

Newsweek

THE GREAT ADVENTURE

JULY 21, 1969

50c

*Apollo 11
Commander
Neil Armstrong*



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FRED NIXON
RICHMOND

Top of the Week

The Great Adventure PAGE 68

The Apollo 11 crew and the 36-story-high Saturn rocket stood poised this week for man's greatest adventure: a voyage to the surface of the moon. For this week's preview of Apollo 11, Science and Space editor **George Alexander**, aided by Washington Science correspondent **Evert Clark**, reports on the mission and the men—civilian Neil Armstrong, 38, the commander; Air Force Col. Edwin Aldrin, 39, and Air Force Lt. Col. Michael Collins, 38. Assistant Editor **Thomas G. Plate**, from reports by Detroit bureau chief **James Jones** and New York Science reporter **Don Scott**, gives the exquisitely worked-out "time line" of Apollo 11's planned 22 hours on the moon—which may well become the most extensively watched and written-about single event in history. Artist **Paul Calle**, who designed the new U.S. moon stamp (photo), also executed a similar design for Newsweek. (Cover photo by NASA.)



Newsweek will hold its presses next week to cover the moon landing—and thus may be delayed in reaching some readers.

The Fireman at Bay PAGE 59

The fireman was once everybody's friend. Not any more; while battling an upsurge of fires bred by urban decay and racial tensions, he also finds himself jeered, detested, harassed and often physically attacked while trying to save the lives and property of ghetto dwellers. Newsweek's U.S. bureaus reported the story, and General Editor **Lawrence S. Martz** wrote it.

Crafts as Art PAGE 62

Across America, a great crafts renaissance has potters' wheels spinning, looms humming, wood saws working and plastics and glass being bent into new shapes. Drawing on files from Newsweek reporters who talked to today's leading craftsmen and on interviews by New York reporter **Ann Ray Martin** with the people behind the revival, Newsweek's **Alex Keneas** wrote the story. His report is accompanied by four pages of color photographs.

The Amazin' Mets PAGE 88

After seven seasons spent in the depths of the National League, New York's comically inept Mets are finally forcing fans to take them seriously. Last week, the second-place Mets advanced on the first-place Chicago Cubs in a series that attracted World Series-size crowds. Aided by reports from Assistant Editor **Johnathan Rodgers**, who has been traveling with the team, Sports editor **Pete Axthelm** wrote the story, which is accompanied by two pages of color photos of the Amazin' Mets in action.

Hasty Hearts? PAGE 109

Twenty months after Dr. Christiaan Barnard performed the world's first heart-transplant surgery on a human patient, the field of heart transplants is in crisis. Newsweek Medicine editor **Matt Clark** examines the present disappointments—and the realistic hopes—for heart-transplant surgery.

Newsweek

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LETTERS

Space: One Man's Meat . . .

Congratulations on a most comprehensive and thought-provoking summary of America's decade in the unknown (*THE MOON AGE*, July 7). The article "Prize—or Lunacy?" makes this special section unique among similar journalistic accomplishments. It caps the extra task of historical analysis (and not just news chronicling) performed by your writers throughout the report.

Physicist Robert Jastrow gives the typically scientific viewpoint of the value of our moon effort, and after sifting through his verbiage about the possible value of lunar rocks to modern science, I find nothing—scientific or otherwise—to justify the enormous expenditure of our resources which Jastrow seems to assume is necessary. I sometimes wonder if scientists inhabit the same planet the rest of us do.

In striking contrast are the opinions of Ralph Abernathy, Margaret Mead and Lewis Mumford. Like myself, they marvel at the courage and technical prowess of modern man. Yet simultaneously they marvel at the complexity of a society which finds it so easy to devote billions to a project that at most stirs the imagination and finds it so hard to rid itself of its excuses for not spending a fraction of this amount on making its own home a better place to live. As Abernathy concludes, we cannot justifiably attack the space adventure itself. We must question the whole American rationale and the priorities stemming from it and pray that after the moon our next target is earth.

FRANK FINCH

Philadelphia, Pa.

■ Someday universal man will marvel over the earthbound mind-set of some of today's people. Space exploration is the future. Anyone who opposes space exploration opposes the future.

D. K. DAWSON

Vancouver, Wash.

■ Seldom have I seen articles that present so clearly the drama, the excitement, the antagonisms and, most important, the moral issues involved in the synthesis of man's technical virtuosity. You are to be commended not only for the superb prose but also for the presentation of both sides of the great debate centering around our space policy.

RICHARD C. KELLOGG JR.

Holderness, N.H.

■ Before I read "The Moon Age" I approved of our space expenditures because I felt that it was man's manifest destiny to reach the stars. When we ruin our own planet, I thought, at least we could escape to another.

Now I realize that I've read too much

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science fiction. It is not man who is reaching the moon; it is the United States, the only nation which can finance a war and a space program while a majority of its citizens are contented enough with their lot to elect a Republican President who has deep commitments to money-oriented, "anti-socialist" groups.

It is the U.S. which plans to build an orbiting space station and to send highly trained military personnel to Mars and beyond, and which would eventually decide what people would colonize which planets and who would govern and police those colonies.

In the name of man, I think it is time to stop seeking glory for American technical know-how until the other residents of our planet can participate in the means of escape to the stars.

Exploring space is magnificent, but not in terms of a few hundred million people waving gaily down at the ground-doomed billions. How about helping the others to their feet before we start making 100 per cent American garbage dumps on other planets?

PETER LARSEN

Los Angeles, Calif.

■ I was shocked to read Mr. Lewis Mumford's comments relating to our space program. A "colossal perversion of energy," indeed!

That he values any square mile of the earth more than all of the planets shows clearly his lack of knowledge of the earth and his lack of true appreciation for our own badly misunderstood planet. The waxing pollution of our atmosphere can only be controlled if we learn more about our earth and the other planets. In fact, the humanity which he claims is being destroyed by antihuman institutions, as he calls them, can probably only survive on earth through the efforts of those very institutions.

He demonstrates a truly infantile knowledge of scientists and science by charging that we think that we can control nature. Mr. Mumford has apparently never attained the knowledge of nature which brings with it that true feeling of humbleness the scientist experiences.

EDWARD J. ZELLER
Professor of Geochemistry
University of Kansas

Lawrence, Kans.

Black Composite

Congratulations are in order to the designer of your June 30 cover. Not only is it an excellent composite of faces from a cross section of Black America, but it also seems to be conveying a message to all Americans—white or black.

While the faces depicted display expressions varying from passive suppression to a degree of militancy and anger, the message that young Americans yet have something to be happy about is richly conveyed by the lone smiling face of the small boy.

Will the example set today by us keep him smiling when he is an adult?

FRANK PERSONETT

Noblesville, Ind.

■ I always assumed that you favored boosting Black America. I don't think, though, you help their cause by filling your front cover with bellicose black faces. This might only feed the backlash. True, there is one cute little boy there, but people also remember that these young boys were the ones who were egged on to do a lot of the damage during past riots.

JOE HABEL

Lititz, Pa.

