Mankind's Giant Leap

The small step of Neil Armstrong's boot from the lower rung of the lunar module landing gear ladder to the powdery surface of the moon was indeed a giant leap for all mankind.

Man's first adventure on the lurain embodied many triumphs of technology and spirit. But its greatest significance will prove to be the watershed it marks in man's knowledge of himself and his universe. From now on, the theories that have beguiled scientists and fiction writers alike will fade swiftly into obscurity as they are submerged by the vast quantity of new facts garnered in man's accelerating exploration of the moon and the rest of his universe.

Vanished already are the horror stories of man's difficulties in operating on the moon—banished by the swift mobility, varied work and easy communications of Neil Armstrong and "Buzz" Aldrin in man's initial 2 hr. on the lurain. Gone too are the long-espoused theories on deep layers of lunar dust that would engulf both man and spacecraft—refuted by the first scuffs of man's boots and the hard, mallet-driven progress of the core-sampling drill. Going fast are many of the theories of a cold, dead moon —jolted by Armstrong and Aldrin's first observations of lunar rocks. The first 78-lb. load of rocks brought back by the Eagle crew from Tranquility base will provide more answers on the origin and composition of the moon than a century of stargazing through instruments from earth.

Less than a week after the Apollo 11 crew returned safely to earth, the Mariner satellites will start transmitting back to earth man's first close view of the Martian surface in another astonishing triumph of space age science fact over theoretical fiction.

Among the other triumphs of Apollo 11 that should be noted are:

■ **Open Program over Secrecy.** The U.S. policy of an open space program for all the world to see paid a stupendous dividend on Apollo 11 as people of almost every nation on earth were able to see man's first steps on the moon in that incredible television transmission. Never has the American image been projected brighter on such a global scale. It showed all mankind that this country is truly willing to share its triumphs, tragedies and knowledge with all who care to participate. The world owes a great debt to Stanley Lebar and his Westinghouse colleagues, who conceived and built the tiny 7-lb. television camera that transmitted so faithfully from the moon, and also to the National Aeronautics and Space Administration officials, who fought so hard to keep it on the mission.

■ **Engineers over Scientists.** One of the key differences between the U.S. and USSR space programs has been the divergent philosophies of its managers. The USSR program, dominated by the senior scientists of the powerful Academy of Sciences, has tended to overestimate the technical problems of manned spaceflight and insisted on over-testing with unmanned spacecraft or animal subjects. The U.S. program is managed by engineers backed by experience with operational development of high-speed aircraft from the X-1 to X-15. They have tackled problems such as the sound, heat and bio-medical barriers by designing and proceduring around them, while U.S. ground-bound scientist experts in these fields urged slowdowns or abandoning manned space flight. The engineering approach not only enabled the U.S. to overtake and pass the USSR in the race to put men on the moon, but is also producing far more scientific data faster than the conservative small-step programs of the scientist-dominated USSR effort. The wild gyrations of Luna 15 in lunar orbit and its ignominious crash in the Sea of Crises at the same time Astronauts Armstrong and Aldrin were broadcasting priceless data from the Sea of Tranquility offered a valid contrast in the two national philosophies.

■ **Manned over Unmanned Spacecraft.** Apollo 11 was another demonstration of the vital necessity for man in the control loop for a truly effective space exploration vehicle. Without man aboard, the lunar module would have crashed in an uncharted crater of huge boulders. Wailing would have been heard around the world on the futility of trying to land spacecraft on the lurain. With Neil Armstrong at the controls, the danger of the automatic landing site was quickly recognized. Eagle was flown manually beyond the dangerous crater to a feathery touchdown on powdery sand. In addition, the LM guidance computer became overloaded, rebelled and flashed false alarms until it was bypassed by the human brains aboard. No unmanned spacecraft could have accomplished the reconnaissance, evaluation and experimenting that Armstrong and Aldrin did in their relatively short lunar stay. Unmanned spacecraft are certainly necessary for preliminary exploration of distant planets just as Ranger, Surveyor and Orbiter blazed a trail for Apollo. But man must eventually be on board to insure the mission's operational and scientific success.

Apollo 11 also gives man his first spark of immortality. It demonstrated that he no longer need be a prisoner of his earthly home. If, at some future time, this planet becomes uninhabitable because of a nuclear war, cumulative pollution or the end of its galactic cycle, the human race now has the capacity to seek a new environment.

Man may find that his ultimate survival as a species may depend solely on his resources of space technology and his skill as a space voyager.

—Robert Hotz