administered, with each project director receiving full control of his or her own budget.

The present system is usually justified by the argument that some individual has to take overall responsibility for evaluating progress, for determining when the direction of the PPG ought to be changed, and for deciding how to fund new opportunities. With this assumption, it is natural that the PI would have this role. But this approach has a hidden cost: it introduces a research director into a group collaboration where none is needed.

If budget authority were shared among project directors, any proposed budget changes would automatically be subject to peer review, instead of being dictated by a single individual. If a new research opportunity should arise, it would get funded only if the peer group can agree on how much each of them should contribute to the effort.

Giving each project director budget control would reestablish the independence and responsibility of individual investigators. It would also mean that PPGs would survive only as long as they remain truly synergistic, promoting collaborations above and beyond those possible by a group of scientists, each of whom has R01 support. Such an approach might be considered for other block grants as well.

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Climate Change and Human Health

The article "Apocalypse not" by Gary Taubes (News & Comment, 7 Nov., p. 1004) addresses the issue of fundamental differences of opinion among health scientists about the impact of climate on human health. While we acknowledge that there are strong differences in opinion about the potential consequences of future climate change on disease incidence and distribution, we share common concerns; we wish to emphasize that despite any differences, there are many areas where we agree.

The key questions behind the climate/health research agendas are, How will climate change alter health risks, to what extent will risks be altered, and what can be done to mitigate any potential increase in health risks? At issue is not which is more important, climate factors or improved health measures; rather, it is important to assess how health risks might change in both industrialized and more vulnerable developing countries.

The complexity of this public health issue entails far more uncertainty than many health hazards with which we are familiar. Impacts may occur indirectly through simultaneous disturbances of other sectors, including water supply, food production, or habitat. Thus far, scientists have found great difficult in communicating this extra level of uncertainty.

We agree on the need to improve understanding of the complex relationships between climatic conditions and disease transmission dynamics. We also agree that disease incidence is influenced by multiple factors (none of us will argue that climate is the only or the most important factor). Well-designed research studies must be conducted to gain a better understanding of how these multiple factors relate to each other and how all might be influenced by climate. Identifying risk factors that influence disease transmission is a key to public health planning, and as more data from climate/health research studies become available, the influence of weather will be better understood.

We recognize that extreme weather events such as those that may accompany this year's El Niño place an extra burden on sanitation and general public health systems. The early regional forecasts obtained from El Niño exemplify important new predictive capabilities that public health officials can use in their public health planning.

Interdisciplinary research and interagency cooperation can go far toward improving the health risk assessment associated with climate change. Ecology-based research and monitoring combined with advances in climate forecasting will enhance our understanding of complex environmental health hazards and may provide the public with early warning systems that allow timely public health interventions.

The signatories of this letter agree that public health is of great importance and that public health infrastructure and services must be improved worldwide. We recognize that environmental and socioeconomic conditions underpin health status; effective and sustainable public health prevention will ultimately require improvement in these underlying conditions. It is important to realize, however, that the projected climate change may have a profound influence on an aspects of human ecology, and we strongly recommend that research be supported to allow development of effective prevention strategies that will help mitigate its effect on public health.

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Heisenberg Meets Photobiology?

In their report "Independent photoreceptive circadian clocks throughout *Drosophila*," Nov. 28, p. 1632), Jeffrey D. Plautz *et al.* demonstrate the existence of photoreceptors and independent circadian oscillators throughout the fruit fly. This elegant work is based on recording emission patterns of visible photons.

Heisenberg's uncertainty principle warns physicists that the very process of measuring a process may change its qualities. If the laws of physics apply to photobiology, as they must, and if photoreceptors exist throughout the fruit fly, as the results demonstrate, then it is reasonable to ask if the output of light by the green fluorescent protein (GFP) may have itself distorted the experimental results. Furthermore, if other species are shown to have ubiquitous photoreceptors, as do fruit flies, the increasingly popular use of GFP as a tool may run into Heisenberg's limitations elsewhere in the study of molecular biology.

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Response: Oren correctly points out that the use of fluorescent probes to study processes in photosensitive cells and tissues has some obvious caveats. However, we only use the brightly fluorescent GFP to localize clock cells expressing the *period* gene, whereas we use the dimly bioluminescent market luciferase to track clock activity in real time.

We have performed many control experiments to demonstrate that luciferase-generated bioluminescence does not interfere with circadian clock activity. Most of these controls are published in previous papers cited in our report. However, it is highly likely that the much higher photon flux generated by the illumination of GFP and its subsequent emission would activate the circadian photoreceptors. Thus, luciferase has the advantage of not only being sufficiently unstable to report temporal changes, but also does not produce enough light to detectably perturb the system.

We fully expect that advances in fluorescent protein technology will circumvent these problems, both by destabilizing the protein marker and generating probes whose excitation and emission spectra do not overlap those of biological photoreceptors.

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Corrections and Clarifications

■ The cover legend for the issue of 6 February (p. 775) incorrectly identified the Hall of the University of Pennsylvania (shown at the bottom, left). The key on the same page should have credited the photo (no. 4) to the University of Pennsylvania Archives.

■ In references *1–4* of the letter "The HUGO Mutation Database initiative" by R. G. H. Cotton *et al.* (2 Jan., p. 10), the dashes before "cotton" in the World Wide Web addresses should have been tildes.

■ In the report "The spatial dimension in population functions" by E. Ranta *et al.* (28 Nov., p. 1621), the labeled units of the *y* axis in figure 1G (p. 1622) should not have begun at the bottom with "–1.0" and "–0.5," but should have read, "0" and "5," respectively.

■ Elizabeth Pennisi's article "The architecture of hearing" (Research News, 14 Nov., p. 1223) did not make clear that Christine Petit of the Pasteur Insitute in Paris was one of the researchers who, with Steve Brown and Karen Steel, showed that Usher syndrome 1B is caused by a mutant *myosin VIIA* gene.

■ Reference 26 (p. 1250) of the report "Trace gas emissions and smoke-induced seed germination" by J. E. Keeley and C. J. Fotheringham (23 May, p. 1248) should have read, "M. A. Cohn and L. Castle, *Physiol. Plant.* **60**, 552 (1984)."

Letters to the Editor

Letters may be submitted by e-mail (at science_letters@aaas.org), fax (202-789-4669), or regular mail (*Science*, 1200 New York Avenue, NW, Washington, DC 20005, USA). Letters are not routinely acknowledged. Full addresses, signatures, and daytime phone numbers should be included. Letters should be brief (300 words or less) and may be edited for reasons of clarity or space. They may appear in print and/or on the World Wide Web. Letter writers are not consulted before publication.