chord in many, particularly his reference to the noise level and the penalization of innovation, which is also becoming axiomatic. Although his proposed criteria will mean different things to different reviewers, we do need to pay more attention to more consistent definitions of such scoring criteria. Another major weakness of the present system, at least with respect to the process at the National Institutes of Health, is the lack of a timely means to clarify misunderstandings or misinterpretations. This could be accomplished by changing the schedule between the time applicants actually receive the sometimes noisy critiques and the time the councils meet; this is often inadequate to clearly eliminate the confusion. The problem is made more acute by the increasing tendency of reviewers to infer ideas or opinions from the applications—and by implication the minds of the applicants—that are not stated and not held. This may streamline review at the expense of understanding and useful evaluation, and in the end everyone loses. It is particularly odious to read statements like, "It is unlikely that useful information will result," when everyone knows that few reputable scientists would propose experiments whose outcome they knew. All the same, economic realities force just this kind of value judgment.

Paying more attention to track records, and above all to innovation records, as Englander suggests, should help us in making more useful choices. Alternatively, we might get all participants off the hook by simply refraining from calling this whole process scientific peer review. In an age when words are fast losing their precision of meaning and questionable conduct often passes as simple politics, we need to recall that the idea of peer review has very deep biological and philosophical roots.

BRIAN G. D'AOUST
Hyperbaric Physiology, Virginia Mason Research Center, 1000 Seneca Street, Seattle, Washington 98101

History of Science Centers

History centers devoted to specific disciplines have an important role to play in the development of strategies for promoting the history of science and technology and in assuring preservation of adequate documentation. Perhaps the best known of the existing centers is the American Institute of Physics' Center for History of Physics. The Institute of Electrical and Electronics Engineers recently formed a similar center. The Babbage Institute for History of Information Processing at the University of Minnesota and the center for the history of chemistry recently established by the American Chemical Society and the University of Pennsylvania are other examples.

The Joint Committee on Archives of Science and Technology (JCAST)* has given special attention to the discipline centers in an attempt to gauge the sources of their success and to examine their best role in dealing with the general problem of historical documentation in the sciences. Crucial to the centers' success is the involvement—including funding—of the major professional scientific societies. The involvement of historians and archivists also is important. By focusing on the discipline, the centers transcend and supplement the institutional bases of science and technology in universities, government, and industry, where the chief archival repositories should be developed. The centers also have an important role in facilitating the mutual involvement of scientists, historians, and archivists in the discipline's history, identifying individuals, institutions, projects, and events that should be documented, locating records or papers of historical value and directing them to the most appropriate archival repository, studying the source and character of documentation in the discipline, and advising archivists on what should be saved.

JCAST would be pleased to hear of any current efforts to establish new discipline centers and to share our concerns with individuals, societies, existing centers, or other agencies.

CLARK A. ELLIOTT
Harvard University Archives, Harvard University Library, Cambridge, Massachusetts 02138

*History of Science Society, Society for the History of Technology, Society of American Archivists, Association of Records Managers and Administrators.

Investing in Science

As a result of our new tax laws, there has been an explosive growth of science-based businesses that serve as vehicles for tax-sheltered investment opportunities for individual investors. This source of capital should be viewed as a serious potential source of funding for scientific research and development projects, particularly when there is anticipated commercial application of the research efforts. At this time, the coming together of such investors and scientists is based on haphazard and serendipitous processes. In such arrangements it frequently happens that all participants (scientists and businessmen) are not able to evaluate the skills and motives of the people with whom they are working. Scientists are not necessarily able to evaluate the business acumen of their financial organizers, and business underwriters may not be able to evaluate the merit or likelihood of success of the science basis for new businesses. In addition, there seems to be no mechanism for open competition for access to venture capital funds. To remedy this situation professional organizations might play a role. Centralized registries for project outlines and budgets or listings of new patents available for implementation could be maintained by appropriate professional organizations, the listings free to scientists and available for a fee to investors. The professional society's clearinghouse could assure scientists that investors had appropriate disclosure agreements on file and could provide basic information about the financial soundness of potential investors to the scientist. In addition, professional societies might suggest to investors methods and experts to review proposals for scientific merit. Universities could play a role in helping scientists to get listed at appropriate registries and by making known the institution's policies with regard to overhead requirements, royalty expectations, and rewards to the principal investigator.

Government could play a role in the stimulation of venture capital investment in research and development by enactment of legislation allowing for variable tax reductions on profits when commercialization of supported research projects occurs. State governments would gain by promoting local business and industrial development, and the federal government could thereby encourage funding of research and development projects whose outcome could be considered to benefit the public interest. The best projects, in terms of merit and promise of financial benefit to investors, might find more than one "buyer" and could be "sold" to investors willing to return some of the tax advantage capital to fund research on projects when commercial application is a long time away, or not even apparent.

While the placement of private capital will not replace the support formerly given research by the federal government, it is, at least, another possible source for meritorious projects.

THELMA H. CARTER
Biotechnology Review Associates, 444 East 82 Street, New York 10028