

Space News Roundup

Vol. 30

March 8, 1991

No. 10

Making room for Bldg. 4 addition

Tree-mendous machine moves timber

By Pam Alloway

The machine that encircled pine trees by Bldg. 4 recently was not a lunar rover on steroids or the newest version of a mobile satellite dish. It was the world's largest tree transplanter.

And its owners, Albert and Doris Korenek of Houston, are mighty proud of it. Fact is they have a scrapbook of the mighty machine's exploits all over the state of Texas, in Chicago and Atlanta, just to name a few. They even have a nickname for it, said Doris Korenek.

"We call it the extra-tree-restrial

machine," she said.

But all joshing aside, this machine was designed, built and operated for some important work — moving and transplanting large trees. And that's why Alan Miyamoto, JSC horticulturist, called Albert Korenek and his company Instant Shade Trees Inc.

In preparation for the construction of a six-story addition to Bldg. 4, nine large trees and 11 crape myrtle bushes had to be moved. The Bldg. 4 expansion project is expected to be completed in October 1992. Miyamoto said eight of the nine trees have been

moved to their new locations. The final tree, a live oak that is 26 feet tall and between 50 and 75 years old, will be moved around March 15 after its surrounding soil has dried.

The trees and bushes have been moved to Bldgs. 31, 37 and the JSC Child Care Center.

Miyamoto said the 28-foot, 130,000 pound tree transplanter garnered its share of looks during its first trip to JSC the week of Feb. 23.

"To my knowledge it's the largest tree planter in the world," he said.

Please see **TREE**, Page 4



JSC Photo by Benny Benavides

Workmen and equipment from Instant Shade Trees Inc. prepare to move a large live oak tree from the lot between Bldgs. 3 and 4.

JSC in on roll back decision

By Kelly Humphries

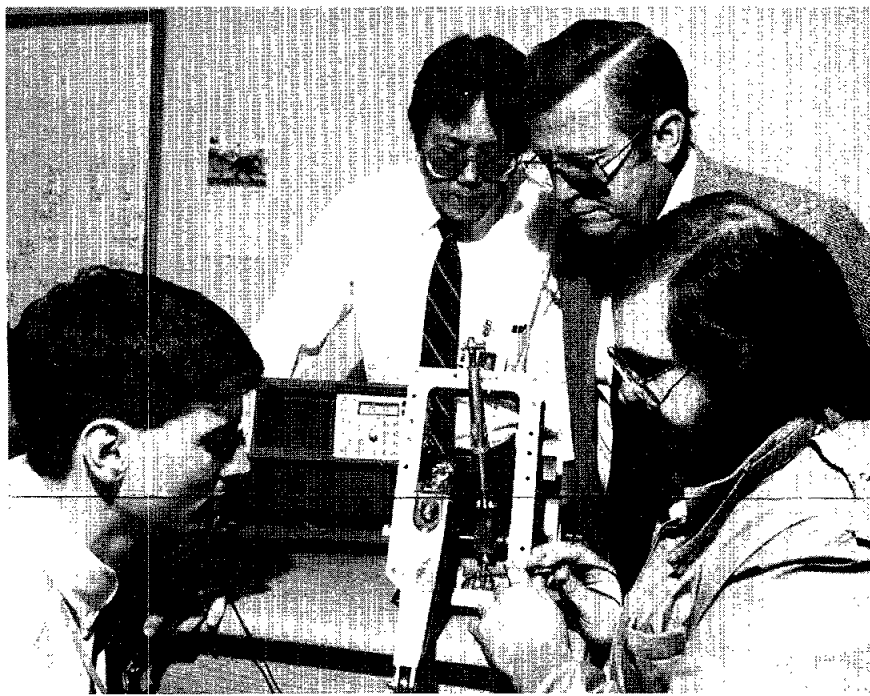
Discovery is headed back to the hangar, but only after teams of JSC engineers, flight controllers and safety experts went through its fuel line door fittings with a fine-toothed comb.

The engineering team determined that from a structural standpoint, it was safe to fly with the cracks. But it was unable to agree on a definitive explanation as to what caused the cracks, so the shuttle will undergo repairs before it flies.

The engineering team, led by Bill Schneider, chief of Engineering's Mechanical Design and Analysis Branch, worked closely with NASA and contractor counterparts in California and Florida to determine just how serious the cracks are, what caused them and what could be done about them.

The operations team, led by Kevin McCluney and Norman Knight in the Mission Operations Directorate's Mechanical and Crew Systems Branch, supported and kept up with the engineering team's work. Had the system been approved for flight, the operations team would have watched it doubly closely.

Members of JSC's Safety, Reliability and Quality Assurance Office kept an independent eye on everyone as all of the technical analysis was being done. Elmer Johnson of the Orbiter Quality Engineering Section, Jerry McCullough and Alan Balusek of the Mechanical Systems Safety Branch, and Jay Wright of the Quality Technology Branch all had



JSC Photo by Bill Blunck

JSC engineers inspect a test article of the shuttle fuel line door closing mechanism in Bldg. 13. From left are Lane Skyles, Ted Tsai, Glenn Ecord and Norman Ruffino. Ruffino is pointing to the support lug in question with a test probe used in the analysis.

a hand in the activity.

The engineering team included Philip Glynn, manager of the Orbiter Engineering Office in the Orbiter and GFE Projects Office; William Acres, David McCann, Ted Tsai and Tom Ross of Schneider's branch; Glenn Ecord of the Materials Branch; Lane Skyles, a computer-aided engineering analyst for Lockheed Engineering and Science Co.; and Charles Salkowski and Norman Ruffino of the Non-Destructive Testing Laboratory.

When the cracks on the forged support lugs for the closing mechanism in

Discovery's umbilical doors were discovered, Schneider, Glynn and Ecord flew to the Cape to take a closer look. They were amazed that the quality engineer who discovered the problem was able to see the cracks among the crowded elements of the hinge assembly.

