when we need their help most because they limit themselves to filling jobs. The agencies represent companies rather than job seekers simply because the companies pay the agencies' fees. The difference shows up clearly in the attitude of the agency when jobs are scarce. So, if job seekers want the agency to represent them, then they must expect to pay the agency's fee directly. One suspects that they have always paid at least part of this fee indirectly, anyhow. If the agencies represented the job seekers, perhaps they would beat the bushes for jobs with the same diligence that they formerly used in contacting physicists on behalf of their client. The agencies tried to keep us moving around, forgetful of the rest of the game of musical chairs—the part where the music stops and there are fewer chairs.

If organizations such as the AIP Placement Service can revive the lost art of finding jobs for people, perhaps the professional agencies will come back to us. Meanwhile, it takes someone who knows what physicists' capabilities are to convince potential new employers that a PhD in physics is not necessarily a total loss. How did we get such a bad image anyway? Could it be that people have been listening to what we have been saying about ourselves? Maybe the public-relations expert who gave Mr Nixon his new image (and new job) will be available late next year to undo the damage for us.

Thomas R. Lawrence
*Wayland, Mass.*

## New emblem for AIP?

John Rigden ("Reshaping the image of physics," October 1970, page 48) gives the example of a salesman thinking that physics is "A pulley and an inclined plane." If, as Rigden suggested, we want to communicate "some of the excitement, beauty and uncertainty of the subject," AIP might make a humble start by considering a change in its weight-ruler-pendulum emblem.

There is no doubt today that there *is* "uncertainty" in physics. The physicist is finally down to earth hustling for a job like most other wage earners.

M. W. Valenta
*University of Vienna*
*Vienna, Austria*

## Rapid publication

Seymour Keller, John Hensel, Frank Stern and the AEC are to be congratulated for the speedy publication of the Proceedings of the Tenth International Conference on the Physics of Semiconductors, Cambridge, Massachusetts, 17–21 August, 1970. A time lag of less than four months between the closing of the conference and delivery of the proceedings must be some kind of record. They have established a standard against which future conferences will be measured.

J. E. Fischer
*Michelson Laboratory*
*China Lake, California*

## Responses to Zernik

Wolfgang Zernik's letter "Judging the value of physics research" (December, page 9) is a good illustration of how unlikely it is that physicists are going to be able to solve their economic problems independently of the rest of society.

In demanding that the value of physics research be proved by essentially utilitarian criteria of worth to society, Zernik is asking for a standard that would be disastrous if applied to nearly any area of economic activity in the US. For the fact is that the "needs" of America in their natural state are not nearly adequate to keep any area of the economy occupied now on a full-time basis. Of course society does not "need" so much physics research, or so many automobiles, or so much air conditioning, or so much professional football! All the "needs" that keep these areas of the economy working are artificial, continually stimulated by advertising, and largely dependent upon a subjective, essentially non-economic, *sense of need* that would not exist in the absence of agressive salesmanship.

As long as physicists, and US society in general, cling to the myth that "productivity" is the primary goal of human life, this internal contradiction will continue to haunt us. When and if US society is able to broaden its definition of the "national Welfare" to include more than economic and military components, then physicists, like other people, will have a chance to be rewarded for a day's work without feeling privately dishonest about it.

David Montgomery
*The University of Iowa*
*Iowa City, Iowa*

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With reference to Wolfgang Zernik's letter I am very disappointed that any physicist would analyze the present research and funding situation and conclude that the job crisis will exist and grow worse "until the output of physicists becomes commensurate with their value." The suggestion that physics support and the GNP are unrelated is absurd. Zernik's own point that "historical development" is of critical importance itself negates his suggestion. Many examples exist in which scientific research and development has contributed to the GNP and reciprocally,

