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tists outside China (Fang Li Zhi, for example) who call for boycotts; however, I think the desires of scientists who work in China rather than those outside should be the basis for action. After all, it is the careers of those in China that will suffer from lack of scientific exchange. Most Chinese scientists remain in China to work not because they support Chinese government policies but because they believe strongly that only by hard work from within, by helping to educate the next generation of scientists and by promoting science and scientific ideas in China will they be able to change China's economic and political conditions.

This brings me to the second reason: China is a third world country; it lacks the strong scientific foundation and expertise the Soviet Union enjoyed. Scientists working inside China have long faced the double burdens of primitive working conditions (for example, old equipment and insufficient subscription to scientific journals, which the Soviet scientists only began to experience amid the chaos of reform) and a restrictive political environment. International conferences held in China are therefore especially valuable opportunities to scientists there. It seems ironic to me that after the effort made by APS through its China program to help Chinese scientists recover from the isolation and political turmoil they suffered during the Cultural Revolution,[1] Western scientists now seek to express their dismay with the Chinese government by isolating Chinese scientists again.

For these two reasons, I do not think a difficult moral choice exists over whether to participate in conferences in China (contrary to the position of Herman Winick, chair of APS's committee on the international freedom of scientists, as described in the May news story). Western scientists go to conferences as individuals, and they can help individual Chinese scientists by providing them with current information. Should the Chinese government try to make political hay out of a scientific conference, the Western scientists in attendance can publicly denounce such maneuvering. They also can choose to send letters of concern to the authorities regarding political prisoners and detained scientific colleagues once they are there. (I think their presence in China adds weight to their concerns.)

Open and fair exchange is the only way Western scientists will get to know the conditions in China. As scientists we should strive to get as much information as possible before making a judgment, and face-to-face exchange is one of the better ways for doing so. It is important not to limit ourselves to the few voices we can hear and act on them alone.

Reference

1. *APS News*, May 1992, p. 19.

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5/92

Democracy Demands Science Education

I read with great interest the Reference Frame column by Leon Lederman in the May 1992 issue (page 9). I too am a strong advocate of informed participation by scientists in pre-college education. However, I am concerned about Lederman's statement that if we do not get involved, "we won't have the new recruits we need to keep our subjects going." I do not believe that there is a shortage of physicists. In fact, judging by the lack of permanent positions, there appears to be an overabundance of physicists. Therefore it seems unreasonable to tie involvement in pre-college education to a desire to produce more physicists.

There are far more compelling reasons why physicists should concern themselves with pre-college science education. In an era when public policy will be formed more and more around scientific issues, it is critical that citizens be educated in science and that they acquire science process skills. The abilities to observe and measure, think quantitatively and come to a logical conclusion based on the available evidence are a set of skills that everyone needs to acquire. If our people as a whole do not possess these skills, then our republican institutions will inevitably reflect that deficiency. Therefore it is crucial that science education undergo systemic reform nationwide and that new pedagogy, informed by the most up-to-date understanding of cognitive development, be at the center of that reform. (See the September 1991 special issue of PHYSICS TODAY on pre-college education.)

Science education must focus on teaching science process, instead of the all-too-common presentation of science as a bunch of facts to be memorized. This approach, by necessity, requires a detailed examination of phenomena through experimentation, and a consequent reduction in the areas covered. One should dig a few deep wells rather than scrape the surface of everything. Moreover, science should be a major focus of pre-college education, with other subjects, such as language arts and history, integrated directly into it. An in-depth, hands-on investigation into the life cycle of fast-growing plants opens up discussions of agriculture, economics and history in a way that no textbook can.

For such reforms to be effective and sustained, we as a community must be informed and involved. We should provide in a collegial fashion the technical support that school systems need. We should act as advocates for effective science education and systemic change. We also should point out, in the "content vs process" debate, that with process comes content and that learning to think is the ultimate goal. And while we recognize that our self-interests will also be served if general interest in science increases, we must always keep in mind the central goal of bringing science as a living subject into the lives of all children, for the greater good of society as a whole.

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8/92

Where Pauli Made His 'Wrong' Remark

In answer to the query raised by Leonard X. Finegold (September, page 103): Wolfgang Pauli's remark "Das ist nicht einmal falsch" ("That is not even wrong") was made not as a comment on a seminar talk but as a reaction to a paper by a young theoretician, on which a colleague (I believe it was Sam Goudsmit) had invited Pauli's opinion.

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10/92

CPT Violation Error Reversed Just in Time

In my review of Michael C. Mackey's book *Time's Arrow: The Origins of Thermodynamic Behavior* (September, page 72), I referred to "Val Fitch and James Cronin's Nobel Prize-winning experiment on *CPT* violation in K^0 meson decays." I meant to say, of course, that the experiment measured *CP* violation and hence implied