At the same time, Acres, McCann and Tsai began checking structural loads and performing independent stress analysis. Salkowski and Ruffino checked the identical qualification test unit hardware in JSC's Bldg. 13 using eddy current

Please see **CRACK**, Page 4

Tiny cracks won't delay Atlantis 'go'

By James Hartsfield

NASA managers Thursday decided *Atlantis* is safe to fly with tiny cracks found earlier this week in metal supports for the spacecraft's fuel line door mechanisms.

The decision cleared the way for technicians to move *Atlantis* to the Vehicle Assembly Building early this morning.

Hairline cracks, about twenty-five thousandths of an inch deep and less than a quarter of an inch long, were discovered late last week on *Atlantis* in the same areas where larger cracks had been located on *Discovery* and *Columbia*. An array of tests finally revealed the cracks on supports for two closing mechanisms on the right door and one on the left after the fuel line doors were latched flush to the spacecraft's underside in the launch position.

Atlantis previously had been believed to show only signs of metal fatigue in those areas. But engineers now are certain the cracks were revealed by moving the doors to the launch position. The cracks were not caused by that singular event, but were made visible by moving the doors.

Extensive analysis performed during the week clearly showed that the cracks on *Atlantis* will not grow prior to or during the flight and that they pose no threat to the proper operation of the doors during STS-37.

Even with the doors latched fully open, the cracks on *Atlantis* were extremely difficult to distinguish, and were found only after four dye penetrant tests and light sanding of the metal.

Atlantis now remains on schedule for an April 4 launch on STS-37 to deploy the Gamma Ray Observatory. The orbiter is scheduled to leave the VAB Wednesday for Launch

Please see **ATLANTIS**, Page 4



Crew return party to mark shuttle 10th anniversary

JSC will mark the 10th anniversary of the first space shuttle mission with a crew return celebration April 15 at the Gilruth Center.

Columbia was launched on STS-1 at 6 a.m. CST April 12, 1981 and landed at 12:20 p.m. April 14.

"It's tailored after the splash-down party that was held for the Apollo 11 20th anniversary,"

said Teresa Sullivan, who is co-chairing the event with Ginger Gibson.

Among the honored guests at the party will be the STS-1 prime crew, John Young and Bob Crippen, and the backup crew that flew STS-2, Joe Engle and Richard Truly.

The Employee Activities Association and the NASA Exchange-JSC are planning the event with input from JSC senior managers and past managers.

The celebration is expected to be from 4:30 to 8:30 p.m. April 15 on the south parking lot of the Gilruth. Tickets will cost \$3 and go on sale at the Bldg. 11 Exchange

Store on March 21.

All refreshments except hot dogs will be included. Hot dogs catered by James Coney Island will be available for purchase.

For more information, call Ginger Gibson at x30596, or Cyndi Draughon at x30494.



JSC Photo by Jack Jacob

SPACE TROPHY WINNER—NASA Administrator Richard Truly congratulates JSC Director Aaron Cohen on receiving the National Space Trophy. They are holding a miniature of the lead crystal trophy made by the Steuben Glass Co. following the presentation at the Hyatt Recency Hotel in Downtown Houston. The full-sized 48-inch tall trophy and Cohen's portrait are on display in JSC's Visitor Center.

Visitor attractions reopen to public

JSC has reopened all of its visitor attractions to the public now that hostilities have eased in the Persian Gulf area.

Visitors are again allowed in Bldg. 9A-B, which houses space station and space shuttle mock-ups; Bldg. 30, the Mission Control Center; and Bldg. 31A, which houses lunar samples. As before the closings, Mission Control visitors must obtain tour tickets at the Visitor Center information desk.

The temporary closing began Jan. 17, 1991, as a precaution against terrorist activities, although JSC was considered an unlikely target for terrorists. Visitors also were asked not to drive or walk to buildings other than the Visitor Center and cafeteria.

JSC Security Officer Ron Wade said there were no reports of any suspicious activity during the period of heightened awareness.

JSC

Ticket Window

The following discount tickets are available for purchase in the Bldg. 11 Exchange Gift Store from 10 a.m. to 2 p.m. weekdays.
 General Cinema (valid for one year): \$4 each.
 AMC Theater (valid until May 1992): \$3.75 each.
 Loews Theater (valid for 1 year-can be used two weeks after movie premieres): \$4 each.

Children's Easter Party (10 a.m.-noon, March 23, Gilruth, includes refreshments, picture with Easter Bunny, egg hunt, jugglers, face painting and clowns): children: \$4; adults: \$1.

Bluebonnet Trail Trip (April 6 or 7, one trip includes tours of Independence and historic church, the Rose Carousel, Miniature Horse Ranch, Rose Emporium and lunch; the other includes the Bluebonnet Festival, miniature horse race, antique carousel and lunch): \$18, on sale at 7:30 a.m. March 11.

Deep Sea Fishing Trip (7:30 a.m.-7:30 p.m. April 13, includes bait, tackle and crew to help during trip): \$45 to fish, \$20 to ride, on sale at 7:30 a.m. March 15.

JSC

Gilruth Center News

EAA badges—Dependents and spouses may apply for a photo I.D. 6:30-9 p.m. Monday-Friday. Cost is \$5.

Defensive driving—Course is offered from 8 a.m.-5 p.m., May 18 and June 15. Cost is \$15.

Aerobic dance—Eight-week session meets 5:15-6:15 p.m. Tuesday and Thursday nights. Cost is \$24.

Exercise class—Class meets 5:15-6:15 p.m. Monday and Wednesday nights. Cost is \$24.

Weight safety—Required course for employees wishing to use the Gilruth weight room. The next class will be from 8-9:30 p.m. Feb. 28, March 13 and March 28. Cost is \$4.

Country and western dance—Intermediate class meets Monday nights for six weeks beginning March 4. Cost is \$20 per couple.

Personal safety—Brief lecture on personal safety awareness. Talk begins at 5 p.m. March 13 in the Gilruth ballroom.

Softball tournament—Men's Open "C", March 16-17. Cost is \$95 per team, with a 16 team limit. Entry deadline is March 14.

Tennis lessons—Beginning tennis lessons will be offered from 5:15-6:45 p.m. Mondays for six weeks beginning March 25. Cost is \$32.

