ROUNDUP

NASA MANNED SPACECRAFT CENTER HOUSTON, TEXAS

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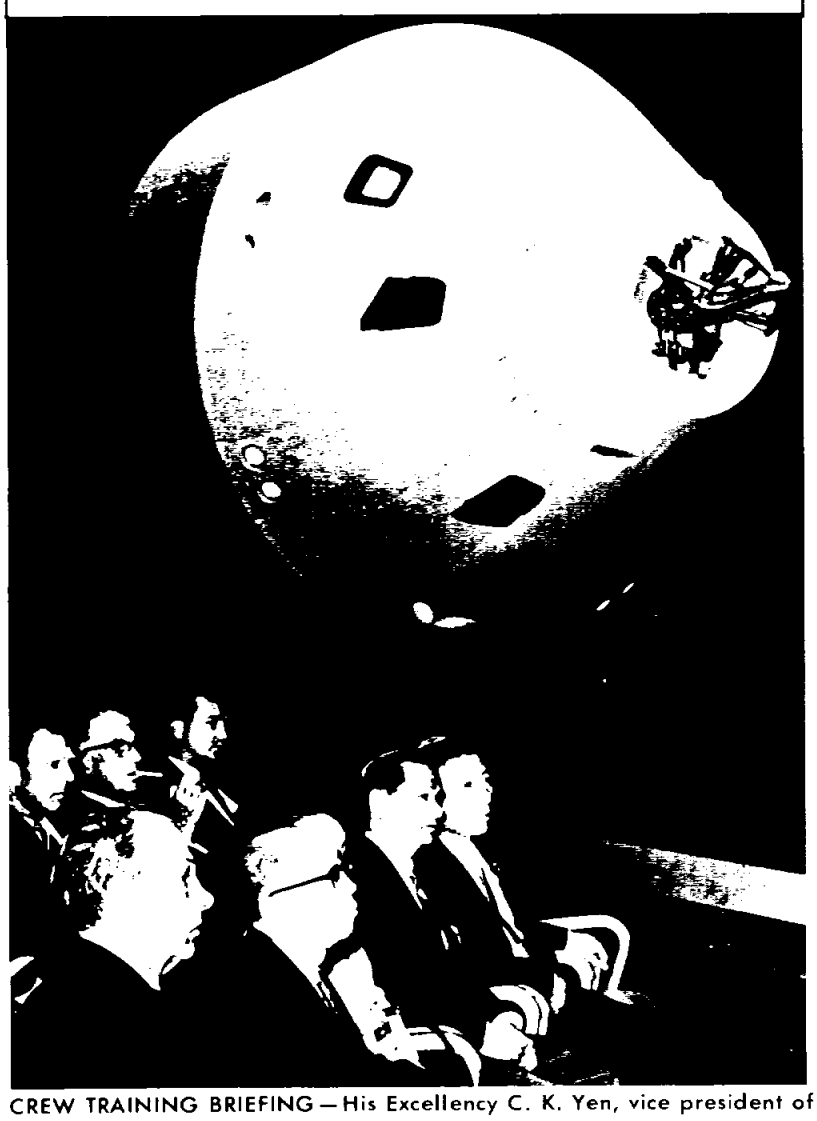
Far-East Visitor



CREW TRAINING BRIEFING—His Excellency C. K. Yen, vice president of the Republic of China (with glasses, front row) May 12 spent the afternoon at MSC visiting laboratory and training areas. Here, he and his party listen to a description of the Apollo Docking Simulator in Bldg 5.

First Apollo Crew Describes Spacecraft Design Changes

With the announcement May 9 of the crew for the first manned Apollo mission, the program made the final move toward recovery from the AS 204 catastrophic fire. The first manned flight is scheduled for the first quarter of 1968.

In a press conference the following day at the North American Aviation Space Division at Downey, Calif., the prime and backup crews for the mission described for newsmen the Apollo spacecraft changes aimed toward greater crew safety and higher mission success probability.

The prime crew is Walter M. Schirra, Jr., Donn F. Eisele, and Walter Cunningham. Backups are Thomas Stafford, John W. Young and Eugene Cernan.

"We will fly the spacecraft when we feel the crew is ready," Schirra told the press conference. "So far, to my knowledge, not one pilot has ever been pushed inside a spacecraft; he's always been helped, and we're here to work with the people that are helping us prepare a spacecraft. It's sort of refreshing to know that attitudes have changed considerably," he continued, "as a result of the accident we all suffered."

"People have changed, their personalities have changed, and the can-do atmosphere is permeating everyone that comes into the plant these days."

Apollo Command/Service Module 101 has been embarked for the first manned flight. It is a Block II spacecraft, differing basically from the Block I spacecraft by having an upper docking hatch for rendezvous with the Lunar Module. Other systems configurations are also quite different in the Block II spacecraft.

Referring to a command module mockup in the room, Schirra said, "When we came out here to look at the changes that were proposed to prevent a fire in the spacecraft, to improve the interior of the spacecraft, to validate systems that were somewhat at fault, we were very impressed with this mockup.

"For example, we have closed out some panels which in the past have had some nylon netting over them. We are now using hard covers. We have covered up the wiring harnesses that are subject both to traffic damage and to a possibility that we have traced as a cause of the accident in Apollo 204. These covers and these changeouts and some of the system changes are obvious."

Eisele assisted Schirra's narrative of spacecraft changes by entering the spacecraft to describe on closed-circuit television the various features of the redesigned spacecraft.

"The hatch itself has been changed," said Schirra. "The hatch now seals by over-center camlocks much as we had in the Gemini spacecraft."

Eisele continued the hatch description. "We now have a hatch that is hinged through the spacecraft and it seals on the outside rather than from the inside. When the hatch is closed, dogs go over center and pull the hatch down against the outer seal. If there is any pressure build-up inside and you have to get the hatch open in a hurry, there's a quick-release device that pulls these dogs back and lets the hatch swing open very quickly. It's a lot safer that the old design which was sealed from the inside with hatch panels that had to be installed from the interior."

Speaking from the mockup's lower equipment bay, Eisele covered some of the basic crew compartment changes. "These close-out panels close out areas that were previously open—electronic boxes, wire-runs, plumbing-runs and the like. These panels will have holes for inspection and also for insertion of a fire extinguisher nozzle if it becomes necessary."

Moving to stowage boxes, Eisele said, "These are all hard-cover metal boxes that will have fasteners on them to form a positive latch for stowing most of the soft material such as meteorite garments, seawater pump, tissue containers — anything that is flammable for which we don't have a good substitute material will be enclosed in these protective cases.

"This is a big step forward in stowage from previous designs," said Eisele, "not only from the fire safety standpoint, but also because they make efficient use of available storage. We think we can get a lot more in here and still not clobber up the available space for moving around."

Security, Fire Contract Signed With Wackenhut

MSC announced May 19 the award of a contract to Wackenhut Services, Inc., Coral Gables, Florida, to provide the Center with protective security and fire protection services. The contract period begins on July 1, 1967, and continues through June 30, 1968. The contract contains options for two additional one-year periods.

The estimated cost of the contract is $1,240,000 per year and a staff of 142 full-time and 10 part-time employees will carry out the terms of the contract.

For the past three years, protective security services at MSC were performed by the M & T Company of Philadalphia, Pa., and fire protection service was provided by the Houston Fire and Safety Equipment Co. of Houston, Texas.

Voyager Design Study Contract in Negotiation

NASA will begin negotiation of contracts with two industrial firms for feasibility and preliminary design studies (Phase B) of planetary entry capsules for its Voyager Project.

The Martin-Marietta Corp., Denver Division, and McDonnell Aircraft, Astronautics Co., St. Louis, were chosen from among four proposers for $500,000 fixed price, three-month contracts.

NASA plans the launch of two Voyager planetary vehicles to Mars in 1973, aboard a single Saturn V rocket. Upon reaching the planet, each planetary vehicle will separate into a landing capsule and an orbiting spacecraft which will operate as a team, providing reconnaissance from orbit and simultaneously making scientific measurements on the surface.

The entry capsule will contain a surface laboratory to conduct scientific experiments on the surface of the planet. Phase B contractor efforts will be the responsibility of the Jet Propulsion Laboratory, Pasadena, Cal., in conjunction with the Langley Research Center, Hampton, Va.

