

# space sciences

## Earth's weather and the sun

The evidence for effects of solar activity on the climate and weather of earth is becoming stronger, although the mechanisms for these effects are not fully explained. At long last Anatolii V. D'yakov has won official recognition in the Soviet Union for his theories of long-range weather forecasting—that solar activity influences weather not only through variations in heat flux, but also through other forms of radiation. D'yakov asserts that the sunspot activity and variations in the solar wind should also be taken into account in long-range forecasting.

Earlier evidence of solar influence was from systematic variations in the widths of growth rings in trees with the solar cycle. Later, the Soviets found similar evidence in variable silt deposit layers in the Aral Sea and Lake Victoria, which they claim can be used to trace the solar cycle back for millions of years. The Soviets also claim that large cyclones and anti-cyclones tend to form in a band around the magnetic north pole. American scientists have evidence for the regular formation of a large low pressure trough in the North Pacific after unusual particle influx from the sun. This subsequently leads to extended storm systems across the United States and Canada.

## 'Wind' on the sun

Solar physicists at Kitt Peak National Observatory in Arizona believe they are seeing evidence for a "wind" effect blowing across the sun in the sun's atmosphere. The "wind" is sweeping from east to west in the same direction of the sun's rotation. William C. Livingston, at the recent meeting of the American Astronomical Society in Las Cruces, N.M., said he thinks this wind could influence the rotational speed of the sun's surface. Evidence for the wind comes from studies of the spectra from 150 solar prominences recorded over the past three years. Much of the time, according to Livingston and Larry Ramsey, also of Kitt Peak, there is a shift in the wavelength seen at the top of prominences that suggest the gas in the prominences is moving systematically faster than the sun rotates. The faster movement of this gas, they suggest, is caused by the wind. Their three-year study will continue.

## New posts for Petrone and Lee

Eberhard F. Rees, a member of the German rocketry team that included Wernher von Braun, retired this month as director of the Marshall Space Flight Center in Huntsville, Ala. Rees came to America in 1945. NASA named Rocco A. Petrone to be his successor. Petrone has been director of the Apollo program at NASA headquarters since 1969. Chester M. Lee, also of the Apollo office, has been named to succeed Petrone as director of the Apollo/Soyuz Test Project, scheduled to fly in July 1975.

Petrone's career in rocket development began in Huntsville, where he participated in the development of the Redstone missile at the Army's Redstone Arsenal. He then served as Saturn project officer at Kennedy Space Center. Before Lee joined NASA in 1965, he was with the Directorate of Research and Engineering in the Office of the Secretary of Defense and the Navy Polaris program.

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# behavioral sciences

## Not with a bang but with a whimper

One of the most dramatic demonstrations of the disastrous effects of overcrowding has come to a quiet end. In July 1968 John B. Calhoun of the laboratory of brain evolution and behavior at the National Institute of Mental Health put four pairs of healthy mice in an eight-foot-square habitat. Given all the comforts and none of the problems of home, the mice prospered and proliferated. By February 1970 there were 2,200 mice in the cage. But the effects of overcrowding were beginning to show and not one newborn mouse survived after March 1970. Last month the lone survivor of the experiment, a female, died.

While the experiment was ongoing, a variety of abnormal activities were reported and attributed to overcrowding. Once the upper optimum limit of population—620—was reached, strange things began to happen. Normal animals became aggressive and began to attack other mice. Some even turned to cannibalism of immature rats. Mothers deserted their young and sexual activity became perverted. Some males made advances toward juveniles and females who were not in estrous. Others made no sexual advances at all. One group of rats became hyperactive while another group, says Calhoun, became "passive blobs of protoplasm, physically healthy but socially sterile."

Halsey Marsden, who worked with Calhoun on the project, explained some of its implications. With all adverse conditions, such as weather and disease, removed, he says, the original mice were given the opportunity to exploit a perfect universe. They did until there were no more territories to establish and no more social roles to fill. Healthy young mice attempted to enter the system and were frustrated by the lack of social opportunities. They turned to aggression, conflict and perversion. These abnormalities became so predominant that the chain of events could not be reversed, even after the mouse population had reduced itself to its former optimum levels. Near the end Calhoun separated out some healthy individuals and put them in a new environment. They mated but produced an abnormally low number of young, none of which survived. It was then obvious that the situation would become progressively worse until the animals completely destroyed their whole world.

## Reducing diet pills

Last year the Food and Drug Administration reviewed the use of amphetamines for diet control and concluded that they are of little value. Accordingly, production quotas for the drug were cut back by 83 percent (SN: 2/19/72, p. 123). Now the FDA is requesting another 50 to 60 percent reduction in amphetamine production. Recommendations sent to the Justice Department's Bureau of Narcotics and Dangerous Drugs call for a 20 percent cut in production of orally taken amphetamines and the complete elimination of all amphetamines prepared to be taken by injection or in combination with other drugs.

Not only are the amphetamine diet pills of little value, says the FDA, they are unsafe in the injectable form and have a great potential for abuse. Reds and uppers, however, will still be available on the black market and abuse of these drugs will probably continue.

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