MARTIN MARIETTA
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DENVER DIVISION

NUMBER 11/1976

The New York Times
New York

Mystery on Mars

Unmanned space exploration has never had the popular allure of dramatic manned flights. In the two weeks since Viking I landed on Mars, however, the journey of a sophisticated but inanimate apparatus has suddenly come alive with unexpected mystery.

Tests to determine whether there are living organisms in the Martian soil have astonished all hands; the first data regarding oxygen generation and liberation of radioactive gas were almost totally unexpected. The activity registered was so vigorous that for the first time the possibility of life on Mars had to be seriously considered.

There remains, of course, a vast gulf even between serious consideration of the possibility of such life and acceptance of that view. However strange and unexpected the data received from Mars seem at first glance, it is always possible that they are the result of simple chemical reactions having nothing to do with living things.

Very appropriately, therefore, Viking scientists are exploring several possible alternative hypotheses. They are prudently warning against jumping to hasty conclusions that the hoped-for result of the Viking landing —the discovery of living organisms on Mars—has already been accomplished at the first attempt. The odds that such a discovery still seem substantial, although now than even a week ago.

It will take some time and additional evidence to answer the difficult, but truly fundamental and historic, questions that have been raised. In the atmosphere created by these early fi it seems appropriate to reflect on Mars—even very primitive Martian soil now being test

At the least, it would many basic earthly philo necessarily been earth-c origin of life on this plan concerning a specific a Being to more prosaic s organic compounds m chemistry that existed o

The discovery of mic of course, invalidate eit discovery of living thi tradict the uniquenes

If life of any kind far greater probabili amidst the billions of What life on Mars w is not alone and th learn to communic even other civilizat

To realize these depends on solving

The Christian Science Monitor
Boston, Mass.

Mars at last!

Amid our preoccupation with earthbound problems it is well to stretch our vision by reminding ourselves of the expansive universe around and of man's capacity to discover and explore it. The landing of Viking I on Mars helps us do just this. It is a thrilling tribute to man's intelligence, determination, and pioneering spirit.

For a layman the technological prowess the Viking mission represents boggles the mind. The unmanned spacecraft left Florida a long 11 months ago. It traveled more than 200 million miles, soaring through space to its rendezvous with a planet half the size of Earth. When it arrived it had to search three times for a suitable landing site. Now it will be busy photographing, scooping soil and performing other scientific tasks – all at the push-button orders of men back home. A marvel indeed!

Coincidentally the American landing on Mars comes seven years after the day men walked on the moon for the first time. Since then public enthusiasm for space exploration has waned. The moon landings became routine overshadowed the as argued, ought to ies, curbing crime,

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end contribute to s ress. As for the c gram is a tiny fra nam.

Moreover, as States cannot perf development of t wants to keep its now the Russians tory orbiting the made a soft landi U.S. has not yet t little doubt the S the first men on M

But for the mor cinated to see Planet turns up. sion is whether o Mars, a discovery religious as wel Most scientists f whatever the fin give mankind a planet and the qu on.

The scientists and Space Admi congratulated. Th fellow Americans

The Sun
Baltimore, Md.

Water and Nitrogen on Mars

Although it will be some days before the Viking lander will send any definitive information on the presence of life, the changes already made in man's knowledge of Mars are staggering. On its way to the surface, the lander sampled the Martian atmosphere and eradicated scientists' expectation that no nitrogen would be found. According to Viking's detectors, the Martian atmosphere is about three or four per cer nitrogen. Dr. Michael B. McElroy of Harvard, scientist on the Viking team, explained what this information means: "Look at what we need for life. Energy, that we have. Water, that we have. Nitrogen, that we [now know we] have. Carbon, we have lots of that. And phosphates we have in the rocks. I see nothing that excludes the possibility of the evolution of life on Mars."

Another atmospheric finding is more ambiguous. Argon, an inert gas, enters the earth's atmosphere in a more-or-less fixed ratio to the carbon dioxide and water given off by the same process. Earlier Russian experiments reportedly measured Martian argon levels so high as to indicate that amounts of water and carbon dioxide would also be high, even thou tities would be

is nearly certain, a key to speculation about life on Mars, past or present. No water is now visible on the surface, because of low temperatures, but there are countless "wet spots" of vapor in the atmosphere, as well as visible ice caps and signs of subsurface permafro new argon readings sug were lik

The New York Times
New York

The Viking Spirit

As the first robot researcher putters around on Mars while a companion robot prepares for a landing, it becomes clearer than ever that the Viking program has dimensions extending beyond the technological marvel of a soft descent by a complex instrument package onto another planet that is millions of miles from Earth.

There is the exhilarating sense that man's artifact has caught up with his fiction; that sci-fi has lost a

The New York Times
New York

The Viking Miracle

Walter Cronkite wasn't in Pasadena last Tuesday morning and neither was Barbara Walters. Jimmy Carter was nowhere in evidence there nor was Vice President Rockefeller nor even California's present Governor Brown or ex-Governor Reagan. There were so few beautiful people around that the television reporters present were reduced to interviewing science fiction writers.