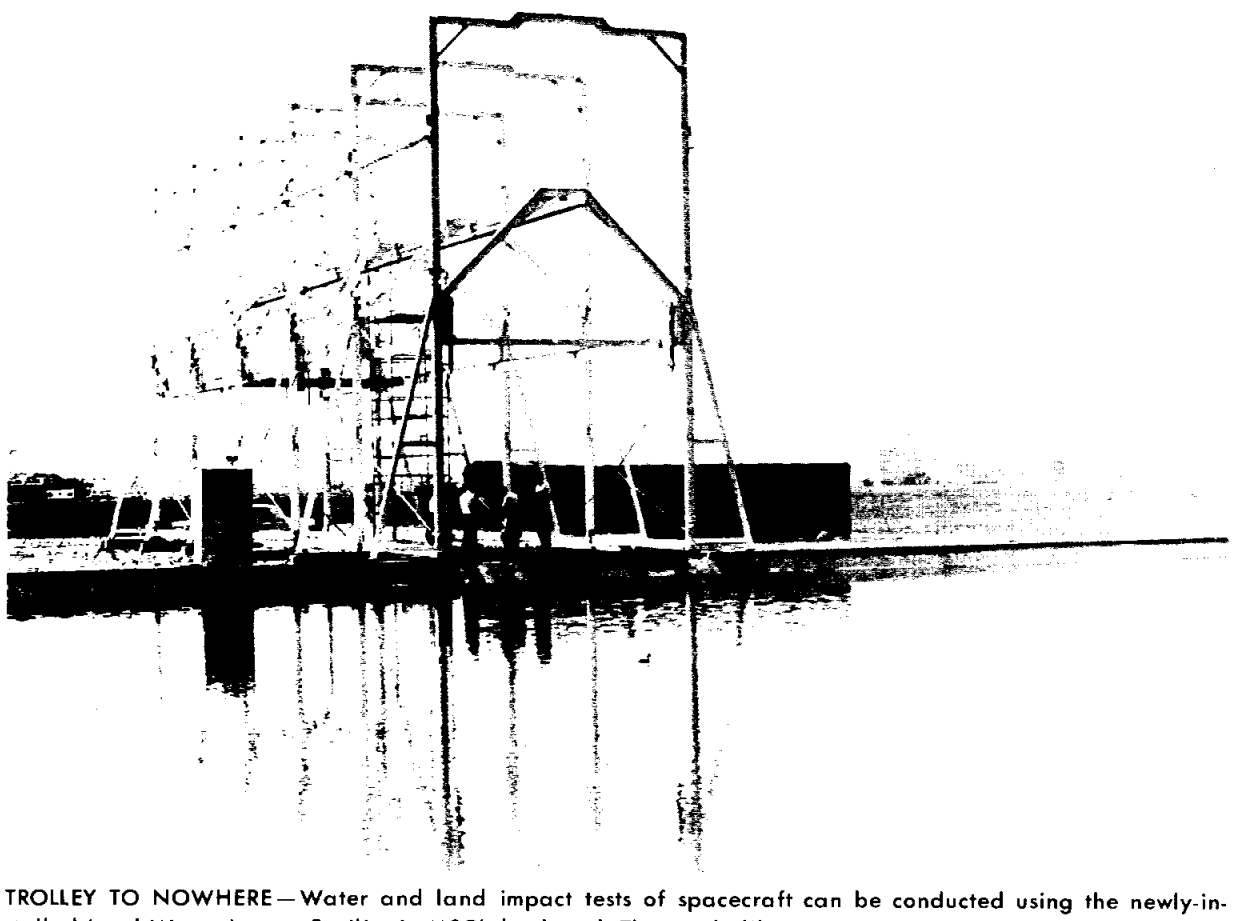
Subsequent system design and hardware development responsibilities following the Phase B activities will be divided between the Jet Propulsion Laboratory and the Langley Research Center, with JPL responsible for the surface laboratory and Langley responsible for the capsule bus system which includes the entry and landing equipment.

Estimates for the gross weight of the entire landing capsule and surface laboratory systems for the 1973 Mars mission range from 5,000 to 7,000 pounds.

The Voyager Program is managed by NASA's Office of Space Science and Applications.

College Bound

SCHOLARSHIP AWARD—Margaret E. Taylor, daughter of Maggie S. Taylor of the Office of the Director of Medical Research and Operations, receives an MSC Exchange Council Scholarship from Exchange Council chairman Paul E. Purser, left, and Scholarship Committee chairman Floyd E. Brandon. Margaret plans to major in English at Sam Houston State College in Huntsville, Texas. A similar scholarship was awarded to Lou Ann Wright, daughter of Bobbie M. Wright of Apollo Applications Program Office. The scholarship awards were the first in the Exchange Council program instituted earlier this year. (See January 6, 1967 *Roundup.*)



TROLLEY TO NOWHERE—Water and land impact tests of spacecraft can be conducted using the newly-installed Land Water Impact Facility in MSC's backyard. The trestle-like structure was used by McDonnell during the Gemini program for Gemini spacecraft water-impact studies. The first test series at MSC will duplicate Apollo pad abort landings.

MSC's Spacecraft Impact Facility Simulates Water, Land Touchdown

The newest addition to the family of test facilities at MSC – he Land and Water Impact Facility – will be put into operation within the week.

Apollo and future manned mission spacecraft will undergo rigorous impact testing at the facility, located in the northwest corner of MSC. The Land and Water Impact Facility, which resembles a portion of a railroad trestle, is a steel frame 100 feet long, 39 feet high and 20 feet wide. For water drop tests an 18-foot deep pool 160 feet in length and 39 feet wide, is located at the west end of the tower.

Flight-configured spacecraft and boilerplate spacecraft will be dropped from the test tower, either into the 18-foot pool or onto the ground. Technicians of the Landing and Docking Branch, Structures and Mechanics Division of the Engineering and Development Directorate, will conduct the tests and impact studies of the drops.

The first series of drop tests scheduled after June 1 will be to duplicate landing characteristics in the event of a pad abort at Cape Kennedy, Florida. Vertical descent of 30 fps (feet per second) will simulate that of an Apollo Command Module during a land landing at the Cape.

Actually, this is the second generation of spacecraft testing for this test unit. The structure originally located at the McDonnell Aircraft Corporation, St. Louis, Missouri, was used in water impact studies for the Gemini spacecraft. Recently dismantled and shipped to MSC, it has been modified for use in the support of the Apollo Program and long-range impact studies for future spacecraft.

In addition to duplicating the vertical velocity, the test facility through a pneumatic catapult system is capable of building required horizontal wind velocity into the tests. Jerry McCullough, project engineer in charge of the test tower, said winds of 40 fps (approximately 22 miles per hour) will be simulated during normal drops. McCullough said winds as high as 65 fps can be programmed into the system.

HELP SUPPORT OUR MEN IN VIETNAM
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Air Medal Winner

MERITORIOUS ACHIEVEMENT—Army Medical Corps Capt. Lonnie L. Hammargren received the Air Medal in ceremonies early this month from MSC Director of Medical Research and Operations Dr. Charles A. Berry. Hammargren received the Air Medal for "meritorious achievements while participating in aerial flight during his recent tour of duty in Viet Nam." He is a flight surgeon presently on military detail from the US Army to the MSC Medical Operations Office headed by Dr. D. Owen Coons, right.

Mars Voyager 'Chute Tested at White Sands

The fifth in a series of ten planned rocket-launched flight experiments to test parachute designs and techniques which might be useful in future attempts to soft-land instrumented capsules on Mars has been conducted successfully by NASA.

A two-stage Honest John-Nike rocket launched at 12:45 pm CDT May 9 from the White Sands Missile Range, N.M., lofted an experimental payload to an altitude of about 130,000 feet—where the Earth atmosphere compares with that of Mars—and a parachute was deployed in a study of its flight characteristics in that environment.

The 40-foot-diameter ringsail parachute was folded inside a spacecraft five feet long and 13½ inches in diameter. After separation from the rocket booster, the parachute was deployed and descended with a 200-pound payload—simulating an unmanned instrumented Mars lander—suspended from it.

Cameras and instruments were installed in the payload to record the deployment of the parachute and its characteristics in flight.

The parachute and payload, including the cameras and instruments, were recovered from the range and are being used by NASA scientists in analyzing results of the flight.

Conditions at test altitude closely resemble those which NASA scientists expect the Voyager capsule to encounter during terminal descent through the Mars atmosphere. The velocity of the coasting capsule just before parachute deployment—about 1,100 miles an hour—together with the density of Earth atmosphere at the test altitude, produce the proper combination of factors for accurate simulation.

The ringsail and two other types of parachutes—the cross and the disc-gap-band – are being investigated in a 15-flight planetary entry parachute program managed by the NASA Langley Research Center, Hampton, Va. In addition to the 10 rocket launches, five balloon-launched flights are scheduled, the first of which was conducted in August 1966.

Langley scientists are evaluating the parachutes for possible use as decelerators in soft-landing unmanned instrumented capsules such as those envisioned in the Mars Voyager concept. Clarence L. Gillis of Langley is program manager; Harold N. Murrow of Langley was project engineer for the rocket flight.

The 40-foot-diameter ringsail parachute—a two-thirds scale test model—was the third investigation of a ringsail parachute in the flight program-previously, 84-foot and 30-foot-diameter ringsail systems were tested.

In addition to the difference in size, the test parachute was modified on the basis of information obtained in previous flights. The upper third of the ringsail canopy consisted of concentric rings with slots between the rings; the remainder of the canopy was of sails, with gaps between the sails.

Martin Marietta Corp., Denver Division, assembled the spacecraft and was responsible for integrating it with the booster and parachute package. The parachute was manufactured by the Pioneer Parachute Co., Manchester, Conn. Air Force crews from Holloman AFB, N.M., launched the rocket; tracking and recovery operations were by airborne and ground crews from the US Army units at Holloman and White Sands.

MSC BOWLING

MIMOSA MEN'S LEAGUE
Final Standings

TEAM	WON	LOST
Fabricators	80½	55½
Chizzlers	79½	56½
Real Timers	79	57
Technics	77½	58½
Whirlwinds	76½	59½
Alley Oops	73½	62½
Road Runners	70½	65½
Foul Five	68½	67½
Weightless Wonders	63½	72½
Strikers	61	75
Agitators	45½	90½
Hustlers	40½	95½

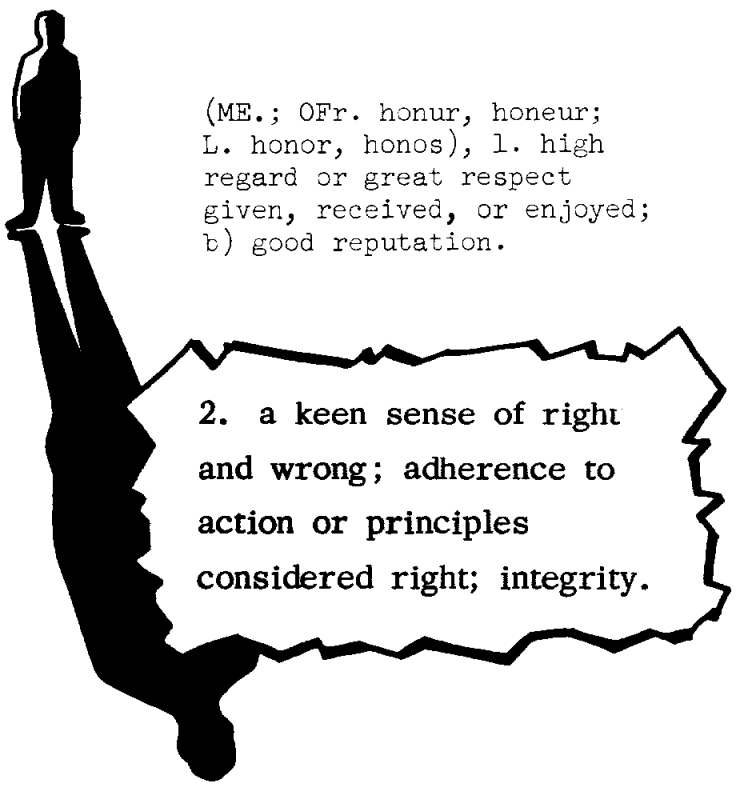
High Game: John Dornbach 284, Bill Whipkey and Jim Grimwood 275.

