

Apollo at last

The first U.S. astronauts
to fly in 23 months
made the moon look bright

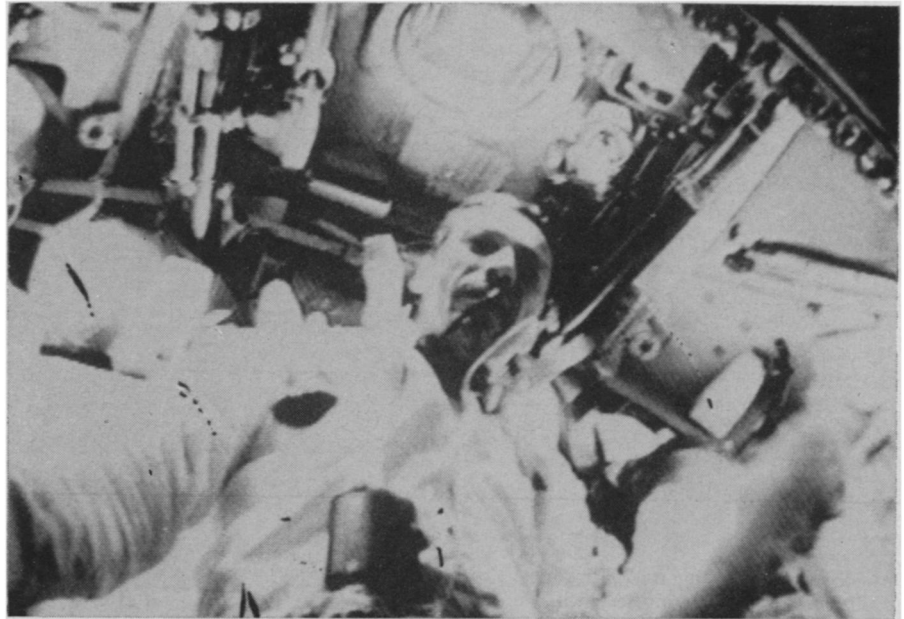
Even before Astronauts Walter M. Schirra, Donn F. Eisele and Walter Cunningham took off on the first manned Apollo flight, their mission had success written all over it. Even residual doubts about possible troubles during recovery, scheduled for early this week after a maximum of 164 orbits, never dampened the mood.

The atmosphere at Cape Kennedy was different from the general case of nerves that had surrounded an earlier Apollo milestone, the unmanned maiden voyage last November (SN: 11/25/67, p. 513) of the mighty Saturn 5 booster that will power the U.S. flight to the moon.

Prior to last November's flight, which turned out to be a glowing success, seasoned observers were doubtful about the rocket's chances; the launch pad fire that had killed three astronauts less than 10 months before was still a grisly spectre: even employees of the companies that had built the booster were betting among themselves about what would go wrong.

But despite two difficulties—an engine which cooled down too slowly and a malfunction of the gantry elevator—the spacecraft lifted off just two minutes and 45 seconds behind schedule.

Once in orbit, the astronauts separated their spacecraft from its remaining booster stage. Spacecraft Commander Schirra then turned the capsule around 180 degrees in space and nosed it back to within five feet of an adapter on the booster, designed to simulate



NASA

Astronaut Donn Eisele looks down at the television camera inside Apollo.

a docking maneuver that will be carried out with the lunar module on the actual moon mission.

During their first night in space, the astronauts deliberately allowed the spent second stage to drift away from them, then tested their navigation skills the next day by relocating it from more than 100 miles away and flying back to another rendezvous. On an actual lunar mission such maneuvering could be necessary if the lunar module, with two of the three astronauts aboard, became stranded in orbit around the moon, forcing the remaining astronaut aboard the command module to seek them out.

Other tasks in space included changing the height and shape of the spacecraft's orbit, as well as making tiny directional changes to check out both men and equipment in the vital and painstaking task of making corrections of trajectories to and from the moon.

The mission was scheduled to last some 10.8 days, long enough to make it the second longest manned space flight in history. Gemini 7 stayed aloft almost 13 days in 1965 with Astronauts Frank Borman and James Lovell aboard. The longest Russian flight was that of Vostok 5 in 1963, which carried Cosmonaut Valery Bykovskiy for less than five days.

Sheer duration, however, was not the primary aim of the Apollo planners, although the flight time and extended tests of equipment were important. Most of the action took place during the first five days. Mission Di-

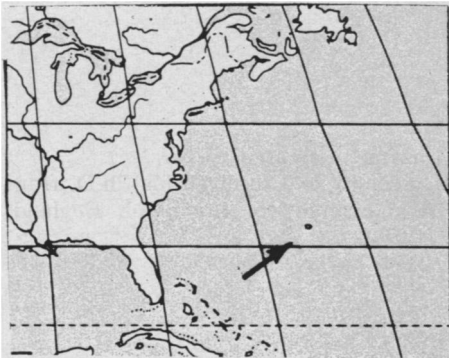
rector William Schneider described the flight as "an open-ended mission," although another official described the extra days as "a lot more than just frosting."

If the flight had its successes, it also suffered numerous difficulties; a few caused brief anxious moments. A power failure at the ground control center in Houston knocked out lights, view screens and instruments for one panicky minute, although the space agency's emergency generators kept everything—particularly the computers storing navigation data—under control. A few days later an electrical overload in the spacecraft caused a similar failure, though the astronauts corrected it with the flick of a switch. "If you think we're calm now," observed Schirra later, "we sure weren't then."

