SPACE MEDICINE

Sad end to Biosat 3

The flight of Biosatellite 3 had been hailed as a major advance in the study of how man might survive the rigors of long-term space flight. For 30 days a 14-pound pigtail monkey, highly trained, carefully selected, and monitored with the most sophisticated biomedical instrumentation ever carried into space on a living creature, was to orbit the earth, subject to the weightlessness, confinement and radiations of the space environment (SN: 6/14, p. 569).

But last week, disaster hit. The monkey, Bonny, became sluggish, was brought back to earth, and died.

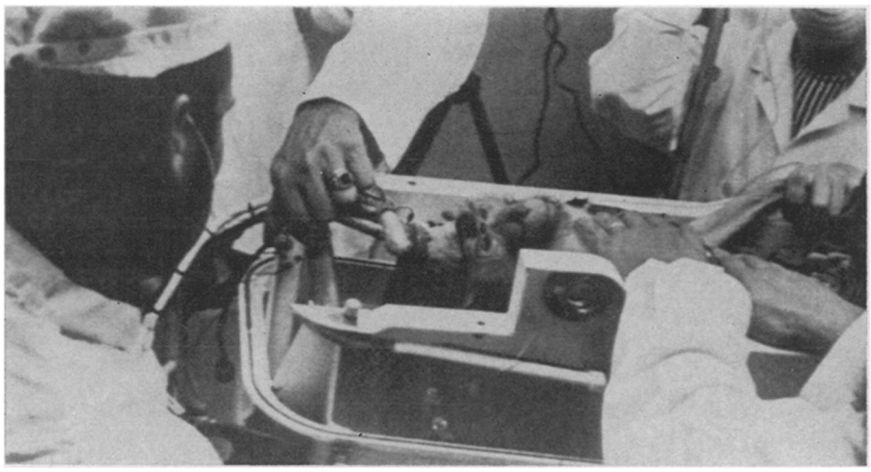
Men and animals have spent thousands of hours in space, but never before had they been instrumented for more than a few obvious conditions (see p. 61). Bonny, however, was equipped with electrodes, catheters and a variety of other devices that would provide scientists on the ground with everything from brain-wave patterns to continual analysis of the content of its urine.

But on the ninth day of the flight, because of concern over the monkey's physical condition, the voyage was ordered ended. Ten hours and twenty minutes after the capsule was fished out of the stormy Pacific Ocean, Bonny died.

The mission started normally enough. The 1,550-pound capsule was placed into a 220-mile circular orbit by a Delta rocket launched from Cape Kennedy on June 28. At first Bonny acted as expected, performing his tasks and consuming his ration of food pellets. There was a time even when it seemed he had found a way to outwit the food dispensing mechanism to get more of the two-gram pellets than he had been allotted.

Then his activity began falling off, and the scientists became worried. Bonny's "daytime" beginning Sunday morning, a 12-hour period, was normal for him. He did not successfully perform his behavioral tasks to receive food but did drink his ration of water. During his free feed period of two hours that afternoon, when pellets are released in addition to those earned for carrying out the tasks, the primate ate all 20 pellets available. His urine output was normal.

Starting that evening, Bonny ceased drinking water at his usual rate. But his physiological data were normal and he appeared to be in good condition. Even though his pulse and respiration were lower than they were before the mission began, the concern was not strong. Metabolic slowdowns are not uncommon to his species, *Macaca nemestrina*, when placed in isolation or confined to a couch.



NASA/Wide World

Bonny: Death for the monkey at the end of a promising ride in the sky.

During the night, Bonny continued to refuse water and appeared to be in a deeper state of rest than at similar times during the flight. Early Monday morning, scientists attempted to alert him with repeated water-available signals, a signal to which he had usually responded.

They took his lack of response as an indication of dangerous sluggishness, which if allowed to continue might have led to serious physical deterioration.

The mission was ordered ended. The reentering capsule overshot its target, where a special Air Force plane was to try to snare the craft in midair as it descended by parachute. Recovery 25 miles north of Kauai was complicated by rain squalls, but divers eventually lashed the capsule to a helicopter which took it to Hickam Air Force Base in Honolulu.

Although his temperature was subnormal, Bonny appeared to be in fairly good condition after being removed from the capsule. He was given intravenous fluids and put in intensive care. where he died at 5:56 a.m. (EDT) Tuesday.

Space agency doctors were unable to guess what could have happened to their pet monkey. "Why he passed away so suddenly is a complete mystery to me," said Dr. W. Ross Adey, Biosat chief investigator. An extension of Bonny's normal 24-hour cycle to 26 hours during the flight was one unusual condition noted. An interior cabin temperature of 70 degrees F.—at the lower acceptable limit—was considered a possible factor in the lowered metabolic rate. Complete analyses will take many weeks.

X-RADIATION

Standards for TV sets

Ever since a child first sat down in front of a TV set, the cry from parents has been, "Don't sit so close." That cry has now been picked up by the U.S. Public Health Service, specifically its Consumer Protection and Environmental Health Service.

However, the agency is not as concerned about eye damage as it is about possible danger from X-rays, especially damage to the genes. The Public Health Service of Suffolk County, N.Y., released a report in April showing that 20 percent of the color sets examined on a random basis were emitting X-radiation in excess of the recommended 0.5 milliroentgen per hour level. Since then, the agency's Environmental Control Administration has urged viewers to stay 6 to 10 feet away from color sets.

A similar survey by the U.S. Public Health Service in Washington, D.C., in January 1968, found only 5 percent of sets dangerous; the difference is in part attributable to the higher picture-tube voltages sometimes required by outlying suburban sets. But the studies catalyzed the formation of an industry-Government committee to work out a proposed performance standard for X-ray emissions for color TV sets.

Television is only one task of the committee, which was formed last month in accordance with the 1968 Radiation Control Act. Problems looming before it include the development of standards for microwave ovens and medical and dental X-ray equipment as well.

Two weeks ago the commitee received a draft of a proposed manufacturer's standard from the ECA's Bureau of Radiological Health, recommending