

consternation, I must say with some pleasure, of the powers within the psychiatric establishment who have been vociferously insisting that vitamins have nothing whatever to do with the functioning of the brain," Rimland says. In addition, officials of the National Society for Autistic children (NSAC) say they are "impressed with his work."

Rimland and colleagues Enoch Callaway and Pierre Dreyfus are not sure exactly what vitamin B6 does to the brain. But in their study of 16 "autistic-type" youngsters, the investigators found that 11 improved significantly while taking massive (several hundred milligrams a day) doses of the vitamin in pill or capsule form. Moreover, the majority of the subjects appeared to deteriorate when "withdrawn" from B6. Each child was placed on B6 for half the study and on a placebo for the other half, but neither they nor those who rated their behavior knew at the time which of the two was in use — that information was not revealed until the ratings were concluded.

Rimland says he "cannot account" for the four youngsters who were not helped by the megavitamin therapy (in two of the cases the behavior appeared to worsen). "Frankly, I thought we'd be right in all of them [the 16 subjects] — I'm disappointed," says Rimland. The psychologist undertook the study, he says, largely on the basis of earlier clinical observations and noncontrolled studies, both in the United States and in England.

The researcher concedes that "it is difficult to say just what the exact mechanism is" that is responsible for the apparent improvement. But those who respond positively exhibit considerably lower levels of the almost trance-like detachment and other behavioral characteristics common among autistic children. B6 has been shown to elevate serotonin levels — apparently depleted in the autistic — and Rimland suggests that this could be a sign of "an underlying allergy in the central nervous system to some substance."

He cautions, however, that "a lot of kids have been helped [several hundred are now being clinically treated with vitamins] but no kid has been made totally well. . . . B6 may be just one of a series of things needed in treatment of the autistic." B6, even in such massive doses, does not appear to damage the system, Rimland says.

Ruth Sullivan, director of the NSAC's Information, Referral and Advocacy Office, says that Rimland "seems to be on to something that could be quite useful — how useful at this point, we don't know." "I know of no person working in the field that is more thorough in their search of the literature," she says of Rimland, whose theory of vitamin dependency could apply to "autism and other mental illness. . . ." "We're pretty sure that autism involves some neurological disability," says Sullivan. "Conceivably, vitamin dependency may be involved with that." □

MAY 13, 1978

## Solar superflare is noisiest on record

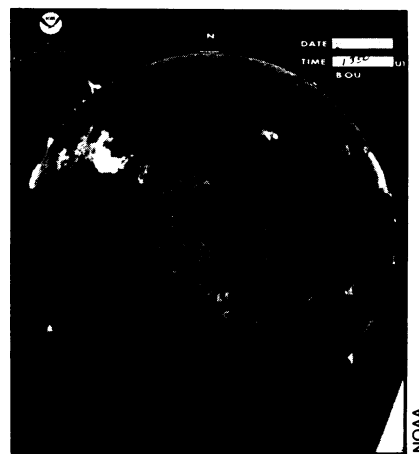
In the annals of the huge eruptions that periodically burst forth from the sun, the flare of flares took place in early August of 1972. Its X-rays, charged particles and other emissions bathed the earth in unprecedented numbers, playing havoc with communications and reaching levels that some researchers feel could have been lethal to astronauts in space. "The August '72 event," says Patrick S. McIntosh of the National Oceanic and Atmospheric Administration's Space Environment Services Center in Boulder, Colo., "is our benchmark."

Last month, however, one of the 1972 event's most important records was broken by a superflare that seems, in terms of its accompanying radio-frequency energy, to be the "noisiest" on record.

Of the sun's radio emissions, says McIntosh, the 10-centimeter wavelengths have been monitored for the longest time. During a period of minimum solar activity, the 10-cm background level is about 70 "flux units," rising to about 170 during an active period. The August 1972 event produced a level of about 22,000, an increase of more than 100-fold. The superflare of April 28, 1978, raised the number to 24,000.

A more representative indication of the flare's overall energy, however, is its X-ray output. The most common flares are small, with peak X-ray energies of about 0.001 erg per square centimeter per second reaching the earth. The August 1972 peak was about 15 ergs, with last month's event reaching about one-third that number. Because the emissions took longer to die out, however, McIntosh says, the total X-ray energy from the recent flare probably reached half the 1972 level.

