ENVIRONMENT

Black Spots Blot German Coastal Flats

BERLIN—Foul-smelling black spots are marring the sandy tidal flats along Germany's North Sea coast, and scientists are struggling to work out why. Since the mid-1980s, these oxygen-starved sediment layers have been appearing here and there in the Wadden Sea, a shallow region between the mainland and a line of barrier islands that is an important wildlife habitat. But in late May and June this year, naturalists in East Frisia were startled to find that this year's outbreak covered a total area of more than 25 square kilometers—about one-tenth of the sand flats' surface area.

SOURCE: COMMON WADDEN SEA SECRETARIAT

Spotty picture. Patches of oxygen-starved sediment cover more than 25 square kilometers of tidal flats.

The cause, scientists agreed at a mid-June workshop in the German village of Dornumersiel, was probably an unfortunate combination of last winter's cold weather and pollution from several sources. Together, these factors caused an unusual buildup of organic matter and then delayed its normal decay in the tidal flats' sediment. But while everyone agrees that long-term efforts to reduce pollutants are necessary, experts have not come up with a short-term prescription for protecting the sand flats from future blemishes. "There are no easy answers," says Jens Enemark, the Danish secretary-general of the three-nation Wadden Sea secretariat.

"Clearly, there is more than one factor at work here," says Thomas Höpner, a biochemist with the University of Oldenburg's Institute for Marine Chemistry and Biology who joined 20 other biologists, chemists, and other scientists from Germany, Denmark, and the Netherlands at the Dornumersiel meeting. Höpner has been studying black spots and the Wadden Sea ecosystem since 1989. During the meeting, he and other scientists visited the tidal flats near the island of Baltrum and found that the spots consist of a blackened, oxygen-starved sediment layer, covered in places by a whitish sulfur film. In many areas, they also noticed dead or dying sea worms.

Those observations confirmed their suspicions that the Wadden Sea ecosystem has been overwhelmed by too much dead organic matter while other factors conspired to deprive the system of the oxygen needed for all that biomass to decay. Höpner says that this year's problem may have started with the winter's severe cold—which covered much of the Wadden Sea with ice from Christmas to the end of March and, he says, "killed a great number of organisms, leading to an unusual accumulation of organic material." Then in May, an unusually large bloom of phytoplankton released an oily film that scientists believe depleted oxygen in the seawater and sediment. Later, when the phytoplankton died, they added to the undecayed organic material.

Such thick algal blooms have become more common in the North Sea because rivers such as the Rhine, Weser, and Ems discharge nitrogen, phosphorus, and other agricultural contaminants that nourish the phytoplankton. And some scientists speculate that a Russian freighter's accidental release of a large quantity of palm oil in May may have added even more nutrients to the brew.

Enemark laments that this picture doesn't point to any simple short-term solutions to the black-spot problem. Germany and other European nations are slowly reducing nitrogen and phosphorus discharges into rivers. But stopping pollution from tankers and other ships is difficult because the East Frisian coast is on one of the world's busiest sea lanes.

Late June's cooler, windy weather shrank some of the spots, but Höpner warns that "hot weather may worsen the situation again." So far, the spots' only apparent effect on wildlife has been the dead worms and a reduced number of birds. But scientists at the June workshop who are concerned about potential long-term effects urged the Wadden Sea secretariat and the German state of Lower Saxony's National Park Administration to support more studies of the spots and their causes.

–Robert Koenig

Robert Koenig is a writer based in Berlin.

1997 BUDGET

Legislators Get Into the Details

Policy wonks and academics may talk about the U.S. science and technology budget as a national research ecosystem. But last week Congress provided a series of rude reminders that each program flourishes or withers according to its own peculiar political microclimate.

Exhibit 1: A Senate spending panel approves a whopping 1000% increase for prostate cancer research after a powerful Senator reads a magazine article about the disease. Exhibit 2: Animal-rights activists join deficit hawks on the House floor to eliminate funding for a joint U.S.–Russian life sciences space experiment involving monkeys, even though the legislation will not reduce the deficit and the monkeys likely will still orbit the Earth. Exhibit 3: The National Science Foundation is threatened with a possible 10% reduction in staff as an influential House member tries to force NSF into downgrading support for social and behavioral sciences, a frequent GOP target.

