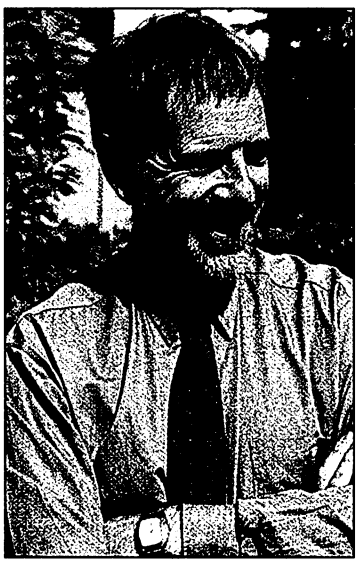
ers, European research organizations, and national science ministries. "Everyone agreed that something has to be done, and quickly," said Gannon, an Irish molecular biologist. "But follow-up meetings will be needed to decide the best way of solving the problems." Gannon says organizers must now find long-term financing, iron out technical problems, and drum up support from the European Union (E.U.) and national research agencies.



Prime mover. EMBO's Frank Gannon aims to launch Web site this year.

The biggest challenge appears to be reaching agreement among Europe's scientific publishers. Stefan von Holtzbrinck, managing director of Macmillan's Nature Publishing Group—which publishes *Nature* and five related journals—told *Science* that he supports the idea of such a Web site, but that E-Biosci should give publishers the option of charging fees for access to their publications. "We would not go with any venture that would require you to make all of your content cost-free from day one," he said. Another European science-publishing executive, who asked not to be named, said he expects that several European publishers "will participate in some way"—perhaps by giving cost-free access to certain journals or articles that were published more than a year earlier. Martin Richardson, publishing director of the Oxford University Press, said he supports "the idea of setting up a European archive" and noted that Gannon and other E-Biosci organizers "are trying very hard to come up with a proposal that will be acceptable to publishers."

Gannon said E-Biosci may not insist on entirely free access: "We and PubMed have the same aims. But I think that PubMed will not be able to offer the complete literature," because publishers may not be willing to share text for free, "and I don't think that E-Biosci will be completely free." Gannon was pleased by what he called "the positive input" from the publishers represented at the meeting: Macmillan, Elsevier Science, Springer Verlag, Oxford University Press, and Blackwell Science.

One way in which E-Biosci probably will differ from the U.S. Web site is in limiting the posting of unpublished papers. Gannon said that everyone at the Heidelberg meeting agreed that unpublished drafts and preprints "would have to be seriously peer reviewed," not simply screened, before being put on the site. PubMed Central, in contrast, may have an adjunct site called "PubMed Express" that will include unreviewed papers. And another European Web site, a private venture called "BioMed Central," is planning to make draft papers available. Vitek Tracz, chair of the Current Science Group in Britain, issued a press release last week saying that the site, funded by advertising and service fees, would be launched in May (www.biomedcentral.com).

Financing is another major issue for E-Biosci. Last summer, EMBO agreed to allocate $511,000 to start the venture, but the project does not yet have any other long-term funding commitments. Although the E.U.'s research commissioner, Philippe Busquin, says he fully supports the concept, Brunno Schmitz—who represented the Research Directorate in Heidelberg—cautions that the European Commission at most "could only provide seed money" for E-Biosci. Gannon said other revenues might come from advertising, science trusts, or from national research councils.

Representatives of science councils in Scandinavia were among the most enthusiastic about E-Biosci at the Heidelberg meeting, with Finnish molecular biologist Marja Makarow calling the Web site "a very good project that should get started as soon as possible." But some worry that E-Biosci might hurt scientific societies, which rely on journals for revenue. The European Science Foundation (ESF) may sponsor a symposium on the impact of e-publications on public trust, patenting, and scientific societies. Said Tony Mayer, who heads the ESF secretary-general's office: "We support the E-Biosci concept, but we are concerned about the implications of e-publication in general on the scientific system."

Meanwhile, Gannon predicts that E-Biosci "will collaborate very actively with PubMed Central" as part of "a wider global effort" to make scientific publications more accessible on the Web. And the chief organizer of PubMed Central—David Lipman, director of the National Institutes of Health's National Center for Biotechnology Information (GenBank)—says he strongly supports the EMBO initiative and hopes that "Europe will participate as an equal partner."

