

On Translating Chemical Russian*

PAUL A. KIEFER, JR.

Consultants Bureau/Plenum Press Divisions, Plenum Publishing Corp., New York, N. Y.

Received August 25, 1969

This article is based on advice provided by Plenum Publishing Corporation's free-lance translators of Russian chemical material. Available dictionaries and aids as rated by Plenum translators are discussed with comments on the merits and shortcomings of each. A section on learning chemical Russian discusses the utility of formal courses vs. self-study; the amount of study needed to acquire proficiency; the sources of idioms, syntax, and grammar which were found most useful; and a method of study designed to provide a basic proficiency in reading chemical Russian, for those interested in self-study. Some of the problems and pitfalls to be avoided in translating Russian chemical literature are also discussed.

This paper is based on a survey of approximately 60 translators of Russian chemical literature from Plenum Publishing Corporation's world-wide panel of more than 200 free-lance translators. Their views should be respected, since in 1968 these translators were responsible for the conversion of more than 34,000 pages of Russian chemical literature into English, for dissemination to an audience estimated at more than a quarter of a million people in the western scientific community. This output represents one-third of Plenum's program in all fields, currently the largest such commercial operation in the world.

Most of Plenum's translators have Ph.D. degrees and translate in their spare time while remaining active in their chosen academic or industrial specialty. Among those who translate full time are some who have been with Plenum for the more than 20 years since, under the name Consultants Bureau, it pioneered in publishing English translations of Russian scientific and technical material.

Interestingly, apropos this symposium, Plenum's first translators were concerned with chemical material, in the form of the *Journal of General Chemistry of the USSR* (*Zhurnal Obshchei Khimii*). This was the first cover-to-cover translation of a Russian journal and was begun in 1949.

Today, Plenum's chemistry translators have a much more formidable task. Suffice it to say that they have to cope with every area of chemical theory and technology.

RESOURCES

As you might expect, no translator is knowledgeable enough to translate in all these fields. Moreover, no one

can function effectively as a translator without relying on dictionaries and glossaries to a greater or lesser extent. This is particularly true for the translator of such specialized material as chemical literature. Unless someone could work almost simultaneously in his chosen field in both the Soviet Union and an English-speaking country in the west, it would be impossible for him to learn the corresponding terms in both languages without the use of dictionaries. In Plenum's experience, the most important prerequisite is that the translator be well-versed in his field and the English terminology common to it, so that he can choose the proper term from the alternatives when he must consult a dictionary. I will go into this in more detail later.

To determine which of the surprisingly small number of chemical dictionaries and glossaries available to translators of Russian chemical literature were most useful, I sent a questionnaire to Plenum's chemistry translators soliciting their opinions of a number of works based on their experience with them.

Table I lists the ratings given by the translators for multilanguage dictionaries. To make these ratings as useful as possible to potential translators, I requested both the area of speciality of each translator and comments in defense of the rating he or she gave. Taking these into account, the Callaham dictionary, at least, seems to be indispensable to anyone engaged in the translation of Russian chemical literature, regardless of the specific field. It received many compliments, and the table indicates how highly it is regarded. The only criticisms leveled by more than one translator were that it did not include enough abbreviations, and that (because it is already seven years old) it needed more modern analytical chemistry terminology.

The Carpovich dictionary seems to be weak in organic

*Presented before the Division of Chemical Literature, Symposium on Methods and Resources for the Translator of Chemical Documents, 158th Meeting, ACS, New York, N. Y., September 10, 1969.

