edited by CONSTANCE HOLDEN

Genentech Comes to Aid of Biology Teachers

While advances in biology are transforming everything from medicine to tomato-growing, they've had little effect in one backwater: high school teaching. That's the message from a recent Roper poll of biology teachers sponsored by Genentech Inc. Of the 503 respondents, 76% said they felt it was difficult to keep up with the fast pace of scientific developments, and most didn't know where to turn for the best information. Almost all—91%—said they wished they had an easy way to exchange ideas with scientists.

So Genentech is spending $10 million to do something about the situation. The San Francisco-based biotech company has developed a program called Access Excellence that is designed to put teachers in touch with each other and with researchers through America Online, a nationwide computer network. Teachers will be able to participate in conferences with biologists around the country, read weekly reports on new research findings, or access newly developed lesson plans and lab experiments organized by a new office at Genentech. "This allows teachers to get active in technology" that continues to appear daunting and inaccessible to many, says Ann Wild of the National Science Teachers Association (NSTA). NSTA has been consulting with Genentech on the project and will choose 100 biology teachers—culled from applications sent in by teachers around the country—who will contribute lesson ideas and activities to the network. The group of 100, which will change each year during the 3-year project, will be supplied with lap top computers, training on how to use the network, and a trip to a biological education "summit."

With a new core group of teachers added to the base of network users each year, Genentech expects the number of participants to grow quickly. After 3 years, they hope that others will join them to fund the project.

WILLIAM K. GEIGER

Surviving in a male culture. Davis, MacCollin, and White.

Women in Biomedicine: Still Slugging It Out

"If a woman can't stand the heat in science, she should go back to the kitchen." That, says Ann-Marie White, a Howard Hughes predoctoral fellow at MIT's Whitehead Institute, is what a male colleague said to her recently. White recounted the conversation at a discussion on women in biomedical research held last week at the Howard Hughes Medical Institute headquarters in Chevy Chase, Maryland. The three Hughes fellows who spoke said that while many men are supportive to women in science, it's an undeniably male culture. A woman still has to fight harder to succeed—and she'd be well advised to forget about babies.

Laura Davis, a Hughes assistant investigator at Duke University, said that in graduate school "it seemed there was a way scientists ought to act if they wanted to be respected. And part of that demeanor was being male." Failing that, women have to "work themselves to death." White, too, said that "to make a statement I have to have two or three times the evidence a man would have to make the same statement." Added Davis: "Sometimes I would like to just be a nice person again instead of always trying so hard."

For the three women, the rewards of their careers outweigh the stresses. But they also agreed the rewards have a price: They may never have children. "Support for females who want children is low to nonexistent," said Davis. White said that the women scientists with children she knows "all have live-in nannies." It may be possible to combine research with motherhood if you "have your own office [where the child can play] and parking space" plus "a partner who shares equally in child raising," she said. "Failing that, I don't see myself having children." Pediatrician Mia MacCollin, on a Hughes postdoc at Massachusetts General Hospital, said it's not a problem for her, but only because "I never wanted to have children."

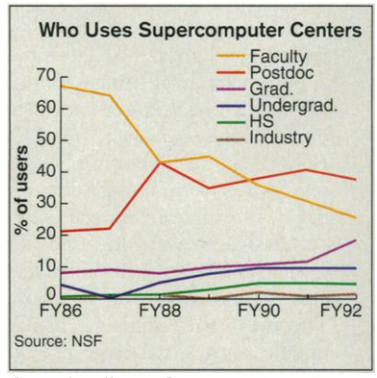
Nonetheless MacCollin said one of the main problems for women in science is the failure of "the culture of science...to adapt to people having outside interests." Meanwhile, women are going to have to keep "playing the game," said White. "If that means being mean and nasty and attacking your competitors at Gordon conferences then that's what you have to do."

NSF Report Calls for More Computing Power

Supercomputer use has become so routine within the past 6 or 7 years that U.S. university researchers are increasingly delegating their computational workload to graduate students. That finding illustrates one of the main points of a new report on high-performance computing* submitted by a panel of experts to the National Science Board of the National Science Foundation (NSF): The country's continued leadership in high-performance computing depends upon the broadest possible access by researchers to the appropriate hardware and software.

The report recommends that NSF double the amount of money awarded to principal investigators for high-performance computing, which now stands at $22 million a year. It also supports continued funding for NSF's four supercomputing centers. The university-based centers were set up in 1987 when it was difficult for academic scientists to gain access to the newest and most powerful machines. Now that supercomputers are much more common, there has been debate as to whether NSF needs to continue funding the centers. The blue-ribbon panel, chaired by Harvard's Lewis Branscomb, says yes. It maintains that the centers not only help foster innovation in the field, but that an open competition for the $14 million that each now receives annually "would be unnecessarily disruptive."

NSF is eager to hear from the computing community before its suggestions are incorporated into future budgets. And it's bracing for some heavy e-mail traffic: After all, senior faculty should have plenty of time to answer now that their graduate students are doing most of the computations necessary for their experiments.



Crossing lines. Graduate student supercomputer use rises as professors turn over workload.

* "From Desktop to Teraflop: Exploiting the U.S. Lead in High-Performance Computing." Available by calling (202) 357-9582.

New Hunt on for Bipolar Genes

The weapons of cutting-edge molecular biology are about to be brought to bear on a puzzle that has defeated at least two previous efforts to solve it: the genetic causes of manic depressive illness (MDI). Backed by $2.5 million over the next 3 years from the Charles A. Dana Foundation, Cold Spring Harbor Laboratory, Stanford, and Johns Hopkins University have formed a consortium to study the genetics of the condition.

