cephalocarid-trilobitoid crustacean only 3 millimeters long (*15*), is highly suggestive in this connection. If the primitive Precambrian brachiopods and trilobites and their associates were also quite small, as seems likely, the amount of organic debris that may have been preserved is considerably reduced, the fossils will not be readily visible, and the probability of discovery is lessened. Examination of Precambrian sediments by suitable microscopic, isotopic, and chemical methods may reveal particles of shell fragments and other structures of the ancestral coast-line fauna mixed in with these transported sediments. Organic microstructures of this sort will not be common in Precambrian rocks. Fossils are rare in any event, and with life less abundant in the seas of Precambrian time, the chances of finding these transported materials are correspondingly low (*16, 17*).

References and Notes

1. We are concerned here only with the remains of multicellular, hard-shelled organisms which make up the bulk of the record and not with "trace-fossils" such as trails, burrows, tracks, and other signs of the activities of soft-bodied bottom dwellers whose systematic relations are unknown and which occur in Precambrian rocks. For a discussion of organisms of the latter type, see A. Seilacher (*2*).
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11. For a more complete discussion and documentation of this argument, see *7, 9,* and *10*.
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13. R. H. Fleming, *Geol. Soc. Am. Mem. No. 67* (1957), vol. 1, p. 87.
14. The problem of their exact time of appearance in the record rests in part on determining the synchroneity of the base of the Cambrian across the world. Since the earliest faunas are meager in number and distinctive type and, also, display important regional differences, precise correlation of widely separated areas is not readily possible. There is a strong probability that the basal Cambrian fossiliferous rocks are not of exactly the same age everywhere in the world; some appear to be older than those of the type section in Wales.
15. H. L. Saunders, *Systematic Zool.* 6, 112 (1957).

16. For critical comments and suggestions I am indebted to C. A. Nelson, Alexander Stoyanow, and E. L. Winterer of the Department of Geology, University of California, Los Angeles; to Robert E. Smith, Department of Physiology, University of California Medical School, Los Angeles; to Joel W. Hedgpeth, director, Pacific Marine Station; to James Gilluly and Preston E. Cloud, Jr., U.S. Geological Survey; to Ralph W. Chaney and J. Wyatt Durham, Department of Paleontology, University of California, Berkeley; and to Eliot Blackwelder, Hubert G. Schenck, and A. Myra Keen, School of Mineral Sciences, Stanford University.
17. This paper is an outgrowth of studies in paleobotany which have been generously supported by the National Science Foundation.

American Use of Soviet Medical Research

A study of 500 medical scientists shows that they make comparatively little use of Soviet work.

Saul Herner

During the past several years there has been a growing interest in the United States in Soviet scientific research. This interest has arisen in part from the political concern of the United States in the over-all activities of the Soviet Union and in part from a growing awareness of an acceleration of activity in science and technology in the Soviet Union since World War II.

One outgrowth of the increased interest in Soviet science has been a program organized by the National Institutes of Health to make Soviet medical research information more readily available to American medical scientists. This program was instituted at the request of the Committee on Appropriations of the United States Senate. It grew out of testimony at the 1956 appropriations hearings of the Department of Health, Education, and Welfare, during which it was observed that Soviet medical scientists are keenly aware of American developments in medicine but that American medical scientists know very little about Soviet medical research activity. The presumed advantage that Soviet medical scientists have over the American scientists is twofold. First, the Soviet scientists benefit from a broad and intensive foreign-information-gathering and translation program in the Soviet Union which covers practically every area of science and practically every nation's literature; second, where American medical research information is concerned, the average Soviet scientist has the advantage of having a fair working knowledge of the English language.

This article (*1*) is an account of the findings of an interview study which was performed at the request of the National Institutes of Health to define the extent and character of the need for Soviet medical research information among American medical scientists and to evolve the best means of meeting this need. The study was also designed to analyze the present mechanisms of use of Soviet medical research information among American medical scientists. In cases where Soviet research information was not being used, it was also the purpose of the study to ascertain and evaluate the reasons for the lack of use. Among the questions considered in ascertaining the reasons for any established lack of use of Soviet information were those of the respondents' familiarity with Soviet work in their fields of science and their general attitudes toward the Soviet Union and Soviet science.