Table I. Evaluation of Multilanguage Chemically-Oriented Dictionaries

| Dictionary | Rating, % of Translators | | | | |
|--|--------------------------|------|------|------|---------------|
| | Excellent | Good | Fair | Poor | No experience |
| Callahan, Ludmilla I., "Russian-English Chemical and Polytechnical Dictionary," 2nd ed., Wiley & Sons, 1962 | 80 | 18 | 0 | 0 | 2 |
| Carpovich, Eugene A., "Chemical Dictionary, Russian-English," 2nd ed., Technical Dictionaries Co., 1963 | 2 | 8 | 4 | 4 | 82 |
| Hoseh, M. & M. L., "Russian-English Dictionary of Chemistry and Chemical Technology," Reinhold Publishing Co., 1964 | 4 | 18 | 4 | 6 | 68 |
| Santoholzer, R., & Korinsky, J., "Five-Language Dictionary (Paints, Lacquers, and Varnishes, Surface Treatment, Corrosion)," Technical Literature Publishing House, Prague, 1956 | 2 | 2 | 2 | 0 | 94 |
| Lambert, M., "Short Russian-English Dictionary of Terminology Used in the Soviet Rubber, Plastics, and Tyre Industries," MacLaren & Sons, 1963 | 2 | 3 | 2 | 0 | 93 |
| Multilingual Dictionary of Important Terms in Molecular Spectroscopy," National Research Council of Canada, 1966 | 0 | 5 | 0 | 0 | 95 |

Table II. Evaluation of Multilanguage Dictionaries for Other than Purely Chemical Subjects

| Dictionary | Rating, % of Translators | | | | |
|---|--------------------------|------|------|------|---------------|
| | Excellent | Good | Fair | Poor | No experience |
| Blum, Alexander, "Concise Russian-English Scientific Dictionary for Students and Research Workers," Pergamon, 1965 | 0 | 2 | 2 | 4 | 92 |
| Bray, Alexander, "Russian-English Technical Scientific Dictionary," International Universities Press, 1945 | 0 | 2 | 5 | 17 | 76 |
| Emin, Irving, "Russian-English Physics Dictionary," Wiley & Sons, 1963 | 40 | 9 | 2 | 0 | 49 |
| Kondratov, L. N., "Russian-English Polytechnical Dictionary," 1948 | 0 | 8 | 6 | 6 | 80 |
| Zimmerman, M. G., "Russian-English Translators Dictionary," Plenum Press, 1967 | 2 | 20 | 7 | 0 | 71 |
| Akhmanov, O. S., <i>et al.</i> , "Russian-English Dictionary" (also known among translators as the "Smirnitskii" dictionary), Soviet Encyclopedia Press, 1969 | 2 | 6 | 0 | 0 | 92 |
| Lohwater, A. J., "Russian-English Dictionary of the Mathematical Sciences," American Mathematical Society, 1961 | 0 | 2 | 2 | 0 | 96 |
| Sofiano, T. A., "Russian-English Geological Dictionary," Fizmatgiz, Moscow, 1960 | 3 | 2 | 0 | 0 | 95 |
| "Soviet Russian Scientific and Technical Terms: A Selective List," U. S. Library of Congress, 1963 | 0 | 2 | 2 | 0 | 96 |
| Voskoboinik, D. I., & Zimmerman, M. H., "Russian-English Nuclear Dictionary," MIR Press, Moscow, 1960 | 2 | 2 | 0 | 0 | 96 |

chemistry, since most of the translators who rated it either fair or poor work in that area. Both this and the Hosèh & Hoseh dictionary received pretty much the same criticism—i.e., they are useful only as last resorts when the Callaham dictionary is of no help. They are considered weak on nontechnical words, and organized poorly. The Santoholzer & Korinsky dictionary, while the only one of its kind, is considered to be virtually obsolete because it contains nothing on polymers.

The last two entries in Table I represent dictionaries which were recommended by Plenum's chemistry translators. The Lambert dictionary is regarded as being quite specialized, although more chemical than its title indicates. It is recommended as being outstanding for polymer chemistry and technology, and has a handy list of abbreviations. The last dictionary listed is recommended to translators who do not have the Emin physics dictionary (see Table II), since most of the terms are included in the latter dictionary.

Table II lists multilanguage dictionaries covering subjects other than chemistry. Because of the overlap between the various physical sciences, many of these are almost as useful as chemical dictionaries, depending on the translator's field. The first five entries were listed on my questionnaire to Plenum's chemistry translators. [Because the "Smirnitskii" (as it is popularly referred to) dictionary was not included in this list, the small number of translators who mentioned it on their own is not a likely indication of its use or lack of same.] The translators, in turn, recommended many others. However, I chose to include in the table only those dictionaries which were recommended by more than one person, because of the dubious value of those which only one translator had seen fit to use. In addition, many were of particularly marginal value for translators of chemical literature. For example, one translator indicated that he found a Russian-English dictionary of social science terms useful from time to time.

