Letters

Budget Cuts at NIH

One suggestion for budget deficit reduction by the Congressional Budget Office is a 10% cut in the research budget of the National Institutes of Health (News & Comment, 24 Feb., p. 1001). If this cut were applied across the board (compared with the alternative of funding 10% fewer grants), the result could be far more devastating to U.S. scientific progress than it might appear superficially. This is because the major portion of research funds in a particular grant usually goes to salaries, which do not get cut. For example, if 70% of a grant is salary, a 10% cut coupled with a 5% annual increase in compensation reduces funds allocated to materials and supplies (M&S) by 50%. Since M&S budgets are carefully calculated to accurately reflect the actual costs of performing the research, the result is that many grant holders will no longer be able to perform the work for which they have been funded. The result will be the unfair elimination of programs with currently realistic M&S budgets, presumably in greater numbers than the alternative, 10% fewer grants. In either scenario, the proposed cut to NIH would exacerbate the intolerable current situation, where only 30% of approved grants get funded.

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Climate and Forests

I would like to respond to the comments by Clark S. Binkley, (Letters, 24 Feb., p. 991) and by Pekka Kauppi and Maximilian Posch (Letters, 24 Mar., p. 1535) on my letter (30 Sept. 1988, p. 1736) about the possible effects of warming-induced forest growth on atomospheric CO_2 levels. In the realm of quibbles, I plead guilty to erroneously citing Binkley's paper (*1*) as the source of some of the growth rate figures to which I referred. More substantively, however, my speculations regarding the possible effect of climate warming on forest biomass and atmospheric carbon levels were offered, not as a completed analysis, but rather as a prospective hypothesis. The data used, including that of Kauppi and Porch (*2*), as presented in (*1*), were designed to establish that, as I stated, "the forces working on the climate system can surely operate in more than a single direction" and therefore that "one cannot rule out the *possibility* that at least the first increments of the anticipated global warming could result in some degree of expansion of the earth's forest into regions not now forested" (emphasis added). The writers of both letters appear to agree with this as a possibility.

I did not, however, as Kauppi and Posch assert, address whether the warming effects "could solve part of the 'missing carbon problem' and balance the global budget for 1980." In fact, Allen Solomon and I systematically examined the possibility of natural forest expansion sequestering carbon and concluded that "there is likely to be little natural net expansion in forest area or volume as the result of golbal warming" (*3*).

Nevertheless, I think the "jury is still out" on the science of this issue. For example, the "fertilization effects" associated with higher ambient levels of CO_2 are not well understood. If substantial, the "effects" could alter the balance between global forest expansion and contraction and thereby mitigate some of the buildup of carbon in the atmosphere.

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2. P. Kauppi and M. Posch, in *ibid.*, chap. 5.
3. R. A. Sedjo and A. M. Solomon, in *Greenhouse Warming: Abatement and Adaptation*, N. J. Rosenberg, W. E. Easterling III, P. R. Crosson, J. Darmstadter, Eds. (Resources for the Future, Washington, DC, in press).

Retraction

Numerous attempts to replicate the enhancement of 1,3-bis(2-chloroethyl)-1-nitrosourea (BCNU)–induced sister chromatid exchanges (SCEs) in α-difluoromethylornithine (DFMO)–pretreated 9L cells, previously reported in *Science* (*1*), have failed. The SCE slides used for the original study were rescored in a blind manner by two independent cytogeneticists. Results from this rescoring revealed that the enhancement of SCE frequency in 9L cells treated with both DFMO and BCNU was due to a previously undetected increase in SCEs induced by DFMO alone; when SCE frequency for the DFMO-BCNU–treated group was corrected for SCEs induced by DFMO alone, the number of SCEs was the same in BCNU- and DFMO-BCNU–treated cells.

Furthermore, we wish to indicate that the average 93% enhancement of BCNU-induced DNA interstrand cross-linking in 9L cells pretreated with DFMO that was previously reported in *Science* (*2*) is not consistently obtained. The magnitude of this enhancement is more accurately in the range of 30 to 40%.

Finally, it should be noted that the previously reported results of reduced *cis*-platinum–induced SCE frequency and DNA interstrand cross-linking in DFMO-pretreated 9L cells (*1, 2*) are still replicable.

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Educational Reform

B. F. Skinner's suggestion that teaching machines are the solution to our failures in education (Letters, 24 Mar., p. 1535) contains the same fatal flaw that has undermined previous efforts at educational reform. A sound knowledge of child development is the only basis on which an effective and successful educational practice can be implemented in this country. When we ignore the two basic tenets of developmental education—that children's abilities to learn change with age and that each subject matter engages the child's learning in a unique way—we have removed any chance of effecting any significant change in our educational system.

Illustrations from the current educational scene may help to make my point. In some school districts children are now taught decimals in the 4th grade. They were once