publication will be followed by requirements that all science courses, everywhere, be taught in English; that all students, everywhere, learn English well enough that visiting American professors need only give their colloquia, and conduct their scientific discussions, during a sabbatical year, in English; and that all shopkeepers and restaurateurs learn sufficient English to equip and feed those who arrive to educate, not to learn from, "the out-of-date natives."

On the one hand, Gingerich stresses the preprints of the most current scientific papers which keep his own work *à la mode;* on the other hand, he mentions those European scientists who were concerned that their past work was being simply rediscovered in that current work to which he refers. This would seem to be an amplifying situation, unless indeed one prohibits all past, present, and future non-anglicized work and references. I remember Bruce Billings—a predecessor of Gingerich at the American University in Beirut—once telling me that all kinds of PhD theses could be inspired by reading *der Annalen der Physik* of 50 years past. In my own scientific wanderings, I have more often found myself simply wistful, in a scientific interchange (especially, a dispute) at the language nuances I *did not know,* which inhibited better and more current learning from that interchange, than I was content that in some years I could read all this in an English-language journal or translation. Gingerich stresses preprints to remain *au courant:* myself, and most of my colleagues interested in frontier curiosity, rather than *à la mode* state-of-the-art computing algorithms, depend as much on discussion and letters—in "their," rather than "my" language—intercountry or interdiscipline.

Gingerich's left-handed defense of the language *requirement,* as a concession to historical origins and image, subordinates language *learning,* as a necessary part of a *global* curiosity in a *whole* world—of geography, of ideas. (Most of my colleagues will realize I write this letter in envy of, rather than in facility with, such language fluency: non-English or English.)

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THE AUTHOR COMMENTS: The wide spectrum of well-argued responses to my letter on PhD language requirements demonstrates that this is still a highly controversial topic. In retrospect, although I still believe that nowadays it is difficult to justify a foreign language as a working tool for the astronomy or physics PhD, I would have emphasized far more strongly its desirability as a communications link in the international network of science. As an active historian of astronomy, my curiosity ranges far beyond preprints, and I am acutely aware how a greater knowledge of both ancient and modern languages would provide richer insights into the intellectual movements that make up our scientific heritage. A broader ability to communicate in tongues other than English would have greatly alleviated innumerable moments of frustration I have felt in the past several years during my visits to over 80 foreign libraries and observatories. I regret that my tone may have seemed wistful or insular because I favor a language requirement, and I heartily endorse the Boulder scheme of justifying a foreign language as a communication device rather than as a research tool.

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Invention of the laser

I was horrified to read on page 32 of the November issue that "Optical communication started in earnest when Arthur Schawlow, Charles Townes, A. M. Prokhorov and Robert Dicke invented the laser in 1958." This attribution of credit for the invention of lasers by Hans Melchior does not contribute anything to his subject—optical communications—but it does injustice to several scientists who had contributed at least as much as some included in the above list. I am thinking first of all of Theodore Maiman and Ali Javan, who made the first solid and gas lasers respectively in 1960, but there are several others. For the history of the inventions I refer to *American Journal of Physics* **34,** 903, 1966. It is an involved matter and a controversial subject that cannot be settled in a few lines.

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THE AUTHOR COMMENTS: Bela Lengyel's endeavor to give proper recognition to all the scientists who contributed to the invention and the realization of the laser is certainly appreciated.

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Ge(Li) revolution

Richard Pehl has written an informative account (November, page 50) of the characteristics and applications of germanium gamma-ray detectors with emphasis on the newer types made from high-purity material.

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