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Technical Library News

These new publications are available in the JSC Technical Library, Bldg. 45, Rm. 100.

Problem Solving and Structured Programming in FORTRAN. Frank L. Friedman, 1987. QA76.73 F25 F74 1987.

Relativity: The Special and the General Theory. Albert Einstein, 1961. QC6 .E336 1961.

Survival in Space: Medical Problems of Manned Spaceflight. Richard Harding, 1989. RC1135 .H37 1989.

JSC

Swap Shop

Property

Sale/Lease: 1 BR Egret Bay Villa, w/boat access to Clear Lake, pool, club house, pier, boat incl, \$43K or \$550/mo. Mr Collins, 480-8190 or 996-7693.

Rent: Lake Livingston, 3-2, C/AH, FPL, covered deck, pier, ex cond, furn, wk/wknd. 482-1582.

Rent: Galveston condo, furn, sleeps 6, Sewall Blvd and 61st St, wknd/wk/dly. Magdi Yassa, x38470 or 486-0788.

Rent: Houston Heights garage apt, 1-1, 10 min to UH Central Campus, grad student desired. Mike, x34710.

Rent/Lease: Clear Lake condo on marina, three level, all appli, FPL, 2-2.5-2, \$950/mo. 474-4922.

Sale: Twelve 50' by 130' lots on Hwy 3 between Dickinson and LC, all for \$12K. 738-2755.

Rent: The Villas condo, 2 BR, new carpet, pool, boat access to Clear Lake, \$550/mo. Phil, 282-1776 or 335-1468.

Rent: Lake Travis cabin, private boat dock, C/A/H, fully equipped, accom 8, wkly/dly, \$325/\$80. 326-5652.

Lease: Piper's Meadow, 3-2-2 w/study, over 1600 sq ft, FPL, formal DR, landscaped, good carpet, \$825, avail Apr 1. Jon, 661-3430.

Sale: Countryside, LC, 3-2-2. lg cul-de-sac, covered patio/deck/spa, furn, new A/C, FPL, paint. \$74.9K. x35027 or 332-1410.

Sale: Univ. Trace condo, 2-1-1cp, W/D, all appli, \$36K. 286-1934.

Sale: Baywind II condo, 2-2-2, 2nd floor, all appli, FPL, balcony. \$39K. Marry, 326-1119.

Sale: Clear Lake 2 story condo, 1-1.5-1cp, patio, balcony, all appli, furn, FPL, assum \$38K. 486-0508.

Sale: Middlebrook, 3-2-2, cul-de-sac, new paint, carpet, ceramic tile, A/C, \$89K. 538-1051.

Lease: Piper's Meadow, 3-2-2, lg den, miniblinds, FPL, fenced yard, ex cond. 332-1609.

Sale: Brittany Bay, LC, 4-2.5-2, \$102.5K assum 8% loan bal of \$82K. 332-0047.

Sale: Wooded 2 acre corner lot in Splendoria, 50 mi NE, \$2K down, owner finance \$12K bal at 8%. 332-0047.

Rent: La Porte, eff apt, furn, W/D, non smoker, single pref, no lease, \$325/mo. 471-5049.

Sale: Seabrook bayfront lot, \$125K; two water view lots near NASA, \$38.5K ea. Don, x38039 or 333-1751.

Lease: Pebblebrook condo, 2-2-1, new paint, carpet, blinds, WBFP, all appli, avail Feb 1. \$475/mo plus dep. Lori, x34718 or 554-2601.

Lease: Friendswood, 3-2-2, gar door opener, fans, screened back porch, fenced, CCISD, no pets, \$625/mo, first, last plus \$300 dep, avail Apr 1. 996-9416.

Sale: 60 acres, 3 mi from Karnes City, TX; El Campo, TX two-story house on 1.5 acres, pecan, fig, peach trees. 783-9164.

Sale: Piper's Meadow, 3-2.5-2, formals, FPL, loft, fans, gar door opener, deck, landscaped, new paint. \$92K. Dennis, x34405, 480-5076.

Cars & Trucks

'87 Chev Cavalier, white, 4-dr, auto, A/C, 38K mi, ex cond, warr, \$4300 OBO. Dave, x39579 or 482-6187.

'84 Ford van, XLT Club Wagon, loaded, ex cond, 75K mi, \$6500. 482-1582.

'84 Chev Suburban, 4WD Silverado, trlr pkg, cruise, A/C, tilt wheel, \$7200. 334-4966.

'87-rebuilt engine in '85-customized '80 Ford van, color TV, radio, CB, 4 captain's chairs, sofa bed, table, built-in bar w/icebox and running water, \$3000. David, x35048, or Mary Fae, x35143 or 482-9061.

'69 Mustang convertible, project car, disas-

sembled, 351W, auto., PS, PB, \$2000. 474-9448 or 286-3115.

'90 Toyota Tercel 2-dr sedan, auto., teal color, tinted windows, loaded, ex cond. x32016.

'86 Camaro Z-28, candy apple red w/gray int, ex cond. 332-8248.

'89 Firebird, 14.3K mi, auto., A/C, 12 mo tune-up warr, \$8800. Carrie, x38506 or 333-4089.

'82 4WD Jeep Eagle wagon limited, 6 cyl auto., pwr wind, locks, 73K mi, \$3000 OBO. x34213 or 286-7149.

'83 Porsche 928S, 57K mi, auto., sunroof, alarm, pwr seats/wind/mirrors, ex cond, records, \$15K. Gloria, 480-0235 or 485-7555.

'87 Nissan Stanza, 4-dr loaded, low mi. 333-4731.

'76 Mercedes 300D, sunroof, all pwr options, good cond, \$2800 OBO. Jerry, x39287 or 554-6093.

'78 Chev 4WD Big Foot truck, needs minor elec work, BO. Jerry, x39287.

'80 Pontiac Phoenix, V6, A/C, 5-dr liftback, AM/FM/stereo, auto., \$1950, x30092 or 481-3637.

'87 Ford Tempo GL, black w/red int, 4-dr sedan, 75K mi, ex cond, \$4000. 538-1051.