True, once it was clear that success had been achieved, President Ford got on the telephone to extend his congratulations, but it was quickly evident that he hadn't been briefed very well or very long. For every reporter who was in the Jet Propulsion Laboratory at the historic time when it became clear that the United States had achieved the almost superhuman feat of landing the first successful instrument package on the surface of Mars—more than 200 million miles away—there were probably 100 or more in Montreal chronicling the intensely human feats of Nadia Comaneci and her fellow Olympians.

While Americans by the tens of millions spent the night of July 20-21, 1969 glued to their television sets watching Neil Armstrong and Buzz Aldrin walk on the surface of the moon a mere quarter of a million miles away, practically next door, how explain the apathetic reaction of most Americans last week to the Viking miracle on Mars: the successful placement of the first human outpost on the surface of the planet which is most nearly like Earth of all known extraterrestrial bodies?

In part, of course, this lack of interest is the product of past successes. So many spaceships, manned and unmanned, have landed safely on the moon; so many rockets have flown past or orbited Mercury, Venus, Mars and even Jupiter that the average citizen has become a bit jaded. The engineers and scientists, he thinks, have solved all the problems of space travel.

Perhaps an even more fundamental explanation is that Viking carried no human beings; at worst a few hundred pounds of instruments would have been destroyed on impact. The human touch was lacking; admittedly a static panorama of Mars is a good deal less exciting than the picture of two intrepid human beings walking through the dust of man's nearest neighbor in the skies.

For these reasons, it is worth recapitulating what Viking I has accomplished, and emphasizing the extraordinary achievement of the individuals—the scientists, engineers and technicians in government and private industry who have made it possible.

First, the Viking 1 rocket was safely and accurate guided for roughly a year over a path of more th 400 million miles to find its target, M of sand in the infinitude of space. Bo have moved most of the way arou Viking 1 was launched, and the d them is now about 220 million mil 900 times the distance from Earth it is a distance so vast that light whose speed of 186,000 miles per s known movement in the universe— utes to travel between Earth and M

Then Viking 1 hunted for a safe complex and often chaotic and surface. Such a spot was found by taken in Martian orbit and radioe the information gained from Eart of small areas of Mars. Then can landing of the complex instrume talented and versatile scouting by human beings. Humanity ha foothold on Mars and soon an data was being received back o

Now scientists know the Mart Mars has nitrogen, oxygen, wat every other essential required f richer and larger planet than t moon. Barring the catastrophe not stretching the imagination by the time of this nation's be sustaining a human popul

Through the link forged b Earth across the limitless arc beings of 1976 are witnessin ence of time and space. The before our eyes by Viking a before, from hundreds of mi us what parts of our own E hundreds of millions of y we can expect the earth to of years from now.

Time as well as space ha The instrument that has p inhuman little robot, sen creature of another mirac spectacular than that of al put together—the miracl

The Washington Post
Washington, D.C.

Viking

BY THE TIME some of you read these words, you will already know whether Viking I has landed on Mars. We hope it has, because a successful landing by this strange-looking machine would add a great deal, over the next few weeks or months, to the knowledge that the Viking project has already provided. Whether or not the actual landing of Viking I is a total success, its mission is already a stunning accomplishment. The flood of pictures it has sent to Earth from its orbit around Mars has changed sharply our perceptions of that great red planet and has provided raw material for years of study and thought. And Viking I is only the beginning; a second ship is now in transit and will attempt to land in September.

The flight of the Vikings is in some ways more remarkable an undertaking than the flights to the moon of the Apollos. Not only is the journey longer (a half-billion miles and almost a year in duration) but once the earth-bound controllers of Viking I sent it the command to land, the spaceship was on its own—no human beings on board to correct errors, no radio waves to re-arrange the instructions programmed into its instruments. The time involved in the transmission of a message from Earth to Mars (19 minutes) simply precluded putting an earth-controlled leash on Viking once it started down to the planet's surface. The scientists have known from the beginning that they would need a substantial amount of luck, as well as an enormous amount of skill, to land Viking without having it crash into a boulder or fall into a canyon. No one, it is worth remembering, has ever seen a picture of Mars in which objects les football field in size are visible.

But if Viking I does land smoothly and d to send back pictures of Mars and data on that planet's surface, the next few days could rank with those spine-tingling moments just seven years ago as among the most fascinating in recorded history. Seven years ago today, man first walked on the moon. Today, if all goes well, Viking I will execute the first part of its program—a program designed to attempt to determine, among other things, whether there is some form of life on the one other planet in our solar system where scientists believe life, as we know it, is most likely to exist. The odds, of course, are heavily against the existence of any form of life on Mars— and, for that matter against Viking I finding evidence of it even if it is there. But those who have argued that life in some form may exist have been buoyed by the pictures Viking I has already transmitted. Those pictures suggest that Mars once had huge amounts of water on its surface and may still contain some, perhaps trapped under its surface. If water is there, the chances for life to exist are increased greatly.