A different sort of problem was the infamous on-board television camera. For years the astronauts had been opposed to live television on their spacecraft. They objected to looking unkempt on nation-wide television, to having their bosses electronically look over their shoulders, and to having a largely public-relations task added to their already heavy work load. When the pro-television forces finally prevailed, Schirra, according to one official, said, "We'll give the camera every chance, but the first time it messes up, it goes back in the box." After all the complaints, however, the camera worked perfectly and the astronauts appeared to enjoy cracking jokes for the networks and 15 million viewers.

Then there was Schirra's cold, which his cabinmates appeared to catch. By the second day in orbit, the astronauts were consuming tissues, aspirin and decongestant tablets. The colds appeared to have little if any effect on the flight, although the astronauts' chief physician, Dr. Charles Berry, admitted that the behavior of microorganisms under space conditions is only sketchily understood.

Relatively little is known, in fact, about man's response to space flight, despite some 2,000 man-hours spent in orbit by Mercury and Gemini astronauts. Past flights have revealed losses of red blood cells, for example, equivalent to as much as a pint of blood. This may be in some way connected



Planned splashdown: off Bermuda.

with the pure oxygen atmosphere, but if so, the mechanism responsible is unknown. Calcium loss has also been common; although it has not caused permanent damage to any astronauts so far, the calcium balance takes so long to build back up after a flight that some remedy may be a necessity for long-term flights such as trips to Mars.

The Apollo astronauts were wired with electrodes to monitor their heart rates and respiration, but only for one man at a time. For the one- and two-man Mercury and Gemini spacecraft, each man could be monitored continuously. Keeping continuous track of the three-man Apollo crew, however, would take up too much space in the available communications band. As a result, the astronauts had to turn a switch in the cabin every eight hours to select a new subject.

Colds in space and limited health data notwithstanding, the next Apollo flight may well bring the moon for Christmas. One of four plans under consideration calls for as many as 10 orbits around the moon before returning to earth.

The flight after that will be the first manned test of the tricky and troublesome lunar module, and a flight or two later could land the first men on the moon.

XYY

Extra chromosome in court

Australian laborer Edward Hannel stabbed to death a 77-year-old widow. The jury this month acquitted him on grounds of insanity.

Daniel Hugon strangled a 62-year-old French prostitute in the Pigalle Hotel. The jury found him guilty last week but thought he should not be punished severely. He was sentenced to seven years in prison.

Both murderers, genetically speaking, are supermales. By some little-understood mistake of nature, each man was born with an extra male sex chromosome, which scientists recently have associated with a tendency toward crime.

These two cases mark the first trials in which a man's chromosomes directly confronted the law, and are expected to have world-wide implications for lawyers and geneticists alike. "As far as I know this is the first time a man has been acquitted on a murder charge because of his chromosome construction," says Dr. Digamber S. Borgaonkar, referring to the Australian case.

The issue has yet to be raised in U.S. courts but may come up soon when Richard F. Speck, convicted killer of eight Chicago nurses, appeals his death sentence. Speck also has one male sex chromosome too many.

Asked if he thinks this abnormal chromosome pattern is a justifiable defense of crime, Dr. Borgaonkar, head of the chromosome laboratory at Johns Hopkins University, replied, "I don't know yet. I haven't enough evidence to answer that." But if it is used, he believes such criminals should be remanded for psychiatric care, "not just released to the streets."

So-called supermales have an XYY chromosome pattern, one female or X chromosome inherited from their mothers and two male or Y chromosomes from their fathers. Normally, a man has one X and one Y. (Women have an XX chromosome pattern. There seems to be in women no corresponding chromosomal aberration and genetically related tendency to crime.)

After about three years of study of some 100 XYY men in prisons and mental institutions here and in Europe, a characteristic picture of a very tall, gangly, aggressive social misfit with a low intelligence quotient emerges, though Dr. Borgaonkar emphasizes that there is no hard and fast pattern. About 10 or 12 XYY's of average height are known, and he is currently working with an XYY man whose I.Q. is high—125. A search for XYY's among very tall basketball players and

other athletes was fruitless. And though there are estimates that one man in every 300 may have this genetic abnormality, Dr. Borgaonkar insists that such figures have little validity at this point because testing has been limited.

Nevertheless, he finds a valid association of the XYY syndrome with behavioral problems (not necessarily criminal), saying preliminary evidence shows that very few XYY persons have relatives with either psychological or criminal records.

Whether XYY males are really psychiatrically different from other men remains to be known. Some of the institutionalized XYY's who have been studied come from broken homes and poor environments that could account for their criminal records and antisocial behavior. The fact that many XYY's are unusually tall could also account for their adjustment problems.

The XYY chromosome syndrome apparently bears no relation to physiological disease, although high hormone levels and unusual heart patterns have been detected in a few such persons.

Though the legal picture is clouded by lack of firm scientific data and by lack of extensive precedent, Harold Ungar, an associate of the famed Washington criminal lawyer Edward Bennett Williams, observes that no single factor constitutes absolute defense. But he predicts this genetic abnormality will prove to be important in criminal trials.

When the defense relies on a man's mental condition, the law asks two questions. Is he mentally defective or insane? Did the condition cause him to commit a crime? "Often," Ungar points out, "we never get beyond the first question. But if a defendant has a peculiar genetic problem, we'd be more likely to get quickly from question one to question two."

From a lawyer's point of view, the jury's attitude plays as great a role as any definitive scientific testimony. "In a practical sense, the XYY condition may be important," Ungar says, "particularly if the man is accused of a bizarre or bloody crime."

If the crime is bizarre and the lawyer can prove that there is something bizarre about the defendant, the jury is more likely to accept a plea of insanity than it is if the crime was cold-blooded and well-planned. Lawyers find that even if a psychiatrist testifies that meticulous planning is a symptom of a man's derangement, it is often difficult to sway the jury, but the clear and unusual circumstance of an extra sex chromosome may be more convincing.