SCIENTIFIC—INFORMATION CENTERS

IN THE U.S.A. AND THE U.S.S.R.

by

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GLOSSARY

ONTI	= Sector of scientific-technical information
SOVNARKHOZ	= Council of national economy; economic unit based on regional administration
VINITI	= All-Union Institute of Scientific and Technical Information
GOSINTI	= State Institute of Scientific and Technical Information
GPNTB	= State Public Scientific Technical Library
NASA	= National Aeronautics and Space Administration.
AEC	= Atomic Energy Commission
DOD	= Department of Defense
DDC	= Defense Documentation Center (Department of Defense)
OTS	= Office of Technical Service (Department of Commerce)
SIE	= Science Information Exchange (National Science Foundation)
NRC	= National Referral Service for Science and Technology (National Science Foundation)
STIF	= Scientific and Technical Information Facility (National Aeronautics and Space Agency)
OST	= Office of Science and Technology (Executive Branch, U.S.A.)
FCST	= Federal Council for Science and Technology, inter-U.S. Government Agency Group of DOD, AEC, NASA, etc.
JPRS	= Joint Publications Research Service (OTS)

FOREWORD

The effective use of scientific and engineering information has become a matter which is receiving world-wide attention. New technical information programs in U.S. agencies, such as the Department of Defense, are becoming well-established; the U.S. Government as a whole is organizing an aggressive coordinating effort through its Committee on Scientific Information. The structure of technical information activities in the Soviet Union is not well known, although much interest has been shown in these Soviet activities recently in Congress and elsewhere in the U.S.

This report provides a review of the Soviet and U.S. technical information systems. It is being printed for circulation only within the Department of Defense and other government agencies, and it is not being released for public distribution until after a decision is made on the use of this material by interested journals.

The report was prepared as an internally funded and staffed effort by the Battelle Memorial Institute when they learned of the interest of DDR&E in the approaches being taken to technical information systems in other countries. Happily, Battelle's excellent library of foreign literature and Battelle's internal specialized information center on the subject of technical information activities provided a convenient source of background material. The report has been released to the Department of Defense for issuance.

The decision to issue the report in its present form has been guided by the obvious need to keep the managers of the U.S. Government's technical programs promptly informed on where the U.S. stands with respect to technical information efforts in the Soviet Union. More facts are needed on what is being done in the Soviet Union. More facts are also needed on our own U.S. programs. This report is issued, therefore, to stimulate further efforts toward collecting and evaluating the facts about technical information systems in both countries.

<div align="right">

Walter M. Carlson
Director of Technical Information

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T. P. Kridler and G. S. Simpson, Jr.*

Battelle Memorial Institute has been designing and operating scientific-information centers for over 10 years. In connection with this activity, Battelle has studied the design and operation of other scientific-information centers in the U.S.A. Recently, this study was extended to include the organization and functions of information centers in the Soviet Union.

The U.S.S.R. has a scientific-information service similar to U. S. information centers. The service is called the ONTI (sector of scientific-technical information), which is a part of the organization of research institutes and industrial plants. In trying to understand the operation of the Soviet's ONTI's, it is necessary first to obtain some insight into the over-all Soviet scientific-information communication network, as well as that of the U.S.A. This is a logical step since, as expected, scientific-information centers in both the U.S.A. and the U.S.S.R. operate within an information complex and not as isolated independent services.

SELECTED QUOTATIONS REVEALING SCIENCE COMMUNICATION CONCEPTS OF THE U.S.A. AND THE U.S.S.R.

Department of Defense Directive No. 5100.36, dated December 31, 1962, stated with respect to its scientific and technical information program that "The program will be established as a coordinated structure of generally decentralized information activities . . . ".

In a report of the President's Science Advisory Committee Panel on Scientific Information, dated January 10, 1963, titled "Science, Government, and Information", the following comment is recorded on page 3:

"The Panel sees the specialized information center as a major key to the rationalization of our information system. Ultimately we believe the specialized center will become the accepted retailer of information, switching, interpreting, and otherwise processing information from the large wholesale depositories and archival journals to the individual user. The Panel therefore urges that more and better specialized centers be established".

