face of the indicated results for colleges and universities is therefore a grave mistake. The ADEA act allows mandatory retirement for selected business executives with adequate pensions. The current revisions of ADEA should offer the same provision for tenured faculty.

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REFERENCES AND NOTES

1. A. Rees and S. P. Smith, *Faculty Retirement in the Arts and Sciences* (Princeton Univ. Press, Princeton, NJ, in press).
2. National Research Council, *Ending Mandatory Retirement for Tenured Faculty: The Consequences for Higher Education* (National Academy Press, Washington, DC, 1991).
3. National Research Council, *Research Excellence Through the Year 2000: The Importance of Maintaining a Flow of New Faculty into Academic Research* (Commission on Human Resources, National Research Council, Washington, DC, 1979).
4. Supported by a pension from TIAA-CREF.

Response: The most important of MacLane's complaints about our Policy Forum is that we presented no data on the effect of age on teaching or research performance. In our book (*1*), we devoted a full chapter to this crucial subject, but we were precluded from discussing it in the Policy Forum by space limitations. The effect of age on teaching performance as measured by student evaluations, although significant, is small and is not consistent in direction across disciplines or institutions. Teaching performance declines for instructors in the natural sciences in their 60s, but rises for the social sciences and is mixed for the humanities. Research productivity declines in all disciplines after middle age. Nevertheless, professors in their 60s publish on average more than one article a year, and many still receive research grants.

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REFERENCES

1. A. Rees and S. P. Smith, *Faculty Retirement in the Arts and Sciences* (Princeton Univ. Press, Princeton, NJ, in press).

Although the conclusions of Rees and Smith are probably valid, it is stretching credulity to believe that students' SAT scores affect faculty age at retirement. I am reminded of the example given in lectures on the misuse of statistics and correlations, namely, that the increase in the number of telephone poles in the United States in the early 19th century was not the cause of the almost equal decline in the number of typhoid cases.

Incentive programs for early retirement are not always "very expensive, and . . . may not be worth [the] cost," as Rees and Smith state. For some institutions, the cost may be borne by the retirement system while the college budget reaps the benefit of getting replacement staff at lower initial salaries. This is certainly true for New York State and New York City higher educational systems.

Perhaps the best reason that faculty have for retirement (despite the right to continue working) is that they are sufficiently learned to do simple arithmetic. When adding up pension payments, social security benefits, and reduced income tax liability and subtracting this sum from current take-home pay, tenured faculty may clearly see that by continuing in their current position, they are working for less than the federal minimum wage. With this knowledge in hand, they opt for retirement. They may then accept positions in other institutions. Shouldn't Rees and Smith have considered this option in their analysis?

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Research on Animals: Unforseen Benefits

Along with many other basic researchers, I believe that biomedical research requiring the use of animals is necessary and justified even when the practical long-term gains cannot be seen. There are those who support some animal research but say they can see no use for other work simply because the costs outweigh *foreseen* benefits. I could not disagree more.

In his book, *Newton's Madness* (*1*), a collection of stories based on some of his neurological cases, Harold Klawans recounts his conversation in Vienna with the Austrian neurologist who discovered that the administration of the substance L-dopa improves parkinsonism by being converted to dopamine that is lost with the degeneration of certain brain cells. That loss results in parkinsonism. Klawans, interested in the mechanisms of certain of L-dopa's side effects in humans, was studying the effects of large doses in guinea pigs at the time. His colleague suggested he look at another substance reduced in parkinsonism as well, serotonin. He called home to a medical student seeking a manageable research project for the summer and suggested she give some guinea pigs the precursor that is converted to serotonin in the brain. "What will happen, she asked?" "I have no idea, he said, but let's see. That's research."

To make a long story short, the student found during that summer that the guinea pigs given the precursor bounced like heated kernels of popcorn and that the severity of bouncing was correlated with the degree of increase in brain serotonin. She suggested, tongue in cheek, that they had an animal model of popcorn but of nothing else. Klawans then found that the bouncing could be elicited by loud sounds, and there the matter rested—an animal model looking for a disease, as he put it.

Debra Marshall, "The girl with dancing eyes," came along 2 years later. Her eyes danced around along with other jerks that prevented her from walking. When crawling, she sometimes jumped off the floor—like a piece of popcorn. This gave Klawans an idea, for she also bounced when he clapped his hands. He had read of two conditions causing this in young children—a type of encephalitis and a tumor, called a neuroblastoma, located not necessarily in the brain but often in the chest. Because she did not act like a child with encephalitis, he bet on the tumor, thinking it might be secreting a substance like the serotonin precursor his student had given the guinea pigs a couple of years before. Sure enough, she had a chest neuroblastoma and went home cured after its removal.

The lesson is clear. The trained mind must be allowed to pursue research—humanely, but with as few impediments as possible. That mind's curiosity is enough, and exercising that mind will almost inevitably pay off. Certainly Debra Marshall's parents would agree with me. I intend to continue educational efforts directed at those untutored in biomedical science to assure them that our stand is justified.

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REFERENCES

1. H. Klawans, *Newton's Madness: Further Tales of Clinical Neurology* (Harper & Row, New York, 1990).

Editor's Note: The above letter was adapted from Dr. Morrison's statement of acceptance of the 1991 AAAS Scientific Freedom and Responsibility Award.

Erratum: In the Books Received column of 23 August (p. 920), the number of pages in *Selected Genetic Papers of J. B. S. Haldane* (K. R. Dronamraju, Ed., Garland, New York, 1990) was given incorrectly. The book has 542 pages of text. The current price of the book is $120.

Erratum: In the heading of the book note describing *Tsunami Hazard* (Some Other Books of Interest, 20 Sept., p. 1431), the name of the publisher of the book was omitted. It is Kluwer Academic Publishers, 101 Philip Drive, Norwell, MA 02061.