High Team Game: Fabricators 1096, Chizzlers 1095 and 1080.

High Series: Bill Holton 728, Bob Lacy 700.

High Team Series: Chizzlers 3132, Real Timers 3105.

honor, *n.*



(ME.; OFr. honur, honeur; L. honor, honos), 1. high regard or great respect given, received, or enjoyed; b) good reputation.

2. a keen sense of right and wrong; adherence to action or principles considered right; integrity.

KEEP THE SYMBOL OF EXCELLENCE

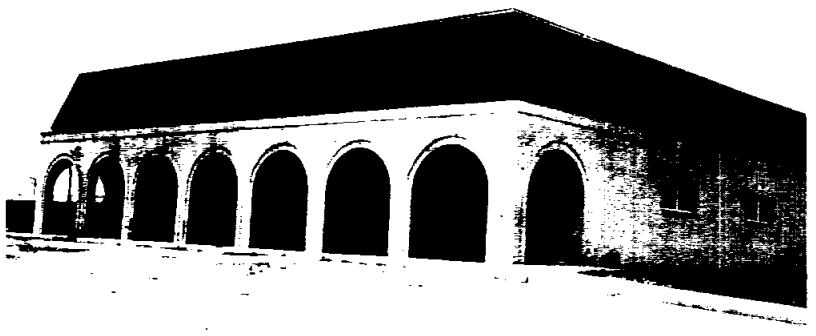
MANNED FLIGHT AWARENESS

Bowlers Divvy Up Trophies at Season's End

TOPS IN LEAGUE—With 80½ games won and 55½ lost, the Fabricators took first place in the final standings of the Mimosa Men's Bowling League. Guarding their newly-won trophies, left to right, are Charles Gardner, Bill Shropshire, Ray Donatto, Fred Rowell and Jim Warren. Not in photo: Gail Blalock, Leon Galler and Rees Underhill.

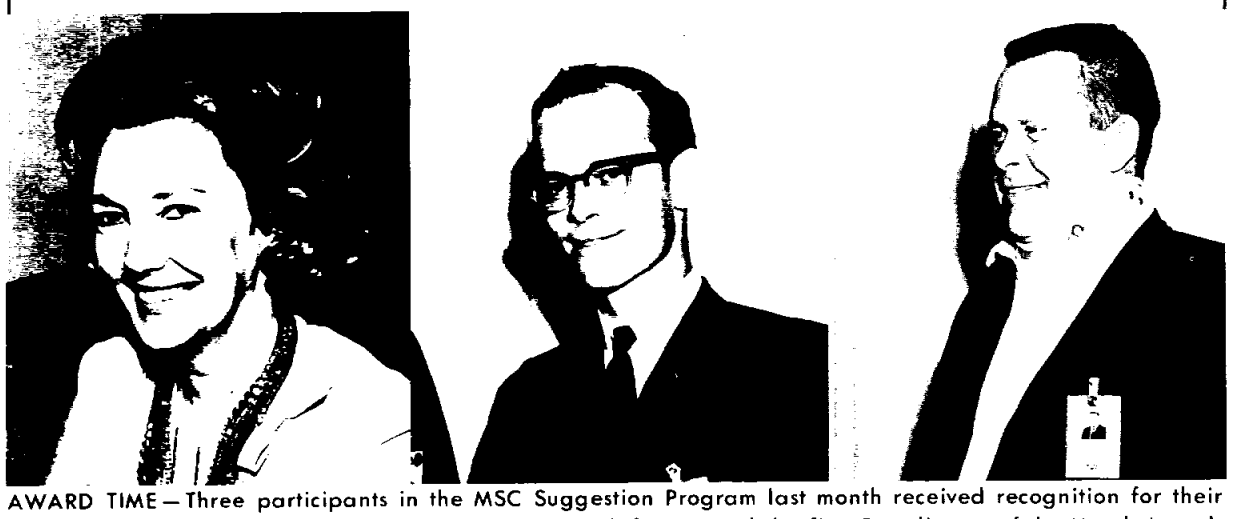
CLOSE BEHIND—The Chizzlers were only one game below the Fabricators at season's end with 79½ won and 56½ lost. Left to right are Roy Powell, Earl Patterson, Dan Kennedy and Dr. John Dornbach. Not in photo: John Sargent, Dexter Haven and Rex Dunivent. Third place in the League was nailed down by the Real Timers, who won 79 and lost 57. Team members are William Moon, Frank Mussato, Gerald Griffin, Morton Silver, John Kamman, Thomas Loe and Dana Boatman.

New MSC—Area Post Office



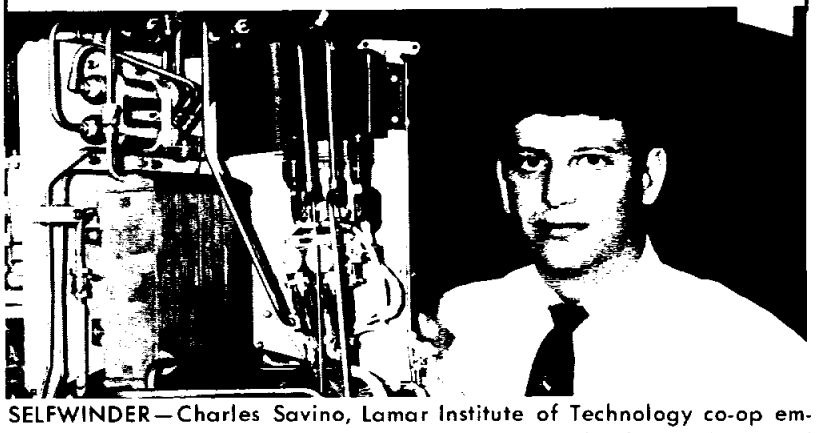
ZIP 77058—Dedication ceremonies will be held at 3 pm tomorrow for the new Albert Thomas Post Office Substation on Upper Bay Road in Nassau Bay. The new substation, named for the late Congressman Thomas, will serve the MSC-Clear Lake area—Zip 77058. Ceremony participants include Mrs. Lera Thomas, Assistant Postmaster General W. M. McMillan, Houston Postmaster Granville Elder, Texas historian Msgr. Anton Frank and MSC Director Dr. Robert R. Gilruth.

They Mobilized Their Ideas



AWARD TIME—Three participants in the MSC Suggestion Program last month received recognition for their efforts. Evon Collins, Resources Management Division, left, received the first Coordinator of the Month Award. Stanley R. Richards, Administrative Services Division, center, was the recipient of the first Suggestor of the Month Award. A $200 Suggestion Award went to Ivan Ertel, Public Affairs Office, right, for designing a less expensive postflight informational brochure at an estimated annual savings of $50,000.

Co-op of the Month



SELFWINDER—Charles Savino, Lamar Institute of Technology co-op employee assigned to the Thermochemical Test Branch of Propulsion and Power Division, is described by his supervisor as being the type whose workload is always high "because he solicits assignments rather than waiting for them. Savino has assisted in evaluation programs on fuel cell systems and developmental liquid-shrouded cryogenic storage system, and is presently writing test procedures for a radioisotope tracer study of the Apollo fuel cell system hydrogen loop.

SUNWATCH—The optical telescope in the dome of the Solar Particle Alert Network facility literally works from sunup to sundown as it automatically tracks the sun and records on film at the rate of one frame every 10 seconds the activities on the solar disc 93 million miles away. Here, R. D. Welch makes minute adjustments in the telescope's electrically-driven equatorial mount. The telescope also permits visual observations at 20 to 80 power magnification.