'77 Chev Suburban, 3/4 ton, 350, auto., A/C, \$995. Pete, 283-8114.

'89 Chev S-10 Blazer, 5-spd, 38K mi, AM/FM/cass, pwr steering, pwr brakes, ex cond, assume pmts of \$308/mo, or \$10.2K OBO. 333-6977 or 946-1989.

'86 Camaro, auto. V8, alarm, T-tops, loaded. 27K mi, ex cond, \$6425. Bernie, x32515 or 486-4722.

'84 Nissan Sentra, 5-spd, 2-dr, maroon, 58K mi, ex cond, new exhaust, tires, \$2800. Lex, 280-5225 or 480-9184.

'77 Pontiac Trans Am, Olds 403, good cond, \$2450 OBO. 482-1633, pager 720-1264.

'82 Pontiac Bonneville wagon, ex cond, all pwr, cruise, tilt, AM/FM/cass, V6, A/C, \$1700 OBO. Glenn, x38067 or 484-4709.

'80 Chev Citation, 42K mi, 4-dr hatchback, 6-cyl, good cond, \$1700. 334-4604.

'82 Ford Anaheim custom van, P/S, P/B, AM/FM stereo, 4 capt chairs, sofa/bed, 2 A/C, 2 tanks, CB, cruise, tilt, BO. 488-3191.

'84 Camaro, V6, auto., A/C, tu-tone blue, 51K mi, ex cond, \$3750. x37108 or 486-8463.

'88 Mercury Sable wagon LS, 47K mi, 100K mi warr, loaded, \$9000 OBO. Terry, x36351 or 996-9164.

'38 Dodge Salesman coupe, rebuilt eng, all parts, \$5000. (409) 948-0241.

'86 Buick Regas Ltd, all pwr, V8, 2-dr, ex cond, 70K mi, \$4800 OBO. 282-4041 or 337-2318.

'89 Thunderbird LX, 2-dr, 5 passenger, 3.8 liter, 6-cyl, 4-spd auto., full pwr, tint, digital controls, AM/FM/cass, 20K mi, \$11.5K. Pat, 771-0955.

'86 Chev PU, '700. x31883.

'80 Honda Accord, 2-dr, good cond, \$1200. x31883.

'85 Monte Carol, 77K mi, good cond, V-6 FI, \$4500 OBO. Dennis, x39012 or 554-4233.

'89 Honda CRX Si, black, pwr sunroof, cass, alum alloy wheels, 5-spd, tint, ex cond, 14K mi, \$9200 OBO. Rick, x38088.

Cycles
 '88 Honda XR250, low use, after mkt susp, ex cond, \$1500. Kevin, 333-6285 or 480-6935.

'90 Honda MTB, CrMo frame and headset, Shimano Rapid Fire 21 Speed, allow rims, Kom tires, gel seat, ex cond, \$250 OBO. Mike, 283-5634 or 286-3101.

'73 Honda CL-350, runs great, \$195. x30951 or 488-5553.

'84 Kawasaki GPZ 750 motorcycle, 8K mi, ex

JSC

Today

Cafeteria menu—Special: Salisbury steak. Entrees: baked scrod, broiled chicken with peach half. Soup: seafood gumbo. Vegetables: cauliflower au gratin, mixed vegetables, buttered cabbage, whipped potatoes.

Monday

Lockheed NMA meets—The Lockheed National Management Association will present a brown bag luncheon at 11:40 a.m. March 11 in the Lockheed Plaza 4, Rm. 44F. "The Oil Industry as a Failure of Price Control," will be the topic. For more information contact Charles Campbell at 333-6107.

Cafeteria menu—Special: beef and macaroni. Entrees: ham steak, Parmesan steak. Soup: chicken and rice. Vegetables: green beans, carrots, au gratin potatoes.

Tuesday

Cafeteria menu—Special: Mexican dinner. Entrees: potato baked chicken, barbecue spare ribs. Soup: tomato. Vegetables: squash, ranch beans, Spanish rice, broccoli.

Wednesday

Astronomy seminar—Arthur C. Clarke will discuss "The Tungusta Event" at the JSC Astronomy Seminar at noon March 13 in Bldg. 31, Rm. 129. Call Al Jackson, 333-7679, for more information.

Cafeteria menu—Special: baked meatloaf with Creole sauce. Entrees: baked scrod, liver and onions, ham steak. Soup: seafood gumbo. Vegetables: beets, Brussels sprouts, green beans, whipped potatoes.

Thursday

WAR '91—JSC's Automation and Robotics Division and the American Institute of Aeronautics and Astronautics Automation and Robotics Technical Committee will present a one-day workshop at 8 a.m. March 14 at the Gilruth Center. Registration and lunch

reservations are required before March 7; lunch cost is \$6 per person. Registration forms may be obtained from Mary Stewart, ER3, x31724 or fax x37580.

Cafeteria menu—Special: smothered steak with dressing. Entrees: chicken and dumplings, corned beef with cabbage. Soup: beef and barley. Vegetables: spinach, cabbage, cauliflower au gratin, parsley potatoes.

March 15
Cafeteria menu—Special: tuna and salmon croquette. Entrees: pork chop with yam rosette, Creole baked cod. Soup: seafood gumbo. Vegetables: Brussels sprouts, green beans, buttered corn, whipped potatoes.

March 17
Chorus auditions—The Bay Area Chorus will hold scholarship auditions for graduating seniors at 3 p.m. March 17 at Webster Presbyterian Church. A Scholarship Concert is planned at 8 p.m. April 20 at Clear Lake United Methodist Church. For more information contact Jennifer Chacon, 684-6030.

March 18
AIAA meets—The American Institute of Aeronautics and Astronautics will hold a Computer and Software Systems Technical Committee meeting at 11:45 a.m. March 18 at Franco's Restaurant. "Artificial Intelligence with Hypercard" will be discussed by Stephen Desrosiers of McDonnell Douglas. Call Karen Lee-Taylor at 283-1961 for more information.

