

letters

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There is enough in it for $1\frac{1}{2}$ years—combined with the Advanced Topics, it makes a beautiful 2-year program.

► Does he really believe that a chapter dealing with "What is Physics?" and discussion of size and order of magnitude is the heart of physics? I opt for Newton's laws, relativity and Maxwell's equations.

► If Faller is so concerned about us "incompetent" physics teachers, has he ever volunteered to help a physics teachers, has he ever volunteered to help a physics teacher in his local school district? Has he ever considered the possibility of taking a few years leave of absence and teaching a physics class or classes? Are his concerns for physics teaching and teachers merely lip service?

CAROLYN SICINSKI

10/83
Nyack, New York
THE AUTHOR COMMENTS: I welcome the chance to respond to the letters by Carolyn Sicinski and Robert Gardner, and to expand on my brief comment in September. First let me say that the suggestion I put forward was not made from a strictly "armchair" perspective. For the past five years, I have been giving talks to junior-high and high-school science classes. (Four of the seven talks I gave at the 1983 International School and Symposium on Precision Measurement and Gravity Experiment in Taiwan were based on presentations I have given at local schools. The titles of these talks are "The Physics of Basketball: An Introduction to Scientific Thinking"; "Telescopes and the Forces that Mold Them: An Introduction to Optics and Mechanical Design"; "Little 'g': An Introduction to Dropping Things"; and "The Fluid-Fiber Based Torsion Pendulum: An Alternative to Simply Getting a Bigger Hammer." They have been published in a proceedings volume by the National Tsing Hua University.)

When my older son brought home the fifth edition of the PSSC physics text (fall 1982), I carefully compared it to the first edition, which I had read as a graduate student and which still resides on my bookshelf. At that time, I told him that I was sorry to find that much of what I would like him to learn as physics was no longer in the latest edition.

Your June 1983 editorial caused me to send my letter. I had clearly in mind the content changes (deletions) in the latest PSSC edition, but recalled (incorrectly) that it was the sixth rather than fifth edition. When my younger son brought home his PSSC text this fall, I realized my error, but at that time the letter had already gone to press. I was both surprised and pleased to find that

my short note appeared in an issue resplendent with ideas and concerns about pre-college teaching. However, only my letter and your cover pointed rather sharply to what I believe is the critical issue in teacher training (too much emphasis on how to teach and not enough on understanding the subject matter that is to be taught).

The two teachers who have responded to my comment, I suspect (being readers of PHYSICS TODAY and apparently well trained in their subject matter), represent exceptions to my general concern. However, I would still take issue with some of their points. Were the majority of high-school graduates really familiar with orders of magnitude, scaling arguments and so on (the content of the first edition's first four chapters), I doubt that there would have been any need for your September issue. (I noticed that in the article "Places where things are right," which also appeared in your September issue, one of the teachers mentioned, Jack Dombrosky, still uses PSSC "although he considers the fifth edition much less useful than earlier editions.") And while Newton's laws, relativity, and Maxwell's equations are at the heart of physics, order-of-magnitude thinking and the use of scaling arguments are at the heart of *understanding* physics—and, as anyone who has given an oral examination knows, are apparently much harder for students to learn.

I agree with many of the ideas expressed in your September issue: There is a teaching problem. The proposal to "bell this cat," now as then, will be met with general applause—particularly since there is apparently an attendant amount of money to be applied to the problem. I believe, however, that the only meaningful long-range solution lies not (as has been suggested by the National Science Board) in "recognizing the BS or MS degree holder in science as a pre-college science teacher" but rather in *requiring* future teachers to possess bachelor's degrees in the subject matter they are to teach. I realize that the holding of a subject-matter degree does not guarantee understanding—and surely it is understanding and reasoning rather than formulas and facts that must be taught—but it is at least a necessary, if not a sufficient, condition.

JAMES E. FALLER

Joint Institute for Laboratory Astrophysics
11/83
Boulder, Colorado

Nuclear-war resolution again

The opinions concerning the APS resolution, as evidenced by the numerous letters to the editor (September, page

11), are very outspoken. They represent the two sides (Keyworth versus Marshak) and seem to be irreconcilable. The one tries to intimidate a dictatorship by new weapons, the other wants to induce peaceful reaction by one-sided disarmament or freeze.

In reality, however, both agree that there has to be some change in attitude on the part of the dictatorship. It appears that the only way to react with reason is in between: While the US may need to respond in kind with the emplacement of medium-range ballistic missiles in Europe, to avoid inviting the USSR to extent its "safety zone" beyond Afghanistan and Poland, we should not help to make Russia a fortress. The best weapon against a dictatorship is information and personal contact with the population.

