

ed to about 0.03 of CO₂'s rate of increase. This is not to say that we should ignore the rising level of CO₂. It is, however, pretty clear that the real greenhouse effect is less torrid than the one the dominant culture promotes.

Reference

1. Natl. Acad. Sci., *Changing Climate: Report of the Carbon Dioxide Assessment Committee*, Natl. Acad. P., Washington, D. C. (1983).

JOCELYN TOMKIN
3/92 University of Texas, Austin

Naysaying the Neutron Scattering Society

The news story announcing the establishment of the Neutron Scattering Society of America (June, page 73) raises a number of questions, and further information furnished on request by members of the NSSA steering committee raises more questions.

The first question concerns the significance of the words "neutron scattering." The information furnished thus far indicates that the interests of the steering committee are confined to the use of coherent neutron scattering techniques as a tool of materials studies, and that therefore the neutron scattering that will be of interest is confined to the lowest end of the neutron energy spectrum. The neutron energy spectrum above that lowest end, often referred to as fast-neutron physics, falls outside the announced interests of NSSA. "Coherent Neutron Scattering Society of America" or "American Society for Neutron Diffraction Studies" would thus be a more accurate name.

A second question concerns the impact that the new society might have on neutron studies generally and on physics generally. Will it encourage formation of other spin-off groups promoting their special interests—for example, an American Society for Fast-Neutron Physics? Will the science of physics as a whole be enriched, or will we be witnessing a further stage in what Jack Wilson has called "the Balkanization of physics,"¹ with more intensive concentration on relatively narrow specialties and subspecialties?

A third question concerns what the NSSA founders refer to as the society's "national" perspective. This seems to run counter to the emergence of international physics as a forum of The American Physical Society.

A fourth question concerns the role of NSSA as a lobbying agency seeking

to influence Congressional funding in favor of its special interests, and the further politicalization of the American scientific community.

These questions should concern not just prospective members of NSSA but all members of The American Physical Society. As one who strongly opposed the APS constitutional changes of 1966 (see my letter in PHYSICS TODAY, September 1966, page 10), which changed the society from one unified in the pursuit of physics as an integrated discipline to a federation of specialists, NSSA seems to me to be another step in the wrong direction. I urge that NSSA reconsider not only its name but its organizational form and apply to APS for admission as a topical group. It also should recognize that the tax-exempt status of APS bars it from political activity, and that includes lobbying Congress for special funds.

Reference

1. AAPT Announcer 19(1), 20 (1989).

LAWRENCE CRANBERG
6/92 Austin, Texas

THE SECRETARY AND CHAIRMAN OF THE STEERING COMMITTEE OF THE NEUTRON SCATTERING SOCIETY OF AMERICA REPLY: At its inaugural meeting in January 1992, NSSA identified the following goals:

- ▷ To identify and bring together the neutron scattering community of the US
- ▷ To identify the needs of the neutron scattering community, including future requirements for instrumentation and sources, and to represent those needs to the neutron facilities and funding agencies
- ▷ To stimulate, promote and broaden the use of neutron scattering in science and technology
- ▷ To carry out educational activities that support the above goals.

Fundamentally, the scientists and engineers who use neutron scattering in their research come from a wide range of fields, from structural biology through polymer films to weld testing in engineering practice. Indeed, the group stretches well beyond physics, incorporating, for example, pharmacology, biology, chemistry and engineering. The aim of NSSA is to bring this diverse group together based on the common use of neutron scattering as a research tool. It is not at all to promote the Balkanization of physics.

NSSA members are primarily interested in thermal-neutron scattering because thermal neutrons have the same wavelength and energy, approximately, as matter at room

temperature. This makes thermal neutrons ideal for studying a wide range of materials. Lawrence Cranberg is apparently interested in fast-neutron scattering. Fast-neutron scattering is certainly interesting, and we hope that Cranberg will join NSSA and develop this field.

By a "national" perspective we meant that we hope to include everyone in the country who uses neutron scattering. Certainly, in terms of both science and the use of facilities, NSSA takes an international perspective.

NSSA has no plans to be a lobbying agency, either to Congress or to other political bodies. However, under the second goal above, we do intend to identify the needs of the neutron scattering community and represent these to national laboratories and funding agencies when appropriate. As an example, NSSA recently presented a brief on behalf of the community to a panel on neutron sources set up by the basic energy sciences advisory committee of the Department of Energy. The brief was based on solicited views from members.

Finally, we would enjoy a close relationship with The American Physical Society, but it does not seem appropriate for us to become a topical group of APS.

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9/92

Westerners Should Go to China Meetings

With reference to the news story "Beijing Meeting Remains on Track—amid Continued Concern" (May 1992, page 55), I would like to give my opinion, as a Chinese national who has been studying and working in the US, on whether Western scientists should go to conferences in China. I think that as long as the conferences do not carry strong political overtones, Western scientists should participate in them as they normally would, for two reasons.

First, unlike the Soviet scientist-dissidents who called for boycotts by Western scientists as a gesture of disapproval of human rights conditions in the Soviet Union, most scientists in China welcome the relatively rare opportunities to interact with their foreign counterparts at conferences. True, there are Chinese sci-

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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.

XIN HAO

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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 neces-

sity, 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.

RUDOLF PEIERLS

Oxford, England

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