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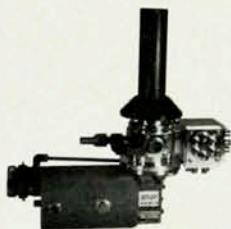
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## letters

tives for making nuclear weapons obsolete. The objective solution of the war problem is not the responsibility of any branch of any government. Indeed, governments may discourage such attempts. Surely it is worth the try.

• • •

Written in Hiroshima, Japan, August 1986.

### References

1. A. Einstein, in *The Atomic Bomb*, H. W. Wilson, New York (1946).
2. R. L. Sivard, *World Military and Social Expenditures—1983 or 1985*, World Priorities, Washington, DC (1983, 1985).

RAYMOND G. WILSON

Illinois Wesleyan University  
Bloomington, Illinois

8/86

## Is Worden's word vulnerable?

In a letter in the July issue (page 13) Lieutenant Colonel Simon P. Worden, special assistant to the director of the Strategic Defense Initiative Organization, stated, "I have never said that the current submarine deterrent is vulnerable."

Worden and I were two of the speakers at a 30 April 1986 session of the spring American Physical Society meeting in Washington. During that session, before an audience of several hundred members of the APS, he stated that the submarine force was not invulnerable and could not be depended upon in the future. Thus, it appears that the truth of Worden's claim could be checked by polling the several hundred APS members who attended that session.

THEODORE A. POSTOL

Center for International Security  
and Arms Control  
Stanford University  
Stanford, California

8/86

WORDEN REPLIES: If Theodore A. Postol would examine what I've said, both at the meeting in question and in other forums, he would find the following logic:

- ▶ No single submarine is invulnerable today.
- ▶ The submarine fleet is sufficiently survivable today to do its deterrent mission.
- ▶ The Soviet Union is working hard to make our submarines more vulnerable. I believe they will succeed in the future to such a degree that a deterrent based on submarine survivability will be very much in question.

My statements on these matters have been consistent and I stand by them.

I feel our fellow citizens would be

better served if physicist critics of SDI addressed our logic rather than trying to play quote games with our statements. Leave the quibbling to the lawyers.

SIMON P. WORDEN

Lieutenant Colonel, USAF

Office of Science and Technology Policy

Executive Office of the President

3/87

Washington, DC

## June cover: Laser lab safety

On the cover of the June issue of PHYSICS TODAY there is a color picture of an instructor and students in an undergraduate physics laboratory, happily engaged in manipulating what might be a dye laser. While the power level of the laser is not specified, the photograph suggests substantial intensity. There is not a laser goggle in sight. The students and the instructor display a level of machismo appropriate to combat infantrymen advancing under sporadic sniper fire.

There is a black and white picture of some industrial physicists involved in laser manipulations on page 58 of the same issue. These cowardly types (no offense meant, fellows) are all attired in uncomfortable protective goggles, which prevent them from enjoying the full beauty of the laser beams.

There must be a moral in these two pictures. There are many reasons for not wearing safety goggles, and students seem to know them all. On the other hand, the only reason for wearing the goggles is to safeguard one's eyesight. Unfortunately, good vision is an ability that is most appreciated after it is lost.

ROBERT GERSON

DON M. SPARLIN

7/86

University of Missouri—Rolla

I found it of particular interest that in the June issue several photographs of university laboratories (the cover and pages 25, 40, 44 and 75) show students in laboratory situations where safety equipment is obviously lacking—particularly safety glasses for those using laser equipment. This is in stark contrast to the photographs of the industrial labs (pages 58, 60 and 62), where safety equipment is properly in use. Does this suggest that nowhere in the "education of a physicist" do students receive safety training? And that it is only in industry that safety is a significant aspect of the work?

I would strongly recommend that in the future PHYSICS TODAY refuse to print photographs of laboratory situa-

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tions that fail to meet adequate safety standards.

TERRY L. GUSTAFSON

Solon, Ohio

6/86

The cover for June is a beautiful and eye-catching picture. I recommend to all those in the photo the short book of D. C. Winburn, *Practical Laser Safety (Occupational Safety and Health, vol. 11, Marcel Dekker, New York, 1985)*, which states: "In all reported cases, except one, of permanent retinal damage read by the author in current literature, permanent damage resulted from the injured person not wearing any protective eyewear! The exception involved a laser user who 'peeked under the frame!'" These concerns would seem as basic to education as the Stark interference being studied on the June cover.

