Surveying Russian Technical Publications: A Brief Course

In eight to sixteen lessons scientists can learn to identify the subject matter of Russian publications.

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The proportion of American scientists who know Russian has been increasing steadily, from about 2 percent a decade ago to 5.6 percent in 1962 (*1*). However, this percentage is still small compared with the 50 percent who know German and the 35 percent who know French, and it is extremely small in the light of the volume of important Russian scientific literature that requires systematic survey (*2*). Moreover, Soviet scientists are not yet participating fully in the exchange of information with their colleagues in the West through personal contacts, correspondence, and special symposia (*3*).

The number of scientists who know enough German and French to browse effectively through papers in these languages is larger than the above percentages indicate. Russian is known and used far less, mainly because it was not included in the curriculum of the average school until after World War II.

During more than 35 years of analysis and research in the field of foreign technical information, I have found that often only a part of a paper needs to be studied in detail. Sometimes this part includes some or all of the tables and graphs; occasionally the introduction, some of the conclusions, or part of the discussion are also needed, but seldom must the entire paper be translated. Thus, to conduct a preliminary literature survey, a researcher need not always have a thorough knowledge of foreign languages.

A brief course has therefore been devised to enable scientists to survey Russian technical publications, to identify the subject matter, and either to immediately extract the pertinent information or to decide whether a partial or a complete translation is needed. In 8 to 16 2-hour class periods the student learns to recognize Russian technical terms cognate to English and a selected group of native Russian words. This is a course in recognizing the contents of Russian scientific publications, not a course in the Russian language.

The course consists of (i) an introductory characterization of the language of science and of scientific Russian in particular; (ii) a list of Russian scientific words cognate to English; (iii) instruction in the use of a Russian dictionary; and (iv) a list of selected Russian words.

Vocabulary and Word Forms

The language of science contains many terms of Greek and Latin origin that are cognate to modern European languages. Nevertheless, some purely native terms are always present, and sometimes both native and nonnative terms are used to describe the same concept. Thus, in Russian we have two terms for the concept "to distill"; the older is the native term *peregnat'* (frequently used in petroleum technology), and the newer is *distillirovat'*.

Words occurring in the general language acquire special connotations in scientific language. The English translation of the German word *brechen* in a German-English dictionary ("to break, refract, fracture") is an example. The first concept in the mind of a mathematician reading the word *vyvodit'* is "to derive" (an equation) rather than "to lead out" (a horse). To a chemist the use of *gnat'*, and *peregnat'* in the sense of "to distill" is conventional; *vozgonyat'* is "to sublime," without connotation of anything exalted—for example, to sublime a salt. Thus, a scientist soon learns to differentiate the scientific sense of a word from its general sense. Furthermore, two languages sometimes identify an object or phenomenon by referring to different aspects of it: The word *railroad* in English describes the shape, a rail, whereas the German, French, and Russian words describe the material the rail is made of (*Eisenbahn, chemin de fer, zheleznaya doroga*).

Many important words and expressions appear more frequently in the scientific than in the general language, and differences in the frequency of occurrence of certain grammatical forms are also important. Specifically in scientific Russian, impersonal expressions, participles, gerunds, and reflexive verbs are used extensively, while the imperative form is almost never found; idioms are seldom used; language forms characteristic of dialogue and emotion are not found, while those characteristic of objective observation and generalized conclusions occur frequently.

The study material begins with a list of scientific terms easily recognizable as cognates to English terms. They are used first in a reading exercise and then are classified into several groups in which the occasional differences in pronunciation and meaning between the Russian and English versions are stressed. This work enables the students to later recognize items not given in the original exercises. This is followed by a study of verbs, adjectives, and adverbs derived from non-Russian stems. An exercise in compound words, one component of which is occasionally a native Russian word, is also given, to demonstrate the method of recognizing the meaning of a long Russian word.

