

The Vehicle Assembly Building doors opened and the orbiter Columbia moved to Pad A of Launch Complex 39 at the Cape Dec. 29. The vehicle is now in a series of tests in preparation for launch now scheduled for mid-March. See UPDATE, Page 4.

Dr. Lovelace named acting Administrator

Dr. Alan M. Lovelace will serve as Acting Administrator of NASA until a new Administrator has been named by the President and confirmed by the Senate.

Dr. Robert A. Frosch's resignation as Administrator is effective Jan. 20.

Lovelace recently resigned his position as Deputy Administrator of NASA to accept an appointment as Associate Administrator/General Manager.

In this position, he will perform the same basic management duties he has been performing as Deputy Administrator, while serving as Acting Administrator.

Lovelace was appointed Deputy Administrator by President Ford in June 1976. He had previously been Associate Administrator for the Office of Aeronautics and Space Technology since September 1974.

Both President Carter and President-elect Reagan have agreed to the new assignment for Lovelace as an arrangement which will provide continuity of management for NASA.

JSC to host Fortune 500 conference

Representatives of Fortune 500 corporations will be on site Jan. 21 and 22 attending a conference on technology transfer, a resumption of the NASA/AIAA "Tracking the Space Revolution" program.

JSC is the seventh NASA site to hold a conference in this series.

During the conference, research and development executives from major non-aerospace industries will be introduced to advanced technology made possible by space programs.

They are also given insight into ways this technology can be used in their industries.

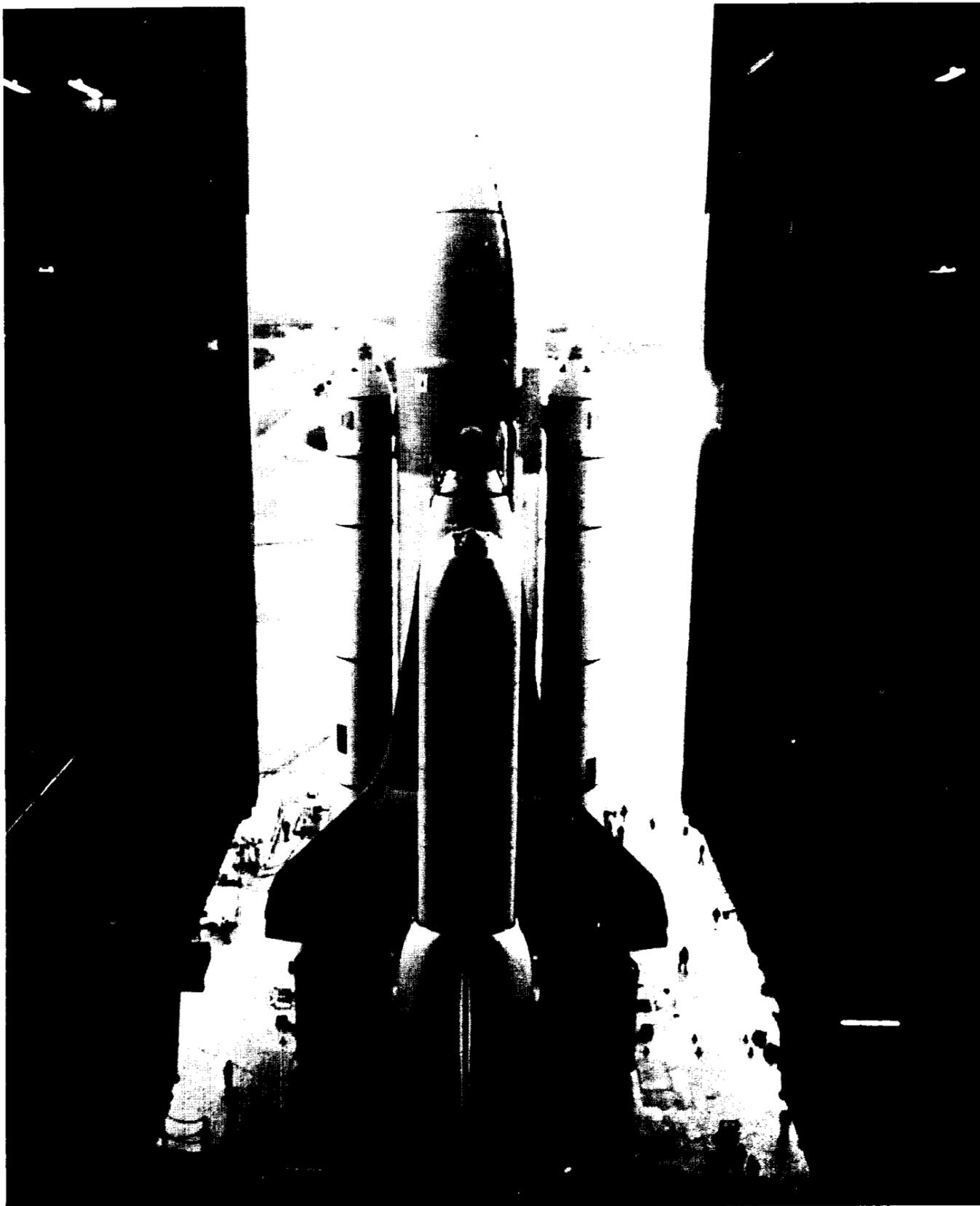
For two days, briefings and sessions will take place around the center. The Fortune 500 executives will learn about space program management from Center Director Christopher C. Kraft, Jr., and receive a technical engineering overview from Maxime Faget.