It also triggered a "storm" that distorted earth's magnetic field for four days, causing communications difficulties by upsetting the ionosphere so that it could not be



April 28 flare (upper left) by H $\alpha$  light.

counted on to predictably bounce radio signals over the horizon. The U.S. Coast Guard, according to McIntosh, reported that it lost radio contact with ships from Maine to New Orleans. The distortion of the geomagnetic field lines also required the Space Environment Services Center to alert RCA Corp. and Comsat Corp., both of which operate communications satellites that depend on the field lines to maintain their proper orientation in orbit.

The superflare was part of an episode lasting more than two weeks, in which one or more "moderate-or-better" flares occurred almost every day. Ten such events were recorded on April 7 alone. If the more common, small flares are included, McIntosh says, the total during the two-week episode may have been as high as 200.

A number of the flares took the form of "loop prominences," stretching perhaps 50,000 kilometers into space and then curving back to the sun. Loops are the most energetic of prominences, McIntosh says, and the hottest, reaching temperatures as high as 2,000,000°K compared to a background temperature of about 6,000°K in the part of the solar surface surrounding the source region.

The sun's activity is expected to reach its maximum in late 1979 or early 1980. The number of sunspots, an indicator of solar activity, has already reached an average of about 100, says McIntosh, only 10 short of that during the last maximum in 1968-69. □

## Sun Day's legacy: Organization for change

On May 3, millions of people from all walks of life found common grounds for celebrating the promise of solar energy. From sunup to sundown, across the nation and in many foreign countries, fairs, rallies, tours, panels and concerts feted the sun. Many functions were just plain fun, such as dancing to solar-powered rock bands or attending races between solar-powered cars. But there were serious messages too, such as the announcement by President Carter that another \$100 million would be added to the federal solar-energy budget.

"The question is no longer whether solar energy works," said President Carter during Sun Day ceremonies at the Solar

Energy Research Institute in Golden, Colo. (SN: 4/22/78, p.255). "We know it works. The only question is how to cut costs so that solar power can be used more widely."

His speech and endorsement of solar technologies marks a turn in the President's solar stance. Less than four months ago he sent a budget proposal to the Congress calling for a reduction in solar spending. Although the additional money he described May 3 will be "reprogrammed" — which means taken from funds originally proposed for use elsewhere within the energy-department budget — solar enthusiasts see it as an important attitudinal change.

And that was the whole purpose of

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creating a Sun Day. Says its coordinator, Denis Hayes, "Sun Day has been organized by people who want change." The festiveness of Sun Day celebrants should not be confused with frivolousness, he says. There's "a deadly earnest sort of strain underpinning this," marked by dissatisfaction with the direction and magnitude of the federal commitment to solar energy, he told SCIENCE NEWS. "Although I had hoped for a bit more out of the Carter Administration," he said, "I expect we can get some important pieces of legislation through this year," in large part due to the visibility and effectiveness of the various Sun Day events.

Several key observers of solar legislation on Capitol Hill agree, saying that the "gearing up for Sun Day" has been an important factor in strengthening the force and membership of a growing "solar coalition" — now nearly 100 strong — of House and Senate members. Legislation they've introduced would:

- provide low-interest loans to small businesses for purchase and installation of solar equipment;

- provide \$5 million for solar demonstrations overseas, primarily at United States embassies;

- provide \$5 billion for direct loans to homeowners and businesses to buy and install solar equipment (this bill already has more than 100 sponsors);

- provide \$1.5 billion over 10 years, beginning with \$125 million in the next fiscal year, to reduce the cost of photovoltaics to \$1 per peak watt by December 1987 (this bill already has more than 80 sponsors);

- provide matching funds to states for the study of how each might tackle the legal aspects of one's right to sunlight;

- supplement appropriations to permit full funding of solar demonstrations in agriculture;

- and create an office of small-scale technology within the Energy Department similar to California's Office of Appropriate Technology.

In addition, the House has already increased the proposed solar budget \$160 million — including \$20 million for wind and \$75 million for photovoltaics. Senate action has similarly resulted in increases of \$20 million for wind and \$30 million for photovoltaics thus far. Many feel Carter's offer of an additional \$100 million for solar will look more like a \$200 million increase before Congress lets go of the budget.