Solar Activity closely monitored by MSC group operating SPAN facility

By Bob Gordon

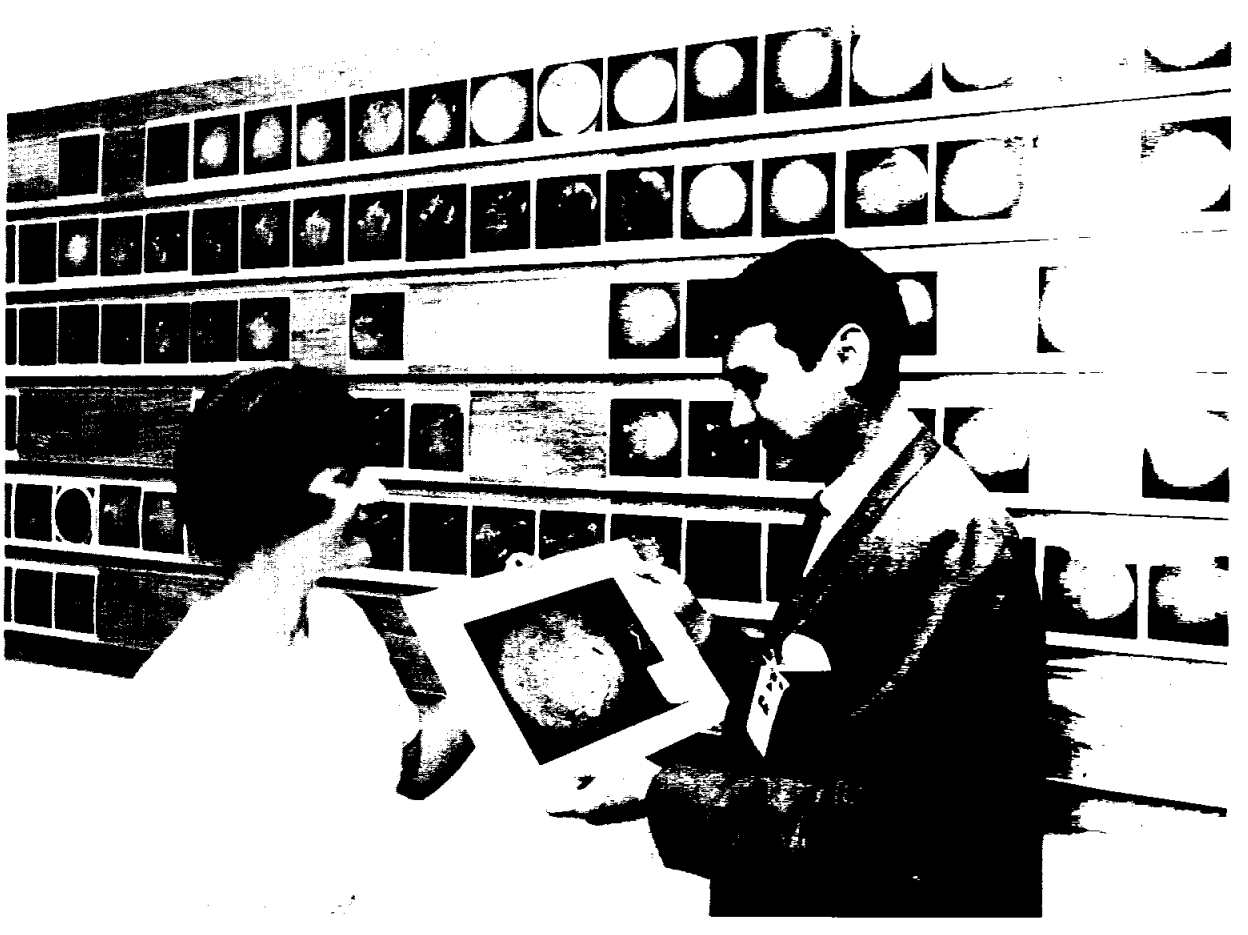
While many engineers, technicians, and scientists at MSC spend their day preparing for America's landing on the moon, a handful of specialists spend their day looking at the sun.

It's all part of MSC's operation SPAN—Solar Particle Alert Network. SPAN, with NASA and other government observation points throughout the world, represents a constant watch of the sun's fiery surface for flares and sun spots.

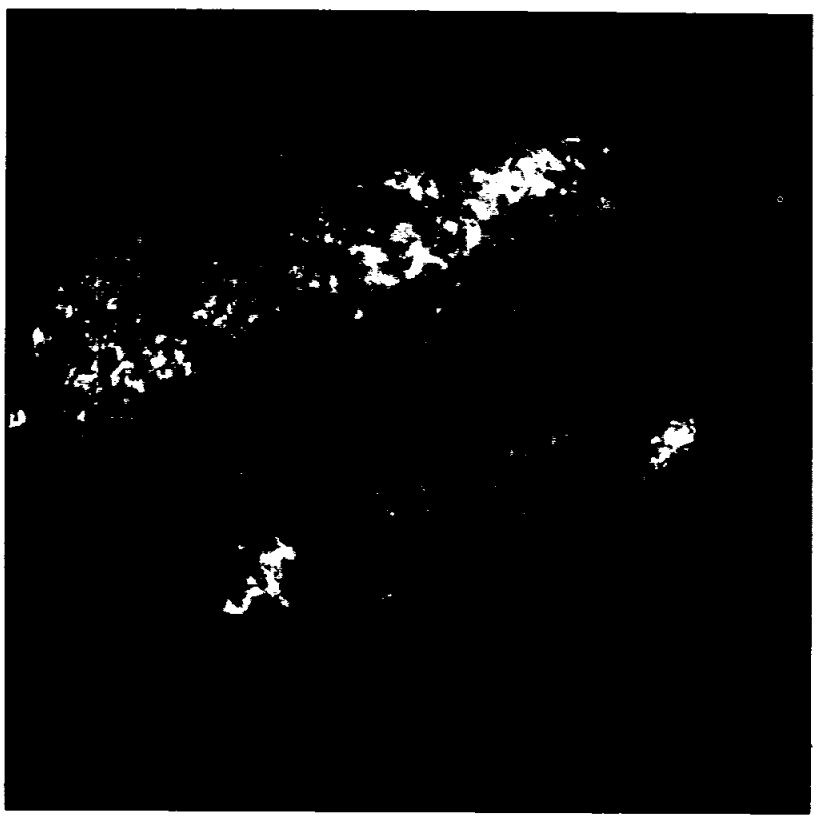
Two types of recording instruments are used in the SPAN facility to monitor solar activity. One records visual phenomena with an optical telescope-camera system, while the second system, the radiotelescope, keeps an ear cocked for radio wave propagation from our star.

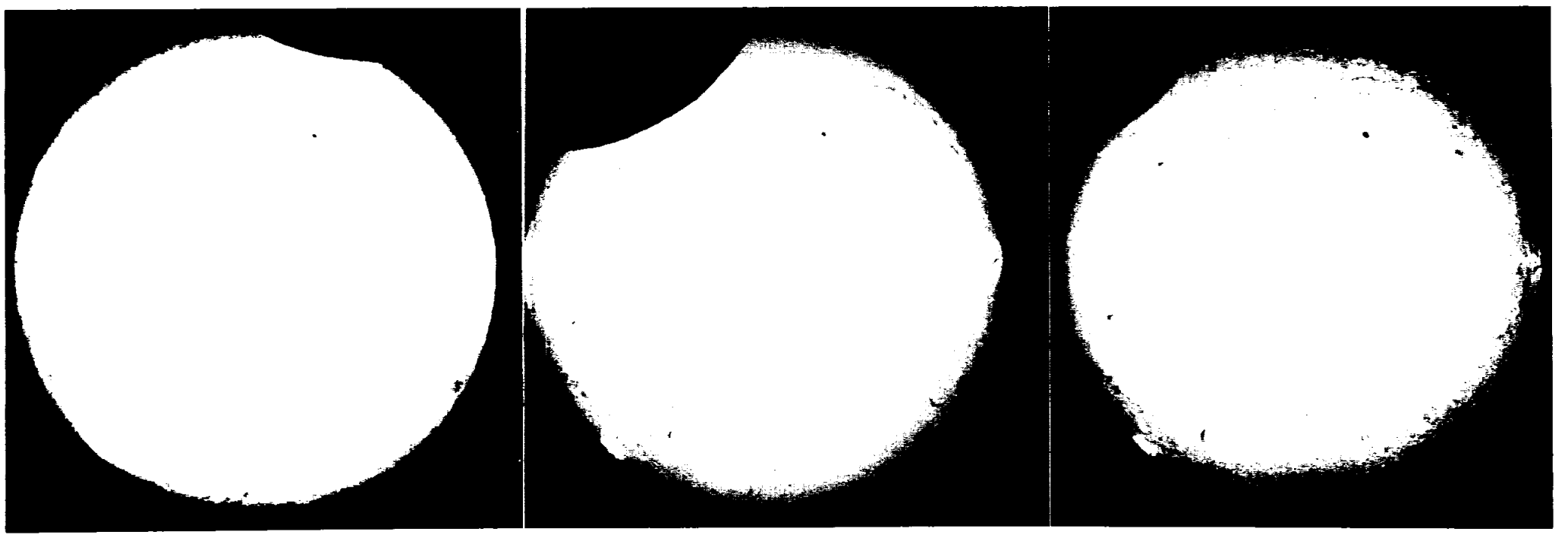
The network is developing a

SOLAR DIARY—Photographs of the sun taken by the SPAN telescope are monitored daily for significant solar activity. Examining a solar portrait are Lockheed Electronics solar data analyst Mary Frances Myers and Don Robbins, head of the Solar Physics Section of the Astronomy Branch.



SPOTTED STAR—A heavy concentration of sun flares (dark areas) was captured by the Solar Particle Alert Network facility telescope at MSC March 29. The photo is representative of the high number of flares recorded during this particular solar cycle.





The May 9 partial solar eclipse was photographed by the optical telescope. At left, the moon's shadow begins to creep over the solar disc (7:45 am); center: 8:35 am, past totality; and right, 8:50 am final phase.

warning system for solar flare particle events which could endanger crewmen on a lunar mission. If a dangerous flare is observed, it would be several hours before the particles would reach the vicinity of the moon. With proper warning from SPAN, the pilots could leave the lunar surface and return to the safety of the command module.

The Houston facility includes a 4-inch solar telescope housed in a 75-foot tower located in the northeast corner of the Center. A 35mm motion picture camera mounted to the telescope is timed to snap photos of the sun every 10 seconds.

The hydrogen alpha solar patrol instrument is also equipped with an occulting cone, a device which creates an artificial solar eclipse for the observer by blocking out the sun's disc to enable him to see the corona or halo around the sun's rim.

An alternate reticle has a raster or grid which allows observers at different stations to correlate their findings.

A small darkroom directly under the telescope room in the tower is used to hand process film strips from the telescope camera.

A second optical system bounces a white-light image of the sun to a spectrograph in a small building at the base of the tower. The sun is tracked by a heliostat atop one leg of the tower. The tower leg serves as a vertical optical tunnel for the image on its way to a 45-degree precision mirror below, and on into the spectrograph for analysis of individual colors or spectra.

The spectrograph measures solar temperatures in active regions and solar magnetic field forces.

