



One gift works many wonders

MSC Director Dr. Robert R. Gilruth signs the Center's first 1968 United Fund pledge card, witnessed by Director of Administration Wesley L. Hjørnevik, left, and MSC United Fund Coordinator Joe D. Bennett, Jr.

September 29, 1967

To All MSC Employees:

Once again, the employees of MSC will have the opportunity to participate in the United Fund Campaign. We have always actively supported this worthwhile program, and have each year achieved 100% or more of our assigned goal. This could not have been done without your complete support. I again ask that we of MSC meet our responsibilities to the community through this very worthwhile drive.

The United Fund Campaign is one of two Center-wide drives conducted each year. The National Health Agencies and Federal Service Joint Crusade Campaign, conducted in April, is the only other drive in which MSC employees are asked to participate.

In the past, many employees have requested information on what their contribution should be. This, of course, is your responsibility, and you should give what you can afford. However, to help you determine your "Fair Share," we are attaching a guideline which indicates the minimum each employee should give if we are to meet our assigned goal.

The campaign at MSC will begin October 4 and continue through October 20. Team captains in your area will be contacting you to request your donation or pledge to this very worthwhile community effort. With the support of you and your fellow employees, MSC will once again meet its quota.

Robert R. Gilruth
Director, MSC

1968 United Fund Suggested Contribution

Income	Contribution	Income	Contribution
\$ 0-2000	\$ 2	\$13001-14000	\$ 33
2001-3000	3	14001-15000	38
3001-4000	4	15001-16000	43
4001-5000	5	16001-17000	48
5001-6000	7	17001-18000	53
6001-7000	9	18001-19000	59
7001-8000	12	19001-20000	65
8001-9000	15	20001-21000	72
9001-10000	18	21001-22000	78
10001-11000	21	22001-23000	85
11001-12000	25	23001-24000	93
12001-13000	29	24001-25000	100

Agena VIII Gives Up After 1½-Year Flight

Agena VIII, first target vehicle with which a Gemini spacecraft successfully docked, reentered the earth's atmosphere September 15 after a year and a half in orbit.

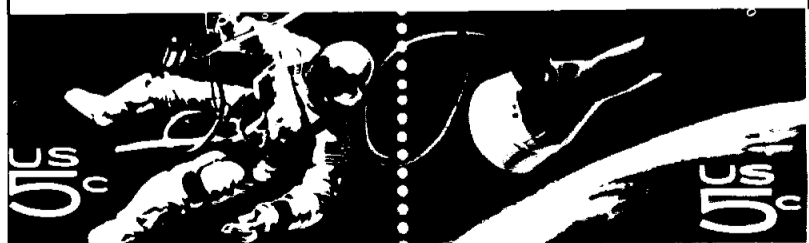
The Agena was the last orbiting remnant of the Gemini program. Gemini VIII, with crewmen Neil Armstrong and David Scott, docked with Agena VIII on March 16, 1966.

Agena VIII also served as a passive target when Gemini X rendezvoused with the "dead" target after having earlier rendezvoused and docked with another Agena.

Reentry was at 27.2° Slat by 150° W long in the South Pacific, some 600 miles south of Tahiti

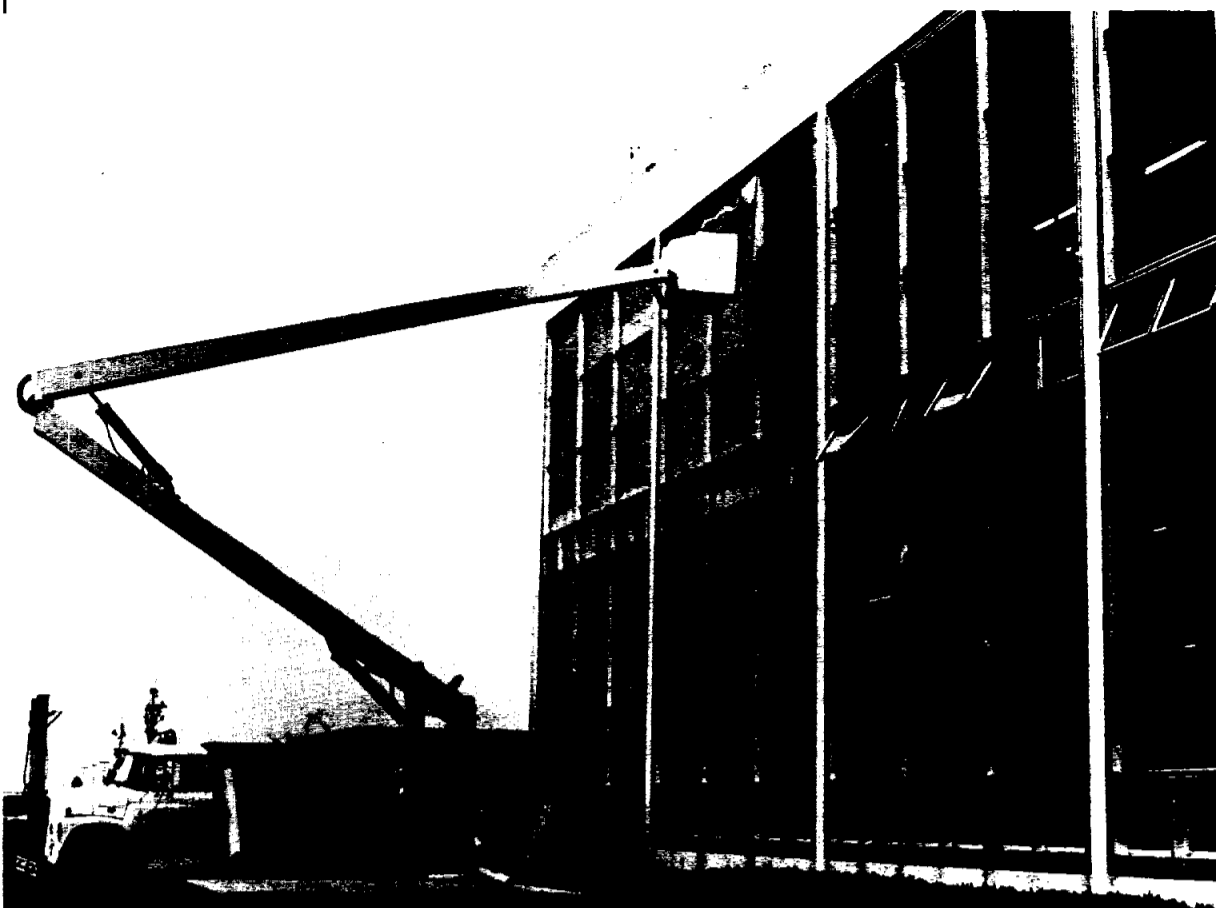
at 3:15 CDT after more than 8750 revolutions and having traveled more than 230 million miles.

Extravehicular Stamps



SPACEMAIL—This double stamp, first in United States philatelic history, was issued today at Kennedy Space Center branch Post Office to salute the nation's accomplishments in space. NASA Sunday will mark its ninth anniversary.

Boarding Beulah Out

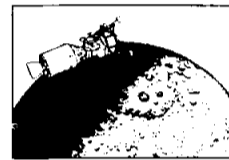


PLYWOOD OVER GLASS—Sheets of plywood were fitted over windows of MSC's Central Heating and Cooling Plant by a crew using a cherry picker as hurricane Beulah threateningly ground toward the Texas coast last week. Beulah's threat was taken as an opportunity to make a dry-run of MSC's Hurricane Control Plan, since nothing stronger than gale-force winds were anticipated in the Galveston Bay area.

ROUNDUP

NASA MANNED SPACECRAFT CENTER

HOUSTON, TEXAS



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Apollo IV Launch Schedule Depends Upon CDT Results

The Countdown Demonstration Test for Apollo IV, as of *Roundup* presstime, was scheduled to begin Wednesday night at Kennedy Space Center. Launch vehicle ground support equipment problems had caused two postponements of the CDT.

NASA Administrator James Webb stated during a visit last week to KSC that the Apollo IV launch date would not be set until after results of this week's countdown demonstration had been evaluated. (See text of Webb's press conference, page 3.)

At MSC, flight controllers in Mission Control Center Monday ran an Apollo IV Simulated Network Simulation (Sim-Net-Sim) and were to support portions of the countdown demonstration.

In other testing focussed upon Apollo hardware, the first phase of a series of tests of a new two-stage reefing procedure for Apollo earth landing parachutes

was completed at El Centro, Calif. The second phase—verification strength of main chute canopies with two-stage reefing—was scheduled to begin today at El Centro. Today's drop will subject a single chute to loads exceeding maximum loads expected in actual spacecraft landing.

A total of four strength verification tests are scheduled on the main chutes. The two-stage reefing and larger drogue chutes are being considered to handle the increased weight of the command module stemming from modifications since the Apollo 204 accident.

In Lunar Module testing, LTA-8, a flight-configured Apollo Lunar Module arrived at MSC Sunday aboard a Supper Guppy aircraft for thermo-vacuum testing in the Space Environment Simulation Laboratory 35-foot diameter Chamber B. LTA-8 will undergo manned testing in the SESI, later this year.

