LETTERS

Research Funding for Completed Work?

I have just returned from a meeting of a governmental group which is charged with distributing $200,000 among the submitters of over $2 million worth of proposals. We are having to go through a lot of chaff for very little wheat. My acquaintances in the National Science Foundation and the Energy Research and Development Administration tell me that they are overwhelmed by the tremendous number of proposals they must read over and have evaluated. It sometimes takes many months and telephone calls to get even an acknowledgment that a proposal has been received by them. Too much time and creative energy are wasted.

Being a reasonably successful researcher who has not been particularly successful at getting grant money, who finds it fatiguing and demoralizing to ask for money with a promise, but who finds it invigorating and stimulating to do the work and exhibit the results, I would like to suggest the following.

A substantial fraction of all governmental grant money should be made available to pay for work which has already been completed. The doer of a worthy piece of work should submit to the appropriate funding agency a final publication (hopefully from a reviewed, archives-type journal) or a final report which describes his work, together with a budget which includes the expenses entailed in its performance, including a reasonable profit for the investigator or his organization. Evaluation of work already performed could be made by technical peers as it is now, and since it would be the work itself which is being evaluated, there would be no need to identify the worker in this evaluation process. The work would stand or fall on its own merit. It is inherently easier to evaluate work that has already been done than it is to anticipate the value of a proposed piece of work.

Some of my most successful colleagues advise me that they now spend as much as half of their time in the pursuit of funding and a substantial fraction of their remaining time in the performance of peripheral jobs having to do with the financing of their research. How much less wasteful it would be if they and the people in the granting agencies could be relieved of the need to wade through tons of proposals that are generated in a shotgun approach to securing funds.

It is pertinent that young people need help in getting started. It is also pertinent that there are some projects for which the expenditure is so great that no individual or organization could afford to take the risk involved in performing them without a guarantee of governmental funding. Such matters could be handled as they are now. But a substantial amount of research supported by the government could be handled in the way that I suggest.

Such a system would help make disbursement of federal funding more competitive, fair, and in the spirit of a free society. It would give creative people more time in which to work on their ideas than they now have and make them less dependent on membership and conformity to an establishment for success.

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Recombinant DNA Guidelines: Environmental Impact Statement

In June of this year, the National Institutes of Health (NIH), with the concurrence of the Secretary of Health, Education, and Welfare and the Assistant Secretary for Health, issued guidelines to govern the conduct of NIH-supported research on recombinant DNA molecules. These guidelines, developed over an 18-month period, involved the participation of both the scientific community and the public. They prohibit certain kinds of experiments and allow others to go forward under special safety conditions. The provisions afford protection with a wide margin of safety to workers and the environment while permitting this important research to proceed.

In response to the requests from a number of public commentators, the NIH undertook to prepare an Environmental Impact Statement on recombinant DNA research activity, in accordance with the National Environmental Policy Act of 1969. The development of the guidelines, as noted in my decision paper accompanying them, was in large part tantamount to conducting an Environmental Impact Assessment. A formal assessment was made, however, and a Draft Environmental Impact Statement was prepared, with a view to promoting public understanding of the issuance of the guidelines. Notice of the availability of this draft document appeared in the *Federal Register* of 8 September (p. 37842). It was also published in full in the

Federal Register of 9 September (p. 38425) for general comment by the public and the scientific community.

The NIH also welcomes comments from the readers of *Science*. Copies of the document are available from Dr. Rudolf G. Wanner, Associate Director for Environmental Health and Safety, Division of Research Services. His address is Room 4051, Building 12A, National Institutes of Health, Bethesda, Maryland 20014. Comments on the draft statement should be submitted to the Director, National Institutes of Health, Bethesda, Maryland 20014, by 18 October 1976.

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Fusion as an Energy Option

The recent series of *Science* articles on fusion power by William D. Metz (Research News, 25 June, p. 1320; 2 July, p. 38; 23 July, p. 307) accurately expresses many of the current concerns of the utility industry about the U.S. fusion program. The articles, however, fail to express the utilities' belief in the need for development of fusion as a commercially and environmentally viable energy source and their confidence that, with proper management, this can be carried out successfully. Fusion power is one of the very few energy options that can provide central-station electric power on a scale sufficient to meet our future needs.

Although the *Science* articles are exceptionally well researched and technically informative, the editorial comments contained therein and in Philip H. Abelson's editorial of 23 July (p. 279) tend to put fusion in an unjustifiably grim perspective. First, the technological problems of neutron damage to materials and of containment and disposal of radioactive by-products have long been known to fusion researchers, if not to the public. It is encouraging that the engineering problems of fusion have been recognized early and are already being tackled.

Second, the early design studies of conceptual fusion reactors—unfortunately mislabeled "reference" designs—have quite naturally yielded cumbersome and expensive products. The purpose of these studies was to identify engineering problem areas; this aim is almost diametrically opposite to that of designing a power plant suitable for commercial application. Again, we are encouraged that this step has been taken