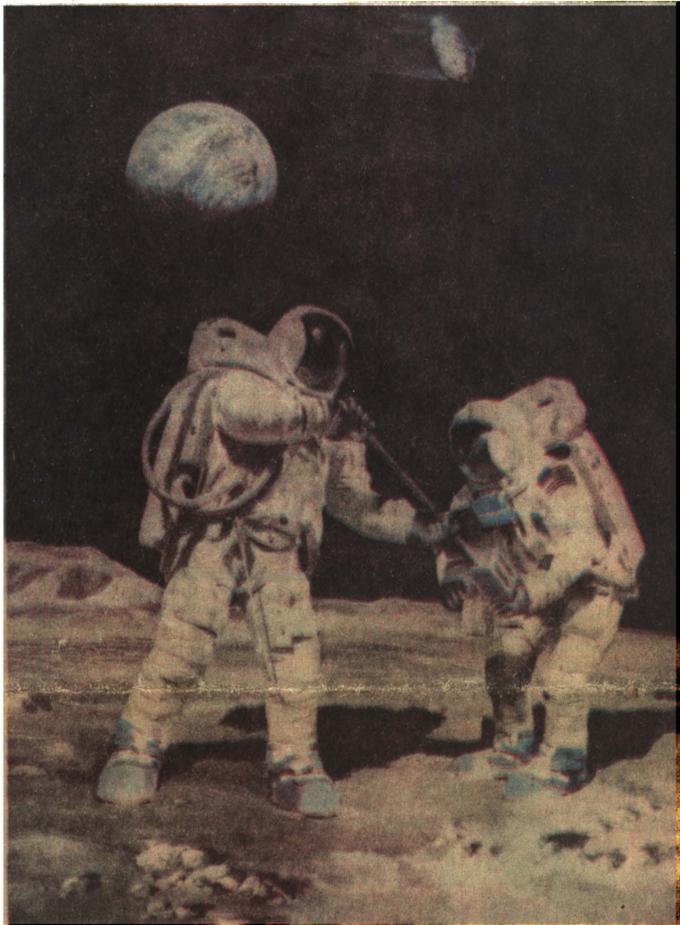


'Giant Leap for Mankind'

Two American Astronauts Leave Footprints on Surface of Moon



A BIT OF THE HEAVENS is scooped from the lunar surface by Neil Armstrong into a pouch held by Edwin Aldrin.

The Apollo 11 crew will bring about 50 pounds of lunar rock and soil samples back to earth for scientists to study. (Unifax)

SPACE CENTER, Houston (AP)—Man came to the moon and walked its dead surface Sunday, July 20, 1969. Two men, wearing American flags sewn to their gleaming white spacesuits, became the first humans to walk the alien lunar soil.

The first was Neil Alden Armstrong, 38, of Wapakoneta, Ohio. His left foot pressed into the dust at 10:56 p.m. EDT. His first words were, "That's one small step for man, a giant leap for mankind."

Edwin E. Aldrin was next. He stepped to the surface 20 minutes later. His first words were, "Beautiful, beautiful, beautiful. A magnificent desolation."

Millions of viewers on the astronauts' home planet — the earth, 240,000 miles away — watched on television as the two saluted the American flag and scouted the lunar surface.

President Nixon phoned the astronauts after their landing from the Oval Room at the White House.

"This has to be the most historic telephone call ever made," the President said. "I just can't tell you how proud I am . . . Because of what you have done the heavens become part of man's world. As you talk to us from the Sea of Tranquility, it inspires us to redouble our efforts to bring peace and tranquility to man."

"All the people on earth are surely one in their pride of what you have done, and one in their prayers that you will return safely . . ."

Aldrin replied, "Thank you, Mr. President. It is a privilege to represent the people of all peaceable nations." Armstrong then added his thanks.

Armstrong's first steps to the moon were cautious, stepping as planned first on one of the four saucer-like footpads of the spaceship. Even while

(Continued on Page 3)



NEIL A. ARMSTRONG, right, returns to the landing area after placing a television camera on the surface of the moon. Edwin E. Aldrin

awaits him in the shadow of the landing craft. (Missourian Television Photo by Tom Melham)

One-Sixth of World Shares Moonwalk With Astronauts

By United Press International Almost all the world bore witness Sunday to mankind's greatest achievement.

But in Communist China—home for one-fifth of mankind—there was no report, no announcement, no word that two humans had reached the moon.

Elsewhere, millions watched or listened to American astronauts Neil A. Armstrong and Edwin E. Aldrin fulfill for mankind the dream it has cherished for millenniums.

In a unanimity that is rare, but understandable, that part of mankind aware of the achievement expressed hope that it would be beneficial to itself and, in some way, bring peace to earth.

Kings and presidents, prime ministers and prelates sent congratulatory cables to the Apollo 11 astronauts, in care of the space center at Houston, and to President Nixon in Washington.

Like husbands, housewives and children of the world, its leaders also sat in front of television sets or tuned transistor radios to follow the moon landing.

The Soviet Union acknowledged the U.S. triumph but waited 10 minutes to do it. Its news agency, Tass, announced the moon landing in a 52-word dispatch.

There were no congratulatory messages immediately forthcoming from the Kremlin.

In the other major Communist nation, Chinese leaders decided to withhold the news of man's attainment of the moon from 750 million persons. The Yugoslav news agency, in a dispatch from Peking, said no word of any phase of the Apollo 11 mission had been mentioned in China.

"It may be said with certainty that, save for those few Chinese in such positions normally to know what is happening on our planet—and now

also beyond it—a very small number of other inhabitants of this enormous country . . . know about man's greatest adventure," said the Yugoslav news agency.

President Giuseppe Saragat of Italy, drawing fully on the eloquence of Italians, perhaps summarized fulfillment of man's moon dream best for all the world.

"Indescribable emotions" have been aroused throughout the world, he told a nationwide radio and television audience.

Pope Paul VI was himself at a loss for words. So he borrowed from a biblical angel for his statement issued from his villa at Castel Gandolfo, where he heard the landing on television.

"Glory to God on the highest, and peace on earth to all men of good will," said the Pope. "Honor to you, makers of this special enterprise. Honor to all who made this bold flight possible."

Local Rhetoric Exemplifies Reaction of Joyous Nation

By DAVID HENDIN Missourian Staff Writer

"What can be added to what has already been said about this historic moment?" Rep. Harold Reisch, R-Columbia, asked rhetorically Sunday night in an interview with The Missourian.

Answering his own question, Reisch said, "If, through an all out effort, our nation can succeed in putting a man on the moon, then why can it not reconcile the differences between man so that we can get on with the business of a world without war, without hunger and without social degradation."

For this special "Lunar Edition," The Missourian's first extra in 24 years, reporters asked Reisch and other Columbians their opinions of the landing.

Rep. George W. Parker, R-Columbia, said, "I think it's a

very historic occasion and I look upon all of this moon exploration as part of our survival."

Parker, a former member of the Air Force, also said, "I thought we reached the limit of what man could do in the F-86D all-weather fighter. We have reached far beyond expectations."

Gov. Warren E. Hearnes was in Washington, D.C., and unavailable for comment, but Jerry Bryan, Jefferson City, the governor's press secretary, said, "Missouri has been involved in the space industry as much or more than any other state and we feel sure that the people are following it with great interest."

William Frech, Boone County Republican chairman, said, "I'm very pleased with the success so far. I'm sure all of us are pulling together and

hoping they get back safely to mother earth."

Frech added, "I thought it was extremely pleasing to those of us who think the Columbia area is a nice place to live that the moon astronauts will find the other Columbia a fitting refuge for their Eagle." Magistrate Judge Temple H. Morgett said, "I have mixed feelings about it. Of course there's the initial thrill of landing man on the moon, but I just wonder really if we're going to get anything concrete out of it."

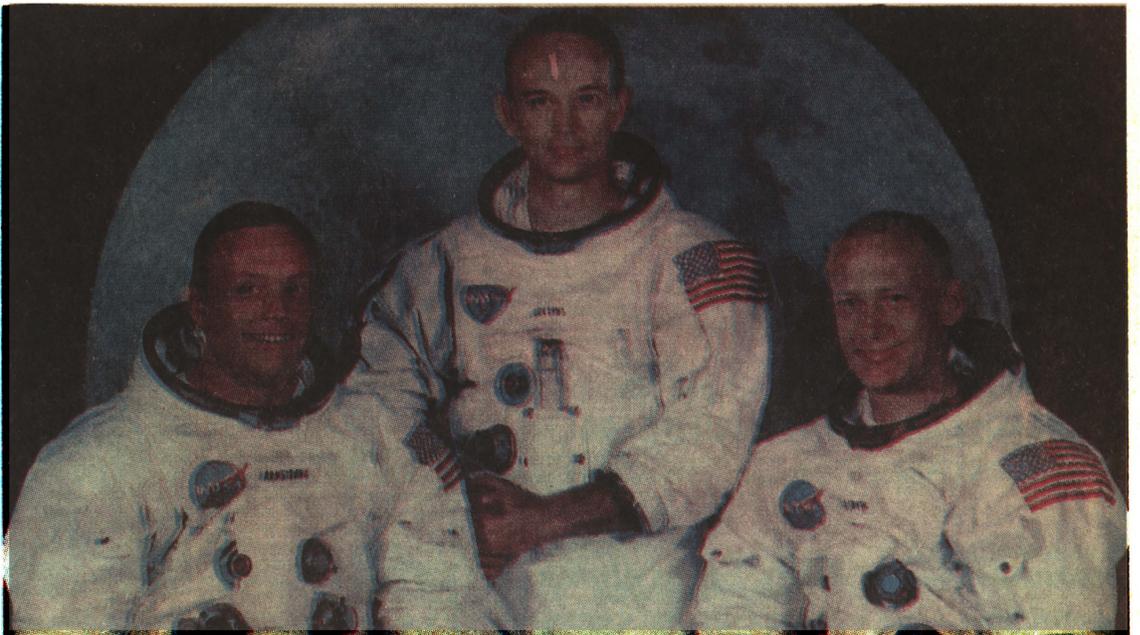
Sen. A. Basey Vanlandingham, D-Columbia, and Robert Smith, Boone County Democratic chairman, were unavailable for comment Sunday.

Aldrin Requests World Thanks Upon Landing

SPACE CENTER, Houston (UPI) — Edwin E. Aldrin Jr. Sunday asked everyone in the world to pause and give thanks for the lunar landing.

The astronaut, speaking in a calm voice from the lunar lander Eagle said:

"This is the LEM pilot. I'd like to take this opportunity to ask every person listening in, whoever and wherever they may be, to pause for a moment and contemplate the events of the past few hours and to give thanks in his or her own way."



