COMMENTS
by Readers

During the war and throughout the two years since its conclusion, the problem of the study of foreign languages, as related to scientists in general, has taken on new importance. At no time in history has it been so necessary to keep abreast of the technological developments of foreign countries as now. This fact, coupled with the tendency of students to avoid the serious study of foreign languages, makes it advisable to review the problem briefly, with particular emphasis on the language requirement for the Ph.D. degree. The war initiated intensive methods into the study of languages. It became necessary for more persons to know foreign languages and to know them better than previously. The rather large number of persons who had "passed" German and French at some previous time in fulfilling the requirements for the Ph.D. found that their knowledge of the languages was entirely inadequate. As a consequence, it now appears to many that in the field of science something should be done to rectify the situation.

There are two obvious difficulties in the present method. One is that the scientist often does not come into contact with foreign languages—except for the high school exposure, if any—until he has passed beyond the M.S. degree. Second, his contact with languages in the Graduate College is insufficient to be of any real use to him. Two alternatives exist: either the language requirement can be eliminated or more intensive training in one language can be substituted. The first alternative is contrary to the present trend and necessity; the second suffers from lack of support on the part of educators concerned with the particular problem. In support of the second alternative there may be listed the following:

(1) The student may make effective use of the language earlier in his school career.

(2) A good knowledge of one language has a cultural value which the M.S. or Ph.D. in science cannot afford to miss, especially in this era when scientists must take a greater part in world affairs.

(3) The student is released from the wasteful procedure of cramming for two language exams which he has come to look upon as mere formalities.

Assuming that one language would be acceptable for the Ph.D. requirement, it is, of course, a problem to make a selection. One may attempt to determine the most useful language, from a technical standpoint, by statistical means, but it must not be assumed that every student should be required to study the most widely used language. A balance must be maintained so that all the useful languages are reasonably well represented in any department at any one time. On the other hand, a student should not be required to take a minor language just to maintain some kind of a percentage balance.

It seems that the bases upon which to select languages should be somewhat as follows:

(1) What language will be of most use to the student in his field?

(2) In what language is the student particularly interested?

(3) Which languages does the student already know?

The first of these questions can be partially answered by making a survey of the frequency of references to articles in foreign languages appearing in abstract journals. As an illustration, the references to technical articles for one year, 1940, in the *Wireless Engineer* have been checked in the fields of wave propagation, circuit theory, electronics, and transmission with the following result: German, 100 references; Russian, 57; French, 48; Italian, 23.

In any particular case, with information such as this for the field under consideration, the adviser may come to a satisfactory agreement with the student concerning his language requirement. The question is of such importance that every effort should be made to readjust the treatment of the language requirement not only for the Ph.D. degree but for science students in general. (L. A. WARE, *State University of Iowa.*)

In a report entitled "Calcium and Growth in Aging and Cancer" (Albert I. Lansing. *Science,* August 29, p. 187) data are given regarding the calcium content of cells. These data clarify some aspects of aging and, at the same time, explain the reason for the low calcium content of cancer cells. However, the clarification introduces new difficulties. The paradox is revealed that cancer, an actively growing young tissue low in calcium, occurs spontaneously most frequently in an old tissue high in calcium and which is no longer actively growing. More than this, in young organisms, relatively low in calcium, cancer occurs with far less frequency. It does not help to say that locally rejuvenated old tissue growing in an old organism might be expected to create havoc, for it has been demonstrated time and again that embryonic tissue transplanted in older tissue does not behave at all like cancer, even though embryonic tissue has a low calcium content. Nor can a lack of cell adhesiveness be incriminated to explain malignancy. The reduction of adhesiveness of fibrous tissue cells does not render them malignant. Malignancy, characterized by a direct destructive action by cancer cells upon somatic cells, is not duplicated by wandering, actively growing somatic cells. Therefore, although the decreased adhesiveness of cancer cells can be correlated with their markedly low calcium content, their *destructive* invasiveness cannot be thus explained.

Malignancy is an inherent property of cancer cells independent of their calcium content. On the other hand, increase of the calcium environment of cancer cells may increase their adhesiveness and consequently possibly decrease their invasiveness and thus limit their malignancy by limiting their movement. This might constitute a rational basis for the use of calcium in cancer therapy, as is occasionally recommended.

The reduction of calcium in methylcholanthrene-induced epidermal hyperplasia does not represent a necessary herald of the onset of cancer, for hyperplastic tissue is young tissue, and its calcium content is relatively low.

The low calcium content of cancer tissue simply accompanies its youth and does not explain its malignancy. It is therefore not logical to imply a lineage between cancer cells and somatic cells on the basis of a decreasing content in cell calcium. The behavior of cancer cells negates the proposition that they repre-