

Guest Comment in Physics Today, July 1979

Owen Gingerich (November 1977, page 9) makes a wistful appeal for a graduate language requirement, which he suggests would stimulate an international spirit in science. A much stronger case can be made for a language requirement. Gingerich states that he reads several languages and translated French and German books into English, but that he does not speak any foreign language. I have given scientific lectures and seminars in several languages, and my experiences add another dimension to the issues raised by Gingerich.

Most scientists in the world have been compelled to learn to read English, and most have succeeded. Because of this, scientists tend to assume that the spread of English has solved the language problem in science. But there are enormous problems associated with spoken English. While I was at a particle-physics summer school in Erice, Italy, my knowledge of Italian encouraged me to spend a lot of time with young Italian students, who admitted that they couldn't follow the English lectures. After giving a talk in English at the University of Ulm, West Germany, I was disappointed to learn that many of the science students had had difficulty following my presentation even though I had been careful to speak distinctly and to avoid slang. At a week-long seminar in Moscow involving scientists, engineers and university educators, all talks had to undergo the slowness and indirectness of serial translation, and personal discussions during tea breaks were impossible due to the highly limited English of most of the Russians and the highly limited Russian of most of the Americans, myself included. (It is probably true that all the Russians could *read* English adequately.) Despite enormous efforts by the Japanese, including eight to ten years of school study, most of the many Japanese scientists who visit my laboratory are barely able to speak quite inadequate English, and understand very little of what is said to them. A nuclear physicist of my acquaintance sparkles with lively intelligence in Spanish but is reduced to frustrated inarticulateness in English despite strenuous efforts to learn to speak it (she *reads* English fluently). She must appear much less impressive to my American colleagues than she has appeared to me.

These real problems are hidden from many American scientists by the fact that foreign scientists whom they hear speaking adequate English at international conferences are a highly biased sample. Success in international science is now conditioned by a discriminatory, non-scientific factor: the ability to speak English. Gingerich mentions that he has had difficulty finding the time to learn merely to read other languages, but at least he wasn't compelled to do this. Foreign scientists are not only compelled to learn to read English: if they aspire to the heights of international science they must find some way to learn spoken English. The lucky few find some way to study or work an English-speaking country. While this discriminatory burden is unfair to all foreign scientists, as with all discriminatory burdens it falls most heavily on the weak, including young scientists in the Third World, (except perhaps in former British colonies). It may not be especially difficult to read English, but many foreigners find it extremely difficult to learn to speak and understand English. The complex sounds and confusing spelling mean that a reading knowledge contributes little to speaking and understanding. Another problem is that it is quite difficult for a foreigner to write good English for scientific journals. I certainly could not write acceptable scientific prose in Spanish or Italian, even though I have given adequate lectures in these languages. Gingerich would perhaps have difficulty writing a French or German article, even though he has translated from these languages into English.

In summary, English is viable where only passive reading is concerned but is not an appropriate vehicle for speaking, understanding, and writing in international science. It is time for scientific societies to consider encouraging the use of an easily learned, politically neutral auxiliary language

for international use. Esperanto is a suitable constructed language. It is at least three to five times easier to master than any national language (for non-Europeans and Europeans alike), due to its simple and regular grammar, agglutinative word-building, phonetic spelling and simple sounds. Esperanto is a language of great power and precision. I have given scientific lectures in Esperanto with better audience understanding and participation than I obtained at my English, Spanish and Italian lectures in foreign countries. We should require science graduate students to learn to read and write Esperanto. This could be handled with available self-study textbooks and tested with written translation tasks. The close connection of written Esperanto to spoken Esperanto ensures that this requirement would lead to a speaking ability.

The old language requirement involved a large amount of work for meager results and was perceived by most graduate students as arbitrary and capricious.. This bred resentment and cynicism. We should have a language requirement, but we should make the work no longer burdensome, make the results real, and replace cynicism with idealism and an international spirit. For further information: An introductory textbook available in many bookstores is Teach Yourself Esperanto by John Creswell and John Hartley. Catalogs of books and periodicals in and about Esperanto are available from the Esperanto League for North America, Box 1129, El Cerrito California 94530 and from the Universala Esperanto-Asocio, Nieuwe Binnenweg 176, Rotterdam. 3002, Netherlands.

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Note added in 2006: The simplest way to learn more about Esperanto now is to use Google to find extensive references and learning resources.