They will learn about Mission Control Center operations, flight crew training, and Space Transportation System Operations.

Employees at JSC have developed skills, techniques, and experience in management, as well as technology, that can be transferred into the private sector.

These conferences are in direct response to the NASA Charter Dealing with Technology Transfer.

Approximately 90 corporations have taken part in some or all of the conferences in this series.



Planets dancing in the sky

Illusion to last 6 months

For the next six months, there is a spectacle in the sky as Jupiter and Saturn appear to dance around each other. They are positioned in an alignment which takes place only once every several hundred years.

Three times before July, the planets will give the illusion of actually switching places. The first event of the "triple conjunction" already happened Jan. 14, but those who missed it will have another chance Feb. 19 and July 30.

The effect is much like being parked next to a moving train.

"The two planets are moving eastward, but Jupiter is closer and moving faster," explained Dr. Thornton Page, NASA visiting astronomer at JSC. "It happens that this year their orbits are aligned.

"Jupiter will be to the right of Saturn, then it passes Saturn, and the motion of the Earth makes it appear to be moving west."

The event takes place again around 1 a.m. Feb. 19 (just after midnight the 18th). However, the two planets will be close to each other in transit across the sky each night they are visible for the next six months.

Called a retrograde loop, the event is "quite striking," Page said. "However, you need to watch for an hour or so to see the actual switch illusion."

The conjunction takes place at that point in time when the Sun, Earth, and the two planets are directly aligned.

Jupiter and Saturn are visible in the constellation Virgo during this period, in the southeastern sky. The last of the three conjunctions will be July 30 at five in the afternoon, so stargazers really only have one more chance, next month, to see the event before it takes place again in the year 2238.

Some historians believe a similar planetary conjunction explains the biblical "Star of Bethlehem."

Why change?

No, Space News Roundup isn't under new management. The name isn't even new.

When the first NASA employees moved to Texas to open the Manned Space Flight Center, a contest was held to name the center newspaper.

"Space News Roundup" was the winning title, and it adorned Volume One, Number One.

Phoncille DeVore had submitted the title. She was at that time Secretary to Paul Purser, Special Assistant to the Center Director. DeVore retired last year with 25 years service, and her last position at JSC was Employee Development Specialist.

Somewhere during its years of publication, the "Space News" was dropped from Roundup, and the current editor decided to put it back in.

We feel the title Space News Roundup retains the heritage of manned spaceflight.

Write here

It's not too late to get an article published in Roundup. Last issue we ran a story speculating on what space activities will be in the year 2000, and we asked employees to send in their ideas. The articles are coming in, and we're still accepting more. Send them (typed double spaced if possible) to Editor, AP3 Roundup. Let's see what employees have to say.

More classes at rec center this season

The Gilruth Recreation Facility is offering the following leisure time classes for your winter enjoyment. Registration is now being accepted at Bldg. 207.

Beginning Tennis - a course designed strictly for persons with no previous formal instruction. Class meets from 5:15-6:45 p.m., Tuesdays, beginning January 20 for eight weeks. Cost is \$24 per person.

Intermediate Tennis - for persons who want to work on a special difficulty in their tennis game. Class meets from 5:15-6:45 p.m. on Thursdays, beginning January 22. Cost for this eight week course is \$24.

Ballroom Dance - an opportunity to learn all of the popular social dances from waltz to disco to the samba. Classes begin on Wednesday, January 21 and meet for one and a half hours for ten weeks. Dancers are categorized as beginners, intermediate, high intermediate, and advanced. Cost is \$50 per couple and registration deadline is January 14, 1981.

Country and Western Dance - features the latest in C&W steps as well as the old standbys. Class meets on Mondays at 7:15 p.m. for beginners and 8:35 p.m. for advanced. Cost for the six week course is \$18 per couple.

Women's Exercise Class - a chance to firm up and shape up for the New Year. Class meets Tuesdays and Thursdays from 5:15 to 6:15 p.m. Cost is \$20 per person.