DOUGLAS B. SCHUMER

Ohaus Scale Corporation  
Florham Park, New Jersey

6/86

**THE EDITOR REPLIES:** The cover photo of our June issue, taken in a student lab at Amherst College, was a double exposure, according to faculty member Larry Hunter. In the first exposure the students were present and the lasers were turned off. The students then left the area shown (except for a student who traced the beam with a card to bounce light into the camera), the room was darkened, the lasers were turned on and a long second exposure was taken to make the low-intensity lasers (100 microjoules per pulse at 3-5 Hz) more prominent. One dye laser was pumped by a nitrogen laser with a pulse duration of 6 nsec; the other dye laser by a flash lamp with a pulse duration of 500 nsec. Although the photo seems to have been taken with adequate precautions, we regret any implication that one should work with high-intensity lasers without wearing goggles. According to David Sliney, author with Myron L. Wolbarsht of a 1064-page handbook, *Safety with Lasers and Other Optical Sources* (Plenum, New York, 1980), many laser-produced eye injuries occur each year that could have been prevented with suitable goggles or enclosures.

## Economics and the job market

The June issue of *PHYSICS TODAY* addressed a topic that has long deserved comprehensive treatment—the education of the professional physicist. However, the issues of the under-

unemployed and economics were not discussed in the depth that they require. This letter is an attempt to redress the imbalance.

Those who suffered during the 1970s as a result of the poor job situation should have been considered. For example, Robert Beck Clark's editorial (page 144) discussed the "high value" of physicists, based on the high talent of physicists. Should we conclude that physicists were somehow less valuable during the previous decade, judging from the poor employment opportunities and low salaries prevalent then? Were physicists less talented then? We think not. The editorial went on to ask, "What opportunities do we offer this select group . . . ?" The June issue did not answer that question for those who have left physics or those who have stayed in the field in spite of economic hardship. Extolling the ability of physicists to switch fields is making a virtue out of necessity.

In spite of the claim that there is a developing shortage of physicists, we see from figure 1 of Beverley Fearn Porter and Roman Czujko's article (page 70) that about 50% of degree recipients in physics leave the field. This contradicts the notion that physics is a highly desirable profession. Moreover, according to Mark N. McDermott and Edward W. Thomas's article on foreign graduate students (page 48), about half of the foreign students leave, some presumably because of a lack of job opportunities. The welcome increase in positions available as listed in the back of *PHYSICS TODAY* is a step in the right direction, but we wonder if perhaps an even greater number of open positions would be necessary to restore economic health to the field.

In fact, we feel that an unsatisfied demand for physicists would be good. Salaries offered physicists are more a function of supply and demand than of our own perceptions of our value. The present lack of interest of young people in our profession may stem from the widespread belief that the economic rewards are low. While not every position would be filled immediately in a shortage, physicists would find themselves commanding higher salaries and enjoying greater lateral and vertical mobility. The greater opportunities for career enhancement would make physics a more attractive profession, reducing the problem of the "very low level of career interest" that McDermott and Thomas say might "eventually erode the support that our profession requires."

McDermott and Thomas's "solution" to the shortage of physicists is an artificial one. We should be concerned with the increasing number of foreign-

citizen PhDs produced in the US. Many foreign-citizen PhDs report that they have been exploited by unscrupulous employers, academic as well as industrial, who offer them below-market salaries in return for a job and a visa. The choice of an inadequate salary or deportation not only victimizes the foreign physicist but also victimizes the profession as a whole by undercutting its salary structure. It also victimizes those who are underemployed, those who wish to return to the profession and those who must overcome prejudice to succeed in the profession.

The underemployed include not only those who have marginal positions but also those highly educated scientists at prestigious research labs who do everything but science. Those scientists yearn to return to science and to make a respectable living at it. Perhaps some educational approach could be directed toward this group so that it could once again make significant contributions to physics.

We recommend the following solutions:

► As much as possible, career restoration opportunities should be extended to those who have been out of the profession during part of their careers.

► The career of physics should make an honest effort to open itself up to women and minorities.

► There must be renewed interest in the quality of education rather than concentration on the number of students, PhD programs and so forth. Increasing the number of foreign students provides an artificial way for marginal graduate programs to continue in spite of clear signs of their redundancy.

► The nation must commit itself to sustained support for laboratory instruction in high school and college. As physicists, we must encourage that sustained support and not sacrifice it for other goals as we have in the past.

► Physics professionals must accept economic concerns as a standard part of their evaluation of the status of the profession. We should be concerned about enhancing opportunities for the US physicist, and thereby strengthening US physics.

Economic issues such as salaries and job opportunities are valid professional concerns. We encourage *PHYSICS TODAY* to seek articles containing detailed statistics regarding salaries versus the type of position in academia, industry and government. The surveys should also contain information on the opportunities for advancement in various companies, with special attention to the degree levels required, and data on how many minorities and women are