Even using this criterion, the table contains some entries of marginal utility. For example, the Blum, Bray, and Kondratov dictionaries were all criticized as being incomplete and not comprehensive enough even without making comparisons to the Callaham or Emin dictionary. In addition, the Bray and Kondratov dictionaries are regarded as hopelessly out of date, although the Kondratov one was felt to be of some help when the Callaham dictionary was weak in chemical technology. The Emin dictionary is considered comparable in quality to Callaham's, as can be seen from the ratings in the table. Translators in all areas of chemistry seemed to find it useful, but it was rated as particularly helpful in dealing with physical techniques, chemical analysis instruments, and chemical physics. The only criticism leveled was that it is not quite as good for nontechnical words as the Callaham dictionary. The Zimmerman dictionary was recommended for beginning translators, to give them a feel for how to render particularly difficult Russian phrases into idiomatic English. Many translators indicated that, with experience, most of the things in the Zimmerman dictionary come almost by instinct. Among the nonchemical dictionaries recommended by Plenum's chemistry translators (the last five in Table II), the only consensus was that the Akhmanov dictionary contained many more technical

words than one might expect, and that the Sofiano dictionary is good for determining mineral names.

I should note at this point that Plenum Publishing Corporation recommends the Callaham, Emin, and Zimmerman dictionaries to prospective translators when they apply. However, this probably does not account for their wide usage, since these translators—having already achieved proficiency—must have outfitted themselves with dictionaries before that time.

Table III lists other dictionaries, glossaries, and handbooks of possible use to the translator of chemical literature. The first four items were suggested in my questionnaire, and the other two were the only ones recommended by more than one translator. Most translators familiar with the Gwirtsman list of abbreviations felt that it could be larger and would thus be more useful, even though the ratings it received indicate it is already quite helpful. The Papok & Ragozin dictionary got generally unfavorable comments, but it is the only book of its kind available in this area. The general feeling with regard to the Stel'nov dictionary was that the Callaham dictionary was better, unless a term unique to a particular chemical industry was a problem. The Library of Congress glossary is regarded as the best single abbreviation source available, and the Zalucki dictionary is thus considered to be quite inferior by comparison.

In all these listings, I have not considered English-Russian works in spite of the fact that many translators mentioned such items, because of their limited value except for double checking by working backwards.

Finally, it should be obvious that these resources are only useful if they are regularly revised and updated to keep pace with developments in the fields they cover. This was pointed out by many of the translators in their replies.

LEARNING CHEMICAL RUSSIAN

In the following requirements, two things are assumed in accordance with Plenum's approach to scientific and technical translations:

The prospective translator must be well-trained in the scientific discipline in which he intends to translate. How much translation work he may eventually be able to undertake will be limited by the scope of his knowledge, so that if his interest is confined to a narrow field, he may not be able to do as much work as he would like without stretching his knowledge to the extent that his translations become unreliable.

The prospective translator's native language should be the same as the language into which he will be translating. He should be able to express himself well in it generally, in addition to knowing its proper terminology for his field.

In Plenum's experience, both requirements must be met in order to untangle the intricacies of Russian sentence structure in such a way that the resulting translation will make sense, both scientifically and grammatically. Otherwise, the greatest possible knowledge of the Russian language will be of no help. This idea was first put into practice in the initial stages of Plenum's cover-to-cover journal translation program. Since then, UNESCO's translation guide has adopted similar criteria, and other producers of translations have accepted these guidelines as well.

