APOLLO 15

Off to the Apennines

Before Apollo 13, coasting to the moon during manned missions was relatively uneventful. But the dramatic explosion triggered by a short which aborted Apollo 13 occurred on the way to the moon, and since then the moonward journeys have been bothered by pesky, but potentially serious problems. During Apollo 14 there was a problem with the docking of the command and lunar modules shortly after the burn that propelled the spacecraft out of earth orbit.

This week as Apollo 15 began its moonward journey after a near perfect launch in nearly cloudless skies, another short threatened for a time to cancel the landing at Hadley/Apennine near the rim of Imbrium Basin. Apollo 15 would have had to be a 4- to 6-day lunar orbital mission.

The short occurred in the circuitry of the service module's propulsion system (SPS), the main spacecraft engine, one hour 48 minutes after liftoff ignition. After a successful docking, command module pilot Alfred M. Worden reported that the SPS thrust light had come on. The light indicates the engine is about to fire.

For the next 24 hours, engineers and flight controllers at the National Aeronautics and Space Administration's Manned Spacecraft Center in Houston worked with contractor engineers to devise various tests—from tapping the panel around the Delta-V thrust switch to actual firing of the SPS engine—to find the short. Had the grounded circuit been upstream from the pilot solenoid valves—between them and the circuit breakers—it would probably have popped the circuit breakers. This would have made inoperable half the SPS engine system. Only one engine would then have been left to fire the men out of lunar orbit—a situation that would have prohibited lunar landing because the lander engines would have to have been preserved as back-up engines. (The solenoid valves release nitrogen pressure, which actuates another valve, which then dumps the oxidizer and fuel to ignite the engine.) If the short were downstream from the solenoid valves, the problem would be annoying, but it could be circumvented manually.

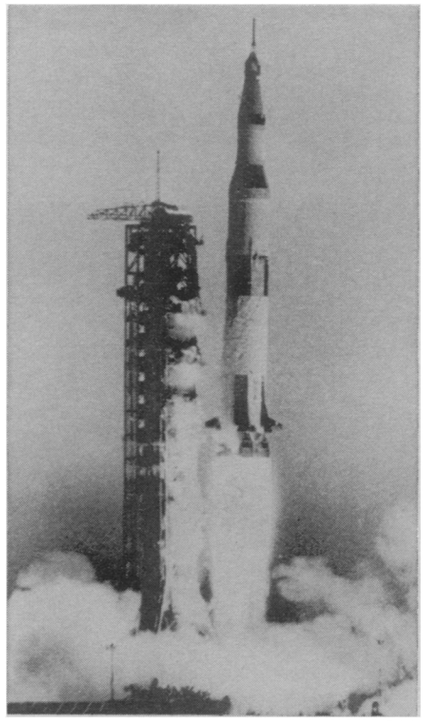
The tension mounted prior to the trial firing of the SPS engine at 2:15 p.m. (EDT) Tuesday. If the engine fired, the mission was saved. It did. "That's beautiful," said capsule communicator Joseph P. Allen, a scientist-astronaut. "That burn was exactly what we wanted to see. We will proceed with the normal mission."

The reply from the capsule was, "Let's go to Hadley." Allen replied, "That's a super idea."

Proceeding with a normal mission meant that if nothing else happened David R. Scott, commander, and James B. Irwin, lunar module pilot, would land Falcon on a plain called Palus Putredinis (the Marsh of Decay) at 6:15 p.m. Friday, July 30. They were then to spend three days exploring the base of Apennine Mountains, craters, the Hadley Rille and the plains (SN: 7/10/71, p. 28). The lunar jeep called Rover was to make its debut, allowing the men to cover a 28-square-mile area (SN: 6/12/71, p. 404).

Scientists hoped the men would find samples from at least six different geological features, which would help pinpoint when and how they were created.

Also to debut was the lunar orbital science package, located in one of the service module's bays. The instruments and cameras would examine and photograph about 20 percent of the moon's surface. The instruments would detect



ESS

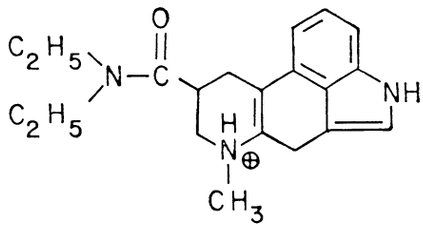
Apollo 15: Three days on the moon.

constituents of the soil, the cameras would map the surface and a laser altimeter would measure and mark the altitude of each feature photographed. Before leaving lunar orbit, a satellite containing instruments to measure the lunar gravitational field (including the influence of the mascons in the circular basins), particles in space around the moon, and physical and electrical properties on and around the moon, was to be released.

Splashdown next week should be around 4:45 p.m. Aug. 7. □

HALLUCINOGENS

LSD and DNA



Lysergic acid diethylamide

Nature

LSD: Dispute over effects on DNA.

Various tactics have been used in the battle against drug abuse, but as the number of drug users continues to rise it becomes obvious that they are not working. The scare tactic, in particular, has been used in an attempt to curb the use of lysergic acid diethylamide (LSD).

In June of 1969 NATURE published a paper by Dr. Thomas E. Wagner, then of the Sloan-Kettering Institute for Cancer Research. "The observation of broken chromosomes in test animals and humans treated with the hallucinogen (LSD) has been well documented" the paper began. Dr. Wagner then went on to announce that, using a spectropolarimeter, he had discovered evidence indicating "that LSD interacts directly with a purified calf thymus DNA, probably by intercalation, causing conformational changes in the DNA." This meant that LSD comes between the DNA bases and interacts strongly at the gene level, unwinding the helix and causing mutations and changes in DNA activity. In other words, the LSD-DNA interaction is responsible for physical changes in the chromosomes, defective genes and possible mutations.

The July 16 NATURE contains two papers that refute those findings. Drs. E. M. Smit and P. Borst of the University of Amsterdam state that, using a more specific and sensitive method for studying intercalation, no interaction between DNA and LSD was detectable. They therefore conclude that "chromosome damage in the presence of LSD is not a consequence of the intercalation of LSD into DNA."

Drs. A. H. Brady, Elizabeth Brady and F. C. Boucek of the University of Miami School of Medicine report similar findings based on completely different methods. And their experiments "have failed to show that LSD has any effect on DNA conformation." Dr. Brady says there "may be some kind of interaction but if there is it is very minimal and does not show up as any change in optical activity." And "if