artwork are always welcome, and you will receive a by-line.

- Writers will also get by-lines. Call the editor to discuss your story ideas. You, too, can be an astro-journalist.



Photo by Patnesky

TOM DUNN OF STRUCTURAL DESIGN holds a small section of a demo model of a composite geodetic structure for space construction, being reviewed this month. The structure would be used in building beams 400-3,000 feet long for a solar power satellite.

Tax Box

You can now get a tax credit for money you pay grandparents for child care of their grandchildren while the parents are out working. Under prior law, the cost of a work-hours babysitter would qualify for the credit. However, child care services by a grandparent were

generally excluded from this credit. The new law changes this. It allows a credit for payments to grandparents, as well as any close relatives of the taxpayer such as a sister, aunt, niece, or nephew. Payments to dependents or payments to a child of the taxpayer who is under age 19 do not so qualify.

Courtesy of the Federal Women's Program

Roundup Swap Shop

Household Articles

6 HP tiller, brand new; 42" attic fan, frame made to set on floor, moves a lot of air. Pettit X5491

Kenmore 4-burner gas stove, 35-1/2"-wide, large oven, A-1 cond., \$95 or best offer. M. Jones 477-3240

Nearly new round dining table & 4 matching mates chairs, antique pine finished, hardwood, extends from 42" to 66", Plastic laminated top, \$150. 474-2203

Lady Kenmore washer, \$25. 488-6095
For Sale: 17" Philco refrigerator, 8 yrs. old, \$75, good cond. Nancy 482-5607 after 5.

Small school desk, \$5; 20-inch girl's bike, green, \$10; Kiddy stop/stool, \$3. 471-3303

1930's living rm. suite, like new, sofa, cushioned chair, 2 end tables, coffee table, occasional table, bentwood rocker, \$875. 333-3279

1920's bedroom suite, bed, drop well dresser, wardrobe, cushioned chair, rocker, floor lamp, nightstand, \$585. 333-3279 after 5 pm and on weekends

Large freezer, nice, white and upright, only 1 yr. old, a giveaway at \$300. Lucie B. 641-7502

Drexel Woodbrier Dining chairs. 2 arm. 6 side, half retail price. 471-2523

Property & Rentals

Owner must sell one acre wooded lot at Beaver Creek Development, (9 mi. from Lake Somerville) Property report and map avail., asking equity, + payments of \$32 per month. Sandra Schmidt 483-4063 or 333-4379 after 5 pm

Vacation Lake Livingston Cape Royale, a beautiful resort community w/all amenities, enjoy charming custom 3-2-1 compl. furn. home nestled among trees by the water, Rent wk/mo/yr. 488-4487

Texas Veteran Land Tracts. Call 482-7697 after 5 p.m.

Cars & Trucks

'78 Tropicana 28" trailer, self contained, all extras \$6500. M. Jones 477-3240 after 5 pm
Camshaft, Dodge 340 TRW-TPI56 (St. Perf.), \$25. Drexel 471-5161

'78 Fiat X19, exc. cond., 8,000 miles, A/C, AM&FM cassette stereo, sports styling, \$6100. 488-8436

'66 AMC Rambler station wagon, 4 dr., 6 cyl, A.T., radio, heat & def., exc. cond., many new & rebuilt items, not rusted. \$500 or best offer. 488-6204 after 5 pm

'77 Olds. Cutlass Supreme, 2 dr., V-8, auto, ac, ps, pb, stereo tape, 26,000 miles, \$4595 or best offer. 482-1535

'76 Oldsmobile Cutlass Supreme Brougham, loaded, am/fm quad sound system, cruise control, etc., "the top of the line," only \$3800. Larry 487-4325 or 483-3871

'78 Camaro Z28, 9300 miles, loaded, mature owner, immaculate cond. 762-0907 between 6 and 12 pm

'69 Chevy Caprice, 2 dr. coupe, white w/black vinyl top, 325 V-8 auto. w/ac and ps, lifetime heavy-duty shocks, new 3-yr battery, new brakes, exhaust system. Ed 483-4031 or 332-3709

