

moon landing

THE
BIG THREE
**Weekly
Heralds**
SOUVENIR AUGUST 2,
1969
6^d



Monday, July 21, 1969. Man stands on the Moon for the first time. Armstrong reflected in the visor of Aldrin's space helmet.

MOON landing

And the world, still stunned almost into disbelief, at last knew it was for real.



The giant leap

IT WAS an epic drama played out in the heavens not by gods but by men, and for a moment — one brief glorious moment — all the people of the world were as one as they watched with bated breath and marvelled at Man's ingenuity, his courage, his thrusting ambition, and his monstrous arrogance.

And when it was over, Man's most daring dream had come true. It was a triumph, opening up new horizons in the immensity of Space, where there is no end to the new horizons, only a bewildering infinity to challenge and mock him.

It had always been Man's destiny to ride the stars. For to fix the beginning of the story of the Conquest of the Moon would mean going back in time to the moment he first noticed that

white globe glowing in the night sky as though planted there as an eternal torment to his curiosity.

His desire to reach out and touch it remained only a frustrated dream until Wednesday, July 16, 1969, when Apollo 11 roared up, up and away from Launchpad 39A at Cape Kennedy and, after looping the Earth, headed for the Moon on Man's greatest voyage of discovery.

The last challenge

On board were Mankind's first two ambassadors to another world, and a third man — their "taxi driver" — who, while they kept their appointment on the lunar surface, would drive round and round waiting to pick them up for the return trip.

The first men on the Moon, Neil

Armstrong and Edwin Aldrin, and the command pilot Michael Collins, were The Quiet Americans.

For while their courage gripped the earth-bound, and the world held its breath, they remained calm, cool, matter-of-fact, and unemotional, saying little unless it was to communicate with Houston mission control about some operation, some adjustment, some technical detail.

No one could begrudge them their aloofness, their complete devotion to duty. They were attempting what no man had attempted before.

In the eight years of American and Russian probes to the Moon, numerous unmanned spacecraft had been sent crashing into the lunar surface. Later more sophisticated spaceships had soft-landed and dug

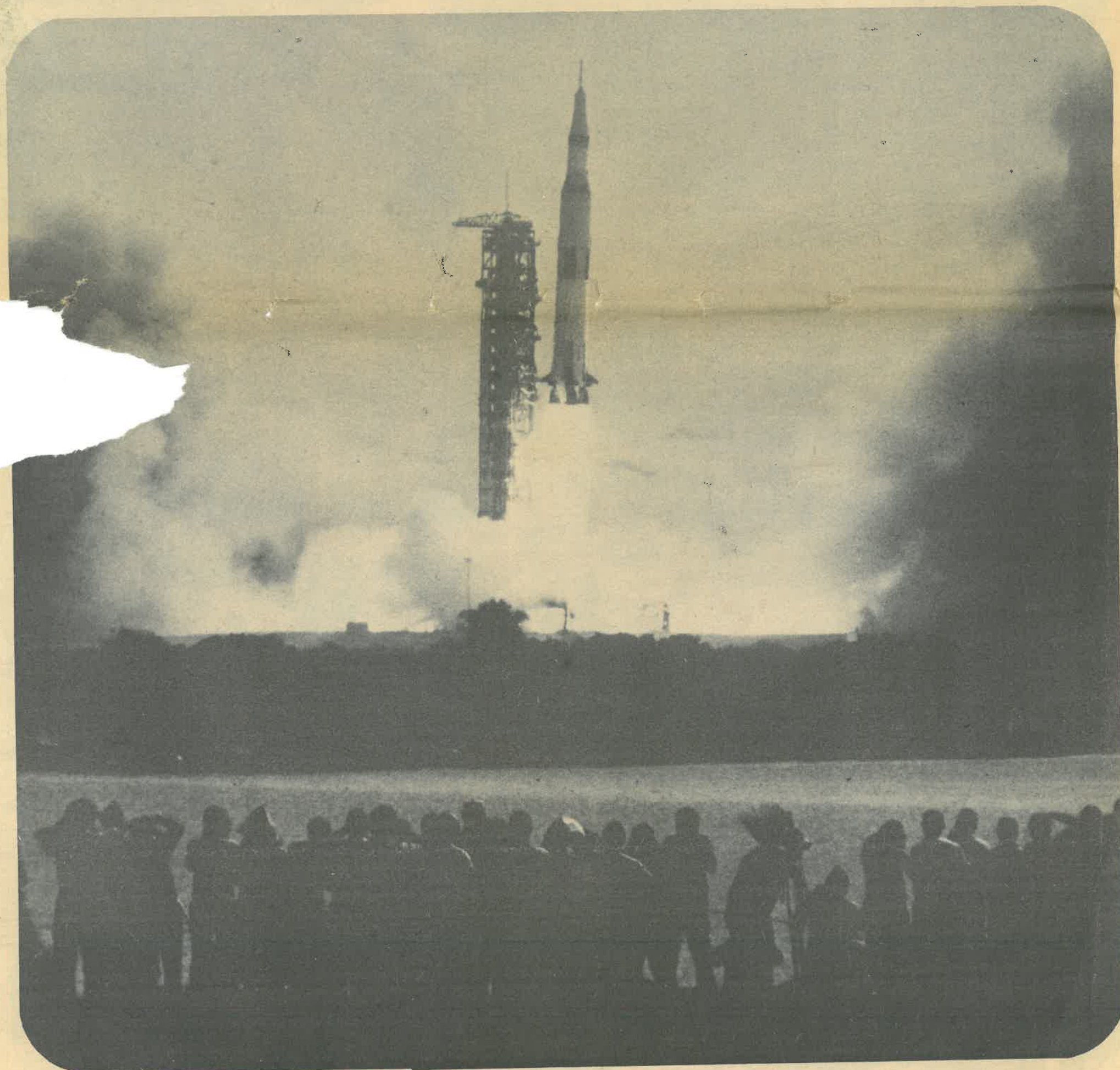
into the lunar crust.

Photographs had been flashed back to Earth from spacecraft on the lunar surface or in orbit above the Moon. Man himself had flown round and round it, down and over it.

But he had never landed. That was the one remaining challenge, and no one knew what hidden dangers lay on the mysterious surface of Earth's, closest neighbour.

On Saturday morning July 19, Apollo 11 moved into the Moon's gravitational field and the crew prepared for the make or break lunar orbit. A reverse fire of the main engine was slowing their speed sufficiently to enable the Moon's gravity to hold the craft in orbit.

Too long a firing would put it in an orbit too low for Armstrong and



2.32pm. They're off! The weeks of waiting are over and a relieved world hears: "Everything is looking good."

MOON landing

Someday had come for the kid from Ohio, and he recognised the magnitude of the moment.



Aldrin to separate their spider-like lunar module and make the descent to the Moon's surface the next day.

Too short a firing would not slow the spacecraft enough to keep it in orbit and Apollo 11 would head back to Earth — either to skim off the atmosphere like a stone on a pond and never come back, or plunge through too swiftly and burn up.

Hardly routine

At 6.13pm British Time on Saturday evening the big test came as the spacecraft slid behind the Moon and out of contact with mission control for the first time.

Thirty-five minutes later it re-emerged, and the world knew that the first crucial phase had passed: the astronauts had fired Apollo 11's main thrust engines for six minutes and two seconds behind the Moon and the burn had been "good." The ship had gone into an elliptical orbit 69 miles by 196 miles.

It was a manoeuvre which had been accomplished by previous manned missions round the Moon. But when a split-second error means certain disaster, it could still hardly be regarded as "routine."

As Apollo 11 reappeared from behind the Moon, Armstrong gazed out of the window of the spacecraft, describing the scarred, desolate landscape below, and picking out lunar landmarks. They had arrived: they were over the Moon.

Early on Sunday afternoon, during the tenth orbit, Armstrong and Aldrin transferred from the command module — code-named Columbia — to the lunar module Eagle. The climax of the mission was about to begin.

The separation of Eagle and Columbia began on this side of the Moon, but the descent itself began with a firing of the lunar module's motor after a long separating orbit on the far side, out of touch with mission control.

'Eagle has landed'

It was seven o'clock on a sunny Sunday evening in Britain, and the whole world was watching and waiting.

At last Armstrong's calm voice broke the static-filled radio silence with an astronaut's affirmative. The first miracle had been performed. All systems were "go."

From that moment, with the tension mounting second by second and with the minimum of interruption from Earth or from the orbiting Columbia, the lunar module bore Armstrong and Aldrin downwards, using its motor as a brake and slowly tilting until it was upright and ready for landing in the Sea of Tranquility.

On and down, past "highgate" at 7,000 feet with the braking phase complete and the spacecraft rotated so that its windows faced forward — the point at which the final approach began.

Still onward and down, but more slowly now, Armstrong and Aldrin checking, checking and re-checking that all systems were still go.

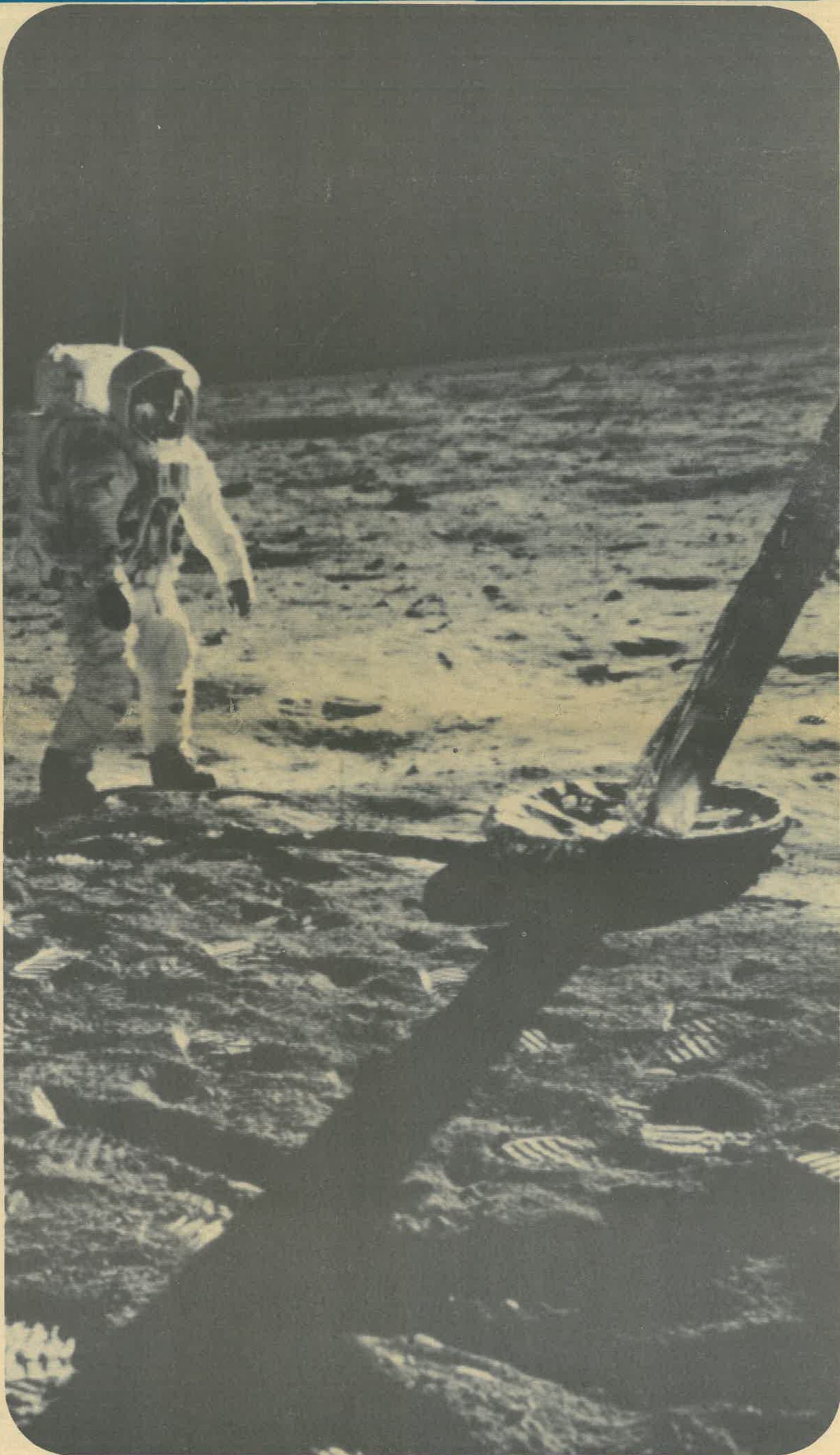
Visual approach, but under automatic control, began at 500ft with the spacecraft still nosing forward slowly. At 250ft, with all forward motion stilled and the descent rate only 2½ft a second, the spacecraft seemed to pause and wait as Armstrong searched the ashen grey landscape for the hidden flaws, the sudden rock, which could shatter the landing.