Donald E. Robbins who is in charge of the operation said the telescope camera has recorded hundreds of hours of different solar activities in the year since the facility has been operational. Robbins, who is in the Astronomy Section, Space Physics Division of the Science and Applications Directorate, said the camera which is equipped with a special filter and timer clicks away at the sun every 10 seconds during the hours the sun is visible from MSC.

A companion station at Carnarvon, Australia, which is operated under the direction of NASA has recorded a similar amount of coverage at 10 second intervals, Robbins explained. Together MSC and Carnarvon have recorded on film more than 1,300 hours or a total of more than a half million frames of solar activity. A third NASA station is expected to be operational at Canary Islands in the very near future.

The partial eclipse on May 9 visible in Houston was recorded in sharp detail by the MSC telescope camera. On March 29 the MSC station recorded 30 separate flares on the sun, an unusually high number for this period of solar cycle, according to Robbins.

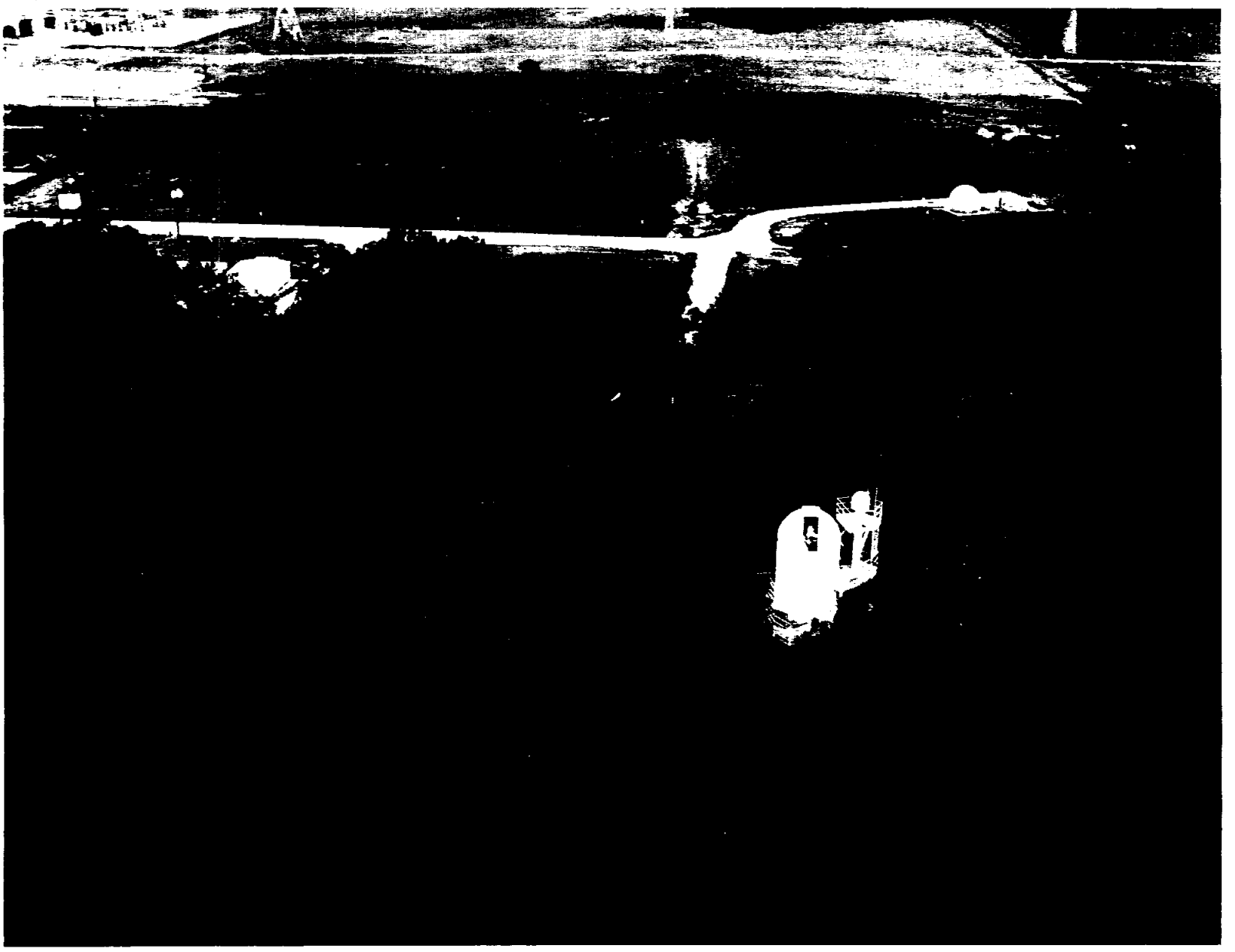
Each day the film is reviewed by specialists under Robbins' supervision. The film is passed through a viewer and solar data analysts examine each frame of film searching for activity which establishes solar radiation hazard.

Based on the information gained from this operation, the network will be able to monitor the sun during man's first venture onto the moon and be able to warn space crews of possible danger from solar radiation.

The solar telescope was assembled by Razdow Inc., Newark, N.J. The building and tower was constructed by Evans Construction Co., Houston. The heliostat was built by Geotech Inc., of Dallas, and the spectrograph and instrumentation was furnished by Jarrell Ash Co., of Waltham, Mass.

CAMERA WITH A CAUSE—R. D. Welch locks in a film magazine on the 35mm automatic camera used to record solar activity. The foam shield above the camera helps protect the film magazine from heating.

ABOVE THE TREETOPS—SPAN's dome juts above the treetops in the grove at the southeast corner of MSC. The Solar Radio Telescope Facility is in the open area directly behind the optical telescope dome.



ROUNDUP BOOKSHELF—

Where Do We Go from the Moon? Six Reporters Give Their Views

By Jack Kroehnke

Fairchild Publications' *Where Do We Go From The Moon?*, a $3.95 paperback authored by six of space flight's better reporters, is a book that all MSC employees should be interested in.

The fact that it is fact instead of fiction isn't calculated to appeal to the thrill-a-minute fans, but the book's reconstruction of past manned space flights, its assessment of the program's present status, and its evaluation of future goals will strike at least one responsive chord in anyone closely associated with or even remotely interested in the whys and wherefores of man's venture into space.

Six different areas—and viewpoints—of interest presented in six individual styles of writing add up to a collection of essay-like pieces that stack up as neatly as a launch vehicle and its spacecraft. Best of all for MSC readers, *Where Do We Go . . .?* ties together the diverse opinions on the pros and cons of manned space flight, the Washington budgetary prospects, and the national economy impact of a private industry engaged in the government's space exploration—trees that tend to get lost in the forest of Clear Lake.

The nation's strides and its stumbles into and out of space since *Sputnik* are recorded in a broadbrush historical treatment by Mary Bubb, Fairchild's Cocoa Beach bureau chief. This keynoting chapter is the most "fun reading" one in the book, partly because Mary, whose Hopperesque hats and penetrating questions have become legend at The Cape, doesn't mind catching NASA with egg on its face and partly because she had the best material to work with—six years of events that probably half the world population has watched, listened to and/or read about.

More thought-provoking than exciting is Philip Trupp's question "Who needs the moon?" and whose not-so-mythical woman in Appalachia to whom an unemployed husband and seven hungry children are reminders that manned exploration of space still is in debate. Trupp does the Washington NASA news scene for Fairchild and he presents matters of money and politics which Houstonians might find interesting as well as enlightening.

Because Bob Ward is a native Alabaman assigned to Fairchild's Huntsville bureau, his interest and his material dwell on propulsion. Again, to MSC employees who sometimes tend to think of rockets as the step-child of the spacecraft and the men who fly them, Ward's description of the powerplants that might move tomorrow's spacecraft is rewarding reading.

While Walter H. Mathews' contribution to *Where Do We Go . . .?* is a mere 16 pages long, it contains much of the meat of the answer to where we go—and what happens if we don't. As a Los Angeles-based senior reporter for Fairchild, Mathews has had ample opportunity to observe the West Coast industrial giant that has sliced off a $7 billion slab of NASA's $22 billion estimate of total costs to put two Americans on the moon.

Mathews writes confidently of a continuing future in space, but he hedges his bet by pointing out that machines, rather than men, might make the trips—a possibility which in itself should be food for thought for those at the Manned Spacecraft Center.

For anyone who finds himself stumped for a rundown on the benefits of manned space flight to date, Dave Marion-Davis, Houston bureau chief for Fairchild, cites space spinoffs ranging from advancement of ball bearing technology to development of new brassiere supports.

Lastly, Fairchild Dallas bureau chief Jack Robertson investigates a couple of controversial subjects—the Air Force manned orbiting laboratory, known acronymically as MOL, and manned exploration of the earth's neighboring planets.

All in all, the book is the result of a great deal of research and a concise compilation of facts. It is easy to read, though not something you'd take to bed. If the six co-authors committed any sin, it was the extensive use of quotations from the many, many people who have spoken about, against and even from space—although Mary Bubb's telling of the hitherto unreported orbital affirmation by Wally Schirra of his membership in the Turtle Club lightens even this transgression.

The *Roundup* is an official publication of the National Aeronautics and Space Administration Manned Spacecraft Center, Houston, Texas, and is published every other Friday by the Public Affairs Office for MSC employees.

Director . . . . . Dr. Robert R. Gilruth
Public Affairs Officer . . . . . Paul Haney
Editor . . . . . Terry White
Staff Photographer . . . . . A. "Pat" Patnesky

Stargazers Hold Meeting Monday

The MSC Astronomical Society will meet Monday at 7:30 pm in the MSC News Center Auditorium, Nassau Bay Bldg 6. On the meeting agenda include picking an official name for the group, setting dues, organizational structure and officers.

If skies are clear, the group plans to peer at stars after the meeting.