It was not many years ago when the dreamers among us talked about discovering thriving civilizations of man-like creatures on Mars. Indeed, prominent astronomers insisted they could see through the best of telescopes a vast system of canals. We now know that what they thought were canals are not canals. And we know that because of the climate of Mars and the composition of its atmosphere their dreams of finding there another race of human beings were just dreams. But we still do not know what is really there. We may soon begin to find out.

imagination, perseverence,

Wall Street Journal
New York

REVIEW & OUTLOOK

Visit to Another Planet

Try as we might, we can't speculate with any confidence on why yesterday's Viking I landing on Mars was important. And yet we are confident that it was.

Technological advancement is that way. First comes the technology, primitive at first but gradually developing. Following along behind is the dawning awareness of how it is affecting our daily lives and perceptions of the universe. The effects are often pervasive and profound.

The testimony to that truth has become almost a cliche. We all know that Orville Wright in his flimsy flying craft, Charles Duryea in his gasoline-powered buggy and Lee DeForest fiddling with his audion amplifier went almost unnoticed by a public engrossed in such forgotten events as the Boxer Rebellion. And we all know what the airplane, automobile and television set are today. In keeping with honored tradition, the TV networks, which a week ago spent tedious hours broadcasting the dullest political convention on record, yesterday were preoccupied with game shows while the Viking was sending back its first pictures of the surface of another planet.

Of course, the conquest of space is no longer a new story seven years after Neil Armstrong set foot on the moon. That event hardly went unnoticed. The Viking trip, without that crucial element of human daring and risk, is a far less exciting story. It will no doubt remain so unless the Viking lander's camera picks up something interesting, like a local resident, as it scans the desert landscape of the Chryse Plain. Science often destroys rather than creates romance, which perhaps helps explain public ambivalence towards it.

Yet, it is only necessary to recite what the scientists and engineers of

Unlike the experiments of the turn of the century, this one did not come cheap. It cost $1 billion. If the findings on Mars are unexciting, there will be many who will say that the money was wasted.

But they will be missing the point. At this stage of space exploration, the most significant discoveries probably are being made on earth, rather than in space. They are discoveries in the application of the most advanced technology to a single objective—miniature power plants using solar and nuclear energy; computers that can solve the complex problems of extraterrestrial navigation; materials that will withstand the dust, wind, heat and cold of the Martian climate; electronic signal transmission over vast distances to control and monitor events in another corner of the solar system.

Aside from the technology, the Viking project is a triumph of human organization. Benefits from the advancement of managerial skills can sometimes be as significant as scientific discoveries. It takes highly advanced skills to pull together all the disparate talents needed for a Viking project and insure what modern engineers call "zero defects" in the accomplishment of the project's goals. Space projects are in many ways simpler than earthbound managerial tasks—the running of New York City, for example—but it goes without saying that anything that might contribute to better management of human and material resources on earth is much to be desired.

Least ponderable of all are the psychic effects of the visit to another planet. The British scientist and author Fred Hoyle once theorized that the first pictures of earth taken from space spawned the environmentalist movement by empha-

News-Pilot
San Pedro, Calif.

We made it

WE'VE MADE IT to Mars. It's difficult to comprehend the magditude of the American achievement in the successful landing of the Viking I spacecraft on the planet that has excited the human imagination more than any other.

If the clarity of the first photos of the Martian landscape transmitted back to Earth is an indication of what will flow from the scientific instruments aboard the Viking lander, we are witnessing an epochal event in the exploration of the solar system.

The jubilation of the controllers and scientists at the Jet Propulsion Laboratory Tuesday was something all Americans could appreciate and could share. Events in the space program are among those undertakings that strike a spark of national purpose in our people. Once again, we have seen a

national independence has c cided instead with the anni sary of an event signaling ma independence from his e thbound origins.

To send astronauts to Mars l within our technological gras awaiting only the commitment do so. There is no reason to dou that this will come to pass whe the priorities fall into place Meanwhile the robot we hav sent to Mars—and with good luc the Viking II which is travelin behind it—will extract the anitic pated wealth of data from the planet's surface.

The age-old question of whether organic or inorganic life as we know it could exist on Mars, or may have existed in the past, apparently will soon be answered. Some surprises may be in store in the

The Daily Oklahoman
Oklahoma City, Okla.

The Viking Has Landed

IN an apparently perfect touchdown on Mars, so distant that it took the signal 19 minutes, traveling at the speed of light, to reach the waiting scientists here on Earth, the Viking spacecraft completed a journey that rivals the most imaginative exploits of Jules Verne's characters.

The Martian landscape was much as had been predicted, since the earth people had been looking at it through remotely controlled cameras from the relatively close range of 940 miles for days. Much new knowledge of the planet had already come from those photographs. Much more will come from the instruments aboard Viking I, and from the visit of its sister ship, which is scheduled to land on the Red Planet in September.