Although not intended for flight, LTA-8 is an almost exact replica of the Lunar Module which will be flown manned next year in earth orbit.

Also at MSC, Apollo boilerplate 28-A Wednesday was to have undergone beach impact testing at the Full-Scale Land and Water Impact Test Facility. The test was in support of the first manned Apollo mission and duplicated pad abort landing characteristics.

In Apollo Program manage-

ment, Scott H. Simkinson has been named Assistant Program Manager for Flight Safety, ASPO. His duties involve the interrelationship of MSC with KSC, North American Aviation, Grumman and other supporting firms.

Formerly Gemini Program Office Test Operations Manager, Simkinson will conduct special studies and reviews and solve specific problems in safety of operations during test, checkout and flight of Apollo spacecraft, in reliability and quality of spacecraft and ground support equipment, and during ground test programs, preparations for flight and flight tests.

Contract Managers Hear Hjørnevik

MSC Director of Administration Wesley L. Hjørnevik was the featured speaker at the September 11 meeting of the Space City-Houston Chapter of the National Contract Management Association at the Ramada Inn.

Hjørnevik spoke on the various political philosophies at work within the legislative branch of the government regarding support services contracts and on the need for closer economic analysis for more adequately assessing propriety factors of services contracting. He also discussed recent congressional actions on the NASA budget and stressed the need for increased economy in MSC operations.

Ground Controllers Save Two Faltering Missions

Engineers and scientists on three continents went far beyond the normal day's work in mid-September to save two faltering United States space projects and bring them to a successful conclusion.

The work involved hundreds of men in tracking stations and control centers in the United States, South America and Australia. Brought down successfully for meaningful results were the Surveyor V on the moon and the Biosatellite II project recovered from earth orbit—two separate projects, launched at different times on separate flight plans but reaching their crises about the same time. The two projects were carried out by two different National Aeronautics and Space Administration teams.

Surveyor V's first indication of trouble came shortly after its three vernier (fine control) engines were fired at 8:45 pm CDT, Friday, September 8 while the spacecraft was in mid-course to the moon.

Helium gas, used to force propellants into the vernier engines, and vitally necessary to carry out the projected low-speed landing on the moon, was leaking. Within an hour after discovering the leak, engineers at NASA's Jet Propulsion Laboratory, Pasadena, Calif., found the helium pressure had dropped from 5,200 pounds per-square-inch at launch time early Friday down to 3,000 psi.

Early Landing

Some hours after JPL's people began tussling with the Surveyor problem, the Biosatellite II engineers faced the hard decision to terminate their flight a day earlier than planned. Across the continent, at Goddard Space Flight Center, in Greenbelt, Md., the tough question was whether to call back the satellite in a complex maneuver only two and one-half hours before the deadline for de-orbit command.

Project officials from NASA's Ames Research Center, Moffett Field, Calif., who manage the Biosatellite program, and network controllers responded to a host of secondary problems. A new Pacific Ocean recovery point was computed ahead of the westward-moving tropical storm Sarah. Recovery aircraft were scrambled out of Hawaii. Tracking station personnel at Woomera, Australia, were roused from bed at midnight in order to monitor the de-orbit sequence since both controller aircraft equipped for this purpose were out of commission.

The critical command to bring back the precious cargo of delicate biological experiments was a prearranged series of binary code zeroes and ones.

To get Biosatellite ready for this command the station at Quito, Ecuador, was ordered to transmit the "clock-set" command. Unfortunately, the command didn't get through.

Shorthand Command

At this point the engineers used NASA's worldwide

voice communications system, "SCAMA" (Station Conferencing and Monitoring Arrangement), for calling in an abbreviated version of the original command number sequence to the Carnarvon station.

As an experiment, the original 18-digit reentry command code was reduced to the 10 most important digits. This procedure can be compared to dropping the last four decimal places of a very large number.

Carnarvon, by adjusting the radio frequency shift, had only recently reported its ability to achieve a signal response from the spacecraft. Meanwhile the Woomera station had reported its operators on the job and had received telemetry data from the Biosatellite that on-board systems were working well.

On the next pass over Carnarvon, the Australians were able to insert successfully the abbreviated clock-set command and the deboost sequence, and a set of slowdown-disconnect events began. Aerial recovery by an Air Force plane was achieved approximately 15 miles from the recomputed impact point over the mid-Pacific.

Thus, at 2:15 pm, Saturday, September 9—44 hours and 11 minutes after launch on September 7, from Cape Kennedy, Fla.—the Biosatellite II was safely back from its 30-orbit journey. Almost, but not quite, it was all in a day's work for the trackers.

Seek Leak

For Surveyor V's routine mid-course maneuver, a flight operations staff of about 50 engineers was in JPL's Space Flight Operations Facility. They represented NASA, JPL, and Hughes Aircraft Co., the industrial contractor for Surveyor.

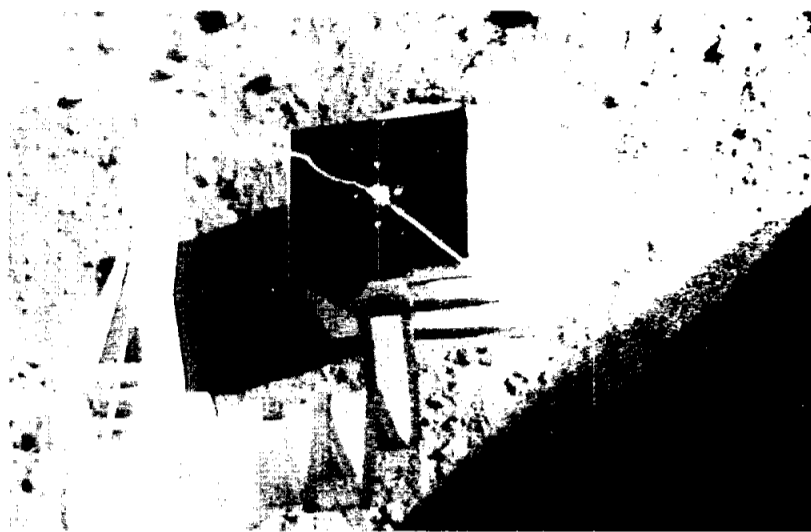
Within seconds after the helium leak was noted, systems analysts—engineers and scientists who calculate and predict the performance of the spacecraft and design the mission sequence—started a desperate search for causes or cures. Suspecting a faulty helium pressure regulator, they requested that the vernier rockets be fired again even though it might mean veering Surveyor away from its target site on the moon. Several firings of the verniers slowed the rate of leak but did not stop it.

While one group of engineers attempted to stop the leak, others considered how to proceed with the mission should the leak continue. The large solid propellant retrorocket is normally fired to slow the spacecraft preparatory for its soft landing, but the big retro could be fired only if the verniers were fired simultaneously to stabilize the spacecraft.

First indications were that the helium supply would be rapidly exhausted that night, so one small group thought of using the retrorocket to put Surveyor into a very high elliptical orbit around the earth. Their main objective, however, was to develop a modified lunar

landing plan even if it was not a soft landing.

Studies of the data encouraged this possibility. Within a few hours, it became clear that the leak was the suspected pressure regulator valve. Relief valves, set to relieve the pressure at 830 psi maximum, allowed the leaking helium gas to enter the propellant tanks. Therefore, as the helium leaked into the propellant tanks, the relief valves bled it off into space.



SAVED BY QUICK WITS—Surveyor V was in jeopardy as it neared the moon because of a leak in fuel pressurant helium, but ground controllers came up with a fix that allowed the spacecraft to make a soft landing quite near the planned landing spot. In the photo above, relayed back to earth from Surveyor V's camera system, the alpha scattering instrument has been lowered to the surface and has begun scattering alphas to determine the lunar soil's chemical content.

No matter how long the helium leaked, the remaining gas would not go below 830 psi. This would leave enough helium in the tanks for vernier attitude control on the 45-second retrorocket burn and for some additional period as well.

It was crucial to find out how long.

Systems analysts worked all night Friday. Saturday morning, project officials ordered a series of critical tests to determine just how much propellant could be available for the post-retro descent phase.

Hughes teams were ordered into action at Cape Kennedy, at Edwards AFB, Calif., and at Placerita Canyon, Calif. At Cape Kennedy, tests were made on the sixth Surveyor being prepared for launch; at Edwards and Placerita, special test models were used in tests to produce data on how the vernier engines could be most efficiently fired to attempt a moon landing.

Test results proved that a lunar landing could be made with the reduced propellant, although it would be hazardous.

Early Saturday, the verniers were burned again to take Surveyor somewhat nearer its original target point on the moon. That afternoon, a final pre-descent burn of the verniers was ordered, in order to consume propellant to the optimum level indicated by ground tests. But trajectory engineers also calculated the direction of the burn so that Surveyor's trajectory was changed back to within a few miles of the original target site.

A new flight profile and landing sequence had to be developed in record time.

Retro Altitude Lowered

In establishing the new decent profile, the most critical decision was selection of the altitude of retrorocket burnout. Normally scheduled at about 35,000 feet, early calculations indicated that it would have to be around 2,000 feet.