Vietnam: 'For Good or Bad'

The flurry in the press over the rival Nixon and Clifford schedules for troop withdrawal from Vietnam (NATIONAL AFFAIRS, June 30) distracts public and journalistic attention from what has always been the principal issue of the Vietnamese war: shall a corrupt military dictatorship endure as the voice of the people? The significant difference between the President's view and that of Mr. Clifford lies in the recognition of the latter that "we cannot realistically expect to achieve anything more through our military force." Not that our force ever did accomplish anything there, except 36,000 sacrifices to our belief in law and order.

DAVID I. TAM

Berkeley, Calif.

■ Disappointments are doubly bitter when we think of what might have been. The ban on NEWSWEEK's June 23 issue in Vietnam reminds me that this is not the first time you have been in difficulty here. It was about two years ago that your Saigon bureau chief, Mr. Martin, did an article with suggestions on how the war might have been salvaged. He recommended, among other things, the reform of the Vietnamese Government and the reorganization of the Vietnamese Army. For his pains, he quickly found himself unwelcome in Saigon. Of course, the official word then was that we were winning the war anyway. We are still winning, although casualties have tripled since.

When in the years to come we consider the American venture in Vietnam, I am afraid that we will fault not so much our involvement here as that it was so thoroughly botched. The U.S. has been blamed for all the evils of colonialism without partaking of its advantages. We failed to exercise the powers we were accused of usurping. We could have forced reforms, reduced corruption and established a democratic national government. This would have offended only a few. Instead, we made only a halfhearted attempt that satisfied no one. Recently one Vietnamese leader said that the U.S. is responsible for everything that happens in Vietnam—good or bad. Whether or not he is right, most of the world would seem to agree. And the Vietnamese people deserve better than what has been happening to them.

Unfortunately, it is too late to discuss whether we should be here, or whether the war protesters in the States are right for the wrong reasons. Even two years ago we still had time, but we never seemed to realize the obvious: the Saigon

government did not necessarily share our desire for peace; the Vietnamese people did. Now, the only remaining problem is how to get out with as much as we can and how to stave off further bloodletting.

PRESTON R. HOGUE

Saigon, Vietnam

Where Were They Then?

It seems to me that the timing of Werner Von Braun and his associates was a few years off when they "made contact with American forces" after Hitler's death was announced (WHERE ARE THEY NOW? July 7). I, for one, would see them in a better light if they had made contact before producing the "thousands of V-2 rockets that rained on the city of London in 1944"—rockets that killed so many defenseless men, women and children.

I regret that I find it difficult to think of them as heroes, but then, as you state, "Operation Paperclip has paid off handsomely," so that's all that matters! Perhaps I have a jaundiced eye because, at the time of the V-2 attacks, I was living with my family in central London.

PETER CHURCH

Corona Del Mar, Calif.

■ Having experienced the terror of the V-2 rocket attacks on London in 1944, it was with the same sense of elation a mouse must feel who has participated in a lung-cancer experiment that I read of the importance of the "same old cucumber" V-2 rockets to the space program.

Now that we are convinced that "the Peenemünde experience has been crucial," let us push on and admit that the experiments carried out on humans in Nazi concentration camps have also benefited mankind.

What we are really saying, with Von Braun and his self-righteous, "anti-Communist" associates, is: the end always justifies the means.

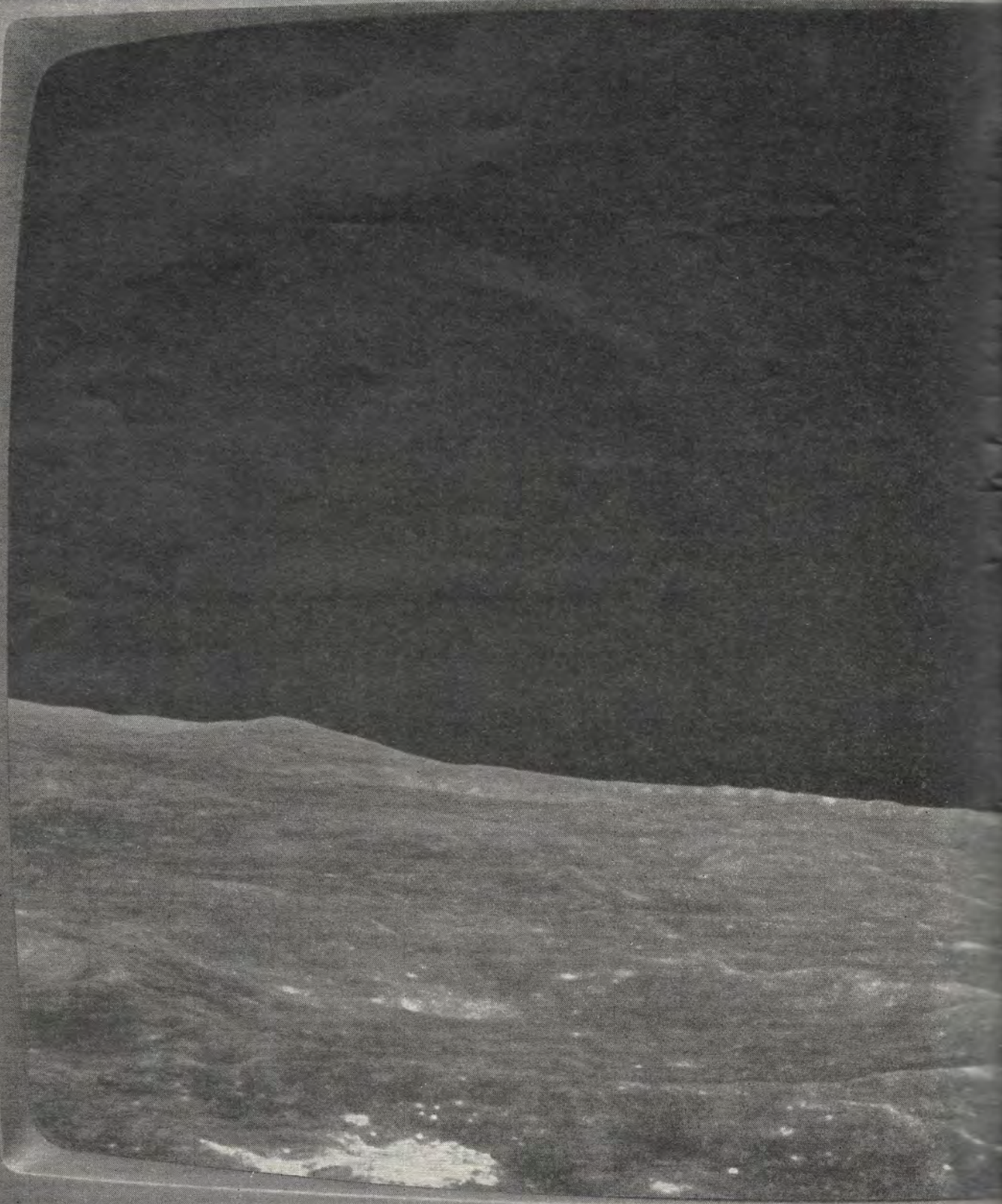
ANNE V. MCGRAVIE

Evanston, Ill.

