doesn't seem to understand the nature and significance of the problem, let alone have any plans to solve it at this late date, seems almost beyond belief. To be cut off from Einstein's legacy to us in this way is very painful, partly because it is so unnecessary, and partly because it could be so easily remedied. But I guess that if those responsible had any sensitivity in the matter, we would not be in this situation.

DANIEL GREENBERGER
3/88 *City College of New York*

THE DIRECTOR OF PRINCETON UNIVERSITY PRESS REPLIES: Having been with Princeton University Press for only two years, I cannot speak from personal experience about the "well-known fiasco" and the long and tortured history of the Einstein papers project. It certainly is the most complicated and accident-prone venture I have encountered in over 25 years of publishing. Any decision regarding the Einstein papers must be made jointly by the Princeton University Press and the Hebrew University of Jerusalem (acting as legal heirs of the Einstein estate) after taking into account the advice of an international body of distinguished scholars. Certainly Daniel Greenberger's letter will be brought to the attention of these parties.

In any case, the complete scholarly edition of the Einstein papers is an immense task for all concerned. It involves the full- and part-time commitment of a number of scholars and enormous financial underwriting. While only one title has been published so far and another is in production, the edition will eventually run to at least 25 volumes. The original contract with the estate of Albert Einstein requires publication of these materials in the original language.

For each volume of the Einstein papers Princeton University Press is providing a separate paperback companion that contains a scientifically accurate translation of all materials not originally written in English. These paperbacks can now be purchased separately from the cloth edition, although they will not contain the English notes and annotations. The original decision to couple the paperback with the purchase of the cloth edition was reversed within a month or so of the publication of volume 1.

All this, however, is an entirely separate venture from providing an English-language paperback edition of Einstein's scientific papers. I personally agree that such a book would be extremely valuable, and hope that with the support of the Hebrew University and the Einstein advisory board it might become a reality in the not-too-distant future.

WALTER H. LIPPINCOTT
Princeton University Press
9/88 *Princeton, New Jersey*

Does Pressure Pique Productivity?

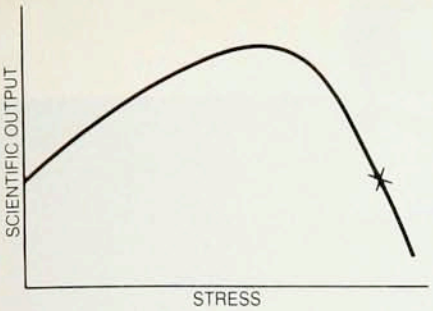
I became a physicist, I suppose, because of the nature of my curiosity. I have a need to understand. More accurately, perhaps, I need to have an explanation for everything. So, much of what I do—like the work of most physicists, I believe—is self-motivated.

I find that to do well what I do, I need not only to work hard and long at the experimental or theoretical problem at hand but also to reflect, to talk to people, to speculate—in short I need time to think.

Since I have come to work in the United States, I have observed that professional physicists (in universities at least) do not have the pursuit of understanding as their primary goal. Rather, the primary aim they adopt—or, I would say, are forced to adopt by the environment in which they work—is that of success.

What physicists work hardest to achieve is not understanding but such things as a larger number of students, proposals that bring in more funds, the publication of more papers, getting invitations to more prestigious conferences.... It is, of course, a commonplace that scientists bitterly complain about the need to undertake these activities, but I want to go further. I want to suggest that the life style of physicists in the US is highly inefficient. I have come to believe that the productivity of scientists is far below what it could and should be, that physicists who are at the peak of their potential creativity and productivity in fact produce almost nothing. They may appear to be productive, but only because they attach their name to students' work—they are not doing much themselves. (Thank goodness that graduate students in the US are aggressive and, from time to time, demand our time—at least while talking to them we have to think about physics.) I am overstating this, perhaps, but to add plausibility and coherence to this discussion let me introduce the modified Laffer curve.

A physicist under no external pressure would still produce a certain quantity of useful physics out of self-motivation (perhaps not every physi-



cist, but we are referring to an average over physicists), but it is legitimate to suppose that with some external pressure (a need to feed children, say) he or she would produce more. So we can construct a curve in which the vertical axis represents productivity and the horizontal axis represents the pressure to which the physicist is subject. Like the Laffer curve, of course, the shape of this curve is unknown, but I suspect that the shape is at least approximately like that in the figure above and that in the US physicists operate well beyond the maximum—indeed, probably beyond X, the point at which productivity is lower than if there were no pressure at all. [I thought I had invented the Laffer curve for productivity in physics, but a recent report suggests that this is an example of a much more general law of productivity: the Yerkes–Dodson law of performance (*Newsweek*, 25 April 1988—I don't have time to track down the original reference; I have to write a proposal).]

Now some of this excessive pressure comes from the general mores of the environment in which we work. The United States, after all, is a very competitive society. However, I believe that a major part of the pressure on physicists and the main contribution to the inefficiency that besets our work comes from the structure of the funding of research.

What I am saying is that by establishing an elaborate procedure to monitor and control the spending of Federal money on physics research, the government has produced a situation in which it gets less for its money than if it just distributed the funds more or less at random. I think that a complete overhaul of the mechanisms of research funding is called for. I do not have a concrete proposal for an alternative, but it must surely be possible to change the means of distributing funds so that it is less traumatic without its becoming either unjust or corrupt. I believe that developing and implementing such a system should be considered one of the highest priorities for science in the United States.

This letter is, regrettably, not as clear and forceful as I would wish, but the writing of a good letter, like good research in physics, requires two things that are in short supply: concentration and peace of mind.

ALWYN EADES
University of Illinois, Urbana–Champaign
6/88

α ν γ. How About You?

As mentioned in our article in the August issue of PHYSICS TODAY (part 1, page 24), we are in the process of writing a book on the history of early work on Big Bang cosmology. We already have a good deal of anecdotal material on the cosmological activities and interests of George Gamow, but would be pleased to hear from PHYSICS TODAY readers about anecdotal material we might use.

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Halley: A Name That Lives On in Mortality

The article by Michael Evans (February 1988, page 41) brought to our attention the remarkable diversity of the fundamental contributions of Edmond Halley in the astronomical, mathematical and geophysical sciences. It may be less well known that even had Halley made none of the contributions noted by Evans, he would still have left us an important legacy as the father of actuarial science.[1] The beginning of actuarial science is often traced to Halley's paper "An Estimate of the Degrees of the Mortality of Mankind, Drawn from Various Tables of Births and Funerals in the City of Breslau," published in 1693 in the *Philosophical Transactions of the Royal Society*.[2] For this great scientist a mortality prediction seemed to be as natural as a prediction of the return of a comet!

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2. E. Halley, Philos. Trans. R. Soc. **17**, 596, 654 (1693).

ED WAYMIRE
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3/88

Corrections

October, page 9—The third sentence of the first paragraph should have said that the range of validity of quantum mechanics had been extended to systems with radii on the order of 10^{-13} cm. The equation in the second paragraph should have been given as $i\hbar\dot{\psi} = H\psi$.

August, part 1, page 43—The second sentence of the caption should have read, "Lines from iron with 16 electrons removed are also present." ■

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G. F. Gilbert, Treasurer