He did spot danger — a crater "the size of a football pitch" — but with a hop to clear it Eagle dropped safely and so smoothly to the surface.

There was a moment's silence, then the flat tones of Armstrong's voice: "Contact light; engine stopped . . . the Eagle has landed."

Man had arrived. The dream had come true. Science fiction had been transformed into science fact. It was

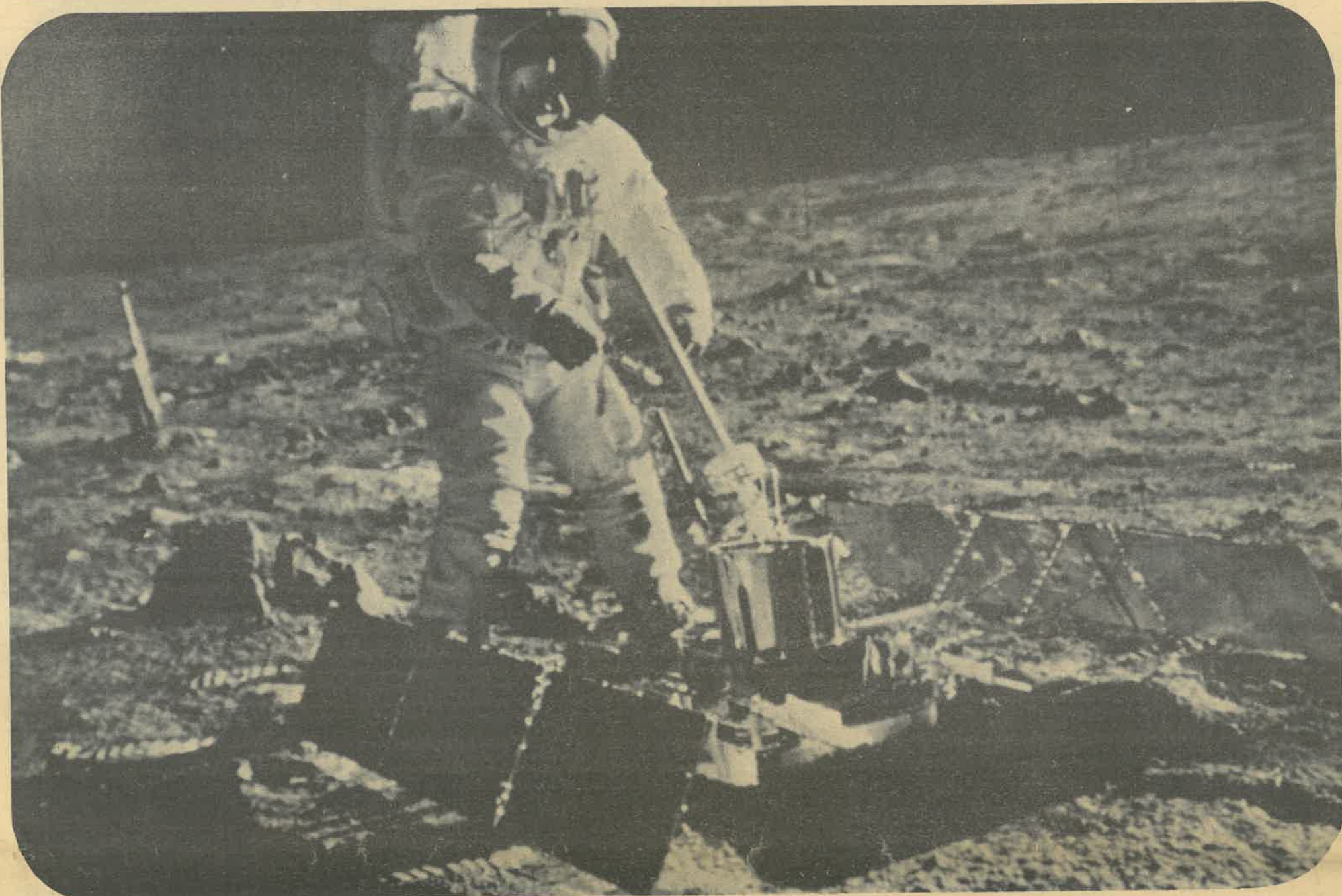
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The legs that took the strain: Aldrin is dwarfed by one of the lunar module's vast legs,

MOON landing

No one knew what hidden danger lay on the mysterious surface of Earth's closest neighbour.



Moonquake! Aldrin sets up the seismic experiment which monitors movements on the lunar surface. Already it has sent back vital information.

Magnificent desolation

■ continued from page 3

9.18pm British Time of July 20, 1969, and Man had made his first space landing.

It was a moment even more breathtaking than the subsequent Moonwalk. The world seemed momentarily stunned by emotion. Only the spacemen appeared unmoved.

From Houston, the space controller checked out: "You got a bunch of guys who're about to turn blue." Eloquent words which spoke for the whole world.

Coolly clinical

Within a few minutes of touchdown came Man's first descriptions from the lunar surface — and the world, still stunned almost into disbelief, at last knew it was for real.

First Armstrong, coolly clinical: "It seems to be a relatively level plain with a fairly large number of craters of the five to 50ft variety and some ridges, most small but some 20 to 60 feet high and literally thousands of little ones and two foot craters around the area. We see some angular blocks several hundred feet in front of us that are perhaps two feet in size and have angular edges."

Then Aldrin: "it looks like a collection of every variety of shape, angularity, granularity, a collection of just about every kind of rock."

And it was Aldrin, an elder and lay-preacher at the Presbyterian Church in the space centre community near Houston, who told the control: "I'd just like to ask everyone around the world who might be listening to pause and consider the events of the past few hours. I'd like everyone to contemplate these events, each in his own way."

The flight schedule called for them to sleep, but that was asking the impossible. They just wanted to go outside and take a walk on the Moon.

Inevitably, Moonwalk was brought forward — by over three hours. And it was at 3.56am on Monday, July 21 that Neil Armstrong stepped gingerly out from the lunar module, making Man's first physical contact with the Moon and fulfilling a boyhood prediction that "Someday I'm going to be up there, I'm going to be on that Moon."

"Someday" had come for the kid from Ohio and he recognised the magnitude of the moment. As America's new frontiersman planted his foot firmly on the lunar surface, he said: "That's one small step for man . . . but one giant leap for Mankind."

Armstrong, who knew the world would be watching and listening as he walked into history, could be forgiven for scripting his first words on the lunar surface.

Twenty minutes later he was joined by Aldrin and together they walked hand-in-hand with all Mankind, the miracle of communications enabling us all to share the historic adventure.

Aldrin proved the more descriptive of the two Moon walkers. He surveyed the eerie scene and declared: "Beautiful, beautiful, beautiful . . . a magnificent desolation." We shared his awe.

The Moon surface was fine and powdery. "Pick it up loosely and it looks like dough," said Armstrong. And it had many colours, not distorted by the still mysterious "Moonglow" we see from Earth.

They found no difficulty moving around under one-sixth Earth's gravity. After Armstrong's "giant leap" came Aldrin's "kangaroo hop"

as he demonstrated the best way to take a lunar stroll.

And it was Aldrin again who showed the world how a Moon rock bounces like a rubber ball.

Then came perhaps the most poignant moment as they unveiled the commemorative plaque to mark the place where Man had made his first visit to the Moon. The plaque showed the two hemispheres of the Earth, and underneath the words: "Here men from the Planet Earth first set foot upon the Moon, July 1969 A.D. We came in peace for all Mankind." It bore the signatures of the three crew members and the President of the United States.

President Nixon was right when he told the astronauts, in his phone call from the White House: "For one priceless moment in the whole history of Man, all the people of this Earth are truly one: one in their pride in what you have done, and one in our prayers that you will return safely to Earth."

Armstrong replied: "It is a great honour and privilege for us to be here, representing not only the United States, but men of peace of all nations, men with interest and the curiosity of man's exploration of the future."

All hell broke loose

Then, after collecting their lunar samples, the dust and rocks which may give the answers to questions Man has asked for thousands of years, they returned to the lunar module, tired men after an unforgettable day.

At 6.54pm on Monday evening, after 21 hours on the Moon, Armstrong and Aldrin blasted away in their lunar module.

It was yet another "first." Never before had a rocket engine lifted anything from the Moon's surface, let

alone a fully-loaded spacecraft.

When the astronauts pushed their firing button everything went according to plan. The Eagle, leaving its spidery legs behind, soared away. Man left the Moon as he had arrived — riding a column of flame.

"Beautiful. Very smooth. Beautiful," Aldrin called out. There was a note of relief in his voice. If the rocket had failed they would have been marooned on the dead planet with no hope of rescue.

Waiting for them above was Michael Collins, who had to orbit alone in the Apollo command ship while history was being made beneath him.

There was one anxious moment when Eagle docked with Columbia — a jerking movement which alarmed the astronauts. "That was a funny one," said Collins. "You know I didn't feel us touch. And I thought things were pretty steady. I went to re-track there and that's when all hell broke loose."

But fate couldn't cheat them then, not with so much achieved. Link-up was successful — if a little bumpy.

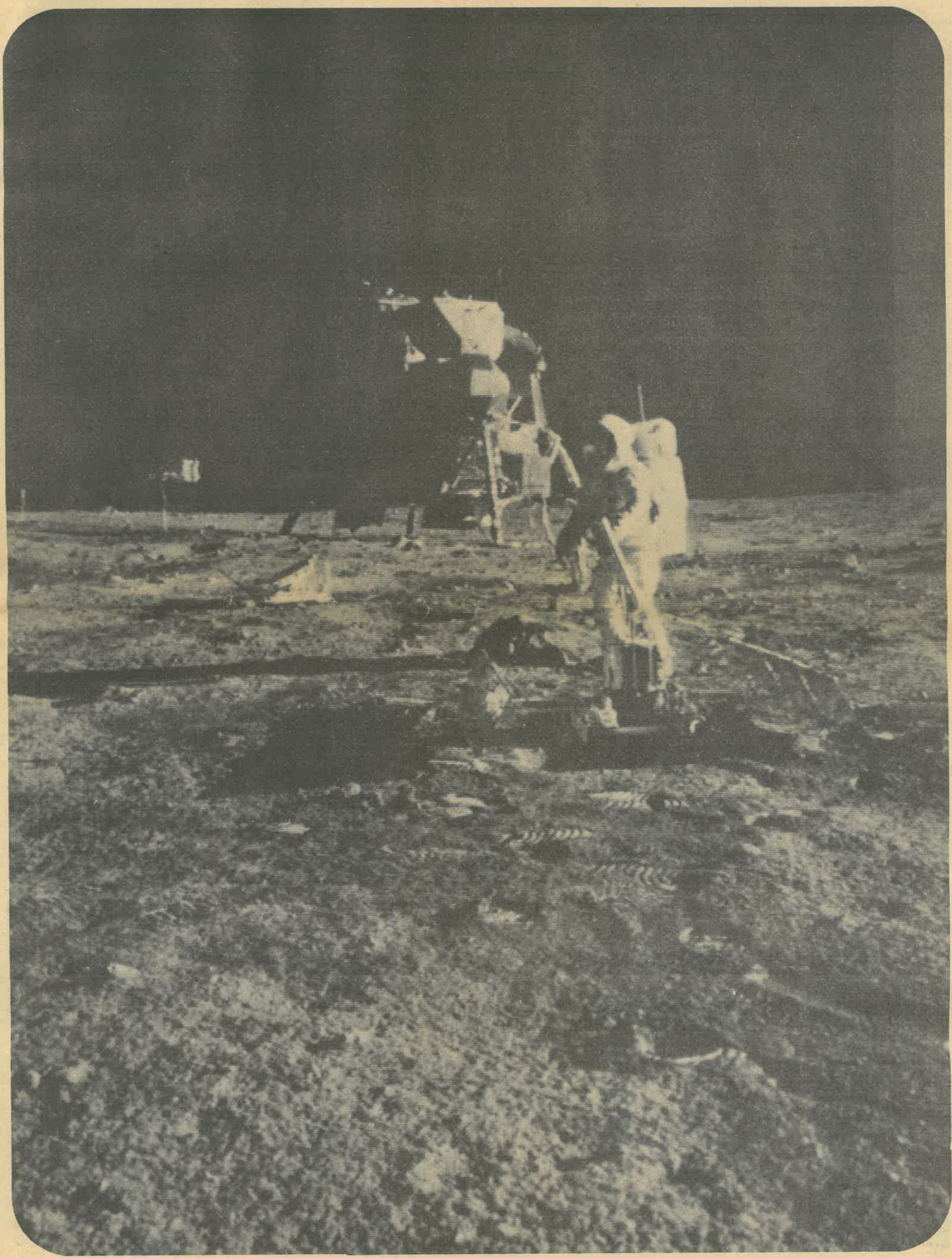
Early on Tuesday, July 22, the lunar module was jettisoned. Then, behind the Moon, the three astronauts fired their spaceship's engine to blast out of lunar orbit. And the journey home began.