–ROBERT KOENIG

ORGANIC CHEMISTRY

Cubic Compound Makes a Bigger Bang

Alfred Nobel would no doubt be intrigued by a feat of organic chemistry reported in this week's international edition of *Angewandte Chemie*: the synthesis of what may be the most powerful nonnuclear explosives ever made. If they can be produced in bulk, the new compounds would put dynamite—Nobel's patented invention—to shame.

The new explosives—heptanitrocubane and octanitrocubane—have been on the drawing board for more than a decade. Their inspiration was a compound with a molecular core consisting of a cube of eight carbon atoms studded with hydrogens, first synthesized in 1964 by Philip Eaton, an organic chemist at the University of Chicago, and his colleagues. Eaton and others later realized that if they could replace the hydrogens with reactive nitro groups—each containing a nitrogen and two oxygens—they'd have an ultradense, and therefore ultrapowerful, explosive.

But swapping nitros for the hydrogens proved a Herculean task. Eaton's team struggled with the synthesis for some 15 years until at last, in 1998, they found a reaction that tacked on all but the eighth nitro. Now Eaton—along with chemist Mao-Xi Zhang and crystallographer Richard Gilardi of the Naval Research Laboratory in Washington, D.C.—has discovered a more efficient way to construct the seven-nitro heptanitrocubane, as well as the magic mix of ingredients and conditions that tacks on the eighth to form octanitrocubane. "I think it's fantastic," says Leo Paquette, an organic chemist at Ohio State University in Columbus. "To get all the way to eight nitro groups is clearly a feat. I really had serious doubts that he'd ever get there. It's asking a lot of the molecule to squeeze all those nitro groups into a limited space."

That tightly packed structure gives the new nitrocubanes a density of about 2 grams per cubic centimeter (g/cm^3), a number closely tied to the explosive power of compounds. By contrast, the density of TNT is 1.53 g/cm^3, HMX—the most powerful conventional military explosive in regular use—is 1.89 g/cm^3, and Cl-20—another experimental explosive—is closer to the nitrocubanes at 1.96 g/cm^3. Eaton notes that other factors also play important roles in the power of an explosive, such as how completely the material combusts when triggered. But because the explosiveness of a compound grows as a square of the density, even small changes in this number can have a dramatic effect. Calculations suggest the new explosive may deliver up to 30% more bang than HMX.

CREDIT: EMBO

Eaton's team hasn't produced enough of either compound to test their blasting power. But they have made enough to ensure that they're likely to be stable when jostled, a vital trait for any widely used explosive. What's more, Eaton notes that the eight-nitro compound should be able to adopt a more compact crystalline structure than the one they've observed in samples so far. If they manage to coax it into that tighter structure, they should be able to wring out even more explosive power.

For now, the synthesis of octanitrocubane remains too impractical to ramp up for military-scale production. But Eaton says his team is already pursuing the possibility of tacking nitro groups onto cheap and abundant acetylene, or ethyne, gas (C_2H_2) and then assembling four of these dinitroacetylenes to produce single molecules of octanitrocubane. Acetylene's high reactivity means that such an assembly won't be easy, says Eaton. But if it works, it's likely to have a powerful impact on both chemistry and explosives.

–ROBERT F. SERVICE

RESTORATION ECOLOGY

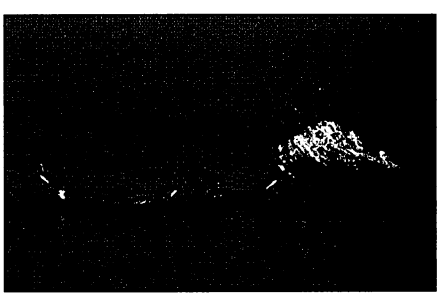
Bringing the Salton Sea Back to Life

The U.S. government has given the nod to what could become one of the most ambitious ecological restoration projects ever attempted: rescuing the Salton Sea, a giant lake in Southern California that has become a deathtrap for wildlife. On 13 January, the Interior Department released a blueprint for healing the lake, now on a fast track to looking as lifeless as the Dead Sea. But Congress must come up with $1 billion or more to pay for a full-scale restoration.

Created 95 years ago when engineers accidentally diverted the Colorado River into a desert trough, the Salton Sea once thrived as a resort. But years of agricultural drainage made the 984-square-kilometer lake ever saltier and loaded it with nutrients that spur oxygen-depleting algal blooms. Nowadays it's the scene of fish kills and bird die-offs. Despite its woes, many biologists say, the Salton provides critical habitat for birds moving along the Pacific Flyway, a major migratory pathway, as well as for endangered species such as the brown pelican. The lake's boosters succeeded in convincing Congress to pass a 1998 law that directs Interior to consider solutions for freshening the water, now 25% saltier than seawater, and improving it as a habitat (*Science*, 2 April 1999, p. 28).