Derivation and Character of the Sample

The sample for the study consisted of 500 American medical scientists. These scientists were drawn from 59 medical research organizations in six American cities. The organizations represented hospitals, medical schools, government agencies, pharmaceutical firms, and independ-

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Table 1. Respondents' use of, and ability to read, foreign-language literature.

Foreign language	Respondent			
	Encounters most often (%)	Can read (%)	Has read in past 6 months (%)	Has read abstract in past 6 months (%)
German	89	87	62	26
French	71	87	60	21
Spanish	18	28	12	5
Italian	15	28	13	2
Russian	5	6	3	0
Scandinavian	4	7	3	1
Japanese	3	1	1	0
Dutch	2	5	2	0
Other	4	13	4	3
None	4	4	20	63

ent research institutions. The cities in which organizations were chosen for study were New York, Philadelphia, Baltimore, Washington, Chicago, and Cleveland. These cities were chosen because they represented a concentration of medical research activity. The 500 scientists interviewed represented all of the major fields of medical research. The median age of the respondents was 36. Forty-five percent had M.D. degrees; 45 percent had Ph.D. or D.Sc. degrees; and the remaining 10 percent had various other scientific degrees.

The specific organizations from which the respondents were drawn were selected from such reference works as the National Research Council's *Industrial Research Laboratories in the United States and Canada,* the American Council on Education's *American Colleges and Universities,* and the National Science Foundation's *Grants and Contracts for Unclassified Research in the Life Sciences.* The selection of organizations for study was intentionally skewed so that places most likely to have facilities for obtaining and utilizing Soviet information would dominate the sample. This was done to alleviate an anticipated (and subsequently justified) fear that if the sample were completely random it would contain so few respondents having experience with Soviet medical research information as to limit severely the implications and significance of the study.

Representativeness and Statistical Dependability of the Sample

In view of the intentional bias in the selection of organizations for study, it is obvious that the sample cannot be considered representative of all medical research activities in the United States. The conclusions and implications drawn from the study are valid only for the specific organizations in the sample.

Statistically, with the limitations noted, the sample of respondents drawn is of an adequate size to ensure a fairly high degree of quantitative dependability. With a sample of 500, the maximum sampling error is in the vicinity of 4 percent. Furthermore, as a result of the method of sampling, in which the number of respondents chosen in each organization was a function of its proportionate size, and in which the individual respondents were selected randomly, there is reasonable assurance that the sample constitutes a proportionately representative profile of the limited universe.

Interviewing

The interviews were conducted by a staff of trained interviewers, all of whom were experienced in face-to-face interviewing techniques. To supplement their past experience and training, each of the interviewers was carefully oriented as to the nature and purposes of the study. This training was done by means of lectures and demonstrations, mock interviews, and trial interviews.

Draft schedules were prepared and pretested on medical research personnel in organizations outside the sample orbit. At the end of the pretesting, indicated editorial changes were made in the draft schedules, and the final schedules were drawn up.

While the majority of the questions in the schedule were of the precoded or check-off type, they were kept sufficiently open-ended to permit answers other than those anticipated. The interviewers were instructed to record verbatim all information volunteered by respondents in answer to questions. In the case of discussion questions, the interviewers probed to obtain the most detailed answers possible. The average interview consumed approximately an hour and a quarter.

Linguistic Ability and Use of Foreign-Language Literature

For purposes of obtaining background information against which the relative use of Soviet information might be measured, each of the respondents was asked a series of questions about the foreign languages he encountered most frequently in his professional reading, his linguistic abilities, and his actual use of foreign-language publications in the previous six months.

As might have been expected, German and French were by far the most frequently encountered foreign languages. After German and French came Spanish and Italian. Next came Russian and Scandinavian, followed by Dutch.

In order to develop data on linguistic abilities, each of the respondents was asked to list all languages that he could read with reasonable facility. For the purposes of the present study, being able to read a language with "reasonable facility" was defined as being able to get through a scientific or technical paper in that language with the aid of a dictionary. As in the case of foreign languages encountered, German and French stood out as the foreign languages in which the greatest proportion of the respondents had reading ability. Following German and French were Italian and Spanish. Next came Scandinavian languages, Russian, Dutch, and Japanese (see Table 1).