Behind them they left a Moon littered with their back packs, a television transmitting aerial, the Stars and Stripes, a lunar earthquake detector, a laser reflector, the descent stage of the lunar module, and the plaque marking man's first landing on another celestial body.

Ahead of them was journey's end — the good Earth. Which was where the story began.

MOON landing

The dream had come true. Science fiction had been transformed into science fact.



Tranquility Base, Monday, July 21, 1969. Aldrin works on the Moon's surface. Behind him, the lunar module — the astronauts' only link with Earth.

MOON landing

While the world held its breath, they remained calm, cool, matter-of-fact and unemotional.



Lunar logbook

A DAY BY DAY ACCOUNT OF THE SPACE ODYSSEY

WEDNESDAY, JULY 16. Bang on schedule at 2.32pm (British Summer Time) Apollo 11 blasted off from Complex 39A at Cape Kennedy. Mission Control at Houston reported: "Everything is looking good."

In the first 150 seconds, the spacecraft reached a height of 38 miles at a speed of 6,000mph. The astronauts were off to a perfect start.

Eleven minutes and 50 seconds after blast-off, Apollo 11 went into orbit around the Earth.

Two hours and 44 minutes into the mission, the third-stage booster was fired for five minutes 47 seconds and the speed increased to 24,545mph to take the astronauts out of

orbit and on their way to the Moon.

Mission Control sent the message: "You're looking good. God Speed."

Thirty minutes after leaving Earth's gravity Lieut-Colonel Collins—the command pilot—fired the thrusters to separate the 30-ton capsule from its Saturn rocket.

Then came the first scare: a flaw in the system feeding oxygen into the cabin. The problem was diagnosed as not too serious and probably due either to a faulty measuring device or a partly-clogged supply valve.

Before going to sleep, the

crew sent back 15 minutes of television pictures. Back on Earth, President Nixon urged that all Americans should be given a holiday to celebrate man's first footsteps on the Moon.



THURSDAY, JULY 17. A comparatively uneventful day

as the three astronauts winged their way to the Moon. Mission Control told them that the Russian Luna 15 spacecraft had gone into lunar orbit.

President Nixon announced that the Americans would leave on the Moon the insignia and medals of the three American astronauts and two Soviet cosmonauts who lost their lives.

Voice communication between ground control and Apollo 11 was poor at first, but improved after equipment was adjusted. A fault was discovered in a pipe used to evacuate water from the cabin. But there was another system on board.

NASA announced that Armstrong might step on to the Moon three-and-a-half hours earlier than scheduled. The crew had changed their trajectory—to arrive in lunar orbit earlier—and Armstrong might now leave the lunar module at 4am (B.S.T.) on Monday.



FRIDAY, JULY 18. The astronauts sent back the most spectacular live TV pictures yet seen from space. They were given permission to enter the lunar module to check its systems nearly an hour earlier than planned, and took a camera with them.

The likelihood that Armstrong would step on to the Moon several hours earlier than planned was increasing.

Meanwhile, the Soviet Union assured the United States that Luna 15 would not interfere in any way with Apollo 11.

SATURDAY, JULY 19. Into the shadow of the Moon went Apollo 11.

A make-or-break reverse fire of the engine slowed it down enough to allow the Moon's gravity to hold the craft in orbit. Too long a firing would have placed it in an orbit too low for Armstrong and Aldrin to separate the lunar module and descend to the Moon's surface. Too short a firing would not have slowed it enough to keep it in orbit and it would have headed back towards Earth.

But all went well, though the entry into orbit meant an anxious 34-minute wait for Mission Control as Apollo 11 was then behind the Moon and out of radio contact.

Then came an automatic call from Apollo 11 stating that it had successfully gone into orbit.

Another three-minute wait... then came an astronaut's voice stating: "It was like perfect." There had been minor problems with the radio.

Armstrong began describing the view. He could see the line dividing day and night on the Moon. The surface on the light side was "ashen grey." The dark side had browns mixed with grey.

Mission Control told Armstrong that Pravda had described him as "the Czar of the ship." Shortly afterwards, Aldrin cracked: "The Czar is brushing his teeth, so I'm filling in for him. What can we do for you?"



SUNDAY, JULY 20. At 9.18pm (B.S.T.) the lunar module made a perfect landing on the Sea of Tranquility, one minute ahead of schedule. Armstrong said: "The Eagle has landed. We are breathing again. Thanks a lot."

Preparations for the landing began when Aldrin crawled through the tunnel linking the command and service module to the lunar module, at the end of Apollo's tenth lunar orbit. Armstrong joined him.

The separation took place out of sight of Earth—behind the Moon. The lunar module re-

appeared at 6.50pm (B.S.T.). Aldrin said "The Eagle has wings."

The lunar module pilot spun the Eagle slowly so that Collins could check that the landing legs were fully extended and locked in position. Five-and-a-half minutes before touchdown Eagle reported: "Got the Moon right out of our window—even better than simulator."

At 40,000 feet, Mission Control said: "Everything is looking good to us." Aldrin: "Looks real good. Collins: "Listen, Babe, everything's going just swimmingly, beautifully."

At 7,000 feet Aldrin took over manual control from the computer. The target area turned out to be a "football-pitch-sized crater with a large number of big boulders."

Houston said: "Beautiful job, you guys."

Eagle came back: "Don't forget the one in the module."

The lunar module touched down only four miles from the planned target. Armstrong reported: "We are in a relatively smooth plain with many craters, five to fifty feet in size. We see some ridges. And there are literally thousands of little one- and two-foot craters."

Eagle was surrounded by a large number of rocks about ten feet high.

Everything had gone so well that Armstrong and Aldrin decided to advance their Moonwalk by five hours.

About midnight (B.S.T.) Armstrong and Aldrin had man's first meal on the Moon. They ate bacon squares, peaches, biscuits and a fruit drink. Overhead, Collins—the "taxi-driver"—had beef and potatoes, butterscotch pudding, chocolate biscuits and grape punch.



MONDAY, JULY 21. At 3.56am (B.S.T.) Armstrong's boot touched the surface of the Moon. "That's one small step for man, but one giant leap for Mankind," he told the world.

Millions of television viewers watched the astronaut climb slowly down the ladder of the Mooncraft. Twenty minutes later he was joined by Aldrin.

Armstrong and Aldrin had decided to take their Moonwalk without having the four-hour rest scheduled in the flight plan.

Houston agreed to bring it forward to 2am (B.S.T.). But preparations took longer than expected and it was 3.39am before the message: "We are going to open now," came through.

At 3.51am Armstrong called: "O.K. Houston. I'm on the porch." As he climbed down the nine-rung ladder, he opened an equipment bay housing a TV camera.

At 3.53am he said: "I'm going to pull it now." As he stepped on to the Moon, Armstrong reported: "The surface is fine and powdery. I can pick it up loosely with my toe. It does adhere in fine layers like powdered charcoal to the sole and sides of my boots. I can only go in a small fraction of an inch, but I can see the footprints of my boots and the treads in the fine sandy particles."

Houston: "Roger, this is Houston. We are copying."

Armstrong: "There seems to be no difficulty in moving around as we suspected. It's perhaps even easier than the simulations at one-sixth that we performed on the ground. It's actually no trouble to walk around. The descent engine did not leave a crater of any size. There's about a foot clearance on the ground."

Virtually everything went like clockwork.

And at one point Armstrong asked Aldrin: "Isn't it fun?"

Armstrong said: "It is different, but it is very pretty out here."

As Aldrin was climbing down the ladder to join Armstrong, he said: "O.K., no trouble at all." On the surface, he said: "I did a hop from one step to

another." As they moved across the surface, both astronauts appeared on TV as if in slow motion.

The two astronauts stood together as a commemorative plaque was unveiled. Armstrong read the inscription: "Here men from the planet Earth first set foot upon the Moon, July, 1969 A.D. We came in peace for all Mankind."

Armstrong set up the Stars and Stripes. There is no wind on the Moon and the flag—held straight by a spring—did not flutter. Then the first men on the Moon stood to attention by the flag.

President Nixon spoke to them by telephone. "I can't tell



you how proud we all are of you," he said. "For every American this has to be the proudest day of our lives."

The astronauts used tongs and a scoop to load samples of rock into aluminium caskets to seal and bring back home.

At one point the pair were 30 minutes behind schedule for their tasks on the Moon's surface and had to hurry.

At 5.40am they were given an extra 15 minutes.

The hatch of the lunar module was closed at 6.11am (B.S.T.). They sealed themselves in and were told by Mission Control: "We think you have done a magnificent job today."

Armstrong had been on the lunar surface for approximately 2 hours 15 minutes.

At 6.54pm (B.S.T.), right on schedule, Eagle lifted off the Moon. Its ascent engine fired at the beginning of the burn lasting 7 minutes 18 seconds to push it into orbit towards the mother ship.

When they were nearly three minutes into the flight, they reported: "It looks like it's holding good."

But something went wrong when the two spacecraft linked up behind the Moon—and out of radio contact with Earth—at 10.35pm.

Communications were very bad. Collins, in Columbia, said: "That was a funny one. You know I didn't feel us touch and I thought things were pretty steady. I went to re-track there and that's when all hell broke loose."

Later Collins said: "Boy, you guys appeared to be jerking around a little bit."

Aldrin: "That thrust, it apparently wasn't committed."

Collins: "I was sure busy there for a couple of seconds."

