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## Spending more for cleaner coal

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President Reagan, following through on a commitment to cut back power-plant emissions that end up in Canada as acid rain, last week announced that he will ask Congress to approve spending \$2.5 billion over the next five years for the clean-coal technology program, to be administered by the Department of Energy (DOE). The announcement comes just weeks before a scheduled meeting between Reagan and Canadian Prime Minister Brian Mulroney. Canadian officials had complained earlier this year that the Reagan administration was not living up to the terms of a year-old agreement between the United States and Canada, which calls for a \$5 billion program to test and demonstrate new technologies for burning coal more cleanly (SN: 1/18/86, p.37).

The Reagan administration's proposal marks a sharp increase in funding for clean-coal technology projects. DOE's budget proposal for fiscal year 1988 originally called for an increase of only \$350 million over five years (SN: 1/10/87, p.21). About \$400 million has already been appropriated and nine demonstration projects selected (SN: 3/1/86, p.132). For each selected project under both the old and new proposals, industry must invest

at least as much money as the federal government provides.

Both the DOE and utilities represented by the Edison Electric Institute, based in Washington, D.C., are confident that industry can come up with its share of funding for clean-coal technology projects. A recent DOE call for ideas elicited 139 suggestions for projects, with total cost estimates adding up to more than \$5 billion. In the nine projects selected so far, industry is providing almost two-thirds of the funding.

A Canadian assessment of the U.S. clean-coal technology program, however, suggests that most of the selected projects don't meet the criteria specified in last year's agreement. The report contends that to date, U.S. initiatives do very little to reduce air pollution flowing toward Canada. Although DOE has argued that all nine selected projects meet at least some of the criteria, the department is now establishing an advisory committee, including a Canadian government representative, to guide future selections by commenting on which technologies should be demonstrated.

Congress now faces a difficult choice. It can go ahead with legislation that places strict limits on air-pollutant emissions as a way of controlling acid rain, or it can increase funding for the clean-coal technology program in the hope of eventually achieving a similar result. — I. Peterson

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## Rift Valley fever: Long-distance diagnosis

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Satellite data can be used to predict outbreaks of a viral disease that affects animals and sometimes humans in Africa, researchers say. The disease, Rift Valley fever, is spread by mosquitoes that thrive in flood conditions; the flooding can be detected indirectly by satellites.

While previous work has suggested that satellite data could show the spread of other diseases, the present study, led by Kenneth J. Linthicum of the U.S. Army Medical Research Institute at Ft. Detrick in Frederick, Md., is evidently the first disease-spread study to correlate satellite data with ground-based measurements.

Rift Valley fever, often fatal in sheep and cattle, causes fever and sometimes fatal bleeding in humans. While there have not been any recent outbreaks in humans, a 1977 epidemic in Egypt resulted in 18,000 reported illnesses and 598 deaths.

The current study was based on a chain of connections: Weather satellites can measure green vegetation, which in turn represents the amount of rainfall, which is related to the flood conditions that produce the mosquitoes that carry Rift Valley fever virus.

Over two and a half years, Linthicum collected mosquitoes to measure their prevalence, as well as whether they carried the virus, and measured flooding

and vegetation in two sections of Kenya; at the same time, satellites overhead measured light reflected from the area. By comparing the satellite information with the biological data, he and his colleagues found that certain satellite readings accurately represented flood conditions and viral prevalence, they report in the March 27 *SCIENCE*.

With the knowledge that conditions favoring the virus-carrying mosquitoes are present, says Linthicum, local governments could take steps to eradicate the mosquitoes before they reproduce.

The potential for using satellite data to predict disease has been shown in other studies. In one, Eleanor Cross, a medical geographer at the Naval Medical Research Institute in Bethesda, Md., used satellite data to find infestation areas of the snail that carries schistosomiasis. She did this by correlating the amount of vegetation with historical data on the parasite. And researchers at NASA/Goddard Space Flight Center in Greenbelt, Md., are currently using satellites to monitor ecological conditions across Africa; this information, says Compton J. Tucker, who is involved in the project and is one of the coauthors of the Rift Valley fever study, could be useful for establishing more satellite-disease connections.

— J. Silberner

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## Manic depression: A new gene defect

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There have been a spate of recent studies concerned with the genetic basis of manic depression, and the latest effort indicates that either of at least two genetic defects may predispose individuals to this severe disorder.

Scientists who studied five large families in Jerusalem report in the March 19 *NATURE* that cases of manic depression or related mood disorders were linked to genetic markers near one tip of the X chromosome. Researchers recently linked manic depression among three Amish families in Pennsylvania to a defect on chromosome 11 (SN: 2/28/87, p.132), although the same defect did not show up in two other studies of non-Amish families. The critical gene in both the Israeli and Amish families has not been identified.

The possibility that manic depression is influenced by a gene on the X chromosome has been suggested previously, since more women than men are affected and family studies have documented that both fathers and sons seldom have the disorder. The 23rd and final pair of human chromosomes consists of two X chromosomes for females and one X and one Y chromosome for males. The Y chromosome is inherited from the father.

Miron Baron of Columbia University in New York City and his colleagues at Yale University School of Medicine and Hebrew University-Hadassah Medical School in Jerusalem isolated genetic material from 161 adults, 47 of whom had manic depression or related disorders, in five Jewish families. DNA-cutting enzymes were used to locate two genetic markers at one tip of the X chromosome linked to color blindness and a chemical deficiency that causes anemia. The genetic mutations occurred overwhelmingly among subjects with the psychiatric diagnoses.

Further analysis confirmed this pattern among the four families of Mediterranean and Asian origin, but not among the one family of Eastern European descent. X-linked inheritance of manic depression may be more pronounced among Jews and other groups in the former regions, suggest the researchers.

The findings do not indicate that manic depression is more common in those populations, note the scientists. Nor is there evidence that color blindness or the genetically caused anemia are accompanied by manic depression in the population at large.

The investigators estimate, however, that perhaps one-third of all manic depressives carry the X-linked gene.

— B. Bower

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