Those instruments represent the present ultimate limits of the state of the art, in most cases. They have been devised for extreme reliability under extreme conditions. They have been miniaturized beyond the belief of electronics specialists of only a decade or so ago. They were set down gently in a hostile atmosphere on rugged terrain, although the land did not offer the hazards present at some other sites on Mars. And like all past space instruments and technology, they mean that consumers here on earth will soon be using a new generation of tools for more mundane purposes.

The purpose of space exploration is knowledge of the solar system and the universe. But there are practical benefits from all the space travel—manned or unmanned—for all who take advantage of the developments that make space travel possible in the first place. The most ubiquitous use is communication. Even the watches that flash accurate time signals, the wrist radios which are advertised as children's toys, the heart pacers, and the international television shows live and in color from remote parts of this globe, have their links to space technology.

Nothing before, however, has had the potential for stimulating man's imagination tha has. The first moon exactly se Viking landing, emotional mom visions of a m have fired me centuries. What Perhaps that th ed by a race t atmosphere a haps that there tation? No life traces of any l by manlike c and invented a

At this poin appears to be but with trace ter. As the j watched the surface appe dicted more space vehicle spacecraft persons. Th laughter at words. But his vision.

Washington Star
Washington, D.C.

The scene on Mars

No curious throngs of green people or exotic animals showed up in the first photographs from the surface of Mars. Viking I may have put an end to generations of fanciful imaginings about what the planet contains.

Whether or not one regards that as a disappointment, the safe landing of the unmanned, instrument-packed vehicle after an 11-month, half-billion-mile flight is another fine achievement for American science and engineering. The landing came, by happy coincidence, on the seventh anniversary of the first arrival of man on the moon. And in contrast to the series of Russian mishaps that ruined past Mars landings, the Viking survived the touchdown and quickly started sending pictures.

It is much too early to say what the ultimate scientific harvest will be. The first photos show a rock-strewn, rolling desert, with signs of wind activity but no visible life.

There will be more photography, and other instruments will gather and send home data on the weather, seismic activity and the composition of the soil. Of greatest interest, perhaps, is the possibility of microscopic forms of life being found in surface material that Viking in a few days is to pick up and analyze. A second Viking is supposed to land on Mars in September.

Is it worth seven years of effort and $1 billion to get a rather sobering view of what our imaginations once told us was a fascinating planet — a setting for bold science-fiction tales? We will have to wait for an accounting, but we have no doubt that the ultimate payoff will be more than adequate in scientific if not in fictional terms.

Some answers, more questions come from Mars

Editor's Note: The Viking Mission is progressing rapidly and new information is being gathered daily. Information presented in this article comes from a conversation between John H. Boyd Jr., director of public relations for the division, and B. Gentry Lee, a member of the Viking Flight team's science analysis and planning directorate. The information was up-to-date at the time of the conversation, but, because of the amazing strides being made during the Viking mission, may now be out of date.

This picture is one of many taken in the northern latitudes of Mars by Viking 1 orbiter in search of a landing site for Viking 2. The picture shows eroded mesa-like landforms. The huge rock formation in the center that resembles a human head is formed by shadows giving the illusion of eyes, nose, and mouth. The feature is 1.5 kilometers (one mile) across, with the sun angle at approximately 20°. The speckled appearance of the image is due to bit errors, emphasized by enlargement of the photo. The picture was taken in late July from a range of 1873 kilometers (1161 miles). Viking 2 is in Mars orbit with a landing scheduled for early September.

Does life exist on Mars or doesn't it?

Scientists analyzing data from Viking biology and chemical experiments are not quite ready to say.

But, chemically, there is no deterrent to the beginning of the production of amino acids and, therefore, the move up the evolutionary ladder to life.

The discovery of nitrogen in the Mars' atmosphere and the determination that running water occurred at one time on Mars provide the building blocks of life.

However, questions seem to be more prevalent than answers at this point in the analysis of data.

For example: Why, if Mars and Earth were similar in their gaseous and chemical composition at some point in each planet's history, has Earth evolved sophisticated life forms while Mars has no sophisticated life forms or, perhaps, no life at all? The answer must come from tracing basic chemical evolutions.

As the scientists say, there is some "very interesting chemistry going on on Mars."

It may be that this interesting chemistry also occurred on Earth, but that we have not fully understood it.

When the gas chromatograph mass spectrometer began analyzing its first sample, the bulk evolution of water and carbon dioxide from hydrated minerals kept the instrument from reaching the sensitivity level necessary to determine organic composition of the sample.

It follows, because of this analysis, that Martian soil is not rich in organic material, but does contain enormous amounts of hydrated water and carbon dioxide.

But, the water does not exist as free water. The hydrated water burst forth only after the sample was heated to more than double the temperature used in the first step in the analysis—from 200F to 500F.

It would appear, then, water is locked in the regolith—the layer of Mars between the crust and the core.