Lockheed NMA meets—The Lockheed National Management Association will present a brown bag luncheon at 11:40 a.m. March 18 in the Lockheed Plaza 4, Rm. 44F. "Inflation and Depression," will be the topic. For more information contact Charles Campbell at 333-6107.

March 20
Astronomy seminar—The JSC

2X lenses, flash, BO. Don, 335-2539 or 992-2827.

Household
 Leather look naugahyde chair, orange, swivel, barrel back, ex cond, \$85. 474-5610.

Jasper desk, 30" x 60", single ped w/center drawer, desk hut w/light, Hon exec chair, \$350. Lupe Salinas, 991-8473.

Electric dryer, 1 yr old, \$200. Becky, x36530 or 941-6156.

Octagon dining table, 4 cushioned chairs, \$100; full sz matt w/box spring and frame, \$30. x39166 or 326-5865.

Heavy duty Magic Chef washer/dryer, cream color, \$375 both, \$200 ea. 486-5527 or 282-5332.

Queen sz semimotion waterbed, ex cond, \$200. Scott, 282-3985 or 286-3922.

Solid wood day bed, Southwest style, heavy solid frame w/matt, was \$219, now \$125; twin top/full sz bottom bunk bed, was \$475, now \$325. 286-0736.

White swivel rocker, ex cond, needs cleaning, \$40. x31260 or 488-2941.

Signature microwave oven, lg capacity, \$35. 488-6310.

Drexel dining room set, china closet, buffet, table w/2 leaves, 12 chairs and server, \$4100; Sears upright frostless freezer, 19.5 cu ft, \$300. 333-9695.

Terra Provence 12" x 12" floor tile, 286 sq ft, \$4 ea; drawer slide runners, 18" lg white, \$3/drawer, used 12" x 20" oriental rug, \$2500; 98" x 136" light wall to wall carpet, \$75. Tom, x36309 or 474-9747.

Bed room suite, antique green, full sz bed, mirrored dresser, chest of drawers, 2 night stands, good cond, \$675; G.E. dishwasher w/Pot Scrubber, almond, built-in, needs repair, \$85. Magdi Yassa, x38470 or 486-0788.

Lg couch and loveseat, navy w/tan design, solid oak frame, ex cond, 4 pillows incl, \$325 OBO; queen sz bed w/mirr/light/bookshelf headbd, 5-dwr dresser, 8-dwr vanity w/mirr/shelves, matt, box spring, \$500 OBO. Ann, x31336.

Wanted
 Want 400W or 800W PA pwr amp. Jim, 333-7690 or 488-4820.

Want used sm dining table and 4 chairs, prefer wood or simulated. Lynda, x30766 or 326-1880.

Want roommate to share 3-2-2 in CLC, non-smoker, \$300/mo plus 1/2 util. 282-3215 or 480-9448.

Want motocross equip, boots, shoulder pads, helmet, etc. Andy, 333-6671 or 332-9105.

Want someone to carpool two or three days a week from the Heights area to NASA/CLC. Todd, 869-7162.

Want vocalist to compliment 5-pc contemporary jazz/rock band, resume. 488-6141.

Want rotisserie baseball league to join, or individuals interested in establishing new league. David, x31267 or 482-4953.

Want to rent 2-3 BR home/condo in CLHS area, have 2 pets, max \$525/mo. Debi, 280-5225.

Want child's Construx plastic construction pieces. Jim, 337-2838.

Want film development express photo coupons, Eckerd etc, from junk mail or newspaper, send to Sue O./KRUJ SD-5.

Want old mechanical wrist watches, and cond. x30186.

Want fem non-smoker roommate to share 2-1 apt close to NASA, begin May 1, \$230/mo plus 1/2 util. Denise, x38056 or 480-3896.

Photographic

35mm camera set, Nikon EM body, motor drive, 80-200mm zoom, 135mm telephoto, 50mm, 28mm,

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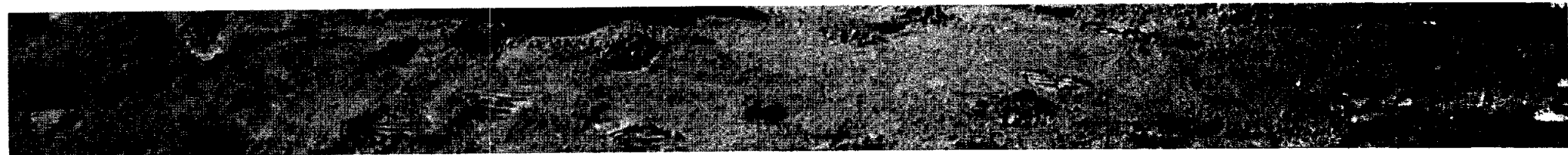
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Terra Provence 12" x 12" floor tile, 286 sq ft, \$4



Digging Deep

Core sample dissection penetrates beneath Moon's surface after 20 years

By Kari Fluegel

With the precision of a diamond cutter, Carol Schwarz gently scoops away a half centimeter layer of the sample in front of her.

Even lacking the glassy sheen and brilliant fire of a diamond, Schwarz's dusty, 28-centimeter-long section of the Moon core sample is far more rare and precious.

Only 35 core samples were collected during the six Apollo Moon landings. Of those, seven remain unopened, said John Dietrich, curator of the lunar sample collection.

The sample dissected recently by Schwarz was pulled from under the Moon's surface by Apollo 16 Astronaut Charlie Duke about 75 meters from his lunar module.

It is unique in that it is the top half of one of three samples taken less than 100 meters apart, Dietrich said. Investigators hope to compare it to the dissections of its sister samples to analyze any chemical differences that may be found.

Sample 60014 is the first sample dissected since 1988 and the fourth done by Schwarz, scientific supervisor of the Lunar Curatorial Lab and a Lockheed Engineering and Sciences Corp. employee.

The dissection process is painfully slow. First the sample is extracted from the drive tube in which it was originally collected. There, it has been stored in a pristine condition since Duke pulled it up in 1972.

The sample is inserted into a dissection platform, four centimeters in diameter, that is composed of three removable stainless steel levels topped with a final layer of plexiglass. Schwarz, wielding a paper thin spatula, then carefully identifies and catalogs the minerals, pebbles and soil she surgically removes.

