RANDOM SAMPLES

edited by CONSTANCE HOLDEN

Eastern Scientists Flood Grants Program

If you're a grant-starved East European scientist, there's some good news and some bad news. The good news: The European Community (EC) has launched the largest effort yet to aid scientists from the old communist bloc. And the bad? So many researchers have applied that the $70 million earmarked for the scheme this year is looking hopelessly inadequate.

When the program—which involves traveling fellowships and money for collaborative research—was advertised last April, science officials at the European Commission, the EC's executive body, expected to get only a few thousand applications. But by the August deadline, more than 12,000 had arrived at the commission's Brussels headquarters. And although East Europeans aren't used to writing Western-style grant proposals, most applications were well up to snuff. "We would have needed 150 million ECU [about $190 million] just to finance the excellent or very good ones," says Reinhard Thomas, one of the program's administrators.

So the commission is now rethinking its plans. Originally, only about $20 million was to go this year for traveling fellowships to allow young East Europeans to work for a few months in West European labs (with a smaller number going from West to East). Most of the remaining $50 million was to link up Eastern scientists with labs in the EC, and to involve them in existing European research programs. But now, most money is expected to go into the fellowships, where demand was particularly great. About 2500 should be awarded over the next few months—but that will still leave 70% of the fellowship applicants without a grant. Officials haven't divulged how much money will be left for new collaborative arrangements.

Commission officials are hoping that the European Parliament will press for more money for the program next year from the EC's member states. And they're going to need it. This year, most scientists from the former Soviet Union weren't eligible because only the Baltic states had signed scientific cooperation agreements with the EC. But as soon as other former Soviet republics formalize their ties with Brussels, commission officials expect another deluge of grant requests.

Putting Aesthetics Back Into Biology

In the days of Leonardo da Vinci, the appreciation of beauty and the pursuit of scientific knowledge often went hand in hand. Some complain that modern science is so reductionist, it has become virtually blind to beauty. But Japan, which has made an art of every activity from tea serving to fighting, now plans to bring aesthetics and science back together in a new Biohistory Research Hall.

Slated to open next April in Takatsuki City, between Osaka and Kyoto, the institute is intended primarily as a center to communicate cutting-edge biology to the public, according to its assistant director, Keiko Nakamura. But part of the $4 million-a-year budget—supplied by Japan Tobacco Inc.—will be used to employ five research scientists, headed by Tokindo Okada, an emeritus professor of embryology at Kyoto University. They'll be asked to conduct original research in developmental and systematic biology, with one caveat: Projects must be readily translated into flashy demonstrations to wow audiences in the center's main auditorium.

That's why the research hall is looking for biologists with a finely honed aesthetic sense. Nakamura believes that the lay public is ready to learn about nitty-gritty biology, provided it's explained using familiar organisms with a ready visual appeal. So dowdy lab workhouses like the white mouse and *Drosophila* are out. In their place: Butterflies and brightly colored fish. To hear Nakamura tell it, even programmed cell death can be pretty to the public: to wit, the formation of butterfly wings.

Euroscientists Grumble Over Gene Laws

"Public opinion has largely turned against science." "Our pharmaceutical industry is no longer willing to carry out research."

These were representative of the bleak comments appended by scientists in Germany to a survey questionnaire, mailed recently to 576 members of the European Molecular Biology Organization (EMBO). The survey's author, Isaac Rabino, an assistant professor for biological and health sciences at the State University of New York (Empire State College), wanted to compare the attitudes of scientists in various European countries about their government's—and their fellow citizens'—views on genetic research.

The results, coming from 400 recombinant DNA researchers and published in the October issue of *Biotech Forum Europe*, are instructive: In Germany and Switzerland, more than 90% of the respondents worry that their nation could lose its competitive edge in this field because of regulations and the negative climate of public opinion. France and the United Kingdom gave the most positive responses. And there's precious little respect among this group for current EC regulations, which must be incorporated into all national laws: Of the scientists working in EC nations, only 20% saw current EC directives as beneficial, while 27% labeled them a "major constraint" to research.

The media got no more respect than EC legislators: 33% of the respondents think media coverage has been harmful, leading to emotional and ill-informed public judgments. However, 67% reported no negative impact on their own research, suggesting that perceptions of a negative public climate apply more to anticipated than current problems.

PERCEIVED THREAT TO NATIONAL COMPETITIVE EDGE

Answers to question: "Is it likely that the country where you currently work could lose its competitive edge in recombinant DNA research because of delays and setbacks caused by controversy and legislation?"

Country & # of respondents	Very likely %	Somewhat likely %	Not very likely %
Germany (92)	70	22	8
Switzerland (34)	38	53	9
Denmark (10)	30	30	40
France (51)	18	30	49
United Kingdom (81)	4	32	59
Belgium (11)	27	9	64
Italy (23)	4	26	70
Sweden (17)	12	12	71
United States (25)	28	12	60

Math Leaders Quash NSF Funding Scheme

Since last summer, grant managers at the National Science Foundation (NSF) have been trying to sell what they view as a simpler and more efficient funding system for basic research. But the group on which it was to be tested first—the mathematicians—aren't buying. Leaders of the math community became so suspicious that they forced NSF to put a proposed reform measure on hold earlier this fall (*Science*, 23 October, p. 541), and last week they killed it entirely.

