

both degrades the quality of the publication.

The usefulness of a reference list—especially in a book—can be further enhanced by making it into an author index. This requires some work, but very little additional printing costs.

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AIP COMMENTS: To include the titles of articles in bibliographic citations could indeed be very helpful to some readers. Some of the journals published by AIP permit or even encourage this practice. Most discourage it to save space. However, since many of our journals now have a format that often results in some empty space at the end of an article, we should re-evaluate current practice. Dolezalek's comment comes at an opportune time, since AIP's Publication Board is in the process of revising the *AIP Style Manual*.

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Physics problems in fusion

We should like to correct some statements concerning controlled fusion contained in the lead letter on page 9 of the April issue. ["The energy crisis: what physicists can contribute" by Tau Yong Chiang.] The letter states, "The problems in plasma and laser fusion [meaning, presumably, the magnetic and inertial confinement approaches] are largely engineering in nature but there are some problems [meaning physics problems?] as well." It then cites the need for increasing $\beta = 8\pi nKT/B^2$ (which is principally a problem for tokamaks) and several technological issues associated with the (still quite speculative) electron-beam pellet approach to fusion.

There is no question that the engineering and technological problems that must be solved before we achieve usable energy from controlled fusion range from formidable to staggering, dwarfing even those of the Apollo program. However, there are also a wide range of extremely subtle and challenging physics questions whose understanding will make a vital contribution to the extrapolation from present experiments to the first working fusion reactor and to the development of more advanced systems involving "clean fusion" (having only, or largely, charged reaction products); direct conversion of particle kinetic energy to electricity (avoiding or minimizing thermal cycles); and so on. For the most part, these problems are essentially classical in nature, involving electrodynamics and the non-equilibrium statistical mechanics of nonlinear, cooperative, collective, many-body phenomena, and hence are some-

times characterized as "applied," in contrast to the "basic" question of elementary-particle physics. Nonetheless, these problems are difficult as well as interesting, and they are squarely centered in physics, rather than engineering or any other discipline.

Theoretical problems include anomalous transport of particles and energy across magnetic fields; large-amplitude wave interactions with particles and with other waves; nonlinear beam-plasma interactions, and stability of exotic magnetic-field plasma configurations. Expertise in mathematical and computational physics is also required in the development of good, physically accurate numerical models for simulating the multitude of complex interrelated physical phenomenon occurring in hot plasmas. On the experimental side, one of the major problems that has inhibited progress towards fusion is our inability to make precise and detailed measurements of what is actually happening in a plasma. In almost all cases, advances in complex areas depend on our ability to measure what is going on. The high temperature and low density for magnetic fusion and the extreme density and short times for pellet fusion make plasma diagnostics an extremely challenging area for experimental physicists.

The compelling advantages of controlled fusion as one of the most satisfactory long-term solutions to the energy problem are too well known to warrant repetition here. Its principal disadvantage is just the multitude of challenging technical problems, both physics and engineering, that must be overcome. In wartime, our most talented scientists have concerned themselves with pressing problems of national urgency, such as the Manhattan project and the development of radar. The problems of energy are just as real, although less dramatic, and the fusion program could benefit greatly from increased involvement by our best physicist, both new PhD's and nature scientists.

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Support for rebuttals

We would like to support the suggestion made by C. LePair¹ recently and by Robert L. Chaplin² earlier for improving the peer-review system in NSF and perhaps other government funding agencies. The modification proposed is that, after the reviews are received by the agency and before they are acted on by the program director, they are sent to the principal investigators to defend themselves and/or to clear up any misunderstandings. Such a rebuttal statement becomes then a part of the data the program director has to work with. The time honored peer-re-

view process in journals obviously incorporates this feature. Indeed, it is hard to see how peer review can be used meaningfully without the opportunity to rebut what may be a simple misunderstanding or error on the part of the reviewer.

References

1. C. LePair, *PHYSICS TODAY*, May 1976, page 13.
2. R. L. Chaplin, *PHYSICS TODAY*, January 1974, page 121.

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New journals not needed

N. P. Mermin and K. G. Wilson (March, page 11) raise a valid point in questioning whether the physics community needs yet another journal such as *Communications on Physics*. This first issue of this journal completely falsifies the arguments presented by David Caplin *et al.* This issue contains four papers in solid-state physics—a field amply covered by existing journals. Two papers are from British authors who have access to excellent journals in the UK without page charges. One is from Japan that could have gone to a well established Japanese journal avoiding any need for long-distance phone calls; and the final paper is from the US and supported by an NSF grant. None of the papers (average length approximately seven pages) could really be said to have warranted rapid publishing. We need fewer journals, not more.

The solution to this problem is in the hands of the physics community. We should refuse invitations to act as referees or editors for these journals and refuse to submit papers to them. Finally, let us not forget those working in less privileged countries. Every new journal decreases their chance of catching up with the scientific community or maintaining their position in it.

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THE EDITORS COMMENT: Brian Wybourne's attempt to condemn *Communications on Physics* after looking at only the first issue seems to us rather hasty. Our arguments for starting the journal were presented fully in the March issue and cover most of the points that Wybourne raises. We need add only that since then we must have had more evidence of discontent with previous letter