Table III. Evaluation of Other Dictionaries, Glossaries, and Handbooks

| Reference | Rating, % of Translators | | | | |
|--|--------------------------|------|------|------|---------------|
| | Excellent | Good | Fair | Poor | No experience |
| Gwirtsman, Joseph J., "Official List of Abbreviations Used in the 'Referativnyye Zhurnal Khimiya,' Their English Translation and the Corresponding Abbreviations used in Chemical Abstracts" | 2 | 8 | 0 | 0 | 90 |
| Papok, K. K., and Ragozin, N. A., "Tekhnicheskii Slovar' Po Toplivu I Maslam (Technical Dictionary for Fuels and Oils)," Moscow, 1955 | 0 | 4 | 2 | 2 | 92 |
| Perel'man, V.I., "Kratkii Spravochnik Khimika (Concise Chemical Handbook)," Moscow, 1954 | 0 | 0 | 6 | 2 | 88 |
| Stel'nov, Yu. A., "Kratkii Politekhicheskii Slovar' (Concise Polytechnical Dictionary)," Moscow, 1956 | 2 | 2 | 6 | 2 | 88 |
| "Glossary of Russian Abbreviations and Acronyms," United States Library of Congress, 1967 | 0 | 3 | 0 | 0 | 97 |
| Zalucki, Henryk, "Dictionary of Russian Technical and Scientific Abbreviations," Elsevier, 1968 | 2 | 2 | 2 | 0 | 94 |

Anyone who already possesses these qualifications and is thinking of learning to translate Russian chemical material had better be very strongly motivated to do so. More than 75% of Plenum's chemistry translators learned their Russian by utilizing at least half their time in self-study, as opposed to formal courses. That percentage breaks down as follows: 38% indicated that their knowledge was gained entirely from self-study, while 32% spent 80% of their learning time in self-study, and the rest split their time 50-50. Only 3% of the translators learned their chemical Russian entirely in formal courses.

In commenting on the utility of the formal courses available to those interested in learning to translate Russian chemical literature, more than half of Plenum's chemistry translators said they found such courses useful to a certain extent. In all, more than 18% indicated that formal courses were very useful. To be fair, remember that 38% couldn't really comment on formal courses, because they had had no experience with them. Only 7% of those queried actually indicated that they didn't find such courses useful. However, the percentage of translators who chose all or mostly self-study must be taken as some indication of the lack of utility of formal courses.

As an example of how much time the prospective translator must be prepared to invest, assuming he wished to attain a minimum level of proficiency in about a year, more than 60% of Plenum's chemistry translators indicated that at least 10 hours per week would be needed. Breaking this down, 16% felt that at least 20 hours a week were necessary, and 21% said more than 30 hours per week would be needed. The time required would depend on how much of a "feel" for foreign languages the potential translator possessed. For longer periods of learning, the above figures should be divided by the number of years—i.e., in two years one would need to invest somewhere

between five and 15 hours per week. Many translators said that they expect to continue improving their translating skills as long as they continue to translate.

For the actual learning process, J. W. Perry¹ suggests the following method based on an hour of study a day:

1. Learn the Russian alphabet by practicing on the Russian names for the chemical elements.
2. Read through an elementary Russian grammar, making an outline of the main points for future reference.
3. Read an elementary chemistry text in Russian, using the grammar as necessary.
4. While reading the text compile a homemade glossary of Russian chemical terms and phrases, and extend the rough outline of the grammar to include noteworthy details encountered.
5. Start reading current Russian chemistry journals.

This method is intended to provide at least a basic proficiency in reading, and hence translating, chemical Russian. Among Plenum's translators of chemical material, 37% felt that they could not suggest a better method than Perry's. Another 52% either had reservations or suggested a method which they felt was better.

I would like to pass along some of the specific suggestions, and for a starter I can't resist quoting one of Plenum's most prolific translators, who adds to Dr. Perry's point five: "and give up in despair."

"If you began at the dawn of time at a rate of one hour a day you couldn't translate 'Tom Swiftovich and His Incredible Mendeleev Monster Machine.' There is no simple way. It takes an excellent foundation in Russian grammar, an enormous library, perseverance, a translation of ideas and not words—and a bottle of vodka alongside for inspiration. With 100,000 new organic chemistry words added every year it takes more than an hour a day just to keep up with terminology, to say nothing of the rapid change in the Russian language (maybe you need two bottles!)."

Several translators suggested an even shorter method than that suggested by Dr. Perry, by keeping the knowledge of grammar to a minimum, and going right to reading a journal by subscription. In contrast, many more translators felt that the study of grammar should be emphasized more than Dr. Perry's method does. Also a surprising number felt that a speaking knowledge of the Russian language was almost essential in translating.