1978 Chevy Caprice, AC, PS, PB, AM/FM stereo, split bench seat, vinyl roof, blue/Bleu., exc. cond. 332-2291

Cycles

1974 Honda XL-250 3700 miles, \$550. Nering X7204 or 481-0608

'65 Honda CB160 motorcycle, black w/silver trim, luggage rack, new rear tire and chain. Mechanically sound and in clean cond., \$250. Ed 483-4031 or 332-3709

'74 Honda XL-175 Street legal w/helmet, \$300. Beck 482-3739

Swap Shop advertising is open to JSC federal and on-site contractor employees. Goods or services must be offered as advertised, without regard to race, religion, sex or national origin. Noncommercial personal ads should be about 20 words and include home phone number. Typed or printed ad copy must be received by AP3/Roundup by Wednesday of the week prior to publication.

Miscellaneous

Partial bundle cedar shingles, \$5. Parker X4241

Sears wooden "Country Squire" wagon, nice for pulling 2-5 yr. olds and/or their toys, \$9.50. Merriam 488-3806

Class III trailer hitch for full size GM cars also Lodad Levelor insert with 2-inch ball. J. C. Waite 333-2442 or X4241

Tire, Uniroyal H 78-15 polyglass whitewall, like new, \$25. 333-3071

"Fawn" brand cigarette & candy machines, woodgrain front, Cost \$1000 ea., will sacrifice \$400 ea., exc. cond. 474-2203 Poindexter

HP-67 programable card-reading calculator, charger, case; exc. cond., standard + math + stat pacs, extra cards, \$320. J. Hoffman X2421

"Let's go skiing - Have plane will travel", six place airplane & pilot you pay fuel. Malone 332-1367

Discount postage: 5 percent below postoffice price, \$10.50 face value for \$10. Jeff 482-5393 after 5 pm or weekends

Ladies beautiful dark brown "Mouton" fur coat, hip length, size 12-14, asking \$50. 488-2822

Wanted: Original Gregg shorthand transcription & typing manual, Need ASAP. Herma Roth 483-2843 or 334-3484

Two int. door units, 32", new \$25 each. Drexel 471-5161

Lionel electric train set, Circa 1944-1946, exc. cond., interested in value to collector. S. Jacobs 777-2173 or X3561

4' x 8' Fredrick-Willis pool table with particle board top, automatic ball return, 5 cues and cue stand, good cond. \$100. Ed 483-4031 or 332-3709.

Van bench seat, tan vinyl, from '77 Dodge, \$30. Bays X5229 or 488-6465 after 5

Trade: \$5460 worth of land at Lake Livingston for Datsun or Toyota. 488-5445
Tow Bar, Custom built for Toyota Celica.

(Could be modified for use on other cars) Cost \$125, now \$62.50; Shelby Mags (4) 6x14 two never used, two with like-new G60 tires, \$150 all; Go Cart, \$350; 1966 VW Pan Assy, \$225; VW Trans Axel (Swing Axel Style), \$25. Underhill 334-1303 after 5

Boats & Planes

Ameagle Powered sailplane, includes wing, landing gear, and tail kits plus completed trailer. Carver X2901 or 334-1764 after 5 pm

25' Bayliner Spart Fisherman w/E-Z Loader trailer. Custom made teak dive playform, 307 Chevy V-8 W/Volvo outdrive, exc. cond., exc. offshore performance. 944-9563 or 452-6257 after 6 pm

Carpools

Wanted: Rider to join carpool leaving Meyerland at 7:20 am for the 8 am - 4:30 pm shift. Russ, X4871, Carl X4871, or Cathy X6387

Need 1 or 2 persons to complete carpool, 8-4:30, leave from Meyerland area, Southwest Houston. Paula or Theron X4660

Wanted: Carpool to U. of H. main campus from Clear Lake Area, Tues., Wed., and Thurs. nites. Rich X5841 or 474-4844

Wanted

Good used set of Child Craft Encyclopedias. Charles Shelander 729-3698

Hunting Antarctic Meteorites



In the dust-free atmosphere you can see for miles. Million-year-old ice covers the ground to the horizon, and the sky is pale, bleached. Over the ice tromps a man dressed in a thermal suit specially designed for this hostile environment. A piece of rock lies in a bed of ice. The man clamps onto it with clean, stainless steel equipment, and places it in a sterile bag.

