Letters

Advanced Computing

John Walsh's article "NSF plans help with big computer problems" (News and Comment, 24 Feb., p. 797) struck a sympathetic chord. For the last 6 months, the National Cancer Institute (NCI) has been discussing, in parallel with the National Science Foundation (NSF), the role for advanced computing capacity in molecular biological sciences. The areas of consideration have been the rapidly expanding databases for nucleic acid and protein sequence camparisons, crystallographic structure refinements of complex biomolecules, molecular dynamics, multidimensional graphic analyses, and especially the molecular modeling of defined structure-target interactions.

For example, determination of the homologies of transforming gene sequences and their cellular counterparts have been among the most exciting recent developments (*1*). Future searches will require increasingly more computation time. Intuitive studies of amino acid substitution in the sequenced molecule of dihydrofolate reductase, the target for the chemotherapeutic agent methotrexate, have shown changes in the configuration and substrate affinities (Research News, 20 Jan., p. 269). It seems that rational drug design based on computational analyses should readily replace such empirical approaches. Analogous situations in several areas of molecular biology support the position of the NSF committee that advanced computing needs are essential to today's science.

In conjunction, NCI has planned for a newly expanded Laboratory of Mathematical Biology within the Division of Cancer Biology and Diagnosis. One of the functions of this laboratory would be to work on already identified problems in biomedicine that require advanced computing capabilities. With this in mind, NCI has tentatively budgeted for a "supercomputer" that could be operational in a relatively short time. Prospective users would not only be from NCI and NIH but from the entire biomedical community. The location of this laboratory would be at the NCI–Frederick Cancer Research Facility, where the necessary support elements could come from the contractor operation already in place.

Because no such computer is presently dedicated to biomedicine, the subject was broached with a number of molecular biologists. The response was quite positive. Some were already considering the need for purchasing such equipment, while others were ready to present us with problems that require immediate advanced computational capacity.

It is recognized that alternative solutions, such as array processors involving available hardware, have been proposed and may be adequate for a number of problems. However, those options seem to be in their formative stages, while regular supercomputer use is an established fact. More important, because of the complexity of future questions, the depth to which they can be answered depends essentially on machines of extraordinary capacity.

NCI has been in contact with NSF's Advisory Committee for Advanced Scientific Computing Resources and strongly concurs with their recommendations. Although their potential users would come primarily from the physical and chemical sciences and engineering, we anticipate attracting a counterpart group in the biomedical area. Additional input and suggestions would be welcome.

PETER J. FISCHINGER
National Cancer Institute,
Building 31, Room 11A19,
Bethesda, Maryland 20205

References

1. R. F. Doolittle *et al.*, *Science* **221**, 275 (1983); M. D. Waterfield *et al.*, *Nature (London)* **304**, 35 (1983); J. Downward *et al.*, *ibid.* **307**, 521 (1984).

Releasing the Fork

There is an additional lesson to be learned from Gina Kolata's article "Order out of chaos in computers" (Research News, 2 Mar., p. 917). As in the story of the philosophers and the forks, there are often win/win solutions to complex problems that could be reached through collaboration if only all of the participants could recognize that this is so. But so often when complex issues are being debated, there is no common recognition that a win/win solution is possible; because of their cultural instincts, all of the participants become adversaries—to their respective loss—which leads to a lose/lose result.

We must find a better way to give a clear and irrefutable demonstration to the philosophers that each would be acting in his own self-interest, when one of the two forks is not available, if he were to release the fork in his hand and to start the whole process again. Such an attitude is counterintuitive and against the dominant adversarial behavior of our culture. We must learn that most of the big issues of our times require these seemingly altruistic and collaborative acts if we are to achieve an eventual "win" rather than a "loss." Sometimes it is better to give up one fork and thereby win a meal.

DONALD B. STRAUS
American Arbitration Association,
1700 Broadway, New York 10019

Cooperation with Japan

It is refreshing to learn from Martin Goland's editorial (20 Jan., p. 241) that a respected authority in U.S. science and technology can look at the technological growth of Japan in a dispassionate way and recognize that, by maintaining a strong bilateral relationship, we can realize significant benefits. Regrettably, Goland's position is not reflected widely among politicians in Washington, either in Congress or the Executive Branch, where pressures from industry and labor are almost entirely in the direction of restricting the flow of even unclassified scientific and technical information to Japan.

While I cannot speak for the private sector in the United States, I have a good understanding of the bilateral technical relationship between the United States and Japan at the government level, not only from the years I spent as the senior science officer of the American Embassy in Tokyo, but also from studies I have conducted during the past year for the Department of State, the National Research Council, and the Department of Commerce. These studies show that technical cooperation through government channels is generally characterized by the American participants as healthy, productive, of good quality, and absolutely worthy of continuation.

Furthermore, it is not generally known that the Japanese government has committed itself to investing more than $100

million in U.S. government research and development programs. This investment has made the difference between continuation of some of these programs and their cancellation. Bilateral cooperation in the nuclear field (fission and fusion) is particularly heavy, both in terms of Japanese investment in the United States and the intensity of the technical exchanges, and most other fields of science and engineering are covered. The overall relationship is unique among nations. It could be dismantled much more easily than it was created.