Among the other suggestions recommended for combination with Dr. Perry's method were:

Going to classes for stages one and two.

Relying on dictionaries in lieu of compiling a glossary.

Getting an English as well as Russian chemistry text.

Similarly, subscribing to the cover-to-cover translation and the original Russian version of the journal to be translated, to get the benefit of a professional's experience.

Skipping stage three, depending on the translator's own knowledge of his field.

Having regular vocabulary drills until the translator's level of output performs the same service.

In connection with the learning process, I also asked Plenum's chemistry translators to suggest the sources of idioms, syntax, and grammar which they found most helpful and to indicate the order of books which brought them from "zero" knowledge to their present level of proficiency. However, the small number of such books which more than one person mentioned, and the lack of a consensus as to the order in which those books should be used by the developing translator, made this latter idea unworkable. The list of these references which I have compiled² simply indicates those books recommended by more than one person. Of these, the Semeonoff book was mentioned most often. It is probably best for the prospective translator to decide which ones might be useful to him, and in what order he will work through them.

PROBLEMS AND PITFALLS

In my survey of Plenum's chemistry translators, I also solicited their opinions on a number of potential hazards which Dr. Perry referred to in "Chemical Russian, Self-Taught" and asked them to point out any others which they had encountered in their work. Judging by the responses, deciphering nomenclature is the biggest headache for the translator of Russian chemical literature. One translator expressed the feelings of many this way: "A given author all too frequently does not conform to international agreement, chemical abstracts nomenclature, or other Russian nomenclature." Difficulty in this matter can be minimized if the author includes formulas and structural diagrams, but only 25% of Plenum's chemistry translators felt that this was done often enough to avoid problems in most cases. Thus, what might be literally translated as "1,2-chlorobromopropane" should in fact be "1-bromo-2-chloropropane." To complicate matters, old-fashioned names are still used in some instances, and in others the word does not mean what it seems to mean. Some examples of these are given in Table IV.

In addition, there are cases when the same word has two or more meanings. In the case of the Russian word "efir," for example, "ester" or "ether" may be intended, depending on the context. As one translator put it, "the more chemistry you know, the more often you will be

Table IV. Misleading Terms

| Literal Translation | Should Be |
|----------------------|------------------------|
| Isobutenyl | 2-Methylallyl |
| Benzene | Gasoline |
| Benzol | Benzene |
| Chloranhydride | Acid chloride |
| Ethylsulfuric acid | Ethyl hydrogen sulfate |
| Carbobenzoxychloride | Benzyl chloroformate |

able to tell which it is (it is often both...), but I think there are times when it is impossible to tell, no matter how much chemistry you know." Another translator cited her experience with this problem as follows:

"I'll never forget the article that had 'efiry' in the title. I had to read halfway through the article before I decided it was referring to esters. Then, when I had translated three quarters of the article I discovered that they had studied some ethers, too, and had lumped them together. Their use of modifying adjectives, 'simple' and 'complex' to denote ethers and esters, respectively, is not too effective either, since sometimes they just differentiate, while sometimes they mean simple and complex."

A similar difficulty was noted regarding the Russian word "oksi." Most of the time it means "hydroxy," but every so often it is used to mean "oxy," or even "oxo" on rare occasions. In the same way, "nitryl" can mean "nitryl" or "nitride."

The most sensitive area of the nomenclature problem seems to be in phosphorus chemistry and the heteroelements. One translator said a large book could be written about nomenclature for this area, since the differences arise because the Russian and western nomenclatures are based on different principles.

In general, the extent of the problem of nomenclature depends on the publication being translated; "pure" chemistry publications seem to cause fewer problems than industrial and technological ones.

A problem of a less technical nature is the Russian habit of avoiding the use of one noun to modify another by using roundabout adjectival arrangements instead. A simple example is "sodium chloride" in English. A Russian author would say, literally, "chloride of sodium." Of course, in extreme situations, this can lead to "...of....of....of...." if the translator tends to be too literal. As an example of how easy this can be, one translator says, "I personally find this quite troublesome because I 'think' in Russian and pretty soon it seems normal to say things in the roundabout way."