At 10.40pm the crew began referring to themselves as Apollo again, which confirmed that docking had been

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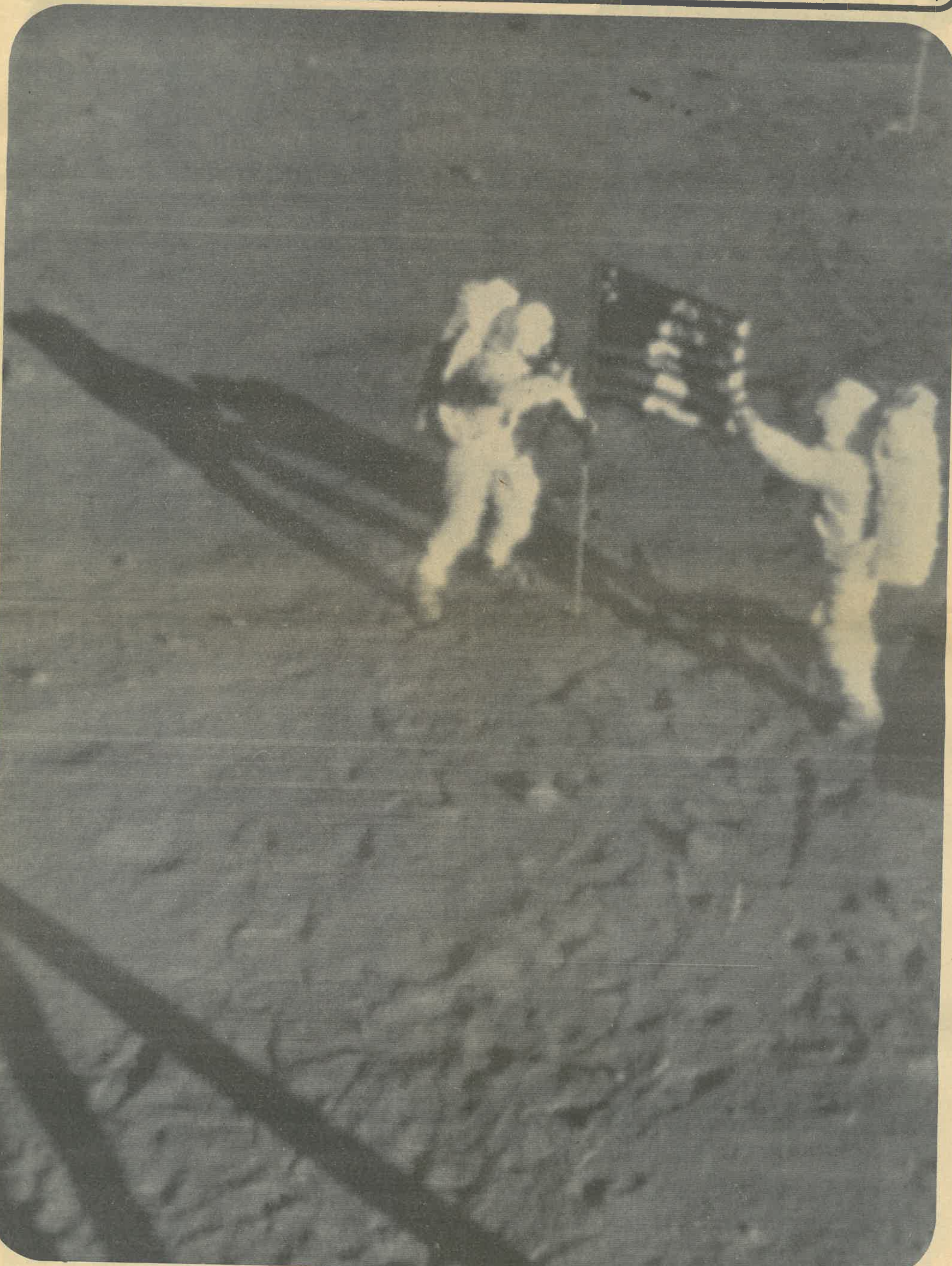
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MOON landing

Here men from the planet Earth first set foot upon the Moon.
We came in peace for all Mankind.



Showing the flag: Armstrong and Aldrin plant the Stars and Stripes on the surface of the Moon — putting America right ahead in the space race.

MOON landing

It was seven o'clock on a sunny Sunday evening in Britain, and the whole world was watching and waiting . . .



The Eagle has landed

WHILE COLUMBIA remained in a 69-mile high orbit, Eagle began a deliberate drop towards the lunar surface. At 46,000 feet Armstrong fired Eagle's big descent engine.

The entire world was tuned in as the lunar module made its final descent.

In Columbia, Colonel Collins was poised to swoop in and rescue his colleagues if anything went wrong before they reached the surface.

At 220 feet the message came from Eagle: "Coming down nicely."

At 75 feet: "Looking good."

At 30 feet: "Picking up some dust."

Then, at 9.18pm (BST), the voice of Armstrong spoke the first words from the Moon. "Contact light on. Engine off. The Eagle has landed. We are breathing again. Thanks a lot."



HERE MEN FROM THE PLANET EARTH
FIRST SET FOOT UPON THE MOON
JULY 1969, A. D.

WE CAME IN PEACE FOR ALL MANKIND

Neil A. Armstrong

NEIL A. ARMSTRONG
ASTRONAUT

Michael Collins

MICHAEL COLLINS
ASTRONAUT

Edwin E. Aldrin, Jr.

EDWIN E. ALDRIN, JR.
ASTRONAUT

Richard Nixon

RICHARD NIXON
PRESIDENT, UNITED STATES OF AMERICA

Lunar logbook

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completed. Mission Control announced that docking was three minutes late but had been completed successfully.

The two spacecraft had linked up for the voyage home. Behind them, on the Moon, they left a television camera, lunar overshoes, the descent stage of the lunar module, the American flag, a silicone disc bearing messages and the plaque.



Aldrin and Collins raced homewards, scientists were in dispute over what might have been the first Moonquake ever recorded.

The seismic trace was made at 2.20am (B.S.T.) by a recorder left on the Moon's surface. It lasted for nearly five minutes.

THURSDAY, JULY 24. At 5.50pm (B.S.T.) the command and service module dropped into the Pacific, only ten seconds behind schedule and inside a mile of the target point. The capsule splashed down upside down but righted itself within a few minutes.

It hit the water 13 miles from the recovery carrier Hornet. As the Hornet moved towards the capsule, with escort of hovering helicopters, Collins said: "Excellent. All crew excellent. Take your time."

The spacecraft hit the 'corridor' dead on time. About 14 minutes before

spacecraft with germ-killing fluid. He scrubbed down the three astronauts and they scrubbed him down.

Sixty-three minutes after splashdown the astronauts were on board the recovery helicopter and off the raft. The raft and its equipment was sunk.

Five minutes later they were on board Hornet.

President Nixon was on the bridge as the helicopter landed. The three figures appeared and crossed the three yards to the isolation caravan.

Two hours after splashdown President Nixon talked to Armstrong, Aldrin and Collins through an intercom.

And he told them, in between the gags: "This is the greatest week in the history of the world since the creation."

ARMSTRONG was here.

This is a facsimile of the stainless steel plaque the astronauts unveiled on the lunar module and left at Tranquility Base. The only incomplete detail: the exact date. Even the Americans weren't quite confident enough to name the day.

TUESDAY, JULY 22. A day of rest for the astronauts cruising home to earth. Exhausted by their last 48 hours, the three men slept soundly until 6pm (B.S.T.) — long past the time that they were due to wake. Ground control did not disturb them.

Their journey continued uneventfully and on schedule. At one stage Apollo's small rocket engines were fired briefly to adjust its course.

Splashdown is scheduled for 5.50pm (B.S.T.) on Thursday. Waiting to greet them on the U.S.S. Hornet will be President Nixon.

Preparations to meet Armstrong, Aldrin and Collins will start 37 hours before splashdown.



splashdown there was the usual loss of signal as it entered the atmosphere, bearing its cargo of moon rocks. Two minutes later Mission Control reported visual contact.

A small heatshield moved away to release the parachute system. Eight minutes before splashdown the men on Hornet saw a red glow in the sky before it was hidden by the clouds.

At 10,000 feet the crew released their main parachutes.

After splashdown, the astronauts had to wait eight minutes for the flotation balloon to inflate and right the capsule. Communication between the spacecraft and the carrier and recovery helicopters was maintained during this period.

The swimmers, who had to fasten a collar on the craft to keep it afloat, dropped from their helicopters. Biological isolation garments were handed through the hatch to the astronauts.

Wearing their special suits, the three men from the Moon were out of their spacecraft 40 minutes after splashdown. Then the hatch was closed.

Lieutenant Clancy Hatleberg, a Naval frogman, who was also wearing a biological isolation garment, was the first person to come in contact with the crew as they boarded a raft. He sprayed the outside of the



WEDNESDAY, JULY 23. Apollo 11 passed the half-way mark on its return to Earth at 8.52pm (B.S.T.). The spacecraft was 118,321 miles from Earth and Moon, travelling at 4,000mph.

The astronauts again enjoyed a long sleep. However, a surprise sound on the radio link was a serenade of violin music. It was Armstrong playing a tape from a 20-year-old album called "Music from the Moon."

Apollo was keeping its course so accurately that a scheduled correction was cancelled.

President Nixon flew from Johnston Island in the Pacific by helicopter to the U.S. Navy communications ship Arlington.

