

## Death to 16 and a critical blow to airborne science

The research aircraft Galileo, a modified Convair 990, was one of NASA's prides and joys (SN: 12/9/72, p. 373). It was more than a plane; it was a flying laboratory that could be equipped for diverse research in such areas as astronomy, geophysics and earth resources. Last week, the Galileo collided with a Navy P3 Orion turboprop near the Ames Research Center at Mountain View, Calif. Sixteen persons were killed, including all 11 persons aboard the Galileo. The \$5 million aircraft was carrying \$1 million worth of scientific instruments.

The crash has rocked Ames. Some of the center's leading scientists, technicians and pilots were killed. The Galileo was the heart of the airborne science program. "It was one of the major programs at Ames," said Hans Mark, director of the center. "It hurts our

program badly. We do not have another aircraft to carry on its work."

A look at a typical flight year—1971—gives some hints of the loss. The Galileo flew 48 missions that year. One was to observe Mars at perihelic opposition. Another was a barium ion cloud expedition. There were meteorological flights. There were missions to support an ice research project in the Arctic. Scientists used the plane to sample the stratosphere. The Galileo could carry a payload of scientists and heavy instruments to altitudes of 40,000 feet. It has been used to chase solar eclipses and to test instruments for oceanographic research. When the accident occurred, the plane was returning from a two-hour flight testing new camera equipment for oceanographic missions. It was scheduled to chart the patterns of whales and other sea mammals.

NASA has announced a joint NASA/Navy investigation board to determine the cause of the crash. There were no indications of mechanical problems. □

## Two physical constants survive another test

The constancy of the fundamental constants of physics comes under continual review. Experimenters seek more and more refined evidence that what theory calls constant truly is so. At the same time theorists occasionally come up with a theory that requires a term that was constant before to become variable. Two constants that have recently come under scrutiny for possible variation are the speed of light and Planck's constant.

Theory says that the speed of light in vacuum is the same no matter what the wavelength or frequency of the light. Much of special relativity and theories dependent on it would have to be reworked if the speed of light were a variable.

Yet the velocity of light does in fact vary with frequency in certain material media. An experiment looking for a similar variation in vacuum was performed at the Stanford Linear Accelerator Center by a group from the University of California at San Diego (B. C. Brown et al). It is reported in the April 16 *PHYSICAL REVIEW LETTERS*.

The idea of the experiment was to make the electron beam of the SLAC accelerator produce two different kinds of electromagnetic radiation: bremsstrahlung by striking a target and synchrotron radiation as it was deviated by a magnetic field. The bremsstrahlung comes out as gamma rays, the synchrotron radia-

tion as visible light. Thus there was a wide difference in frequency over which any tendency to variation of speed with frequency might show up.

The times of flight of the two kinds of radiation were compared. The result was negative: The experiment found no evidence of a variation.

Planck's constant is fundamental to quantum mechanics; it relates the energy of a quantum to the frequency of the wave associated with it. Some theorists have suggested that it may have varied over the history of the universe. Peter D. Noerdlinger of Michigan State University points out in the April 16 *PHYSICAL REVIEW LETTERS* that if Planck's constant varies, "... the assumptions of general relativity are violated ... [and] quantum mechanics would need some reworking."

If Planck's constant had been different in past aeons, the effect should be observable in light that comes to us from that time. Since most observers agree that the 2.7-degree blackbody background radiation comes from the earliest times of the universe, Noerdlinger uses it as a test. A difference in Planck's constant would change the shape of the blackbody spectral curve. Noerdlinger's consideration shows, however, that the shape of the curve is compatible with the present value of Planck's constant.

## Education briefs: Reading, fund cuts

Apparently, even as a college freshman, Johnny still can't read. Researchers at the University of Nevada have found that a quarter of their freshman students are two years behind in their reading skills and that nine percent read at only an eighth grade level. "This statistic is even more appalling," said one of the researchers, "when we realize these students are right on the national percentile ranks."

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In the wake of President Nixon's announced budget cuts for education, various professional societies have been polling their members to determine the effect of the cuts. The latest group to report is the National Association of State Universities and Land Grant Colleges. Among the losses reported by member institutions are: University of Iowa, \$12.8 million; University of California system, \$100 million (over 28 months); University of Wisconsin system, \$25 million; University of Missouri, \$7.1 million; University of Illinois, \$5.6 million; University of Michigan, \$8 million, and at least seven other schools with losses exceeding \$2 million. The association says the cuts will hit hardest the university functions of teaching, research and extension.

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The first hint that the Administration may be having second thoughts on the budget cuts for education came in a speech made before a meeting of the National Cancer Advisory Board. There, according to a report published in *SCIENCE*, Benno C. Schmidt of the President's Cancer Advisory Panel told of discussions he held with Presidential aides during which he had made a "good case" for at least selective reinstatement of some National Institutes of Health training and fellowship grants. He said that when he left the White House, the decision to decimate NIH grants was being reconsidered.

## \$25,000 to Piaget

It was announced last week that Swiss child psychologist Jean Piaget will be the first recipient of the Kittay International Award for psychiatry. The \$25,000 prize is the largest award given for psychiatry. Ironically, Piaget has predicted that psychoanalytical theory will be exposed as myth by studies on hormones and the way the brain functions. The award by the Kittay Scientific Foundation in New York gives recognition to researchers in psychiatry whose work has had practical clinical application. □