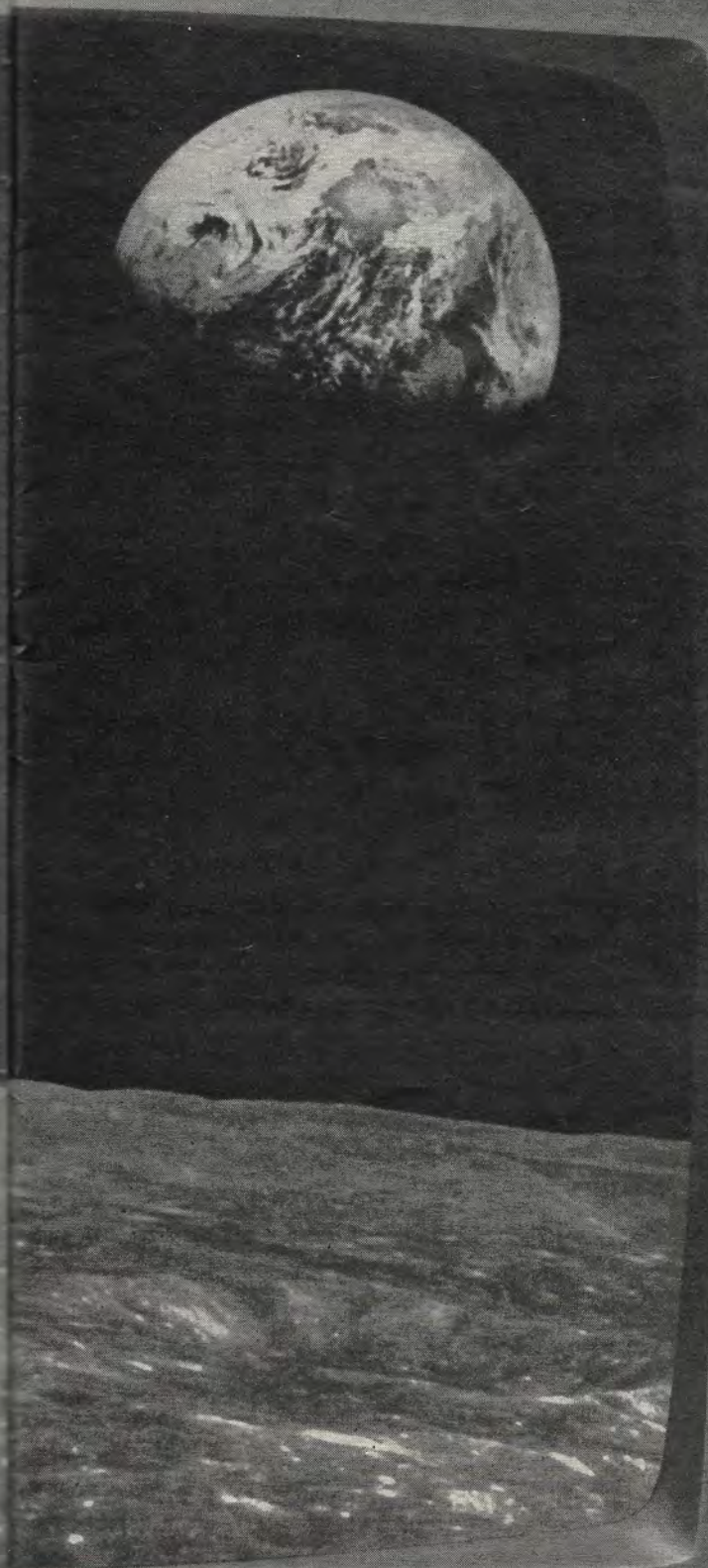
'The Yawning Gap'

I wish to compliment you on "A Guest in Ghetto America" (THE CITIES, June 9). There can be no better title for it. The parlous and degrading conditions of American ghetto dwellers have made no impression on American minds. The continued efforts of your magazine for the past three years to spotlight the injustices meted out by the world's greatest democracy on its people have not caught the American conscience. If the black Americans can be subjected to inhumane treatment even within the doors of American society, what right have we black Africans to expect any better treatment from the Americans, even with their aid. The African feels mentally depressed to read about the fate of the Negroes in America.

The very depth of the race problem in American society and the efforts of the society to cope with the problem are best evaluated from the riots themselves. And as you well said in "The Negro In America: What Must Be Done" (NEWSWEEK, Nov. 20, 1967), "to deal with the



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Godspeed, gentlemen.

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THE GREAT ADVENTURE



Drawn for Newsweek by Paul Calle

U.S. on the moon: A fitting task for Eagle and Columbia

The odyssey is at hand, computed to the tiniest margin of error. All the ingenuity of technology is marshalled, thousands of contingencies have been calculated. But it remains for man, not the computer, to venture into the unknown.

Apollo 11 is, quite simply, man's greatest adventure—his first flight to the surface of another body in the space that encompasses his familiar earth. And though much of the countdown at Cape Kennedy last weekend retraced the now-familiar steps for a momentous journey, there were new signs to point up the majesty and portent of Apollo 11's mission.

There was, first of all, the beauty and national pride reflected in the names selected by the astronauts for their ships—Eagle, symbolic emblem of the United States, for the landing craft that is to carry Neil A. Armstrong and Edwin E. Aldrin to the floor of the moon; Columbia, the shining symbol of the nation, for the mother ship that Michael Collins will pilot while his crew mates explore the moon. As Armstrong, the commander and the man scheduled to be first to set foot on the moon, recently noted: "The names are representative of the flight and of the nation's hopes." And there was the quickening interest in the eight-day, 500,000-mile odyssey, as hundreds of thousands of ordinary folk—plus former President Lyndon B. Johnson, the representatives of 60 foreign nations, and U.S. congressmen and senators—began descending on Florida to see the start of the journey. Beyond the Cape, hundreds of millions more were expected to watch the launching via TV and communications satellites.

What they will see is some 160 seconds of powered flight as the 363-foot-tall Apollo-Saturn vehicle leaves Pad 39 at 9:32 a.m., EDT, Wednesday.

But that lift, calculated to the second and the foot-pound, should be enough to thrust Armstrong, Aldrin and Collins into the ranks of man's pre-eminent explorers. And to Columbus's Santa Maria, Lindbergh's Spirit of St. Louis and Yuri Gagarin's Vostok, will be added the names of Eagle and Columbia. In less than twelve minutes after launch, the Apollo 11 crew hope to be 115 miles in a temporary orbit, their three-segment ship still attached to the Saturn 5's third stage.

A little less than three hours later, the third stage will be started up again and, in a nearly six-minute-long burn of its 227,000-pound-thrust single engine, increase the speed of the Apollo 11 ship from about 17,400 mph to 24,200 mph and drive the spaceship onto a translunar trajectory. About 25 minutes after they have begun the three-day-long coast out to the moon, Collins is to separate the Apollo command and service modules—Columbia—from the third stage. Eagle will still be attached to the spent stage; Collins will nudge Columbia back to Eagle, docking and taking it over for the coast to the moon. Then Eagle and Columbia will be in the "barbecue mode"—rotating slowly so the sun heats them evenly.

