

letters

previously by V. L. Ginzburg.⁴

One point that Matthias does not make but that should be made, is this. In view of the heroic efforts which have gone into raising the transition temperature of conventional superconductors to date, recognizing the rather modest return from this (less than 13% increase in 17 years) and the dismal prospects in continuing this approach, it would be far more worthwhile from the *technological point of view* to devote proportionally less effort to this dying approach and a much bigger effort to the goal of improving the efficiency of cryogenic refrigerators. The return is likely to be much greater from this tack, for the absolute value of T_c is less important technologically than its value relative to what can be achieved economically. The distinctive feature of the newer approaches, based on the development of materials using an excitonic interaction with a much higher *theoretical* limit on T_c is that, if they are successful, their use would bring about a change of technology that could not be matched by any improvement in refrigeration. In this sense such work is on a different plane.

Finally, the "Proceedings of the International Conference on Organic Superconductors" cited in Matthias's article as being "in press" were published by the *Journal of Polymer Science*⁵ in July 1970.

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Language requirements

Many graduate schools are now in the process of rethinking their graduate foreign-language requirement for the PhD in physics.¹ It seems appropriate, therefore, to share with the physics community some facts and figures that were established at Dartmouth College about a year and a half ago while undertaking a similar study. At that time, our language requirement stated that "all candidates for the PhD must demonstrate, prior to enrollment in the third year of graduate study an ade-

quate reading ability in two foreign languages or a reading, writing, listening and speaking ability in one foreign language: French, German or Russian (or other languages with the approval of the department)." As a consequence of the above investigation the above requirement was abolished in January 1970. In its place was substituted the following policy: "No formal foreign language requirement exists for PhD candidates; however, in individual cases depending on the research topic a reading knowledge in one or two languages may be required by the thesis advisor." The motivation for making this change was the fact that over the last few decades English has become the language of physicists. To justify this statement the following facts were established:

1. English is an official language at all international physics conferences,
2. 80 to 85% of all periodic physics literature appears in English (see below),
3. 95% of the important periodic physics literature appears in English. "Important" as used here relates to the number of citations that a given article receives (see below).

The results quoted in 2 above were derived from two literature surveys made by the American Institute of Physics.^{2,3} Both surveys examined one year of *Physics Abstracts*, a British publication that attempts to abstract all pertinent physics and closely allied periodicals. In the first survey (*Physics Abstracts*, 1961) 20 287 abstracts from 405 journals and 39 countries were analyzed. Among other things information concerning the language of the original paper and whether it had been translated into another language was provided. The results derived from these data give the following language distribution:

English	81.3%	original or translated into English,
French	7.2%	} original and not translated into English.
German	6.4%	
Russian	2.4%	
Other	2.7%	

It is noted that almost all Russian journals are translated into English by the AIP or some independent publisher and that almost all Japanese journals are published solely in English. The second survey (*Physics Abstracts*, 1965) included 32 279 abstracts from 495 journals and 40 countries. This survey listed the journal from which the article came but unlike the previous survey did not provide information about the language(s) in which the article appeared. In order to derive the desired data the number of abstracts listed for a given journal were weighted by the average percentage of that journal that appears in English. These percentages were derived from the 1961 survey.

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Proper account was also taken for those Russian journals that are translated into English. The following results were obtained from this analysis:

English 84.6% original or translated into English,
Other 15.4% original and not translated into English.

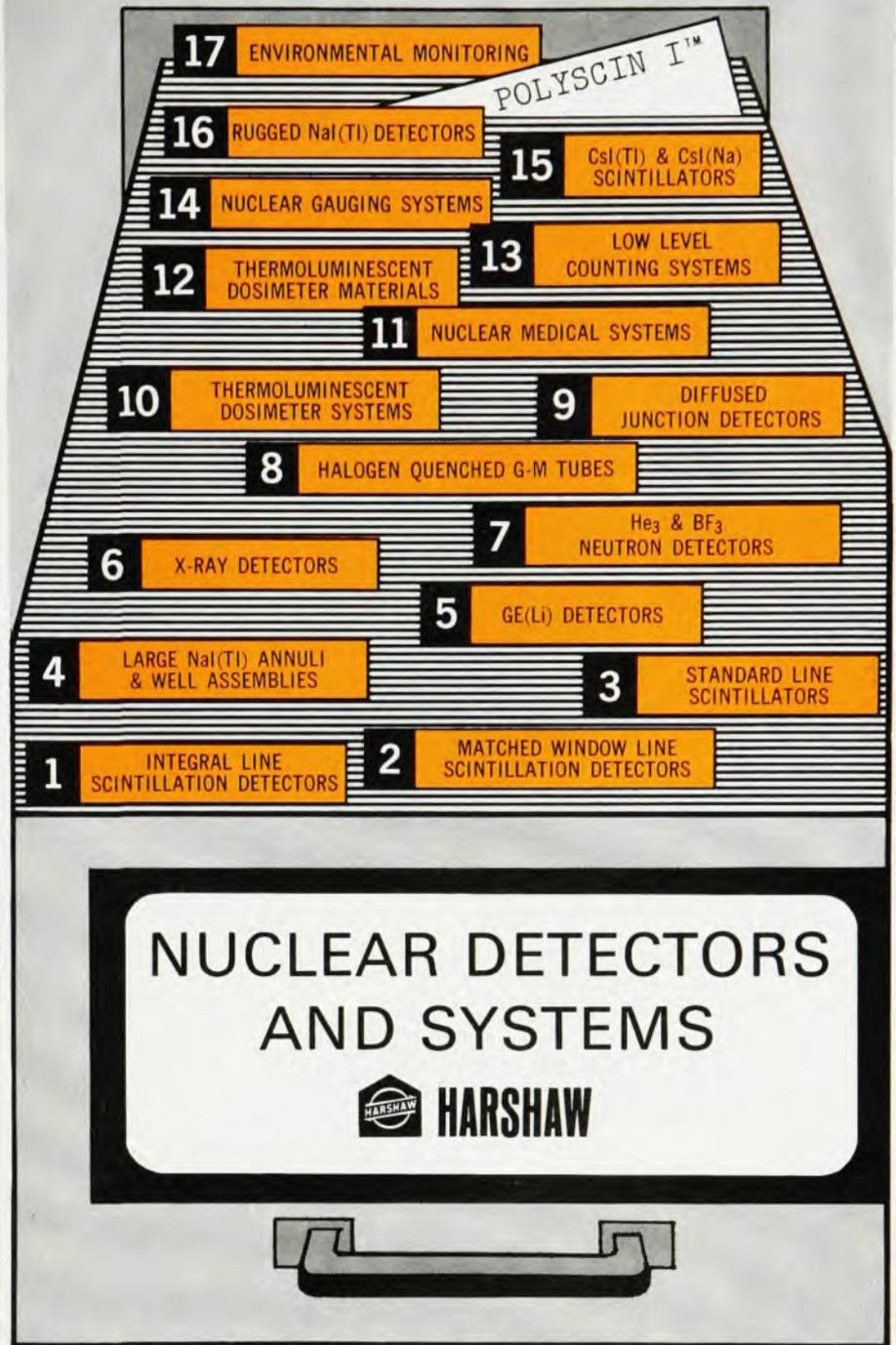
The results quoted in 3 above were derived from a long and extensive project being conducted by M. M. Kessler at the Massachusetts Institute of Technology on the problems of the exchange and retrieval of scientific information. Two aspects of this project which are relevant to our discussion are (1) an analysis of bibliographic sources in *Physical Review* (Volume 77, 1950 to Volume 112, 1958)⁴ and (2) an investigation of the flow of technical information.⁵ The combination of these two studies have led to the following classification of literature in physics:

- I—a definitive journal (*Physical Review*),
- II—a closed list of widely used journals (55 journals),
- III—an open list of rarely used journals.

An explanation of these categories follows. *Physical Review* (the leading American journal in physics) occupies a unique and dominant position as the source most referred to both by the people who publish in *Physical Review* and in all other journals regardless of country. *Physical Review* plus 55 other journals form a very time-stable group. This same group accounts year after year for the majority of references. Over the period of time investigated (*Physical Review*, 1950 to 1958) this group, which comprised only 7% of the total journals cited, accounted for 95% of the individual references. The other 5% were distributed among the remaining 93% of the journals, a large and ever-changing list of rarely used sources. In arriving at a figure that represented the percentage of important (i. e. most cited) periodic physics literature appearing in English, the number of citations associated with the journals in categories I and II were weighted according to the average percentage of English by article that appeared in them. These percentages were obtained from the 1961 AIP study.² This analysis yielded a figure of 95% (63% attributed to *Physical Review* alone).

In addition to the above arguments the physics department, while being fully aware of the cultural value of knowing a foreign language, felt that graduate school is neither the time nor place to learn languages. (It was further felt that even the present undergraduate language requirement at Dartmouth

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should be considered remedial in nature, that is, languages should be taught primarily in elementary and high schools.) To determine roughly whether or not an adequate language background is being taught during pre-graduate training, a search of college transcripts of the present Dartmouth graduate students was made. The results showed that in the physics department 82% of the students had the background equivalent to our graduate language requirement (4 semesters in one language or 2 semesters in each of two languages), while the remaining 18% met half of the requirement. These values are to be compared with those of the graduate school as a whole, which were 60% and 26% respectively. In interpreting these results the following remarks are pertinent: (i) high-school records for approximately 50% of the students were also incorporated into the compilation; (ii) only passing grades in German, French, Spanish and Russian were considered; (iii) foreign students were included, English having been considered a foreign language. It must be kept in mind that these results are in part a reflection of the graduate-school language requirement. This task, however, should be taken over by undergraduate language entrance requirements.

In summary then it was, and still is, our express opinion that our former language requirement could not be justified, either from a professional or cultural viewpoint.

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Books needed

Franconia College is a small innovative liberal arts school, nonprofit, without much money. We have a small library and are desperately in need of books. We thought the readers and contributors of *PHYSICS TODAY* might help us out by

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LEON BOTSTEIN
Franconia College
Franconia, New Hampshire

From the other side

The message told to us today—
the future is so bleak,
From front to back in book and journal
"Too Many!" is the shriek.
"Too many, too many" on they chant
"We've PhD's galore,
The market's bad and getting worse
And chaos is in store."

But others stand, straight and tall
With emotion they behold
What makes the heart beat hard and fast
And can't be bought with gold.
They've sat transformed in a master's
class,
Merriman, Lipsich and many more.
The master's light that burned so bright
In them is all aglow.

The romance there was strong and deep
And still it does not die;
As they read from the master's books
The hours like seconds fly.
Linked with itself and with the world—
Rich beauty now appears.
Without the dollar, alone it stands
Camouflaged by fears.

"Too many?" No! one can't deny
This satisfying treasure
From the heart and soul of man
For its beauty and his pleasure.
So to science, as lean years come
To math pure and applied,
The future looks dark and gray
Only from the dollar side.

WESLEY A. DARBRO
Marshall Space Flight Center
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Origin of the barn

I have heard a vague tale that the unit of nuclear cross section, the barn, originated in a conversation during the Second World War at Los Alamos National Laboratory. Is this really true? If so, what are the correct details surrounding the incident? If some knowledgeable reader will send the correct version of the birth of the barn either to me or the editor, they will do johnny-come-latelys like myself a favor. Thanks!

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