It had to be low enough so that after retro burn, sufficient helium remained to continue firing the verniers to further brake Surveyor to a point 14 feet

after retro burnout for the radar controlled verniers to cancel out the lateral motion which could be expected at the end of retro burn. It was also possible for one of the radar beams to sweep up and lose contact with the moon if the lateral motion was too great.

More analysis and testing with a prototype Surveyor were ordered and the answer came Sunday. A few seconds prior to retro burnout, a command would be sent to Surveyor to fire the explosive bolts to jettison the big solid motor.

This would turn on the RADVS, but the thrust of the retro would keep it lodged in place under Surveyor until burnout, when it would drop away.

Commands on Tape

Since descent events would be happening so quickly and precisely, the necessary commands could not be sent manually. A split second could mean the difference between success and destruction. Commands would be sent by a tape which would be synchronized with the altitude mark.

The final plan for Surveyor's descent to the Moon called for these events:

- At 7:44:38 pm CDT, the normal signal by the altitude marking radar that the moon was 60 miles away, and the start of the command tape. If the spacecraft failed to generate this signal, all was lost. There would not be enough time to send a backup command 240.00 miles away to trigger the foreshortened descent sequence.

- The command tape would call for 12.5-second delay in retro ignition which would come at 150,000 feet instead of 274,000 feet.

- Two seconds before retro burnout, the jettison command would be sent, turning on the RADVS.

- Retro burnout would occur at 4,400 feet with Surveyor falling at 60 miles-per-hour.

- The verniers then would brake the spacecraft until the 14-foot mark and the free fall to the moon, with touchdown predicted at 7:46:38 pm.

In the hushed Space Flight Operations Facility, the Surveyor team gathered as flight controllers prepared to guide Surveyor through its descent.

Perfect Touchdown

It went like clockwork. Surveyor V soft-landed on the moon at 7:46:46 pm CDT, Sunday September 10, at a speed just over eight miles an hour and within 18 miles of its original target site. So ended an episode that began at 2:57 am September 8, with liftoff at Cape Kennedy.

Ground tests had indicated that when about 550 psi of helium remained, the verniers would begin to falter. After touchdown, Surveyor's telemetry reported its helium pressure at 556 psi.

Webb Sketches Space Future at Press Conference

In the course of NASA Administrator James E. Webb's visit to Cape Kennedy September 20 to escort Dr. Gerhard Stoltenberg, Minister of Science, and Max Mayer, Director of Space Activities, Federal Republic of Germany, the party met with the Cocoa Beach press corps.

Also in the official party were KSC Director Dr. Kurt Debus, George Washington University President Elliott, New York Port Authority official Matthias E. Lukens, American Society for Public Administration President Dr. Stephen K. Bailey, past Associated Press President and editor-emeritus of the Washington Evening Star Ben McKelway, and current Associated Press President Paul Miller.

Here is a partial transcript of the press conference:

Mary Bubb, Fairchild Publications: Mr. Webb, now that the budget cuts have virtually wiped out any hope of Voyager for 1973 and 1975, and the only two missions left are the Mariner Mars 69, what current plans do you have for planetary exploration, both manned and unmanned?

Webb: I would like to say that the work of the outstanding scientists and engineers who

have put together the Voyager project will, I believe, be supported to the extent that they can in a period of several years when we will not be flying, develop new and better concepts so that after 1975, when some of our more pressing problems like Viet Nam and the problems of our cities have been taken care of, we can proceed outward to the planets.

As to the question of whether this work should be done manned or unmanned, the President's scientific advisors have suggested that we have a very careful look at NASA's organization for doing this work. We will take advantage of this period when we will not be planning and executing missions to do this. Dr. Homer Newell has been named Associate Administrator, which means that he joins Dr. Robert Seamans and me, and in effect becomes the Dr. Dryden of the agency. He has been asked to examine this question. "How do we, in fact, decide whether a mission should use man or not use man?" And this we will have time to do in a way that we could not have done had we proceeded in parallel with the lunar Apollo flights and the preparation of the first planetary flights.

Sue Butler, Daytona Beach Journal: Mr. Webb, could you please spell out for us your satisfaction or limitations concerning North American's performance since the accident, and could you possibly break it down into areas where you feel the most progress has been made and other areas that you are still concerned with?

Webb: Let me say I do not like to reject a question from a very lovely lady, but this is not the time and place to explain in detail, as you request, every facet of a complex relationship with a large company. Let me say this. We have settled \$4 billion of previous work done by North American Aviation. We have established a basis for the negotiation of a contract covering roughly \$1 billion more. We have explained fully and completely to the Congress of the United States the plan for a Block 2 Apollo spacecraft and have established a very careful plan to move forward and fly that Block 2. In the Rocketdyne Division of North American, a tremendously important and valuable job has been well done. Rocketdyne has produced the engines for these vehicles and they have done a splendid job. Many people do not recognize the large accomplishment by that company in this field.

Second, let me say that I testified in Congress that at least 90 percent of the work done by North American has been outstanding. I stated that they did have problems in total systems engineering and management. They have moved to correct those, are moving to correct them, and we believe very real progress is being made by the company and NASA together. Now I don't think I need to say more about that. If you want to know more about it, just ask Mr. Hello. He's a good man and he's right here at the Cape working for North American.

Howard Benedict, Associated Press: Mr. Webb, a couple of questions. Have you people set a target date yet for the 501 launching, and also, would you assess the importance of the 501 launching, whether it fails or succeeds, in the overall Apollo moon program?

Webb: You know there are about three questions in one there. First of all, let me say that our system is to have something like a pyramid—to conduct a large number of tests back away from the Cape at the base of the pyramid, to focus on those critical elements here before we fly. Next week we're going to have a complete launch demonstration test. I don't believe that there's any way that either Dr. Debus or I can forecast whether some item in this very large system will show a deficiency in this test. I hope, and believe, on the basis of past tests that it will go forward with flying colors and will not indicate further work to be done. If that takes place, we'll then begin to fix a target date for the launch. Generally, I'm hopeful that we can get this bird off within the next thirty days or so. But we're going to do the things

that are necessary to have the greatest assurance of success and not press forward to any launch date. So any date that you get next week or two weeks after that should be taken with the assurance that we're going to delay that date if necessary to have success.

Now, as to success. As you know, this large cut that we've just sustained, over \$500 million, is not the first large cut that NASA has sustained. In 1964 we had a cut of \$600 million in one year, and we went to the all-up systems concept. You at the Cape know what that means. The 501 launch is the first major test of this complex which is costing about half a billion dollars on the ground, of an end result of both spacecraft and launch development which have already cost about \$10 billion and which now, in the production phase, have about say, \$3 billion more to run out.

The test is to give us information. We will conduct the test to get information. I have confidence that what we did in going to the all-up systems test was correct. I have pointed out many times that the chance of success on any one flight is less under this concept, but the chance for success in the overall string of flights is greater because we exercise the whole team and the whole equipment on every flight.

I do not know how to assess it. I would say that Dr. Debus has a long record of not pushing the button to launch until he's quite sure that he is going to have success, or he knows no reason why success will not occur and I think that's the best way you can think about this—not in terms of whether it's 50-50, 60-40, 90-10. Now Dr. Debus may want to add a word to that. Is that right? (Dr. Debus nodded vigorous assent).

With respect to the whole program, I don't think there's any doubt that to absorb this second cut, \$500 million, after already having absorbed \$600 million in one year back in 1964, means that we will have to slow up the launch rate. Here at Cape Kennedy the work in the years ahead is going to be less. And the work in the next two years is going to be just as intense as it would have been, because we will either fly out the tests of the Apollo on the Saturn 1B (up-rated Saturn 1), or we will have success of the early Saturn V flights and shift over to the Saturn V for the exercise of the Apollo equipment. If we are able to do that with a minimum of Saturn 1B flights, we should be able now, even with this cut, to get off as many as nine Saturn V flights before the end of this decade.

I cannot tell you now. I think after we have flown say, three of these flights, the third one may be manned or unmanned depending upon what we find on the first two. We'll know a lot more about whether we can get to the Moon with nine flights. I've said all along that we had a reasonable chance to get there with 11 flights. We had strong

assurance that we could get there with 15. Now we cannot get off more than nine under this schedule by the end of 1969. So the number of flights is going to be less. The forward funding of new projects like Voyager and Apollo Applications is much less and the present system will not permit extended use of the Apollo equipment after the Apollo mission. It will probably be phased out, just like the Gemini equipment was phased out, and used for many purposes such as the MOL uses the Gemini where it has special applications. But our attention, just as in the case of Voyager, will be focused on using two or three years to define the next system after Apollo which might be something on the order of a 100,000 pound space station or something bigger, launched with a Saturn V, or something like a hundred thousand pounds launched with a new booster, either an off-the-shelf Saturn V or some other efficient booster. I think we will maintain competition between the liquids and the solids until that configuration, smaller than Saturn V, larger than Saturn I, booster comes into play.

I think further we will be working closely with the military services to determine the most effective use of the Titan III-M for NASA programs with the Saturn 1B to be completely phased out after 216 . . .