Meanwhile, as Armstrong,



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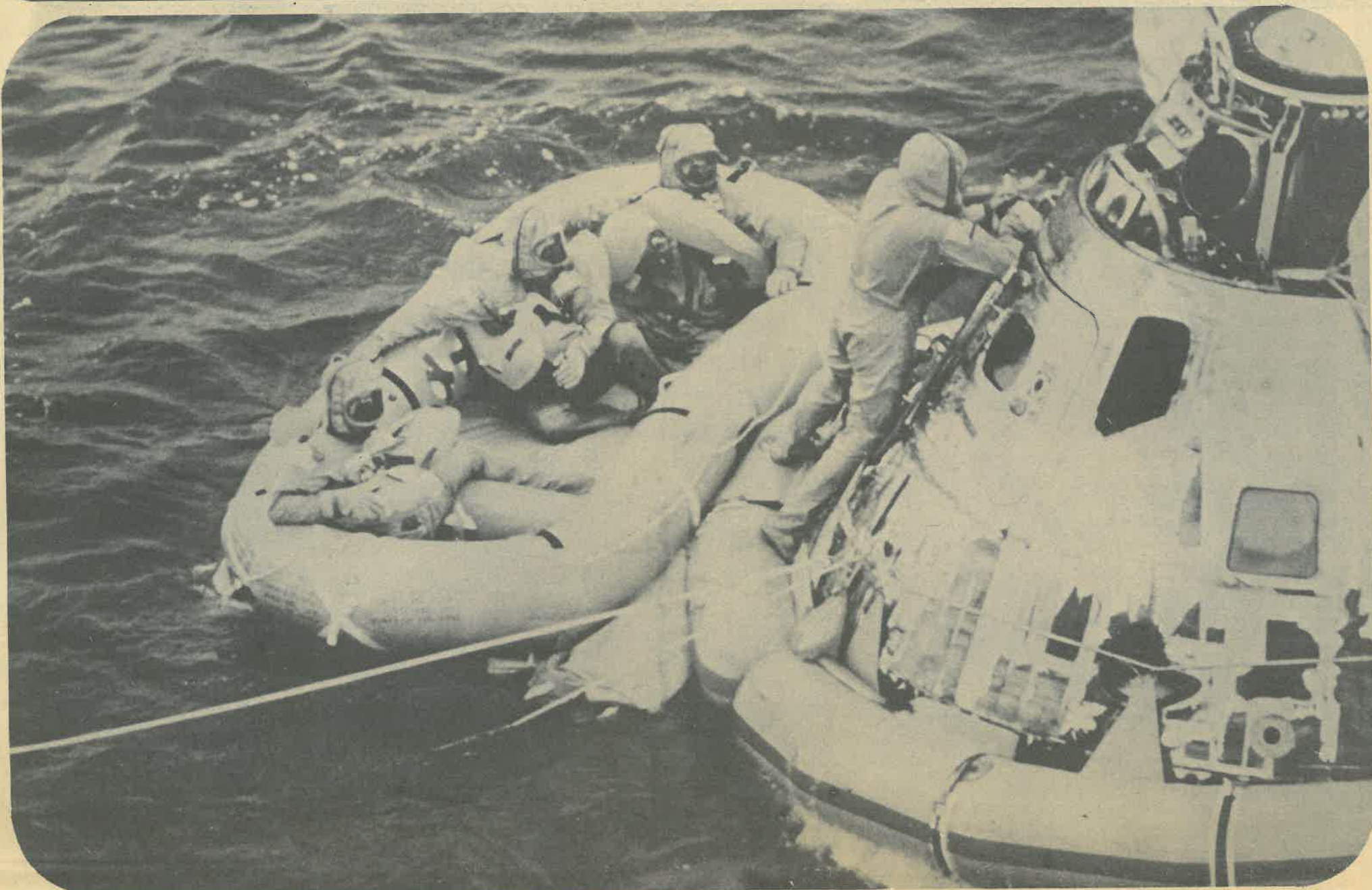
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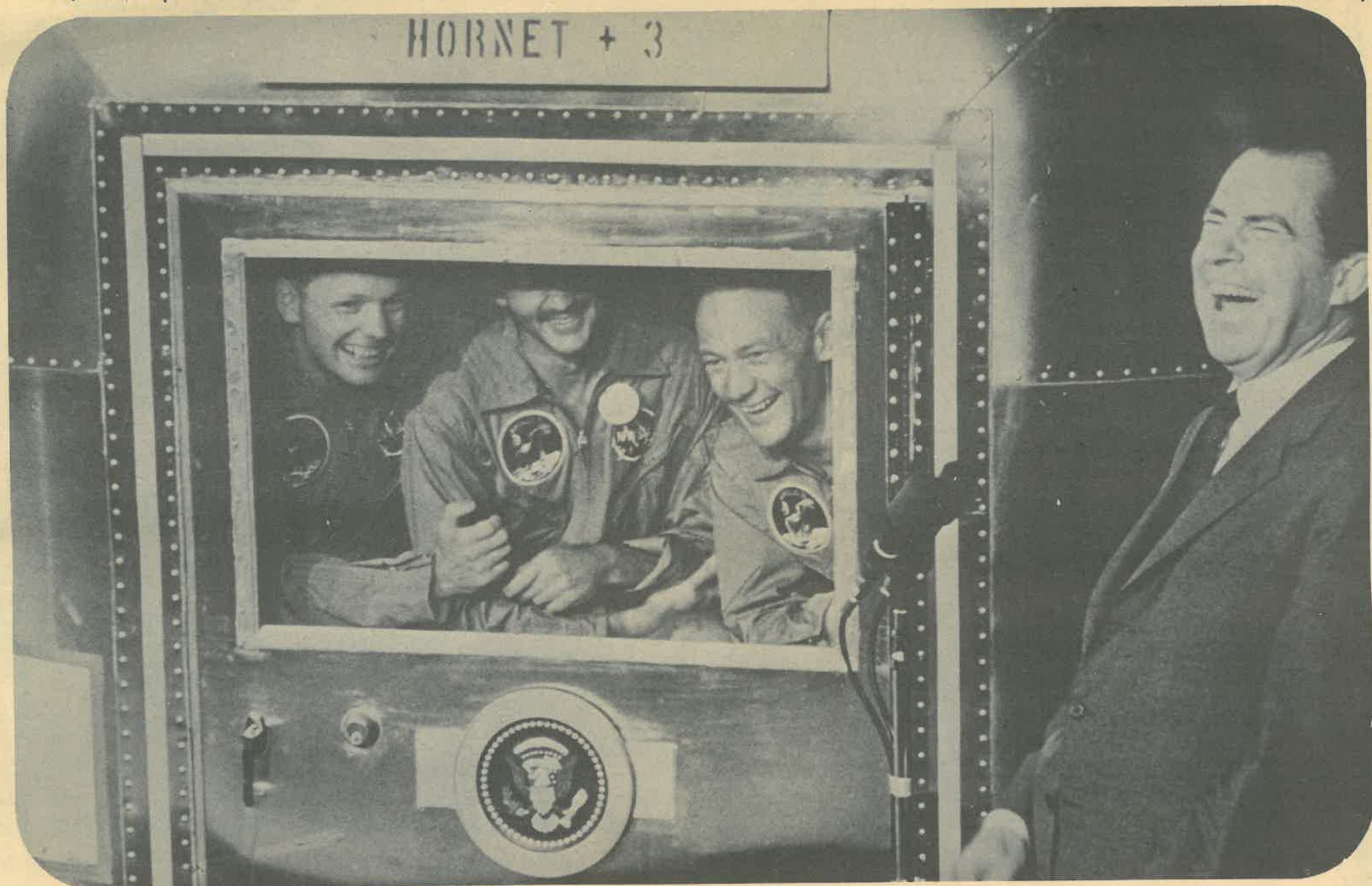
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MOON landing

I'd like everyone to contemplate these events, each in his own way — Colonel Buzz Aldrin.



Splashdown! 5.50pm, Thursday, July 24. They're back safely, and a frogman sprays the spacecraft in case they have brought any Moonbugs with them.



A joke with the President: the tension of the mission evaporates as the astronauts relax inside their quarantine home on the aircraft carrier Hornet.

The Moon belongs to every one

AMERICA'S Moon men could not claim the Moon for the United States by planting the Stars and Stripes on its surface.

The Moon belongs to everyone — under terms of a 1967 international treaty subscribed to by the United States, the Soviet Union and more than 80 other countries.

The Apollo 11 flight was the first application of major provisions of the law, which provides celestial bodies are for the use of all Mankind and governs man's exploration of space.

The treaty also bans use of extra-terrestrial bodies for military purposes and imposes some specific restrictions on exploration which will become applicable with later, more ambitious, Moon missions.

The provisions

The ratification of the treaty on outer space on October 10, 1967, represented monumental foresight: for the first time, international law was in force by the time technology created a problem.

The outer space treaty provides that: "Outer space, including the Moon and other celestial bodies, is not subject to national appropriation by claim of sovereignty, by means of use or occupation, or by any other means."

"The exploration and use of outer space, including the Moon and other celestial bodies, shall be carried out for the benefit of and in the interests of all countries, and shall be the province of all Mankind."

"Outer space, including the Moon and other celestial bodies, shall be free for exploration and use by all states without discrimination of any kind, on a basis of equality and in accordance with international law, and there shall be free access to all areas of celestial bodies."

"There shall be freedom of scientific investigation in outer space, including the Moon and other celestial bodies, and states shall facilitate and encourage international co-operation in such investigation."

U.N. banner

Congress voted that a U.S. flag might be carried to the Moon by the Apollo 11 astronauts, but stipulated that this would not constitute a territorial claim.

It prohibited the carrying of a United Nations flag to the Moon, though four years ago Colonel James McDivitt and Major Edward H. White, the first American to walk in space, carried a small U.N. banner, which had survived the Korean war, into orbit.

They presented it to U.N. Secretary-General U Thant and it now hangs in the living room of his home.

The question of sovereignty was raised 10 years ago, when a Soviet Lunik fired a capsule from space and hit the Moon. The Soviets never pressed a claim of ownership.

U.S. spacemen doubt that the Soviet pennants could ever be found. From the distance the capsule was fired, they calculate that it buried itself deep into the lunar surface.

Moscow was a prime mover in negotiating the Moon pact, which has the grandiloquent title of "Treaty of Principles Governing the Activities of States in the Exploration and Use of Outer Space, the Moon and Other Celestial Bodies."

Negotiations

Sir Leslie Munro, of New Zealand, President of the U.N. General Assembly in 1957, was probably the first to mention the need for a Moon treaty, but no move toward negotiating one was made until May, 1966, when President Lyndon B. Johnson proposed such a pact.

U.S. Ambassador Arthur J. Goldberg put Johnson's proposal to Kurt Waldheim, of Austria, chairman of the U.N. Committee on the Peaceful Uses of Outer Space. Three weeks later Soviet Ambassador Nikolai T. Fedorenko filed a similar letter from his Foreign Minister, Andrei Gromyko.

In the next months, both Moscow and Washington put before the committee for negotiation a list of points each thought should be included in the treaty, and the final pact was approved unanimously by the General Assembly on December 19, 1966.

Instruments of ratification, putting it into effect, were deposited in Washington, Moscow and London the following October.

The problems

Despite the treaty's far-sighted provisions, legal problems about space remain. Among them:

- Liability for damage caused by objects launched into space.

- Utilisation of space and its resources, especially concerning the various forms of communications.

- Rules for navigation and possibly control and registration of objects launched, and so-called "space garbage" — rocket stages and other objects left in non-functional permanent orbit.

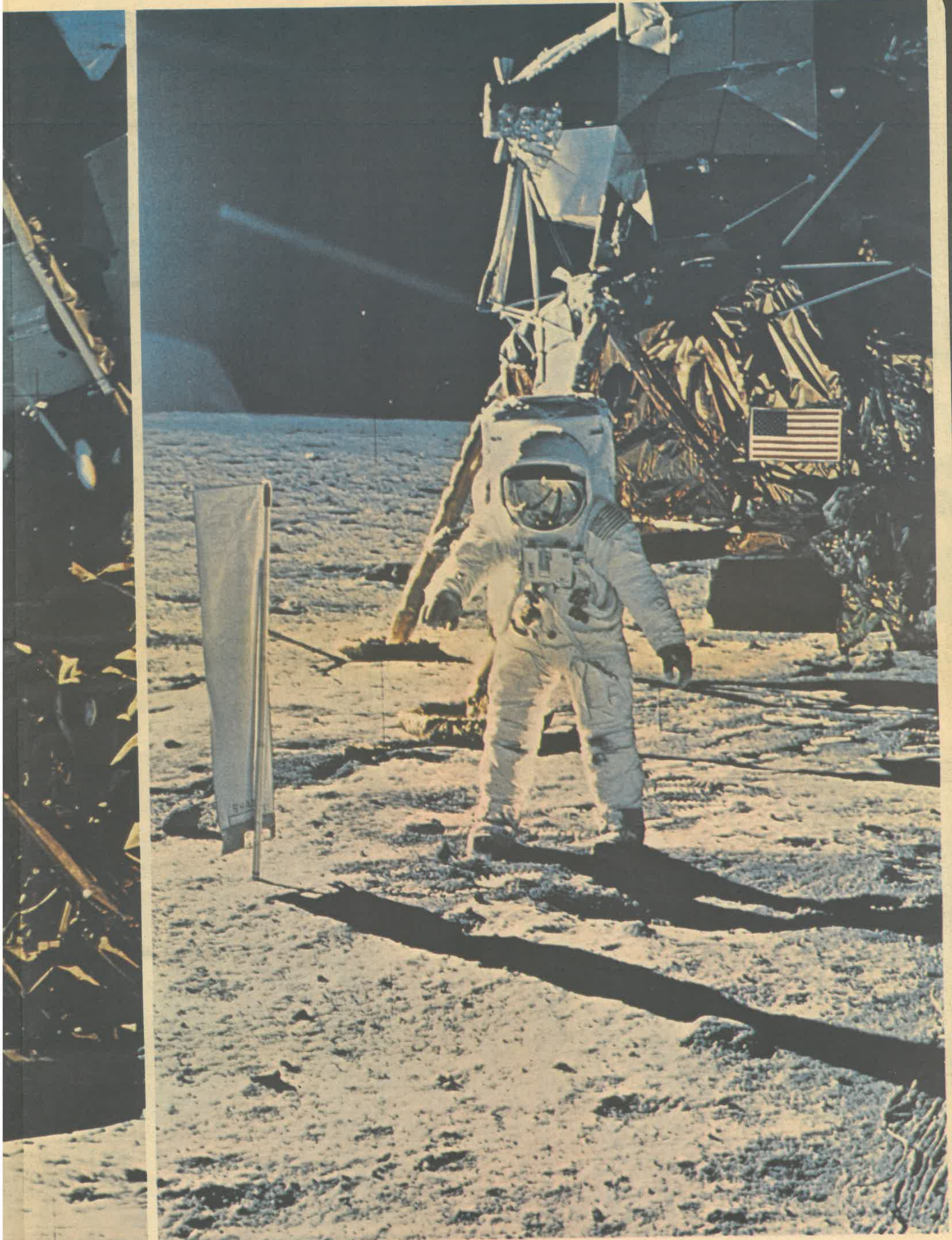
- An appropriate definition of outer space itself.

These aspects of space law are expected to evolve slowly.

Meanwhile, law has kept pace with technology, assuring that the new worlds opened up by men such as the Apollo 11 astronauts will be used for the benefit of all Mankind, not just a privileged few.