Goland is to be applauded for making his views known. If more of the many hundreds of American scientists and engineers who have been participants in cooperative or joint programs with their Japanese counterparts were to speak up in like fashion, the tide of intellectual protectionism could be dammed.

JUSTIN L. BLOOM
Technology International, Inc.,
11600 Georgetowne Court,
Potomac, Maryland 20854

Student Scientific Conferences

A scientific meeting of poster papers presented only by students can provide a simple and remarkably effective way of stimulating scientific interaction and building personal contacts among students from different schools and academic departments who have related scientific and technical interests.

We recently organized such a student-only scientific conference for students working on or with lasers and related optical topics in the San Francisco Bay area. The meeting was held in a public area of the Terman Engineering Building on a Saturday afternoon. Invitations to participate were sent a few months in advance to graduate and undergraduate students in relevant academic departments in colleges and universities in the northern California area. Participants were invited to present a poster paper according to the usual rules; that is, we simply provided a space about 1 meter high and 1.5 meters wide on which illustrations and text could be thumbtacked.

Anyone could attend the meeting, and invitations were distributed to industry through the local chapters of various professional societies. However, only students could submit posters. In addition, a program booklet containing short abstracts supplied by each contributor was distributed at the meeting.

In the final event, there were approximately 40 papers from seven different schools, with department affiliations ranging from physics, chemistry, and biology through electrical, mechanical, and aeronautical engineering. The interaction among the attending students was clearly successful, with animated conversations continuing around individual posters from the time the meeting opened until it closed some 3 hours later. One technique that seemed particularly effective was to place posters that appeared to have related technical content, but were from different schools or departments, in close proximity to each other. This stimulated many fruitful contacts among students who were previously unaware of each other's existence.

There are obviously many other topics or themes around which such meetings could be organized. One interesting observation was that a sizable number of the better-presented posters did not contain the name and department of the student presenting the poster. Does ego development only occur later on in the graduate education process?

P. M. FAUCHET
A. E. SIEGMAN
Edward L. Ginzton Laboratory,
Stanford University,
Stanford, California 94305-2184

Irradiation of Foods

While recognizing the induction of poorly characterized "unique by-products" in foods after high-energy irradiation, Marjorie Sun (News and Comment, 17 Feb., p. 667) implies that there is no way in which concentrated doses of such products could be evaluated toxicologically in a manner analogous to high-dose carcinogenicity or teratogenicity testing. This is certainly not the case. Stable radiolytic products could be extracted from irradiated food by various aqueous and nonaqueous solvents, which could then be concentrated and subsequently tested. Until such fundamental studies are undertaken, there is little scientific basis for accepting industry's assurances of safety. Similarly, there is little or no basis for accepting Food and Drug Administration (FDA) approval of irradiation as an alternative to ethylene dibromide (EDB) fumigation, let alone for more large-scale use.

These considerations are yet further emphasized by Department of Health and Human Services Secretary Margaret Heckler's support of the industry position in her arbitrary rejection of the FDA's proposal for labeling of radiated food. They are also emphasized by the availability of known safe alternatives to EDB, including aluminum phosphide for grains and cold storage for fruits and vegetables. Public policy on the nation's foods must not be based on reckless gambles and denial of the public's right to basic information and free choice.

SAMUEL S. EPSTEIN
Department of Preventive Medicine
and Community Health,
University of Illinois Medical Center,
Box 6998, Chicago 60680
JOHN W. GOFMAN
Donner Laboratory of Medical Physics,
University of California,
Berkeley 94720

According to a special FDA committee assigned to review food irradiation, radiolytic products are difficult to pinpoint because they are of unknown composition and must be extracted from foodstuffs, which are inherently chemically complex. This committee, formed in 1979 under the Carter Administration, reviewed available studies and concluded that food irradiated at the proposed standard of 100 kilorads contains "a concentration of total radiolytic products in food so low that it is nearly impossible to detect with current techniques."

The Environmental Protection Agency does consider aluminum phosphide to be a suitable alternative to EDB. Agency documents note, however, that aluminum phosphide is explosive and acutely toxic and poses a risk to unprotected applicators.—MARJORIE SUN

Marjorie Sun quotes one of us (D.S.) as saying there was nothing wrong with irradiated food. In fact, as Sun hints, the Center for Science in the Public Interest has not investigated this matter and has never adopted an official position.

MICHAEL F. JACOBSON
DEBORAH M. SCHECHTER
Center for Science in the Public
Interest, 1755 S Street, NW,
Washington, D.C. 20009

Erratum: In the report "Communal nursing in Mexican free-tailed bat maternity colonies" by G. F. McCracken (9 Mar., p. 1090), table 1 was incorrectly printed. The correct table is reprinted below.

Table 1. Nonrandom nursing in 167 pairs of *Tadarida brasiliensis mexicana*. $P \ll 0.001$ (G-test).

Result	Nonparental genotype pairs		
	ME	SOD	Both loci
Expected (random)	24.3	21.3	42.5*
Observed	5	2	7

*Factors out nonparental combinations that would be detected at both loci.