Well, I just want to point out that what we're doing here, with the Minister, is showing him a very large capacity, that we have a policy, we expect to continue that policy, of the 1958 Space Act, namely, to develop the capabilities openly, in public view, for the benefit of all mankind and in close cooperation with nations like Germany that wish to participate and feel it is in their national interest to participate with us in the program.

Mary Bubb: Mr. Webb, we're approaching the anniversary of Sputnik. What do you expect to see in the next ten years, both on our side and on the side of Russia?

Webb: Well ten years is a long time. Almost seven years ago, President Kennedy asked me to come down and said: "Will you build a transportation system to the moon" and I said: "What are we going to lay the crossties and the rails on, there's no land out there?," and in effect the scientists said: "We're going to use inertia and gravity and the laws of thermodynamics and use them in a different way than laying crossties and rails to get there" and that's proved to be true. This building was not even conceived five years ago in the form you see it in today. The Saturn V was a two engine rocket system six years ago, not a five engine rocket system. We still thought we'd have to go to a 12 million pound thrust NOVA to get to the moon, and we've now found by refinement of our processes and knowledge we can get there with seven and a half million pounds.

Credit Union Straight Talk

By Paul Sturtevant

The secret of "buying on time" is to pay cash. Sounds impossible, doesn't it? But you can do it by using your Credit Union wisely.

Most families buy on "easy terms" at one time or another. But few families know what they are paying for their credit.

Most merchants are honest. But they must be paid for credit the same as anyone else. It stands to reason that, being in business for a profit, they charge for the use of their money.

Unfortunately, some merchants have discovered they can make more money selling credit than they can from the sale of merchandise. So they devise many devious schemes and ways of quoting their high charges. They charge all the traffic will bear—and then some.

There are many tricks of the trade. It is well to be aware of them so you can protect yourself. When they advertise "just pennies a week," or "a dollar a month for each \$50," be on your guard. A dollar a month on a revolving plan for each \$50 comes to \$12 a year per \$50, or a true annual rate of 24%. This is high!

You cheat yourself when you use "loose" credit. When you buy an automobile on terms of one-third down and 36 months to pay, usually 10½ months of payments go just for financing charges, even though you don't realize it.

New car financing through a dealer or a finance company, although quoted as "6% to 7½% a year," really represents a true rate of 12% to 15%. This is because the lower rate probably is what is known as "add-on." This

is when the interest charges are added on to the full amount you borrow. You pay interest on the full amount for the entire term of the note even though you are required to reduce the principal by monthly payments. Often there are other charges.

Used cars run even higher. These rates may be quoted as 1½% to 3½% per month. This adds up to a true rate of 18% to 42%.

Revolving charge accounts are fun, but they can make you dizzy! The average charge for this type account is 1½% per month, or a true annual rate of 18%. In practice it can be more, and there are several variations. Why pay half again as much for your own credit when you can get the cash from your own Credit Union?

When you buy appliances and some other merchandise, you find yourself paying over 33% for the courtesy of paying in the future.

Again, you can get more for your money by seeing your Credit Union, and then paying cash for what you want. The time-price as opposed to the cash-price is always higher—usually about 33% or more higher.

So always compare all the costs in dollars and cents as well as in percents. You'll find your MSC Credit Union is the best source of money to pay cash.

This is how you can "buy on time," yet pay cash. You'll save money because your Credit Union has the lowest possible rates on a nonprofit basis, and there are absolutely no hidden clauses or charges.

See your MSC Federal Credit Union. We can help you.

Only Four Survive Eight Years Of Servitude and Hardship



Cabeza de Vaca: Part II

Escape at Last

ABOUT nightfall of their first day on the island, the Spaniards found themselves suddenly surrounded by a large and curious group of Indian archers. These proved friendly enough to promise food in the morning. After they had eaten, the Spaniards felt strong enough and had provisions enough to think about resuming their voyage.

With much labor, the castaways dug their boat out of the sand, placed everything on board, and managed somehow to launch the craft. It was a futile effort. Before they had sailed "the distance of two crossbow shots in the sea," they shipped a great wave which almost tore the oars from their numbed hands. The next wave capsized them. Three men drowned and the rest made shore half-drowned and "naked as they were born."

It was a miracle that they remained alive, without food, clothes, or shelter—in the dead of winter, with a fresh norther

howling down upon them. De Vaca gave thanks where they were due: "Thanks be to our Lord that, looking among the brands we had used there, we found sparks from which we made great fires. And thus were we asking mercy of Him and pardon for our transgressions, shedding many tears, and each regretting not his own fate alone, but that of his comrades about him."

Saved by Indians

When the Indians returned the next morning, they were surprised to find the Spaniards in such straits. And their savage reaction was even stranger. As the astonished white men looked on, "The Indians at sight of what had befallen us and our state of suffering and melancholy destitution, sat down among us and from the sorrow and pity they felt, they all began to lament so earnestly that they might have been heard at a distance, and continued so doing more than half an hour. It was strange to

see these men, wild and untaught howling like brutes over our misfortune."

Though some of his men still feared and distrusted the Indians, Cabeza de Vaca did the only sensible thing. He asked the Indians for food and shelter in their village. Building fires along the way where the half-frozen white men might warm themselves, the Indians literally carried the weakened men to a hut which had been prepared. Here they were joined, some time later, by countrymen from another of the five boats which had been cast up on another part of the island. These men, under command of Captains Andres Dorantes and Alonzo del Castillo, brought the total number of Spaniards on the island to 80.

More Trouble

As the winter wore on and food supplies grew shorter, the Spaniards' welcome began to wear thin. Indian acceptance gave way to surliness, and surliness

became outright hostility as epidemic disease swept through the tribe, killing savage and Spaniard alike.

By spring, only 15 of the 80 white men remained alive. By now the Spaniards had fastened the name of Malhado (Misfortune) upon their island prison. That even these few clung to life was almost a miracle. When the epidemic was at its worst, hot-head warriors were for putting the strangers to death, blaming them for all the tribe's troubles. At the last minute, a wise chief intervened—pointing out that the Spaniards were dying, too, and would not conjure up a disease that killed them along with the savages.

Thwarted in their attempt to kill the Spaniards, the warriors persuaded their chief to put the white men to work healing the natives. As Cabeza de Vaca put it, "They wished to make us physicians without examination or inquiring for diplomas."

At first, the Spaniards refused to be so employed, saying they knew nothing of medicine or healing. They were forced into "practicing without a license" when the Indians withheld food from them until they started to work. Wishing to get off to a good start, they took a cue from the way native medicine men cured the sick. Cabeza de Vaca explained their method:

"Their custom is, on finding themselves sick to send for a physician, and after he has applied the cure, they give him not only all they have, but seek among their relatives for more to give. The practitioner scarifies over the seat of pain, and then sucks about the wound. They make cauteries with fire, a remedy among them in high repute, which I have tried on myself and found benefit from it. They afterwards blow on the spot, and having finished, the patient considers that he is relieved."

Cabeza de Vaca and his companions took a slightly different tack in their approach to healing, but with highly successful results:

"Our method was to bless the sick, breathing upon them, and recite a Pater-noster and an Ave-Maria, praying with all earnestness to God our Lord that he would give health and influence them to make us some good return. In His clemency He will that all those for whom we supplicated, should tell the others that they were sound and in health, directly after we made the sign of the blessed cross over them. For this the Indians treated us kindly; they deprived themselves of food that they might give to us, and presented us with skins and some trifles."

Strange Customs

As Cabeza de Vaca went among the Indians, ministering to their medical needs, he was free to observe at close range some of their unusual customs. He reported there were two tribes, the Capoque and the Han, each with its own language. (Modern historians believe these Indians may have belonged to



Healing the Indians

by E. M. Schiwetz



by E. M. Schiwetz

the Karankawa and Attacapa tribes which later occupied that area of the Texas coast.) They loved their children and treated them with the greatest kindness. When a son died, parents and kin went into a year of mourning. All dead were buried except medicine men, who were burned and their bones ground into powder for a ritual potion. In any house of death, no inmates would take food for three months unless it was brought there by others.

Every man had an acknowledged wife, De Vaca reported, and only a medicine man might be allowed two or three. A mother-in-law was not permitted to enter her son-in-law's house, though a married woman was free to visit in her mother's house at will. Women wore garments of skins or plaited moss, but the warriors went unclothed. The going price for a wife was one well-made bow and two arrows, though some wives were taken during raids between tribes.

Change of Masters

Though he earned some stature as a physician, Cabeza de Vaca was little more than a slave and was often put to hard labor, digging roots with his fingers from the shallow coastal waters. At length, deciding he could endure it no more, he ran away to the mainland and joined a tribe he called the Charrucos. These treated him better, allowed him more liberty, and encouraged him to become a sort of itinerant trader. They needed a go between who could exchange goods with unfriendly tribes . . . such trade goods as beads, cutting shells, paints, flints, and dyed feathers. In this new-found freedom, De Vaca began to explore the country more thoroughly and lay the first plans for escape.