Apollo 11 astronauts, from left, Neil A. Armstrong, Michael Collins, Edwin E. Aldrin Jr.

(Color Photo by NEA)

Mayor Wires NASA

Columbia Mayor Herb Jeans Sunday afternoon sent a telegram to mission control at NASA Headquarters, Houston. The telegram read:

"Congratulations on the success of Columbia and its crew for their part in the successful moon landing. The citizens of Columbia, Mo., are proud the name Columbia is associated with this great achievement in the opening of a new frontier. (Signed) Herb Jeans, Mayor."

Apollo 11 Owes Success to International Scientific Team

(Editor's Note: The author is director of NASA's George C. Marshall Space Flight Center in Huntsville, Ala.)
By WERNHER VON BRAUN
(C) N.Y. Times News Service

Apollo 11 will always be remembered as a magnificent achievement in the history of applied science and technology in the United States, and we Americans are justifiably proud of it. In reality, however, the team that brought Apollo 11 to fruition cuts across national boundaries. The mission itself had its beginnings not on July 16, 1969, but several centuries ago.

The sense of history involved in this realization of man's ancient dream of voyaging to the Moon is easily overlooked. We tend to consider this particular feat as a product of 20th-century science and technology. It is not overlooked, though, by men such as Col. Frank Borman, who is a pioneer himself in the centuries-long journey to the Moon. In addressing the

House of Representatives on Jan. 9, following his return from orbiting the Moon, he said:

"Yet when we say that this was an American achievement, we really have to go back to Newton and paraphrase him. . . how can anyone think of Apollo 8 without thinking of Galileo or Copernicus or Kepler or Jules Verne or Oberth or Tsiolkovski or Goddard or Kennedy or Grissom or White or Chaffee or Komarov? We truly stood on the shoulders of giants."

Apollo 11 also owes as much to men such as those named by Borman as it does to the hundreds of thousands of engineers, scientists and technicians who labored for a decade to make possible man's first landing on the Moon. For men such as Tsiolkovski, Goddard, and Oberth worked out the basic principles of astronautics, drawing in turn on the earlier, fundamental work of Newton and Kepler in the 17th Century. Without the knowledge of why a rocket works, we

could not hope to place an artificial satellite around the Earth or to escape Earth's gravity and land men on the Moon.

We sometimes, too, underestimate the influence of the arts on the sciences (and vice versa), particularly in astronautics. It is interesting to note that the three modern pioneers in astronautics — Tsiolkovski, Goddard and Oberth — all had something in common, in addition to their learning and passion for science. They had imaginations that were initially inspired by the fiction of Jules Verne, who made space travel sound exciting and—even more technically feasible to young boys with an aptitude for science. These two elements of his books were the spur needed to turn serious minds toward serious scientific problems in the latter years of the 19th Century and the opening years of the 20th Century.

Nearly two centuries elapsed between Newton's formulation of the laws of motion and Tsiolkovski's mathematical proof that the rocket was the only means by which man would

some day place himself into space. His mathematics revealed the principle of mass ratio. Basically, this told him that the size and weight of the rocket was ultimately limited. However, it suggested two alternatives to overcoming the problem. He could find the best combinations of propellants to increase the velocity of his exhaust gases or he could reduce the weight of the rocket and all its parts in order to carry more propellants.

Tsiolkovski's deep insight into the full scope of astronautics led him also to speculate on the life support system for the future astronaut. Indeed, he envisioned the spacecraft as "a metallic elongated chamber (the least resistant shape) supplied with light, oxygen, absorbers of carbon dioxide, miasmata, and other excretions. . ." While his studies in the biomedical field are not as extensive as his other contributions to astronautics, they do show that he had a total grasp of what is involved in manned spaceflight. Contemporary rocketry and Apollo 11 also owe a debt to a native American pioneer in astronautics—Robert H. Goddard, the shy and brilliant professor of physics at Clark University in the early 1900s at Worcester, Mass. Though some 25 years younger than Tsiolkovski, Goddard was certainly his intellectual peer. Goddard was a theoretician, but he was also a builder. He was the perfect example of the practical New Englander who likes to prove things to himself. His work most relevant to today's problems began shortly after World War I, but his theoretical studies and experiments with gunpowder rockets antedate that conflict.

His contributions to the modern space booster are too numerous to recite. During the 42 years between 1914 and 1956, he received 214 patents in the field of rocketry alone. Many of these were for components that have become standard today. Goddard's greatest contribution was probably in the field of rocket engineering. He proved that liquid propellant rockets could be built and that they would perform as he and Tsiolkovski before him had mathematically predicted they would. He launched the world's first one in 1926.

Apollo 11 also owes a debt to the work of Hermann Oberth, the German pioneer in astronautics. He was a contemporary of Goddard, and in one of those twists of circumstance that one often finds in the history of science, Oberth spent many long hours performing intricate mathematical proofs of what had taken Tsiolkovski and Goddard an equally long time. Tsiolkovski was an obscure Russian school teacher working by himself in a small rural village. His work was published in Russian, and he had little contact with fellow scientists in his own country and practically none outside. Thus, Oberth was completely unaware of the Russian's work until his own was practically done. The same was true with Goddard, who worked in secrecy for the most part, publishing little.

The influence of Oberth on modern astronautical engineering is probably more direct than that of Tsiolkovski, however, because of geographical and temporal factors. Oberth was working in Germany and publishing in German at a period when a group of young rocket enthusiasts were beginning to associate in the late 1920's and early 1930's. Oberth's work, including the layout of a two-stage, liquid propellant rocket using liquid oxygen and alcohol, was known to them and became the basis of the practical work that soon found the amateur spacemen building and firing liquid propellant rockets. From these groups came the cadre of engineers and scientists that were to build the first really large rockets such as the V-2 of World War II, which proved that the space booster was an engineering possibility.

30 Flights by Man Pave Way to Moon

Russian Yuri Gagarin Made First Trip to Outer Space

The Apollo program, which now has placed a man on the moon, is the result of 30 manned space flights by American astronauts and Russian cosmonauts.

Manned space flight began with a one-orbit flight of the earth on April 12, 1961, by Russian Yuri Gagarin in Vostok 1. Less than a month later, on May 5, Alan Shepard Jr. became America's first spaceman in Mercury 3, "Freedom 7."

Listed below, with the most recent missions first, are the manned space flights which paved the way for Apollo 11.

Apollo 10: May 18-26, 1969, Astronauts John W. Young, Thomas P. Stafford and

Eugene A. Cernan.
Apollo 9: March 3-13, 1969, Astronauts Russell Schweickart, David Scott and James McDivitt.

Apollo 8: Dec. 12-17, 1968, Astronauts Frank Borman, William Anders and James Lovell.

Soyuz 3: October 26, 1968, Cosmonaut Georgy Beregovoy.
Apollo 7: Oct. 11-22, 1968, Astronauts Walter Cunningham, Walter Schirra and Donn Eisele.

Soyuz 1: April 23, 1967, Cosmonaut Vladimir Komarov killed in landing crash.

Gemini 12: Nov. 11-15, 1966, Astronauts James Lovell and Edwin E. Aldrin.

Gemini 11: Sept. 12-15, 1966, Astronauts Charles Conrad and Richard Gordon.

Gemini 10: July 18-21, 1966, Astronauts John Young and Michael Collins.

Gemini 9-A: June 3-6, 1966, Astronauts Tom Stafford and Eugene Cernan.

Gemini 8: March 16-17, 1966, Astronauts Neil Armstrong and David Scott.

Gemini 6-A: Dec. 15-16, 1965, Astronauts Walter Schirra and Tom Stafford.

Gemini 7: Dec. 4-18, 1965, Astronauts Frank Borman and James Lovell.

Gemini 5: Aug. 21-29, 1965, Astronauts Gordon Cooper and Charles Conrad.

Gemini 4: June 3-7, 1965, Astronauts James McDivitt and Edward White.

Gemini 3: March 23, 1965, Astronauts Virgil Grissom and John Young.

Voskhod 2: March 18, 1965, Cosmonauts Leonov and Belyayev.

Voskhod 1: Oct. 12, 1964, Cosmonauts Komarov, Feokistov and Yegorov.

Vostok 6: June 16, 1963, Cosmonaut Valentina Tereshkova (only woman in space).

Mercury 9: May 15-16, 1963, Astronaut L. Gordon Cooper Jr.

Mercury 8: Oct. 3, 1962, Astronaut Walter M. Schirra Jr.

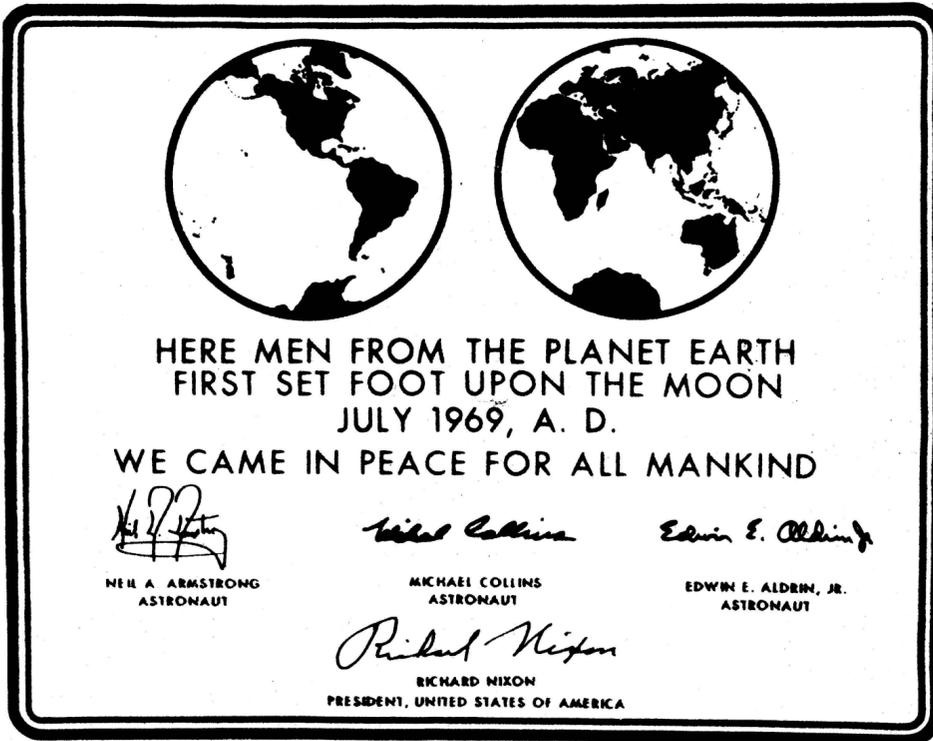
Vostok 4: Aug. 12, 1962, Cosmonaut Pavel Popovich.