Because Russian is a highly inflected language, a word, to be recognizable in a dictionary, must be reduced to its original form. Therefore, the most necessary grammatical forms are demonstrated. Primarily this involves inflection of words cognate to

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English words, but this exercise cannot be limited to cognates. Thus, in a discussion of nouns, of the absence of articles, of gender, and of declensions, a native Russian neuter noun is declined, since few Russian neuter nouns are cognate to English nouns. Declension of adjectives and pronoun-adjectives is omitted; it is explained that these elements always agree in gender, case, and number with the noun they modify. The inflectional form of a noun determines that of its modifying adjective. A cognate Russian verb derived from a non-Russian stem is conjugated in its essential forms, including participles and gerunds. Then a native Russian verb is conjugated, to demonstrate the various methods of formation and the significance of the perfective and imperfective aspects. Finally, relationships among nouns, adjectives, adverbs, and verbs from the same root are demonstrated, to increase the student's ability to recognize native Russian words. Only then is the use of a dictionary discussed.

In exercises involving actual surveys of Russian scientific papers, the students are cautioned against unwarranted extrapolation of the meaning of sentences and are advised to concentrate on titles, tables, and graphs, looking over the text only when this is necessary for verifying important data. For instance, a scientist who was uncertain that the adjective *platinovyĭ* in a table and title actually referred to platinum easily confirmed his guess that it did by finding the symbol Pt in the adjacent text.

The size of the selected vocabulary of native Russian words varies with the interests of the group and with the sciences involved, depending on whether these are basic or applied, recently developed or older. Thus, physical chemistry is treated more successfully than various branches of engineering because it is more recent and requires a knowledge of fewer native Russian words, and a much shorter list of words is needed for atomic physics or automation technology than for many areas of biology or mechanical engineering, whose vocabularies are older.

For research scientists in petroleum technology, the selected vocabulary includes some 100 general Russian words, 50 words from the field of general chemistry, 50 words from organic chemistry, and 35 words from petroleum technology—a total of 235 words. For scientists active in other areas, the words, as well as the number, will obviously be different. Each student is urged to compile his own vocabulary of words that occur most frequently in the material he sees, put each word on a separate card, and classify the cards according to the Russian alphabet.

Study Groups

The course was given three times between 1959 and 1964 to groups of chemists and chemical engineers at the research laboratories of the American Oil Company and once at the Evening Divisions of Northwestern University in conjunction with a course on methods of searching the Russian technical literature.

Members of the third group given the course at the American Oil Company laboratories had relatively similar interests. Supplementing the class sessions with home study, they covered the material in eight sessions. Of 30 students who started the course, 22 completed it. Of these, 10 demonstrated their competence by selecting articles from current Russian periodicals and presenting to the group a translation (sometimes incomplete) of the title and translations of the tables and graphs, as well as their own conclusion concerning the usefulness of the material surveyed. Some extended their survey to the introductory or experimental part of the paper to support their views. The factual material on which they based their conclusions was extracted from the article, and their translation of this material was correct in all cases. In a few cases an article that appeared, at first glance, to be of direct interest to a line of research in progress turned out, from a survey of the data, to be of little direct value. In at least one case a paper of real value was found, and no further information on it was needed beyond that obtained in the survey of the data, since the scientist making the study was acquainted with the research of the authors and could evaluate the reported contribution.

Because the group at Northwestern represented various branches of science, 16 meetings were necessary. The vocabulary of native Russian words could not be limited to the needs of any one student; it had to be larger than the vocabulary selected for the other three groups, and accordingly progress was somewhat slower.

Conclusion

This rapid method supplements rather than supplants existing methods of translating, recording, and reporting Russian technical literature. It satisfies two needs. (i) It enables the scientist to survey a small number of Russian periodicals; this is usually sufficient for keeping abreast of the leading Soviet contributions. (ii) Current awareness of the state of technology, which is important in technological research and in patent work, requires early information on new developments. The ability to spot a paper of potential interest, which, when necessary, one can have translated, accelerates utilization of the information it contains.

Even when verification of the findings or complete translation by experts in the Russian language are needed, the overall savings in time, effort, and money justify the rapid survey.

Although the method cannot yet be considered well established, the results have been sufficiently encouraging to justify the hope that it will be tried elsewhere by qualified scientists.

References

1. *NSF Sci. Manpower Bull.* (Mar. 1964).
2. J. G. Tolpin, *J. Chem. Educ.* **40**, 430 (1963).
3. P. H. Abelson, *Science* **141**, 319 (1963).