He had thought of escape earlier, but wanted to take with him a friend on *Malhado*, one Lope de Oviedo, who had repeatedly refused to make the break. Finally, in 1534, almost six years after their shipwreck, Oviedo agreed to go with him.

The two men slipped away one day, making their way westward toward New Spain. After crossing a number of creeks and rivers, they came upon some Indians who told them they were near three other Christians who had also been shipwrecked. These proved to be Dorantes, Castillo, and a Moorish slave, Estevanico.

Before making contact with his countrymen, however, Cabeza de Vaca lost the company of Oviedo. The fearful Lope chose to go live with some friendly Indians, rather than risk the uncertainty and hardship of further travel.

Of his meeting with the other three, De Vaca wrote poignantly: "Andres Dorantes came out to see who I was, the Indians having told him a Christian was coming. When he saw me, he was much surprised, having considered me dead for a long time, as the Indians had told him. We gave many thanks to God for being together again. This was one of the happiest days of our lives." The meeting place was at a stream called by the Indians "the river of nuts." Modern historians believe it was the present Guadalupe River.

Plan for Escape

Though the four men were absorbed comfortably into the tribe, their thoughts remained on escape. The best time, they decided, would be during the *tuna* season. Fruit of the prickly pear was called *tuna* by the Indians, and they considered it a great delicacy. Whole tribes would descend on the *tuna* fields

when the fruit was ripe to palaver and trade.

An unfortunate incident prevented an escape in the *tuna* season of 1534, and the four captives had to wait until the following year before making a successful break. As their captors crammed themselves with fruit, the white men stole silently away from the field (thought to have been in either Karnes or DeWitt County).

Thus the four men set out blindly on a journey that would take them over a large portion of Texas and northwestern Mexico before they finally reached civilization. From tribe to tribe they wandered, everywhere ministering to the sick, for their fame always preceded them by some mysterious tribal "telegraph." At one place, Cabeza de Vaca restored an Indian who "had all the appearance of death" (he probably was in a coma or otherwise unconscious) and was hailed as a true "son of the sun."

Surgical Operation

At another place, Cabeza de Vaca added lustre to his fame by performing what was probably the first surgical operation within the present limits of the United States. He wrote tersely of the operation:

"They fetched a man to me and stated that a long time since he had been wounded by an arrow in the right shoulder, and that the point of the shaft was lodged over his heart, which, he said, gave him much pain, and in consequence he was always sick. Probing the wound I felt the arrowhead, and found it had passed through the cartilage. With a knife I carried, I opened the breast to the place, and saw the point was slant and troublesome to take out. I continued to cut, and putting in the point of the knife, at last with great difficulty I drew the head forth. It was very large. With the bone of a deer, and by virtue of my calling, I made two stitches . . . and with the hair from a skin I stanchd the flow. They asked me for the arrowhead after I had taken it out, which I gave, when the whole town came to look at it."

The wound healed so well that the surgeon declared later, with reasonable pride, that it appeared "only like a seam in the palm of a hand."

Exit from Texas

Their travels had taken them into West Texas, apparently in the general region of Big Spring. De Vaca reported that the four travelers came to a more thickly settled region where the Indians had an unusual way of hunting rabbits. They surrounded the hapless little beast and threw clubs at it with such precision that it was soon meat for the pot. From this land of club-throwers, Cabeza de Vaca led his companions into what has been thought to be the Davis Mountains.

Coming to a river that "ran through ridges" (apparently the Rio Grande), the travelers went up it to a town with huts more nealy resembling civilized houses than any Cabeza de Vaca had seen. Indians welcomed them here, and guided them farther upriver.

De Vaca found the Indians in that vicinity to be of a higher type than usual. He described them by writing: "They have the finest persons of any people we saw, of the greatest activity and

strength, who best understood us and intelligently answered our inquiries. We called them the cow nation, because most of the cattle are killed and slaughtered in their neighborhood, and along up that river for over fifty leagues they destroy great numbers." The cows he spoke of were, of course, buffalo.

Entry into Mexico

Somewhere in this area (most historians believe near present Presidio), Cabeza de Vaca and his companions crossed over into Mexico. As they progressed from tribe to tribe, and from village to village, the four men began to see signs that other Spaniards had come that way. Castillo saw the buckle of a Spanish sword-belt hanging from the neck of one Indian. When questioned about it, the savage said it had come from heaven, or at least from men who came from heaven.

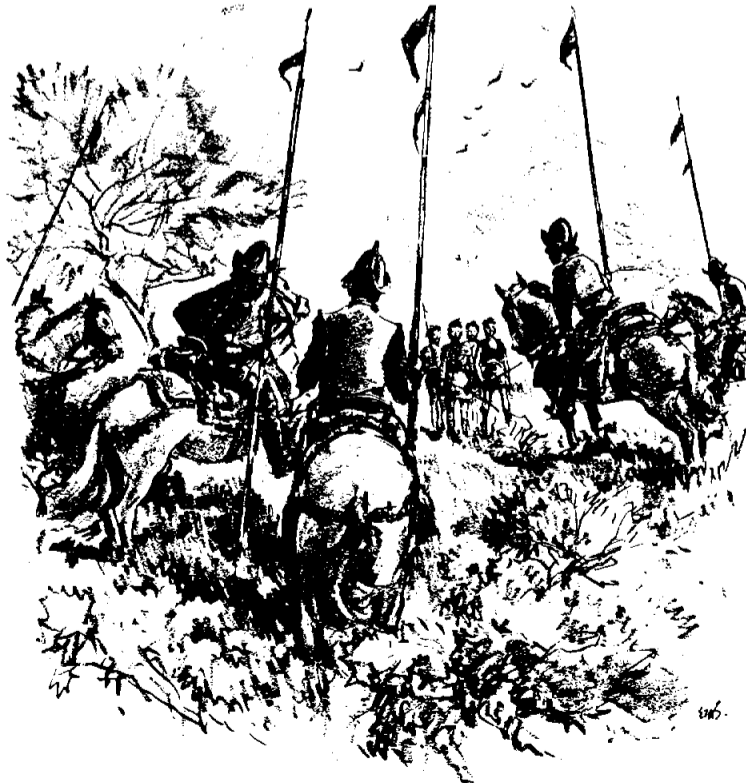
Other tribes later told how men like themselves made periodic raids on the Indians for slaves. The natives greatly feared these men, and fled to the forests whenever they appeared. At length, the four survivors managed to pick up the trail of a company of Spanish slave-hunters. After following the trail for some days, Cabeza de Vaca finally came upon the Spaniards, who were so astonished at seeing him that they "stood staring at me . . . so confounded that they neither hailed me nor drew near to make an inquiry." Their leader, Diego de Alcaez, promptly took the travelers under his protection.

It was only a matter of time until the four survivors of the ill-fated Narvaez Expedition rejoined their countrymen on the western coast of Mexico. They arrived at Culiacan on May 18, 1536—eight years after they had been thrown up on the coast of Texas.

Though their dramatic journey had been important geographically and historically, Cabeza de Vaca and his three fellow travelers had also scored great personal victories. They had borne up bravely in the face of death, their faith and courage carrying them on. They were men who would not die.

By now, one would suppose, Cabeza de Vaca had had his fill of adventure. But it was not so. Returning to Spain, he petitioned his king for a grant to conquer and colonize the lands he had seen in Florida. In this, he was a bit late; the grant had already been issued to Hernando de Soto. De Soto offered De Vaca the post of second-in-command of the expedition, but the toughened veteran of the Narvaez Expedition refused. Instead, he later became Governor of Uruguay—a full command for him at last.

Here trouble still pursued Cabeza de Vaca. Political intrigue contrived by enemies sent him back to Spain in disrepute in 1544. The Council of the Indies banished him to Africa, but he was later recalled and appointed to a judgeship in Seville, where he died about 1564. It was a quiet end for one who had spent such a wild and dangerous life for his country.



Reunion with Spaniards

by E. M. Schiwetz

The history of Texas from its earliest exploration through its colonization and growth into a republic, and finally as a state of the Union, is an extremely interesting history. Through the courtesy of Humble Oil and Refining Company, articles from Humble's *Texas Sketchbook* will appear in the *Roundup* during the next several months. The articles were written by F. T. Fields. Pencil sketches and watercolors accompanying the articles are by the noted Texas artist E. M. "Buck" Schiwetz. Many of the places described in the series are within weekend driving distance of MSC.

Three for the Show



MERCURY ROW — Three Mercury spacecraft left MSC September 15 as the first major contingent of manned spaceflight artifacts to be turned over to the Smithsonian Institution under an agreement with NASA whereby the Smithsonian will be responsible for refurbishment and display scheduling across the country. Nearest camera is Spacecraft 9 in which chimpanzee Enos made a two-orbit flight on November 29, 1961. Spacecraft 15, which among other assignments, was backup spacecraft for Gordon Cooper's 22-orbit MA-9 mission May 15-16, 1963, is next. At the van's tailgate is the Big Joe Mercury boilerplate launched on a suborbital heatshield test atop an Atlas on September 9, 1959.