Further detail on the use made of foreign-language literature was obtained by asking each of the respondents whether he had read any technical literature in foreign languages in the previous six months and, if so, in what languages. The answers paralleled those obtained from the previous two questions. Sixty-three percent of the respondents had read technical literature in German in the previous six months; 60 percent had read literature in French; 13 percent in Italian; 12 percent in Spanish; 3 percent in Russian; 3 percent in Scandinavian languages; and 2 percent in Dutch. Twenty percent of the respondents had not read any technical publications in a foreign language during the previous six months.

Degree of Use of Soviet Information

In order to establish a dependable basis for defining the type and extent of use of Soviet information by the respondent group, each respondent was prescreened by means of a question which asked whether or not he had sought or obtained any information on Soviet research in his field during the previous six months. Those respondents who answered the question affirmatively were asked a series of detailed questions which they were to answer on the basis of their actual recent experience with respect to Soviet information. Those respondents who had not sought or made use of Soviet information in the previous six months were asked another set of questions, designed to establish the reasons for this lack of use.

As it turned out, slightly less than half of the respondents had sought or made use of Soviet information in the previous six months. The majority of the preclinical scientists had sought or obtained Soviet information in the previous six months, and the majority of the clinical scientists had not.

Methods of Obtaining Soviet Information

The first question that was put to the respondents who had sought or obtained Soviet information was where they had obtained it (if they had succeeded in obtaining it). As it developed, these respondents used a variety of tools and methods in getting it.

The primary means was through the indexing and abstracting publications. The second most general method of obtaining Soviet research information was through English-language papers, including review papers, in which Soviet developments were discussed. The third most important source of Soviet information was the translated paper or book. The fourth most frequently cited means of obtaining Soviet information was through reports from recent visitors to the Soviet Union or through personal conversations with such persons. Fifth in importance were papers in the Russian language and abstracts and proceedings of meetings. Then came translated editions of Soviet journals and attendance at international meetings, followed by conversations with visitors from the Soviet Union.

As a means of evaluating the usefulness of the various methods and tools for obtaining access to Soviet information, each of the respondents who had had experience with such information in the previous six months was asked what method or tool he considered most valuable in obtaining it. The overwhelming answer was, indexing and abstracting publications.

Ways to Learn of Soviet Information

In order to determine whether medical scientists use different methods to apprise themselves of Soviet information from those they use to get information from other countries, each of the 500 respondents was asked how he became aware of the existence of scientific information in general, of foreign-language information in general, and of Soviet information. As it developed, there were significant differences.

In the case of scientific information in general, the average respondent used 7.6 different tools or methods for learning of the existence of useful information; for foreign-language information, the average number of tools or methods was 4.4; for Soviet information, this number was 1.6.

In all three cases, the most prominent tools or methods were indexing and abstracting publications, footnotes or cited references, personal recommendations, and personal reference files. However, there is an interesting shift in the relative importance of these tools or techniques as one goes from information in general, to foreign-language information in general, to Russian information (Table 2).

When asked how they became aware of information in general, the respondents placed cited references and indexing and abstracting publications on an approximately equal level of importance, with personal recommendations and personal reference files slightly behind. In the case of foreign-language information in general, the significance of cited references diminished slightly and the significance of indexing and abstracting publications rose. Where only Soviet information was concerned, the significance of indexing and abstracting publications rose to nearly twice that of cited references. Personal recommendations also rose in importance.

The element of chance or accident was relatively great for all three types of information. However, there is a definite diminution in the role of chance or accident as one goes from information in general, to foreign-language information in general, to Soviet information. This pattern would seem to relate to the falling off in the number of bibliographic tools used by the respondents in their efforts to learn of Soviet and other foreign-language information, as opposed to information in general.

Indexing and Abstracting Publications

In all, 40 different indexing and abstracting publications were mentioned by the respondents as having been used for locating or learning of Soviet information. The one most frequently mentioned was *Chemical Abstracts*; this was followed, in order of rank, by *Biological Abstracts, Current List of Medical Literature, Chemisches Zentralblatt, Excerpta Medica, Translation Monthly, Library of Congress Bibliography of Translations from Russian Scientific and Technical Literature* (2), *Library of Congress Monthly List of Russian Acces-*

Table 2. Tools or methods for locating, or becoming aware of sources of, information about Soviet medical research, used in the past 6 months.