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Dr. Jerome Wiesner of the Office of Science and Technology, states in part in the foreword of "Status Report on Scientific and Technical Information in the Federal Government", dated June 18, 1963:

".. . the federal government and its constituent agencies are developing principles for an effective science information system and an articulation between components that will focus activities for a common purpose. In this regard, we have adopted the view that it is both unwise and impractical to concentrate all of the science information activities in a single agency ...".

N. B. Arutyunov, director of the Main Administration for Scientific-Technical Information and Propaganda of the State Committee for Coordination of Scientific Research of the Council of Ministers, U.S.S.R., stated in June, 1962, that the Soviet scientific-technical information system must be centralized and be based on the branches of industry. [1]

U.S. AND U.S.S.R. SCIENTIFIC AND TECHNICAL INFORMATION NETWORKS

The Soviets report that they are developing a structured scientific-information network which they hope will permit a reduction in the lead-time of research and design work by publicizing achievements in Sōviet and foreign science and technology. The network includes agencies that perform centralized information-processing functions, but the primary responsibility for using scientific information at the research and production working levels lies with the ONTI's (sectors for scientific-technical information) within the research institutes and industrial plants.

The importance of the ONTI to the Soviet information network was described in a resolution of a scientific-technical council. [2] The council said: "Scientific-technical information is especially important in the research institute. A correctly functioning information service is an inseparable component of the research and design process inasmuch as it guarantees the use of the newest achievements in various fields of science and technology and promotes the successful solution of the institute's problems in the shortest possible time with minimal expenditure of creative resources and efforts. The information service (ONTI) must participate throughout the entire research process. It plays an important role in the initial and final stages — of the preparation of bibliographies and the selection of literature and other information sources, and also in the reporting of the research results. In addition, the information service must improve the general scientific-technical level of the institute's work and must organize an exchange of experience among the subdivisions and the individual researchers. All its work should be directed toward assuring a clear understanding by the institute's staff of the general mission, the basic principles and ideas underlying the assemblies and systems that are being developed". [2]

The content of the above resolution is quite similar to the observations made by the Panel on Scientific Information for the President's Science Advisory Committee in its January 10, 1963, report.

The ONTI is the basic unit of a complex Soviet network of scientific-information organizations that function on the national level, the republic level, the regional level, and within individual research institutes and production facilities. There are 4000 ONTI's in the network. Above them organizationally, in order, are the 94 economic region (sovnarkhoz) central bureaus of technical information, a number of republic-level information organizations, and 84 national-level organizations. [1,3] The Soviet scientific-information network is reportedly staffed by more than 50,000 people who perform interrelated and, at the higher levels, centralized information-processing functions. [3]

In the U. S. there are an estimated 250 specialized information centers, and new ones are being formed each year. [4] For example, a recent Government report makes the following statement regarding the growth of information centers:

"There has been continued growth in the number and use of specialized information centers both within the Government's own laboratories and also through support by some Government agencies of information centers in subject areas of particular interest . . .
The Department of Defense leads other agencies in the number of specialized information centers receiving support, with approximately 100 now functioning in their fields of competence and disseminating evaluated, condensed 'state of the art' reports. DOD plans to bring these information centers into a more effectively coordinated network in which there will be improved coverage of the major scientific and technical disciplines of direct interest to the Department. The National Institutes of Health is planning for a program of specialized information evaluation centers, three of which may be funded in FY 1963. Critical reviews, general-purpose summary monographs, and similar selective digests would be produced by each evaluation center. Similarly, the Atomic Energy Commission has already established more than a dozen such centers at its national laboratories, including two within recent months, one for radiation shielding and one for nuclear safety. Additional information centers are being planned by other agencies to cover a wide variety of scientific and technical areas in depth. " [5]

In the U. S. S. R. , other unofficial or quasi-official agencies such as publishing houses, the Moscow and Leningrad Houses of Scientific-Technical Propaganda, the scientific-technical societies, and the All-Union Society for Dissemination of Political and Scientific Knowledge also provide scientific-information services. These organizations, however, will not be discussed here.