One small step for Man . . . Aldrin comes down the ladder to join Armstrong on the surface of the M



; Moon.

Finding his Moon legs: Aldrin goes for his kangaroo hop in front of the lunar module.

The machine that made it all possible

The lunar module is the two-stage vehicle designed for space operations near and on the Moon. It is incapable of re-entering the atmosphere.

It is made of two halves, together standing at 22 feet 11 inches high and is 31 feet wide.

Aluminium

Joined by four explosive bolts and umbilicals, the ascent and descent, or upper and lower, stages of the lunar module operate as a unit until staging — when the ascent stage functions as a single spacecraft for rendezvous and docking with the command and service module.

The ascent stage, which housed Armstrong and

Aldrin, is made up of three main sections: the crew compartment, mid-section and aft equipment bay.

This stage has six sub-structural areas: crew compartment, mid-section, aft equipment bay, thrust chamber supports, antenna supports and thermal and micro-meteoroid shield. Only the crew compartment and midsection are pressurized as part of the lunar module cabin.

The descent stage consists of a load-carrying structure of two pairs of parallel beams, upper and lower decks and enclosure bulkheads — all of conventional aluminium alloy. The centre

compartment houses the descent engine; and descent propellant tanks are housed in the four square bays around the engine.

Batteries

The descent stage measures 10 feet 7 inches high by 14 feet 1 inch in diameter. Four-legged truss outriggers mounted on the ends of each pair of beams serve as "knees" for the landing gear main struts.

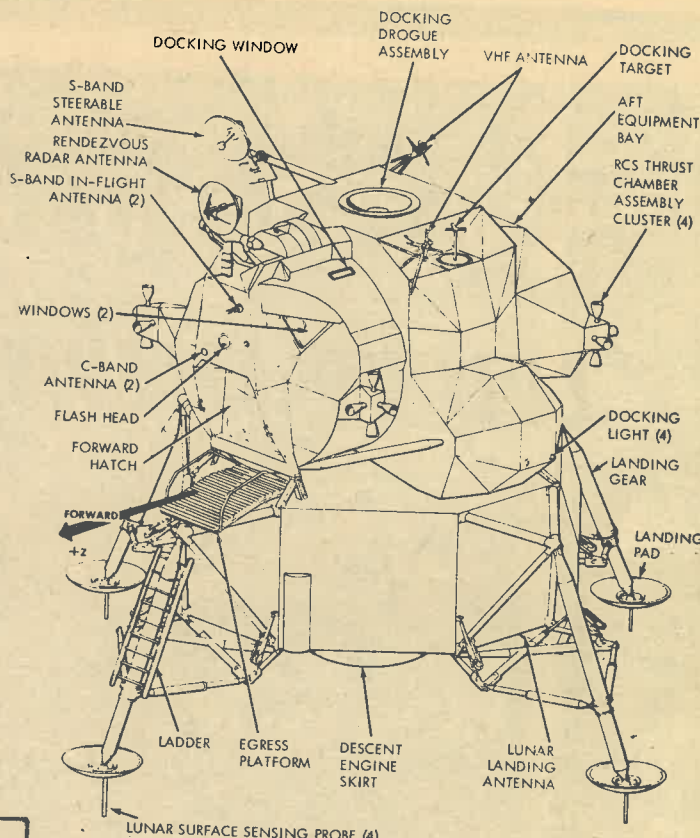
The lunar module's electrical power system consists of six silver zinc primary batteries, four in the descent stage and two in the ascent stage.

The environmental control system consists of the atmosphere revitalisation

section, oxygen supply, and cabin pressure control section, water management, heat transport section and outlets for oxygen and water servicing of the portable life support system.

The communications system is made up of transmitter-receivers, two VHF transmitter-receivers, a signal processing assembly and associated spacecraft antenna.

The guidance, navigation and control system has six sections: primary guidance and navigation section, abort guidance section, radar section, control electronics section and orbital rate drive electronics for Apollo and lunar module.



This is how the lunar module works

WHEN the lunar module extended its four spider-like legs and began its descent to the Moon, Armstrong and Aldrin stood at the controls, looking through the windows, held only by a safety harness.

The absolute success of the lunar module was imperative because if anything had gone wrong, then the crew would have been unable to return to the command and service module and would have died.

The lunar module had only been tested in lunar orbit once before — on the Apollo 10 mission.

Honeycomb

The lunar module external platform or "porch" is mounted on the forward outrigger just below the forward hatch. A ladder extends down the forward landing gear strut from the porch for crew lunar surface operations.

In a retracted position until after the crew mans the lunar module, the landing gear struts are explosively extended and grip the Moon's surface.

The main struts are filled with crushable aluminium honeycomb for absorbing compression loads. Foot-pads, 37 inches in diameter at the end of each landing gear, make it "float" on the lunar surface.

Each pad is fitted with a sensing probe which signals the crew to shut down the descent engine upon contact with the surface.

Oxygen

The atmosphere revitalisation section is composed of the suit circuit assembly which cools and ventilates the pressure garments, reduces carbon dioxide levels, removes odours, noxious gases and excessive moisture.

The cabin re-circulation assembly which ventilates

and controls cabin atmosphere temperatures is also there and a duct which vents steam from the suit evaporator into space.

The oxygen supply and cabin pressure section supplies oxygen to the atmosphere revitalisation section for maintaining suit are ascent and descent stage oxygen supplies.

Water for drinking, cooling, fire-fighting, food preparation and re-filling the portable life support system tank is supplied by the water management section.

The water is contained in three nitrogen-pressurised bladder-type tanks, one of 367 pound capacity in the descent stage and two of 47.5 pound capacity in the ascent stage.

The reaction control system comprises four clusters of four 100 pound thrust engines each using helium-pressurised hypergolic propellants. The oxidiser is nitrogen tetroxide.

Thrust

If one system fails, a propellant crossfeed allows one system to supply all 16 engines. The engine clusters are mounted on outriggers 90 degrees apart on the ascent stage.

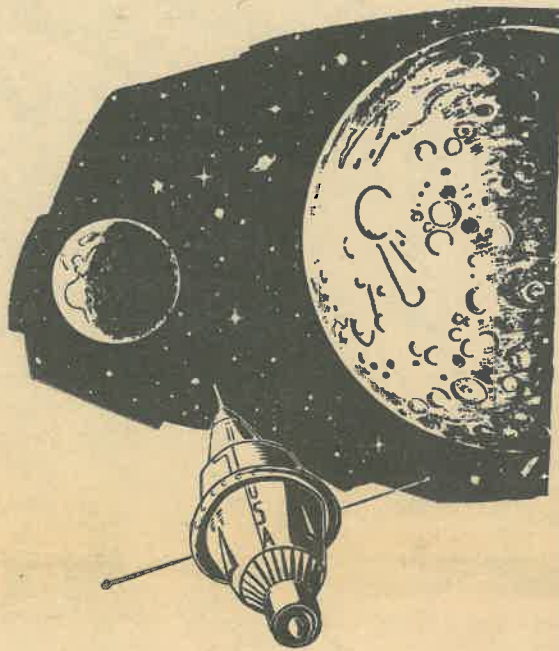
The descent propulsion system: The maximum thrust of the descent engine is 9,870 pounds and it can be throttled between 1,050 and 6,300 pounds. The engine can be turned through six degrees in any direction to offset gravity pulls.

The ascent propulsion system: The 3,500 pound engine performs at full thrust. It remains dormant until after the ascent stage is separated from the descent stage. All docking lights have about a 1,000 feet visibility.

The lower descent stage is the launching pad from which the astronauts take off from the Moon.

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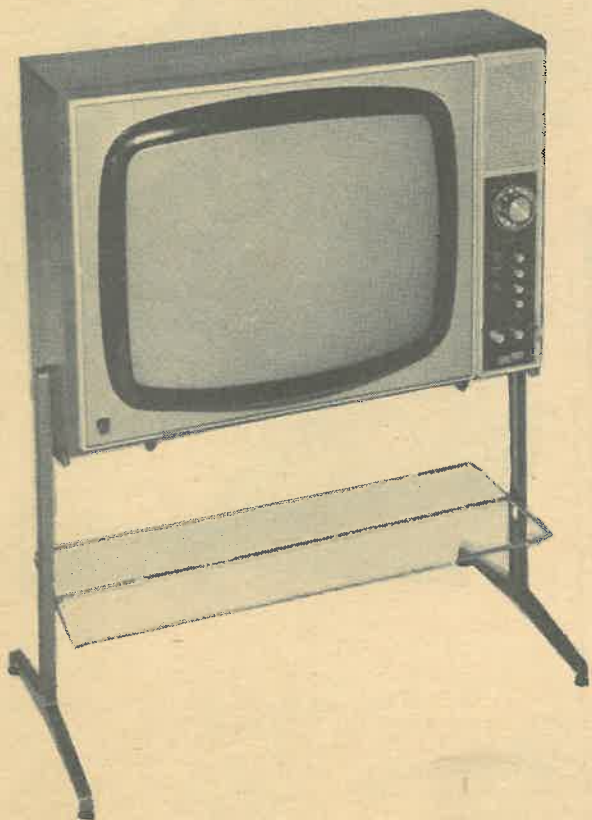
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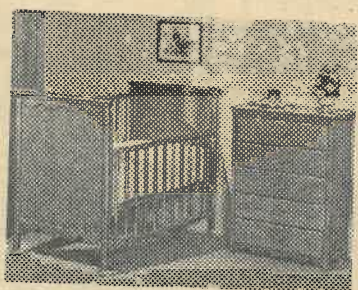
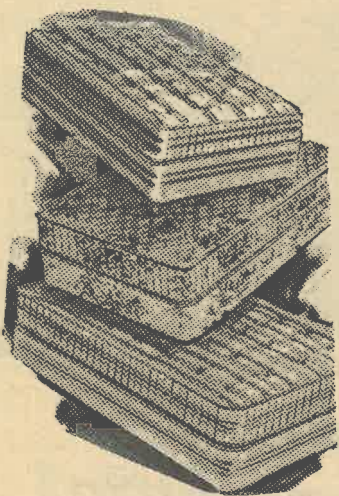
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A SHORT TIME before his assignment to the crew of the first Moon-landing mission, astronaut Edwin Aldrin was addressing a women's group in Washington on "Man In Space." A member of the audience jokingly asked him whether he wouldn't agree that "Woman In Space" would have been a more appropriate title.

Without batting an eyelid, Aldrin explained that he was anxious to confine himself to a subject that was thoroughly familiar to him, and added: "Woman is a topic I don't know so much about."

This was one of those rare flashes of spontaneous humour from the 39-year-old lunar module pilot who four-years-ago was almost invalidated out of active space exploration.

Lovell, who at that time had already spent more man hours in space than any other human being.

Aldrin was born on January 20, 1930, in Montclair, New Jersey, and graduated from Montclair High School.

Planning to follow his father in a military career, he accepted an appointment to the United States Military Academy at West Point, New York. Even at that time, he was profoundly interested in science, and in 1951 graduated THIRD in a class of 475 with a B.Sc. degree.

During the Korean War he flew 66 combat missions and shot down two MiG-15 aircraft. He was awarded the Distinguished Flying Cross with one Oak Leaf cluster, the Air Medal with two Oak Leaf clusters and the US Air Force Commendation Medal.

Aldrin and his wife, Joan Ann, have two sons — aged 13 and 11 — and a daughter, also 11.

Trampoline

A knee Aldrin injured while trampoline jumping was knocked again when he was playing squash in 1965. But an operation to remove a torn cartilage repaired in time for his first venture into space in November, 1966. And straightaway he turned in a performance that impressed space officials immensely.

In fact, even before his walk on the Moon with Neil Armstrong, Aldrin — a colonel in the United States Air Force — was the world's most experienced space walker. He spent a total of five-and-a-half hours outside Gemini-12, during which he "walked" round the world three times.

On that flight — a two-man mission — Aldrin scarcely behaved as the Rookie he was expected to be in the company of the flight's commander, James A. Lovell Jr., already a space veteran. A key task on that 59-orbit flight was to catch up and connect their craft with an unmanned Agena space vehicle then also orbiting the Earth.