RCA Engineers Speak at IEEE October 12 Meet

The Houston Chapter of the IEEE Aerospace and Electronics Group will meet October 12 at the NASA Holiday Inn. Principal speakers will be L. B. Garrett and F. A. Hartshorne of RCA's Communications Systems Division, Defense Elec-



GARRETT HARTSHORNE

tronic Products, Camden, New Jersey.

Their speech is entitled "Meeting the Space Telemetry, Tracking and Command Challenges of the 1970's." Current and future space programs will be discussed in terms of forthcoming communication link requirements. The problems of distances, traffic, security/privacy, re-entry, tracking, and size/weight reduction will be described. New methods and techniques such as Direct Satellite Relay and Plasma Modified for Re-Entry will be illustrated.

Garrett is Manager, Aerospace Communications Systems Studies and holds BSEE and MSEE degrees from Drexel Institute of Technology. He has 15 years experience in Aerospace Communication Systems Design and management.

Presiding officer of the Houston Aerospace and Electronics Group is Ralph S. Sawyer, Chief of MSC Instrumentation and Electronic Systems Division. Sawyer said that monthly meetings are planned. The group will also co-sponsor the National Telemetry Conference to be held in Houston April 9-11, 1968.

New members are being solicited. In addition, non-members are welcome at all meetings. The October 12 meeting includes cocktails at 6:15, dinner at \$3.50 at 7:15 and meeting at 8. For reservations or information call Dianne Milner at HU 3-5541.

White Sands Man Sets Rifle Records

John A. Mathis of the MSC White Sands Test Facility Propulsion Engineering Office recently set two national records in National Rifle Association high-power rifle competitions.

Mathis, an Army Reserve captain and firing member of the Fourth US Army Reserve Rifle Team, established records in the "A" course reserve category and in the President's match aggregate reserve category. Courses of fire are at 200, 300, 600 and 1000 yards using the 7.62mm NATO M-14 service rifle.

He holds an NRA master high-power rifle classification, has been competing in high-power rifle matches for six years and has been a member of medal winning teams in the national matches three years.

In the 1967 national matches, Mathis placed third in the Leech Cup Match (1000 yards) reserve category, was in the top ten in the Wimbledon Cup Match (1000 yards) and was a member of the President's Hundred — top 100 shooters of approximately 2100 competitors from reserves, regular Army, Marines, Navy, Coast Guard, Air Force and civilians.

Service Award



Charles L. Coston
Management Services Division
30 Years Service

Spanish Club Meets Monday

The MSC Spanish Club Monday will hold its October meeting at 5:15 pm in Room 108 Bldg 13. Club vice president Steve Gilbreath will be the featured speaker. His topic will be his work with the Peace Corps in Ecuador and on the ancient Incan city of Machu Picchu.

Guest speaker at the September meeting was Mrs. D. Suarez. Lamar high school teacher who gave a slide-illustrated lecture on Spain.

Prospective Spanish Club members are welcome to attend the October meeting.

Vengan todos.

The SPACE NEWS ROUNDUP, an official publication of the Manned Spacecraft Center, National Aeronautics and Space Administration, Houston, Texas, is published for MSC personnel by the Public Affairs Office.

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

Long fight with short stick . . .



Hire Handicapped Week Marked

National Employ the Physically Handicapped Week will be observed, for the twentieth year in a row during the first full week in October this year (Oct. 1-7).

Federal agencies have been engaged for many years in an evolving program of hiring qualified citizens who are coping with reverses forced on them by physical impairment, a history of mental illness, mental retardation, or other severe handicap.

According to Burney Goodwin, MSC Personnel Division, coordinator for the Employment

of the Handicapped, there are over 100 employees at the Manned Spacecraft Center with major physical handicaps. These persons perform well a variety of assignments throughout the Center, both in technical and administrative fields.

The employment records of handicapped workers show why it is good business to hire them, Goodwin said. When properly placed, they have better safety records, better production records, and better stick-to-the-job records than the able-bodied.

Peanuts



In Xanadu did Kubla Khan His pleasure dome decree . . .

NASA Publication SP-7, Dictionary of Technical Terms for Aerospace Use, has the following entry:

astrodome — A transport dome in the fuselage or body of an aircraft or spacecraft intended primarily to permit taking celestial observations in navigating.

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

3-2-2 brick contemporary in Bayou Chantilly, Dickinson, 2109 sq ft, sunken lvg room, fam room w/corner fireplace, built-ins, utility room, walkin closets, central heat/air, draperies, antique-gold carpeting, terrazzo, enclosed patio fenced, 10 min to MSC, no city taxes. \$23,200. GI-no down. R. L. Latta, 53404380.

Wooded, 80 X 130 ft. lot in Shadowland Subdivision, Dickinson. Paved streets, utilities. \$4,750. J. E. Grimaud, GR 4-3450.

2 bdr, 1 1/2 bath, 4 yr old brick on 100 X 150, Bacliff. Paneled den, lvg room, walkin closets, central heat, carpeted terrazo entry, cedar fenced. Close to Hwy 146, 12 mins from MSC. \$14,500. Sue Edelman, 932-4102.

3-2-2 brick in Miramar addition, 1849 Bimini Way, Seabrook. Extra large ash-paneled family room, built-ins including dishwasher, carpeting and drapes. Elementary and Jr. High schools and shopping center nearby. 10 mins to MSC. \$19,600. Lee Swank, GR 4-2280.

Bay Port Area—Ranch style house, 4 bedrooms, 2 full baths, large living room, breakfast and dining area, oversized double garage, breezeway, patio on 110 x 140 wooded lot in a quiet residential area with pier privileges. Standish, GR 4-3382 after 5.

57 Oldsmobile 4-dr sedan, good condition, \$250. One owner, Jim Peacock 932-4458 League City.

59 Ford Galaxie, automatic, pwr brakes and steering, 4-door, \$275, call 946-6870 after 5:30.

FOR SALE—MISCELLANEOUS

Lowrey transistorized electric organ—2 manual, full pedal board, Leslie speaker, many extras, including bench. Walnut finish, 2 yrs old, but like new. Cost \$1450. Will sell for \$900. Can be financed at \$24/mo. Electric floor scrubber, waxer and polisher, like new, \$15. Electric clothes dryer, 2 years old, perfect condition, \$60. James C. Weaver, 932-2371.

15' Lone Star fiberglass boat, 35 hp Johnson, two gas tanks, canvas cover, trailer, all in good cond., \$600. G. A. Nixon HU 6-0981.

Male Beagle puppy. One year old. Nice looking hound with an excellent pedigree. He has been trained to hunt rabbits as well as being a child's pet. Has permanent shots \$40. Ted Cone, GR 3-8835.

7.5 cubic ft refrigerator, \$35. Sears deluxe 30" range \$65. Wards portable dishwasher \$50. International stamp collection \$214 value for \$95. Miscellaneous silver holloware, priced per each piece. Ben Locher, GR 1-4387, LaPorte.

Sailboat, Sunfish, good cond, \$365. E. S. Harris, 877-2651.

Bright red satin long formal, size 9—worn once, \$15, Virginia Ellis, HU 7-1040 after 4:30.

Wedding dress, size 10, has been cleaned, and is in perfect condition. Has detachable floor length train, \$70. Carolyn Davis, 3327 (no home phone).

Telefunken stereo, \$100, 6 speakers 4 band AM/FM radio/shortwave. 2 Englander Box Springs \$35. 2 Danish Modern Beige Couches \$25. 1 Couch Bed (leatherette) \$35. Metal Wardrobe 36" wide/w full length mirror \$15. 8-drawer double dresser \$15. Dixie Patterson, UN 1-8286 after 6.

Headache rack for 67 Ford 1/2-ton pickup truck. For styleside long wheel base, \$30. B. D. Patterson, GR 9-1715.

Motorcycle, late 66 Honda 305 Super Hawk. Absolutely showroom new, 1900 miles. Contact G. W. Harvey MO 5-0947.

Browning .25-cal. semi automatic pistol. Very small, light, yet powerful. Good condition. Firm price of \$25 (owner bought new Browning 9mm). Frank S. Miceli, GR 1-0723.

21' South Coast sloop, fiberglass, 195 sq ft sail, dacron main and jib, 1 year old. Cuddy cabin, head, sleeps two, 3-hp British Seagull century plus. Teak trim, stainless standing rigging, dark blue hull, sky blue and white topsides Watergate slip 1-24. W. Platt 484-2939, R. Sutton 877-2947 after 5.

English Setter puppies, 8 wks old, \$35 registered, \$25 unregistered. J. W. Pearson, HU 6-2409.

24 ft. Islander sloop, full racing and cruising gear, cost over \$8000 new; firm price \$5950. R. J. Piotrowski, NB 591-2153.

Hammond organ, church model, tone cabinet with reverberation, walnut, for home, church, or studio, will guarantee, \$1000. Lt Col Thomas J. Borgstrom, HU 8-0069.

2 Tiajuana Brass stereo 8-track tape cartridges, "S.R.O." and "What Now My Love," \$2.95 ea. Barbell and dumbbell set, \$25. Roy Johnson 944-7020.

Apartment-size refrigerator (Philco), excellent cond, freezer compartment across top; large vegetable bin; ideal for small apartment, beach house, or as extra refrigerator, \$35. Cecil Dorsey, GR 3-4010.