Therefore it is in our best interest to maintain an open policy with respect to travel, cultural exchange, scientific exchange, radio and possibly satellite tv. The more we succeed in opening up the Russian camp, the more we induce discussions and meetings at the ground level, so important for both sides. Better information of the population at large will decrease the influence of the military in the USSR and strengthen the civilian forces.

This is actually, short of war, the only way left to us to influence the fate of the 220 million people under the communistic-military dictatorship.

HERBERT F. MATARÉ

12/83
Los Angeles, California

I have followed with considerable interest and much concern the Keyworth-Marshak controversy regarding the APS Council resolution on nuclear war. While projecting themselves as men of peace, Marshak's allies have launched an academic and political attack on Keyworth, insulted and berated the President of the United States, and defended the Soviets' position on Salt II, arms control, and nuclear freeze.

Judging from the "moral, ethical, rational, and intellectually honest" positions taken by the letter writers, it would appear that our political leaders, in their shortsightedness, developed such weapons as the atomic bomb, the hydrogen bomb, MIRVed missiles and strategic cruise missiles, and that no scientist other than Keyworth had anything to do with the production of this evil weaponry. The fact is that quite a few scientists have made a name for themselves first by getting involved in defense research and acquiring undue influence in Washington, and then by becoming apostles of peace to gain popularity in the worldwide scientific community.

In fairness to Keyworth, I must make these observations:

► In view of the unusually bitter

controversy generated by the Guest Comments of Keyworth and Marshak, it has become imperative that this issue be submitted to a vote of the members of The American Physical Society, as suggested by Keyworth.

► It seems to me noteworthy that in the face of severe budget cuts, Keyworth has been able to persuade the White House to provide generous support for basic research. Frank Press also has had kind words to say about Keyworth's success within the Reagan administration. It is a pity that any scientist should use ungentlemanly language in expressing his disagreement with someone who has done much for the scientific community in these difficult times.

► Since Lincoln Wolfenstein has taken it upon himself to comment on the scientific contributions of Keyworth, I should mention that shortly before Marshak left the City University of New York, a top administrator at that institution asked me to evaluate Marshak's scientific contributions. I told him that Marshak is very influential and has published extensively, but that he has never made any really great contribution to physics.

► Jay Orear has alluded to the fact that Ronald Reagan used to be an actor. But, he has neglected to mention that the Russians have chosen as their leader the former head of their secret police. I am also wondering whether for the nation Orear would prefer the procedure followed by The American Physical Society, and thus have a nominating committee of ten individuals, who will then nominate two "worthy" candidates for the Presidency of the US.

SURAJ N. GUPTA
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9/83

Let minority be heard

I agree with Richard Peppin (September, page 12). It is important that all individuals and all organizations are willing and able to take stands upon important problems—if they are involved, can make intelligent decisions and have the facts necessary to make those decisions. Certainly, the APS ought to qualify in most of these areas.

There is a terrible problem, however, on how the APS is handling this need and obligation to speak out. (This problem is obvious, as one can see from the nature of the letters to the editors being received.) This problem existed with the APS position on the ERA, on creationism, on women and now on the nuclear problem. (It even exists in many areas of physics, but this would only confuse the present issue.) It always seems okay to those who are on

the same side as APS, and it always seems wrong to those who are on the opposite side. This is the problem! APS has not learned how to be fair to those who might be on the opposite side.

What does it take to be fair? All it really takes is to be kind and to let that kindness show. Be more than fair. Seek their opinion as to what might be fair in their eyes, and go even one step beyond. There is nothing lost by such acts. If you are right, it actually makes your own position stronger.

As a minimum, voting ought to be required on every formal position. If it is important enough for APS to take a stand, then it is important enough for everyone to have a say in it. Of course, voting can be made unfair by the preparations allowed for the voting and on how the questions are worded. Again, the real solution is to show great kindness. Another consideration is to always publish every letter to the editors. Would this really be impossible? How terrible it is to have one in power make the decision as to when and where the minority is heard. If you really are going to take positions, then you must be responsible. The APS has not been responsible and will never be responsible until the feelings of the minority are properly heard and considered.

GERALD L. O'BARR
General Dynamics
San Diego, California

9/83

I strongly support the letter of Richard Peppin on controversial issues. If The American Physical Society states a stand on these issues it should be clearly stated that it is by poll of the membership, the preferable way, or by majority of the council, or whatever group decided on the stand.

Imagine the response of Orear and others if the Society had come out in full support of President Reagan and George Keyworth.

FREDERICK H. C. SCHULTZ
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9/83

Materials Research Society

The President-elect of APS, Mildred Dresselhaus, has issued a very cordial welcome to the Materials Research Society as a new affiliate of AIP (October, page 144). She has correctly identified many of the possible advantages to such new societies and to AIP. Permit me, however, as a founder of MRS to point to some possible dangers of such affiliations to the health of American sciences and technology. It is to the great credit of the physics community that, as Fred Seitz put it,

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