As a result, scientists are beginning to get a different idea about the interaction of the atmosphere and the surface on Mars and on Earth. It was apparently this interaction on Earth that produced the first amino acids to start the move up the origin-of-life tree.

And it may be the hint of an answer to a puzzling question existing in the minds of those who study life as it relates to micro-biology: Why are enzymes capable of both oxidation and reduction reactions?

In hallway discussions, scientists theorize we may have found something that may be a partial key to the extreme talent the cell has had in dealing with a large number of environments—some of which we have understood and some of which we haven't.

It is discussion like this—formal and informal—that points up the scientific value of Viking.

As some say, "In terms of science per dollar, there never has been anything remotely like Viking."

First, we have landed sophisticated biological and chemical laboratories on another planet.

Second, the information obtained can lead to incredible theories of how planets get to be the way they are—and applying those theories, learn how Earth got to be the way it is.

The knowledge gained in the search of the solar system can lead to a fuller understanding of the evolution of Earth, from geological evolution and the coupling of geological and geochemical evolution leading to biological evolution.

Tracing these evolutionary steps, understanding the interaction of the atmosphere and the surface, could lead to the beginning of the very process of building life from fundamental atoms.

This understanding, while overpowering, is likely to be slow in coming. But, in another area of investigation, understanding is coming more quickly.

That is in weather.

Meteorology is simpler on Mars. Scientists now have a closed system to study that helps them better understand the weather on Earth and make predictions.

Some answers

from preceding page

The development of the global circulation patterns on Mars has caused the scientists to slightly change their views of meteorology on Earth.

It is this comparison with another planet with another atmosphere that leads to a better understanding of what is going on on Earth.

Although Viking missions are exciting, successful, and producing great quantities of scientific data, scientists are looking for more.

Mobility is the answer to how to get more.

Scientists are certain there are places on Mars vastly different from the spots where lander 1 is now working and where lander 2 will be operating in early September.

They liken this two-spot search to landing similar vehicles on Earth—one in the Sahara Desert and the other in Yellowstone National Park. There would be no way of tying together the information from these two sites.

Roving laboratories, pursuing chemical, biological, and meterological information could move from site to site making comparisons that again would be used to further understand our own planet.

Does life exist on Mars or doesn't it?

The answer will come.

On the cover:

The cover displays only a few of the hundreds of editorials the nation's newspapers have published since Viking 1 landed on Mars. In addition to the editorials, the newspapers have printed almost daily stories on Viking activities. The division's public relations department has received thousands of clippings from the papers.

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August 1976

Pay, benefits important to employees, company; surveys help to determine changes

How does our pay compare with others in jobs like ours in other companies? How about benefits—like insurance and pensions?

Employees are not alone in asking these questions. R. E. Weber, Denver division director of professional and industrial relations, and his counterparts throughout Martin Marietta, regularly ask the same questions.

"We are concerned about treating people fairly," Weber said. "We want pay to be right, employee benefits to be right, and we want working conditions to be right."

Pay and benefit surveys were recently completed in many areas of the nation, including locations where Martin Marietta has facilities—such as Denver, New Orleans, and the division's other field sites. "Results of these surveys show that we are really quite competitive," Weber said.

Translated, that means employee pay at the Denver division and its off-site locations is generally equal to pay in the aerospace industry and generally above the pay in other companies of comparable size and complexity in the local area. Some companies may pay a little more for a specific job, some may pay less, but on an overall basis comparable companies pay in the same range as we do. As a general rule, most smaller and less technical companies pay less than we do.

"Our investment in labor and benefit costs is like any other investment we make," Weber said. "We must get the most for our employees and the company for the money we invest. We believe our investment in these areas has been good, proven by an efficient and productive work force. What we pay any employee to do a certain kind and amount of work becomes extremely important to the division when we submit a proposal for new business," Weber said. "And benefit costs are also important. These two cost items, which really make up our basic compensation package, constitute a good portion of what we have to charge a customer to do his job. Costs in both these areas have risen at a rapid rate over the past few years."

Weber said a "liberal merit budget" has been established for salaried employees for this year. "Performances have been and will continue to be reviewed and, where performance and pay levels warrant, pay increases have been and will continue to be made," he added. "Despite difficulties the past few years, we have tried very hard to reward employees for good performance and to treat them fairly."

Hourly employees, Weber pointed out, receive automatic progression increases, cost-of-living adjustments, and yearly rate increases in line with contracts with unions representing bargaining unit employees.


R.E. Weber

Turning to employee benefits, Weber asserted the Martin Marietta benefit programs "are in line with our industry." In some instances, specific programs or of a particular part of a program may be better in another company. "But," Weber added, "in other areas such as long-term disability insurance, our severance program, and the pension plan death benefit provisions, we are far above the average for our industry."

Employee benefit programs are reviewed regularly in much the same way as pay. Programs in other companies are studied, trends in benefit program changes are noted, and employee needs and interests are checked.