The Silent Minutes

Around 1:26 p.m., EDT, next Saturday, the Apollo 11 ship is to sweep behind the moon. For 34 minutes, officials at NASA's Mission Control Center in Houston have no way of knowing if the ship's 20,500-pound-thrust engine, in a six-minute burn, braked Apollo 11 from a speed of 8,279 mph to 5,476 mph and dropped it into lunar orbit with a pericyynthion (low point above the moon) of 69 miles and an apocynthion of 195 miles. If the engine—which has so far been successfully fired 34 times in previous Apollo flights—does not ignite, Apollo 11 will be traveling too fast for the moon's weak gravitational field to hold it and will head back toward earth.

On Saturday evening, Aldrin and Collins are to open the hatch in the top of the cone-shaped Columbia, remove the

docking mechanism, and clear a 32-inch-diameter, 3-foot-long tunnel leading to Eagle. Aldrin is to wriggle down the length of the tunnel and swing open Eagle's hatch. After a quick check that everything is in working order inside the landing craft, Aldrin is to return to the three-man cabin.

Four days out, the schedule calls for Aldrin to re-enter Eagle, followed—an hour later—by Armstrong. At 2:12 p.m., EDT, Sunday, Armstrong and Aldrin will shove off from Collins. While Armstrong fires small thrusters to keep Eagle on an even keel, the guidance computer will operate the 10,000-pound braking engine.

At 50,000 feet above the moon, Armstrong is to turn Eagle over—it will have been descending until then on its back, with its two triangular windows looking out toward black space—for a good close-up view of the moon. At that point, Eagle will be about 276 miles west of the landing site.

It will take the four-legged, spidery-looking craft just under twelve minutes to cover those 276 miles and descend those final 50,000 feet. A radar on the underside of Eagle's descent stage will bounce signals off the moon, and the ship's computer will calculate not only how far above the craters the LM is at any instant, but also how fast it is sinking.

Below 10,000 feet altitude, Armstrong will gradually begin to right his ship. By the time Eagle passes through 7,600 feet altitude—called the "high-gate" mark—the ship will have been tilted vertically enough so that the crewmen will be able to see the landing site almost 5 miles directly ahead. On the windows in front of Armstrong and Aldrin are a series of lines, like the marks on a measuring cup and numbered from zero through 70. The computer, after calculating the coordinates of the landing site, then prints out a number; by looking through designated lines on the panes, the crewmen will know where their craft is to settle down.

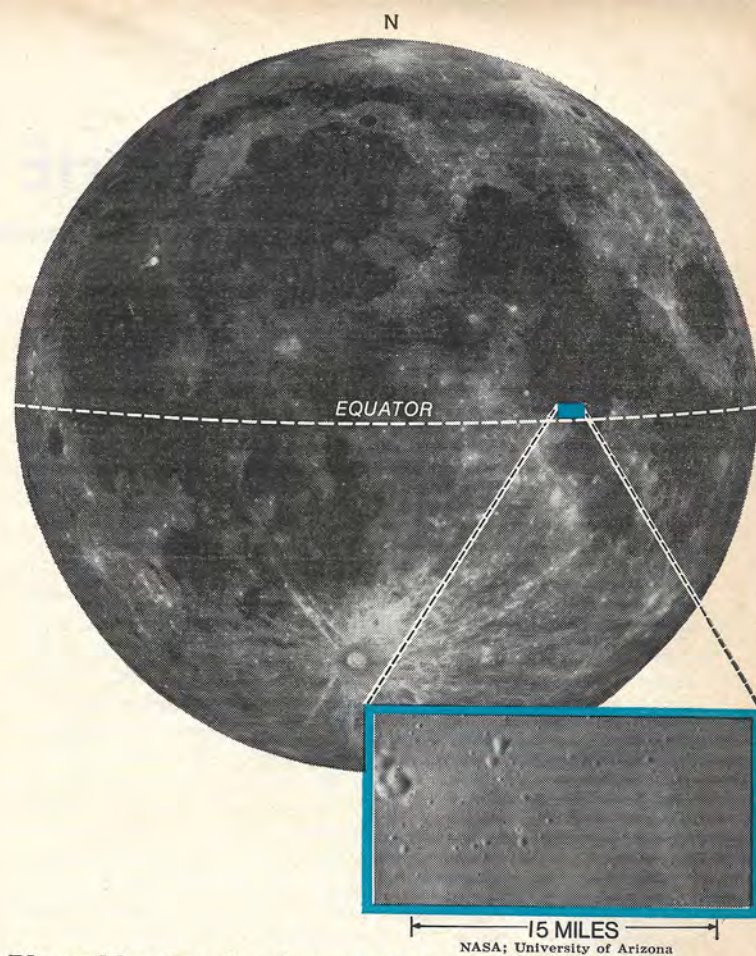
At 500 feet, Armstrong will have Eagle almost completely right side up and, like a helicopter, beginning a steep—but slow—descent to the surface. At 78 feet altitude, Eagle will be sinking gently at a rate of 3 feet per second, and the two astronauts are to give the landing area a very close inspection for deep craters or large boulders that might tip their craft on landing. If they spot any potential hazard, they will have enough propellant left in the tanks of Eagle's descent stage at that point for about two minutes of hovering flight in which to pick out a smoother site and then maneuver the LM to it. NASA engineers say this is sufficient fuel reserve for the astronauts to reach a better site.

Touchdown in Tranquillity

On the bottom of three of Eagle's four large saucer-shaped landing pads are 68-inch long probes that, like curb feelers on an automobile, alert the crew that they are about to land. The first probe to touch the lunar surface will turn on a light on the astronauts' instrument panel to indicate that contact has been made; the crew is to shut down the engine one second after the light flashes and allow the craft to free-fall the final few feet to a comparatively smooth corner in the Sea of Tranquillity. The landing jolt is not expected to be harder than what an airline passenger feels when his jet lands.

At about 4:19 p.m., Sunday, July 20, if everything has gone well up until then, Armstrong and Aldrin expect to be peering down on the grayish-tan surface of the moon approximately 15 feet below them. And the flight plan, a model of prudence, calls for the two men to prepare the ascent, or upper, stage of Eagle for take-off (see the following two pages for a detailed account of the moon stay).

That part of the Sea of Tranquillity where Eagle is to come to rest may seem about as exciting to viewers back on earth as a televised view of the Sahara desert. The landing site, according to Navy Capt. Lee Scherer, the NASA director of the Lunar Exploration Office, was chosen because it appears to be empty of large craters and big boulders that could destroy a landing craft. Most of the craters in this area, Scherer thinks, are no bigger than 10 feet across. The surface of the moon here is thought to be largely made up of fine-grained basalt, with the cohesiveness of wet beach sand. Like



Planned landing site: A corner in the Sea of Tranquillity

the footprints found by Robinson Crusoe, Armstrong and Aldrin are expected to leave the imprint of their heavy thermal boots to a depth of $\frac{1}{4}$ -to- $\frac{1}{2}$ inch in the virgin surface of the moon. Physicist Robert Jastrow, an adherent of the theory of a cold moon where geological activity has ceased, suggests the astronauts' footprints might last a million years.

The crewmen hope to return to earth with 130 pounds of soil and rocks for 142 scientists and laboratories in the U.S. and abroad to analyze, in samples weighing from 0.1 to 300 grams. The material, unaffected by weather, may provide clues to the origins of the universe.

