

when both sexes are encouraged to try and both sexes are reinforced in the belief that they can succeed. Until we can either remove our cultural sexual bias or construct an experimental plan that can statistically determine the bias, the existence of a predisposition must remain an open question and cannot be assumed to be a fact. In the meantime, Ciparick introduces a "fact" that increments by one the number of microinequalities that women are consistently subjected to and that they have repeatedly reported as being a part of the largest barrier they face in science today. In short, he is part of the problem.

Further, as a fundamentalist religious person I reject his "fact" that as such I have accepted "the dogmatic authority of Scripture with no questions asked." Indeed I am as capable of discerning logical errors in my personal religious beliefs as I am of discerning Ciparick's logical errors and inconsistent arguments.

I strongly urge Ciparick and others who share his beliefs to understand in what sense such "facts" are really excuses for poor research, and poor research leads only to poor science.

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Scientists Should Heed George Brown's Thesis

There is an ergodic theorem that applies to old physicists; namely, if you live long enough, everything will have happened to you. I have been a practicing scientist, the chair of a university physics department, an academic dean, a vice president and provost at several universities and the executive director of a Congressional authorizing committee with jurisdiction over virtually all Federally financed civilian R&D. I support science, big and small, with no reservation or hesitation.

From my vantage point, I have seen few legislators over the years who have been as good a friend to science and scientists as George Brown, chairman of the House Committee on Science, Space and Technology. Further, I see no one on the current scene who compares to him.

Thus I am dismayed by the apparent disgruntled rancor and sense of betrayal evinced by many in the academic community with respect to Brown's recent speeches and editorials on the role of the scientist in society. Apparently some scientists feel resentment that an enlightened representative, elected by a disparate

set of voters, does not lead a science *claque*. That should not be his role or responsibility. Personally I believe that it is *our* (the scientists') obligation to persuade Brown's colleagues, through such actions as the APS program of regular Congressional visits, that science is affordable and as close to being a panacea for society's ills as we have any prospect of finding.

I believe that Brown's thesis on the responsibility of scientists is a most appropriate injection of reality into a debate often rooted in fantasy as to what the nation must do for scientists. George Brown is a complete public servant and, at the same time, a staunch defender of science. If he has chosen to speak to us about the social responsibility that must undergird our priorities in research, we would do well to recognize that he is being pragmatic and, I might add, patriotic.

HAROLD P. HANSON
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10/93

Physicists' Long Hours Limit Job Numbers

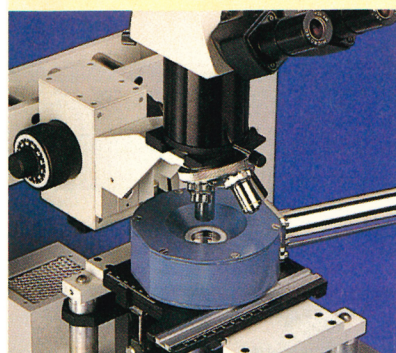
The changes in the economy of the United States and many other nations have resulted in a situation where it is difficult for physicists and engineers to find employment opportunities in industry. There have been a number of letters addressing this situation from various viewpoints in PHYSICS TODAY over the past few years, but I have not seen reference to the practice in industry of "exempting" professional salaried employees from the 40-hour week that applies to hourly wage workers. It seems to me that this practice must have a significant impact on the number of people required to carry out a development program in a specified time frame, and thus on the number of professional employment opportunities.

As a recently retired physicist, I have been a "beneficiary" of this exempt status over the past 30 years. I have worked many 60-hour weeks and sometimes went over 100 hours a week when an urgent "fix" was needed. Much of the work was interesting, and the urgency of certain schedules was evident, so I do not state this as a complaint. However, it is evident that if employers had to pay overtime for such work, and if other current disincentives to hiring additional staff were removed, significantly more technical people could be employed.

It seems to me that reducing the

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incentives to overwork technical employees would have the dual societal benefits of reducing unemployment and underemployment and of improving the quality of life for those who are employed. Drawing the line between technical employees and management employees presents some difficulty, but the present system of placing all salaried professional employees in the exempt category makes little sense. While I realize that professional societies such as the APS or IEEE are not labor unions, it would be desirable for them to pay attention to issues such as these, which strongly affect the work environment and employment possibilities of their members.

FRED UNTERLEITNER
Santa Clara, Utah

12/93

It is not so much that we need nuclear weapons right now as that we must be thoroughly competent to handle the unexpected in the future, near or distant. It is easy to imagine realistic scenarios in which nuclear expertise or the ability to threaten nuclear retaliation will be desperately needed. We hope these scenarios will never happen, but examples and potential threats abound. My generation (and others) suffered terribly, unbelievably in World War II because in peacetime we had disarmed, so that we were woefully unprepared to prevent or fight wars. As it was true in the past, it remains true now and always: *Si vis pacem, para bellam*. ("If you want peace, prepare for war.")

JOSEPH J. DEVANEY
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6/93

Nuclear Expertise Must Survive Disarmament

Believing that it ensures peace and that we are the very paragons of peace-loving virtue, the United States is recklessly destroying its nuclear weapons competence. We are destroying much much more than the intercontinental missiles necessary to reassure the Russians of our peaceful intentions toward them.

We are destroying not only weapons but records, facilities, careers, knowledge and competence. These attributes were dearly bought by decades of research and development by dedicated scientists, engineers, technicians and machinists. We still need these attributes to detect, comprehend and respond to foreign nuclear developments as well as specifically for our own defense weaponry. The ongoing destruction includes not only theoretical knowledge but also the all-important "hands on" arts that are essential to design, fabrication, maintenance, safe handling, safe storage and safe disposal of nuclear devices. Once gone, this expertise cannot be retrieved, short of a semi-Manhattan-Project-type effort. We are least likely to have the time and ability to redevelop the expertise when the need for it is greatest.

We are not facing up to two extremely unpleasant facts: Human nature has not changed, and the nuclear weapons genie is irretrievably out of the bottle. The knowledge of how to build nuclear weapons will inevitably continue to spread, and as a matter of fact, right now it appears likely that more and more of the world's fanatical or unstable countries will possess them.

Mercury's Perihelion Precession, Precisely

Daniel Kleppner (April 1993, page 9) writes that "according to general relativity Mercury's perihelion should precess at a rate of 43 seconds of arc per century."

This seemingly simple number has a rich history. What Einstein so ably explained was the observed excess argument of perihelion. The problem of the discrepancy between the measured precession and the classically calculated precession was known in the 1850s to Urbain Jean Joseph Le Verrier, one of the predictors of the existence of Neptune, and its value was refined in the 1880s by Simon Newcomb, one of my heroes. (Einstein held Newcomb's work in high regard, I seem to recall.) The total advance is about 5599 arcsec per Julian century with respect to the geocenter, our observation platform. The precession of the equinoxes of the Earth contributes approximately 5025 arcsec to that sum. The classical, or Newtonian, contribution of the other planets through the *N*-body interactions is approximately 531 arcsec. Subtracting yields about 43 arcseconds.

Einstein himself gave "43" per century¹ for the general relativistic contribution to the precession; the modern theoretical value is approximately 42.98 arcsec.

Reference

1. H. A. Lorentz, A. Einstein, H. Minkowski, H. Weyl, *The Principle of Relativity*, translated by W. Perrett, G. B. Jeffery, Dover, New York (1923), p. 164.

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