Finally, a thin "peel" is taken of the remaining sample with the rest being encased in epoxy for further inspection.

The entire process takes about six months from preparation to completion of the cataloging, she said.

Because of the time and effort involved in the process, core samples are dissected only when the curatorial lab receives a specific request from an investigator.

Dietrich said the core samples add depth to the research done on the numerous surface samples collected by the Apollo astronauts. The layer, either chemical or visible, can give investigators insights into the geological events that affected the Moon, he said.

"It gives us a third dimension," Dietrich said. "That's the story of how it (the lunar surface) built up."

Sample 60014 does not have the distinctive stratification seen on several previous core samples. It does, however, have very distinctive chemical differences throughout the length of the sample, Dietrich said.

The sample is generally fine grained with larger fragments between one and four millimeters large, according to Schwarz's report. Fewer than one percent are greater than four millimeters in diameter.

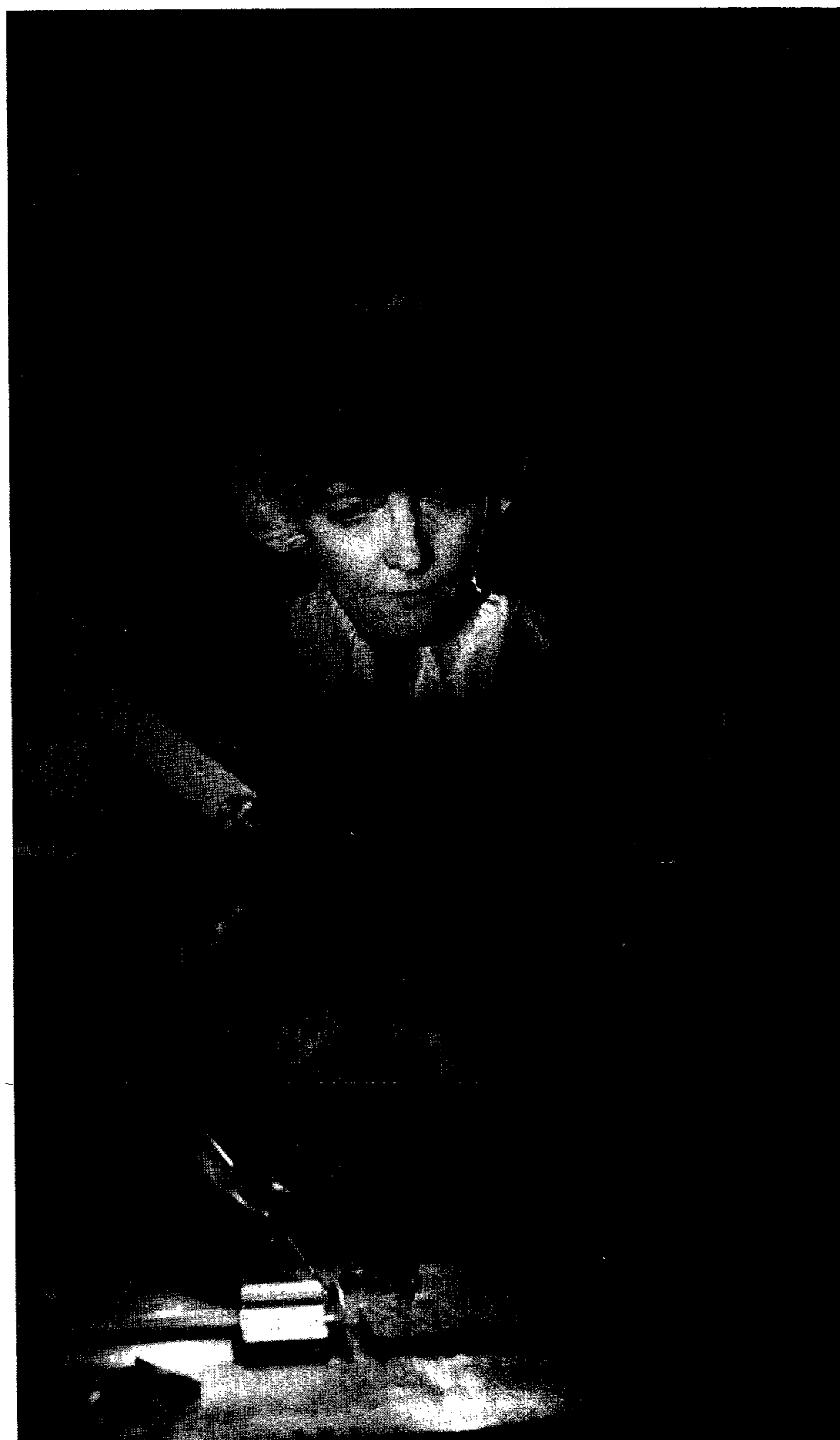
Most of the core samples were dissected before 1978. In the early 1980s funding cuts forced the reluctant discontinuation of the practice until 1986 when Schwarz began her first sample.

Researchers are constantly developing new techniques to analyze samples, hence the ongoing need for core sample material even 20 years after the Moon landings, Schwarz said.

The sample just completed was one of two retrieved from its storage place at Brooks Air Force Base in San Antonio in September 1989. About 117 pounds of lunar samples are carefully stored in stainless steel storage cabinets purged with fresh nitrogen gas to keep the samples in pristine condition.

Schwarz said the next dissection will be of the bottom half of the double drive tube pulled up by Duke.

"This is the first time these have been looked at by anyone," she said. "My dream is to find a meteorite (in one of the samples.)"