The first class in telescope mirror making met May 8, and the class is still open to late registrants. Call John Erickson at Ext 3485 or Clark Neilly at Ext 5348 to register.

More than 50 people attended the May 18 Public Observing Night to look at planets through the seven telescopes set up by the group.

25-Years Service

Henry Carleton
RASPO-Bethpage

Straight Talk from your Credit Union

Vacation ideas . . . but no money?

What are your vacation plans? Are you going to the mountains . . . perhaps to one of the National Parks . . . to Mexico?

Money problems? See your Credit Union.

If you have not saved all you need for your trip, a Credit Union loan can get you on your way. We'll be glad to help you set up a savings plan, too, for next year's vacation or any other goal.

Remember: the Credit Union is here to serve you.

Borrowing money always turns up a batch of terms and euphemisms designed to lull the borrower into thinking he is getting a good deal. Here are some examples from "lender's lingo":

Add-on: You ask for $100, and you immediately owe $106, possibly more.

Six percent: A standard term for true interest rates ranging all the way from 7 to 18 percent, or even more.

Four percent: Another way to state the same interest charges, making them sound even lower.

Refinancing: Your golden opportunity to owe more money while paying a higher rate at the same time.

Balance: The large sum you owe after several monthly payments.

Low service charge: The store charges you 1½% each month on the balance maintained since last Christmas.

Low down payment: The finance charges will probably be high.

Time-price differential: A name used for financing costs which are above the legal limit for interest charges.

Investigation fee: They telephone your neighbors and it costs you two bucks or more.

Extra charges: When you look at the monthly payment, you forget to notice how many of these "extra charges" are added to the amount you owe.

Penalty: The prepaid interest you don't get back if you pay off the loan ahead of schedule.

All lenders don't try to skins you, but if you have any doubts, compare costs at the Credit Union—where you'll always get straight talk instead of double talk!

Jay Walkers Hinder Traffic, Endanger Selves

Security Branch has requested that pedestrians use the marked cross-walks when crossing MSC streets. A considerable number of employees are not using the cross-walks and are endangering themselves as well as impeding traffic flow, especially during rush periods. Vehicle operators are required by MSC Traffic Regulations to yield the right-of-way to pedestrians in a marked cross-walk. A sufficient number of cross-walks has been provided so that pedestrians do not have to go far out of their way to cross streets.

Also, too many vehicles have been observed going the wrong way in the parking lots. Drivers are requested to observe the arrows in each lane which indicate direction of traffic. These arrows are in the process of being repainted so that they will be even more clearly visible.

Traffic regulations provide that from one to four traffic violation points will be assessed for failure to observe traffic signs and signals.

Guaranteed Parking

COST CUTTERS—Thinking of ways to save the government money earned for three MSC employees the privilege of a reserved parking place for one month near the buildings in which they are officed. MSC Director of Administration Wesley L. Hjornevik show the three what the Cost Reduction Award reserved parking sign looks like. Winners, left to right, are Jack Dunnaway, Crew Systems Division, Robert Hill, Engineering Division and Lyle Ferguson, Procurement Division. Three employees are selected each quarter for their contributions to the cost reduction program and each in succession gets an assured parking place for one month.

Roundup Swap-Shop

(Deadline for classified ads is the Friday preceding *Roundup* publication date. Ads received after the deadline will be run in the next following issue. Send ads in writing to *Roundup* Editor, AP3. Ads will not be repeated unless requested. Use name and home telephone number.)

FOR SALE/RENT—REAL ESTATE

4-bdr 2-bath in Seabrook Baywood subdiv, living room, dining room, family room, carpets, drapes, central air, dishwasher, disposal, 2-car detached garage, swimming pool, waterfront privilege, fishing pier, boat ramp, on 100x145 lot. C. J. Hall, GR 1-4586 after 5.

3-bdr 1½-bath in Crestmont Park, brick, paneled area, built-in kitchen. Small equity or trade for anything of equal value. GI loan, $97/mo payments. Doris Gossett, RE 4-5519.

4-bdr 2-bath in League City, 2-car garage, carpets, dishwasher, disposal, built-in range and oven, cedar-fenced back yard, 1890 sq ft. $158/mo. $1350 and assume—will take second mortgage. S. L. Owens, 932-3011.

4-bdr, 2-bath in Clear Lake City, central air and heat, drapes, dishwasher, avail Sept. 1. Equity approx. $1200. $159/mo. Allen D. Cummings, HU 8-0316.

3-bdr, 2-bath in Faimont Park, brick, garage, drapes, paneled family room. FHA or conventional. $18,700, $1,000 down. N. J. Beauregard, GR 1-0434.

4-bdr, 2-car garage in Clear Lake City for rent. Corner lot, screened porch, plenty storage. Avail June 10. $210/mo. George Straty, 591-2119.

4-bdr, 2-bath in El Lago Estates, 9 mos. old, 2 blks from El Lago school, 619 Bayview Dr. $22,500. Jim Cooper, 877-1869.

3-bdr 2-bath in Fairmont Park, LaPorte, brick, fully equipped elec. kitchen, central air and heat, patio, fenced yard, 2-car garage with utility area, carpets, drapes, community swimming pool. $16,975. $950 for equity and assume 5¾% FHA mortgage, $131/mo include insurance, taxes, principal, and interest. J. Willborn, GR 1-1436.

4-bdr 2-bath 2-car garage in Newport, 1½ story Spanish, all builtins, oversized lot. Assume FHA loan with minimum equity. 1905 Williamsburg Ct. So. C. Klein, 932-4090.

3-bdr 1½ bath 2-car garage in League City, central air and heat, large paneled den, living room, kitchen with dining area, large walkin closets, 80x120 ft lot, backyard fenced, school bus next corner, all newly painted. Small equity and take over payments of $110/mo (including everything). 1506 Webster, James Weaver, 932-2371.

3-bdr 2-bath 2-car garage brick in Clear Lake City, paneled den, carpets, separate dining room, builtin kitchen, central air, patio, landscaped. Sell equity $2,000, assume 5¾% loan. R. L. Tweedie, HU 8-1256.

5-bdr 2½-both executive home in Bay area, one-yr lease, avail mid-August. W. Rhine, GR 1-1354.

100' front; 120' rear (bayou); sides 140', 165'; wooded lot in Bayou Crest subdivision, located ¾ mile west of Gulf Fwy on FM 517, 18-ft elevation bayou property, all subdiv lots sold. Rod Bass, 932-4763.

FOR SALE—AUTOS

1961 Renault Caravelle, radio, heater, 4-speed, good condition. $275. W. Kincaide, 877-4257, El Lago.

1965 Corvette convertible, marina blue 4-speed, positraction, 375 hp, two 4-barrels, good condition, 14,000 miles. $2700. Tony Cwiertny, WA 6-4253.

1960 Pontiac, factory air, pwr steering and brakes, excellent condition, orig. owner. C. Klein, 932-4090.

1954 Mercury Monterrey hardtop, new motor, good body, 2-owner car. $225. S. L. Owens, League City, 932-3011.

1938 Ford pickup truck, newly rebuilt engine, transmission, interior and new tires, body in good condition. Bobby Jones, MI 4-5887.

1965 Mustang hardtop, red, 200 hp, V-8, 4-speed, air conditioning, radio. $1675. Wes Hetrick, HU 8-3530, Ext. 2650 (work), HU 8-1438 (home).

1947 Plymouth, radio, heater, two new tires and tubes. $75. Clayton D. Forbes, HU 8-4238.

1963 2-dr Plymouth Savoy, radio, heater, good condition. $500. Gloria B. Martinez, OV 6-5307.

1964 Valiant, V-8, automatic transmission, 4-door, 8,000 miles left in factory warranty, radio, heater, excellent condition. $950. James Beeman, HU 6-7877.

1927 Model "T" hot rod, peacock Metalflake paint, white Metalflake naugahyde interior, white naugahyde top, took first place in Houston Car Show in its class, Cadillac motor, lots of chrome. $2,000 car and trailer. James Campbell, WA 6-7061.

1962 4-dr Buick LaSabre, air-conditioned. $800. John Stonesifer, HU 2-7643.

1963 Ford 300 4-dr sedan, factory air, radio, heater, pwr steering, good tires, good condition and clean. Good work car. $550. Linda Neely after 5, MI 9-2426.

1963 Rambler American 440, new brakes, exhaust system, tires—10,000 miles, exterior fair, motor very good condition. Excellent second car. $550. C. G. Sullivan, Jr., 591-3968.

1966 Porsche 911, red, 6-cyl engine w/ overhead cams, 5 fwd speed gearbox, Blaupunkt radio, late model 911 accessories, xclnt condition. New, $7050. Now, $4800. Rod Bass, League City, 932-4763.

1966 VW 1300, radio, heater, 11,000 miles, perfect. $1475. T. J. Dunn, GR 2-7478.

1962 Rambler Classic station wagon 4-dr delux 400 series, factory air, reclining bucket seats, headrests, vinyl interior, radio, autotrans. Orig. owner who ordered it from factory. $875. Financing can be arranged; consider trade. Floyd Turner, RE 3-7667.

1958 Cadillac Coupe de Ville, extra clean, new double-duty battery, new tires, (no air). Best offer. Chris Critzos, Kemah 877-3218.

1962 Ford Fairlane, 49,000 miles, green and white, new tires, has sticker and plates, runs perfect. $500. John Bergeron, 932-2148.

1962 MG Midget, 48,000 miles, Nassau Blue w/black top, has sticker and plates, good condition. $350. John Bergeron, 932-2148.

1964 VW Karmann Ghia coupe, clean, one owner, AM/FM radio, pastel blue. $1295. D. V. Massaro, HU 2-7976 after 5.

1958 Ford Fairlane 500, engine and trans recently rebuilt, good tires, ample rust, xclnt fishing and work transportation. $125. M. E. Donahoo, Dickinson 534-3279.