The scene is on Earth, though the work is the study of extraterrestrial materials. NASA-JSC is applying its lunar-developed techniques of collecting rock samples to the curation and study of meteorites. Associate curator John Annexstad has just returned from a 3-month mission to the Antarctic, where 309 samples were found.

Meteorites, of course, can fall anywhere. But in Antarctica they fall on an ice system that is always moving, "a dynamic system," says Annexstad. "The meteorite is transported by the ice over millions of years. When it comes to a blockage, like a mountain

range, and the ice gets stopped, it either flows around or becomes stagnant or old. The winds strip off the snow and meteorites appear."

"We say the ice ablates—wears away," Annexstad said. The meteorites concentrate in these "blue ice" areas, "and you just pick them up," he said.

NASA's lunar landing missions provided the tools. Annexstad used stainless steel scissors and Teflon bags and gloves. "The meteorites haven't been contaminated, so we try to preserve them as best we can. We pick them up without touching them with our hands."

Annexstad and his Japanese companion, F. Nishio of the Institute for Polar Research in Tokyo, camped 40 nights 130 miles from McMurdo, living in tents. Early in the season, winds were blowing 25 miles an hour and temperatures went to 25 degrees below zero. "You wear down clothing," he said. "And use special equipment like a Scott tent. You pile

snow around the sides of the tent to keep the wind out. You sleep on three or four urethane mats. You take a Bauer bag—a thick, long sleeping bag—and put a small down bag inside. Then, if it's really cold, you sleep with all your clothes on."

Annexstad has been on 5 expeditions to the Antarctic, and he plans to go again this fall. On this trip, he traveled over 500 miles by snow machine and flew 15 hours in helicopters over the continent.

Samples they gathered will arrive

at JSC in late March or early April. Then, employees in the Lunar and Planetary Sciences Division will begin categorizing and analyzing them—further application of JSC's unique technology for handling extraterrestrial materials.

Working with Northrop contractors, NASA will unload the samples and put them in large freezers in Building 37. Then they will stage the samples—put them in clean containers and assign permanent numbers which go into a computer system.

They will use microscopic analyzing techniques. Lab workers will weigh the specimen, take a photograph, then saw it in half. They will take a small chip for a thin section and study it with optical techniques to classify the samples.

After that the real science begins. They will do a detailed study of the thin sections. Just a few of the studies they perform are measurement of radio nuclides to determine terrestrial ages, bulk chemical analysis for major elements, and investigations of the effects of cosmic ray bombardments.

The Curators' Branch publishes a newsletter about the meteorite samples. Through it, interested scientists throughout the world request specimens for detailed specific studies.

The complete program is a cooperative effort between NASA, the National Science Foundation, the Smithsonian, and the University of Pittsburgh.



Annexstad gathers sample

Think Tank Results

How far can a cow graze?

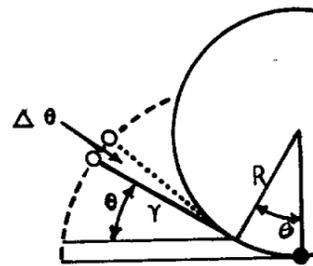
We really stirred up brain dust with the last Think Tank Puzzle. 33 solutions came in: 21 followed the method described here and were correct; 6 were wrong; and 6 followed harder methods and came up with the right answer. One person made two errors but still had the correct answer. Special mention goes to **Roger Cor-**

son for coining the word "cowculus" to describe the calculations.