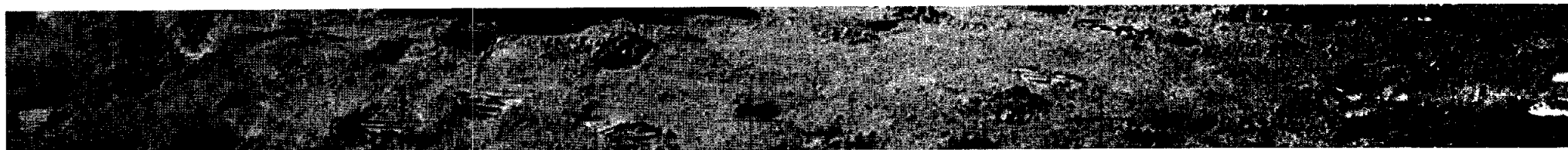
Schwarz, her hands enclosed in an air-tight glove box, slowly scrapes a half-centimeter layer off of the lunar core sample. The painstaking process of dissecting a 28 centimeter tube of lunar material takes about six months to complete.



Astronaut Charlie Duke collects Lunar Samples 60014 and 60013 during one of the Apollo 16 surface excursions. The samples have remained in their original tubes since they were collected.



Technicians Jack Warren, Ron Bastien and Ed Cornitius prepare the drive tubes for transport from Brooks Air Force Base in San Antonio to JSC in September 1989.



Ocean data contract new way of business for NASA

NASA has selected Orbital Sciences Corp. to negotiate a contract that represents a new way of doing business for the space agency.

Under the Ocean Color Data Mission contract, OSC would provide data to NASA to support research performed by the Laboratory for Hydrospheric Processes at Goddard Space Flight Center. NASA would buy only the data; all other functions of the mission would be the responsibility of OSC.

The contract, expected to be awarded April 1, would run for about 7.5 years, including five years of data production. The work would be per-

formed at OSC's facility in Fairfax, Va., and other subcontractor locations. Launch is expected in August 1993. The total proposed firm-fixed price is \$43.5 million.

The mission's scientific objective is to measure changes in ocean color that indicate where concentrations of phytoplankton and chlorophyll lie on the surface of the ocean. For global change research, measuring concentrations of phytoplankton is essential in understanding the role of oceans in the global carbon cycle.

The oceans are believed to store vast amounts of carbon through the

phytoplankton's photosynthesis, but the extent and nature of these mechanisms are not well understood. By improving their knowledge of how oceans store and release carbon, scientists can better understand and model global climate.

The data's commercial value lies in its ability to pinpoint likely concentrations of fish, which feed on the phytoplankton or on other species associated with the phytoplankton.

The Ocean Color Data Mission is an advancement of work done by the Coastal Zone Color Scanner (CZCS), an instrument aboard the Nimbus-7

satellite. Following its 1978 launch, CZCS returned ocean color data for eight years, providing scientists with global-scale, multi-year data on ocean biological productivity.

The interdisciplinary uses (oceanography, climatology) of data provided by CZCS and the Ocean Color Data Mission are characteristic of NASA's Mission to Planet Earth, a coordinated effort that uses ground-, airborne- and space-based measurements to study the Earth as an integrated environmental system.

Under the contract, NASA would purchase for the first time only the

results of the mission, the data, which would have to meet performance standards specified in the original request for proposals. OSC would be responsible for providing an instrument to return the required data, building the spacecraft and providing launch, tracking and control services.

Normally NASA manages those functions and purchases instruments and spacecraft from contractors. However, because the data has commercial applications, the agency structured the call so that the contractor will be able to sell the data commercially and then provide it to NASA for research.

Volunteers will share experience

The JSC chapter of the National Management Association is still looking for volunteers to work with local high school students and teachers during the fourth annual Management Experience Day.

Twenty-four seniors and six teachers from six local high schools will be exposed to what it's like to work within a federal agency on April 24. Clear Lake, Clear Creek, Dobie, Friendswood, Pearland and Dickinson High Schools will participate this year.

Each student and teacher will be assigned to accompany a JSC manager through his or her activities for an entire afternoon. Participants will be matched with JSC managers based on their areas of interest.

Managers from all disciplines are encouraged to participate. Volunteers should call Freda Marks, x30505, by March 29.

Mentors needed for high school volunteers

The Human Resources office is working with the Volunteer Center of the Bay Area to introduce a new program that gives high school volunteers job readiness training and career information.

HONORS, short for the Honors Education Role-Development Opportunity Volunteer Project, will introduce high school seniors from Clear Creek and Friendswood to employment opportunities in the aerospace industry.

The program, which will begin in September, is seeking mentors for about six young people in various areas of the center. Mentors will work with their young volunteers two to three hours a day after school twice a week throughout the school year.

Anyone who would like to be a mentor should call Nancy Garrick of the Human Resources Management Branch at x33030 by March 15.

