

I believe that the time is long overdue when those scientists who agree with McNeill make a concerted effort to convince their colleagues throughout the world to abstain from all forms of weapons development and "defense work." This suggestion arises from three simply stated concepts which involve value judgements and moral beliefs:

► The probability that the arms race will prove to be suicidal is high (greater than 50%).

► Individual human beings are responsible for their actions; for example, as enunciated at the Nuremberg trials: "... individuals have international duties which transcend the national obligations of obedience imposed by the individual state." [Quoted in W. J. Bosch, *Judgement on Nuremberg*, North Carolina U. P., Chapel Hill, (1970) page 15.]

► Scientists have been exposed to the practice of ordering evidence and drawing rational conclusions. Statistically speaking, one may expect that a wide-ranging debate among scientists will lead to significant changes in behavior.

Any effort to convince scientists and engineers to stop contributing to the arms race is fraught with difficulties, will probably call for individuals to sustain significant hardships, and could, if successful, unleash formidable powers of entrenched groups within the US which would make the "McCarthy era" seem like a picnic. Extreme sacrifices are often made in times of war; can they also be made to avoid war?

The following comments are intended not as part of an overall plan, but to initiate the debate:

► The scientific community must strengthen its self-identity and provide alternatives for scientists who no longer wish to contribute to the arms race. As a first step, I suggest the creation of an organization, perhaps to be called "The Survival Institute." This organization could be created and advised by a consortium of existing groups such as the AIP, the Union of Concerned Scientists, and so on. Its primary functions would be to (a) coordinate the ongoing effort among scientists to stop the arms race, both within the US and worldwide; (b) raise (private) funds to create a series of research and education centers where scientists could work on basic problems of our society and contribute to the well-being of humanity; and (c) develop a legal expertise to work on problems which may be resolved in the courts.

► The movement to stop the arms race by scientists must be fostered in all countries of the world as quickly as possible. The flavor of activities would vary considerably, but all avenues of communication between scientists should be employed.

► Since we may expect severe censoring by sizable segments of our society who believe that scientists (like road builders) should do as they are instructed by their government, we must develop a reasonably coherent and concise statement of our philosophy. I have already mentioned the Nuremberg principles, and, in addition, I believe we may be guided by moral statements such as the Hippocratic oath which was once taught to, and upheld by, the medical profession.

► What of the inevitable dissension and rancor which will unavoidably be exacerbated within the AIP and the scientific community? Whenever a political stand is contemplated by the AIP, AAS or similar group, the cry goes up that our professional societies exist to further our needs as scientists and that we must steer clear of politics.

As individuals we are seriously divided by differing beliefs about social structure, social justice and the best way to minimize the probability of a nuclear holocaust. As physicists, we are urged to pretend that these differences do not exist and to remain inactive in the hope of preserving a fictitious unity of purpose. I believe that we must discard this pretense and come to grips with the fundamental problems of survival: Should we be obedient servants of our political "leaders," providing them with the means to destroy the Earth, or can we develop a moral code that will encourage scientists to accept full responsibility for their actions?

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10/81 *Lexington, Massachusetts*

Reagan's economic program

I agree with the conclusion of Allan Bromley in his July editorial (page 104) that physicists should speak out in opposition to the severe budget cuts for social-science research. I disagree strongly, however, with his initial premises.

Bromley states that "the great majority of physicists... are entirely sympathetic to and supportive of President Reagan's goal of turning around our economy." Reagan's economic program consists of

► giving away billions of dollars of taxes to a small number of wealthy people,

► a huge acceleration of military expenditures that is inflationary and diverts resources from our civilian economy,

► the gutting of needed energy-conservation and solar-energy programs, and

► severe cutbacks in programs to aid the poor, minorities and so forth. Bromley's assumption that the great majority of physicists support the goals

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letters

of this program represents a gratuitous insult to the physics community.