The best 5 answers came from **Robert Shuler, Jerry Borrer, Larry Grissom, Frank Baiamonte, and Joe Thibodeau.**

The solution:

Divide the movement of the rope into a series of small angles $\Delta\theta$. Each wedge is about $1/2r^2\Delta\theta$ square feet, where $r=50-R\theta$ and θ is in radians ($\frac{\text{degrees}}{360} \cdot 2\pi$). As $\Delta\theta$ is made smaller, the approximation becomes closer, until—with an infinitesimally small $d\theta$ —the exact value can be found via the integral calculus:



$$\frac{1}{2} \int_0^{\theta_{MAX}} r^2 d\theta = \frac{1}{2} \int_0^{\theta_{MAX}} (50 - 25\theta)^2 d\theta = \frac{2500}{3} \text{ Square Feet}$$

The area of grass available to the cow is then:

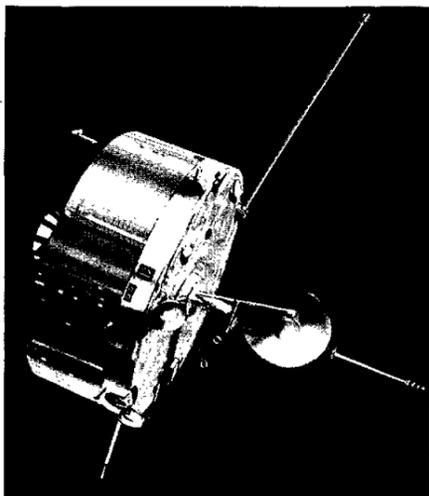
$$2\left(\frac{2500}{3}\right) + \frac{\pi(50)^2}{2} = 5593.66 \text{ Square Feet}$$

Venus: An uninviting place

Early findings from the Pioneer Venus probe mission ratify that the planet is not a likely prospect for future manned missions.

New information on the forming of the inner planets, an explanation for Venus' hell-like heat, and observation of "mysterious chemical fires" on the planet's surface are part of early scientific findings by Pioneer Venus 1 and 2.

Pioneer found several hundred times more primordial argon and neon on Venus than expected, a finding that challenges



The Pioneer Venus Orbiter

previous theories about the forming of the solar system. The theory was that light elements (argon, neon) were swept away from the inner planets by solar winds. The fact that neon and argon are found in about the same proportions on Venus and Earth suggests a more uniform process and temperature as the solar system formed.

Near the bottom of the clouds, at about 29 miles altitude, the temperature is near the melting point of sulfur. A precloud

layer fades into a faint haze at about 19 miles altitude.

From there to the surface, the atmosphere is free of particles according to the data.

In a previously unexplored 1900-km strip on Venus' surface, much of the terrain appears relatively flat, more similar to Earth's surface than to the rough, cratered terrain of Mars and the Moon.

But there is a drop in altitude of 10,000 feet over one area 75 miles long, comparable to the drop between the crest of the Rocky Mountains near Denver to a spot in the Great Plains. More scans by the Orbiter will show a more comprehensive picture of Venus' terrain.

Starting at 13 km altitude, the two night-side probes saw an unexpected glow increasing as the probes descended. Mass spectrometer evidence suggests that the mysterious glow could come from "chemical fires" on the surface or in the very hot and dense lower atmosphere. The "fires" would be fueled by reactions involving sulfur compounds. Experimenters are considering another possibility—that the glow resulted from the heated or electrically charged surfaces of the probe craft themselves.

The findings of .1-.4 percent of water vapor and 60 parts per million free oxygen will help tell us whether Venus originally had abundant water and lost it—or never had much water. Many scientists think Venus' primordial water circulated to the top of the atmosphere where solar ultraviolet broke it down into hydrogen and oxygen. As the lightest element, hydrogen then escaped to space. (The Pioneer measurements show such low hydrogen-escape rates today that water loss, if it did happen, has long since ceased.) If massive water loss did occur this way, where is the left-over oxygen?