Congress also funded $5 million in studies to reconnoiter the lake's chemistry and biology. The just-released results have "dispelled a lot of perceptions" about the sea's health, says wildlife disease biologist Milton Friend, chair of the multiagency Salton Sea Science Subcommittee. "For the first time, we have some good, solid information" that eases concerns that the lake is too polluted to bother saving. Absolved as suspects in the die-offs are pesticides and the element selenium (concentrations of both are too low), and algal toxins, which so far in lab tests do not appear to harm vertebrates. However, many fish are covered with parasitic worms, reflecting unhealthy conditions that might make them more susceptible to other pathogens. Its penchant for poisoning its inhabitants aside, the lake teems with a remarkable array of life-forms—scientists have counted over 300 organisms not previously reported there, including many microbes new to science. Their studies will appear later this year in *Hydrobiologia*.

Having concluded that the Salton Sea is worth salvaging as a resource for wildlife, recreation, and agriculture, Interior officials endorse building an evaporation plant and ponds to remove salts, and they have suggested schemes for pumping in fresher water or moving salty water out. Their plan also calls for a permanent science office that would fund studies and work with management on solutions. Congress will need to appropriate money for these projects, which Interior officials admit could cost $1 billion or more over the next 30 years.



CREDIT: M. FRIEND

Rest stop, in need of restoration. Interior has released a blueprint for saving California's Salton Sea, a mecca for migrating birds.

In the meantime, Salton managers have $8.5 million in hand to move ahead with a pilot project—an evaporation tower that will spray a fine mist of lake water into a holding pond, where salt will precipitate. They're also seeking to pay a commercial trawler to harvest fish, which by removing the nutrients sequestered in the fish's bodies would lead to a healthier ecosystem, and they've hired a wildlife biologist whose job is to anticipate—and take preemptive measures to alleviate—disease outbreaks.

Some critics say the plan doesn't go far enough to tackle tough issues such as stemming the flow of nutrients into the lake. "Birds and fish are going to continue to die unless they address these other problems," says Michael Cohen of the Pacific Institute, a think tank in Oakland, California. The plan does leave many issues unresolved, says Stuart Hurlbert, a limnologist at San Diego State University and staunch restoration advocate, but undertaking a pilot project first, he says, "seems a reasonable way to go."

–JOCELYN KAISER

CLINICAL RESEARCH

FDA Halts All Gene Therapy Trials at Penn

The death of a volunteer in a gene therapy experiment at the University of Pennsylvania in September triggered a flood of publicity; now, the consequences have landed on researchers and other patients at Penn. On 19 January, the Food and Drug Administration (FDA) stopped all seven clinical trials run by Penn's Institute for Human Gene Therapy—perhaps the most respected and best funded center of its kind—after finding "serious deficiencies" in the way the institute monitors its trials. The FDA had already halted the trial in which 18-year-old Jesse Gelsinger died.

Penn had not calculated at press time how many patients might be affected by the shutdown. But it noted in a statement that five "active trials" are on hold, including experimental therapies for cystic fibrosis, mesothelioma (lung cancer), melanoma and breast cancer, muscular dystrophy, and glioma (brain cancer). University President Judith Rodin has asked the provost, physician Robert Barchi, to oversee two reviews of all of Penn's clinical research. One panel, chaired by Barchi, includes "distinguished members of the Penn faculty," and the other, whose chair has not been named, will use outside scientists. The director of the gene therapy institute, James Wilson, a key investigator on all the trials, had no comment on FDA's decision. In December, during a public review of the case in Bethesda, Maryland, Wilson defended the institute's record and argued that the accident was unforeseeable (*Science*, 17 December, p. 2244).

The FDA did not release conclusive findings. But it did release an eight-page report offering preliminary "observations" that help explain the suspension order. The report lists 18 problems, some well publicized already. For example, FDA inspectors found that physicians had not filled out volunteer eligibility forms in advance, as required, for any of the 18 patients enrolled in the fatal trial, which was testing a new therapy for a genetic disorder that overloads the body with ammonia. The FDA learned that undated forms were filled out for these patients after Gelsinger's death. In addition, the report says that Penn failed to document ade-