

# SPACE SCIENCES

## Lightning and the Apollo-Soyuz

A team of Federal and university researchers at the Kennedy Space Center in Florida is using three instrumented aircraft and a 24-station ground network to collect data on what one National Oceanic and Atmospheric Administration official calls "Florida's incomparable lightning season." The scientists hope to be able to predict—even as few as 10 or 20 minutes in advance—the chances of lightning striking the Apollo spacecraft of the July Apollo-Soyuz Test Project as it climbs through Cape Canaveral's crackling atmosphere.

The project is a continuation of work begun after a bolt of lightning struck the ascending Apollo 12 on Nov. 14, 1969, temporarily affecting a number of instruments aboard the spacecraft. Funded by the National Aeronautics and Space Administration, the work is being directed by Heinz Kasemir of the NOAA Atmospheric Physics and Chemistry Laboratory and includes scientists from NASA, the New Mexico Institute of Mining and Technology and the University of Arizona.

The ground network consists of 24 stations feeding electric-field data into a central computer, which processes the data and displays them on a television monitor, updated once a second. The display includes a map of the area, the station locations, total electrical activity in nearby storms, weather-radar precipitation contours, electric-field contours (in 1,000-volt-per-meter intervals) and the positions of lightning strikes. A Naval Research Laboratory aircraft will make low-altitude surveys of atmospheric electric fields around various types of clouds, while a NASA plane does the same at mid-level heights.

At high altitudes, a Schweizer 845-A powered glider belonging to the Office of Naval Research will fly patterns around thunderstorms, as well as penetrate the frozen cloud anvils which are the cirrus clouds swept off the tops of thunderstorms by upper-level winds.

## French dual-satellite launch

Castor and Pollux are in orbit. The two small French scientific satellites were launched May 17 aboard a single French booster as replacements for a similar pair which failed to reach orbit last year.

The 167-pound Castor satellite will be used to study changes in earth's atmospheric density and gravitational fields, as well as to detect micrometeoroids. Its primary sensor is a highly sensitive, tri-axial accelerometer said to be capable of measurements as small as one billionth of the acceleration of earth's gravity at the surface.

Less than half the weight of its big brother, the 79-pound Pollux is an orbiting test-bed for a long-life, low-thrust propulsion unit being studied for use as an attitude-control thruster on future satellites.

## Satellite takes a trip

The ATS-6 Applications Technology Satellite is taking a trip. On May 20, controllers at the NASA Goddard Space Flight Center sent the command that started the multi-purpose probe moving from its fixed (geosynchronous) position 35,900 kilometers above the Pacific Ocean just west of the Galapagos Islands to a new site over Lake Victoria in East Africa. It should arrive about July 1, in time to help with tracking during the Apollo-Soyuz rendezvous mission. After that, its main role for the next year will be to serve the government of India in relaying daily instructional television programs to about 2,500 community receivers. Launched May 30, 1974, ATS-6 has been used in a wide variety of educational, scientific, medical and communications projects.

# NATURAL SCIENCES

## Baby turtles: To be banned

A favorite image of the indomitable little boy spirit: freckles, mischievous grin and a turtle in his blue jean pocket. Or was it a frog? Better make it a frog. . . . Within a few weeks, pet baby turtles will be a thing of the past.

The Food and Drug Administration has announced a ban on sales of pet baby turtles to begin within a few weeks. The agency tried several approaches to controlling "the turtle problem" short of banning them, but the problem remains: Pet baby turtles carry bacteria that can cause salmonella poisoning in mischievous little boys and anyone else who handles them without washing their hands afterwards. An estimated 280,000 cases of salmonella poisoning per year are caused by pet turtles.

Following a petition last year by Consumers' Union, the FDA required shippers to certify their turtles as free of the pathogenic organisms. A follow-up survey revealed, however, that 54 percent of those certified germ-free had picked up the infections again from their food or water after a few months. On the basis of this recontamination and the magnitude of the problem, FDA decided to ban sales.

The ban will apply to turtles whose shells are less than four inches in length and to fertile turtle eggs. Sales of the animals will continue for scientific, educational and exhibition purposes.

## How frogs spot their dinner

How do frogs find insects for dinner? And what part of their brains are involved in such vision? Answers to both questions are reported in the June 6 *SCIENCE* by David Ingle of McLean Hospital in Belmont, Mass.

First Ingle put frogs on rotating plates. The frogs were contained in plastic cylinders so they couldn't hop away. But as the plates rotated, a dummy bug was flown over each of the frogs' heads for only 0.3 seconds and only through a five degree arc. This motion was repeated after a 3.2 second delay. During 100 test trials, the frogs snapped at the initial stimulus motion only eight times, but 75 out of 100 times at the second motion. "That frogs can be alerted by such a brief motion is obviously adaptive for feeding on insects or worms," Ingle concludes.

In a second experiment, Ingle found that one class of neurons in the frogs' optic tectum continued to discharge for a few seconds following a brief dummy bug motion. So these neurons, Ingle believes, probably allow frogs to sight bugs.

## Why some birds like "spsh"

In North America, birds of the passerine families—vireos, warblers, orioles, blackbirds, chickadees, titmice, finches—are attracted to the sound of "spshing" by bird watchers. Their Old World counterparts are not. Reasons for this difference are reported in the April *PROCEEDINGS OF THE NATIONAL ACADEMY OF SCIENCES* by Neal Griffith Smith of the Smithsonian Tropical Research Institute in the Canal Zone.

Smith carried out his field observations in North, Central and South America, and in Europe and Africa. He found that the sound of "spsh" mimics the vocalizations of certain bird species in the tropics that the North American birds socialize with during migration. The North American migrants join the local birds to gain expertise about local food sources—fruit and nectar—generally relinquishing insect eating until they migrate back north.

Old World passerines do not react to "spsh" because there are plenty of insects for them to eat in Africa and they do not migrate in such densities as in America. Thus, they do not have to seek out local birds to learn about new food sources.