

## Of solar winds and solar cycles

Observers have made various attempts to correlate changes in the solar wind with changes in the sun. Since the sun is the source of the solar wind, there ought to be connections. Responses of the solar wind to short-term events such as solar flares have been documented, but up to now evidence has not been presented for a relation between the wind and the 11-year solar cycle.

In the Feb. 15 *ASTROPHYSICAL JOURNAL LETTERS* D. S. Intriligator of the University of Southern California presents an argument for long-term solar-wind variations based on observations taken from July 1965 through June 1971. He finds that the frequency of high-speed streams in the solar wind and their duration vary over the solar cycle. More days associated with high-speed streams occur during solar maximum than during solar minimum. The yearly average speed of the solar wind varies over the cycle, and it is highest at solar maximum. There is also evidence that the changes in the solar wind can account for the sun's modulation of the cosmic rays that stream by it.

## Jupiter leaks heat

The Hale Observatories' 200-inch Hale Telescope at Mt. Palomar has been equipped with a new infrared photocell detector that is 10 to 100 times more powerful than previous ones. This has enabled James Westphal, Keith Matthews and Richard Terrile to make sharper pictures of Jupiter at five microns wavelength than was possible before. In the course of this observation they found that Jupiter, in defiance of the energy crisis, leaks heat from holes and rifts in its clouds.

Five microns is a wavelength that penetrates both the methane and ammonia in Jupiter's atmosphere and the earth's atmosphere. The Hale observers found localized rifts and holes—at least as small as the 2,000-mile-diameter resolution of the photocell—that enabled them to look deep into the planet's atmosphere and observe the heat coming through.

Occasional color photos taken through the 200-inch telescope were correlated with the infrared pictures. The correlation indicates that the heat radiation comes not from the wider orange and red bands but from the narrow blue and purplish bands, which seems to indicate that those regions are relatively free of clouds. The Great Red Spot appears as a very cold giant cloud that "probably sticks up above the rest of the clouds."

## Pulsars and exploding binaries

Theorists tend to believe that pulsars are the remnants of supernova explosions. Some theorists also believe that the newly discovered pulsating X-ray sources are the remnants of supernova explosions. No known pulsar is now part of a binary star system, but the pulsating X-ray sources appear to be. Since about 50 percent of all stars start life in binary or multiple associations, it appears that often a supernova explosion disrupts a binary system. Can there be an exception for the X-ray sources?

W. Sutantyo, an Indonesian astronomer visiting the University of Amsterdam, finds that there can be, and so reports in the March 15 *NATURE*. For systems where one member is about 30 times the mass of the sun and the other is between one and five solar masses (which seems to fit most of the pulsating X-ray sources) systems with periods of revolution larger than five days will survive the explosion.

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## Chewing up an ecosystem

The erosion of Hawaii's coastal region began about 200 years ago when goats, "the poor man's cow," were brought by seafarers to newly discovered islands to provide fresh meat and milk. The once domesticated animals have been allowed to multiply, and now several thousands run wild throughout the islands.

Dieter Mueller-Dombois and Günter Spatz, two University of Hawaii botanists taking part in the Island Ecosystems Integrated Research Program, are assessing the goats' impact on lowland vegetation in the Hawaii Volcanoes National Park. After staking out two grassy regions, Kukalauula and Puu Kaone, and removing the goats, they found perennial, seedling and woody plants increased in number while annual grasses decreased. In Kukalauula, a native legume vine, *Canavalia*, appeared within less than two years.

"A program to remove goats totally is extremely urgent and important if a partially native ecosystem is to be saved," the botanists say. The Park Service is attempting to control the goats by fencing in large tracts of land.

## Wetlands endangered

Wetlands contain a wealth of birds, insects, big fauna (pine, palm, cypress and mangrove trees), a population of declining American alligators and rare mammals such as the aquatic manatee. The Government's tools for protecting wetland areas are the Migratory Bird Conservation Account Program, the Interior Department's Accelerated Wetlands Acquisition Program, the Water Bank Program, the Reuss Amendment, and wetland easements under the new Farm Act. The Administration is now attempting to deactivate three of these five programs.

The Accelerated Wetlands Program will not be funded even though the Bureau of Sport Fisheries and Wildlife requested \$6 million. Normally, it obtains money borrowed against future duck stamp sales. No money was requested for wetland easements and the Administration is recommending that the Reuss Amendment be deleted from the FY 1975 Agriculture Appropriation Act. The Amendment has already saved many thousands of acres of valuable wetland by prohibiting the use of public funds to drain shallow and deep marshes and open water areas.

Comment Congressmen Henry S. Reuss (R-Wis.) and John D. Dingell (D-Mich.): "The President's proposals appear to be an all-out attack by development interests to wipe out hard-won legislative efforts to preserve these natural areas. They give the green light to agricultural, commercial and industrial development on wetlands and their hastened destruction. The wetlands of our nation deserve a better fate."

## DDT to battle tussock moths

The Environmental Protection Agency (EPA) has given the U.S. Park Service permission to use DDT in Washington, Oregon and Idaho to control tussock-moth infestations. The decision is the first exception made to the general DDT ban that currently exists. According to EPA Administrator Russell E. Train, efforts to find alternative tussock-moth controls have been "almost totally inadequate to the point of dereliction." Precautions are being taken, however. They include a 200-foot buffer strip along streams and waterways, the marking of waterways with flags so helicopters spraying the areas can identify them, and the posting of times of sprayings as a public warning.

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