Vostok 3: Aug. 1, 1962, Cosmonaut Andrian Nikolayev.

Mercury 7: May 24, 1962, Astronaut M. Scott Carpenter.

Mercury 6: Feb. 20, 1962, Astronaut John H. Glenn Jr.

Vostok 2: Aug. 6, 1961, Cosmonaut German Titov.
Mercury 4: July 21, 1961, Astronaut Virgil Grissom.



May Lead in Long Run Soviets Yield Moon Race But Planning for Future

MOSCOW (UPI) — The Soviets have yielded to the U.S. in the race to put the first man on the moon, but they still have a good deal up their space sleeves.

Western experts believe the Soviets dropped behind in the moon race—and switched the accent on their man-in-space program to orbiting space stations—primarily because they lacked the huge launch rockets needed to boost a lunar explorer directly to the moon.

But losing a race, these same experts note, doesn't mean losing a meet. One said, "The Soviets take fewer steps than the Americans, but they take longer ones."

The manned space stations and the unmanned interplanetary probes for which the Soviets have a broad-based, systematic program stretching years ahead, may give them a substantial lead over the United States in the long run in exploring farther reaches of the solar system.

In a secretive country, nothing is cloaked in deeper silence than Soviet space plans. So it is significant that since the successes of the Apollo project, the Soviets have become almost verbose in public declarations their program is concentrating on Manned Orbital Laboratories (MOL) and unmanned interplanetary probes.

Neither field has the glamor of a moon landing, but Soviet space scientists imply they represent potentially better value for money.

The Western experts estimate the Soviets probably are somewhat ahead of the Americans in capability of constructing an island in space, supplying it with crews and materials by short-haul "courier ships" from earth, and assembling a true spacecraft there for interplanetary journeys.

Although in the early days of the space era there was no doubt the Soviets were out to grab as many "firsts" as they could, they never formally committed themselves to a moon race with the U.S. in 1967, even Khrushchev began hedging his bets.

On the tenth anniversary of the first Sputnik, space scientist Prof. Leonid Sedov told UPI's Henry Shapiro the Russians were not racing anyone to the moon, and the Americans would probably get there first. "We shall attempt a flight to the moon in the distant future," he said, "but there are still some technical problems to be solved first."

The Soviet goal is an orbiting space structure from which spacecraft can be launched with much smaller power plants than the massive stage one rockets needed to lift a relatively small payload free of earth's gravity.

Yuri Zonov, a space engineer, wrote in Pravda in January:

"It is not rational to launch cosmonauts every time from the surface of the earth for the maintenance of a single space object. It is much more sensible to assemble such an object in orbit, serving a group of space objects, to live on the inhabited stations for some time and, as the need arises, to fly out in small rockets to carry out the necessary work on apparatus entrusted to the

cosmonauts car.

"There is no doubt that such stations are necessary for adjusting the systems and for cosmonaut training before flights to other planets of the solar system—flights which may take years.

"These flights will probably begin not from earth's surface but from orbital stations to which cosmonauts, fuel and interplanetary ships will be delivered from the earth by reusable cargo rockets."

Construction of a spacecraft, and a launch to the moon may take the Soviets two, three or more years, Western experts believe—but they would still be ahead of the U.S. in such a development under present plans.

Timer for Experiments
SPACE CENTER, HOUSTON (AP) — A timer, set to operate in two years, will turn off a seismic experimental package left on the moon by the Apollo 11 crew.

Flight Path Of Columbia Well Planned

SPACE CENTER, Houston (UPI) — The men who designed the flight path Apollo 11's command ship "Columbia" is following in moon orbit did a better job than they had to do.

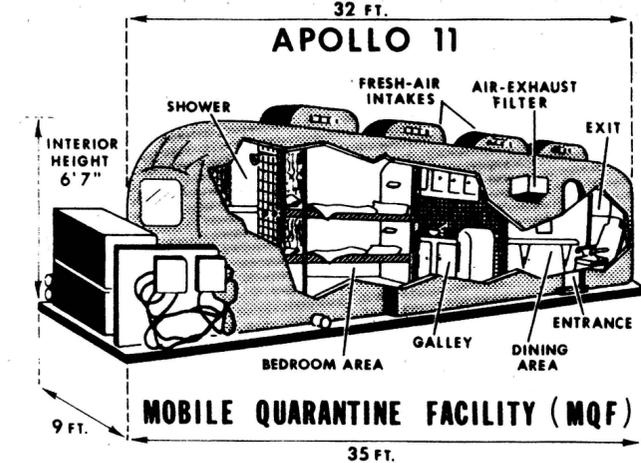
During the first two moon orbit missions — Apollo 8 and Apollo 10 — the spacecraft started out circling the moon in a circular orbit 69 miles high.

By the time activities at the moon had been completed in those two flights, flight planners found, the moon's uneven gravity field had pulled the spaceship slightly out of its circular orbit.

James C. McPherson, head of the mathematics and physics branch at the Manned Spacecraft Center, said Sunday Apollo 11 is targeted into a 62-by-76-mile high orbit with the second firing of its main engine at the moon.

By aiming into this orbit with the high point and the low point at precisely the right places, he said, the command ship will have slipped into a 69-mile circular orbit under the influence of moon gravity by the time the "Eagle" landing craft takes off from the lunar surface to rejoin the command ship.

"It doesn't matter that much," he said, "We're just getting cocky and we're going to tune it up real fine on Apollo 11."



Astronauts' Home Away From Home

After splashing down at the end of their lunar excursion, the Apollo 11 astronauts will be placed in a mobile quarantine facility (MQF) on the air-

craft carrier which retrieves them for transfer back to the Houston Spacecraft Center. (Unifax)

Today it's all Apollo 11, but who knows?

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Millions Cheer On Mother Earth For Moon Exploit

(Continued From Page 1)

he was on the ladder, he was in full and clear view of a television camera suspended on a workshelf that dropped down from the spacecraft.

"The surface is fine and powdered, like powdered charcoal," he said. "I can see my footprints of my boot in the fine sandy particles."

Armstrong read from the plaque on the side of the spacecraft. In a steady voice, he proclaimed, "Here man first set foot on the moon, July, 1969. We came in peace for all mankind."

At 11:42 p.m. EDT they unfurled the Stars and Stripes and it stood in the airless, windless atmosphere of the moon, held taut by a rod along the top. One of the Americans stood back and saluted.

Astronaut Leaves Shallow Footprint

Armstrong said the spacecraft's footpads had pressed only an inch or two into the soft lunar surface. His foot sank only a "small fraction — about an eighth of an inch."

The lesser gravity of the moon, one-sixth that of earth, was no problem. "There's no trouble to walk around," Armstrong said.

Neither Armstrong, nor Aldrin, nor the spacecraft were visible to the third Apollo 11 astronaut, Air Force Lt. Col. Michael Collins, locked in his lonely patrolling orbit 69 miles above in the mothership.

Looking about him, Armstrong, a civilian, said, "It has a stark beauty all its own. It's different. But it's very pretty out here."

They arrived on the moon at 4:18 p.m. Six hours later they were collecting rocks, setting up experiments and stalking the surface as if they belonged there.

In the moments when he was alone, Armstrong scouted the surface, appearing phosphorescent in the sunlight, his white suit blinding.

165-Pound Men Weigh Only 25 Pounds

Aldrin tried a kind of kangaroo-hop, but found it unsatisfactory. "The so-called kangaroo hop doesn't seem to work as well as the more conventional pace," he said. "It would get rather tiring after several hundred."

In the lesser gravity of the moon, each of the men, 165-pounders on earth, weighed just a little more than 25 pounds on the moon.

Armstrong began the rock picking on the lunar surface. Aldrin joined him using a small scoop to put lunar soil in a plastic bag. Collins, 38, on his lonely patrol, said he saw a small white object on the moon, but didn't think it was the spacecraft. It was in the wrong place.

Armstrong and Aldrin took pictures of each other, and Aldrin shot views of the spacecraft against the lunar background.

In a world where temperatures vary some 500 degrees, from 243 degrees above zero in sunlight, to 279 below in shadow, the men in the spacesuits felt comfortable.

Sun Proves Problem for Vision

Aldrin reported, "In general, time spent in the shadow doesn't seem to have any thermal effects inside the suit. There is a tendency to feel cooler in the shadow than out of the sun."

The sun was a problem for vision. "I have so much glare from the sun off the visor that when I go into shadow, it takes a while for my eyes to adjust," Aldrin said.

The dust, too, was unusual. "The color of my boot has completely disappeared into . . . I don't know how to describe it — a kind of cocoa has covered my boot."

In spite of the dust they raised as their rocket flame churned the surface from as high as 40 feet, there was no discernible crater below the descent engine, they reported.

A surge of pride swelled through the hearts of Americans Sunday night as they watched first one, then two of their number set foot on the moon's surface.

About 3,000 persons watching the landing on an enormous television screen outside the Time-Life Building in New York City cheered and clapped when the announcement came, "He's on the moon!"

They also broke into applause when Nixon said to the astronauts "peace and tranquility on earth."

An estimated 10,000 persons watched the events on giant television screens set in Central Park in New York City. Vendors sold "moon dogs" and "lunar chips."