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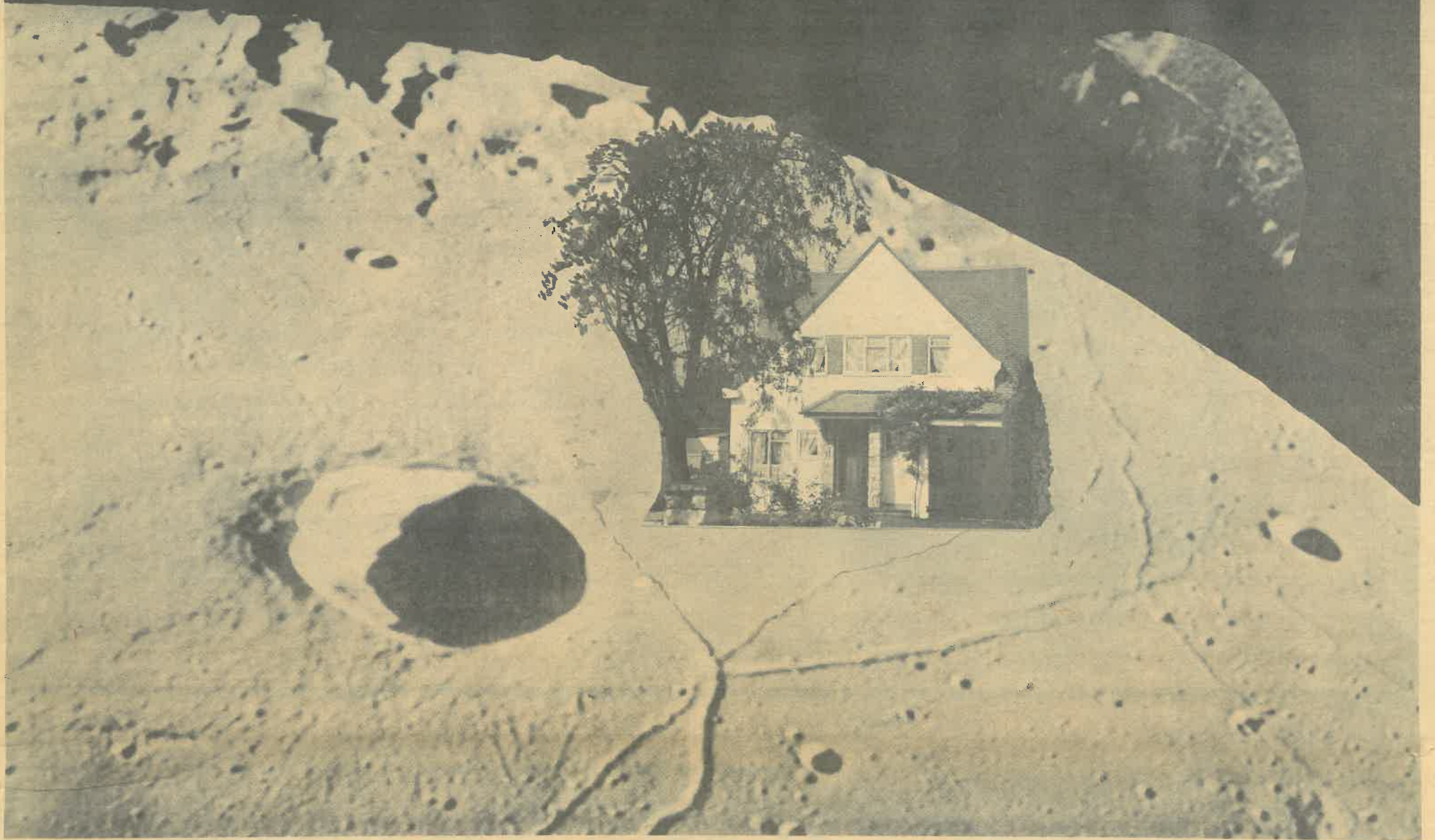
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Neil Armstrong

BORN TO BE THE FIRST MAN ON THE MOON



IF ANYONE was born to be the First Man on the Moon it was Neil Alden Armstrong.

Armstrong, the civilian commander of Apollo 11, went for his first flight in an old-fashioned Ford Triometer at the age of five, and he has been flying faster and higher ever since. His father recalls that young Armstrong was a little worried during that first trip — but if he was this time, he hasn't shown it.

Born on August 5, 1930 on an Ohio farm, Armstrong has made flying his life. As a schoolboy he built model aeroplanes, read books on flying and looked up whenever he heard the roar of an engine in the sky.

In 1949 he joined the U.S. Navy as a flyer, serving until 1952. During the last two years of his service he flew 78 combat missions in Korea. He was shot down, but parachuted to safety behind the United Nations lines.

The challenge

On his return to civilian life he studied aeronautical engineering at Purdue University and graduated with a B.Sc. degree in 1955. Since then he has attended the University of Southern California Graduate School.

When asked why he joined the U.S. Space Programme, Armstrong replied, "The general challenge of the unknown."

But, even for him, the decision was a hard one.

In 1955 he joined the National Aeronautics and Space Administration's Lewis Research Centre as a civilian aeronautical research pilot and later transferred to the N.A.S.A. High Speed Flight station in the same capacity. He took part in flight test work on the F-100, F-104, B-47, F-102 and on the X-15 rocket plane, which carried him at five times the speed of sound.

But when Project Mercury — the first of the U.S. manned space flights — came along in 1961, he and some of his fellow pilots were not entirely in agreement with the venture. They believed that winged vehicles with the pilot in complete control would be a better approach to a space flight than a capsule.

"Gradually, however, I began to change my mind," says Armstrong. "The X-15 was basically still an aeroplane and I began to realise that the Gemini-Apollo programmes were going to take man far beyond mere



Janet Armstrong
She knew what she was getting into

fringes of atmosphere and into deep space. Since this was my real interest, I decided I had better get aboard."

And on May 7, 1968, Armstrong again showed his cool courage when the engine of a Moon-landing training craft spluttered out while he was experimenting with it several hundred feet above the ground. Seconds before the craft crashed and burned, Armstrong ejected himself and parachuted to safety.

His hobby is flying light aeroplanes and gliders. He and his wife, Janet, have two sons — Eric, aged 12, and Mark, six. "My wife knew I was in this sort of business when we got married," says Armstrong. "She knew what she was getting into."



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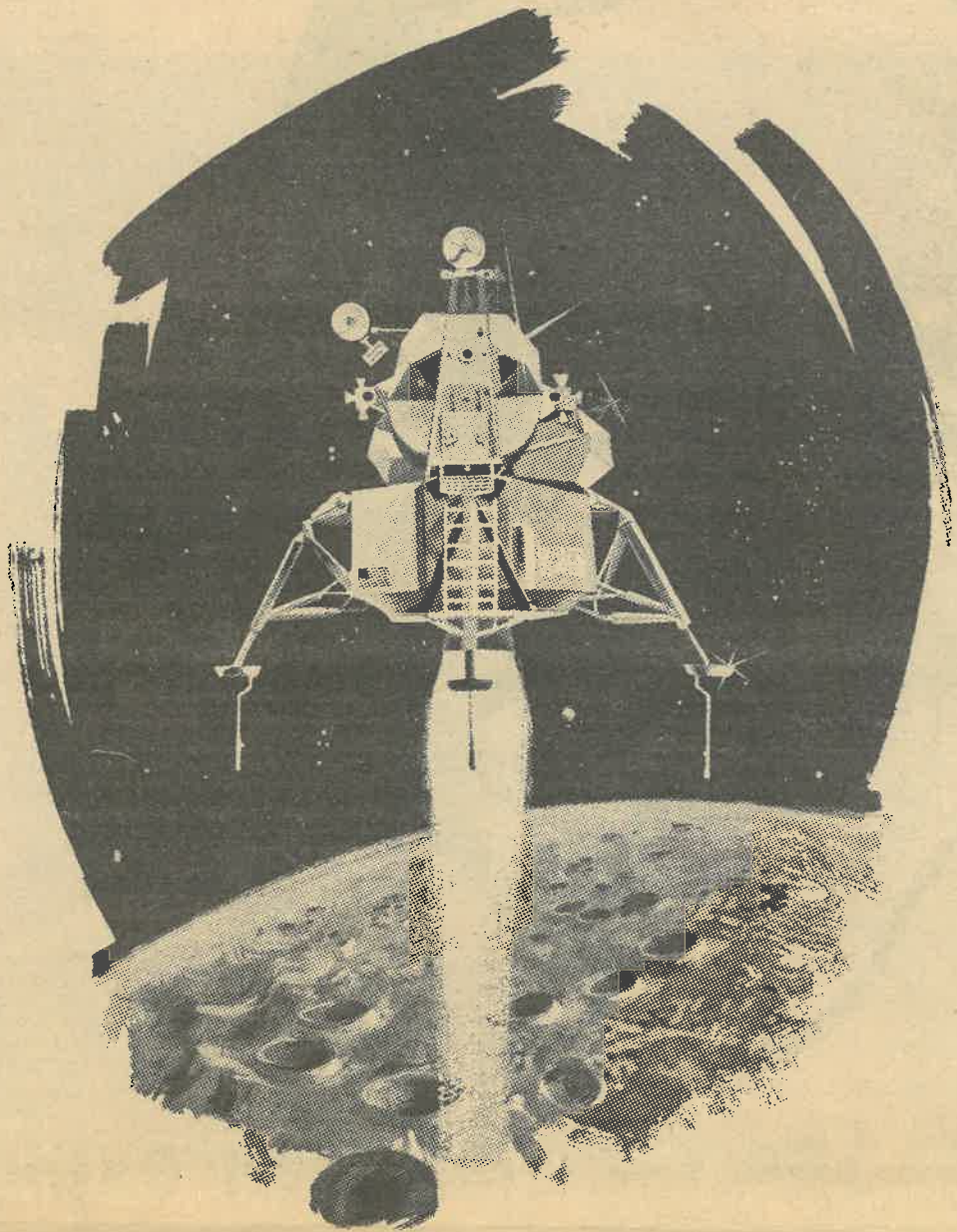
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EDMONTON MAN WAS BEHIND MEN ON THE MOON



WHILE the astronauts were shooting into space, orbiting the Earth, landing on the Moon and returning from their fantastic adventure, praise for their courage, their fortitude and the knowledge, ingenuity, skill and dedication of those who planned and directed their mission was coming from every quarter of the globe.

And for local people, there was one, in particular, who will always have a special place in the story of our times — Dr. John Hodge, chief of the Advanced Missions Programme at the Manned Spacecraft Centre, Houston, Texas.

For John Hodge was raised in Edmonton, and received his early education at Houndsfield School, Edmonton. There are many who remember him — including one of his old teachers who retired this week, Mr John Matthews.

In the space saga, the contribution of the Back Room Boys is as important as that of the astronauts, for without them, no rocket could rise from the Earth.

By Charles V. Ramsumair

MAN ON THE MOON! For the past three weeks the world has been agog with the fantastic achievement of the three American astronauts, two of whom left their footprints in the arid sands of Tranquility Bay. But the man behind the men on the Moon is a LOCAL MAN. He is Dr John Hodge, chief of the Advanced Mission Programme at the Manned Spacecraft Centre, Houston, Texas.

The 40-year-old Earth-based spaceman, who shoulders the tremendous responsibility of planning what space mission America should attempt in the future, brings honour not only to Forest Road, Edmonton, where he was raised, but also to Enfield and Southgate.

In an exciting comment immediately after the Moon landing, Dr Hodge said the next step would be a manned space station from which spacecraft could be launched to Mars and other planets.

John Hodge received his first schooling at Houndsfield School, Edmonton, went on to Cranborn School, Enfield, and Minchenden Grammar School, Southgate, from where he gained entrance to Northampton College of Engineering, London, now City University.

And while millions of people all over the world sat glued to their television sets, at least four people alternated their eyes from the Moon pictures to their mantelpieces where framed pictures of John Hodge occupy a pride of place.