Hatha Yoga - learn the art of stress reduction; release from tension and fatigue; muscle tone and weight reduction. Class meets from 5:15-6:45 p.m. for six weeks beginning Tuesday January 13. Cost is \$20 per person.

Saturday at the Movies - The first children's movie for 1981 will be the Disney blockbuster "The Black Hole." Movie time is 10 a.m. on Saturday January 17. Cost is \$1 which includes popcorn, coke, and cartoons.

Parker & Johnson stand up to system, state, & 'Killer Bees' to increase NEBA life benefits

It took ingenious maneuverings, stalwart stamina, and the clout to overcome an attack of the Killer Bees to get increased spouse coverage for NEBA member life insurance through the Texas State Legislature last year.

As of October 1980, NEBA member spouse coverage is \$15,000, a \$5000 increase over last year, but effecting the change was no easy task for NEBA Secretary and Treasurer Frank Parker and his assistant Marion Johnson.

Roundup recently asked Parker to relate the bizarre chain of events.

It all started in 1968 when the NEBA Board decided to include spouses and dependents in life insurance policies for NASA employees, a plan that had no problems anywhere but Texas. The Lone Star State had at that time a law against spouses being covered.

NASA pleaded its case and through NEBA underwriter Home Life Insurance's contacts, a bill passed in 1969 and "things rolled along," Parker says.

A bill to increase coverage passed in 1976 and NEBA and Home Life figured they now had the support of the Texas State Insurance Board, the Texas Life Underwriters Association, the Texas Life Insurance Companies Association, and anyone else hiding under the desks.

But a similar increase was opposed in 1978, and "no one seemed to know what had hap-



Johnson & Parker: on the phones daily for NEBA

pened," Parker says.

The battle of the lobbyists began, and phone calls exchanged between Home Life's attorneys (Vinson & Elkins) and the numerous Texas insurance groups. Plus Parker was on the phone daily with those persons and NEBA Chair Ralph "Mike" Cushman in Washington.

"Representative Carraway really went to bat for JSC and got the bill through the House by his own hard work," Parker said. Then just as the companion bill was about to clear the Senate, the bomb fell.

The Killer Bees attacked. Texas legislation ground to a halt, and the NEBA increased coverage bill was left in a stack in an empty Senate office. State law

enforcers searched through logs and hollows, highway and homes, and the remaining Legislators harumphed disapproval, saying none of the scoundrels' bills would ever get out of committee.

(For those who were out of the country at the time, the Killer Bees were a group of Texas state Senators who protested the passage of a separate Presidential primary bill by refusing to show up at the Legislature or anywhere else for several weeks. Many of those Senators are no longer in office...)

With five days left in session, the Killer Bees returned. However, the NEBA bill had been introduced by one of the truant Senators. It never saw the smoke of the Senate floor.

Parker and his teamworkers got on their phones. "To put it mildly, I was a pain in the neck to those attorneys," he says.

In the process of persuading Home Life to "pursue all avenues," they discovered a small technicality in Texas' voluminous life insurance laws that allowed NEBA, with a few additions to its affidavit, to qualify to offer spouse coverage after all.

If an insurance organization provides other services as well as insurance, it can qualify for dual policies. NEBA advises on veterans' claims and gives estate planning counseling and other assistance, so it qualified to offer dual coverage.

Affidavits were written, signed, and on the Texas Insurance Board's desk by noon the next day (they used Federal Express).

So NASA employees enjoy yet another benefit from NEBA; but after hearing this story, it can hardly be taken for granted.

Parker wants to stress that none of it would be possible without the support of Christopher Kraft, Clifford Charlesworth, Cushman at Headquarters, Wally Grimes and Jack Lister who are president and vice president of the JSC NEBA Chapter, the employees who made emphatic phone calls to Senators, and Parker's invaluable assistant Marion Johnson.

And of course, the increased coverage wouldn't have been possible without Frank Parker.

Manned Flight Awareness Column returns to JSC

(Message from the Administrator for the Manned Flight Awareness section of the JSC Space News Roundup.)

With the advent of the Space Shuttle, we are beginning a new era in manned space activity. Instead of occasional trips into space by explorers, we are approaching the time when men and women with diverse scientific and technological backgrounds will venture into space regularly and frequently.

The implications for each of us who will help put these people into space and bring them home are obvious and considerable. We in NASA and the contractors who work for us have a reputation for the highest quality work—a reputation dramatically renewed by the recent encounter with Saturn.

We cannot, however, rest on our laurels. The dawn of the Shuttle era should remind us of that. The lives of many of our associates and the opportunity for the people of this nation—and the world—to reap the rewards that space offers will depend on our unflinching devotion to the highest quality in our work.

