RANDOM SAMPLES

edited by CONSTANCE HOLDEN

Soviet Biowarfare Apparatus: All Gone?

Is the newly independent Russia running an illegal biological warfare program, inherited from its predecessor, the Soviet Union? That question has been embarrassing Boris Yeltsin's government since late August, when *The Washington Post* ran a front-page story claiming that a high-ranking Soviet biochemist who defected to Britain in 1990 had revealed details of two offensive biological weapons research programs. One was said to be in military labs, and the other at a supposedly civilian center called Biopreparat, in St. Petersburg.

The question may seem mysterious for the moment, but it should soon be cleared up: Following a meeting between senior Russian, U.S., and UK officials in Moscow on 10 and 11 September, American and British inspection teams are set to take part in an investigation Yeltsin has ordered into the Biopreparat facility—the results of which will be made public. According to a statement released by the three governments last week, other facilities implicated in the Soviet military biological research program will also be opened up to U.S. and British inspectors. Provided, that is, that Russian officials can make similar trips to labs in the United States and Britain.

The Russian delegation, led by deputy foreign minister Grigory Berdennikov, assured U.S. and British officials that offensive biological weapons research—outlawed under the 1972 Biological and Toxic Weapons Convention—has now ceased, and that a former weapons test site on Vozrozhdeniye Island, in the Aral Sea, has been closed. But the Russians acknowledge that an illegal program did exist, and that many of the steps to close it down took place only earlier this year—including the dissolution of a department within the defense ministry responsible for the offensive biological program.

U.S. and British officials are now cautiously optimistic about Russia's future compliance with the 1972 treaty. "The meeting... has allayed our concerns to a considerable degree," one British official told *Science* last week, "but it's an ongoing process and there will have to be follow up."

Toshiba and Teachers Launch Contest

The Japanese come in for a lot of criticism in the United States—partly because they're perceived as being snobs about what they see as our undereducated, lazy work force. Well, now one Japanese company is trying to do something about both things simultaneously: our work force and their image. This week the National Science Teachers Association (NSTA) and Toshiba America Inc. launched what they claim is "the world's largest science competition for students." Aimed at children from kindergarten through 12th grade, the "Toshiba/NSTA ExploraVision awards" will be an annual event, offering prizes worth about $300,000 to students, teachers, and schools. Toshiba is sinking $1 million into the effort.

The contest differs in a number of respects from the well-known Westinghouse awards, which go to the cream of the crop of America's high school students for individual research projects. Rather than appealing to the basic-research elite, the new program appears to be designed for tomorrow's industry scientists and engineers. Prizes will go to students at four levels—kindergarten to third grade, grades 4-6, 7-9, and 10-12. The format is based on teamwork, and students must work in "R&D teams" of four to create, with the guidance of a teacher-adviser, "a vision of the future." Each team will select a type of technology and prepare a presentation projecting its development and use 20 years into the future. Each of the students from the four winning teams will get a $10,000 U.S. savings bond.

The contest is part of an explosion of Japanese corporate philanthropy aimed at improving science education in the United States. According to Jack Padalino, president of the Pocono Environmental Education Center in Pennsylvania, Japanese companies began a "concerted effort" starting in 1990 to focus on U.S. precollege education, especially in environmental studies. Other Japanese corporate activities include Seiko scholarships for environmental education, a Toyota awards program for teachers, and Honda support for minority science education.

Ferocious with life. Aerial view of Monterey Bay.

Newest, Largest Marine Sanctuary

Stretching 400 miles south from San Francisco's Golden Gate to San Simeon, the Monterey Bay—once described by John Steinbeck as "ferocious with life"—became the nation's largest protected marine area (unseating the Florida Keys National Marine Sanctuary) on 20 September, when legislation signed by President Bush last June permanently banned oil and gas drilling off the central California coast, providing a haven for 22 threatened or endangered species.

Deeper than the Grand Canyon and covering 4024 square nautical miles, the bay is home to 80% of North Pacific marine mammal species, and supplies grist for more than a dozen research organizations in the area that are studying everything from molecular genetics to global atmospherics. With the establishment of the sanctuary—to be administered by the National Oceanic and Atmospheric Administration—research activity should step up considerably, says marine ecologist Gregor Cailliet of Moss Landing Marine Laboratories. Within the next 3 years, Cailliet says, branches of the National Weather Service and the U.S. Geological Survey will be moving to Monterey. And nearby Fort Ord, which is being vacated by the Army and turned over to a variety of civilian functions, offers "promise" as a locus for expanded marine science research, he says.

In the spirit of Woods Hole, California assemblyman Sam Farr, along with several government and university researchers, has proposed a "world center for marine studies" near the sanctuary. Indeed, Farr thinks such a center could propel Monterey Bay a step closer to becoming a "Silicon Valley" for marine sciences by providing a focal point for research.

California activists have fought for the sanctuary since 1977, when the Department of the Interior announced plans to allow oil drilling off the central coast. The 1984 opening of the world-renowned Monterey Bay Aquarium "reinvigorated an interest in keeping the bay pristine," says Farr, since its exhibits rely completely on pumped-in sea water.

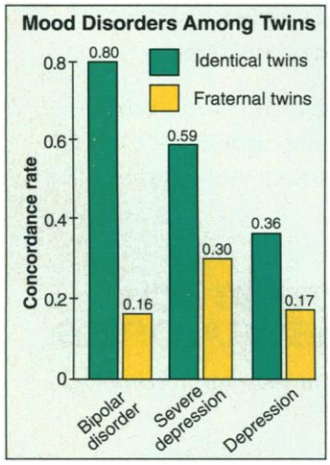
Neuroscience and Mental Illness

"An atmosphere of enthusiasm surrounds neuroscience," observes the Office of Technology Assessment (OTA) in a new report for Congress called "The Biology of Mental Disorders." But that enthusiasm hasn't been translated directly into the kind of funding increases that appear to be needed to combat mental disorders, which last year cost the nation an estimated $136 billion.