Each year, a comparison of Martin Marietta benefits with those in other companies is presented to the corporation's board of directors and the finance committee along with proposed improvements. "This presentation normally takes place in August," Weber said. "We in Denver have made our recommendations for this year's presentation and they are being considered along with those from other divisions.

"It would be premature to speculate on what changes will be made this year," Weber said, "but it isn't premature or speculative to say that any changes will be positive and will improve an already good employee benefits program."

Summing up pay and benefits, Weber said, "We strive to compensate our employees fairly and to provide them with a sound benefit program that will provide them with maximum benefits for the money invested."

AFA chapter is being organized

An Air Force Association chapter is being organized locally, with membership open to those interested in supporting and promoting the objectives of the U.S. Air Force.

Major Dennis A. Peterson, assigned to the Air Force Plant Representative Office at the division, is spearheading the chapter organization.

"Twenty members are needed to found a chapter," Major Peterson said. "These must be people who have served in one of the military services—Air Force, Army, Navy, Marines, or Coast Guard. Only these people can vote or hold office. However, those without military service may join as patron members."

Active duty Air Force personnel, while they may be members of AFA, cannot hold office and do not have a vote on AFA matters.

Persons interested in becoming charter members of the local chapter should contact Major Peterson, ext. 4716. Dues are $10 a year.

Continuing education classes begin Sept. 7

Fall classes in the Martin Marietta Continuing Education program will begin Sept. 7 and continue through Dec. 16.

Although preregistration forms were due Aug. 18, enrollment is still open in many classes. Registrations will be accepted now and through the first meeting of the class.

Class descriptions and enrollment forms may be obtained from professional and management development, ext. 2021.

Actual course availablility will depend on the number of employees registering and availability of classrooms. Classes are normally held from 5 to 7 pm.

Participation is entirely voluntary. Only charge is for books. Courses are open to all employees, hourly or salaried, male or female.

Found: Wedding band

A gold wedding band has gone unclaimed for several weeks in the division's lost and found department in plant protection. The ring, apparently for a man's finger, can be claimed by calling Janna Winkel, ext. 2524.

Howard A. Garcia, left, and William J. Owen, right, look over some of the space navigation equipment featured in their award-winning paper.

'We compliment each other,' authors say

Howard A. Garcia and William J. Owen sat in shirt sleeves in an office at the division's inertial guidance laboratory reflecting on a recent visit to Washington, D.C.

The visit was no ordinary sightseeing junket, nor was it a routine business trip. Garcia and Owen were there to attend the 15th Annual Martin Marietta Corporation Honors Night.

They earned the trip as co-authors of a paper judged the best written in the Denver division during the year. That opinion was shared by the Corporate evaluation committee. Garcia and Owen were named authors of the year in Martin Marietta.

How do Garcia and Owen account for their success?

"We compliment each other."

Garcia is strong in software, analysis, and system design.

Owen is an inventor and is strong in converting concepts into hardware.

Each man claims the other has the ability to see a need and then develop something to fill that need.

It was a need that each saw that led to their award-winning paper and to a contract for the division.

Owen invented a space sextant because he saw a need for it. Garcia saw its value in space navigation. Together they developed a presentation that led to a contract for the high-altitude autonomous navigation and attitude reference system from the U.S. Air Force Space and Missile Systems Organization (SAMSO). The study phase is about to end, with design and build to follow. A performance demonstration flight is planned for 1980.

Garcia is lead engineer for software and analysis for the program; Owen is lead engineer for hardware design and development.

Garcia, a staff engineer, joined the division in 1970. Owen, also a staff engineer, came here a year later.

Both have a primary interest in navigation. They met on the division's pre-proposal effort for a grand tour of the outer planets and kept in touch after the effort ended.

It was this keeping in touch that helped them develop the concepts for the new program. Each knew the other would understand what was needed and how to go about developing it.

For the paper, they initially went separate ways as authors, with each preparing an individual abstract for his part in the program.

"We submitted the abstracts for presentation at the AIAA Guidance and Control Conference," Garcia syas, "with the suggestion we give them as a dual presentation—or at least that one follow the other."

"We were asked to combine the abstracts into one paper," Owen said, "so we did."

The paper also has been accepted for publication in the Journal of Spacecraft and Rockets, an AIAA publication.

How was the Corporate Honors Night and banquet?

Garcia: "Grand!"

Owen: "Top drawer!"

In Denver

Machinist recalls first Viking work

In his 20 years at the Denver division, Carl R. Stevens has machined parts for all the division's major—and minor—programs.

But none of the work he has done has been quite as satisfying as his boring-mill work on the Viking lander.

"I see those pictures of the lander on Mars and I can point to the work I did," Stevens said. "It isn't often I get to see my finished work in use."

G. R. Floyd, supervisor of detail fabrication, said, "Carl cut the first chip and the last chip on the lander."

The first machining was for the structural portion of the lander, particularly the side beams. When Stevens started the rough machining, he was working on an 800-pound chunk of metal. More than a year later, he was called on to do the final, close-tolerance finish machining on the lander.

