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THE NAVAJO NATION LOOKS AHEAD

RALPH LOONEY 740
BRUCE DALE

MOUNDS: RIDDLES FROM THE INDIAN PAST

GEORGE E. STUART 783

THOSE POPULAR PANDAS

THEODORE H. REED
DONNA K. GROSVENOR 803

ISRAEL—THE SEVENTH DAY

JOSEPH JUDGE
GORDON W. GAHAN 816

APOLLO 16 BRINGS US VISIONS FROM SPACE 856

PROBING THE DEEP REEFS' HIDDEN REALM

WALTER A. STARCK II 867
JO D. STARCK

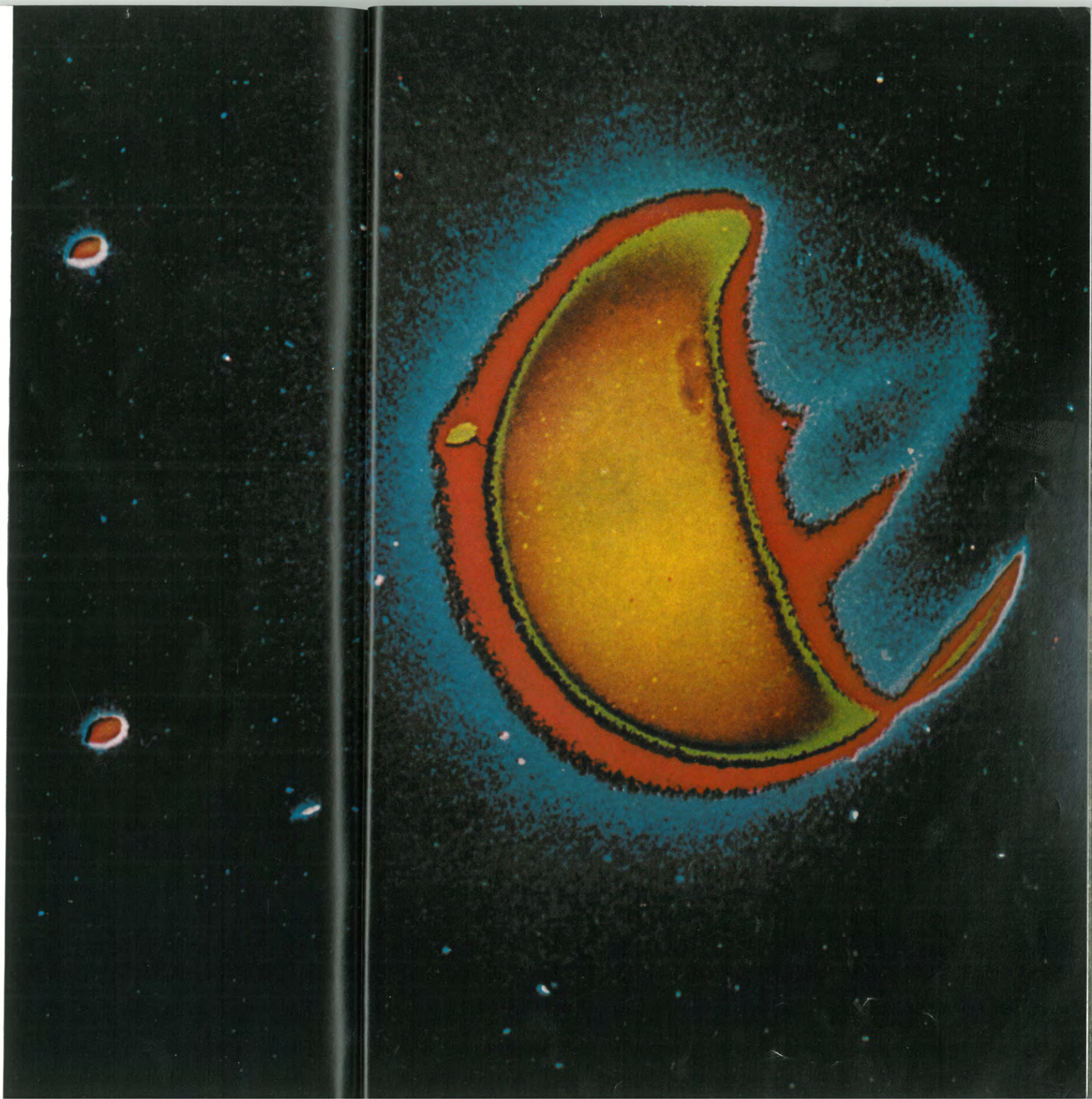
Apollo 16 Brings Us Visions From Space

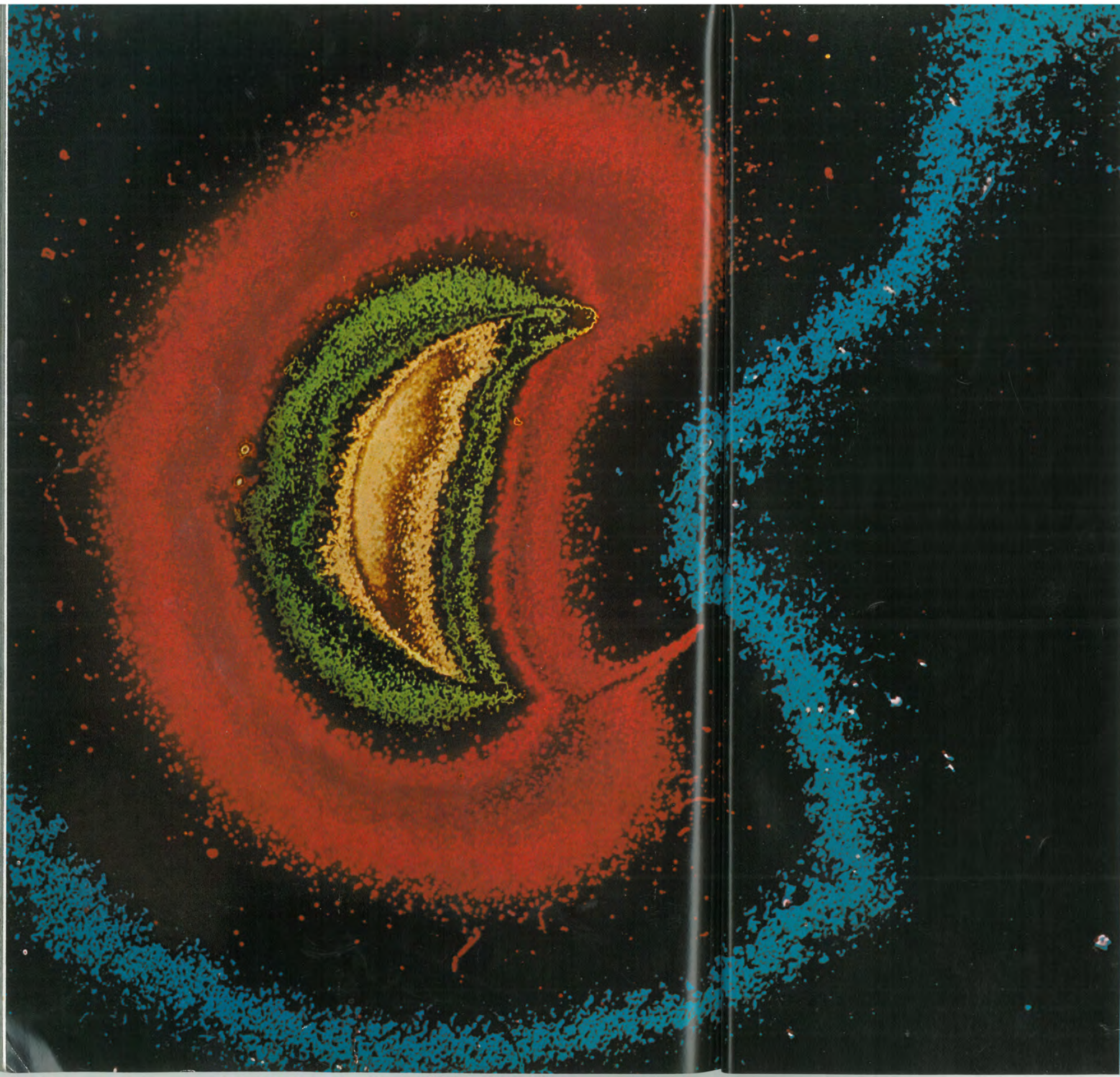
IN THE VASTNESS of the heavens lies beauty in abundance. Man has honed his skills as a space traveler, and each lunar voyage now returns with aesthetic as well as scientific cargo. A record haul from the April flight of Apollo 16 produced this unearthly portrait of our planet glowing like a psychedelic vision in a color-enhanced ultraviolet photograph made from the moon. Sensitive to radiation unseen by the human eye, the camera recorded oxygen levels surrounding the earth at various altitudes—a new look at the upper atmosphere that could benefit communications and help measure long-term effects of air pollution.