Unlike diseases such as cystic fibrosis, which are caused by a single gene (although one with many mutations), researchers believe several genes are involved in manic depression, and they are probably different for different families. The two prior—and unsuccessful—efforts to untangle the genetics involved only a few large families, but this new study "tries to cope with the issue of genetic heterogeneity" by sampling many small families, explains Hopkins psychiatrist Raymond DePaulo. DNA samples will be collected from members of 50 families—a number that "is supposed to be large enough to ensure that all possible genes are identified," says Stanford University geneticist David Botstein. Each family must contain at least three close relatives that are affected.

Stanford will be hunting for MDI genes through linkage mapping with DNA samples using a "simultaneous search" technique Botstein developed with Eric Lander of the Massachusetts Institute of Technology. The strategy, designed for conditions where multiple genes are sought, has the statistical power to "cope with the phenomenon of two families having the same disease for different genetic reasons," says Botstein.

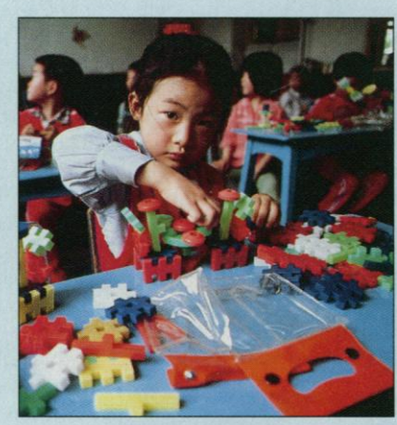
A new Dana-Cold Spring Harbor Center for the Study of MDI, headed by Nobel laureate James Watson, is the third leg of the Dana consortium. The center will integrate the findings with other research into a new database devoted exclusively to manic-depressive illness, and will sponsor meetings on the social and ethical implications of the research.

The benefits of a successful quest could be enormous. Manic depression is relatively common, afflicting about one in 100 people; the suicide rate is one in five. Researchers say finding the genes could lead to earlier identification and treatment, as well as to the development of drugs more specific and effective than the commonly prescribed lithium.

Language May Give Chinese an Edge in Math

Are Chinese tots better at arithmetic than American ones because the Chinese words for numbers are easier to remember? That's a hypothesis put forth by psychologist David C. Geary of the University of Missouri at Columbia, who has been comparing the math performance of Chinese and American school children.

Geary and his colleagues, including Robert Siegler of Carnegie Mellon University and Liu Fan of the Chinese Central Institute for Educational Science, have already noted that Chinese first-graders use more sophisticated problem-solving strategies (Science, 3 July 1992, p. 26). Now, they say Chinese kids outperform Americans "even before instruction."



LARRY GATZ/THE IMAGE BANK

Head for numbers. Chinese preschooler.

The researchers compared 51 kindergarten-aged children in areas of equivalent socioeconomic status in Hangzhou, China, and Columbia, Missouri. The children were given a paper-and-pencil arithmetic test, a measure of numerical memory span, and an assessment of "addition strategies" on some single-digit problems where researchers watched them and computers measured their reaction times. The Chinese tots came out way ahead on the tests: They got three times as many items right on the first one, and they could hold more digits in short-term memory (6.7 vs. 4.1). As for the strategies, the Chinese were much more likely to use verbal counting, a faster and more sophisticated strategy than finger counting, which was used by many of the Missouri kids. As expected, having a high memory span score correlated with decreased use of finger counting in both groups.

The authors conclude that the difference in performance shows up too early to be easily explained by differences in formal instruction. They suggest instead that the Chinese children may do better in math because their words for numbers take slightly less time to say. For example, it takes a few hundred milliseconds less to pronounce "yi," the Chinese word for one. That enables the Chinese students to hold more numbers in their heads, making it possible for them to abandon the slower tactic of finger counting at an earlier age. "Across a number of items, a difference like that adds up," says Geary. The researchers will float their hypothesis in a paper to be published in the December issue of *Cognitive Development*.

Organic Farming With Cocaine

Pesticide manufacturers prospecting for safer chemicals may soon be looking at a substance deemed by the law to be decidedly unsafe: cocaine. This alkaloid, from the leaves of coca plants, may be a natural pesticide, suggest researchers at Massachusetts General Hospital (MGH) in the 15 October *Proceedings of the National Academy of Sciences*.

Coca plants are remarkably pest-free and suffer little leaf damage compared to other tropical flora. That may be explained by the fact that cocaine comprises up to 1% of coca leaves' dry weight, say MGH neuropharmacologist James Nathanson and his colleagues. When they sprayed similar cocaine concentrations on tomato plants, voracious tobacco hornworms turned loose on the leaves quickly found the fare unpalatable and walked off—"The larvae soon became hyperactive and developed tremors," notes Nathanson. At higher concentrations of cocaine, leaves even killed hornworms.

The real surprise, however, lies in the mechanism whereby cocaine fends off rampaging bugs. In mammals, it blocks the reabsorption of neurotransmitters such as dopamine, an effect that creates coke's addictive and pleasure-inducing properties. But in insects, cocaine prevents reuptake of an insect-specific neurotransmitter called octopamine —the insect version of adrenaline. "You get an excess of the neurotransmitter. It's like an overdose," says Nathanson. Scientists thus might be able to use cocaine analogs—the drug itself is too nonspecific—as a basis for insecticides that are harmless to mammals because they block only the re-uptake of octopamine.

Cornell biologist Thomas Eisner calls this cocaine research "very elegant" and part of the growing field of chemical ecology. Another plant, catnip, has also recently been shown to have insecticidal properties, he notes.