Armstrong, Aldrin and Collins have trained diligently for this mission, since being notified last January that they had been assigned to Apollo 11. Armstrong, the civilian who is commander of this epochal journey, has driven the crew like a "czar," according to observers around the Manned Spacecraft Center in Houston. All three are extremely competent, intelligent men, but there is little of the camaraderie that the crew of Apollo 9 and 10 exhibited.

For the past several days, the three astronauts have been taking elaborate steps to avoid catching a last-minute cold. President Nixon, whose signature the astronauts will carry to the moon on a special plaque attached to a landing leg of Eagle, had planned to have dinner with Armstrong and his crew the night before the launch. But NASA's Charles A. Berry, the astronauts' physician, expressed his concern that the President or some of his staff members might be carrying germs. The President canceled out. He still intends, however, to be aboard the recovery carrier in the Pacific July 24 when Apollo 11 is scheduled to return to earth.

Although he will not be able to shake hands with the triumphant moonmen—they will be strictly quarantined against the remote possibility that they have taken back unknown microorganisms to earth from the lunar surface—Mr. Nixon nevertheless will be able to talk to Armstrong, Aldrin and Collins through a telephone to their sealed trailer. What he has to say may be of more than passing interest; there have been reports that the President might announce a new major goal for the U.S. space program, just as John F. Kennedy committed the nation to the moon more than eight years ago.

EAGLE'S NEST: THE LUNAR COUNTDOWN

It all comes down to 22 hours on the moon. Five years of planning, ten manned Gemini and four manned Apollo flights, long meetings of the Lunar Surface Operations Planning Group representing a dozen NASA offices and scores of doctors, suit designers, geologists, lighting and photo experts, human-factors engineers—all these events and men had to coalesce in the last few months to produce the Lunar Surface Operations Plan. For, after \$24 billion had launched the astronauts to the moon, what were they to do there? And what could they feasibly do within the physical limitations of man and his technology? Tests revealed, for example, that an astronaut was likely to burn up 1,600 British Thermal Units of energy per hour on the moon. So one contractor developed a back pack designed to keep an astronaut cool for four hours, and NASA programmed a maximum time of three hours for Extravehicular Activity (EVA). Other human parameters, such as the size of an oxygen unit an astronaut could conveniently carry, began to chisel down the endless list of things man might like to do on the moon.

What finally emerged from the debates at NASA was a "time-line"—a schedule precise to the split second that detailed time allotments for everything from the deployment of sophisticated equipment on the lunar surface to the spontaneous expression of joy likely to be emitted by the astronauts once they realize that they, after all, are the first men on the moon. Apollo 11's planned time-line, subject to the X—for unknown—factor, follows:

Sunday, July 20, 2:12 p.m., EDT. Lunar Module (Eagle) separates from Command Service Module (Columbia). Armstrong and Aldrin stand like motormen at the controls of the LM, firing the descent rocket to begin braking Eagle's orbital speed from 3,500 mph. On final approach the craft tilts to the vertical and the crew for the first time can look out their windows to reconnoiter the planned landing site. Descent engine still thrusting, speed dropping to a few feet per second, Eagle's four landing pads—three with 68-inch probe extensions—touch moon surface.

4:19 p.m.: Touchdown. When the tip of the first probe touches, the lunar contact indicators on the control panel light up blue. A second later the crew cuts descent engine.

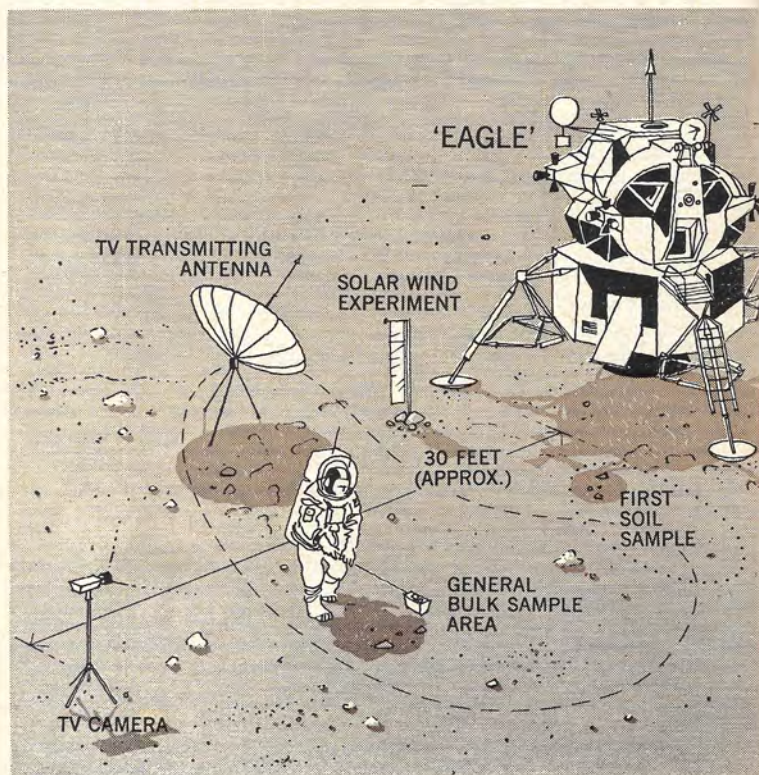
4:19:01 p.m. Eagle settles onto surface as probes break away. The astronauts will confirm verbally with Houston what Apollo Control's instruments on earth have recorded. The crew's first action once they've landed will be to try to decide whether to leave. They will punch "V 37 E 12 E" into their computer, the normal program for ascent. The computer will then prepare the ship for blast-off. Less than 60 seconds later the computer will flash: ENGINE READY ENABLE. Armstrong and Aldrin will then check out their instruments. If they find something wrong, they will punch the computer PROCEED button to rocket the ship off the moon and back to Columbia. If they feel, however, that all systems are working properly and the ship has suffered no damage in landing, they will punch "P-68" (the Landing Confirmation Program), automatically entering their exact position into the computer, shutting down the systems and putting the ship in an idle state for a later departure.

6:23 p.m. By now, the astronauts have completed their laborious post-landing checkout. Next, they are to eat reconstituted freeze-dried food packages in their pantry and rest for four hours (they may take a Seconal sleeping pill to dim their excitement). According to NASA officials, they are not likely to skip their rest period because they anticipate at least two grueling hours moving about in a space suit that adds 30 moon pounds—or 180 earth pounds—to their burden. "Unless the controllers said 'Go out early,' I don't think they would pass up that rest," says Richard J. Green, of NASA.

10:58 p.m. The astronauts eat once again to build up energy.

11:58 p.m. Armstrong and Aldrin begin putting on their Extravehicular Mobility Units (EMU), which consist, essentially, of a pressure suit, a thermal garment, a helmet, and a Portable Life Support System (PLSS) back pack containing the oxygen supply, electrical power, communications gear and a liquid cooling unit. The space suit is a 28-layered, white-colored network of synthetic fibers. The outer layer is made of a heat-resistant glass fabric layered with plastic that, despite its smooth, silky texture, is tough enough to insulate against an expected moon temperature of 150 degrees Fahrenheit. The helmet is a clear sphere, a plastic fishbowl of Lexan. There are two visors. The outer one is tinted gold to shield infra-red and ultraviolet light without appreciably altering the color of the moon. The inner one is slightly tinted, to reduce interior fogging. The astronauts will also put on "lunar overshoes."