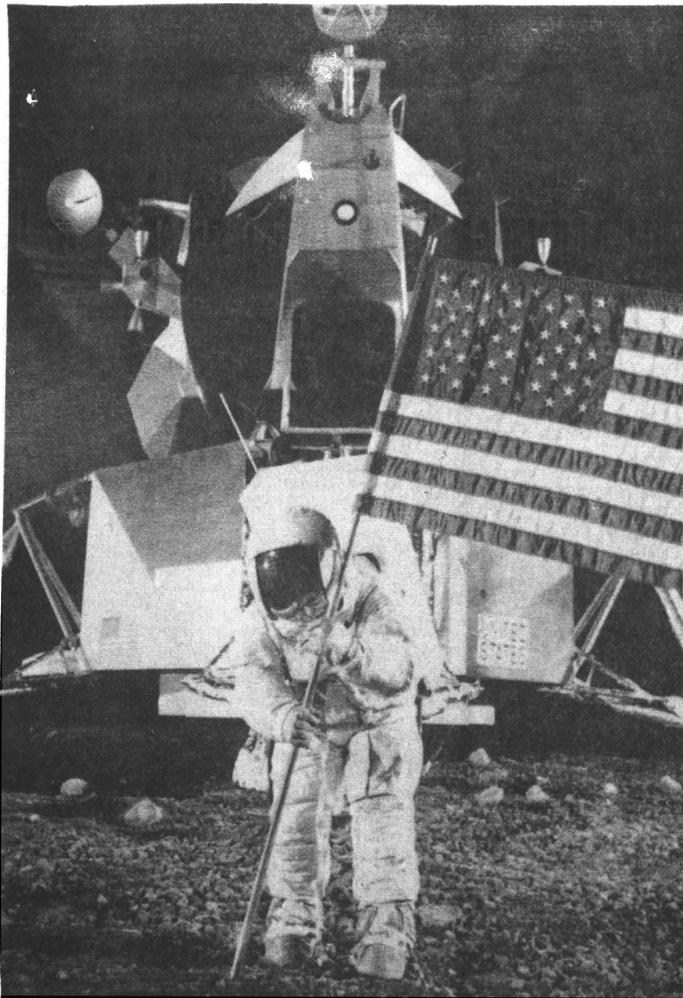
'The Hatch Is Closed and Locked'

As the time available to them on the lunar surface dwindled, Armstrong finished gathering the lunar soil sample. He sealed it in plastic bags and packed them into a metal box.

They took two core samples of the crust of the moon. Aldrin, hammering the cores in, said, "I hope you're watching how hard I had to hit this into the ground to the tune of five inches . . . It almost looks wet."

Aldrin retrieved the solar wind experiment, and stowed it in an experiment box.

At 1:11 this morning Armstrong and Aldrin reported they were back in their spacecraft. "The hatch is closed and locked," Armstrong reported. They repressurized the cabin and prepared to sleep, the first humans to camp out on another world.



PLANTING THE U.S. FLAG in a simulated lunar expedition is Scott MacLeod, chief consulting pilot for Lunar Module Projects for Grumman Aircraft Engineering Corp. In the background is a full-scale model of the vehicle which placed an American astronaut on the moon. (Unifax)

As Astronauts Walk

Luna Gets 10 Miles Away

(By Our Wire Services)

MOSCOW — The Soviet Union's Luna 15 orbited within 10 miles of the moon while the American astronauts walked on its surface.

Tass, the Soviet press agency, announced only minutes before the Apollo 11 module detached from its mothership that Luna's orbit had once more been altered.

Soviet officials have given assurances to the Americans that Luna 15 would not interfere with the Apollo mission. But the new orbit led to renewed speculation that the Russians might try to land the Luna craft and return it to earth with moon rock in an effort to demonstrate that unmanned craft are the equal if not more valuable than manned ships.

As usual, Tass gave no information on the eventual goal of the Luna 15 craft. It said only that "the automatic station Luna 15 continues scientific exploration in the near moon outer space."

Luna 15 was launched last Sunday and went into moon orbit on Thursday. Saturday night Tass announced that its orbit had been altered to between 136 miles at the maximum and 59 miles minimum from the moon surface.

In its new orbit, Luna 15 was circling the moon every hour and 54 minutes, Tass said. The previous orbit took two hours, 3 1/2 minutes.

"According to the data of the telemetric information, the systems and scientific equipment on board the station are functioning normally," Tass said.

When Luna 15 was first launched, Tass said its mission was to conduct research in the moon and near moon space, leaving open the possibility of a moon landing.

Heart Speeds For Armstrong Aboard 'Eagle'

SPACE CENTER, Houston (AP)—Neil Armstrong's heart rate jumped from a normal 70-75 beats a minute to 110 when the Apollo 11 lunar lander started its descent toward the moon Sunday.

At landing his heart rate was 156 beats a minute. Forty-five minutes later it had settled into the 90s.

Speedy Trip on Return

SPACE CENTER, Houston (AP)—After the Apollo 11 lunar module ascends from the moon surface, some 22 hours after landing, it will reach an orbital speed of about one mile a second to catch up with the command module.

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'That's a Big Step'

Mrs. Armstrong 'Animated' As Husband Steps on Moon

By H. D. QUIGG

UPI Senior Editor EL LAGO, Tex. (UPI)—"I can't believe it's really happening. That's a big step!"

That was the reaction of Neil A. Armstrong's wife Jan Sunday night as the astronaut became the first man to step onto the moon.

"Be descriptive now," she urged when Armstrong began to tell the world what the moon looked like.

Jan's initial words were disclosed a half hour after the start of the moon walk by a space agency spokesman at the Armstrong's home. He was among the 19 persons in the living room watching the historic telecast.

"She was more expressive than I've ever seen her," said spokesman Walter Fruland. "She was really alive and animated watching this picture."

At the Nassau Bay home of Edwin E. Aldrin Jr., his wife Joan said: "It's just like a gigantic TV drama. It seems so unreal."

At the home of Michael Collins, also in Nassau Bay, his wife told newsmen through a space spokesman: "Why make any comment? They're up there doing it. I think it is

marvelous, fantastic." Everyone in the large Armstrong living room was quiet for the start of the telecast.

Mrs. Armstrong sat Indian-fashion before a large console with their six-year-old son Mark in her lap. Other son, Eric, 12, sat nearby on the floor.

It was an ecstatic, smiling—and visibly relieved—Janet Armstrong who faced 150 newsmen in the front yard about two hours after her husband reported he and Col. Edwin E. Aldrin Jr. had landed safely on the moon.

"It's fantastic . . . and I'm just as excited as you all are!" she said then.

Her eyes looked a bit tired. But she was laughing and bantering and trading light talk with the pushing, crowding, shouting reporters, photographers, and neighbors gathered around a six-inch-high platform with a pink rug provided by television.

For Joan Aldrin, whose husband piloted the lunar lander, the touchdown brought tears.

"I cried . . . it seemed like forever . . . tears of relief," she said.

A slightly graying and normally serious woman, Mrs. Armstrong was bubbling with excitement.

She wore reddish orange culottes and a white blouse. On the left of her open collar was a gold pin model of the landing module Eagle with a chain, and the initials J.A. at its end.

"I was terribly excited," she said. "It was a marvelous thing that they were able to touch down so well. We have said our prayers all along. I was sitting on the bed and watching and looking at a map, crater by crater, and doing my best to follow them as they went down."

"I think it's fantastic."

She said she thought it was "an excellent decision" on the part of NASA to call the landing site Tranquility Base. She insisted she was never worried and that this wasn't even the greatest moment of her life.

"No, when I was married—that was the greatest moment."

Mrs. Armstrong got a round of applause when she walked out and when she walked back into the house.

"I will be continuing to follow the flight and listening to the descriptions of the

Teens Win Missouriian Ball Tickets

Patricia Ann Watson, 13, of 2317 Shepard Blvd., won The Missouriian's moon landing baseball contest Sunday. Fittingly, Patricia Ann was in Texas. But she's a St. Louis Cardinal fan and will attend the Cards-Cubs game of Sunday Sept. 14 with three friends.

Second prize, four tickets to the Kansas City Royals-Oakland A's game of Sept. 17, went to 13-year-old Russell Somers, Route 3.

The Royals won both games of a doubleheader Sunday, 8-6 and 3-2 in 11 innings. Both winners guessed the exact score of the second game.

The Cardinals were rained out at Pittsburgh and since no entry predicted a rainout, the game was not counted in judging.

More than 150 persons entered the contest to pick the baseball scores the day men landed on the moon.

Calm Talk Belies Landing Drama

SPACE CENTER, Houston (UPI)—The dialogue during man's first landing on the moon:

Capsule communicator Charles M. Duke—Eagle you're looking great. Coming up 9 minutes.

Mission Control—We're now in the approach phase. Everything looking good. Altitude 5,200 feet.

Astronaut Edwin E. Aldrin Jr.—Manual attitude. Control is good.

Duke—Roger. Copy. Mission Control—Altitude, 4,200 feet.

Duke—Houston, you're go for landing. Over.

Aldrin—Roger. Understand go for landing.

Duke—We're go. Think tight. We're go.

Aldrin—2,000 feet. Into the AGS (abort guidance system). 47 degrees.

Duke—Roger. Aldrin—37 degrees.

Duke—Eagle, looking great. You're go.

Mission Control—Altitude, 1,600.

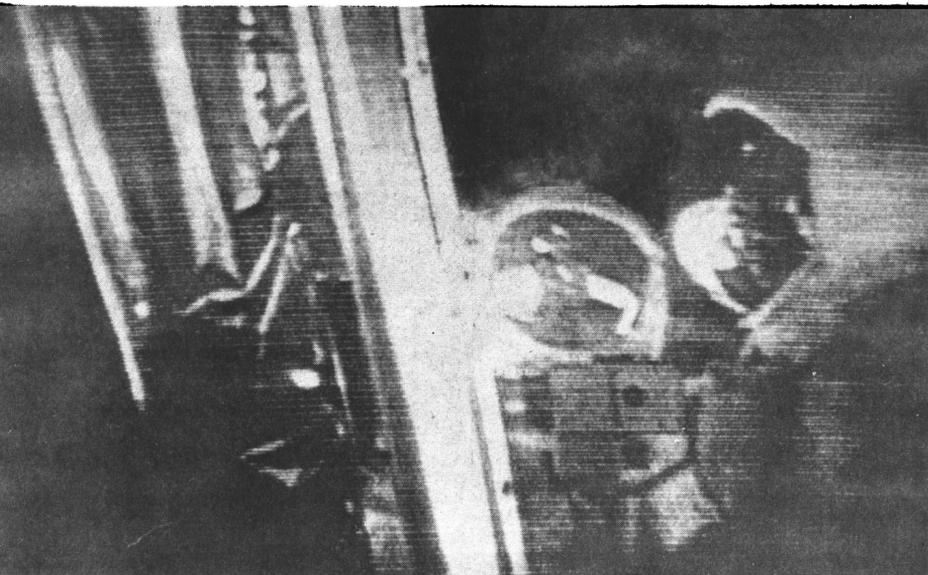
Duke—1,400 feet. Still looking good.

Aldrin—35 degrees. Duke—35 degrees.

Aldrin—750 coming down to 23,700 feet—21 down, 33 degrees . . . feet down to 19,540 down to 30 . . . 15,400 feet down at 9. A forward. 350 feet down at 4 (static).

(The fires given for forward and down by Eagle are reports of their speed—velocity in feet per second—both across the face of the moon and down toward its surface.)