Funding isn't the only problem that affects this kind of research, the report notes. Also critical are:

- Animals. Primates are needed as models for "more complex behaviors." But their use has been constrained by animal activists, who are particularly suspicious of behavioral research, as well as the costs of new animal regulations.
- Human tissue. Researchers need to study the brains of deceased patients. But research demand for tissue, both diseased and normal, has been sharply rising and "far exceeds the available supply."
- Human subjects. Research on mentally ill people without the confounding effects of medication is "critical." But such subjects are hard to find, and generally need expensive hospitalization.
- Clinician-researchers. The need for them is "particularly acute" in mental health. But few students in professional training programs receive formal exposure to research, and salaries aren't very attractive.

Despite the problems, the report does see positive signs: The National Institute of Mental Health (minus its service programs) has finally been returned to the National Institutes of Health, and its budget, after many abysmal years, has for the past 6 been on a steady upward trajectory that, if continued through the decade, "should compensate for the years when research...did not keep up with inflation or with the advances in funding for other diseases."



Blue genes. Data from 110 twin pairs indicate heritable component to all affective disorders, but especially in manic depression, where identical twins show 80% concordance rate, compared with only 16% for fraternal twins.

The Anatomy of Scientific Productivity

Last year, two labor economists plunged into the acrimonious debate over whether a "shortfall" of scientists in the United States is imminent by charging that the country is producing too many Ph.D.s (*Science*, 1 March 1991, p. 1017). The two, Paula E. Stephan of Georgia State University and Sharon G. Levin of the University of Missouri in St. Louis, have now produced a book* elaborating their case. They argue that the population explosion of researchers has been accompanied by a decline in quality—as inferred from the types of institutions that are turning out scientists and the journals that are publishing their work.

One factor in the decline, say the two economists, is the aging of the scientific workforce. Exceptional contributions are most likely to be made by scientists under 40, but while one in four U.S. scientists was under 40 in 1973, only one in 10 is now. But even when age was controlled for, recent cohorts of Ph.D.s in some fields have published less than those who got their degrees a generation ago. Stephan and Levin also assert that "the cream content of science was diluted" with the influx of people into science in the '60s, and that as early as the '70s, the cream started spilling into nonscience fields as the growth in research support slowed. Intensified competition has made things worse, say the authors, making scientists risk-averse and "stym[ying] creativity and productivity...." It has also led to paper inflation and a certain amount of "dysfunctional" behavior—as reflected in fraud and misconduct. Along with this has been a "loss of fun" in science.

AGE AND SCIENTIFIC PRODUCTION

Ages	Chemistry	Physics	Medicine
21-25	0.9	7.4	0.7
26-30	15.7	19.9	10.7
31-35	27.0	27.2	24.8
36-40	28.7	19.9	23.5
41-45	16.5	14.7	25.5
46-50	7.0	8.1	6.0
51-55	0.9	1.5	6.0
56-60	2.6	1.5	1.3
61-65	0.9	0.0	1.3
Mean	37.6	35.7	39.0
Median	36.5	34.5	38.0
Cases	(115)	(136)	(149)

Ah, youth. Percentages of scientists in different age groups during the years they were doing research that led to Nobels, 1901 to 1989.

But Stephan and Levin share an optimistic vision of the future. "The age structure of the scientific community in the United States has worked against science for many years, but in the 1990s it can work to its advantage," they write. A wave of faculty retirements starting in the late '90s will offer a "window of opportunity" for institutions to rethink their research. More resources can be put into undergraduate education, Ph.D. programs can be downsized, more faculty jobs will be open, there will be more money, and more fun. And once again, "the Ph.D. would be reserved for the truly talented and creative members of society."

**Striking the Mother Lode in Science: The Importance of Age, Place, and Time*, Oxford University Press, 1992.

Monkeying With NSF's Basic Mission?

It looks as though a backlash is brewing among advocates of basic science who fear it could suffer from the government's heavy emphasis this fall on applied research and "technology transfer"—and the National Science Foundation (NSF) is at the center of the controversy. Physicists in particular are upset about wording in a recent Senate appropriations subcommittee report that instructs NSF how to spend its money in 1993 (*Science*, 21 August, pp. 1035, 1039).

The goal of making science relevant to industry is high on NSF chief Walter Massey's policy agenda, and it pervades the Senate report. But Representatives George Brown (D–CA) and Rick Boucher (D–VA) of the House Science Committee want Congress to reconsider. In a 14 September letter to Representative Bob Traxler (D–MI), who will lead the House team in this month's House-Senate conference on the NSF appropriation, Brown and Boucher warn that the Senate uses "unprecedented and inappropriate" language in its detailed instructions to NSF. The report, for example, recommends ways in which NSF should revise its mission to "take a more activist role" in transferring research results from academia to industry. This "micromanagement," the congressmen say, "would modify the NSF's basic mission statement." They urge the conferees to "nullify" the Senate instructions, pending further "discussion and debate."

Meanwhile, Senator Barbara Mikulski (D –MD), who will lead the Senate team and who is responsible for the disputed language, also has been petitioned to reconsider. The president and vice president of the American Physical Society, Ernest Henley and Burton Richter, wrote to her on 31 August asking her to delete the controversial wording. They have not yet received a response. Time is short—the conference has to complete a bill by October.