that may be derived from an informed involvement by physicists and the scientific community at large. Indeed, education should be central to the role played by the citizen physicist.

I must say, however, that one sentence in the article by Dietrich Schroeer simply confounded me. "A good measure of the success of arms-race education may well be its ability to institutionalize itself." The author was clearly decrying the ravages of on-again/off-again funding. But allow me to offer a contrary view: A good measure of the success of arms-race education will certainly be its demise at the hands of its own success. (A circular argument is an offense in science, but not necessarily in politics.) When these courses move from the current-events curriculum to history, we will all be able to rest easier.

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Value of a physics education

I want to discuss an issue concerning "displaced physicists" that seems to be prevalent today because of the employment situation (June, page 107). Many people who are educated in physics who do not pursue a career in physics (perhaps for no reason of their own) need to resolve any inconsistencies between their education and their present career objectives. A physics education instructs one to obtain understanding and solve problems through fundamental principles. This type of educational experience usually leads one into a career of research. A non-physics environment has the reputation of applying to problems solutions derived from other working systems, without a total understanding of the fundamentals involved. This may be due to time constraints or necessity. In this type of environment, a contradiction would arise between the skills of someone educated as a physicist and the immediate requirements of the task at hand.

Does this make the displaced physicist bitter that he may not have the opportunity to use in his future endeavors the many hours of arduous study he spent in such subject areas as quantum mechanics and mathematical physics? The physicist can resolve this dilemma by forcing application of his esoteric skills to the tasks at hand. He must realize that his education was meant to train his mind and prepare him for advanced problem solving that may be beyond the scope of specialized engineering. A sincere effort must be made by the physicist to apply his talents to the problem at hand, whether called for or not. Perhaps this would be the greatest challenge of all. For example, a physicist friend of mine, who is now employed as a design engineer, told me he uses *S*-matrix scattering theory to design surface acoustic wave devices.

A physics education does not have to be put aside when one is engaged in a non-physics career. In fact, the physicist will have more than his share of tools necessary for producing good work, including analytical thinking and cogent expression that he gained from studies of quantum mechanics, and so on. The application of his talents and fundamental approach will put him in a position of versatility and much visibility relative to his colleagues. I, for one, now have a job that does not directly use most of my physics talents (naval mine engineering), but it gives me much pleasure to employ them whenever possible. For this reason, I continue to belong to the American Physical Society, take advantage of its many opportunities to be involved with physics, and faithfully read PHYSICS TODAY.

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Saturday-morning physics

A number of recent letters have spoken glowingly of physicists' Saturday-morning or other lectures to high-school students or to elementary and high-school teachers. While I think it is fine that physicists are doing this, I would like to note that such programs are nothing new and, moreover, that such extracurricular after-school classes are likely to have extremely little positive *national* effect on our educational system. Indeed, they may have a bad effect if they convince scientists that they are thereby doing their bit for improving science education and need do nothing else.

I know of no careful studies that show programs of this kind to be of value. The evaluations of the many teachers' training programs conducted with NSF and other funds in the 1960s and 1970s tended to be negative.

Education certainly suffers severe problems at present, both in school systems and in universities. University professors, often unaware of their own problems, tend to focus on the problems of others. It seems very unlikely that with the major problems confronting American education today, a limited number of faculty lectures given in very few locations around the country will make much difference in the total picture. If we consider that only one-third of our high schools now

continued on page 115