FOR SALE—MISCELLANEOUS

1966 Ducati Motorcycle, 160cc, 70-75 mph, 90 mpg, 1500 actual miles, xclnt condition. Also helmet, tinted bubble, cable lock w/ keys tarpaulin. $300 for all. J. M. Walker, RI 8-5910.

Membership in Edgewood Swim Club, 5815 Van Fleet St., (across from K-Mart), family lifetime corporate share $200, no-interest time payment available, shares may be resold, summer membership $60 until June 1, No. 2 Olympic pool (82-5x42) with kiddie wading pool, lifeguard and manager, clubhouse facilities. Wil Brugger, MI 5-5287 after 6.

Fender Stratocaster guitar, new paint, 3 pickups, tremulo bar; Princeton reverb amplifier, new condition, has vibrato and reverb pedal, 30-foot cord. Guitar alone $150; amplifier alone $100; both $250. John Bergeron, 932-2148.

Sailboat, 16' Rebel, Fiberglass 20' aluminum mast, completely equipped, dacron sails, tilt trailer, everything in good condition. Esther Davis, GR 2-1034 after 4:30 p.m.

RC Allen typewriter with stand, $35. Winchester Mod 92 25-20 cal, $35. Model 92 38 Special Cal, $50. 220 Swift with K-6 scope, $65. 45 auto with magazines and ammo, $50. Reloading supplies and tools. J. F. Moser, HU 4-5546.

Kenmore washer and RCA Whirlpool dryer, both in perfect condition. $150 for both. W. Johnson, JA 2-1292.

Polaroid Model J66 Electric Eye Land Camera Kit with builtin Fast 10 Second Exposure, Electric Eye, Flash Attachment, for color or black/white film. Guaranteed perfect condition. Retail cost, $139.95. Will sell for $89.90. Dorthy Szopski, HU 4-4941 after 5.

Free kittens, 7 weeks old. John J. Cunningham, HU 8-1390.

General Electric Filter Flow Washer, new motor, new water pump, new tub boot. $20. S. L. Owens, 932-3011.

Two matched 12-inch Lafayette SK-58 co-axial speakers. Ideal for stereo. $40. John D. Williams, HU 5-1729 after 6.

Chinese sampan fishing boat/6HP Mercury long shaft outboard. $275 cash or consider trade/equity/what-have-you. E. Horton, 877-4102.

14' Falcon Fitts plywood runabout with 35hp Johnson electric, canopy and big wheel trailer. Good condition. $450. Frank Newman, GR 4-3497 after 5.

2-bdr mobile home, 10x50. $1,500 equity. Make offer. Phyllis Morton, HU 6-4752, Monday through Thursday.

Refrigerator, Philco, 12 cu ft, freezer on top, automatic defrost, excellent condition, now in use, avail June 1. $140 or best offer by May 26. Bill Lokken, GR 1-2853.

1966 Honda S90. Good condition. Cheap. Edna McAnelly, WA 6-7140 evenings.

Detachable trailer hitch, fits bumper, easily attached and removed, suitable for light to medium size trailers or boat trailers. Only $15. Donald Hunter, 877-2780.

1965 fiberglas 17'3" inboard, outboard runabout. Excellent for skiing and fishing. 160 HP Interceptor with only 120 hrs. With trailer, all curtains, boat cover, extra tank, depth finder, etc. Excellent condition. Sarah Lopez, Kemah 877-2149 after 5.

Complete 10-gallon aquarium outfit and wrought iron stand, $20. Child's high chair, $2. Golf clubs and bag, $15. Richard Stanton, 932-2982.

Sealy twin-size mattress and matching box spring, metal bed frame, less than one year old xclnt condition. $25. A. F. Smith, HU 8-3238.

Lowrey transistorized organ and bench, walnut, two manuals, eight pedals, Leslie speaker, sell half price—arrange payments, see to appreciate. James Weaver, League City, 932-2371.

Manual record player—Cost $29.95, Sell $9; Emenee electric organ—Cost $30, Sell $12; maple desk, 3 drawers one side—$14. Louise Shannon, HU 8-3123.

Horse, 4 yrs old, gentle, medium sized gelding. Xclnt for lady or family. With bridle, xclnt saddle, and other equipment. $275. Bob Handley, HU 2-7041 after 5.

Curtis Mathis 23-in console TV, Early American styling. Approx. 3 yrs old. UHF channel converter included. $100. Lou Bernardi, MI 4-0916.

Sell or trade 120cc 1966 Suzuki motorcycle, max 70 mph, 600 actual miles, just like new. $325. L. Armstrong, HU 8-1532 after 5.

Reader's Digest Rapid Reading Kit, 3-speed setting, all reading material included and tests. Never used. $20. Bobbi Lerdon, 591-4322.

WANTED

Used boy's bicycle, 24-in. wheels. Edna McAnelly, WA 6-7140, evenings.

Want ride from Rice Area (Lexington) to Bldg. 12, 8-4:30, June 1-Sept. 1. Elizabeth Wieland, JA 9-7147 after 6.

Furniture wanted: Spanish or Italian style for living room, dining and bedrooms. Colored frig and washer, maple dresser, swing set and small girl's bike. Craig Hooper, Ext. 5127. (No home phone).

Want to buy electric portable typewriter, typing stand or desk. E. Horton, 877-4102.

Want carpool from vicinity of Gulfgate, 8:30-5:00. Calvin C. Guild, MI 3-6751.

Want used lightweight, 3-speed bike. Jim Cooper, 877-1836.

Want ride from the Third Ward Section of Houston, 3239 Cleburne St. near Cuney Dr., to Ellington, Bldg. 360, Monday thru Friday, 8-4:30. Gloria Benjamin, Ext. 7668; (Home) 748-5479.

Want good home for two-year old male cat, neutered, housebroken and affectionate. Owner being transferred overseas. James Beeman, HU 6-7877.

Want male roommate to share 2-bedroom apt for 3 months, beginning June 1. Casa Blanca Apts, 3637 S. Shaver, $67.25/mo. each. Bob Cochran, HU 6-0791.

LOST

Prescription sun glasses between Bldg. 13 and 14 parking lot on May 11. Black rims, brown case. Ed Chimenti, PA 9-1239.

Accountant Get-Together

MEMENTOS—Houston Chapter Federal Government Accountants Association guest speaker W. Fletcher Lutz is presented Lunar Module tie clasp and cufflinks at the FGAA April meeting. Lutz is FGAA National President and deputy director of the Civil Aeronautics Board Bureau of Economics. He spoke on "The Administrator Views Financial Management." In the photo, left to right, are Edward Osterberg, Houston FGAA director of programs; Lutz; Ralph Rhodes, Houston FGAA president, and E. Ray Walker, Houston FGAA vice president.

Bridge Club Picks New Officers

The MSC Bridge Club belatedly elected officers for 1967 in April. The new officers are: President William Hamby, Vice President Dick McCreight, Treasurer John Hermann, Secretary and Publicity Director Ann Bragg, Administrator R. Wiley, and Membership Director Dave Enerson.

The new officers in a board meeting appointed Jim Rainey as club director for 1967 and he was installed May 9.

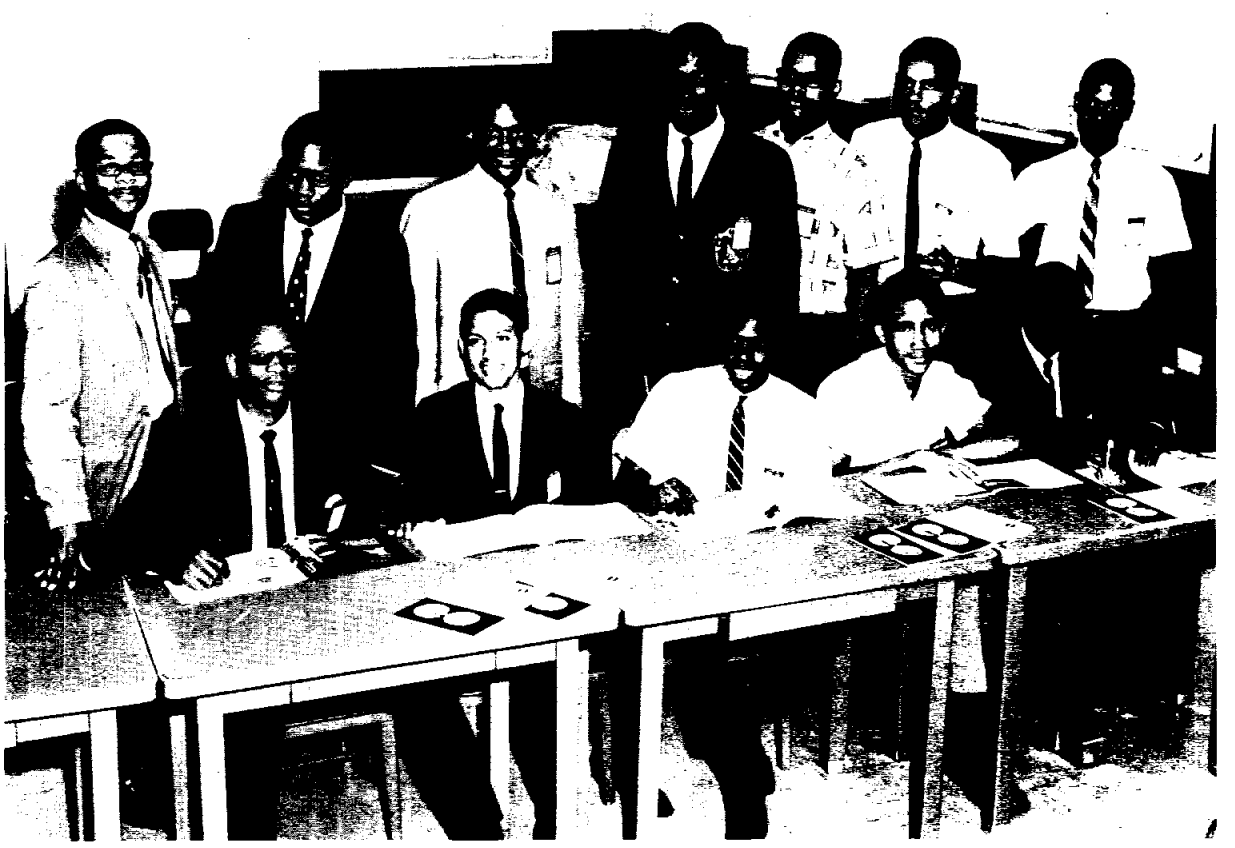
The remaining 1967 club schedule will include three fractional master point seven game series, a mixed pair championship, a matched pair championship and a club championship, all of which are trophy events.