Therefore, I commend this new column and its message to you. It is designed to keep all of us on our toes and to remind us of the vital part that each of us plays in the safety and success of this new era.

Robert A. Frosch
Administrator

'They wave us through'



Recognizing hoods and collars

They know us by our cars
And Clothes
Blue Toyotas
Morning, white Ford
"The yellow MG smashed his door!"
They wave us through
Dark blue
Recognizing hoods
And collars
At the center
Of machines and men
Looking for badges
Hard won
Large and small
Some red and black
"Do you have your badge?"
"Let me see your badge please."
"Damn, I forgot my badge!"
It was temporary from then on
Patting my pocket
Hoping to pass
Black blue
White blue
Waving me through

Gary Morrison, AP3
News Media Producer
AV Services Corp

Clydesdale horses are coming to JSC

The Clydesdale horses are headed this way. The eight superbly trained and immaculately groomed animals will be pulling a three and a half ton wagon through Johnson Space Center Friday Jan. 23 at 10 a.m.

Two generations ago, these horses were used to deliver barrels of sudsy refreshment. They are direct descendents of the powerful draft horses which originated in the valley of the River

Clyde in Scotland.

The Budweiser Clydesdales will enter the Main Gate, parade up Second St. and stop for display at the parking lot across from Building 47. They'll then proceed back towards NASA One, stopping once more at Rocket Park.

These are beautiful animals, dwarfing any ordinary horse that stands next to them. Even their glistening, brass-trimmed harness is a sight to behold.



The famous Budweiser Clydesdale horses

It isn't often one gets a chance to admire such magnificent animals, and their visit is sure to be a rare treat.

The Roundup is an official publication of the National Aeronautics and Space Administration, Lyndon B. Johnson Space Center, Houston, Texas, and is published every other Friday by the Public Affairs Office for all space center employees.

Editor..... Kay Ebeling

Bulletin Board

A number of JSC employees have organized charity projects to make Christmas better for less fortunate persons. Two such projects are pictured here. At right, Mike Sundholm of CSC watches as a Boys Harbor of La Porte resident opens a package which was one of many delivered by employees of Buildings 12 and 30. Their project started with one shift's workers in 1972 and now involves the entire company and a local bank. Below, a Family Affair Christmas Project worker packs bags of toys and food for pre-Christmas delivery to needy families in the Houston area. This year, the group raised \$4000 (their goal was \$3500), and they were able to help 135 families. Twenty JSC employees were involved.



Ski Club To Hold Skating Party To Keep Those Muscles Strong for Snow

Back by popular demand this year, the Clear Lake Area Ski Club has reserved Fun Time Roller Rink in Webster from 7 to 9 p.m. January 25 (Super Bowl Day) exclusively for the club members, families, and guests. Last year, there was a great turnout and no injuries except for a few bruised egos at wiping up the floor and getting caught on film by Wanda Jamison. This is an excellent way to work those muscles both pre- or apres-ski. See any officer or trip leader for advance tickets of only \$2 each, and come out and join the fun.

Lunarfins To Show Film On Diving The Clear Waters Of Honduras

The Lunarfins Scuba Club will feature at its next monthly meeting a program on diving experiences recently encountered on the Cochinos Islands in the clear waters of the Honduras. Plans are also in progress to offer a basic course in scuba in March. Meeting is scheduled Thursday, Jan. 22, 7:30 p.m., at the Clear Lake Park Building, NASA Road One. All are invited. For more info, call 480-1340, evenings.

These Items Are On Sale At The JSC Exchange Store

(Store hours: 10 a.m. to 2 p.m.)
Plitt Theatre tickets: \$2
General Cinema tickets: \$2.40
Postage Stamps (20-15 cent stamps): \$3
Entertainment '81 Coupon Book: \$16
Gold C Values Book 80-81: \$5

Watch For These Programs Coming Up On PBS Channel 8

"The History of Space Flight" airs Saturday January 17 at 12:30 p.m. NOVA on Jan. 20 is of especial interest to geologists with the program, "Message in the Rocks:" a look at some possible

geological events involved in the Earth's origins using clues found in a fresh meteorite fall, volcanic eruption, and lava behavior underwater.

JSC Golf Association Begins Its Annual Membership Drive

The JSC Golf Association will open its 1981 season with a best ball tournament at El Dorado Country Club on the Washington's birthday holiday Feb. 16. The JSCGA, which had 86 members last year, conducts monthly competitive tournaments leading to a Championship Tournament for qualifiers in the fall. Play is held at 12 different courses in the area using established handicaps playing within two flights. Officers for 1981 are Steve Gorman, Al Ligriani, Cal Mitchell, Bill Ramey, and Larry Magers. Applications are being mailed to last year's members. We invite any golfers at JSC to join us in what has been an enjoyable competitive format for many years here. You may call Gorman at x4891 for more information.