In a little council flat off Bounces Road, Edmonton, sat silver-haired, Mrs Emily Brooks, who is 80. She is John's grandmother, Mrs Brooks, her deep blue eyes, glinting with Moondust, said she drank endless cups of tea to see the Moon programme through.

In Woodside Lane, Whetstone, were John's parents, John senior and Emily, both in their sixties. On their mantelpiece is their proudest possession — a picture of son John being congratulated by former U.S. President Lyndon B. Johnson. Two years ago the President awarded John a medal for outstanding services.

Last year Mr Hodge senior, a lecturer at Northern Polytechnic, and his wife spent a holiday with their son, his English born wife, former nurse, Audrey, and their four children.

Recalling their trip, Mr Hodge said: "The people at the space centre hold John in such esteem that at a party given for him on his promotion from Flight Controller to Chief, they had his name up in lights."

Talking about Saturday night the Hodges said: "We know John was part of this great adventure. We couldn't help feeling proud and excited. We are proud of both our sons."

Fourth Moon watcher was the other son referred to by the Hodges — Keith, but he must have seen the programme in far off Karachi, India.

Keith, aged 37, of Firs Park Avenue, Winchmore Hill, is an aerodynamist with De Havilland's, and is on an assignment in Karachi. Like brother John, Keith attended Houndsfield, Cranborn and Minchenden schools. And also like his brother, has his eyes firmly fixed to the skies.

Many people will recall seeing John Hodge on British television when he was here three years ago. He had come to receive an Honorary Doctorate conferred on him by City University to mark their inauguration.

Michael Collins

HE STAYED BEHIND IN
THE COMMAND MODULE



WHEN MICHAEL COLLINS, the Apollo 11 command module pilot, was among 14 men selected for astronaut training in October, 1963, he replied unhesitatingly to a reporter's question about his future hopes: "I'd like to be the Man on the Moon."

Well . . . he didn't miss it by much. His Apollo 11 assignment called for him to remain in the main spacecraft 70 miles above the Moon while his two colleagues descended to the surface. And the performance of this 38-year-old Lieutenant-Colonel in the U.S. Air Force was no less essential to the success of the mission than that of Armstrong and Aldrin.

Taciturn

Collins, known as the most reticent of America's 52 astronauts, is described even by his wife as "a man of few words."

When he and John W. Young were in orbit during the three-day Gemini-10 flight in July, 1966, communication from the spacecraft was so sparse that Paul Haney, who announced space flight news for the Press corps, commented: "This is the least talkative group we have had up yet."

On that flight, Collins made momentous contributions to space exploration during a 39-minute "walk" through space.

Describing that experience, Collins has said: "When I got there, my body inertia kept me going and I slipped." On his second attempt his body started rotating. "The combination of this and the straight-forward thrust of the gun caused me to fly kind of a curved path like an aeroplane approaching an airport."

Tradition

Courage and a love of adventure run in the family. His uncle, General Joseph Lawton Collins, who served as Chief of Staff of the U.S. Army, was known as "Lightning Joe" because of his bravery and decisiveness. Colonel Collins' father was a major-general in the U.S. Army and, for a time, was military attache at the U.S. Embassy in Rome, where the astronaut was born on October 31, 1930.

In keeping with the family tradition, Collins chose a military career and went to West Point. He became a Bachelor of Science in 1952.

He joined the U.S.A.F. and served as an experimental flight test officer at Edwards



Patricia Collins

They have two
daughters and a son

Air Force Base in California, testing the performance, stability and control characteristics of planes — mainly jet fighters.

Collins was originally named as command module pilot for the Apollo 8 around-the-Moon flight in December, 1968, but had to miss it because of a spinal operation. His place was taken by his back-up, astronaut James A. Lovell Jr.

Colonel Collins and his wife Patricia, who comes from Boston, Mass., live near the manned spacecraft centre in Houston, where the astronauts receive their training. They have two daughters — Kathleen, aged ten, and Ann seven — and a six-year-old son, Michael.

Space-fiction man explores the depths



Space-fiction writer, Arthur Clarke's second love is deep sea exploration. Here he is, deep off the coast of Ceylon, framed by the barnacled propellers of a merchant ship, believed sunk during the 1939-45 War (See story on facing page).

A REAL-LIFE CINDERELLA

OF THE SPACE WORLD

By Jim Smith

Arthur Clarke of Wood Green is the man who made science-fiction come true.

Not only has he written books and articles about space-travel and exploration, many of which have been turned into television programmes, he has made serious forecasts of developments in space technique, and has seen his predictions come to reality.

But more than that, he is a science-fiction writer who has been accepted by the professionals who, because of his serious writings on their subject, have given him their recognition and respect.

He has attended many rocket-launchings in America, has met top space experts such as Werner von Braun and Yuri Gagarin, and was specially invited to Houston for the launching of the Moon-shot. His telephoned report of that occasion, made to his brother Fred in Wood Green, was lyrical in its ecstasy.

Arthur's "space career" is almost like that of a science-fiction hero.

His prediction

To be a top international author — he has more than 40 books to his credit, and is a television and film writer, and in addition, to be accepted by the hard-headed mathematicians who cannot get themselves out of a problem merely by writing another chapter to a novel, is indeed to get to the top of both trees. Never was there a more real-life Cinderella.

But even that is not all. For relaxation Arthur has turned to deep-sea diving and exploration, off the coast of Ceylon and, in conjunction with other enthusiasts in this sphere, he has discovered wrecks that have lain beneath the surface for upwards of 250 years, and has brought to light real sunken treasure, some of which has been lodged in museums in America, some of which lies at his home in Nightingale Road, Wood Green.

Arthur was the man who foresaw the Telstar system of international communication ten years before it became a reality. He published a technical paper on the subject, in a serious journal, in 1945. This set out in detail how a system of world communication by satellite might be achieved.



Arthur Clarke (left) with rocket designer Werner von Braun, in New York in 1964.

The system that is now in use, which brings to television viewers in Britain live shots of boxing matches in America, Test matches in Australia, and Moon landings 250,000 miles from Earth, is the one that Arthur predicted.

The honours that have been heaped on him are fantastic. His first achievement was to get a first-class honours degree in physics and mathematics at King's College, London. During the war (he is now 52) he served in the RAF and went into the newly-created Radar branch. Here he was put in charge of the first "talk-down" system for bringing aircraft in to land under difficult conditions. In this sphere Britain was far ahead of Germany.

In 1962 he was awarded the £1,000 Kalinga Prize by Unesco for contribution to the understanding of science through his writings. He was invited to Delhi to receive his prize.

In 1963 he won the Stuart Ballantine Medal of the Franklin Institute of Philadelphia, and went to America to receive the award.

In 1965 "Life" awarded him the Aviation Space-Writers' Prize for the best aerospace reporting of the year in any medium. In the same year he received the Robert Ball Award of the Aviation-Space Writers' Association.

Back home, the former Wood Green Council held a reception in his honour to show their appreciation for the achievements of one of their citizens.

He has been a chairman of the British Interplanetary Society, and is a member of the

Academy of Astronautics, the Royal Astronomical Society, the World Academy of Art and Science, the American Institute of Aeronautics and Astronautics, the Association of British Science Writers, the International Science Writers Association, the British Sub-Aqua Club, the British Astronomical Association, the Society of Authors, and the American Astronautical Association. He is patron of the Ceylon Astronomical Association.

His books have been published in 30 languages, and have sold more than 10,000,000 copies. Probably his biggest science-fiction project was the writing, in conjunction with Stanley Kubrick, of the film "2001 — A Space Odyssey", which is still showing in London.

Evolutionary step

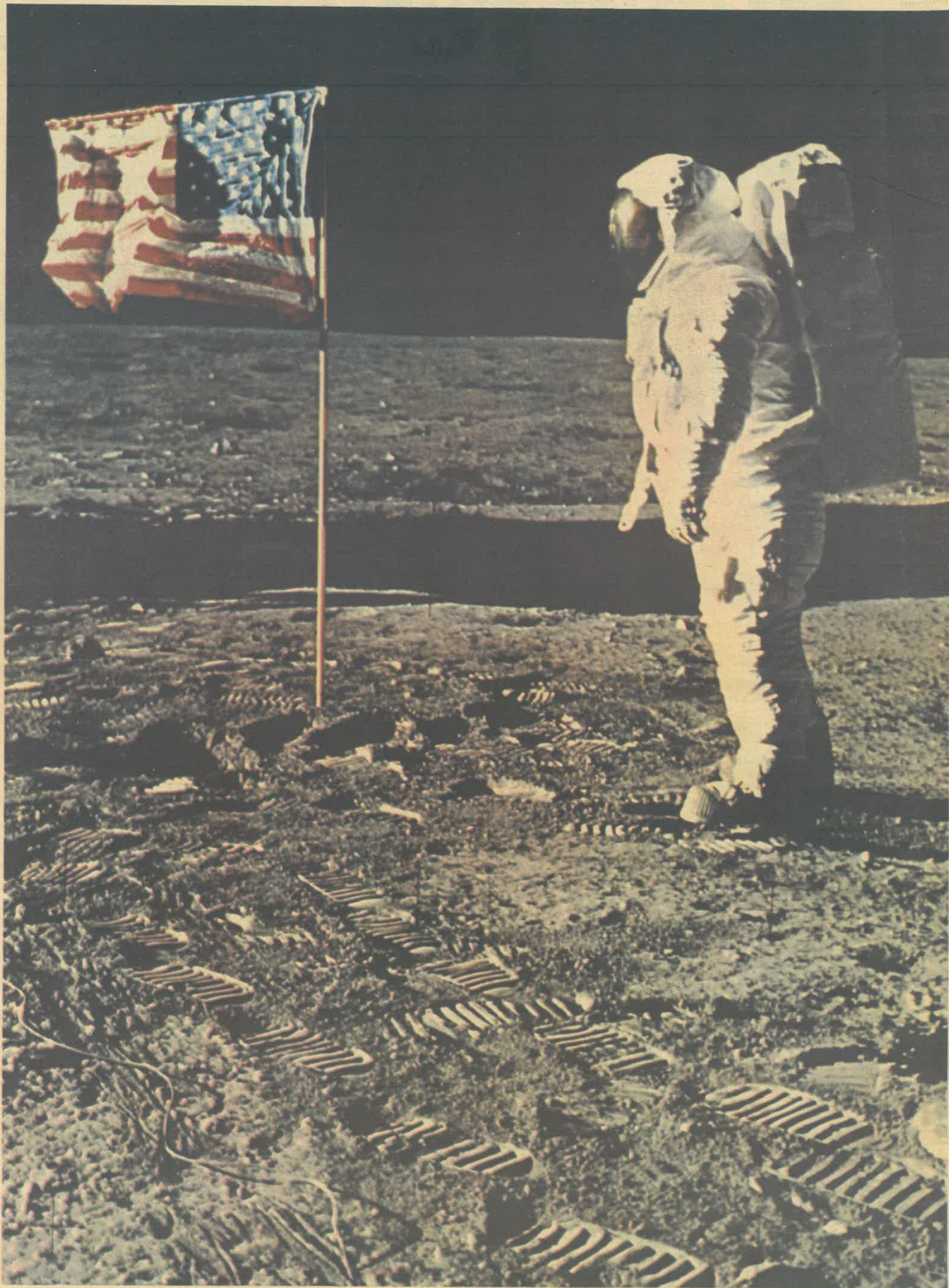
Immediately after attending the premiere of this film in London, Arthur went on a tour of American and Canadian cities, at each of which the film was given a local premiere. Wherever he went he was received rapturously.

Looking at this latest achievement, of man actually landing on the Moon and coming back alive, Arthur told me that he saw it as of equal significance with the time when the first water-creature — millions upon millions of years ago — broke surface and crawled up on to dry land.

"Today," he said, "we are breaking the bubbles of our own surface. We are moving forward to a new step in evolution."

And one man who for a long time has seen the way, is Arthur Clarke.

The star-spangled banner



Old Glory on the Moon. Aldrin poses proudly by the Stars and Stripes. Armstrong took the picture.

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