Scientists added color to black-and-white photographs to enhance differences in the brightness of the oxygen glow. Reacting to the sun's ultraviolet radiation, oxygen atoms fluoresce, appearing here as a cloak of gold closest to the earth's surface, where the life-sustaining gas lies heaviest. As it thins with altitude, oxygen appears green, red, and finally blue. On earth's night side the gas shows blue in two intersecting arcs over the Equator—a phenomenon scientists do not yet fully understand.

An aurora shimmers over the south magnetic pole, extreme right. Stars dot the film; one appears as a bright yellow lump on earth's left side.

NASA



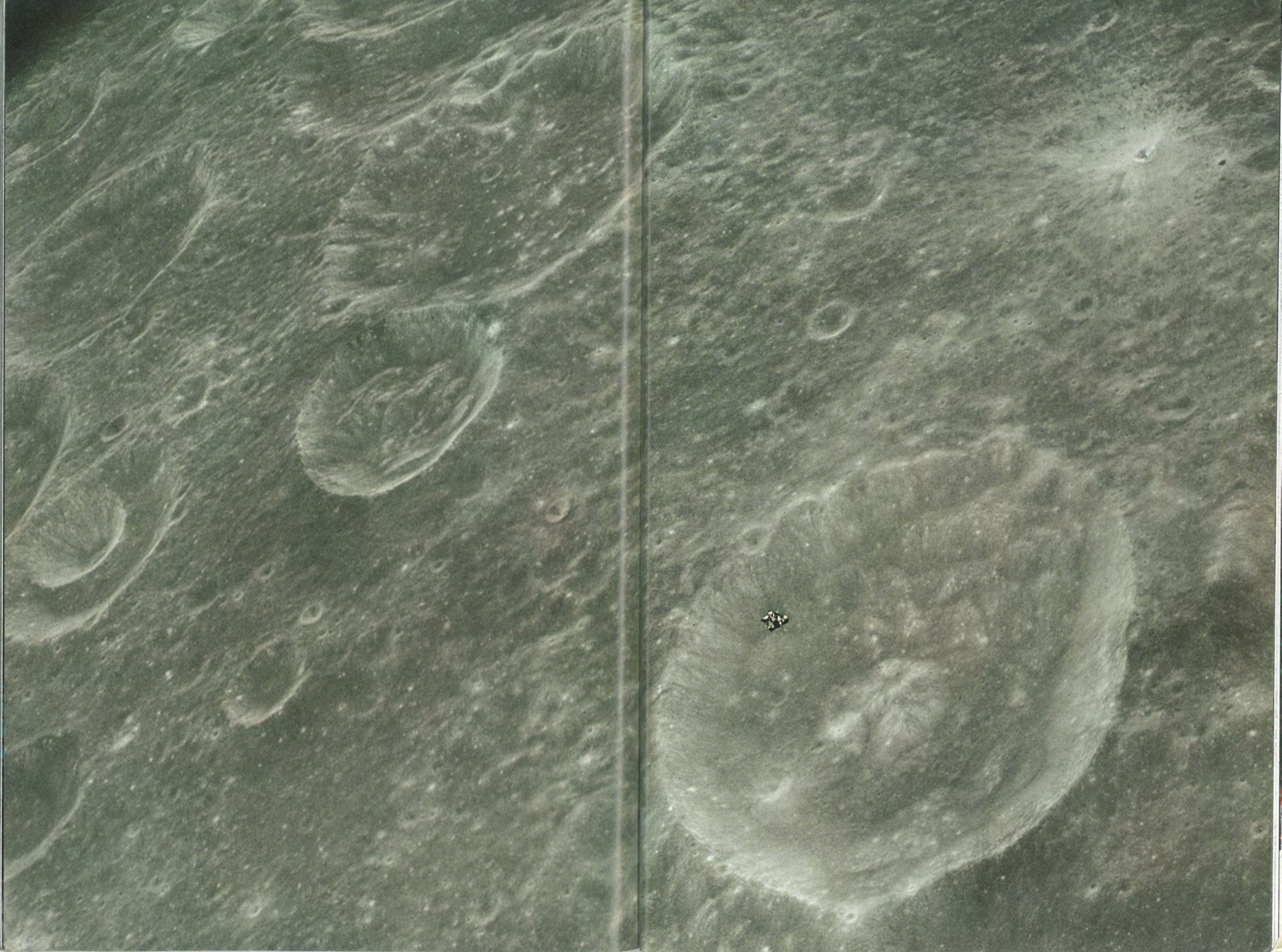


EARTH'S CORONA, a halo of hydrogen, flares some 16,000 miles into space in a 15-second ultraviolet photograph made through a lithium fluoride filter. Blue, red, green, and gold represent increasing concentrations of the gas. Longer exposures show that the geocorona extends to 100,000 miles. Breakdown of water vapor from the oceans sends hydrogen drifting far above the planet, while heavier oxygen remains closer to the surface. Many scientists now believe that the separation of water vapor into its two elements, rather than photosynthesis in plants, may be the major source of the earth's oxygen.

Dr. George R. Carruthers of the Naval Research Laboratory in Washington, D. C., developed the electronic camera that registers only ultraviolet light. Here it rests in the shadow of the lunar module (**below**), safe from damaging heat. Astronaut Charles M. Duke, Jr., stands between the module and the lunar Rover. In 180 exposures the camera recorded not only earth's atmosphere, but also distant stars, the solar wind, and possibly intergalactic hydrogen, whose presence, some scientists believe, would increase the known mass of the universe tenfold.



JOHN W. YOUNG (ABOVE); NASA



GNATLIKE at 70 miles above the pocked moonscape, the lunar module rises to rendezvous with the command ship to begin the long journey home for Apollo 16 (preceding pages). Blunted crater edges on these highlands west of Mare Smythii date the area as one of the oldest exposed lunar surfaces. Some four billion years ago, a meteorite blasted out 22-mile-wide crater Schubert B, appearing beneath the module. A "fresh" excavation, the bright splash at upper right, took place millions of years ago.

Alone in orbit for three days as his companions explored the moon's Descartes highlands, Thomas K. Mattingly II described his scanning of the intriguing lunar surface as a time of "sheer exhilaration."