The cuts in the social-sciences budget, as well as in such programs as the history of science, are only one part of a well-orchestrated anti-intellectual campaign. Other parts are the cutbacks in support of education at all levels and of the Endowment for the Humanities. Some of the motivation lies in the desire to please those who would replace the theory of evolution with biblical myths. In this sense the motivation resembles that of the anti-intellectual campaigns of Hitler and Stalin. As in those cases the physicists have a somewhat privileged position because they are thought to be needed to help build a huge aggressive war machine.

I believe it is incumbent on the physics community to play a leadership role in combatting this anti-intellectual campaign.

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9/81

Nobel cover

The cover of the AIP 50th Anniversary Issue (November 1981) contains several errors.

If you intended to put the Nobel Prize winners in chronological order by decades, as you say on the cover, then note the following misplacements:

Bethe 1967; Van Vleck 1977; Mayer (Goeppert-Mayer) 1963; Rainwater 1975; Gell-Mann 1969. There are possibly several other errors.

Furthermore, it seems to me that you stretch the case by including Fermi, who got the prize while in Italy, for work done there while still an Italian citizen. If you include him you should include J. Franck, O. Stern and several other physicist of European origin.

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12/81

The arrangement was—when possible—to reflect the time of the active research rather than the date of the prize. The Editors.

More on gyroscopes

The news story on fiber-optic gyroscopes in October (page 20) leaves the impression that the first fiber gyros had such a low response that a rapidly rotating table was required. In our 1976 paper¹ it is shown experimentally that the wavefront does not get scrambled in long fibers, making it possible to

build not only fiber gyroscopes but other fiber sensors (acoustic, magnetic, temperature, and so on). Subsequently² several gyroscopes were built, including one with 1.5-km-long, single-mode fiber. Its diameter was one meter. From $\Delta Z = 2\omega LR/\lambda c$ one gets, for one complete fringe ($\Delta Z = 1$) or 2π phase shift in the interference pattern, $\omega \approx 5^\circ/\text{sec}$. This is less than one RPM for a full fringe. The noise level of that instrument was equivalent to about ten times the earth's rotation rate for 0.1 second averaging time.

One of the important objectives in building fiber gyroscopes is to eliminate all active optical components in the beam path. This would increase its reliability and make it virtually maintenance-free. It was done only partially in both Shaw's and Ezekiel's experiments. I think that it is possible to approach this goal with the new polarization-maintaining single-mode fibers and super-radiant or LED light sources.

References

1. V. Vali and R. W. Shorthill, *Appl. Opt.* **15**, 1099 (1976).
2. V. Vali and M. F. Berg, *Proceedings of SPIE*, San Diego (1978).

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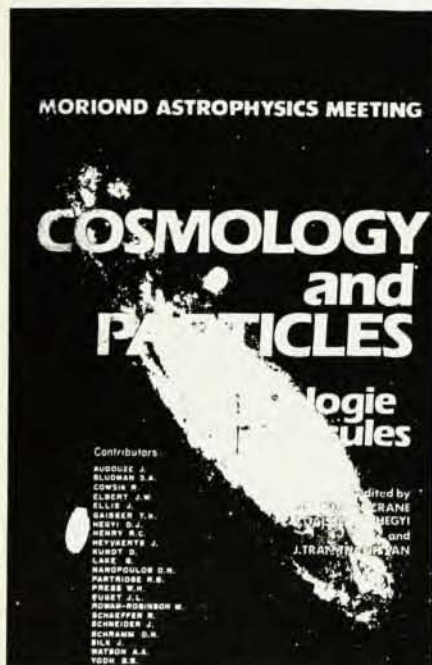
11/81

More on coining words

In a recent letter (September, page 13) Kenneth Sassen describes the introduction of the word "monochrombow" for Airy's rainbow, to emphasize the "chromatic pureness of the laser generated variety." Some neologisms tickle the ear with euphony and grace the English language by filling in a void. "Monochrombow," heaven spare us, does neither; instead it bludgeons the ear and inflates the language. Furthermore, it is a bastard neologism, a grotesque offspring of a forced wedding between the Greek root *monochromatos* and the Old English root *boga*. Let us hope for the blessing of an early natural death for the unfortunate progeny, lest we find ourselves searching for an "aurumpot" at the end of a "polychrombow."

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