Monday, July 21, 1:01 a.m. The astronauts struggle within the confines of the LM to suit up. They already have to adjust to a new world. The PLSS back pack (a \$250,000 unit) redistributes the total weight of astronaut and equipment so that the center of gravity is raised from "earth point" around his wishbone area to "moon point" at chin level. Adjusting to lunar gravitation—one-sixth of earth's—can be hazardous. "If he bends forward slightly, he pitches forward," explains Angelo Micocci, a Bendix project engineer in Ann Arbor, Mich., where the moon science experiments were built. "He can't squat either. If he does fall on his chest, he can do a push-up that will put him back on his feet." Originally, the back pack was a sharp-cornered square box. "When they were square," says Micocci, "the astronauts had an awful time rolling over." Now that the back pack edges are rounded, "falling down is not a prime concern," says Micocci. "They've practiced."



Surface tasks for man: Scraping up some lunar

1:58 a.m. Gradual depressurization of Eagle begins to make its interior of equal atmosphere with the airless moon and enable crew to open hatch.

2:12 a.m. Armstrong opens the forward hatch and pauses on the exit platform: he hunches over and backs out of the LM slowly. On his way down, he pauses to pull a D-shaped ring of a lanyard that pops open the Modularized Equipment Storage Assembly (MESA); this also exposes a TV camera. Aldrin photographs Armstrong with a Maurer 35-mm. movie camera. Armstrong is to take five minutes to execute a semi-slide down the ladder—being wary of tearing the suit.

2:17 a.m. Armstrong touches left foot to lunar surface, keeping his right foot solidly on an LM footpad and his arms wrapped around the landing gear to make sure that the moon crust isn't softer than NASA thinks it is. Armstrong will then probably look toward the horizon, which, on the moon, will only be a mile and a half away. Next, he will determine if he can move around freely—and if he can retrace his steps to the ladder. "The first priority," says one official, "will be to see whether we can get him back off the moon."

2:20 a.m. Armstrong will lift his arms to see how high he can reach, take a few steps near the ship, and report to Houston—over the \$100,000 PLSS gold-plated radio—how the moon feels. "He'll be building up his confidence," says Green.

2:26 a.m. Armstrong will then pull out a collapsed "contingency-sample" tool—a 25-inch-long aluminum handle with a loop at the end to which the astronaut attaches a Teflon bag. With this tool, Armstrong doesn't have to bend over—his space suit wouldn't allow him to do that anyhow—or even bend his arms and legs more than slightly. He is to scrape together some lunar soil and rocks.

2:38 a.m. Aldrin leaves to join Armstrong. While Aldrin is feeling his way around, Armstrong will walk back toward MESA and mount the TV camera on a tripod.

2:48 a.m. Armstrong will take the bundle to a spot about 30 feet away and set up the camera: earthbound audiences may then have a fairly panoramic view of the astronaut's activities from then on. The sun will be about 10 degrees above

the eastern horizon and the astronauts will have to be careful not to point the camera toward it—just like any tourist snapping pictures. If Houston says the reception is poor, Armstrong may deploy an umbrella-like antenna 12 feet high and with a 10-foot-diameter wire-mesh dish to improve the signal.

2:51 a.m. Aldrin is to go back to MESA, pull a lever, and set up the solar-wind collector. Little more than a screen of aluminum foil and easel, it unfolds like a home-movie screen. If it sticks, Aldrin will probably abandon the experiment.

3:28 a.m. The Early Apollo Scientific Experiments Package (EASEP) is deployed by Aldrin. The major item in EASEP is the Passive Seismic Experiments Package (PSEP), a seismograph fifteen to twenty times more sensitive than any so far used on earth.

3:31 a.m. The PSEP is to be set up 70 feet from the LM and to work properly, it must be lined up on the moon's east-west axis. To do this, Aldrin must deploy a spring-loaded gnomon (a car-antenna-like unit) that will cast a shadow on the sundial contained in the PSEP baggage and indicate compass directions. PSEP is so sensitive that NASA hopes to record the astronaut's footsteps as he walks away from the experiment. Simultaneously, Armstrong will set up the Laser Ranging Retro-Reflection Experiment (LRRR) about 10 feet away. The astronauts will only estimate—not pace off—distances in deploying the equipment. In all they will stay within a 70-by-100-foot area—about the size of a modest home lot.

3:42 a.m. Aldrin and Armstrong begin to fill NASA's "sample-return containers," or, as the astronauts call them, the "rock boxes." Each box is about 19 inches long, 11½ inches wide, and 8 inches high—a single unit that has been hollowed out of an aluminum block (a multisheeted box would require welding of the joints, the solder being too heavy an addition for the weight-conscious NASA). The astronauts will carry the boxes perhaps 100 feet from the LM and—using an aluminum scoop resembling a steam shovel—jam as many samples in the boxes as possible (up to about 50 pounds). Armstrong, however, may photograph some rocks, seal them in numbered plastic bags, and photograph the area from which the rock was taken. Armstrong will fill one small aluminum can with loose dirt and one with rocks and cap them to seal in lunar "atmosphere." Aldrin starts back to the LM.

4:18 a.m. By now the astronauts will be close to departure—and perhaps close to exhaustion due to all the excitement and hard work. Armstrong will hook the sample boxes one at a time to the Lunar Equipment Conveyor (LEC)—a pulley system with one end attached to a hook on the ship's exterior and the other to a hook on the sample box. Green fears that if the LEC is given too much to pull, "it may act like an overloaded clothesline and bang against the steps." Armstrong pulls, and Aldrin, waiting at the hatch lifts the boxes inside.

4:29 a.m. About twenty minutes after Aldrin's return to the LM, Armstrong will follow, shedding his overshoes and wiping his feet on the rungs before entering the ship. They will have left behind the scientific equipment, litter such as springs that were released and discarded bags, a plaque with Richard Nixon's signature, the American flag, micro-filmed messages from leaders of foreign nations on earth, and the footprints of the first men on the moon.