AIAA To Discuss "Engineering Challenges" At Its Jan. 20 Meeting

Robert W. Rummel, who chairs the Aeronautics and Space Engineering Board for the National Research Council, will address the American Institute of Aeronautics and Astronautics at its Jan. 20 dinner meeting in Gilruth Center. (There is no charge to attend the program only.) Rummel, who is a former vice president of Trans World Airlines and former consultant to Howard Hughes, will speak on "Engineering Challenges." Social hour begins at 6 p.m., dinner at 7, and the program at 8. Reservations for dinner should be made by Friday, Jan. 16 by calling Sandra at X3995. Rummel is an AIAA fellow and a 1979 recipient of the Distinguished Public Service Medal from NASA. He's listed in Who's Who in America and Who's Who in Aviation, and he is currently president of an aviation consulting firm.

Roundup Swap Shop

Ads must be under 20 words total per person, double spaced, and typed or printed. Deadline for submitting or cancelling ads is 5 p.m. the first Wednesday after publication. Send ads to AP3 Roundup, or deliver them to the Newsroom, Building 2 annex. No phone-in ads will be taken. Swap Shop is open to JSC federal and on-site contractor employees for non-commercial personal ads.

Miscellaneous

Binks 1/8 HP diaphragm air compressor, intended for use with airbrush, excellent condition \$60. Pat x5316 - 538-1705

You may be out of honey, but I'm not! Quarts \$3. Gallons \$11. Ward X4976.

A M radio for car, 8 track tape player, 2 speakers; \$35 for all or \$10 each. Schultz 334-3046.

CRC Hnadbook of Radioactive Nuclides. 960 p. \$10. National Bureau of Standards Handbook of Mathematical Functions, 104 p. \$8. Linda X3611.

Tennis Table, like new, fold-up, with wheels. \$80 new, will sell for \$45. C.W. X4105 - 643-8944 after 5 p.m.

Cars & Trucks

'76 Lincoln Continental Town car, moon roof, burgandy color loaded, very good condition. \$3000. Bob X4721 - 946-5459

'77 Chev. Monza Spyder, 4 cyl., 5 speed, air, am/fm cassette, 47,000, new tires, \$2100. Greg - 482-7643

'80 Gran Prix Pontiac am/fm 8 track, excellent condition, Cruz Control. For more information call Diane X5883 or 5884 or 935-8876

'76 Toyota pickup, long bed SR5 with Gem top cover - excellent condition \$2975.00 M. A. Bernard 333-2968 or X4461 JSC.

'76 Gran Torino S/W, 351 V8, 3 - seat, PS/PB/Auto/AC, AM/FM 8-Trk, exc. cond., 48,000 mi., \$1,995. Jim X4742

'73 Grand Prix - Good running car, good tires, a/c, am/fm radio, elect windows, etc. \$900 - John X5553 or 944-4997.

'72 Buick Riviera, p/s, p/b, auto, air, am/fm stereo, original owner, exc. condition, soon to be classic \$1995. Herb X7272 or 482-3546 after 5:00.

'74 AMC Hornet hatchback, 6 cyl, auto trans, air, pwr. steering, excellent tires, good work car. \$700. Goody X7241, 333-3024.

'66 Mercedes 230S, 6 cyl., air, ps, auto, very good condition, \$3000. Jones X2394 or 471-3303.

'74 Volvo 142, 4 speed fuel injected, needs paint, high miles, \$800. 334-7061 after 5 p.m.

'77 F-250 4x4 Ford pickup - 8 foot bed, 3 tanks, heavy hitch \$2,500 X4065 or 470-0279 after 6.

'78 deluxe truck camper - 8 foot bed refrig., stove/oven, overhead bunk. \$1250. X4065 or 470-0279 after 6.

Property & Rentals

SALE: El Lago, newly redecorated throughout 3-2, large recreation room, separate den and living room. \$80K 334-2354.

SALE: League City/Pecan Forest 4-2-2A, combine non-escalating 8-1/4 % loan with 2nd mortgage for great affordability, immediate occupancy, low 60's, 554-2934.

LEASE: One bedroom condo., fireplace, w/d connect., clubhouse, pool, tennis cts., \$290/mo. + elec., 483-5511, 850-1520 eves.

LEASE: Dickinson, 6 month max., executive home, 3-2 1/2-2, cathedralled family room w/fireplace, fenced, playhouse, \$525 mo., call 337-1840.

20' Winnebago motorhome, sleeps 6, completely self contained, good rates. Reeves X3087 or 482-7233.