Tools or methods	For information in general (%)	For foreign information (%)	For Soviet information (%)
Footnotes or other cited references	97	79	29
By chance or accident, while looking through publications	96	70	31
Indexing and abstracting publications	95	86	53
Personal recommendations	88	61	25
Personal reference files	81	49	10
Book reviews	70	26	4
Library card catalogs	69	17	2
Publishers' advertisements	67	16	1
Library acquisition lists	59	21	4
Separate bibliographies	42	16	5
Other	2	2	13
Average No. of methods used	7.6	4.4	1.6

sions, Psychological Abstracts, Quarterly Cumulative Index Medicus, Leukemia Abstracts, and the Consultants Bureau's list of available Soviet translations. It is interesting to note, in further confirmation of the narrowing of the variety of bibliographic tools and techniques used in specialized literature, that the use made of the first five indexing and abstracting publications named was greater than that made of the remaining 35 combined.

Soviet Journals

Another measure of the use that is made of Soviet literature and Soviet information is the degree to which the respondents endeavor to see Soviet journals on a frequent or regular basis. In order to develop data on this point, each of the respondents who had sought or made use of Soviet information during the previous six months was asked whether there were any specific Soviet journals that he saw either regularly or occasionally.

Of the 240 respondents who had sought or obtained Soviet information in the previous six months, 58 did see specific Soviet journals on a regular or occasional basis. The median number of journals named by the respondents was one, although several named as many as five. Eight of the respondents who saw Soviet journals with some frequency saw them in translated form.

In all, 15 Soviet journal titles were named by the respondents who did see Soviet journals. These titles, in order of rank, by number of times mentioned (figures in parentheses), are as follows: *Biokhimiya* (16), *Zhurnal Obshchei Khimii* (10), *Doklady Akademii Nauk S.S.S.R.* (8), *Byulleten Eksperimental'noi Biologii i Meditsiny* (7), *Fiziologicheskii Zhurnal S.S.S.R. imeni I. M. Sechenova* (4), *Mikrobiologiya* (3), *Biofizika* (2), *Meditsinskaya Parazitologiya i Parazitarnye Bolezni* (1), *Sovetskaya Meditsina* (1), *Terapevticheskii Arkhiv* (1), *Voprosy Virusologii* (1), *Zhurnal Analiticheskoi Khimii* (1), *Zhurnal Mikrobiologii, Epidemiologii i Immunobiologii* (1), *Zhurnal Nevropatologii i Psikhiatrii imeni S. S. Korsakova* (1), and *Zhurnal Priklad'noi Khimii* (1).

As still another means of establishing the use made of Soviet publications, each of the respondents who had had experience with Soviet information in the previous six months was asked whether he had had any Soviet material translated during this period. Forty-four had, 184 had not, and 12 did not answer. The bulk of the translated items were papers from Soviet journals. For the most part, the translations were made within the respondents' own organizations, either formally, when staff translators were available, or informally, by colleagues, staff members, and similar personnel.

Evaluations of Soviet Journals

In answer to a follow-up question on how the Soviet journals compared with their American counterparts, none of the respondents who saw Soviet journals on a regular or occasional basis thought them superior; 18 thought them equal to their American counterparts; 25 thought the Soviet journals inferior; and 15 did not express an opinion. Along with the value judgments as to the relative merits of Soviet journals, a record was kept of the verbatim remarks of the respondents on the subject.

The remarks took many different forms and covered many areas. However, they can be distilled down to the following points: In over-all quality, the Soviet journals seen by the respondents vary, like all journals, from good to bad. But, in general, they are inferior in quality to comparable American journals. The papers are often uninteresting, they leave out important details, and they are poorly documented. The theories expounded in the papers are not modern, although an occasional novel idea seeps through. There is an overemphasis on applied science, to the detriment of coverage of basic science. The papers do not appear to be politically slanted.

Table 3. Respondents' opinions of current Soviet medical research.