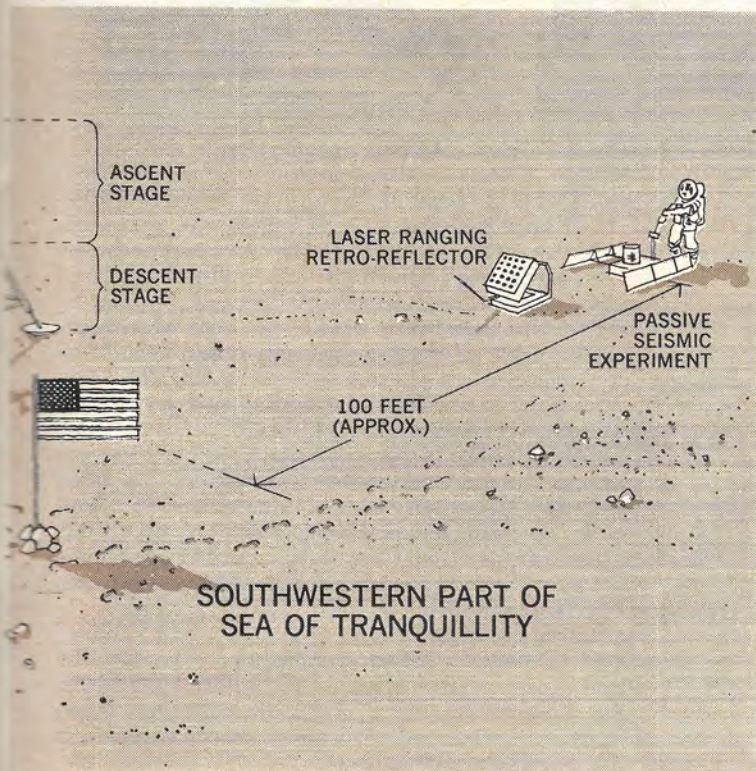
4:42 a.m. By this time the hatch may have been shut long enough for the oxygen-pressure buildup to reach a point where the astronauts can discard their helmets—thus releasing the pressure inside the space suits. They will then eat and sleep for a scheduled four hours and 40 minutes.

9:22 a.m. Houston will awaken the astronauts for their next task—breakfast and then the countdown.

1:55 p.m. They fire the ascent engine to leave.

5:32 p.m. Columbia and Eagle dock in lunar orbit.

Tuesday, July 22, 12:57 a.m. Armstrong fires Columbia's engine, on the moon's far side, for return to earth.



soil and rocks in a world of PSEP, MESA, LRRR

MEN FOR THE MOON

To many outsiders—and to the scoffers—the three men who are to embark for the moon this week seem hard to tell apart: close-cropped, small-town, family men—three WASP-ish peas in a space pod. On closer inspection, however, the Apollo 11 crewmen are distinct individuals. No one need mistake them for the man next door—they are much too intelligent and complex. In a matter of days, these three Americans are to become historical figures for all time and for all men. Here are three candid portraits of the men of Apollo 11—and of their views—on the eve of their adventure.

Civilian Neil A. Armstrong, 38, the Apollo commander who is scheduled to be the first man to walk on the moon, has been known to smoke a cigar and enjoy himself at parties. But he can also be a diffident, tightly controlled individual whose intensity may come to the surface only in the form of small gestures: nose-rubbing, blushing, ear-pulling, a slight

scholarship and in 1947 entered Purdue University to study aeronautical engineering. When the Korean War began, Armstrong was called to active duty at age 19. He flew 78 combat missions in Korea and was forced to eject from one crippled plane and lost a wingtip of a second.

Armstrong returned to Purdue and was graduated in 1955; one year later, he married Janet Shearon, a sorority queen he had met on campus. They are the parents of Eric, 12, and Mark, 6, and Armstrong's idea of a good weekend is "to go scuba diving with my family."

After graduation, Armstrong joined the National Advisory Committee for Aeronautics—NASA's predecessor—and flew the X-15 rocket plane. His initial reaction to the manned-spaceflight program, back in 1959, was one of mild disdain. "We had spent years developing the rocket airplane concept and Mercury looked like a dark horse to us," Armstrong said recently. "We tended to regard the Mercury people as inexperienced intruders in our business. I am frank to admit I gave them too little credit."

In 1962, test pilot Armstrong applied for astronaut training and was accepted in the second "class"—along with Frank Borman, James A. McDivitt, the late Edward H. White and five others. He drew the commander's role for the Gemini 8



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The men—and the wives and children—of Apollo 11: Armstrong (left), Aldrin and Collins

stammering. "He appears cold," says Dr. Charles A. Berry, chief of medical operations at NASA's Manned Spacecraft Center, "but actually, he's bashful. When you know Neil, you find that he can be a very warm individual." There are not, however, many people who know Armstrong.

Armstrong was born in Wapakoneta, Ohio, the son of a state auditor. "We would do an audit, which would take about a year," Armstrong's mother recalls, "and then move on." By the time he entered high school, Neil Armstrong had lived in more than half a dozen different towns.

His bedroom, his mother remembers, was stacked with books, magazines and drawings of aircraft; model airplanes—which Neil bought with money earned from after-school jobs and built with meticulous care—dangled from the ceiling. Among the non-technical books he recently read are "We," given to him by Charles Lindbergh, and early science-fiction by Edgar Rice Burroughs.

Armstrong started taking flying lessons at the grassy Wapakoneta airfield when he was 15. It cost him \$9 for a one-hour lesson and Neil carefully saved the money he earned from a drugstore job to pay for the instruction. He received his private pilot's license at 16 and proudly pedaled his bicycle home to tell his parents—he had yet to learn to drive a car.

A superior student, Armstrong won a Naval Air Cadet

mission, with David R. Scott as his co-pilot, in early 1966—the first U.S. attempt to link two craft together in space. No sooner had the two craft docked than the combination began to spin wildly. Armstrong brought the ship under control and made an emergency landing in the Pacific Ocean.

Armstrong showed equal piloting skill last year when a jet-powered training craft in which he was practicing lunar landings suddenly skittered out of control. Sensing that the wingless craft was about to turn over, he ejected and parachuted to safety while the vehicle crashed and burned.

In the past two months, Armstrong—who is not particularly fond of physical training and tends to pudginess—has managed to diet away 15 pounds to a "mission status" of about 165 pounds. In his quiet, diffident way, he says of Apollo 11: "I think if historians are fair, they won't see this flight like Lindbergh's. They'll recognize that the landing is only one small part of a large program."

Air Force Col. Edwin E. Aldrin Jr., 39, who expects to be the second man to set footprints on the moon, is better known by his nickname of "Buzz." But, says a friend, "Aldrin is the kind of guy who really shouldn't have a gee-whiz nickname. He should be called Edwin."

Aldrin has the stony face of a police detective. His voice

MOON WATCHING

is flat, his speech laconic, and his gaze penetrating. "If you didn't know what he did, you wouldn't be at all interested in him," says a woman who knows him and his family. "He's a very forgettable man, but he's a nice man." Yet, Aldrin is the spiffiest dresser of the three Apollo 11 crewmen—and the most bejeweled. He wears a wedding band on the ring finger of his right hand and a Masonic ring on the little finger, and his West Point class ring on his left hand. He wears a tie clasp fashioned from pilot wings and dangling from it are the Greek symbols of two engineering honor societies.

Aldrin's grade-school principal in Montclair, N.J., recalls that the astronaut had an IQ score of 150. Aldrin was graduated third in a class of 475 cadets from West Point in 1951, entered the Air Force (his father was also an Air Force colonel) and flew 66 combat missions in the Korean War. He earned a doctor of science degree from MIT as part of a special USAF program in 1963. His doctoral thesis dealt with orbital rendezvous—a feat he performed during the flight of Gemini 12 in late 1966. When the radar failed, Aldrin—the co-pilot—himself worked out the computations.