Among other major spin-offs of Sun Day, Hayes described formation of two national organizations to promote a change in the political and social climate affecting solar energy development. The Solar Lobby, which should get underway within the next few months, will represent consumers on Capitol Hill. The Center for Renewable Resources will assemble a "talented pool of experts" to scrutinize policy and government expenditures, and train grassroots organizations to coordinate their efforts for effective action. Both will

operate out of Washington and draw on the experience and membership of Sun Day's coordinators.

One of the center's first activities will be to identify the principal barriers to solar energy on a regional basis. Hayes says the center already has the money to hold meetings this year in every state. Findings should be presented at a national meeting it hopes to sponsor next year. In addition, Hayes said he hopes the center will help shape the national "overall solar strategy for speeding use of solar technologies" also called for by Carter in his Sun Day address.

In *The Solar Energy Timetable*, a 40-page report issued last month by the Worldwatch Institute in Washington, Hayes outlined the type of commitment

he thinks governments must make soon for a transition to a solar-dominated post-petroleum age. "Failure to begin building the equipment, establishing the infrastructure, and educating people in the skills needed in a solar era will only increase the cost and disruption of the transition and decrease the likelihood of its completion within five decades," he writes.

Is that transition necessary? The President's Council on Environmental Quality thinks so and stated why in explicit terms last month with publication of a 52-page report, *Solar Energy: Progress and Promise*. "[W]e can now say with assurance," it said, "that solar energy... is in fact our best hope" for transition to that post-petroleum age. □

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## Snail darter: Winning battle but losing war?

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A heated battle still rages over whether fewer than 300 tiny fish should halt completion of a \$116 million dam. The fish are snail darters, three-inch-long minnows whose critical habitat is endangered by the Tellico Dam on the Little Tennessee River near Knoxville. As the Endangered Species Act is now written and interpreted, no government project may jeopardize an endangered species or its critical habitat; if an "irresolvable conflict" arises, the species wins. But the notoriety and issues spawned by the snail darter case — now before the Supreme Court — have served as a catalyst for legislation that could change that.

An amendment to the Act, introduced by six senators last month, would cast irresolvable conflicts into the hands of a seven-member interagency-review committee (which at press time seemed likely to comprise the Secretary of Agriculture, Secretary of the Army, chairman of the Council on Environmental Quality, Administrator of the Environmental Protection Agency, Secretary of the Interior, Secretary of the Smithsonian Institution and Secretary of Transportation). It would take the vote of at least five to exempt a project from provisions of the Act.

There would be three criteria for which an override could be considered: when "there is no reasonable and prudent alternative," when "the project is of national or regional significance," or when "benefits of [an exemption] clearly outweigh... conserving the species or its critical habitat, and... such action is in the public interest."

"In my opinion the Endangered Species Act is under a frontal attack right now," says Dave Conrad of the American Rivers Conservation Council in Washington. His and other environmental groups have been expecting such a confrontation for a long time. They also are not very optimistic about chances that the proposed amendment will be defeated.

The Act, which is due to expire at the end of the next fiscal year, must undergo budget review for reauthorization before May 15 of this year; it has cleared the House, not the Senate. Many observers feel chances of the Act emerging unscathed from congressional oversight this year are "near zero" and that the proposed amendment represents a "reasonable compromise" to more radical changes that may be proffered.

But many environmentalists fear that if a loophole is written into the Act whereby protection of endangered species may be overridden, agencies may not try too hard to resolve or mitigate conflicts in the first place. Then each challenge could result in elimination of one more species from this planet, they say. □

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## Man-made superconductor

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A man-made superconductor is not necessarily news. A number of superconducting alloys and compounds are man made in the sense that it takes precise technology to produce them, but a man-made element that is superconducting is new. It is americium, the first transuranic element to show superconducting properties, as reported by James L. Smith of the Los Alamos Scientific Laboratory and Richard G. Haire of Oak Ridge National Laboratory in the May 5 SCIENCE. Americium becomes superconducting at 0.79° K, less than a degree above absolute zero.

Americium is man made in the sense that it is one of the heavy radioactive elements not naturally found on earth. It is the first radioactive element to show superconducting properties; all other known superconductors are stable isotopes. It is also somewhat surprising that americium is listed in the periodic table with magnetic elements. Magnetism and superconductivity are usually incompatible. □