LEASE: Baywind 2 condo, 1 bedroom, fireplace, near tennis courts & pool. \$285/mo. + electric. X6401 or 333-3734.

GALVESTON By-The-Sea condominium: Two bedroom furnished apartment for rent by day, week, or month. Clements. 474-2662.

IT AIN'T NO STRAIN



TO COME UP WITH A COST REDUCTION IDEA AND SEND IT TO COST REDUCTION OFFICE BE ON FORM 1150!

Cartoon by Russ Byther

Carpools

Need ride from La Marque to JSC bldg. 15 everyday 7:30 to 4:45. 483-4950. Diane.

Want to form carpool from Alta Loma or Dickinson to Bldg. 13 or near facility. 8:00 to 4:30 shift. Tergsa X3076 or 925-2326.

Non-smoking riders wanted 8 a.m. to 4:30 p.m. shift. Rayburn High School area. Fisher X5341 or Pixley X4751.

Ride to/from Shoreacres to JSC Bldg. 15 weekdays 7:30 - 4:00. X4065.

Wanted

"Paper trimmer," 12 in. min. 488-5037.

Parts for 1970 Olds Delta 88. X4895 or 482-3678.

Wanted: Ping Pong Table. Schultz 334-3046.

Boats

16-ft. DelMagic/50 hp Mercury, trailer has big wheels, new tires, this is a clean rig. \$2000. Herb C7272 or 482-3546 after 5 p.m.

18 lb. anchor w/chain and 100 ft. of 1/2 in. nylon rope. \$40. Mallary X3068, 482-7081.

Bass Boat: Falcon Tiger Bass Rig, complete, excellent condition, \$1700. 474-4690

Cycles

Girls' 20 inch bike, fair condition, \$10. 488-4463.

'79 Honda Twinstar motorcycle. Ony 5,000 miles. Like new, 75 MPG. Two helmets. \$895. Steve X5111.

'76 KZ400, 4000 mi., luggage rack, fairing, 60 MPG, \$750, 481-5227.

Household articles

For Sale: entirely hand made matching twin bed quilts, \$250 each, X6444, or 649-1493.

Homemade painted furniture for child's room. Single bed/book case end; chest of drawers: book/toy case. \$50. Kennedy, X3969.

Couch and matching love seat/Earthtone yellow. Will exchange for sleeper sofa or best offer over \$250. 481-4449 or Joy at 3026.

25-inch Magnavox console color T.V. Good condition. \$135. 488-4459.

Gas range, electric double oven, both built-ins; \$50 for all. Schultz 334-3046.

Butcher block formica table with chromed legs, six matching vinyl chairs, like new. \$148, John X2794 or 488-6195.

4x8' pool table with rack que's, etc., \$200. Herb X7272 or 482-3546 after 5 p.m.

19' RCA portable TV, \$100, good cond. Robin X3222.

Musical Instruments

Buecher Alto Saxophone - like new - \$350. 554-2693 after 4:30 p.m.

FOR SALE: Upright Newman Piano \$350. 332-8618 after 5.

Stereos

Heathkit am/fm receiver 35 watt stereo, \$100., X4065 or 470-0279 after 6.

Voyager 1 teams report mission discoveries

The following is part one of a summary of the major scientific discoveries, observations and theories generated by the recent encounter of Voyager One with Saturn:

The Planet

- The basic appearance of Saturn's atmosphere is similar to that of Jupiter; with alternating dark and light cloud markings. The features in the Saturnian atmosphere, however, are muted by the presence of a much thicker haze layer above the visible clouds. The belt/zone structure on Saturn also extends to much higher latitudes than on Jupiter.

- Wind speeds in the atmosphere are not closely tied to the belt/zone boundaries as was apparently the case for Jupiter. The greatest wind speeds (more than 1,600 kilometers or 1,000 miles per hour) occur at the equator and are four to five times stronger than Jupiter wind speeds.

- Temperatures near the cloud tops range from 86 degrees Kelvin (-305 degrees Fahrenheit) to 92 K (-294 F), with the coolest temperatures noted near the center of the equatorial zone.

- Auroral emissions were seen near the poles of Saturn; auroral-type emissions in the ultraviolet were also noted near the illuminated limbs of the planet.

- The dark face of Saturn receives a substantial amount of light from the rings, especially in that hemisphere above the illuminated face of the rings.

- Lightning bolts have not been observed in the images of Saturn's dark face, but radio emissions typical of lightning discharges have been noted. These discharges are believed to emanate from Saturn's rings rather than from its atmosphere.