Evaluations	Respondents		Both groups (%)
	Had sought or obtained Soviet information in past 6 months (%)	Had not sought or obtained Soviet information in past 6 months (%)	
Don't know, or no opinion	30	60	46
Good, or adequate, or equal to U.S.	33	13	23
Of inferior or questionable quality	30	23	26
Varies from good to bad	8	3	6

Reasons for Not Using Soviet Information

To turn now to the question of why over half of the respondents had not sought or obtained any Soviet research information during the previous six months, the primary reasons stated were lack of accessibility and lack of familiarity. First, it was felt that there are no fully adequate keys to make the American scientist aware of the existence of pertinent Soviet information, and that, if there *are* keys, they are not being sufficiently publicized. Second, the nonusers expressed the feeling that they could not obtain up-to-date Soviet publications. Third, there was the language barrier and the difficulty of obtaining translations when and as they are needed. Fourth, there was the problem of inadequate contact, correspondence, and exchange of information with Soviet scientists on a person-to-person basis. This was related, in the minds of a number of the respondents, to security restrictions imposed by both the United States and Soviet governments. Fifth, and related to the fourth problem, was a lack of familiarity with notable Soviet workers in fields of interest to the respondents. Sixth, there was an ignorance of what the Soviet Union is doing in pertinent fields and of whether it is worth looking into.

In addition to the problems of inaccessibility and unfamiliarity, there was a proportion of the respondents who did not believe that the Soviet medical scientists were doing work in subjects of immediate interest to them. Coupled with this was the feeling of many of the respondents that the Soviet work in their fields was on a low technical level and unreliable. Finally, there was the overriding problem of inertia: A large percentage of the respondents who had not sought or obtained Soviet information in the previous six months, when asked whether there was any particular reason for this, answered that they simply felt no specific need for Soviet information, that they were not in the habit of looking

for it or using it, or that they did not have time to look for it. Related to these attitudes is the remark of a number of the respondents to the effect that, in seeking information, they did not single out any countries in particular but were interested in pertinent work wherever it was being done.

Accessibility of Soviet Information

In order to probe a bit deeper into the over-all problem of accessibility, each of the respondents was asked specifically whether he considered Soviet information in his field to be readily available to him. In cases where the respondent answered "no," he was asked to describe any particular problem that he had encountered in obtaining Soviet information. In answer to the first question, 6 percent of the respondents considered Soviet information readily available to them; 76 percent did not consider it readily available; and 18 percent did not know. Of the respondents who did not consider Soviet information readily available, 54 percent had never tried to obtain it. This merely reemphasizes the fact that the small use that is made of Soviet information by American medical scientists is due, in large measure, to a simple lack of interest in it. In all other respects, the problems described as posing barriers to obtaining Soviet information were exactly the same as those described in answer to the question about why the respondent had not sought or used Soviet information in the previous six months.

Increasing Availability of Soviet Information

As a logical extension of the discussion of the availability of Soviet information, all of the respondents were queried about possible means of increasing its accessibility. The suggestions advanced fell into four general categories. The most widely recommended method for increasing the availability of Soviet information was by improving the coverage of Soviet literature by indexing and abstracting publications. This would seem to follow logically on the heavy reliance that is already placed on indexing and abstracting publications as a means of obtaining and learning of the existence of Soviet and other foreign-language information.

A number of the respondents (considerably fewer than those who wanted broader coverage in abstracting publications) suggested the dissemination of translated tables of contents of current Soviet medical periodicals. Actually, the Russians have made a start in this direction themselves by resuming the practice of including English-language summaries and tables of contents in their major medical science journals.

The second category of recommendations dealt with translations. There was fairly general agreement that some sort of translation service is needed to make Soviet information more readily and more cheaply available. There were a number of opinions about just what should be translated and how the needed translation program should be conducted. The largest segment of the recommendations was for facilities for having translations made on request, with the individual scientist ordering translations of specific items as he needs them. Then there was a group that suggested cover-to-cover translations of selected Soviet journals. A somewhat smaller group wanted translations of selected articles.