These and other decisions about 1997 federal science funding came as Congress rushed to recess for the Fourth of July holiday. None of these measures is final, but they all provide clues to the shape of the budget package likely to emerge this fall.

The potential $93 million windfall for prostate cancer researchers comes courtesy of Senator Mark Hatfield (R–OR), chair of the Senate Appropriations Committee, who felt that the $7 million put into the Army budget for such research by its defense subcommittee wasn't enough. A staffer explains that Hatfield had been moved by an article in *Fortune* by Andrew Grove, the CEO of the Intel Corp., describing his experience with prostate cancer and the inadequacy of diagnostic tests for the disease. Hatfield also sought gender equity with a $150 million Army-based program for basic and clinical studies of breast cancer.

The news was grimmer for advocates of NASA's Bion project, which aims to increase knowledge about the biological effects of microgravity. The House ordered the agency not to spend any money on the program, which animal-rights activists claim is cruel to monkeys and which budget cutters argue is a waste of money. But NASA officials say the Russians intend to go ahead with the September launch regardless, and that the money would go to other NASA programs rather than deficit reduction. However, the decision—if upheld in the Senate—could force NASA to cancel its plans to participate in a second flight planned for 1998.

The House also approved a cut that could trim NSF's 1200-person staff by as much as 10% next year. Representative Robert Walker (R–PA), chair of the House Science Committee, won approval to shift $9 million from NSF's salary and expenses line into its

$2.43 billion research account, which would grow by $117 million in 1997 under the spending bill. Walker's move is aimed at pressuring NSF to streamline its operations by eliminating one of seven research directorates, preferably social, behavioral, and economic sciences (*Science*, 6 October 1995, p. 19).

NSF officials have argued that their administrative costs, less than 5% of the foundation's $3.3 billion budget, include no "fat" and are already lower than at most agencies. And they cite an existing streamlining plan submitted as part of a governmentwide belt-tightening that would eliminate 50 to 75 positions by 2000. "This is a dramatic cut that would seriously disrupt our ability to do business," says one NSF official.

Opponents of congressional "earmarks" also won a victory last week, as the House rejected a proposal by House Speaker Newt Gingrich (R–GA) to shift $13 million from NASA to an Earth observation program to help the American Museum of Natural History in New York City (*Science*, 21 June, p. 1729). Representative George Brown (D–CA), ranking minority member of the House Science Committee, won a rare floor victory in eliminating the committee earmark, which was strongly supported by New York lawmakers.

Next week the House is expected to take up a bill that provides the National Institutes of Health with an increase of 6.9%. While the appropriations committee cleared the spending proposal without objection, members reimposed an across-the-board ban on human embryo research. That vote overturns a subcommittee decision that would have prohibited only the fertilization of human ova for the purpose of research. Meanwhile, the Clinton Administration has threatened to veto both civilian science bills because of inadequate funding for national service and education programs at other agencies.

While members of Congress skirmish over specific programs, 60 Nobelists have urged Clinton to take up a broader cause: protecting university-based research. Mentioning no specific programs, their 19 June letter calls on the president to "reaffirm the fundamental role of the federal government in supporting basic scientific research." It's not clear whether their broad plea will have any impact on the 1997 budget process. But it may warm the hearts of those who believe in the unity of funding for science.

–Andrew Lawler

With reporting by Eliot Marshall and Jeffrey Mervis.

ARCHAEOLOGY

Chauvet Study Gets the Go-Ahead

PARIS—Earlier this month, France's Ministry of Culture awarded archaeologist Jean Clottes a once-in-a-lifetime opportunity: He was chosen to direct research at the Grotte Chauvet in southern France, recently discovered site of the world's oldest known cave paintings (*Science*, 3 February 1995, p. 614). This should not be surprising, as Clottes is the ministry's own scientific adviser on prehistoric art and one of the world's leading authorities in the field. "If someone had come to me independently and asked who should do it, I would have said Jean Clottes without hesitation," says Mark Patton, an archaeologist at Trinity College in Carmarthen, United Kingdom.