Aldrin—300 feet. Down 3 1/2, 47 forward. One minute, 1 1/2 down, 70. Altitude velocity light. 15 forward. Coming down nicely. 200 feet. 4 1/2 down, 5 1/2 down. 9 forward. 100



APOLLO 11 COMMANDER Neil Armstrong, left, and Lunar Module Pilot Edwin Aldrin stand on the

surface of the moon in the shadow of their spacecraft in this photograph taken from the television screen. (Unifax)

Apollo 11 Attracts Youthful Admirer

BEIRUT, Lebanon (AP) — A couple in Fadhous village north of here named their new baby Apollo Selli. He's their 11th child, born on the day of the Apollo 11 moonshot.

Page 3
The Columbia Missourian

COLUMBIA MISSOURIAN
Published every morning (except Monday and Holidays) by The Missouriian Publishing Assn., Inc., 211 South Ninth St., Columbia, Mo. 65201. 2nd class postage paid at Columbia, Mo.

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Gehrke Devises Research Aid M. U. Scientists to Test Samples

By TOM MELHAM
Missourian Staff Writer

Today's spectacular landing of Apollo 11 halfway through its 500,000-mile voyage may result in a free trip to the West Coast for five University scientists.

Dr. Charles W. Gehrke, Dr. David L. Stalling, Dr. Walter A. Aue, Robert W. Zumwalt and Donald Roach are part of a worldwide 140-man team selected by the National Aeronautics and Space Administration (NASA) to analyze the first moon samples to be brought back by the Apollo astronauts.

The lunar soil will be tested first at Houston to see if it contains any organic matter. If these preliminary tests are positive, the five will go to NASA's Research Center at Ames, Calif., where equipment is set up to check the samples

for amino acids (the components of proteins) and genetic code molecules (DNA and RNA).

As these compounds are basic to all known living things, their presence in lunar dust may indicate past or present life forms on the moon.

Speculating on the existence of lunar life-related compounds, Dr. Gehrke said, "There is either a lot or nothing at all."

Gehrke is responsible for improving methods to be used at Ames — a fast and accurate technique known as gas-liquid chromatography, or GLC.

This is a means of physically separating and identifying the 20 known protein amino acids, both quantitatively and qualitatively, for amounts as small as one billionth of a gram.

One goal of the initial lunar analyses is to gain insight of the moon's origin. Some scientists believe it broke off from the earth billions of years ago; others believe it congealed from clouds of celestial dust.

If certain known life-related compounds are found on the moon, there would be "every probability" that the moon and earth were once one, Dr. Stalling said.

Samples must be purified first before they are subjected to chromatographic analysis. Lunar organic matter, if any, will be extracted from the soil, then "cleaned up" — eliminating all compounds except amino acids and genetic code molecules. The final preparatory step will be to chemically alter the amino acid solutions to make them volatile.

The GLC method consists of a yard-long tube, or column,

filled with an inert, finely-divided solid, usually diatomaceous earth. These solid particles are coated with a thick, colorless liquid polymer.

A tiny amount of the treated sample is injected into one end of the column, where it immediately vaporizes.

Separation of different amino acids is based on differences in attraction to the polymer — some amino compounds are drawn more powerfully to the liquid than others.

Roach compared this to "putting a group of different drinkers in a town lined with bars. The teetotalers will pass through faster than the alcoholics."

The column is flushed by a continual stream of nitrogen, which carries the amino acids least attracted to the polymer

out of the column first. As time and temperature increase, the more strongly attracted compounds are drawn off one at a time, effectively separating the 20 different amino acids.

The vaporized samples are burned as they leave the column, causing ionization which sets up a tiny voltage drop that can be measured, much like a cardiogram.

Whenever ionization occurs, a peak will be generated on the voltage-measuring device. The time at which the peak appears indicates which amino acid is present; the height of the peak shows how much is in the sample.

By this procedure, a treated sample can be analyzed for biological molecules in about half an hour. This is a vast improvement over other chemical methods, which take many hours and are not as sensitive.

GLC also will be used to check for the related purine and pyrimidine groups found in DNA and RNA molecules, the determinants of heredity.



DR. CHARLES W. GEHRKE, University research associate in space science, is a member of a 140-man team selected to analyze lunar samples

brought back by the Apollo astronauts. (Photo Courtesy of Missouri Alumnus Magazine)

U.N. Delegates Want to Know

Who Owns Products of the Moon?

(C) N. Y. Times News Service

UNITED NATIONS, N. Y. — As Apollo 11 astronauts scoop up samples of lunar soil or rock, delegates at the United Nations are suggesting it is time to decide who owns the Moon's products.

Argentina recently raised the question at a meeting of legal experts on space law and suggested the U.N. study the jurisdiction of materials, resources and products taken from the Moon. Italy promptly agreed that the matter be taken up by the Outer Space Committee.

The Moon landing by American astronauts also may have inspired another suggestion from Poland that the U.N. draw up a code or set of rules governing the "conduct of humans on celestial bodies."

The model, it was suggested by the Polish legal expert,

might be found in existing national and international law.

Although the sponsors would like to see the U.N. tackle their proposals without long delay, the U.S. would prefer to see other business completed first and particularly the pending treaty covering liability for damage caused by objects launched into outer space.

The U.S. has been urging since 1962 that the liability pact's completion is a matter of urgency as space traffic increases. To stress this argument, an American delegate resorted seven years ago to the gimmickry of bringing to the conference table a 14-pound piece of Soviet Sputnik which fell on a street in Manitowoc, Wis. — happily causing no injury apart from melting the pavement.

By contrast, the U.S. sees the issue of ownership of Moon products as rather remote because no commercial ele-

ment is involved.

"Even if there were polished diamonds lying around up there, the cost of returning them to Earth would be so prohibitive as to rule it out," remarked an American legal expert who helped draft the 1966 outer space treaty.

The pact, banning nuclear weapons from space, also promised "freedom of scientific investigation" and the U.S. sees its planned Apollo undertaking to obtain lunar samples as just that — a scientific and non-commercial venture.

Moreover, arrangements have been made for the lunar specimens taken by Apollo 11 to be shared by the international scientific community. Scientific groups in eight countries will conduct their own tests of samples in addition to the analysis undertaken by more than 100 groups in the U.S.

In response to an announcement by the National Aeronautics and Space Administration, hundreds of offers were received from research groups which wished to cooperate in the testing of the lunar samples.

From among the offers, NASA picked groups in Britain, Australia, West Germany, Japan, Belgium, Finland, Switzerland and Canada — many of them universities. They will pay all costs involved in their participation.

The Moon samples, which it is expected will weigh less than 100 pounds, will be taken to the Lunar Receiving Laboratory at Houston and tested for contamination and put through a preliminary analysis and a seven-week quarantine. The selected scientific groups will be required to pick up the samples at Houston.

Other leading world scientists, chosen by NASA, will test lunar samples in almost every conceivable way. Chemists will analyze the mineral and chemical content of the soil. Biologists will check for any bacteria, molds or other life forms similar to those known on earth. Geologists plan to study rock formations and crystal structure. Paleontologists will look for micro-fossils and other evidence of past living forms.

In all, the moon shot will bring back samples that could initiate the most thorough series of analyses yet performed on a single chunk of soil. The scientists, understandably, are excited about the possibilities of this bold venture. Their thrill will be surpassed only by that of Neil Armstrong, the first man to stand upon the moon's surface.

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Scientists Hope to Solve Density Problem

SPACE CENTER, Houston — (UPI) — One of the puzzling facts about the moon that earthbound scientists hope actual moon rocks will help solve is the difference in the density of the moon and the earth.

The earth has a bulk density about five and a half times that of water while the moon

is about three and a half times as dense.

"We can't have the same proportion of heavy to light elements, for example, in the moon that we have in the earth," said Dr. Elbert A. King of the space agency's lunar and earth sciences division prior to the flight.

He said, "The speculation

then, is how did the moon originate if it isn't really a daughter of the earth and some way separated from the earth in an early stage.

"If they were separated before they were differentiated into a nickel iron core and a silicate rock outer layer, it should have the same bulk density as the earth. It

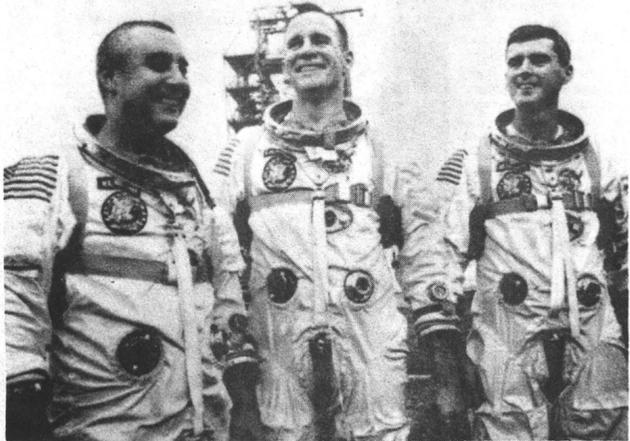
doesn't.

"So it either had to be separated at a later stage, or perhaps it's foreign body that was captured by chance when it got into the vicinity of the earth through just gravitational forces and happening to arrive at the right distance from the earth with

the right velocity.

"Or, perhaps it had sort of a separate formation from the earth but nearby," he said.

"These things are still a subject of speculation and probably won't be solved at least until we see some direct samples from the lunar surface."



In Memoriam

Many have given much to make the Apollo 11 flight successful. The greatest sacrifice was made by astronauts, from left, Virgil Grissom, Edward White and Roger Chaffee, who were killed in a fire during a launching pad test Jan. 24, 1967. The defects in their Apollo 1 ship were corrected for the benefit of their successors. (Unifax)

Russians More Successful

U.S. Beset With Trouble In Early Space Ventures

By EDWARD K. DELONG
UPI Space Writer
SPACE CENTER, Houston (UPI) — More than three years passed between the opening of the space age in 1957 and the first human ventures into orbit.

Man had barely rippled the vast, forbidding ocean of the cosmos when President John F. Kennedy boldly proposed in 1961 that the United States land men on the moon "before this decade is out."

Only two space pilots had looked down on their home planet from above its atmosphere. One was the Russian, Yuri Gagarin, the other America's Alan B. Shepard, and both their flights had occurred within the two months before Kennedy spoke. Combined, their flight times totaled only 2 hours 3 minutes.

The space age dawned upon a startled world Oct. 4, 1957. On that morning, a great white rocket climbed away from the launch pad of South Central Russia and placed a 23-inch diameter, 184-pound ball in an oval path around the earth.

The Russians called it Sputnik 1. Its name meant "fellow traveler of the earth."