The club meets each Tuesday evening at 7:30 pm at Bldg 336 Ellington AFB. All MSC and on site contractors or members of their families are welcome to attend. Membership dues are $1 per year. The cost of play is $.50 per person on fractional master point nights and $1 on full master point nights.

The winners for May 9 were: 1st Ann Bragg and Joan Oldfield, 2nd A. Decker and H. C. Donivan, and 3rd W. Schmidt and P. E. Vander Meyden.

The winners for May 16 were: North South 1st N. Hamby/R. Cohen, 2nd P. Swanzy/M. Powell, 3rd T. Holt/W. Oldfield; East West 1st C. Castle/D. Boydeston, 2nd A. Decker/H. Donivan, 3rd Mr. and Mrs. C. Haddick.

Junior Student Trainees



HIGH AVERAGES—Promising high school graduates are encouraged to participate in the MSC Cooperative Education Program. To be eligible, the students must have maintained a B average or higher while in high school and be enrolled in a college or university. Seated, left to right, in the group above are Harold Willis, Norberto Mata, Charles Willis Jones, Rudolph S. Prevot and Eddie Osborne. Standing: Elton Martin, Hugh McElroy, Kenneth Wayne Johnson, Cornelius Jammer, Gilbert Sauls, Glen Labrie and Julius McQueen.

Hootnanny Hooters

SINGALONG — Banjos twanged, guitars strummed and toes tapped at the May 6 EAA-sponsored teen hootnanny at Kemah Elks Lodge. Setting the pace for the floor-seated teenagers are, left to right, Bob Johnson, Kathy Blakley, Ron Duval, Max Krchnak, Stuart Snow, Carol Neckar, Allen Snow and Claudia State.

CRATER CRAWLING —

Three-Day Geology Field Trip Attended by Twenty MSC Pilots

Twenty pilots from the two last groups selected last week spent three days on a geological field study trip in western New Mexico and Eastern Arizona. In the group were the five scientist-pilots and 15 of the last group of 19.

The group spent May 17 studying and interpreting geological features and basalt lava flows and dikes in the Zuni Salt Lake volcanic crater area of western New Mexico. The following day, they studied soil samples and features in the Hopi Butte area north of Windlow, Ariz. believed to be similar to the lunar surface.

On the final day, the group hiked to the bottom of Meteor Crater west of Winslow to study the geological characteristics of one of the larger and better-known impact craters on earth. Lecture stops were made during the 570-foot descent to hear Dr. Eugene M. Shoemaker, chief geologist of the US Geological Survey in Flagstaff, Ariz.

The three-day field trip was directed by Dr. Alfred H. Chidester of the Flagstaff USGS office. MSC geologists taking part in the field trip were Dr. David S. McKay, Uel S. Clanton, Richard Laidley and Michael C. McEwen. Other Flagstaff USGS geologists assisting included Dave Cummings, Robert Sutton, Dave Dahlem, Robert Regan and Thor Karlstrom. Also assisting were Dr. Aaron Waters and Clifford Hopson of the University of California at Santa Barbara, Harold James, USGS chief geologist in Washington, and Bill Lamb, MIT civil engineer.

Unable to attend the trip from the 19-pilot group were John S. Bull, Joe H. Engle, Edward G. Givens, Jr. and William R. Pogue.

Refresher Spanish Course Starts June 12

An EAA-sponsored 10-week course in conversational Spanish will start June 12 at 5:15 pm in Room 163 Bldg 1 and will continue each Monday thereafter.

The course is designed as a refresher for former Spanish students and as an accelerated beginner course. MSC and contractor employees are urged to get their names on the class roster early by calling instructor Nick Reyes at HU 8-1600 Ext 147 or OX 4-5042 after 5.

ROUNDUP

SECOND FRONT PAGE

Lunar Orbiter Corrects Camera Fog Problems

The Lunar Orbiter IV spacecraft is now transmitting lunar photographs of good quality to NASA Deep Space Net Tracking stations.

Difficulties experienced earlier with the spacecraft thermal door and with fogged film due to sunlight leaking into the camera and to moisture condensed on a protective window over the lenses have apparently been overcome by adopting new operating procedures. These difficulties resulted in photographs which contained much useful information and ranged in quality from poor to good.

The procedures instituted for controlling the flight of Lunar Orbiter IV involve partly closing the thermal door between exposures and tilting the spacecraft so that the camera's two lenses are shielded from direct sunlight. With the door partly closed, a small heating element is able to keep temperatures near the protective window within acceptable limits and thereby avoid condensation of moisture.

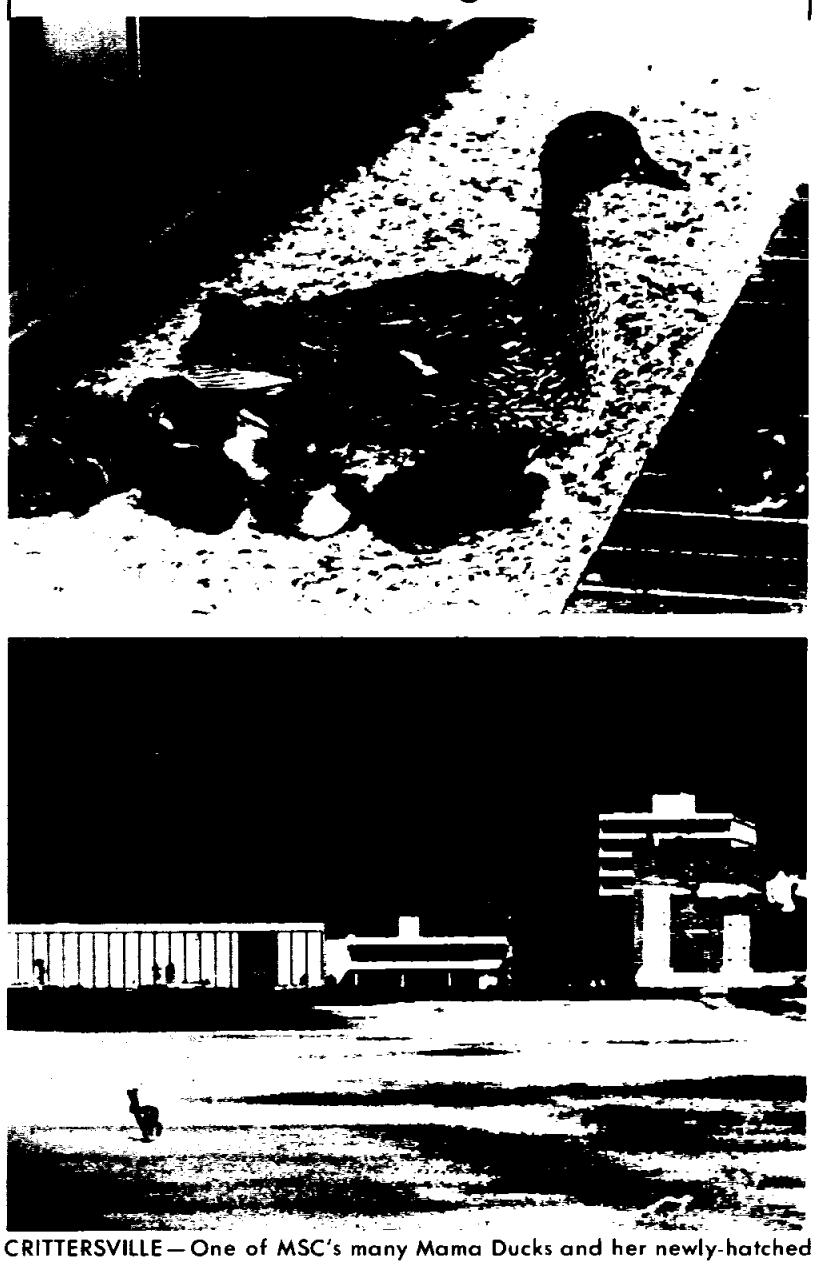
Readout of photographic data to NASA's DSN stations at Goldstone, Cal. and Woomera, Australia May 18 provided clear photographs of high quality. As of 7 am CDT May 18, Lunar Orbiter IV had exposed 101 of the 212 frames of film on board and was nearing mid-point of its mission to make a photographic survey of the lunar surface.

Saturn V Stage Fired at MTF

A flight Saturn V S-IC stage May 16 was successfully static fired at the NASA Mississippi Test Facility. The two minute five second burn was the first firing of a flight stage at MTF, although a test S-IC had been fired on the new stand twice before.

The S-IC stage developed its full seven and one-half million pounds of thrust with its five F-1 RP1/LOX engines. Eleven more S-IC stages and 13 S-II Saturn V second stages are scheduled for static firing at MTF.

MSC Menagerie



CRITTERSVILLE — One of MSC's many Mama Ducks and her newly-hatched brood last week staged a sit-in at the rear of Bldg 2 in a demand for wetter water, more grain or some sort of social justice. At bottom a jackrabbit gallops across the antenna test range and is caught by photographer Pat Patnesky's camera as he was making some arty color photos at sundown of test range dummy spacecraft with MSC in the background.