The third category of recommendations called for the fostering of more direct contact between the American scientist and the Soviet scientist through such devices as meetings in which American and Soviet scientists participate, the promoting and encouraging of exchange visits by American scientists to the Soviet Union and by Soviet scientists to the United States, and correspondence with Soviet scientists. A number of respondents emphasized the need for allaying the fears of many American scientists that keep them from making contact with Soviet scientists.

A fourth and final category of suggestions had to do with making the Soviet publications themselves more accessible. A number of respondents were concerned with the fact that, once they become better acquainted with Soviet work in their fields, through abstracts, cited references, and other means, they would develop a growing need for the literature cited or abstracted. They anticipated the frustrations which might arise from knowing of the existence of possibly useful material and being unable to get hold of it. A number of respondents expressed the opinion that, in many cases, abstracts or translations would not be sufficient, and that the original publications would be necessary. In order that these publications might be made available as needed, these respondents suggested establishing some sort of centralized or regional facility for distributing reprints and photostats of Soviet publications on request.

Evaluation of Soviet Medical Science

Eventually, whatever is done to improve the availability of information on Soviet science must be related to its quality. Obviously, if the quality of Soviet science is high in the eyes of American scientists, there is an inducement to obtain and make available more information about it. On the other hand, if the assessed quality of Soviet science is low, there would seem to be less point in undertaking any special efforts to make information about it available.

The respondents' opinions of the quality of Soviet journals have already been discussed. In addition to the matter of the quality of Soviet journals, each of the respondents was queried about his opinion of the quality of Soviet research in his field. For purposes of comparison, the answers obtained from those respondents who had made use of Soviet research information in the previous six months were separated from the answers of those who had not.

In general, the respondents' opinions of Soviet research were fairly evenly divided between "good" and "bad." Forty-six percent did not venture an opinion; 23 percent categorized it as either good, adequate, or on a par with American medical science; 26 percent considered it inferior or of questionable quality; and 6 percent thought the quality varied from good to bad (Table 3).

There was an interesting contrast between the opinions of the respondents who had sought or obtained Soviet information in the previous six months and those who had not. Among the respondents who had had some recent experience with information on Soviet science, 30 percent had no particular opinion about its quality; 33 percent were favorably impressed by it; 30 percent considered it inferior or of questionable quality; and 8 percent thought its quality varied from good to bad. Among those respondents who had not sought or obtained Soviet information in the previous six months, the opinions were reversed: 60 percent had no opinion; 13 percent considered Soviet science to be good, adequate, or comparable to our own; 23 percent considered it inferior; and 3 percent considered it variable.

Criticism of Soviet Medical Science

As is frequently the case, those respondents who were critical of Soviet science had much more to say to justify

their opinions than did those who were favorably inclined toward it. The primary criticism advanced by those respondents who were not favorably disposed toward Soviet science was that it is not trustworthy. The second most often expressed criticism was that the work of Soviet scientists is behind the times. Another fairly large group considered Soviet science to be politically biased (seemingly contradicting the group which considered Soviet research journals not to be politically biased—a group that was considerably smaller than the present one). Another comment, which was also made in connection with Soviet research journals, was that the Russians tend to overemphasize applications and are not interested enough in basic research.

In addition to the clearly critical comments, a number of the respondents stated that their lack of interest in Soviet science stemmed from the fact that the Russians and Americans work in different fields. This comment may serve to explain the earlier comment, made by a number of respondents, that the Russians are good in "other" fields. It could also explain the general apathy of the respondents toward Soviet science, although distrust and ignorance are also factors.

The gist of the favorable comments was that Soviet medical science is improving; that the Soviets used to do good work, and that this is an indication that they are capable of it; that they do good work in other fields (other than that in which the respondent is working); that they do good work in fields connected with warfare; that their scientific facilities are equal to ours; and that their freedom and lack of moral restriction in their conduct of experiments are a help to them. In addition to the foregoing comments, which encompass the views of the largest segment of the respondent group, a fair number of respondents used such adjectives as "highly imaginative," "unique," "uninhibited," and "fantastic" in their evaluations of Soviet science. It is difficult to say whether the last adjective is actually an accolade or a condemnation.