Later, millions heard that awesome shrill "voice from space" on American radio and television broadcasts. Amateur radio operators tuned it in.



ALAN SHEPARD



JOHN F. KENNEDY

News commentators struggled to explain that the earth now had a new moon, one made by human hands.

The Sputnik launches of October and November, 1957, caused consternation and soul-searching in the United States. Some have called it the greatest shock to the nation since Pearl Harbor. Words like "space race" and "space lag" entered a vocabulary already striving with "arms race" and "missile gap."

"Overnight," recalls space pioneer Dr. Wernher von Braun, "it became popular to question the bulwarks of our society, our public education system, our industrial strength, international policy, defense strategy and forces, the capability of our science and technology."

"Even the moral fiber of our people came under searching examination."

Against this background of pessimism, Von Braun and his German rocket team which had been transported to the United States after World War II were called into the breach. They were working for the Army on missile development at Huntsville, Ala.

The comeback was swift. On Nov. 8, 1957, Von Braun had promised to orbit a satellite within 90 days. On Jan. 31, 1958, he did. Explorer 1 streaked atop a Jupiter-C

missile into the night sky and soared into orbit, a 31-pound package of instruments.

In the spring of 1958 President Dwight D. Eisenhower set up the National Aeronautics and Space Administration (NASA), responsible for "space activities... except... those projects primarily associated with military requirements."

Project Mercury was born. A one-day flight was the goal.

But Russia once more pulled off a spectacular — its biggest yet — when on April 12, 1961, 27-year-old Maj. Yuri A. Gagarin orbited the earth one time inside the eight-foot diameter ball of a Vostok spaceship. His flight lasted 1 hour, 48 minutes.

Perhaps the bitterest disappointment from the Gagarin flight was felt by seven Americans astronauts who were preparing for one of their number — Alan B. Shepard — to ride a bell-shaped Mercury capsule on a bullet-like trajectory briefly into space and then down into the Atlantic.

Twenty-three days later, Shepard wedged himself into the Freedom 7 capsule atop his Redstone rocket and shot into the morning sky toward a maximum altitude of 116.5 miles. He splashed safely into the Atlantic 302 miles from the cape 15 minutes 2 seconds later.



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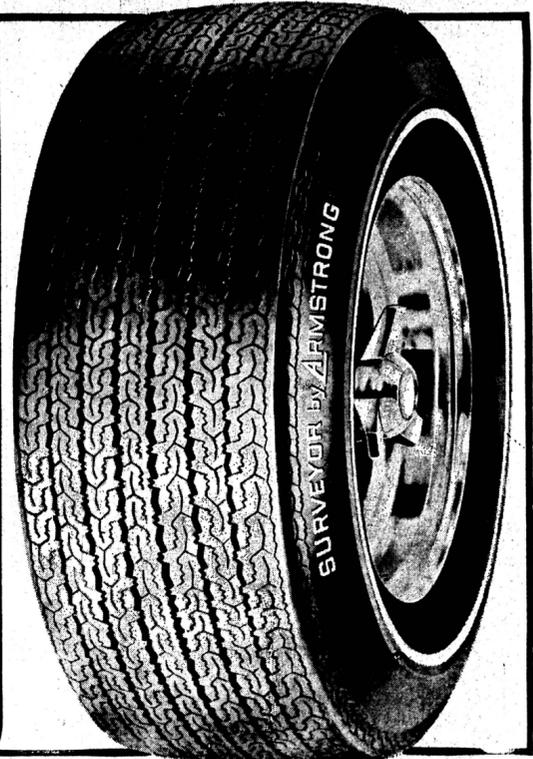
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Neil Armstrong Prefers Ideas to People

First Man on Moon Stays Calm and Cool In Tight Situations

By WILLIAM B. FURLONG
(C) 1969, World Book Science Service

The kids were crying, the phone was ringing, his wife was out, and a visitor had dropped in prematurely. On the whole, Neil Armstrong looked like a man who would have cheerfully performed brain surgery on all of them — with a dull butter knife.

He struggled to cope: To make peace with the kids, to strangle — vicariously — the people who phoned, to deal — a trifle grimly — with his visitor.

"I love soaring," he said, in the strained subarctic tones of a man who doesn't think it's much business of yours — or anybody's — what he loves. "I was out soaring in a glider yesterday. It's a very demanding sport. You can't blame the mistakes on anyone but yourself."

He gazed reflectively out the tall door-window to the garden and swimming pool. The summer storm had subsided now and the afternoon sun was beginning to peek over the horizon. "It's a very quiet sport," he went on — pointedly, I thought. "You're away from everyone."

People Third-Rank for Discussion

He talked reluctantly, grudgingly, almost contemptuously. He disdains all talk about people. He prefers to talk about ideas and hardware — the ideas and hardware he's encountered in aerospace research. "People are a third-rank category of things interesting to talk about," he said in that curious mixture of scientist-cum-bureaucrat patois. "Someone once said, 'Great men talk about ideas, good people talk about things, and everybody else talks about people.'"

It was tough going, but gradually, bit by bit, there emerged the image of Neil Armstrong. It slowly became evident that the man who is first to touch the surface of another body in the universe is not simply an unemotional, robotlike man in whom the flesh is perfectly subjugated by the intellect. He has interests other than flying, though not many of them. It's just that he doesn't care too much to talk about them.

He does not display any sense of personal destiny — or vanity — at the prospect of being the first man on the moon. "I guess there's some thrill to being first to do something, and most of the guys in our program so far have been first to do something. Just because there are so few of us and so much to be done for the first time."

"Of course, the first to land on the moon — why that's a considerably bigger thing. But I will have to admit I was

Neil Armstrong does not display any sense of personal destiny—or vanity—at the prospect of being the first man on the moon.

selected for this feat by happenstance. The whole program, by design and by detail, is the product of a lot of people's effort and whoever is first is a matter of coincidence rather than plan.

"It is not the same thing as when Lindbergh crossed the ocean. He and a couple of other people did the whole business, based on his own ideas, techniques and accomplishments. That's not the sort of thing this is. This is the product of the desire of a whole society to do something. There will be people like myself identified by name, but it won't be the same as with Lindbergh."

Gradually, Neil Armstrong came to talk of other, even personal things. Such as why there is no living room in his home on Woodland Drive in Seabrook, Tex.

"We wanted a house that could be lived in. That's why we don't have a formal room. We don't have any place in the house which has to be polished all the time."

He talked of the time the house burned down (they rebuilt it exactly as it was), and of his love of tools which were lost in the fire. He talked of carrying flying over into his private life. Armstrong has owned several different kinds of gliders. "The kinds I like I haven't owned, because they're too expensive," he says. He also owned one-third interest in a single engine, four-passenger plane.

Serious Music an Outside Interest

Serious music is one of his few outside interests. He's learned to play four musical instruments — the baritone horn, trombone, bass and piano. One of his few extracurricular activities in high school, outside of the aero club and science-oriented pursuits, was playing in the school and city bands back in Wapakoneta, Ohio. Today he is one of the few astronauts who cites serious music (symphony, concert, choral music) as his favorite forms of art.

But it is the depth of his experience, not its breadth, that has made Neil Armstrong what he is. His intensity about



ARMSTRONG TAKES A BREAK during a rehearsal of his historic moon walk. He wears a camera strapped to his chest to leave his arms free for collecting rock samples and setting up scientific equipment.

research and aerospace is deep and enduring. If it has left him with a scholar's contempt for everything non-scholarly, it has also left him superbly equipped to lead the flight of Apollo 11.

Armstrong has an extraordinary mind that has been used exclusively — remorselessly — on the problems of flight and space for the last 22 years. Ever since he was 15 years old, he has been engaged almost exclusively in the study, practice, and science of flight.

Neil Armstrong was born Aug. 5, 1930, in Wapakoneta, a small town in western Ohio, just off Interstate 75. "My father remembers taking me out to Cleveland airport when I was 2," he recalls. "I took my first flight — in an old Ford tri-motor — when I was 6." To take flying lessons, Armstrong spent the money he'd saved for college. On his 16th birthday, before he got his driver's license, he earned a pilot's license.

Now he had to find a way to get through college and, if possible, into flight. That's when Armstrong displayed a gift for adapting himself to the situation. He chose a Naval program which provided two years of college, four years on active duty, and the final two years in college. Armstrong started the first leg at the age of 17 by enrolling at Purdue. The active duty part included 78 combat missions in Korea. Then he went back to Purdue and in 1955 got his degree in aeronautical engineering.

Armstrong wanted to be deeply involved with the research of flight. "I was most interested," he says "in a series of planes built right after the war to investigate new performance configurations." Those planes were designated X-1 through X-15, and they were being tested at Edwards Air Force base in California by both the military and National Advisory Committee for Aeronautics — the civilian agency which later became NASA.

Rejected in Research Application

In 1955 Armstrong applied with NACA to join its research effort at Edwards. But NACA turned him down.

Again he had to adapt. His only choice was to go to work for somebody else, or to go to work for NACA at a lesser job to Cleveland. It was the wrong job and the wrong direction, but it was the right organization. Armstrong took the Cleveland job. When an opening developed at Edwards, he was standing urgently in line. He got the job and achieved his long-planned goal.

Armstrong flew the famed X-15 rocket-powered airplane on seven test flights, reaching altitudes of more than 200,000 feet (40 miles) and speeds of 4,000 miles an hour. "We didn't fly often, but it was unbelievably exciting," he says. The X-15 was to be followed by the Dyna-Soar, a plane that was intended to use its rocket power to burst into space, to go into orbit, then to make a landing on a runway just as any airplane. To old hands in aviation, this seemed eminently more sensible than putting a man on the tip of a rocket, shooting him into space and then fishing him out of the ocean after his "cartridge" had plummeted by parachute into the sea. Therefore, when NASA announced it was going to send men into space this way on Project Mercury, Armstrong was not enthusiastic about the program.

"Many of us at Edwards had spent years developing the

rocket-plane concept, and Mercury looked like a dark horse to us. We tended to regard Mercury people as inexperienced intruders in our business," he admits.

However, there came a time when Washington had to choose between the two competing programs, and Dyna-Soar was killed. Neil Armstrong thought it over and decided that he'd rather switch than fight. If Mercury and its follow-on were going to get men into space, then that was the place to be.

In September, 1962, he was accepted in the second group of astronauts. Three and a half years passed before he went into space, but on the Gemini 8 flight Armstrong proved he was superbly fitted for the task. As he and co-pilot David Scott were locked together with an unmanned Agena vehicle in Earth-orbit, the combination started tumbling wildly. Calmly, he backed the spacecraft away from the other vehicle, stabilized its wild gyrations, and brought it down for a successful emergency landing in the Pacific. His quick and thoughtful work prevented the first U.S. casualties in space.