There are also many general problems in translating Russian chemical material which are common to any subject, and others which are particularly troublesome in chemistry:

The lack of an indication as to whether the article "the" or "a" should be used.

The double negative sentence construction.

The frequent use of abbreviations which are hard to identify (many translators mentioned this).

Roundabout sentences, with three or four subjects (cf. Wolcott Gibbs: "backward ran sentences until reeled the mind").

Overloaded sentences ("In a study of the chemical changes of benzene under the influence of ultraviolet radiation in an apparatus operating at constant temperatures designed by

the All Union Scientific Research Institute of . . . in the presence of various derivatives it was shown that. . .").

A number of translators felt that Russian journals contain more misprints than their western counterparts, but this may simply be the result of their having to work so closely with them. There are also differences in the quality of writing in the articles themselves, although again, this is not unusual in the west. However, there is admittedly a problem when an article is published by an author from one of the Soviet republics in which Russian is not the native tongue.

There are, naturally, many more comments on things of which a translator of chemical Russian should be wary, but it is impossible to list them all here. The most important ones have been mentioned.

For those in whom the foregoing has raised doubts about their resolution to become translators, I offer this final thought from another of Plenum's chemistry translators:

"If I had to start again, I would take a one-year elementary class (evenings) or lessons from an individual tutor, or if

these were not available, follow some radio or television Russian course. After that I would read any kind of Russian that interested me—Russian novels, Russian sports magazines, or scientific Russian, preferably with my feet up and the Russian dictionary on a distant shelf."

REFERENCES

- (1) Perry, J. W., "Chemical Russian, Self-Taught," Chemical Education Publishing Co., Easton, Pa. 1948.
- (2) Bondar, D., "Simplified Russian Method," Pitman, New York, 1942.
- (3) Perry, J. W., "Scientific Russian," Interscience, New York, 1950.
- (4) Potopova, Nina, "Russian Elementary Course" (in two volumes), Foreign Language Press, Moscow; condensed in "The Penguin Russian Course," Penguin, Baltimore, Md., 1959.
- (5) Semeonoff, A. H., "A New Russian Grammar, Dutton, New York, 1955.
- (6) Turkevich, J., Turkevich, L. B. "Russian for the Scientist," Van Nostrand, Princeton, N. J., 1959.

The Accuracy of Chemical Production Forecasts as Reported in the Literature

JAMES H. SCHWARTZ

Technical Information Section, Celanese Research Co., Summit, N. J.

Received December 2, 1969

Estimates of production in the United States of 20 organic chemicals for 1965 as reported in ten trade journal articles are compared with production figures recorded in *Synthetic Organic Chemicals, U. S. Production and Sales* published by the U. S. Tariff Commission. Of 23 forecasts, 17 were underestimates and six were overestimates. Of nine estimates made before 1964, all were lower than Tariff Commission figures. The most recently published estimates were most accurate. Of 12 estimates made in 1965, all were at least 80% accurate. Twelve of 18 estimates from *Chemical & Engineering News* were more than 80% accurate.

Numerous articles published in trade journals contain estimates of capacity, production, and consumption of synthetic chemicals. Although theories and techniques used in making these market forecasts have frequently been described, little attention has been directed toward the accuracy of the predictions.

Recently, Pafford¹ analyzed 40 marketing research forecasts prepared by consultants and marketing personnel of chemical consuming industries. The forecasts included capacity, demand, output, and sales figures for 1965-67. By comparing forecast figures with actual government figures, he found that 72.5% of the forecasts were too low by a mean of 17.25%.

In this report, forecasts of only one market parameter, production, for a single year (1965) are studied. Estimates

of production in United States of 20 organic chemicals for 1965 as reported in ten articles are compared with production figures recorded in *Synthetic Organic Chemicals, U. S. Production and Sales* published by the U. S. Tariff Commission (USTC).

In Table I, year in which forecast is published, estimated production, Tariff Commission production figures, difference between estimates and USTC figures and accuracy of estimates (%) for each chemical are shown.

As shown in Table II, 17 of the 23 estimates were underestimates and six were overestimates. Of the nine forecasts made before 1964 all were lower than the Tariff Commission figure.

The most recently published estimates were most accurate. Of the 12 forecasts made in 1965, all were