12X12 Wonderplush, antique gold, \$100. 9X12 nylon, off white, \$50. James B. Irwin, GR 1-0373.

Double bed with walnut headboard, good condition. R. Wilson, HU 8-4139.

4 yr-old gelding, 16 hands, white brown marking head and tail. Part Tenn. Walker. Gaited, gentle. Joe Pirtle, GR 4-2138.

Sailboat, 12-ft plywood racing dinghy, registered Penquin class, with two sails: one well-used cotton and one like-new dacron. Bottom fiberglassed. Needs repair. \$225. J. H. Sasser 591-2336.

67 S-90 Honda. \$225. Dutch von Ehrenfried 591-4163.

66 model white, Roper gas range, large oven with window 5 burners including "burner with a brain" and griddle, elect. clock and timer, sell for \$125. Robert C. Brown GR 9-4689.

Buckskin quarter horse 15 1/4 hands, used for beginner riding. May be seen by calling 932-3225 League City near Lighting "B" Rodeo ranch. Will sell or trade. Contact Bob Fletcher, owner 6205 (no home phone).

General Electric 20-inch fan \$20. General Electric Thinline room air conditioner 110 V \$100. Sears Kenmore electric range \$100, Stearns and Foster double bed mattress \$50. Yard Chief barbecue \$25. Charles Klabosh 591-3862.

Garage sale: 3 gulch boxes, toaster, electronics, hdwe and misc. Eric Swarthe, 591-4378.

Sailboats for sale or rent: 13'9" Scorpion boardboat, 15'3" Demon centerboard sloop. Bob Ward Nassau Bay 591-2182.

15 ft Ouichita fiberglass runabout with 75 hp Scott outboard. Tilt trailer. Including convertible top, canvas boat cover, and insurance. Exceptionally well cared for. \$895. Bob Hardy, HU 4-3652 after 5.

10 ft. fiberglass fishing boat with new 5 hp Clinton motor and small wheel trailer. \$254. Bob Hardy, HU 4-3652 after 5.

Nice dresser and night stand, good condition. J. Whiteley, HU 6-3804 after 5.

Kodak automatic 35 slide camera, integrated light meter. Takes 20 or 36 exposure 35 mm film. Flash unit and leather case included. Make offer. John Boynton, 946-1363 or 944-9319.

Fender Mustang guitar, red, excellent cond. with case, \$150. Surfboard, "Surfboards Hawaii Noserider," 9'8", 8 months old, excellent cond, \$135. Al Martin HU 8-2776 or 591-3951.

G.E. upright freezer. Needs some work. Best offer. C. Duke 877-1389.

English Pointers, AKC reg. Top show and field stock, liver and white pups, \$100. Rita Heywood 534-3979.

Gas powered lawnmower, Craftsman 9.0 cu in with grass catcher. Cost \$96. will sell for \$40. Used only 4 times. Joseph Vilgos 643-2062.

Vanderoef, HU 2-7540.

Remington model 870 pump gun with modified and full choke barrels. Excellent condition. James Sulester MI 5-5603.

WANTED

Need to get in a carpool from Gulfgate area to MSC. Hrs: 7:30 to 4. Jerry Schiller WA 1-1586.

Tektronix type 512 or 514 scope and type 104 or 105 square wave generator. R. B. Lang, HU 8-0149.

Guitar, suitable for a beginner. Do not want electric. D. Briggs 946-5849, after 5.

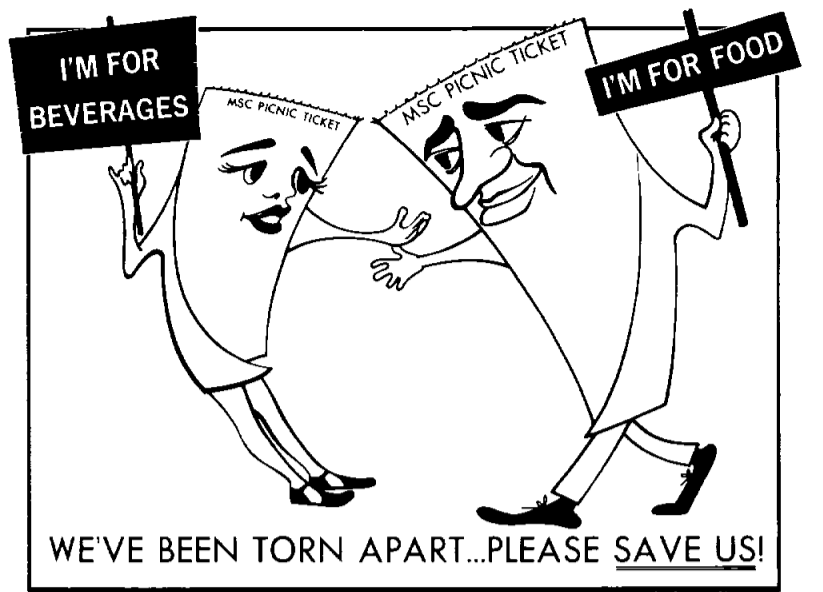
Back issues of 73 magazine. Years 1960, 1961, and 1962. Frank Blatner 946-6623.

You to meet me "Under the Big Top" at the Galveston County Park, League City, October 14, 10 am for the MSC picnic and amusements.

Wanted to Buy, Acetylene-oxygen welding outfit consisting of hoses, regulators, and small torch. Cutting torch desired but not required. Will discuss purchase of small gas bottles. James W. Moore, Jr. JA 3-9932.

BUY U.S. SAVINGS BONDS

NOW PAYING 4.15% WHEN HELD TO MATURITY



Picnic Planners Vow Event, Rain or Shine

"Hurry, hurry, hurry! Step right up, folks, and buy your ticket to the fifth annual MSC Picnic..."

While ticket selling for the picnic is perhaps a little more restrained than the raucous harrangue of a circus barker, the determination to get a good turnout for the October 14 EAA-sponsored event is definitely there. The picnic committee has vowed that the picnic will be held come rain or come shine—or hurricane.

Following a circus motif, the picnic will have a surprise ringmaster to emcee at the dance pavillion and a mystery celebrity to award trophies. The chowline offers such things as barbecue links and beef, beans, potato salad, relishes, cole slaw and pastries from 11 am to 6 pm.

To wash it all down, there will be soft drinks and a beverage from the Land of Sky-Blue Waters. Moreover, the beverages will follow picnickers around the park aboard beverage chariots.

For the small fry, many contests are planned with stuffed toy animals as prizes. Shrine Circus clowns will further keep the youngsters entertained.

But the circus-style picnic is not just for the kiddies; plenty of grown-up entertainment and

activities are planned, such as a girls' volleyball game and an exhibition softball game. The John Sylvia Combo will provide dance music.

Other entertainment includes the Wheeler-Dealer Square Dancers, Shrine Circus Band, Latonka Indian Dancers, Shriner motorcycle exhibition, Doc Rail's water ski exhibition and a playoff between the first and second place MSC baseball teams.

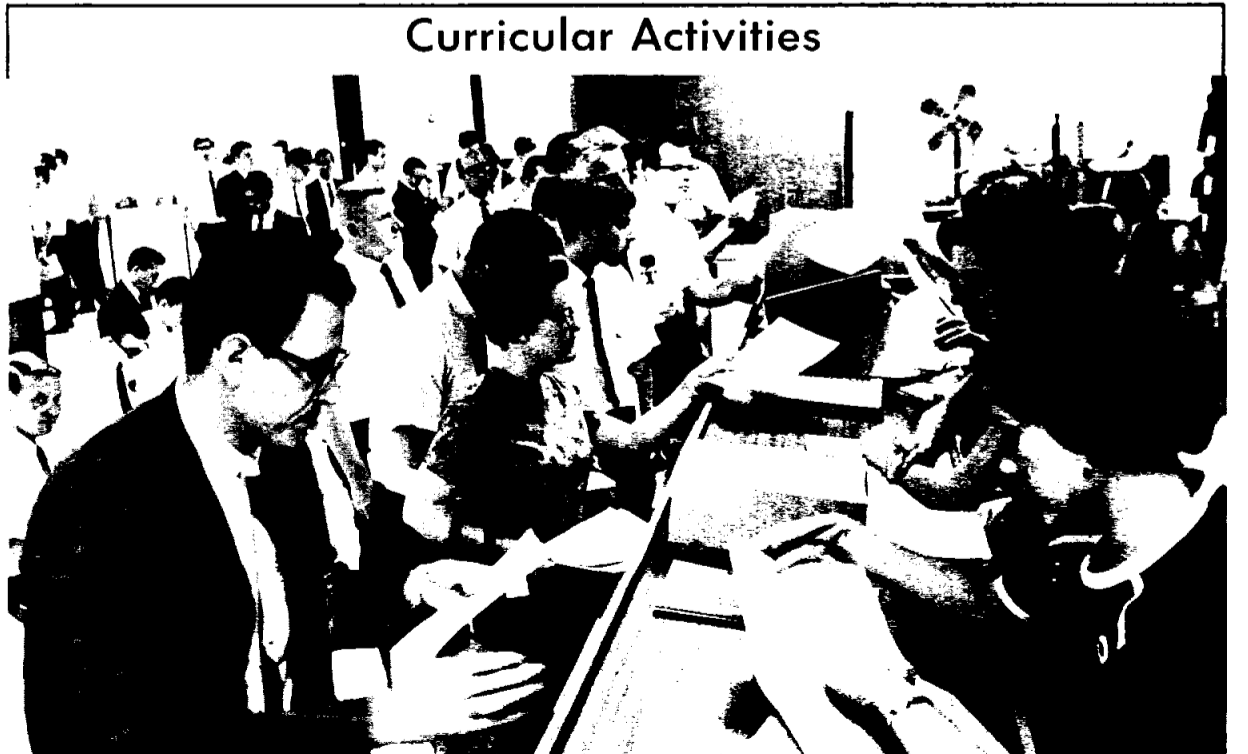
Employees who have a "lucky number" on the flyer they will receive with their next Labor Distribution Sheet. The October 13 Roundup will carry a list of lucky numbers. To claim a prize, present your flyer and your MSC badge at the picnic Public Information booth between 10 am and 6 pm.