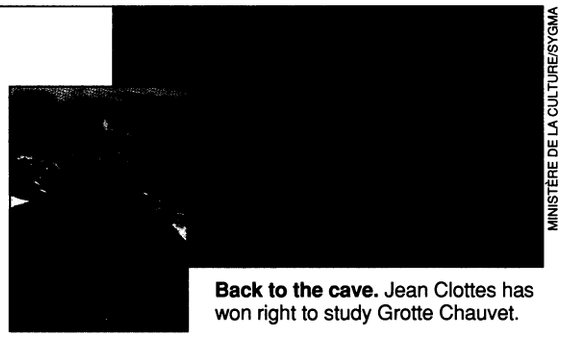
But little to do with the Grotte Chauvet in the 18 months since its discovery has been straightforward. There have been legal wrangles over rights to photographs taken of the cave paintings and also over compensation for the owners of the land where the cave was found. And Clottes, his high qualifications notwithstanding, had to compete for the right to study the cave.

This muddle over the Grotte Chauvet makes a marked contrast to its auspicious discovery in December 1994. The cave's four galleries, which revealed nearly 300 magnificent drawings and engravings of rhinos, lions, bears, and other predators rarely before seen represented by prehistoric artists, promised new insights into the artistic endeavors of early humans and their symbolic significance. "The discovery of Chauvet changed our theories concerning the evolution of art," says prehistorian Gerhard Bosinski of the University of Cologne in Germany.

When preliminary carbon dating of pigments from some of the paintings showed them to be up to 32,000 years old—at least 4000 years older than any other rock paintings yet discovered—Clottes set about making plans for a detailed study. Yet within months, the plans had to be put on hold. First, the cave's discoverer, caver-archaeologist Jean-Marie Chauvet, the French Ministry of Culture, the Sygma photo agency, and the owners of the land under which the cave was found got into a four-way battle over the photographic rights. Then the landowners sued the French government, arguing that the compensation offered for expropriation of their land was too meager.

Finally, last December, the worst blow came for Clottes: The culture ministry decided to launch an international competition to choose who would direct the research at the cave, and appointed a jury of nine experts in prehistory—seven French scientists and one each from Spain and Germany—to make the final judgment. But only one rival stepped forward to challenge Clottes for this scientific prize, prehistorian Denis Vialou at the Institute of Human Paleontology in Paris. Because Clottes, the ministry's own leading expert, had already authenticated the cave and prepared a research program to study it further, some French archaeologists speculate that the ministry's decision to launch a competition reflected personal and political rivalries as much as scientific concerns. "The fact that there were only two candidates says a lot," remarks one French prehistorian, who asked not to be identified.

Nevertheless, on 31 May, the jury, voting by secret ballot, ruled unanimously in favor of Clottes, and the culture ministry adopted its judgment shortly afterward. Members of the panel who spoke privately to *Science* say that the unanimous verdict indicates the decision was made strictly on scientific criteria, because the jury included friends and associates of both men. "Clottes was clearly more qualified and experienced than Vialou," says one French jury member.



MINISTÈRE DE LA CULTURE/SYGMA

Back to the cave. Jean Clottes has won right to study Grotte Chauvet.

Both Clottes and Vialou now decline to discuss the competition between them. But with this episode behind him, Clottes says that in several months his team of up to 50 experts will begin a three-pronged research program: a detailed examination of the paintings themselves; a study of the bones, artifacts, and footprints found on the cave floor; and an analysis of the cave's "environment," including pollen samples and other organic material.

In addition to determining the dates of the paintings more precisely, the team plans to make detailed life-size tracings of the rock art, an established technique for assessing how cave paintings were made. "When you trace a bison ... your hand must do what the hand of the prehistoric artist did," says Clottes. They will work from photographs, however, to preserve the fragile originals.

After being denied his prize for so long, Clottes seems determined to make a good job of it. "I want the Grotte Chauvet to be the best studied cave in the world," he says.

–Michael Balter