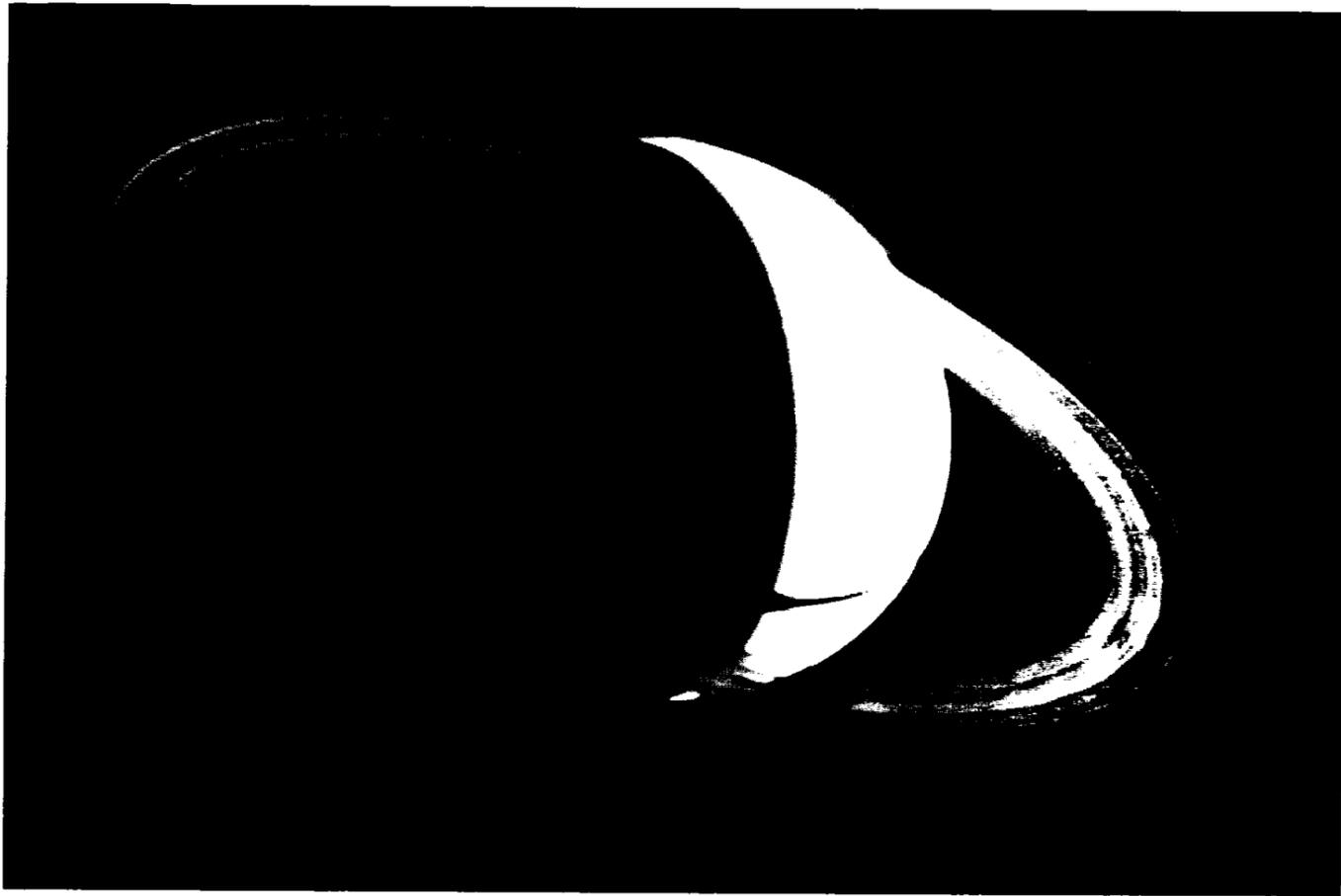
- Radio emissions, primarily from the north polar region and near 90 degrees longitude, indicate that the body of Saturn and its magnetosphere rotate with a period of 10 hours 39 minutes 26 seconds.

The Rings

- The classically known A, B, and C rings were observed by Voyager One to consist of hundred of ringlets, a few of which are elliptical in shape.

- The F ring, first discovered by Pioneer 11, is composed of three separate ringlets which appear to be intertwined. The inner and outer limits of the F ring seem to be controlled by two shepherding satellites, S-13 on the outside and S-14 on the inside. The outer edge of ring A is similarly shepherded by S-15. All three of these satellites were discovered by Voyager One.

- The existence of a D ring inside the C ring was confirmed by observations during Voyager One's passage through the shadow of Saturn. The tenuous E ring, previously observed only from Earth during periods when Saturn's rings could be



The view as Voyager 1 looks back at Saturn Nov. 16, four days after close encounter

viewed edge-on, was also observed during shadow passage.