Failing to get a lucky number, there are still sack races and egg-tossing contests where one can win prizes.

Picnic tickets are on sale in both MSC cafeterias and from picnic representatives in most buildings at \$1.50 each for adults, \$1 for children 6-11, and \$.50 for children under 5.

Betty Schick at 3371 and Rita Sommer at 2397 are still seeking more help in making arrangements for the picnic. Mary Dunn at 3941 will answer any questions about the picnic.

Curricular Activities



REGISTRATION LINE—MSC and contractor employees sign up for classes in the University of Houston Clear Lake City Center fall semester September 8 at the MSC News Center. Classes began September 18. The Clear Lake City Center offers classes in math, physics and several engineering disciplines.

The Arm Bone's Connected to the . . .



WHERE THE MOON IS HANDLED—Dr. Elbert King, left, of MSC Science and Applications Directorate Geology and Geochemistry Branch, explains to Prof. Dr. Wolf von Engelhardt the operation of one of the Lunar Receiving Laboratory's gas-tight modular ventilated cabinets. Professor von Engelhardt, one of more than 100 LRL principal investigators visiting MSC last week, is professor of mineralogy and director of the Mineralogical Institute at the University of Tuebingen, Federal Republic of Germany.

New Biological Isolation Garment Added to Apollo Crew Wardrobe

Another garment may soon be added to the wardrobe of Apollo crews.

The new garment, termed Biological Isolation Garment (BIG), is being considered for use in the event the lunar returned crew does not land near the prime recovery forces and is forced to exit the spacecraft. In this case, pararescue men drop the garments to the Apollo crew who don them and await recovery either by pararescue men or helicopters.

The garment, currently under evaluation by technicians at MSC, is designed to provide adequate biological isolation and at the same time afford the crew complete mobility, comfort and safety. Biologically, the garment is capable of restraining minute organisms.

The BIG is a one-piece, loose fitting garment with an integral headpiece. A special respirator,

built into the headgear, filters the air which the pilot expells.

The BIG is a joint development of MSC's Crew Systems Division of the Engineering and Development Directorate, the Landing and Recovery Division of Flight Operations Directorate which has the responsibility of safe recovery and transfer of the crews from their Pacific Ocean landing spot to the Lunar Receiving Laboratory at Houston and the Biomedical Specialties Branch of Medical Research and Operations Directorate which has been responsible for the prevention of back-contamination.

This new item is part of the comprehensive control the NASA is utilizing to prevent possible back-contamination.

There is a remote possibility, although highly unlikely, the crew may return with living organisms from the lunar surface. NASA, together with the Interagency Committee on Back-Contamination, is guarding against the introduction of extra-terrestrial life forms into the terrestrial biosphere.

Following recovery, the crew will enter a special Mobile Quarantine Facility (MQF) aboard the prime recovery vessel. They remain in the MQF, a unique self-contained, biological isolation unit, for the transfer via ship, aircraft, and truck to the LRL at Houston.

The three pilots remain in the LRL Crew Reception Area for a quarantine period of approximately two weeks during which time they will unfold the story of their moon journey.

The biological garment has already been put through habitability tests, including sea trials

in the Gulf of Mexico by the Operational Test Branch and the Recovery Systems Branch of the Landing and Recovery Division. During these sea trials, a suit technician, garbed in the BIG and floating in a life raft, spent many hours evaluating the suit's comfort, mobility and safety. Tests have also been performed by the Biomedical Specialties Branch of the Medical Research and Operations Directorate to determine material choices and suit configuration to insure biological isolation.

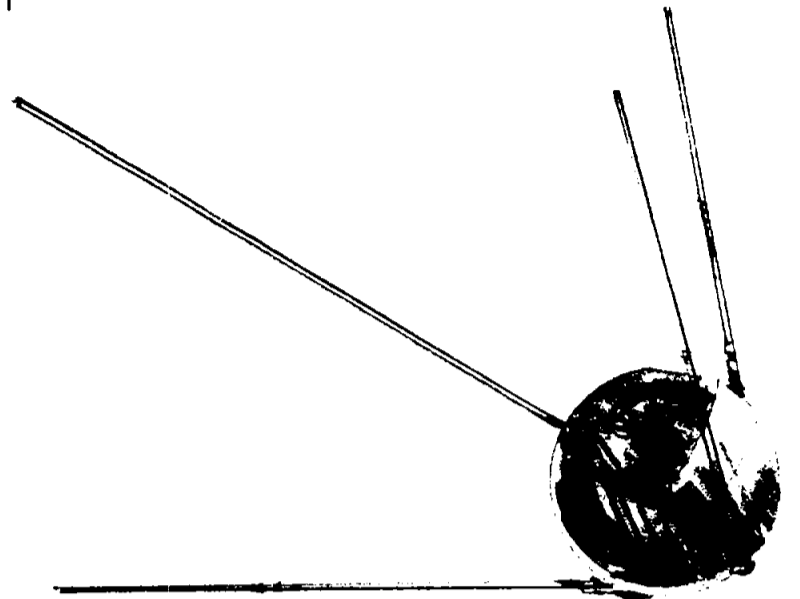
Additional water tests and biological evaluations are planned before officials at MSC approve the Biological Isolation Garment for use in the lunar landing phases of Project Apollo.



ROUNDUP

SECOND FRONT PAGE

Orbital Anniversary



STARTED IT ALL—Wednesday is the tenth anniversary of when it all started. On October 4, 1957 the Soviet Union placed into orbit a 184-lb *Iskustvenyi Sputnik Zemli*—artificial satellite of the earth—to begin the space age. *Sputnik 1* measured temperatures and pressures in space during its 92-day lifetime. Its orbital ephemeris was 142 statute miles perigee and 588 miles apogee.

Sailwing Tested at Fort Hood

A drop of a developmental 90-foot Sailwing chute, postponed last week because of bad weather, was rescheduled for this week at Fort Hood, Texas.

The Sailwing, a gliding type parachute, is one of a number of systems under study by NASA for possible use in land-landing spacecraft of the future.

This week's test was to investigate reefing methods with a

2250-pound load — about half the maximum load for the 90-foot Sailwing.

Yule Dance Set Dec. 16

The EAA-sponsored annual MSC Christmas Dance will be held December 16 from 9 pm to 1 am at the Emerald Room of the Shamrock Hilton. Music will be provided by Dick Krueger and his orchestra.

Poster Awareness

ALL THE MONEY IN THE WORLD
WON'T BUY A GOOD SPACECRAFT.
PEOPLE HAVE GOT TO CARE.
IT'S AS SIMPLE AS THAT.
YOU HAVE TO CARE.

AND THE YEARS?
YOU CAN'T BUY BACK
THE ONES YOU'VE SPENT.
APOLLO ADVANCES
(OR FALLS BACK)
AT THE RATE OF 60 MINUTES
TO THE HOUR.

SOME THINGS YOU CAN'T BUY

WHAT HAVE YOU ACCOMPLISHED?
IN THE LAST 60 MINUTES,
LET'S SAY.....JUST
BECAUSE YOU CARED.



Alan B. Shepard Jr.
NASA PILOT

KEEP NASA THE SYMBOL OF EXCELLENCE
MANNED FLIGHT AWARENESS
APOLLO

FIRST IN SERIES—A message from MSC pilot Alan B. Shepard is the subject of the first in a series of 17x22-inch Manned Flight Awareness posters being distributed by the MSC MFA Office to promote quality consciousness in the aerospace industry.

Bay Chorus Seeks Basses, Tenors

The Bay Area Chorus is seeking Mario Lanza and Ezio Pinza types who have tenor and bass voices to sing with the chorus.

Sunday's rehearsal will be the final day for joining the chorus, made up of more than 60 singers, many of whom are MSC employees.

The chorus has held two rehearsals in preparation for the Christmas Concert Program to be presented in the MSC Auditorium during December.

For information on Bay Area Chorus membership and activities, call Clare Schweickart at HU 8-2335.