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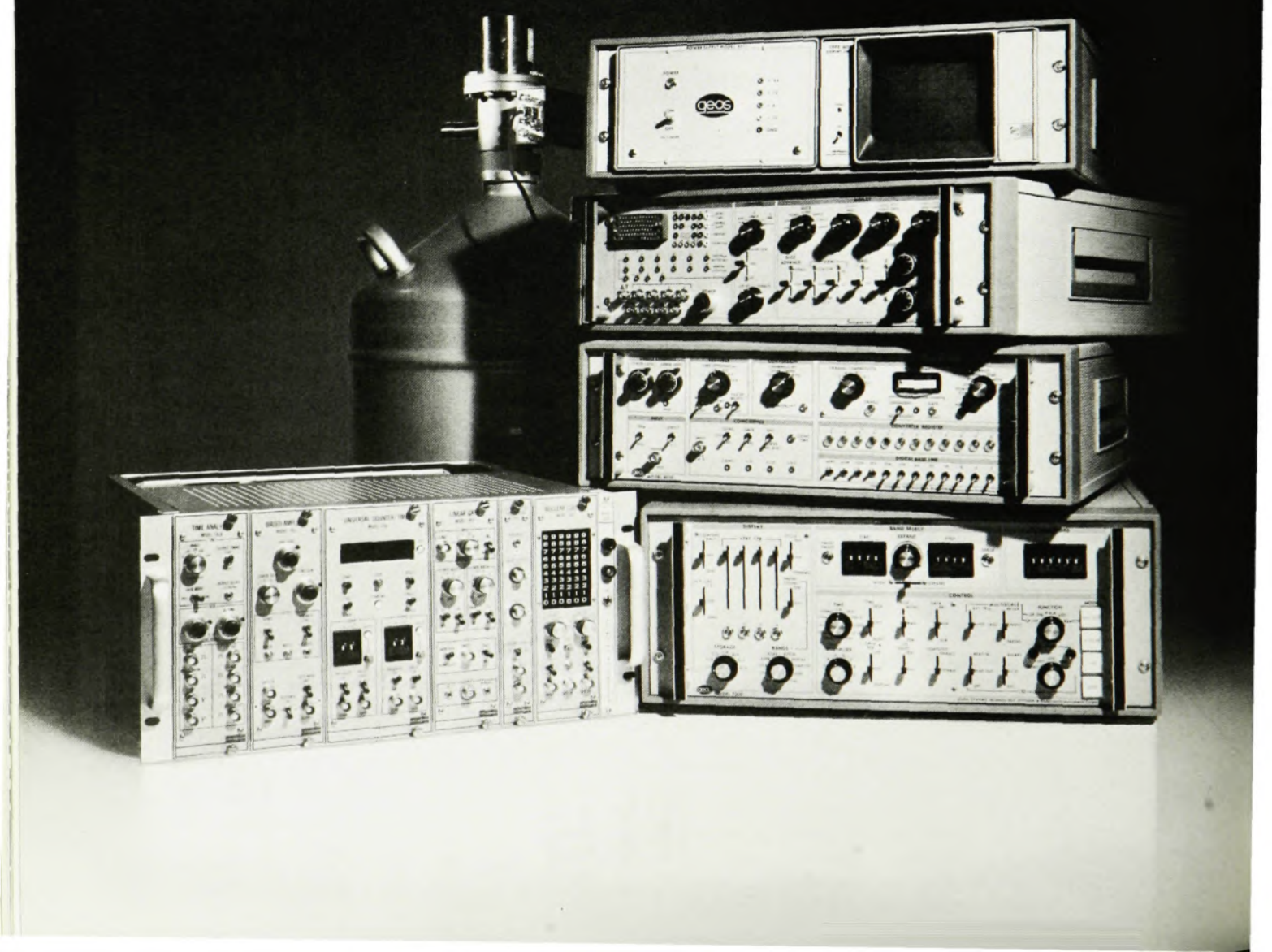

# letters

growing technology to science. Surely if financial support for research is not linked to economic history, we would expect little permanence to this mutually beneficial interaction.

Granted that cost-effectiveness would be desirable in research funding, Zernik then states, however, that laymen are persuaded by "superficial arguments" and most physicists are "utterly incapable of assessing the importance of their daily work." Who is left to pass judgment on all the vast trivial research, Mr Zernik? I think the physics profession *has* an elaborate system (probably it could be improved) to referee the quality and significance of research and judge publication or funding. It is always easy to shout "Trivial!" after the fact.

Concerning cost-effectiveness, I'd rather trust the profession's judgment than the machinery that gives millions toward developing university and industry research capabilities, graduate student and faculty fellowships, and national laboratories, then only to waste these very resources it has spent tax money to produce. I think the "job crisis" will exist until the output of physicists becomes commensurate with their use.

Lloyd A. Case
*Indiana University Southeast*
*Jeffersonville, Indiana*

## Boston workshop

*physics today* (February, page 64) reported that physicists are welcome to attend the AIAA employment workshop programs. Telephone numbers for 14 cities were listed, for use in making reservations.

The program is also operating in Boston, with the cooperation of IEEE Boston Section. For reservations or further information, call (617) 862-3880.

Paul Penfield, Jr
*Boston Section IEEE*

## Women in physics

I sent a letter to my congressman and to my two senators that reads as follows:

"I have recently read Congresswoman Green's Hearings on Discrimination Against Women. I urge you to support Section 805 of HR 16098 (or the Senate version of this bill) barring discrimination against women. (This bill was reintroduced in the 92nd Congress as HJ 208 and SJ 8 and 9.)

"In the meantime I hope that you will press HEW to enforce Executive Orders 11246 and 11375, which prohibit discrimination against women in federally assisted programs."

... I recently chaired a panel on 'Women in Physics' at the annual American Physical Society meeting. In physics, as in all the professions, we find that there is severe discrimination—at all levels—against women. It is foolish and a waste, and it should not be permitted when federal funds are involved."

I urge the readers of *physics today* to obtain copies of the Hearings from their congressmen and to communicate their views on this matter to their representatives and to their senators.

Fay Ajzenberg-Selove
*University of Pennsylvania*
*Philadelphia*

## More far infrared

I must express my disappointment at the article by W. G. Rothschild and K. D. Möller in September (page 44) on far infrared spectroscopy.

Some of the points that I feel deserve inclusion pertain to the whole development of interferometric spectroscopy. Michelson saw the general possibilities in the 1890's; in Strong's laboratory at the John Hopkins University early attempts by Gebbie and Vanasse (1956) were followed by the effective instrumentation developed by Gebbie and his group at the National Physical Laboratory, Teddington, England. The September article omits the significant virtue of the refractive-index dispersion being available simultaneously with the absorption; the production of continuous spectra down to two wave numbers by 1967, which is more than two octaves below the ten wave numbers mentioned in the article; the production for the first time of the total rotational absorption spectrum of gaseous molecules at resolutions of 0.01 wave number; the observation of the Poley-predicted absorption seen in all polar liquids between 20 and 100 wave numbers; and the delineation of the quasi-resonant broad absorption in nonpolar liquids arising from collisional interactions of their molecules.

These features, to mention no others, provide essentially new formation on molecular behavior. The fact that the British-designed interferometric system is now being largely and very effectively sold by a well-known US corporation will surprise few people who are familiar with both British and US instrument manufacturers.

Mansel Davies
*The University College of Wales*
*Aberystwyth, UK*

**The author comments:** While it is true that the specific topics of far-infrared research mentioned by Mansel Davies had not been included in our article, it should be realized that our article,

*continued on page 66*