Neil Again Proves His 'Cool'

Armstrong proved his mettle again in May, 1968. While flying a special research vehicle designed to simulate landings on the moon, the craft went out of control. Seconds before it rolled over and plunged to the ground, Armstrong ejected from the vehicle and parachuted to the ground. It was another remarkable exhibition of coolness and command-of-self in an extreme emergency situation.

Thus, the fitness of Neil Armstrong for his role in history is indisputable. He is expected to meet the challenge of landing on the moon with great competence and undeviating diligence. The question in the minds of many people is how he will meet the challenge of what happens after his return. How will he react to the cotton-candy fantasy life that shrouds and sometimes strangles the personality of the Great Celebrity?

He is not an endlessly patient or accommodating man. He has that reflexive quality of many scientists: He likes to describe explicitly the drawbacks of everything.

Some time ago, for instance, he was asked if he detected a gap in public knowledge of NASA's goals which resulted in public apathy about the space program.

"Not necessarily," he responded. "If so, it could be cured by bringing the average adult understanding of the program's goals up to the level of the average fifth-grader."

On another occasion, he dipped briefly into a discussion of the flaws of the press and the interest of publishers in people.

"That is the only thing that publishers are interested in talking about. I don't think that's necessarily right, but they happen to think that's the thing they can sell the easiest."

His Fierce Candor Refreshing

There is something refreshing in this fierce candor, in the unassailable integrity which drives him to tell people their faults. But some fear that it will jolt the careful image-making of NASA and the security of Armstrong's own personality. They wonder whether he will be able to keep this candor under control — whether he will sublimate it, conceal it, or abandon it. The worst that could happen to Neil Armstrong is for his life, and its purpose, to slip away from him in reaching for the moon.

What he brings back from the moon will not change the world, but it will tell us something of the universe and its origins that fits into a comprehensible whole. In that kind of work even the astronaut who gathers a few rocks is a significant man and a mighty symbol.

As the sun seeped over the wall of the garden, and as his flashes of irritation dwindled, he reflected on that dimension. He made it clear he prefers the cocoon of his own experience — his flying, his soaring, his music. They are the experiences of a man alone. Away from the crying kids, ringing telephones, and inquisitive visitors.



WEARING A "SNOOPY" HAT, which fits under his space helmet, Armstrong enjoys a joke as he prepares to fly to the moon. (Photos by World Book Science Service)



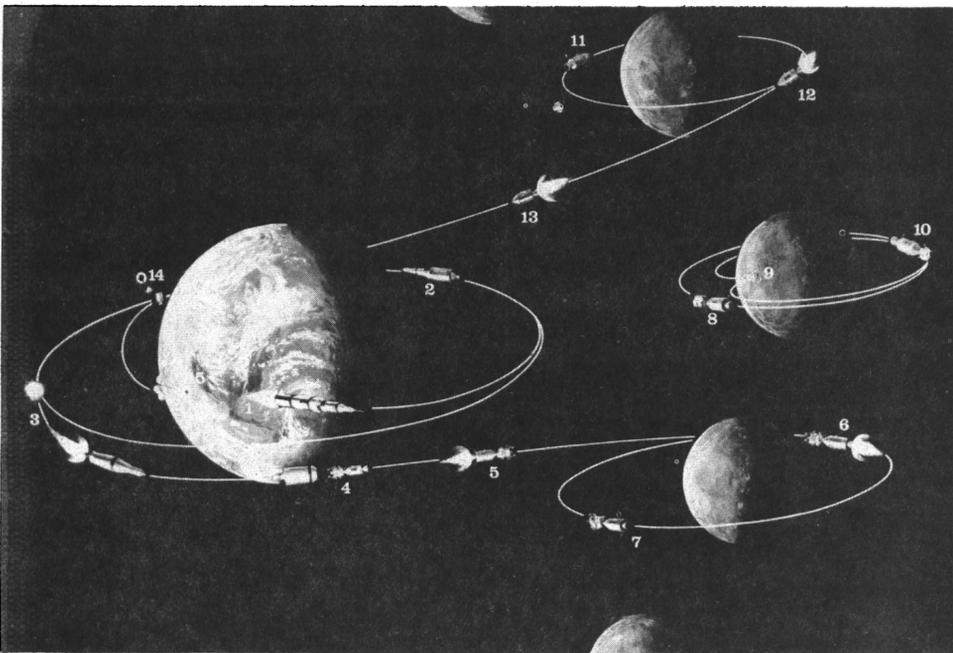
ARMSTRONG LOOKS YOUNGER than his 38 years as he ponders a question asked by a newsman during an interview. "My being selected as the first man on the moon is a matter of coincidence rather than plan," he says.

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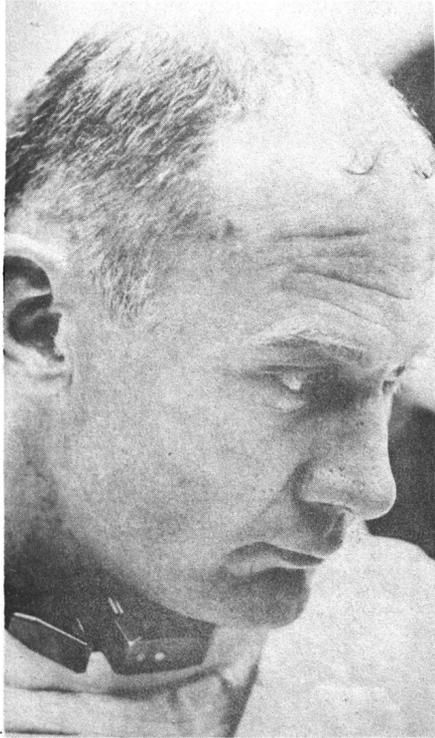
Profile of a Historic Flight to the Moon

Moon's orbit around earth during Apollo 11 mission is shown by different positions during flight in this drawing by North American Rockwell's Space Division. Bottom shows moon's position at launch. Middle shows positions during flight and top shows moon's position at splashdown. Numbered positions show 15 key steps. (1) Liftoff (2) Earth Orbit checkout (3) Injection on path to moon

(4) Turnaround and docking (5) Course correction (6) Retro-firing for lunar orbit (7) Elliptical lunar orbit (8) Lunar module separates (9) Landing on the moon (10) Ascent stage docking (11) Ascent stage is left in orbit (12) Injection on homeward trip (13) Course correction (14) Service module is jettisoned (15) Chutes lower men to earth splash-down.

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BUZZ ALDRIN SHOWS the strain of the intensive training necessary for the Apollo 11 moon-landing mission. He had to complete more than 900 hours of training in six months. (Photo by World Book Science Service)

He Becomes Second Man on Moon

Aldrin: Cool Commitment to Challenge

By WILLIAM B. FURLONG
(C) World Book Science Service

Col. Edwin (Buzz) Aldrin, 39—the man who followed Neil Armstrong onto the surface of the moon—has a face as tough as a top sergeant looking over a fresh batch of recruits, and a gaze as cool and steady as a marksman taking aim. But this is deceiving. It has been 10 years since he engaged in anything but cerebral work—10 years since he wore his Air Force uniform. Aldrin is more accurately described by his activities than his appearance.

- He has a doctorate in astronautics from Massachusetts Institute of Technology (MIT). (He is the first Ph.D. ever launched into space.)

- He has done everything from climbing Mt. Vesuvius to skin diving around ancient treasure ships.

- He has a perspective and a purpose that are expressed quietly but cogently. Among examples are:
His thought on the priority of the space program in the nation's interest: "I think we should have a stopping place everywhere but up."

The Aldrins like to live experimentally and practically. For instance, there is no wall between their bedroom and the family room. In the space, they mounted a large color TV set. When they are in the family room the Aldrins can swing the TV so they can see it there; when they are in the bedroom they can swing it around so they can see it from the bed. "It beats," says Buzz, "buying two color TV sets."

There is no living room. "My wife thought the family room would be enough." The family room is really too much. In one corner, there's a monstrous camel saddle used as a TV seat. "It's got to be more comfortable when it's mounted on a camel's back," comments Buzz. There's a large earthenware jug, perhaps 2,000 years old, that he picked up while scuba diving in the Mediterranean. "I found several of them which were still intact and still had the wine in them. The wine isn't too good, of course," says Buzz. There's a wooden sculpted plaque from Hawaii, a brass plate from Tripoli, some trophies on the mantelpiece that Joan, his wife, got for acting, and a military dress sword.

Joan Aldrin is a healthy, outgoing woman who earned a

degree in drama from Columbia University in New York. She had her own radio program in college, played small roles on television (Playhouse 90, Studio One), and still plays parts in theater groups in and around Houston. In some circles," says Buzz Aldrin, "I am known as Joan Aldrin's husband."

They have three children: Mike, 13, Jan, almost 12, and Andy, 11.

Joan makes a deep effort to understand the more arcane details of Buzz's work in space, but she doesn't. Buzz tries to understand the more mystical meanings of her work in drama but he doesn't. Yet there are moments when poet and pilot come together. One was the night before his lift off in Gemini 12 in November, 1966. It was midnight and a moment for romance. But he was worried about navigational problems "and stood there shooting stars with a sextant," says Joan helplessly.

Buzz's father was a military pilot who went on to get a doctor's degree from MIT. He served as an aide to General Billy Mitchell and rose to become a full colonel before leaving the service in the 1920's. But he did not leave flying; for years, he managed the airport at Newark, N.J. Buzz remembers his first flight at the age of 1½ years. "They say you can't remember from that age, but I have this special feeling about it," he says.

In football, the 160-pound teen-age center from Montclair High had a unique talent. "I was the only guy who centered for a punt with one hand," he says. Invariably, such efforts are made with two hands, largely because the punter stands 12 to 16 yards behind the center and it takes a good deal of strength, accuracy, and control to get the ball back that far.

Buzz wanted to fly, so when he got out of West Point in 1951 he switched to the Air Force. Within 18 months he'd qualified for jet combat and was on his way to Korea. Buzz flew 66 combat missions and won two Distinguished Flying Crosses and three Air Medals. He still remembers going into a tight circle behind a MIG. "It was as if I had a tiger by the tail and could not let go," he recalls. "Finally, the plane started smoking and the pilot bailed out."

Buzz met Joan in 1952, just before leaving for Korea. First, he had met her mother at a cocktail party, and she im-

mediately invited him for dinner and to meet Joan. Joan was embarrassed at the ploy and all she remembers about Buzz at the time is that he was "pleasant but rather young." (He was 10½ months older than she.)