Aldrin keeps in shape with gymnastics and pole-vaulting; he occasionally puffs on a corn cob pipe. His idea of relaxation, he recently said, is "sitting around in the sun up at Dad's place on the New Jersey shore, eating corn on the cob, swimming and taking it easy," along with his wife, Joan, and children Michael, 13, Janice, 12 in August, and Andrew, 11.

What will he feel when his landing craft bumps down upon the moon? "I would hope," he said, without intonation, "there will be a normal amount of adrenalin flowing in me that would help, rather than impede, the mission."

Air Force Lt. Col. **Michael Collins**, 38, had been assigned to the flight of Apollo 8. But a bone spur on his spine, near his neck, was pressing against nerves controlling his legs and the slight, muscular astronaut last summer suddenly found himself falling down for no apparent reason. Given the choice between long-range treatment or risky surgery that would eliminate the problem, Collins unhesitatingly decided on the operation. It cost him his seat on Apollo 8.

Typically, Collins accepted the situation with realism—and determination. When he finally shed the neck brace that he wore during the three-month recuperation, he worked hard to get back in shape, playing handball.

Collins is one of the best-liked astronauts. "If there was a contest for 'Everybody's Favorite Astronaut,'" says one close friend, "Collins would win it going away and then discreetly refuse the title." Still, Collins dislikes the prospect of becoming a world hero. "There are two kinds of people in this world," he says, "those who like publicity and those who prefer to do without it. I prefer the latter."

The son of the late Army Maj. Gen. James L. Collins, Mike Collins was born in Rome, Italy, and grew up on a succession of different Army bases. So he cherishes his family life with wife Patricia, daughters Kathleen, 10, and Ann, 7, and son Michael, 6. "For anybody who lives out of a suitcase as much as I do," he says, "it's fun to be at home."

Collins, a '52 West Point graduate, is a nonsmoker who prefers Martinis and small dinner parties, usually with crew members. When the men wind up in the kitchen talking about the state of the flight preparations, the wives fret about why the men don't spend more time talking to them.

Collins has made two spacewalks. Now he will be in the mother ship. He says it does not bother him to come that close and not land—and those who know him believe him.

"Walter Cronkite, more than anyone else, sees us through these shots," Art Buchwald wryly remarked not long ago, "and we really count on him to get the Apollo capsules back safely to earth."

This time, with Apollo 11, Cronkite and his colleagues have their hands fuller than ever. Before the Apollo mission is over, it will be encapsulated in millions of words and tape and film footage—the most watched and written about single event in history.

The European TV networks expect 225 million viewers during the Apollo mission. In the United States, CBS, ABC and NBC confidently expect to attract 150 million television viewers in the nation at 2 a.m. Monday, July 21—when even Johnny Carson is over but when the astronauts hope to step out onto the moon. Each network revised and juggled plans almost hourly, hiding as much from the competition as possible, right up to launch time.

The high stakes involved—ABC, NBC and CBS are spending well over \$1.5 million each—reflect in the network epics themselves. As a group, they are loose, ambitious catchalls, by turns ingenious and banal. CBS has both Lyndon Johnson and ex-astronaut Walter Schirra. Johnson will reminisce about how the moon program developed. Schirra will team with Cronkite and the science-fiction writer Arthur Clarke to give CBS's commentary an authoritative edge.

CBS's largest New York studio houses a projection screen plus nine film projectors that will create special effects and imagery to blend with live coverage. The synchromeshed projectors, controlled by a computer, can flash anything from words, charts and diagrams to simulations of docking maneuvers and star sightings on the screen. "We probably won't project more than six or seven images at once," says executive producer Robert Wussler. "We have to remember the people with their 9-inch Sonys."

TV Poetry: CBS also has a package of space films dating from a 1900 spool to "2001," along with a parade of widely diverse guests, including Bob Hope, Sir Francis Chichester, Arthur Miller and Marianne Moore.

ABC is matching Marianne Moore with James Dickey. It has stockpiled special film, too, mostly for the time between 4:30 p.m. on Sunday and 12:30 the next morning, when the astronauts will be sleeping or checking equipment. The obvious worry at all the networks is dead time. ABC is readying—among other things—a new concerto in honor of the landing by Duke Ellington, who will also sing in public for the first time; a "philosophical" panel featuring Marshall McLuhan and Bill D. Moyers, and a children's panel, around which commentator Frank Reynolds and a group of 7- to 10-year-olds will swap reactions and theories.

NBC has a secure thematic lock, at least, on its epic. "Our theme is 'a state of the earth,'" says James Kitchell, NBC's executive producer. "We're going to look at what's going on in the world while two men sit on the moon's surface." The familiar NBC faces, Chet Huntley, David Brinkley, Frank McGee and company, will be commenting, backed up by scientific luminaries such as Harold C. Urey.

Space and TV were meant for each other—a marriage made in heaven—but the print men have not surrendered the



Newsweek—Bernard Gotfryd

TV simulation: Also, blue cheese

story. "Certainly there are some things that television can do that we can't," concedes Nick Williams, editor of The Los Angeles Times, "but we can do some things ourselves that television can't." For most newspapers, that meant an accent on quality rather than quantity, on backgrounding rather than trying to match TV's on-the-spot coverage. The Los Angeles Times and The Washington Post will emphasize staff-written pieces, rather than articles by guest experts. The Post also has developed a technique for shooting the image of the first man on the moon off a TV screen for reproduction on Monday morning's page one. The New York Times is planning three specials. The first one, the day after lift-off, will run to more than 100 columns, and include essays by Wernher Von Braun and the ubiquitous Arthur Clarke. The Times may also try for its first news color pictures.

Payoff: Finally, book publishers hope to knit up the loose ends left by the other media. Norman Mailer stands to make more than a million dollars doing just that, with a book for Little, Brown (serialized in three parts by Life magazine, which is paying him \$100,000).

Mailer's book will not appear in completed form until 1970. At least half a dozen Apollo books are on the pad in Great Britain alone awaiting publication. In the U.S. John Barbour's "Footprints on the Moon," an Associated Press production, is already in galleys—with the last chapter to come—scheduled for serialization in 400 newspapers. The book should be on sale the last week in July—even before the astronauts get out of their quarantine. About the same time, both Columbia Records-CBS and Time-Life Records will produce multi-volume albums with the first sounds heard from the surface of the moon.

A magnificent effort—to match a magnificent event. Or is it? To some, these frantic books, TV extravaganzas, and record albums are mere drives for the fast buck. To others, they seem, taken as a whole, spirited and vigorous—a classic example of challenge bringing out new qualities in media that respond to it.

Blue Cheese: Any good McLuhanite must be delighted, furthermore, by the lunar celebration created by August Heckscher and the New York City Department of Parks for the night of July 20. The city's "Moon Watch" in Central Park will feature huge screens showing live TV coverage, a synthetic aurora borealis created by artist Forrest Meyers, searchlights, a collage of films, inflatable sculpture, dancing, "moon music," Mayor John Lindsay perhaps reading poetry—and a blue-cheese picnic.

Everyone at the "moon-in" is to wear white clothes. Indeed, when New Yorkers dress up for an overnight in the park, the millennium is here. As composer John Cage observes: "The moon landing will expand the media just as it is expanding our minds—that is, our sense of what we are capable of doing."

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