Letters

MRC Funding: No Freeze

I was disturbed by inaccuracies in the News briefing "Hard times for MRC" (30 Nov., p. 1202). We have not canceled all new funding for at least 6 months. The Medical Research Council (MRC) continues to award grants, fellowships, and studentships. What we have done is inform our own establishments that they must defer new staff appointments for 5 months and defer delivery of equipment authorized but not yet purchased for a similar period.

This action is to help deal with a projected overspend this year of about 2% of the MRC's budget, an overspend caused directly by inflation levels in the United Kingdom in the second half of 1990 turning out to be considerably higher than we (and others in the United Kingdom) had been anticipating earlier in the year. It is therefore inaccurate to talk about financial problems being hushed up—earlier this year they simply did not exist.

Finally it is not true that we have recently imposed a ban on staff speaking out on MRC policy. Like any employer, however, we do take exception to the very rare occasions when employees make inaccurate or misleading comments about MRC decisions in a way that is damaging to the MRC's interests. I would suggest that *Science* itself is hardly contributing to an improvement in the morale of MRC staff by printing incorrect allegations.

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Testing Special Relativity

The article by Robert Pool (Research News, 30 Nov., p. 1207) about ever increasing precision in explicit tests of Einstein's special theory of relativity creates a misleading impression of the progress over the years. Pool states that the beautiful Hils-Hall experiment (*1*) represents an increase by a factor of 300 in precision (from 2% to 70 parts per million) in testing Einstein's second postulate, namely, that there is a limiting speed (of emission of electromagnetic radiation, in the case at hand) independent of the motion of the source. The factor of 300 is actually the measure of improvement over the classic 1932 experiment of Kennedy and Thorndike.

There are a number of equivalent ways of testing the second postulate, some that use the exquisite precision possible by comparison of frequencies to examine the speed of light for sources differing by modest speeds and others that use modest precision with sources differing in speed by the maximum possible amount. When one considers the various experiments, the Hils-Hall experiment is an improvement of a factor of 2, at best.

In a paper published more than 25 years ago (*2*), a group at CERN reported a dramatic explicit test of the second postulate. The experiment was made with highly relativistic neutral pions moving at speeds greater than 0.999 times the speed of light in vacuum. Such neutral pions decay into two light quanta. The time of flight of the 6 gigaelectron-volt (GeV) photons emitted by these extremely rapidly moving sources was measured over a distance of 80 meters by using the radio-frequency structure of the 19.2-GeV proton beam that produced the neutral pions. Within experimental error, the speed of the photons emitted by the moving sources was equal to the speed of light in vacuum. If the observed speed is expressed as $c' = c + kv$, where c is the speed of light in vacuum and v is the speed of the source, then the experiment showed that $k = (0 \pm 1.3) \times 10^{-4}$, or zero within 130 parts per million. This powerful proof of Einstein's second postulate has been part of the textbook literature for 15 years or more (*3*).

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Women and AIDS

The most recent report on AIDS issued by the National Academy of Sciences (NAS), entitled *AIDS: The Second Decade* (*1*), describes the changing face of the AIDS epidemic. Women, the report points out, will constitute the fastest growing proportion of new cases of AIDS.

We feel that, although the NAS publication clearly sounds the alarm by warning of the increased threat of AIDS to women and children, it offers little substance or guidance above the issues facing them. In short, it awakens our concern but offers no direction.

The report devotes only one chapter to women and, while the authors elegantly refute the outworn concept of the prostitute as vector, they single the prostitute out only to assert that her risk is similar to that faced by any woman who is sexually active or who uses intravenous drugs. Minimal space is allocated to the host of critical questions that have been raised for American women by the HIV (human immunodeficiency virus) epidemic.

When we protested to NAS about this dearth of information on women, it said that hard data resulting from large-scale quantitative gender-specific research were unavailable and that the available data focusing on women and AIDS were "too soft" for inclusion in the report.

We believe that the judgment of NAS not to use existing data because they are "too soft" is a grave error. First, such an approach suggests that we lack the tools to provide a careful analysis of preliminary data. This is not so. Each of the sciences has developed methodology for the critical review of data that are collected by observation, from qualitative studies, or in research with the use of uncontrolled or unblinded designs. Such review cannot provide firm answers—those must await future investigation—but it can provide an estimate of both the state of the art and future research directions.

Second, such an approach denies policymakers and planners a presentation of the existing material. Public health officials are often forced to make decisions on the basis of incomplete data, and this instance is no exception. The use of incomplete data for policy decision is greatly facilitated by careful, exhaustive review, and in this case NAS might have provided for such review.

Finally, many unresolved clinical questions are intimately interwoven with complex behavioral issues. AIDS will spread among women to the extent that they are unable to adopt the protective behaviors shown to work among intravenous drug users and among gay men. But it is unclear that women, given their relative lack of power in sexual and drug-using relationships, will be able to assert themselves and insist on protective behaviors. What are the strategies through which women can learn sexual self-protection? Are there new ways that women themselves can use to prevent infection? These questions will be answered through intervention research. We have adopted vigorous campaigns to urge pregnant women to have HIV testing even

though we lack information on how to manage the illness during pregnancy. We encourage women to insist that men use condoms, even though there is growing evidence that, for many women, this may not be a feasible preventive strategy. Because of the threat AIDS poses to the women and children of our society, errors of omission, such as those described here, are not simply matters of neglect: they are matters of life and death.

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Response: *AIDS: The Second Decade* is the third in a series of reports (*1*) dealing with scientific issues related to the human immunodeficiency virus (HIV) epidemic in the United States. In planning this report, our committee identified the changing character of the AIDS epidemic in the United States and, in particular, the growing impact of HIV infection and AIDS on women as topics in need of urgent attention.