In an emotional meeting at NSF headquarters on 27 October, the Advisory Board on Mathematics formally voted to reject an experi-

ment in "flat-rate" funding that would have channeled most math grants into two fixed categories of $30,000 or $20,000 per year. In a tersely worded resolution, the advisory board said it "does not recommend" that the experiment go forward "at the present time," although it encouraged the NSF to keep up the good work by developing "alternate funding modes" for future consideration.

The words were upbeat, but their effect was not. NSF's associate director for math and physics, William Harris, told the board he was "disappointed" with the action.

Mathematicians initially objected to the system of fixed grants (which would cover both overhead and salaries) because they said it would penalize colleagues at institutions with high overhead rates. NSF staffers then offered to fund overhead independently. But the math board still gave a thumbs-down. Why? Board members are reluctant to spell out their concerns, but they seem to be afraid that in a time of tight budgets, NSF might use the new system to cut back support for mathematicians.

Things Are Tough All Over

Name a government official who reminds reporters of problems they've been overlooking in his own backyard. Sounds unlikely, but new NASA head Daniel Goldin did just this during a talk to the District of Columbia Science Writers Association in Washington last week. Goldin was being grilled on the usual topics—the escalating price tags and endless delays plaguing the space shuttle and the planned $30 billion space station—when, far from being defensive, he called attention to similar ills in the planetary program.

Invoking the planned Cassini mission, Goldin noted that the Saturn probe's price tag had rocketed. Back in 1990, Congress approved twin probes that would explore Saturn (Cassini) and orbit a comet (Craf)—all for $1.6 billion. But money trickled out too slowly to keep the projects on schedule, says program manager Howard Wright. So, he adds "we had to stretch the program." Annual budget cuts extended the delay as in-flation pushed up costs. In the end NASA had to cut Craf altogether.

Now Cassini alone comes to $1.4 billion—which just covers the cost of the craft and launch. When you add in the operating cost for the 7-year trip and 4-year orbit, the price tag climbs to $4 billion. "It's still an expensive project," Wright says with no hint of irony in his voice. Which may be why NASA's boss—operating on a plank of fiscal responsibility—wanted the assembled journalists to think about the matter.

AERIAL IMAGES

Biotech by the Bay

Last month, South San Francisco-based Genentech Inc. unveiled an $85 million center *(lower left)* that it calls "the world's largest research facility devoted solely to biotechnology." A prominent feature: a bronze statue of Genentech founders Robert Swanson and Herbert Boyer guzzling beers at a patio table in the early 1970s, when they decided that there was money to be made in recombinant DNA technology. Scientists began moving into the facility in September, and by early next year it should have its full complement of 400 researchers.

Chaos Games Yield DNA Portraiture

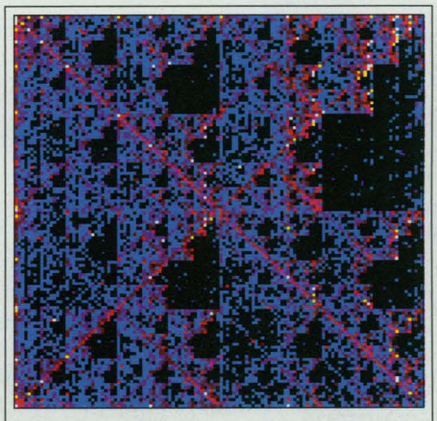
Stare at a million base pair sequence of DNA, represented as usual by a string of the letters A, C, T, and G, which designate the four molecular building blocks of DNA. Now try to discern overall patterns hiding in the linear sequence. You can't? That's not surprising because even the brains of top-notch molecular biologists are not good at that kind of pattern recognition. But they'd like to be because such patterns could be signposts of undiscovered biological principles or signatures of genetic kinships for that sequence (*Science*, 7 August, p.747).

How to make those patterns emerge from the noise? Some computer scientists are spinning variations on The Chaos Game. Invented in the mid-'80s by mathematician Michael Barnsley, then at Georgia Tech, the game is an image-generating technique for modeling natural shapes.

Scientists applying the game to the DNA sequence problem, as first done by H. Joel Jeffrey of Northern Illinois University, begin by constructing a square whose four vertices correspond to DNA's four bases. They then place a dot halfway between the square's center and the vertex corresponding to the first letter of a DNA sequence. After reading the sequence's next letter, they place a second dot halfway between the first dot and the vertex corresponding to the new letter. They continue in this fashion for as many iterations as there are letters in the sequence.

The results are "fractal images of DNA," says Hwa Lim of the Supercomputer Computations Research Institute at Florida State University. "We map a nucleotide sequence into a geometric shape." To the naked but trained eye, the shape's overall dot distribution quickly depicts structural information such as the relative abundances of nucleotides or nucleotide pairs in the sequence. Hwa hopes fractal images will enable biologists to associate an unidentified DNA sequence quickly with known genes yielding similar fractal images.

At a biotechnology conference last summer in Crystal City, Virginia, Hwa and Victor Solovyev, now at the Baylor College of Medicine in Houston, reported on the use of their technique, which builds on Jeffrey's earlier work, to distinguish coding from noncoding regions of genes. Hwa and Jeffrey admit their DNA portraiture might prove little more than pointillist play. But Jeffrey hopes "it will become a tool for the scientific imagination."



HWA *ET AL.*, FSU

DNA à la fractal. Image depicts frequency of specific nucleotide motifs distributed in 1649 gene sequences, each nearly 1 million nucleotides long. Brighter dots mean a higher frequency for the corresponding motif.