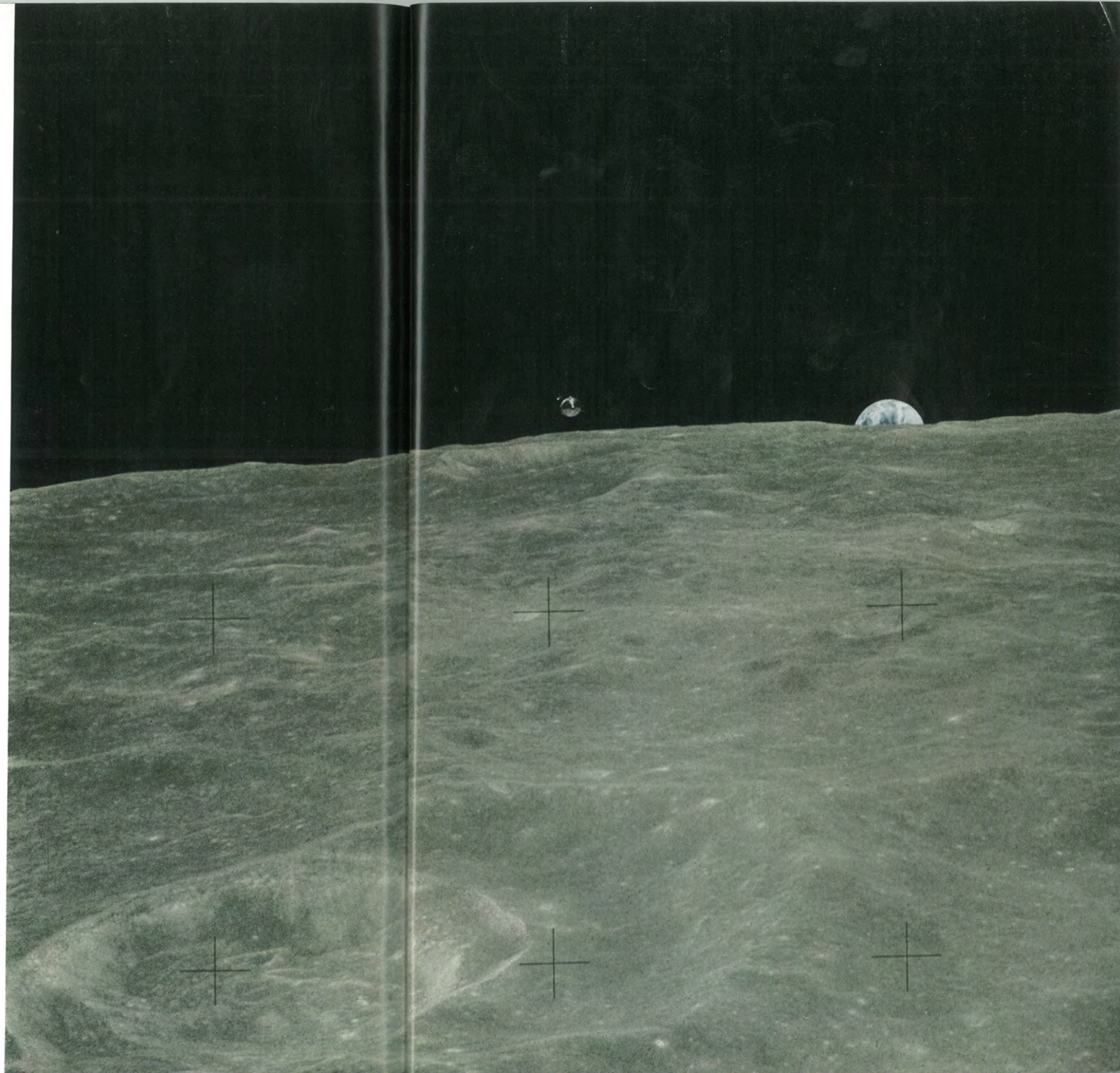
THOMAS K. MATTINGLY II

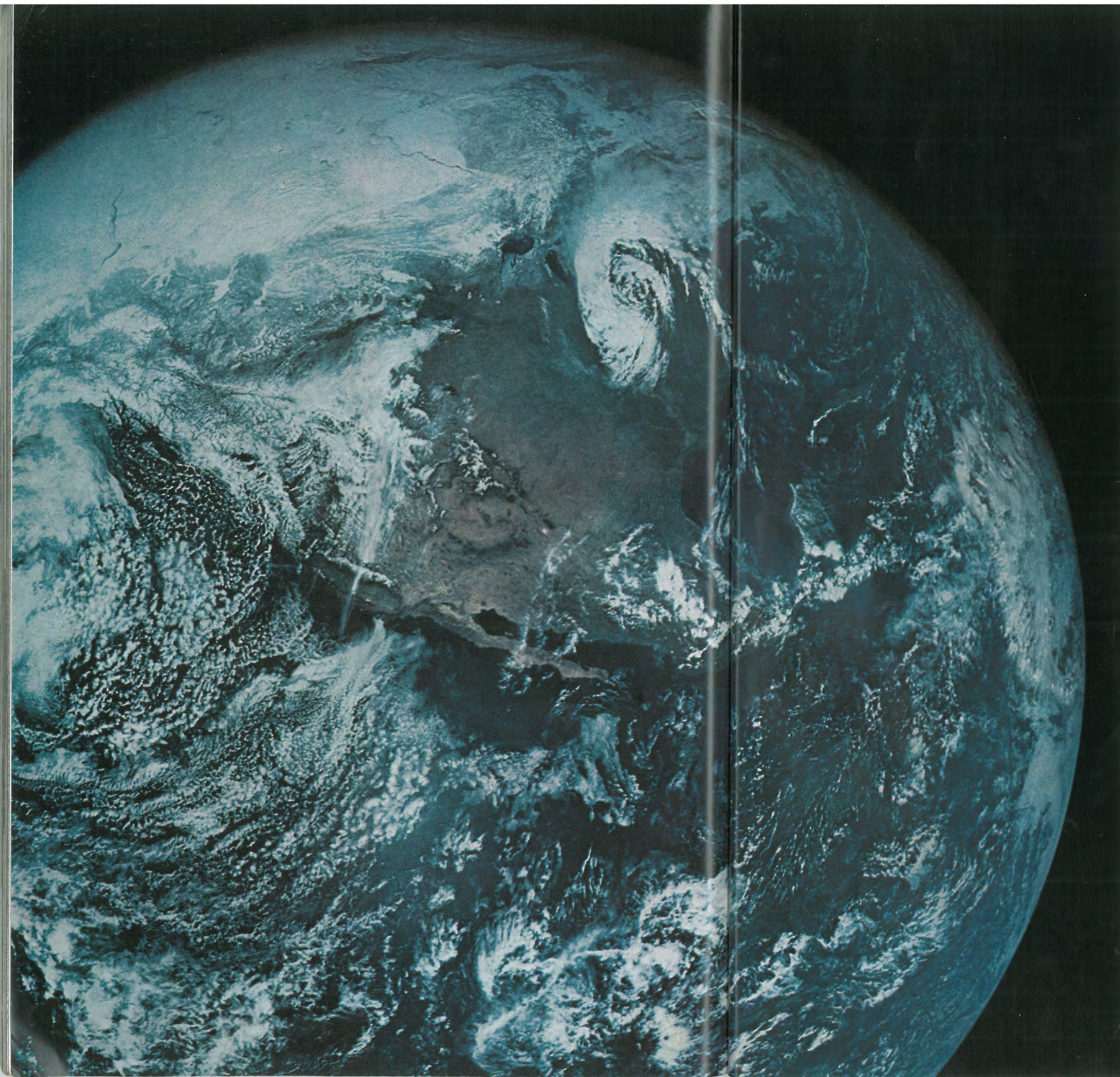
EARTHRISE LIFTS a marblelike orb over the moon's scarred highlands east of Mare Smythii. Photographed from the lunar module as it prepared for its landing, the command ship gleams as it drifts toward the horizon. On billowing terrain in the foreground, a meteorite perhaps a quarter of a mile in diameter has gouged a 12-mile-wide crater into the rim left by an earlier impact.

The scientific treasure hunt in the Descartes highlands brought surprises to Astronauts Duke and John W. Young. They had expected to find volcanic rocks in the material known as Cayley fill that overlies many highland depressions. Lava samples would have supported arguments that molten rock once seethed in the lunar interior, spewing occasionally to the surface early in the moon's history. Instead, the ninth and tenth men on the moon found breccias—fused rock fragments—suggesting that ejecta from massive meteorite impacts formed the Cayley fill.

"Each mission not only yields an enormous amount of information about the moon's history, but also poses new questions," says lunar geologist James Head.

JOHN W. YOUNG





CLOUD CURTAINS PART for a rare unveiling of North America, photographed from 10,000 miles.

"The earth is the most beautiful sight in space, with all its colors of land, seas, and clouds," said Astronaut Duke. "Looking at it against the blackness of space was almost a religious experience for me."

"There's not a scene on the moon that carries the emotional impact of watching your earth shrink to a little ball," added Mattingly.

On this unusually clear day most of the United States and Mexico can be seen, from Florida to Baja California. Shallow seas around Cuba and the Bahamas shine light blue against the darker, deeper water. The Mississippi River Valley traces a pale line through southern woodlands toward the huge delta bulging into the Gulf of Mexico.

North of the Great Lakes, scattered cloud cover gradually merges into solid-white polar ice. Spring thaws have rent cracks several miles wide in ice at the east shore of Hudson Bay and along the west edge of the Queen Elizabeth Islands in Canada's north.

Erosion has left little visible evidence of the earth's early development, a reminder that the moon's less abraded face may hold the keys to our own planet's history. □

THOMAS K. MATTINGLY II