

TOWARD A BROADENED VIEW OF PHYSICS TRAINING

Widespread concern has been expressed concerning the opportunities available to young physicists. It is important that all of us, most importantly those involved in physics education, realize that to a large degree the extent of those opportunities is delimited by the range of challenges that those trained as physicists are motivated and equipped to pursue. And that range is in turn related to the breadth of education and experience, as well as the set of expectations, that are the result of the educational process in our colleges and universities.

Too often, I believe, we take far too narrow a view of the career possibilities for which we are educating physicists. We are too focused on the doing of physics rather than on what physicists can do. If one takes the view that education in physics, particularly graduate education, is aimed toward providing a source of people with both a deep understanding in a particular area of physics and a curiosity and openness to challenge across a far broader set of issues in which the underlying scientific methodology and content can prove effective, the perceived range of opportunities available to graduates is substantially increased. Such a broadened view of the objective of investing in a graduate degree in physics is consistent with the view that there is no direct and detailed educational curriculum aimed at much of what people actually do. Acceptance of such a broad objective for physics education would logically lead to changes in the curriculum, the culture and the expectations set at the universities.

This is not to say that requirements for demonstration of deep expertise and significant accomplishment in a particular area should be diminished. However, the curriculum, the subjects of the seminars, and the culture and values of a department that accepts this broader view of the set of challenges of interest to, and best met by, physicists would be open to a broader world of experience and more interwoven with the institution and com-

munity in which it is placed. Such a change of view would lead also to change in criteria for admission and support of physics graduate students.

I am convinced that such an explicitly broadened view of the role that those trained as physicists can play and of the preparation required to support this breadth would serve physics, physicists and society well.

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'Young Scientists' See No Physicist Shortage

I am a member of the Young Scientists' Network [see the news story on page 57] and a reader of *PHYSICS TODAY*, although I am an engineer rather than a physicist. I am writing to you about an issue that is important in *all* the sciences today, not just physics: Our present educational system produces many more PhDs than the job market can possibly absorb. This is true not only in physics but also in engineering, chemistry, biology, astronomy and many other fields. The educational system is geared toward overproduction because universities and professors gain by having as many students as possible but lack any incentive to ensure that these students are employed after graduating. In fact, new PhDs looking for academic employment and applying for grants are often in direct competition with their former mentors. With Federal and state budgets declining and industry losing interest in basic (or even applied) research, this lack of opportunities has become a serious problem in the last two or three years. Moreover, all claims that this problem is going to go away in the foreseeable future are without any basis.

Nobody promises a student a job after he or she graduates. People decide to get degrees for many reasons, but there is no question that for most, current information about the

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LETTERS

job market has a strong influence on that decision. However interested they may be in a field, many people (myself included) would not go into it if they knew in advance that their chances of finding employment that used their training were extremely slim. It is one thing to accept the unavoidable risks and uncertainties associated with any career path, quite another to enter a field that virtually guarantees unemployment.

Getting a PhD often takes five or six years, and since, owing to the tight job market, more and more of us have to take one or more postdoctoral positions before we can hope to find permanent employment, the "training" of a PhD scientist can take from six to ten years—sometimes even more. If the typical individual's working years are from the ages of 20 to 65, this "training" can easily occupy 20% or more of his or her productive life span. One cannot expect that people who have spent so long in preparation and then found themselves with almost no chance of having the research career for which they prepared will not feel extremely frustrated. What we have now in this country is hundreds, if not thousands, of very frustrated junior scientists. That is why the Young Scientists' Network has over 1000 subscribers and is growing every day.

The considerations I have discussed above make it very important to give younger people *accurate* information about the job market. It's a point of honesty. I think *PHYSICS TODAY* could and should contribute more to the dissemination of such information. While a few letters about the job market have appeared in your magazine (notably the letter from Kevin Aylesworth in the October 1990 issue, page 13, which started the Young Scientists' Network), there is not enough discussion of the current poor prospects for junior scientists. I hope that *PHYSICS TODAY* will make this issue a higher priority in the future.

I emphasize that we in the YSN are not asking for favors or special treatment. All we ask is that the truth about the current job situation for science and engineering PhDs be told.

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10/92

I am a member of the Young Scientists' Network, a group of more than 1000 lively young scientists who keep in contact through electronic mail postings. Sadly, a great many of us are currently facing the nation's true attitude toward science. A good number of us are unemployed or under-

employed PhDs.

At this point I simply cannot pity our nation when I read in a national science publication that children are being turned off to science; perhaps that is a good sign. Why should a young scientist like myself encourage a curious teenager to enter a field that I, through observation, have found unpromising? Instead I would tell the youth who asks questions such as "How does a laser work?" or "What is relativity?" not to worry about such things: They are not important; there is no future in such studies; you will go through years of schooling only to find yourself unemployed.

Honestly, I would like the talk about how the US needs to improve its science and math scores to cease. I would like proof that science is important. While I am still wishing, I would love for some official to send me (I've given my address below) a persuasive reason why I should continue my pursuit of a science education and why it is so important to this country that I do, and to earnestly show me his or her appreciation by giving me the opportunity to contribute to society through legitimate employment. Can our ailing nation truly afford to discourage its own young scientists?

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10/92

I am a member of the Young Scientists' Network, and I am sending this message to emphasize the critical shortage of job opportunities in physics relative to the existing pool of highly qualified scientists. While I have found a very satisfying job outside of research, I wish for others to be spared as much as possible the stress and uncertainty that permeated much of the latter part of my research career.

AIP, the APS and NSF should be told by every means that there is *no* shortage of physicists out there.

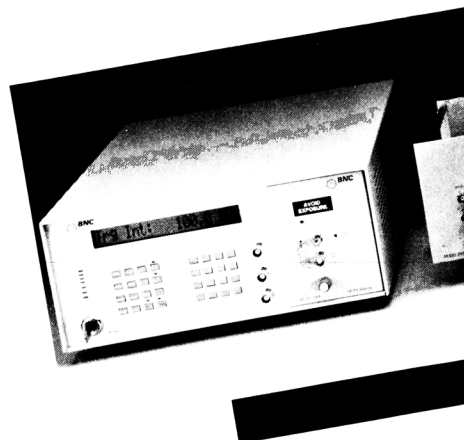
JOACHIM THEILHABER
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10/92

Opportunities Remain in Science's Hard Times

Leo Kadanoff's Reference Frame column "Hard Times" (October 1992, page 9) proposes a gloomy picture that reflects, more than reality, the author's nostalgic feelings for a bygone (and unreal) golden era. This extreme pessimism is a calamity worse than the difficulties—some real and some not—used for its justification.

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