Toward this end, the authors of the above letter were asked to contribute materials either as members of a panel of scientists invited to assist our committee in its work (Ehrhardt and Fullilove) or as consultants employed to draft background papers (Chavkin, Cohen, and Worth). Their contributions are noted in the report in the same manner as those of committee members, other panelists, and consultants.

As is always the case, however, some materials prepared for our report were not incorporated in the final version. Among these were some materials on women and AIDS prepared by some of the signatories of the above letter. It was the committee's judgment that these materials did not present sufficient scientific evidence to support all of the arguments that were being made. In making this judgment, our committee recognized that the difficulty of drawing conclusions and making recommendations in this area was due, in part, to the insuffi-

ciencies of the research focused on HIV infection in women.

AIDS: The Second Decade draws attention to this fact and to the urgent need for additional research in this area, arguing that

> For most of the subgroups who are now faced with the threat of AIDS, the existing knowledge base is deplorably limited. Specifically, in the case of women, there is a tremendous need for more and better information regarding the behaviors that transmit the virus as well as the determinants of those behaviors. The gender-specific differences in the distribution of these behaviors and the social and psychological factors that contribute to the initiation and continuance of both risk-taking and health-seeking behavioral patterns among women warrant significant attention in the coming decade.

AIDS: The Second Decade has drawn lay and scientific attention to the growing threat posed to women in the United States (*2*). Our committee has also recommended a variety of research and intervention activities to cope with this threat, including,

- a careful review of the goals of testing and counseling programs for women of childbearing age and implementation of research efforts to ascertain the effect of such programs on future risk-taking behavior;
- exploration of the lessons to be learned from genetic counseling that might be applicable to the design and implementation of counseling programs for HIV-infected women;
- research to understand the determinants of condom use for the diverse populations at risk for sexually transmitted HIV infection;
- interventions to promote consistent use of condoms;
- research to improve condom design and materials in order to make them more acceptable to users; and
- research to develop protective methods that are more "user friendly" than condoms, and, in particular, methods that can be used unilaterally by women.

Finally, because HIV prevention efforts cannot wait for the completion of needed research, we have recommended that intervention programs be mounted with the use of planned variations of key program elements combined with rigorous evaluation research. This strategy will enable us to learn from both our failures and our successes in inducing protective changes in sexual and drug-using behaviors. It provides a basis for hoping that in the future we will have a better scientific understanding and a greater ability to retard the spread of HIV in all segments of our population than we do today.

Our committee has no prejudice for or against particular research methodologies.

We have reviewed and recommended ethnographic, survey, behavioral, statistical, and epidemiological research in appropriate contexts. We do believe, however, that all research can benefit from peer review, and it is the policy of the National Research Council to refrain from publishing scientific materials when such review indicates that the materials do not provide adequate scientific evidence to support their conclusions.

We share the concern of Chavkin *et al.* that much remains to be done. *AIDS: The Second Decade* was never expected to address all the questions concerning HIV infection among women. Much of the needed research has not even begun, and the evolving nature of this epidemic means that the realities and needs of this and other populations will require our continued attention.

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"Citizen Friendly" Science

Elizabeth Culotta's News & Comment article "Can science education be saved?" (7 Dec., p. 1327) does not focus on the key issue facing the nation. What are the goals against which one judges success or failure? The Kennedy-Hatfield Omnibus bill clearly stated early this year that Congress had two parallel national goals: (i) more and better scientists and (ii) scientific and technological literacy for all citizens.

Robert White, president of the National Academy of Engineering, has given excellent data (*1*) to support the thesis that we have too many scientists, and Alan Fechter (*2*) has also made a strong case against the alleged shortage of scientists.

What is the evidence that tinkering at the margins in kindergarten through grade 12 could possibly make better scientists than G. N. Lewis, Linus Pauling, and R. P. Feynmann? Except for AAAS's James Rutherford, the doyen of the nation's "science educators" trying to reform the U.S. system, none of the individuals cited in Culotta's article address the system's main problem.

Realizing that most citizens do not understand the technology (including the relevant science) that they are in daily contact with, and on which they vote, is the key. A "citizen friendly" science, which starts with real world problems and moves to technology and applications and only then to a *few* principles of science, may actually do more good than a "more physics" approach.

Culotta barely mentions the Science/Technology/Society movement which, without ballyhoo, has been embraced by more teachers and brought into more schools than all the other reforms put together.

Surely we should match Rutherford's well-conceived Project 2061 with a Project 5090. If the National Science Foundation and the Department of Education would mandate that 50% of the money go for the 90% of the citizens and their technological literacy, I feel sure this would reflect better the hopes of Congress.

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Erratum: The last line of the 11 January erratum (p. 143) correcting the last name of the eleventh author of the report "Inhibition of HIV-1 replication by a nonnucleoside reverse transcriptase inhibitor" by V. J. Merluzzi *et al.* (7 Dec., p. 1411) was inadvertently omitted. The last sentence of the erratum should have read, "That author was 'Alan S. Rosenthal,' not 'Rosehthal.'"

Erratum: The last sentence of the fifth paragraph of the 21 December article by Ruth Levy Guyer and Daniel E. Koshland, Jr., "Diamond: Glittering prize for materials science" (p. 1640), contained an error. It should have read, "Whereas silicon chips can withstand temperatures up to 300°C, one estimate is that diamond chips might be able to withstand temperatures as high as 600°C," not "5000°C."

Erratum: Figure 1 in the report "Ice nucleation by alcohols arranged in monolayers at the surface of water drops" by M. Gavish *et al.* (16 Nov., p. 973) should have been credited to B. Kamb [in *Structural Chemistry and Molecular Biology*, A. Rich, Ed. (Freeman, New York, 1968), pp. 507–542, figure 3a].