Knowledge about Soviet Workers

Another measure of the value placed on Soviet science by the respondents is their interest in the activities of specific workers in the Soviet Union. In answer to a question on the subject, 94 of the respondents named specific Soviet scientists whose writings they said they would like to see translated into English. They named a total of 96 different Soviet scientists. The average number named was two. There was an interesting repetition in the names mentioned, indicating independent agreement about the apparent importance of the Soviet scientists involved. One scientist, Braunstein, was named 15 times; another, Englehardt, was named 14 times; and a third, Smorodinzev, was mentioned 12 times. In a few cases, in naming Soviet scientists, it developed that the respondents were thinking of scientists they *used* to follow. While every effort has been made to correct for this in the tally, it is probable that a small percentage of the scientists named and counted are no longer living.

The ten scientists named most frequently were the following: Braunstein (biochemistry, enzymology), Englehardt (biochemistry), Smorodinzev (virology), Kritzman (biochemistry), Orbeli (physiology), Bykov (physiology), Beritoff (physiology), Palladin (biochemistry), Oparin (biochemistry), and Schumakov (virology, bacteriology). Actually, the fields covered by the Soviet scientists named practically run the gamut of preclinical and clinical medical science. In addition to the fields already mentioned, these included the following: biostatistics, cardiology, dentistry, dermatology, embryology, epidemiology, genetics, hematology, medicine, neurology, ophthalmology, pathology, pediatrics, pharmacology and therapeutics, psychiatry, radiology, and surgery. From the foregoing data, it is clear that the Soviet Union, like most other countries, has its "name" scientists, who are known and respected by their counterparts in the United States. There also is apparently good agreement about who these "name" scientists are.

Ratings of Soviet with Other Foreign Research

One other means used in the present study to elicit value judgments of the quality of Soviet medical research was to ask the respondents whether there were any other foreign-language countries whose research activities they would like to know more about, and to have

Table 4. Respondents' rating of Soviet medical research against medical research in other foreign-language countries.

Country	No. of times cited	No. of times ranked above U.S.S.R.	No. of times ranked below U.S.S.R.	No. of times ranked equal to U.S.S.R.	No. of times comparison with U.S.S.R. was not possible
Germany	106	53	10	1	42
Japan	90	33	26	4	27
France	60	23	4	1	32
Czechoslovakia	44	5	21	0	18
Italy	44	10	6	0	28
Sweden	37	14	1	0	22
Hungary	36	4	14	1	17
China	28	3	13	0	12
Poland	21	1	12	1	7
Switzerland	21	7	0	0	14
Argentina	20	5	5	0	10
Brazil	12	2	3	0	7
Denmark	10	6	1	0	3
Holland	10	5	1	0	4
India	10	1	4	0	5
Finland	9	0	3	0	6
Yugoslavia	8	1	6	0	1
Spain	7	1	0	0	6
Mexico	6	2	1	0	3
Austria	5	1	1	0	3
Israel	4	0	1	0	3
Norway	4	0	0	0	4
Belgium	3	1	0	0	2
Chile	3	0	2	0	1
South Africa	3	1	0	0	2
Portugal	2	0	0	0	2
Rumania	2	0	2	0	0
Cuba	1	1	0	0	0
Totals	606	180	137	8	281

them rate these other countries against the Soviet Union. This line of questioning produced a list of 28 countries. The countries named most frequently were Germany, Japan, France, Czechoslovakia, Italy, Sweden, Hungary, China, Poland, and Switzerland, in that order. Of these countries, Germany, Japan, France, Italy, Sweden, and Switzerland were generally rated above the Soviet Union, and Czechoslovakia, Hungary, China, and Poland were generally rated below.

On examining the list of countries cited (Table 4), it is clear that one of the greatest stimulants to the use of information is familiarity with its source. This is demonstrated by the expression of the need for more information from countries such as France and Germany, whose information is already abundantly available and heavily used. This expression of need may, of course, be related to the form in which American medical scientists prefer to get their German and French information; it may merely mean that they are not getting enough information on German and French research activities in the English-language articles and abstracts from which they ordinarily expect to obtain it.