Stevens was one of the first jig bore operators hired by the division and has been running the huge machine since.

Besides the Viking lander, he has worked on all three models of Titan and on Skylab.

He is currently working on tooling for Michoud, where the external tank for Space Shuttle, the nation's next major space program, is being fabricated.

Floyd, who was instrumental in planning the machining for Viking lander, said, "Everyone in detail fabrication touched the lander at one time or another. We were all part of the Viking team. We look at those pictures proudly and can almost tell you the day when a certain hole was drilled or a particular part was finished."

Two get awards

The National Aeronautics and Space Administration has presented cash awards and certificates to two Martin Marietta employees for new technology disclosures that have been published as NASA Tech Briefs.

Receiving awards were William P. Coppfer of the division's manufacturing, test and structures engineering and Edward W. Wojtaszek of the Denver Data Center.

From Michoud

Engineer of the year gives credit to others

Allan M. Norton

It was the outstanding event in his professional career. He had received the Martin Marietta Corporation's engineer of the year award.

But Allan M. Norton more than once during the conversation about the award said, "Actually it was an award for the 300 engineers at Michoud. They are the ones that did the job."

A description of the job was part of Norton's award citation: For outstanding technical leadership in managing the engineering design and meeting the weight, cost, and schedule objectives of the development program for the Space Shuttle external tank.

Norton, who is director of engineering for Michoud operations, pointed out, "The weight of the tank today is the weight we said it would be in our proposal four years ago. Our strict adherence to design-to-cost has kept costs exactly as they were in the proposal."

The Corporation's newest engineer of the year joined Martin Marietta in 1962 as a project engineer on re-entry vehicle heat shields at Baltimore. Norton transferred to Denver in 1967 and lead several advanced structures technology programs.

When the division won the external tank competition for NASA's Space Shuttle in the summer of 1973. Norton moved to New Orleans as a member of the original staff for Michoud operations.

He was named director of engineering in April 1975.

About Space Shuttle, Norton says, "Although the challenges of developing the new space transportation system has been defined, the rewards of success for the American public and to business are still to come."

Viking BLDT team members at Michoud

While the whole world was on the edge of its seat waiting to see if the Viking 1 lander would settle on Mars successfully, many of Michoud Operations' employees had a special interest in the outcome. These were the men, now at Michoud, who worked at one time on the Viking Project, some as far back as the days of Voyager, which preceded Viking.

One of these men, Paul R. Donohue, now manager of final assembly and checkout on the external tank project, directed the balloon launch deceleration tests (BLDT) in the deserts of New Mexico to qualify the major deceleration entry system for the Viking lander.

Working for Donohue at Michoud are five members of his BLDT team: Hal Dulaney, Chuck Hernandez, Bud Murphy, Stu Russell and Henry Snelgrove.

In addition, three other BLDT team members are also working on the ET: Charles Baumann and Robert Spencer, product assurance; and William Davis, planning.

Paul R. Donohue

Interviewed prior to the successful landing, Donohue explained that the parachute must be jettisoned early so that it doesn't fall back and cover the lander. "Then all we could expect to get from it would be pictures of the inside of a chute."

Rather than the inside of a chute, the world is being treated to the most dramatic photographs ever received from an unmanned space probe.

In Michoud

Call C. H. Fleischer at 3876 with suggestions or information for articles for the Martin Marietta News