- Measurements show that the D, E, and F rings have a large population of particles less than 1/10,000 of an inch in diameter. Radio measurements of the C ring yield an effective particle size of about one meter (3 feet), but also suggest a wide distribution of particle sizes.

- The existence of a thin ring just inside the co-orbital moons S-10 and S-11 was first inferred from the passage of its shadow across one of the moons, and later detected directly in the Voyager image of the E ring mentioned above.

- The spokes in the B ring are dark in approach pictures and bright in forward-scattered light in post-closest approach pictures, and may be a result of electrostatic forces lifting fine particles above the face of the optically thick B ring. These spokes appear to corotate with Saturn's magnetic field.

The New Moons

- Each of the recently discovered moons of Saturn was photographed, but only S-10 and S-11 had large enough angular diameters in the images to determine their shapes. Both are irregular in shape with their long axes pointed toward the center of Saturn. S-11, the trailing satellite of this co-orbital pair is about 135 km (80 mi.) long by 70 km (40 mi.) wide. S-10 is somewhat larger with an average diameter of about 200 km

(120 mi.). Both bodies are apparently composed of water ice, and both orbit the planet at a distance of 91,000 km (57,000 mi.) above the cloud tops of Saturn.

- Little is known about S-12 through S-15 other than their orbits. S-12 (sometimes referred to as Dione B) orbits at the same distance from Saturn as Dione, slowly oscillating about a point 60 degrees ahead of Dione. As mentioned earlier, S-13, S-14, and S-15 were dis-

covered by Voyager One and orbit just outside the F ring, just inside the F ring, and just outside the A ring, respectively.

- Other satellites may be discovered as Voyager One scientists examine the voluminous data returned from the encounter, or from photos to be returned in the summer of 1981 by Voyager Two.

Next issue: the moons and magnetosphere



Shuttle astronauts are always in training. Shown here, Robert L. Crippen sits in the front position and Astronaut Candidate Jerry L. Ross occupies the backseat. They have just arrived at El Paso.

More than Shuttle to launch in 1981

NASA's 1981 expendable launch vehicle schedule calls for 15 satellite launchings—10 from the Eastern Space and Missile Center, Cape Canaveral, Fla., and five from the Western Space and Missile Center, Vandenberg Air Force Base, Calif., according to Joseph B. Mahon, NASA Director of the Expendable Launch Vehicles Program. NASA conducted seven satellite missions during 1980.

Included in the 1981 schedule are two NASA scientific payloads sponsored by the NASA Office of Space Science. These are the Dynamic Explorer to be launched in July by a Delta rocket, and the Solar Mesospheric Explorer scheduled for a September launch, also onboard a Delta.

The remaining 13 missions will be for other U.S. Government agencies and commercial firms for which NASA will be reimbursed for launch and related services.

These include two weather satellites for the National Oceanic and At-

mospheric Administration, three missions for the Department of Defense, and eight commercial geosynchronous communications satellites. The commercial users include the International Telecommunications Satellite Organization (INTELSAT) with four launchings; the Com-

sat General Corp., one mission; the Radio Corporation of America, two missions; and one for Satellite Business Systems.

The expendable launch vehicles program is managed by NASA's Office of Space Transportation Operations, Washington, D.C.

NASA accepts Mars fund

The Viking Fund, a private organization under the auspices of the American Astronautical Society which has been

"We are always at the end of something, always at the beginning of something else. If we stop with one success and do not recognize that it stands merely as a threshold to something greater, more complex, more infinite, then I think we do only half our job."

—James Michener

collecting donations to give to NASA, presented the agency with a check at ceremonies held Wednesday, Jan. 7 at the National Air and Space Museum.

Stan Kent, a former NASA consultant, kicked off the campaign in Omni Magazine a year ago to raise money so NASA could continue its exploration of Mars.

Dr. Robert A. Frosch, NASA Administrator, accepted the check for \$60,000. Other participants included Dr. Noel Hinners, National Air and Space Museum Director; and Dr. Edwin Speaker, Executive Vice President of the American Astronautical Society.

Shuttle Update

The Flight Readiness Firing, in which the three main Shuttle engines will fire for 10 seconds on the pad, is set for no earlier than Feb. 10. If all goes well with this test, then all systems are go for a mid-March launch of the first Space Shuttle mission.

The firing will be preceded by a Wet Countdown Demonstration Test and "dry" launch simulations.

Before the FRF can be confirmed, the Main Propulsion Test Article will undergo its final full duration cluster firing, now scheduled for January 17 at the NASA facility in Bay St. Louis, Miss.

Meanwhile, at the Cape, the entire system is undergoing Pad Validation Tests.

Here at JSC, flight controllers are gearing up for the sixth and second to the last-54 hour simulation of the first Shuttle flight, scheduled for Jan. 20-22.