

budget constraints. In the discussion concerning the possibility of closing existing facilities, Kitt Peak and Cerro Tololo in Chile are presented favorably, but one might conclude from the way the argument is structured that it makes the most sense to consider closing the remaining mountain site of the National Optical Astronomy Observatories (NOAO), namely Sacramento Peak in New Mexico. The importance of the National Solar Observatory and its Sacramento Peak component to solar physics is not discussed. A more in-depth look at budgeting pressures might suggest other ways of meeting the current shortfall, especially for the national solar effort.

The operation of the solar facilities at Sacramento Peak differs considerably from that at Kitt Peak and at Cerro Tololo. Sacramento Peak is the world's premier solar observing facility, important to both U.S. and worldwide solar physics, to astrophysics, and to the U.S. solar-terrestrial research effort. Its relative importance has grown as NASA support and other funding of solar physics have declined. Sacramento Peak is an interagency effort, jointly funded by the National Science Foundation and the Air Force, that continues to generate new and exciting instrumentation and projects in spite of budgetary constraints. Recent advances include development of a prototype reflecting coronagraph, a filter system capable of 20-milliångstrom resolution, image stabilization systems that remove atmospherically induced image motions and feed the stabilized images into spectrographs and filter systems, multiple charge-coupled-device camera systems that permit simultaneous high-speed observations at many wavelengths, active and passive methods for removing image distortion, and portions of the fully automated telescopes for GONG, a network of telescopes being built to measure global solar oscillations. Larger projects for which work is both ongoing and planned and for which partial funding has been obtained include development of an adaptive mirror and development of a large reflecting coronagraph.

While the scientific rationale for larger ground-based, nighttime telescopes is strong, such projects should be approached carefully, with attention paid to the technical issues of making them work properly, and with a logical plan for phasing them in without destroying or seriously harming other important scientific programs. The funds in the NOAO budget for solar facilities are intended for solar astronomy. Closing existing solar facilities without replacing them with new solar capabilities would mean the loss of these funds to the solar community with no guarantee they could be

used by the rest of the astronomy community. The new nighttime facilities should come from expanding the astronomy budget through successful advocacy or from shutting down those facilities that will be made scientifically obsolete by the new telescopes.

STEPHEN L. KEIL
Solar Research Branch,
Air Force Geophysics Laboratory,
Sunspot, NM 88349

Retirement Policy

I was disheartened to read M. Brewster Smith's letter (8 Apr., p. 129) trotting out old, tired arguments in favor of mandatory retirement of faculty members. It is especially discouraging to see material dredged up out of the muddy pool of stereotypes, myths, and half-truths. What evidence can there possibly be to suggest that lifting the age ceiling will produce results "stultifying to the research and teaching enterprise?" I know of no such evidence; and none has been, or can be, produced.

I assume that since Smith is a member of the post-65 group himself, he feels he can speak of people of a certain age as "superannuated" or refer to people who "hang on until the bitter end," indeed, "until they have to be carted away." None of this has the remotest relation to the reality of academic or professional life. People do not "hang on"; the overwhelming majority leave when they are no longer comfortable doing their jobs. This is not a guess, but reflects the experience of firms and occupations where rules of mandatory retirement do not and have not applied. One such occupation is Justice of the U.S. Supreme Court. In the 200 years of that institution, which places much more demands on incumbents than the professoriate, the problem of "superannuation" has cropped up at most once or twice; to the contrary, some of the most magnificent contributions have been made by men long past "normal" retirement age—John Marshall, Louis Brandeis, and Oliver Wendell Holmes, Jr., among others, who all served well past age 80, and, in the case of Holmes, past 90.

The factual case in favor of mandatory retirement is at best wrong-headed speculation, at worst, mindless hysteria. The moral case is, if anything, weaker. If a professor wishes to retire early, that is his (or her) privilege. Many—perhaps most—professors will likewise retire, before they reach 70; this has been the experience so far at most universities. Some will want to continue serving. They should be allowed to do so. Smith says it is "kindness" to let the axe fall "with complete impartiality and arbitrariness."

Those on whom the axe falls may feel otherwise. Would it be a "kindness" to exclude all women from the professoriate, or all blacks, provided it is done with "complete impartiality?" Discrimination is discrimination; and tyranny can be exercised, and often is, through blind, general rules which pay no attention to *individuals* as human beings, but consign them to arbitrary categories, without possibility of exception or appeal.

There is an ethical issue here, an issue of justice and of civil liberties—the right to be judged on one's merits and not to be dumped on the ash-heap simply because there are so and so many candles on the birthday cake. Fortunately, the U.S. Congress has decided otherwise. In this case, they are entirely correct.

LAWRENCE M. FRIEDMAN
Stanford Law School,
Stanford University,
Stanford, CA 94305-8610

Whatever retirement pattern develops when professors, like the rest of us, become immune to age-mandated retirement is almost certain to be the cause of greater injustice than is the arbitrary system now in place. Smith's comment on Koshland's editorial (11 Mar., p. 1225) clearly outlines the flaws in this ill-considered legislation, but he delicately refrains from noting that, by nature, the professorial role is such as to make it relatively easy to rest on one's oars and, thus, tempting to remain in place. Except at the extremes, there is no obvious measure by which the individual, let alone others, can objectively gauge his or her performance. Nor is it easy to imagine devising a test that would not fatally compromise academic freedom, especially if—as is likely—the courts insist that any gauge of productivity be applied across the board rather than, invidiously, to the aged only. Even if that hurdle is cleared, somehow, the winking out of ancients who have for many years previously been honored members of the community will be distasteful in the extreme. Most institutions will shrink from it, incurring costs they can ill afford; those that grasp the nettle will pay costs of another kind, equally unaffordable.

E. L. PATTULLO
Center for the Behavioral Sciences,
Harvard University,
Cambridge, MA 02138

Erratum: Two books were inadvertently omitted from reference 12 of the article "Manufacturing innovation and American industrial competitiveness" by Stephen S. Cohen and John Zysman (4 Mar., p. 1110): M. Piore and C. Sabel, *The Second Industrial Divide: Possibilities for Prosperity* (Basic, New York, 1984) and C. Sabel, *Work and Politics: The Division of Labor in Industry* (Cambridge Univ. Press, New York, 1982).