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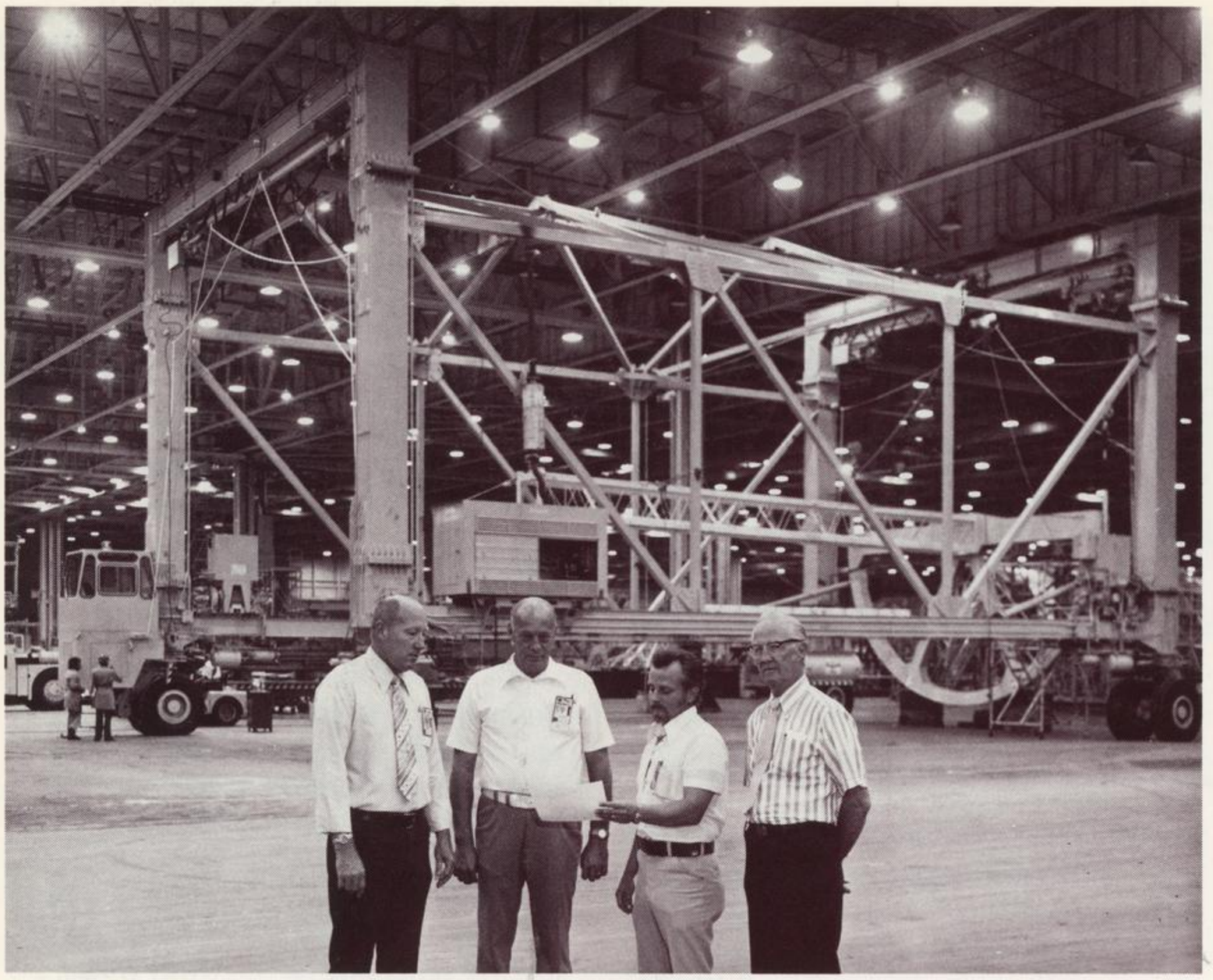

Dwarfed by the straddle carrier for which they are responsible are, left to right Ben Turner, materiel, Bill Jester, transporation, Robert Mann, project engineer, and Mickey Johnson, support equipment design engineer, scan a final print of the tool.

Straddle carrier transporter for ET tested successfully

A major tool to be used for handling external tanks now being assembled at Michoud has been successfully tested.

The straddle carrier transporter is a self-propelled, straddle-type vehicle with an integral hoist system capable of lifting, stabilizing, and transporting major external tank assemblies over concrete floors and improved roadways. It is specifically designed for handling and transporting the liquid oxygen and liquid hydrogen tanks in the factory area and between buildings during manufacture and test operations.

"Although the transporter has been designed and fabricated to support specific functions at Michoud, it has the versatility to handle and transport any type of load in its rated capacity and will be used for many other operations," Robert Mann, group engineer responsible for the design and procurement specification of the straddle carrier, said.

Financial support for the Opportunities Industrialization Center of New Orleans is being provided by Michoud operations. Receiving the check was Philip M. Baptiste, center, executive director of OIC in New Orleans. Representing Martin Marietta were, at left, W. V. Willis, equal employment opportunity administrator, and, at right, H. J. Baum, director of professional and industrial relations. OIC trains the underemployed, unemployed, and disadvantaged to meet the needs of various employers.

Double celebration marks key space program events

Heading the group of dignitaries gathered at the Michoud Assembly Facility to take part in the program was Wally Schirra, one of the original seven astronauts.

The program included the planting of a Moon Tree—a pine seedling grown from seed that had orbited the moon aboard Apollo 14 in a test to determine effects of weightlessness on seeds—and the sealing of a time capsule machined by Michoud operations personnel.

Others on the program were Dr. William R. Lucas, Marshall Space Flight Center director; James Fitzmorris, Louisiana lieutenant governor; Verna Landrieu, chairman of the New Orleans Bicentennial Commission; and George E. Smith, vice president and project director of Michoud operations.

Principal speaker was Dr. Lucas, who said, "The external tank is the only major expendable item in the Space Shuttle program and we have placed great emphasis on low-cost production of this tank. The people at this facility are doing an excellent job."

The time capsule, to be opened during the nation's Tricentennial in 2076 will contain historical and scientific data, a Denver division press book on Viking, a book with the signatures of all Michoud operations employees, and pictures relating to Space Shuttle.

It wasn't planned that way, but the celebration July 20 in Michoud turned out to be a double celebration.

Planned for months as a commemoration of man's first walk on the moon seven years ago, the event took on added meaning when Viking 1 thrilled the world with the first successful soft landing on Mars.