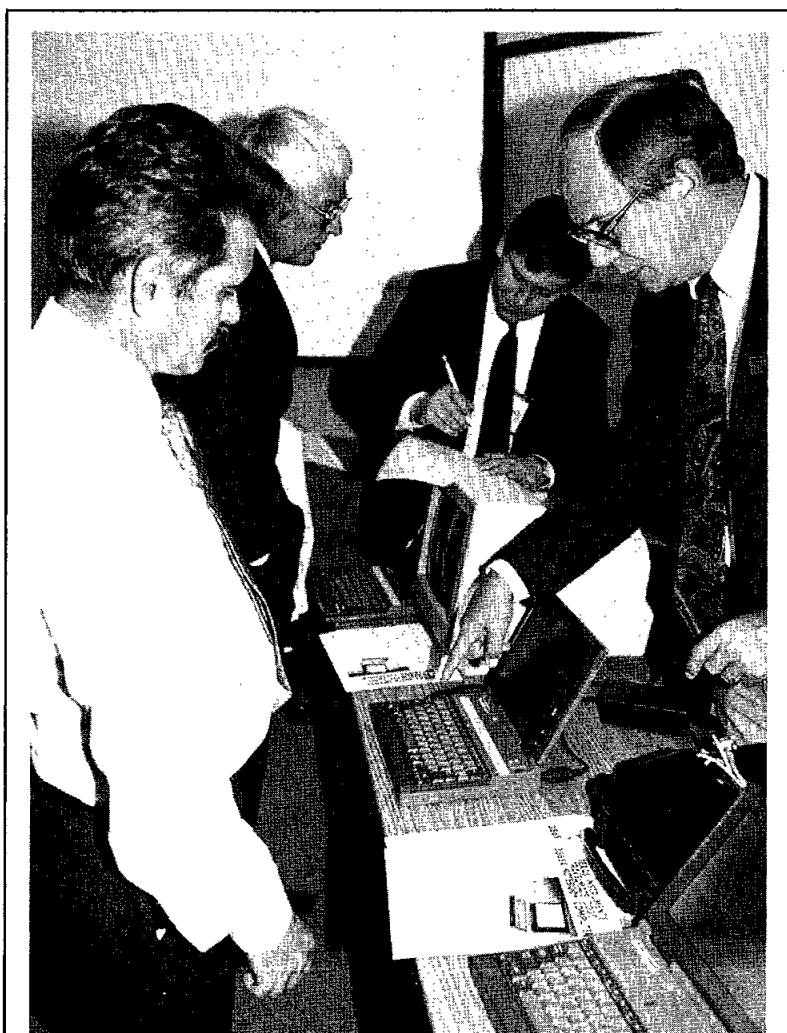
Tree movers work at JSC

(Continued from Page 1)

"And it's definitely needed. The added size of the root ball you're able to extract with it enables you to move larger trees that you wouldn't be able to move otherwise. It also dramatically increases the tree's survivability because you're able to transplant much more of the root ball."

Korenek designed the first all-hydraulic tree transplanter in 1965 and has a patent on it. He designed and built the large 14-foot transplanter in 1983. The company recently was selected to transplant a 65-foot blue spruce tree from the Carson National Forest to Washington, D.C., to be the national Christmas Tree.

By the way, Korenek is a native Texan and a believer in the adage, "Everything's bigger in Texas." Maybe that explains his fondness for largeness.



JSC Photo by Jack Jacob

LAPTOP LOOK—JSC employees take advantage of the chance to look at the latest in laptop computer technology and talk with factory representatives. More than 400 people visited the Information Systems Directorate's Laptop Showcase on Feb. 27. Eighteen vendors displayed 30 different briefcase-sized computers in the Bldg. 12 Product Demonstration Facility.

Crack analysis draws on JSC expertise

(Continued from Page 1)

inspection (an electromagnetic testing technique) and dye penetrations. Skyles went to work on a computer-assisted graphics simulation of the cracks.

Together, they determined after careful examination that the cracks were begun by fatigue from repeated openings and closings of the doors during ground processing. Evidence that the two sides of one displaced crack had been rubbing against each other made it clear the crack had been there before the door was put into flight position.

The technical community couldn't agree on the mechanism that caused the crack's rapid growth. It also

appeared that some single event had caused the almost invisible fatigue cracks to separate and widen. The team was able to find a likely candidate on the left door, but could not agree on the cause for such an event on the right door.

Since the exact cause of the problem could not be established for both door closing mechanisms, mission managers decided to roll back for repairs.

To check whether the doors would close properly while on orbit, the JSC engineers came up with the idea of simulating how the cracks affect closure using a specially machined bolt on one of *Columbia's* umbilical doors. It turned out that Rockwell International engineers in California, who did most

of the detailed analysis and loads determination, already were thinking along the same lines.

"We could run the numbers, but we wanted to show management with a demonstration," Schneider said. "So we came up with modifying the bolt so that it responds as if the lug were broken."

The simulations showed that even with a broken lug, the doors could be closed properly on orbit. Uncertainty about the cause of the cracks was the only thing keeping *Discovery* on the ground.

Meanwhile, McCluney and Knight worked with Richard Jackson and Paul Dye to keep up from an operations perspective. McCluney will be

the Maintenance, Mechanical Arm and Crew Systems flight controller for STS-39.

"When it comes time to close the doors, I'll be the one who's monitoring them the most closely," he said. "On every flight, we pay a lot of attention to getting these doors closed. On this flight, because we've had the problem, we'll probably be looking at it that much more closely."

Cooperation has been the hallmark of the effort to understand the crack problem, he said.

"When we get a problem like this, everybody pulls in very quick to solve the problem or come up with the answers fast. But it hasn't been done hastily — definitely in depth."

Xerox chairman to discuss TQM

The next NASA Total Quality Management Colloquium will feature David Kearns, chairman of the Xerox Corp.

Kearns will discuss "Quality as a Competitive Advantage" during a video teleconference from 2-3:30 p.m. Mon-

day in Bldg. 13, Rm. 156. Audience members will be allowed to ask questions.

The colloquium also will be aired live on the JSC Television Distribution System, Channel 4.

Atlantis gets 'go'

Pad 39B following its attachment to the solid rockets and external fuel tank. A flight readiness review for STS-37, a final, thorough review by top managers of the status of equipment and manpower for the mission, is now set for March 21-22 at Kennedy Space Center. GRO is scheduled to move to the launch pad Monday to await loading into *Atlantis*.

Meanwhile, *Discovery* was moved back to the VAB Thursday to be detached from its stack and taken back to the processing hangar. Plans are to remove the fuel line door closing mechanisms and casings in which large cracks were found last month and replace them with iden-

tical, brand new hardware taken from *Endeavour*.

Endeavour eventually will receive redesigned casings, as will *Discovery* and the rest of the shuttle fleet. However, *Discovery* may fly as early as late April on STS-39 with the *Endeavour* fittings.

Columbia, in the processing hangar being readied for STS-40, will have its casings removed and modified prior to the flight to strengthen the areas with cracks. STS-40 may be launched as early as late May.

STS-40 will carry a Spacelab module in the cargo bay for a Space and Life Sciences-1 series of experiments.

Space News Roundup

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Swap Shop deadline is every Friday, two weeks before the desired date of publication.

Editor Kelly Humphries
Associate Editors . . . Pam Alloway
Kari Fluegel

UHCL invites employees to open house

JSC employees are invited to attend the University of Houston-Clear Lake's fourth annual spring open house for prospective students.

Showcase '91 will be held from 1-4 p.m. Sunday in Atrium II of the Bayou Bldg. The event is hosted by the Office of Admissions.

Representatives from academic areas, admissions, financial aid and student organizations will be available to talk with guests and provide information about the university and the programs it offers.