When he returned from Korea, the girl he left behind was not too receptive. He happened to meet Joan at a theater rehearsal where the other girl worked, and he made a smooth adjustment to the situation.

It was not altogether simple. Only a month before, Joan's mother and two of her brothers had been killed in a plane crash, so her family was not terribly enthusiastic about pilots. Nevertheless, Buzz began dating Joan regularly. "On one of our first dates he began talking about space exploration and landing on the moon," recalls Joan. "I thought it was fascinating, but too way out to take seriously."

They were married in St. Bartholomew's Episcopal church in Ho-Ho-Kus in 1954. A year later they started a three-year tour of duty in France. The Aldrins made the most of their time there. "We went over with one child and came back with three," says Buzz.

Their two younger children were born just 10 months apart. "Joan was a little pregnant or taking care of little ones most of our time there," Buzz says. Nevertheless, they managed to roam Europe. They would hire maids to live in their quarters with the children while Buzz and Joan went off exploring.

Buzz knew the time would come when he had to be better equipped for the future than with the skills of a fighter pilot. He renewed his friendship with Ed White, a one-time classmate at West Point and teammate on the track team who was also flying fighters in Europe. Ed planned to return to get a graduate degree in aeronautical engineering at the University of Michigan. Buzz decided to do the same. He applied for and won entrance to MIT for post-graduate studies.

"Being the champion of the extraordinary is lonely, but gratifying," Col. Edwin (Buzz) Aldrin tells his children.

Collins: Competent But Forgotten Man

By WILLIAM B. FURLONG
(C) World Book Science Service

At the age of 38, astronaut Mike Collins is a low-keyed, quiet, agreeable man without dazzle, pomp, or pretense. "It sounds kind of blah, but I don't have any really strong characteristics one way or the other," he admits.

The thing that makes him remarkable is that in the bizarre, high-pressure world of space exploration he does not feel the need to appear remarkable.

This quiet competence fits him superbly for his role in the first landing on the moon: To bear being inconspicuous. While the world breathlessly watched and listened for the moon walk by Neil Armstrong and Buzz Aldrin, Mike Collins cruised in orbit overhead. His job was to undertake emergency action if something went wrong, or to pick them up from the lunar module for the return to Earth if everything went right. His greatest "achievement — his fondest hope — is to be triumphantly unnoticed.

But Collins is a superb pilot and engineer. He flew the Gemini 10 mission in July, 1966, with astronaut John Young. On that flight Collins ran some of the most demanding mathematical computations designed for space—some 350 of them within a relatively few minutes of lift-off. They were vital to the central thrust of the mission—to execute rendezvous and docking and thus lay the foundation for the joining of the lunar module with the orbiting command module after the lunar landing. "It was a situation," says John Young, "where if he wasn't 100 per cent right and finished in a very small increment of time the whole point of the mission was off."

Collins once was asked what five books he would take with him if he was caught in the "Twilight Zone" and didn't know when he would get back. Many astronauts are baffled, or irritated, at questions like this; their interest in reading rarely extends beyond Common Logarithms of Numbers or Values of Trigonometric Functions. But Mike Collins' choice was easy and reflexive: The Rubaiyat of Omar Khayyam and Don Quixote. Of his other three choices, only the Bible might have been considered by fellow astronauts. He would also take with him An Anthology of English Verse and The Spiral Road, by Jan de Hartog (his favorite novelist).

Collins has an active interest in other areas. He likes Dixieland and the Blues. He would have been happy as an architect. "It's creative, varied work with a worthwhile and tangible end product," he says.

When he was stationed with a fighter squadron in France, he and his wife Pat bought one bottle of wine at a time and savored it. By the time they were transferred home he'd

"gotten to the point where I could tell a good wine from a bad wine and I could tell roughly what district it was from and maybe what chateau or vineyard." He concedes that "it's been more than 10 years since I could do this, and French wine is just too expensive to fool around with now."

Collins had a father and an uncle who became Army generals. His uncle was chief of staff of the Army during the Korean War. Mike grew up as an Army brat during the time when armies all over the world were being severely tested. He was born on Oct. 31, 1930, in Rome, where his father was military attache in the U.S. embassy, although he lived in 10 different places as a youth, Collins claims Washington, D.C., as his home. "It's a dynamic place in which are focused world events and the flow of history," he says.

Mike Collins has the quiet competence required of someone who must bear being inconspicuous. That is his job today.

Mike went to West Point, but not because of family pressure. "I wanted a college education," he says. "I wanted a good one. I wanted a free one. Obviously, West Point met all these specifications."

After graduation, the Army brat transferred to the Air Force. He never felt any family pressure to follow family tradition in the Army. "My father would have been happy if I had gone into the Army, but it wasn't a big thing with him," Mike says. "He would have been just as happy to see me go into the Air Force or the Peace Corps or do anything else I wanted to do."

Mike wanted to be a flier, but beyond that he had no elaborate goal in life. "I've always felt that the next little step is the one to be concerned about. I've never thought, 'Well, where is it all going to lead?'" he says. In the beginning it led him from Nellis Air Force Base in Nevada to George Air Force Base in California.

"When I was at George Air Force Base," he explains, "I got to know and admire some of the pilots at nearby Edwards Air Force Base, the test flight center." He thought it over and decided to become a test pilot.

The next little step was space. But Mike took it too soon. His application for the second group of astronauts was turned down.

"I was very disappointed," he admits. "I never really expected to have another chance."

But he did, and he made the most of it. Collins was in the third group of astronauts selected in October, 1963.

At first, Collins thought he was going to fly only on later exploration flights to the moon. As it turned out, he was one of the earliest third-group men selected to fly on the Gemini two-man missions.

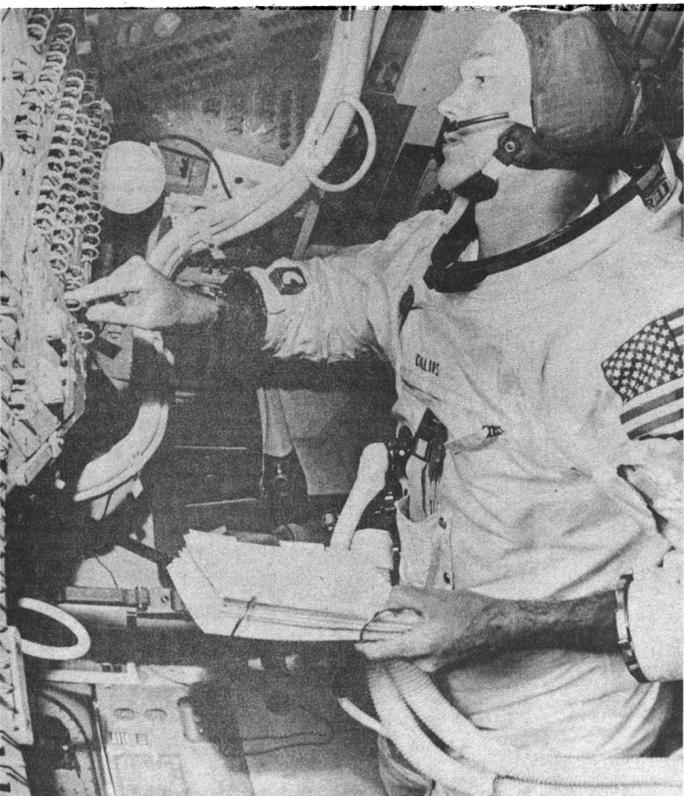
His Gemini 10 flight was the most daring and demanding of any space mission flown up to that time. Collins and Young achieved the first rendezvous with two different vehicles in space. They docked with one and Mike space-walked to the other. This proved that inspection of a U.S. or enemy satellite could be carried out in space. The only flaw in the whole flight was the seepage of an eye irritant into the life-support system which caused tears to well up in their eyes. Because they were in a weightless state, the tears did not roll down their cheekbones. "They just stayed up in the eyeballs," says Collins.

With Gemini 10 over, Mike took a vacation. Among other things, he and Pat went back to France and repeated their marriage vows in the same chapel in Chambly in which they'd been married 10 years earlier. She was working at the Air Force base there when Mike came up and introduced himself. "We had dinner together and that was kind of it," Pat says.

Collins originally was scheduled to orbit the moon on the Christmas flight of Apollo 8. He hopes to make this flight and another later in the series. But a bone spur growing on one of the vertebrae in his neck scratched him from Apollo 8. Then he found himself re-assigned to what became the first lunar-landing flight. "I broke my neck to get that flight," he says with a grin.

Because of this emotional diffidence, Mike cannot bring himself to leave his family with the specific knowledge that he might be leaving forever. He faced this same problem three years ago before Gemini 10. As he left to go to Cape Kennedy for that flight, he told Pat that he'd left some things on the desk in the den that she might want to look at when she had the chance. They were many of the cherished things that pass between husband and wife and recall their good life together. Among them was a poem called "High Flight," written by John Gillespie Magee, Jr. "When reading it," Pat said later, "I felt Mike was there in the room and he was saying the words to me." She memorized the final lines:

I've topped the windswept heights with easy grace
Where never lark, or even eagle flew.
And while with the silent, lifting mind I've trod
The high untrespassed sanctity of space,
Put out my hand, and touched the face of God.



ASTRONAUT MICHAEL COLLINS positions himself aboard the command module in lunar orbit while Neil Armstrong and Edwin Aldrin spend 22 hours on the moon. He checks out spacecraft systems according to the

detailed flight plan in his left hand. When his teammates leave the moon, Collins will rendezvous with them and all three will return to Earth in the command module. (Photo by World Book Science Service)

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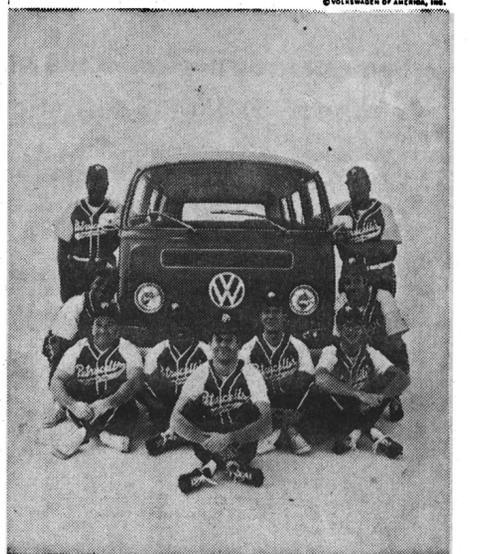
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