To return to the question of how the respondents rated the countries they named in comparison with the Soviet Union, the fact that emerges most clearly is that the Soviet Union is an enigma to the American scientist; he cannot say with certainty how he would rate the Soviet Union against countries whose work he is familiar with. In the comparative ratings, there were 180 cases in which countries were rated above the Soviet Union, 137 cases in which countries were rated below the Soviet Union, eight cases in which the Soviet Union was rated equal to the countries mentioned, and 281 "don't know's." If the thesis that familiarity with a country's work stimulates interest in it is a correct one, the present lack of familiarity with the Soviet Union is likely to be self-perpetuating, unless some sort of artificial stimulus is utilized to alter the situation.

Conclusions and Implications

From the foregoing discussion, it is evident that lack of accessibility and a resulting lack of familiarity overshadow and limit the respondents' use of Soviet medical research information. The choices of methods for learning about pertinent Soviet activity are severely limited. The importance of indexing and abstracting publications in the case of Soviet information is heightened, and the importance of such prominent tools as cited references in the English-language literature is diminished. Authors apparently do not refer as much to Soviet publications as they do to those of other foreign-language countries. The reluctance or inability of authors to give greater attention to Soviet developments in their discussions and references has had a limiting effect on the methods available to the respondents for keeping abreast of Soviet work in their fields.

Another factor which has a limiting effect upon the respondents' use of Soviet information is their apparent unwillingness to read foreign-language literature. From the answers to questions about the respondents' ability to read foreign languages and their actual use of such literature, it is evident that linguistic ability alone does not ensure the use of foreign-language literature. However, this conclusion should be tempered by the understanding that reading in a language other than one's mother tongue is bound to be comparatively slow and difficult, and is bound to be avoided or at least infrequently practised because of sheer lack of time. This factor would undoubtedly limit the use of Soviet literature, even if it should become universally available and even if a large percentage of American scientists develop a reading knowledge of Russian.

It is possible that the present Soviet practice of including English summaries and tables of contents in Soviet medical journals will alter the situation somewhat by easing the language problem and ultimately making pertinent work in the Soviet Union more familiar to the American medical scientist. Perhaps this will be a means of curbing the distrust and lack of interest which presently characterize the American medical scientist's attitude toward Soviet research. A number of the respondents mentioned having read Soviet journals in the past when these included English summaries. Perhaps this activity will now be resumed, provided that pertinent Soviet journals are made available to would-be users.

On the other hand, increased accessibility of the information contained in Soviet journals could have exactly the opposite effect, by exposing current Soviet research to a degree of criticism which has not been possible in the past. It is possible that the availability of Soviet journals in a form which permits perusal will serve to amplify the critical attitudes of American scientists toward Soviet medical science. In a significant number of cases in the present study, respondents mentioned having been unable to duplicate experiments and results reported in Soviet journals. Such experiences are bound to color a scientist's attitude toward Soviet research and his interest in Soviet information even if the information is readily available.

But distrust or skepticism are not the only factors that may militate against the use of Soviet medical research information. The basic problem that makes it difficult to induce medical scientists in this country to make more use of Soviet research than they do is that they think in terms of subjects, not countries. When a biochemist wants to know what is being done in a given field of interest to him, he wants to know what is being done everywhere, and not in one particular country. Indeed, if he were to concentrate on specific countries, he would run the danger of getting only a part of the picture. One question that the respondents put to the interviewers continually in the present study was, "Why Russia in particular?"

Ultimately, Soviet medical information will have to meet the test of the market place and rise or fall on its merits. There is no question but that Soviet medical research information has been less readily available to American medical scientists than has information from other foreign-language countries. The primary benefits that will accrue from the inclusion of English titles and summaries in Soviet journals, and from the various steps that agencies such as the National Institutes of Health are taking to make Soviet medical literature more broadly accessible, will lie in the fact that American medical scientists will be able to accept or reject the results of Soviet research in exactly the same way that they accept or reject the research of scientists in other countries. Whether increased accessibility of Soviet medical information will give rise to a greater appreciation of Soviet research will depend ultimately upon the quality and nature of that research.

Notes

1. I wish to express my indebtedness to Robert S. Meyer for his very significant contribution to the execution of the study on which this article is based.
2. Publication of the *Library of Congress Bibliography of Translations from Scientific and Technical Literature* was discontinued in December 1956.