The over-all Soviet scientific-information network is administered on a national scale (see Figure 1), and is both directly and indirectly under the Council

of Ministers, the highest government body in the Soviet Union. The agency that is directly responsible for the Soviet scientific-information system is the Main Administration for Scientific-Technical Information and Propaganda (see Figure 2), which is a component of the State Committee for Coordination of Scientific Research. The Main Administration, headed by Dr. N. B. Arutyunov, formulates the policies and coordinates the activities of all the agencies regardless of their administrative affiliation. The nearest U. S. equivalent to Arutyunov's office is the Committee on Scientific Information (COSI) of the Federal Council for Science and Technology. Arutyunov was trained as a metallurgical engineer, while the last two Chairmen of COSI have been U. S. officers of flag rank.

The U. S. scientific-information network cannot be depicted in so orderly and in so easily charted a structure as is that of the U. S. S. R. At present, while the U. S. Government's scientific-information network is becoming orderly, and possibly structured, the non-Government network is not.

Not only is the U. S. national science information network not structured, it is not clearly identifiable. For example, in a 1961 study of data on over 200 scientific-information centers in the U. S. , 97 centers were directly supported by the U. S. Government, and 97 were funded by private industry, professional societies, and research institutions.[4] Since 1961, the number of U. S. Government-supported centers has increased[5] by some unknown amount, as has the number of non-Government centers. Many U. S. industrial organizations maintain scientific-information centers, but published information on the details of these centers is inadequate for analysis. Indeed, private industry information centers and other information services are known which do not desire publicity because they have been established to service only scientists and engineers on their staff.[6] Nevertheless, the services provided by the U. S. scientific-information network are quite similar to those provided by the Soviet network. To emphasize this point, equivalent U. S. Government scientific-information-oriented committees, councils, and services have been included in Figures 1 and 2 for comparison purposes. Non-U. S. Government scientific-information oriented groups such as Chemical Abstracts Service of the American Chemical Society, the Engineers Joint Council, the National Federation of Science Abstracting and Indexing Services, industrial scientific-information centers and services, and publishers were not included in the figures since these U. S. groups are not organizationally bound to conform to any particular channel or structure − other than their own.

N. B. Arutyunov, in policy statements made in 1962[1,3], indicated that the Soviet scientific-technical information system will be centralized and will also be organized on the basis of specialized branches of industry. That is, the gross processing of Soviet and foreign scientific and technical literature will be centralized in a few large institutions, while the processing of specialized information that reports the achievements of production plants, research institutes, and planning-design organizations will be concentrated in national-level industrial information organizations.

Council of Ministers, U.S.S.R.

Supreme Sovnarkhoz

| Ministry of Culture U.S.S.R. | Academy of Construction and Architecture, U.S.S.R. | Academy of Medical Sciences, U.S.S.R. | Academy of Sciences, U.S.S.R. | State Committee for Coordination of Scientific Research | Committee on Inventions and Discoveries | Committee on Standards, Measures, and Measuring Instruments |

U.S. - None

U.S. - None

Department of Health, Education, and Welfare. National Institutes of Health

National Academy of Science, U.S.A.

Office of Science and Technology. Federal Council for Science and Technology

U.S. Patent Office

National Bureau of Standards

Main Administration for Scientific − Technical Information and Propaganda

Committee on Scientific Information (FCST)

Technical Libraries

Central Institute of Scientific and Technical Information

Information Institute

VINITI

GOSINTI

Central Bureau of Technical Information

Laboratory of Scientific-Technical Information of the All-Union Scientific-Research Institute

U.S. Govt. Developing

U.S. - None
Private Societies and Associations Provide Some Services. OTS May Assist

In U.S., Similar Work Done by Defense Documentation Center, Office of Technical Services, JPRS, NASA's STIF, AEC, NSF, and Private Groups

U.S. - None

U.S. - None

National Science Foundation and Department of Defense

Republic Council of Ministers

U.S. - None

Republic-Level Information Organizations

DDC, OTS, Regional Depots, and State Information Services

Sovnarkhov

U.S. - None

Economic Region Central Bureaus of Technical Information

U.S. - None

Institute and Plant Sectors of Scientific-Technical Information
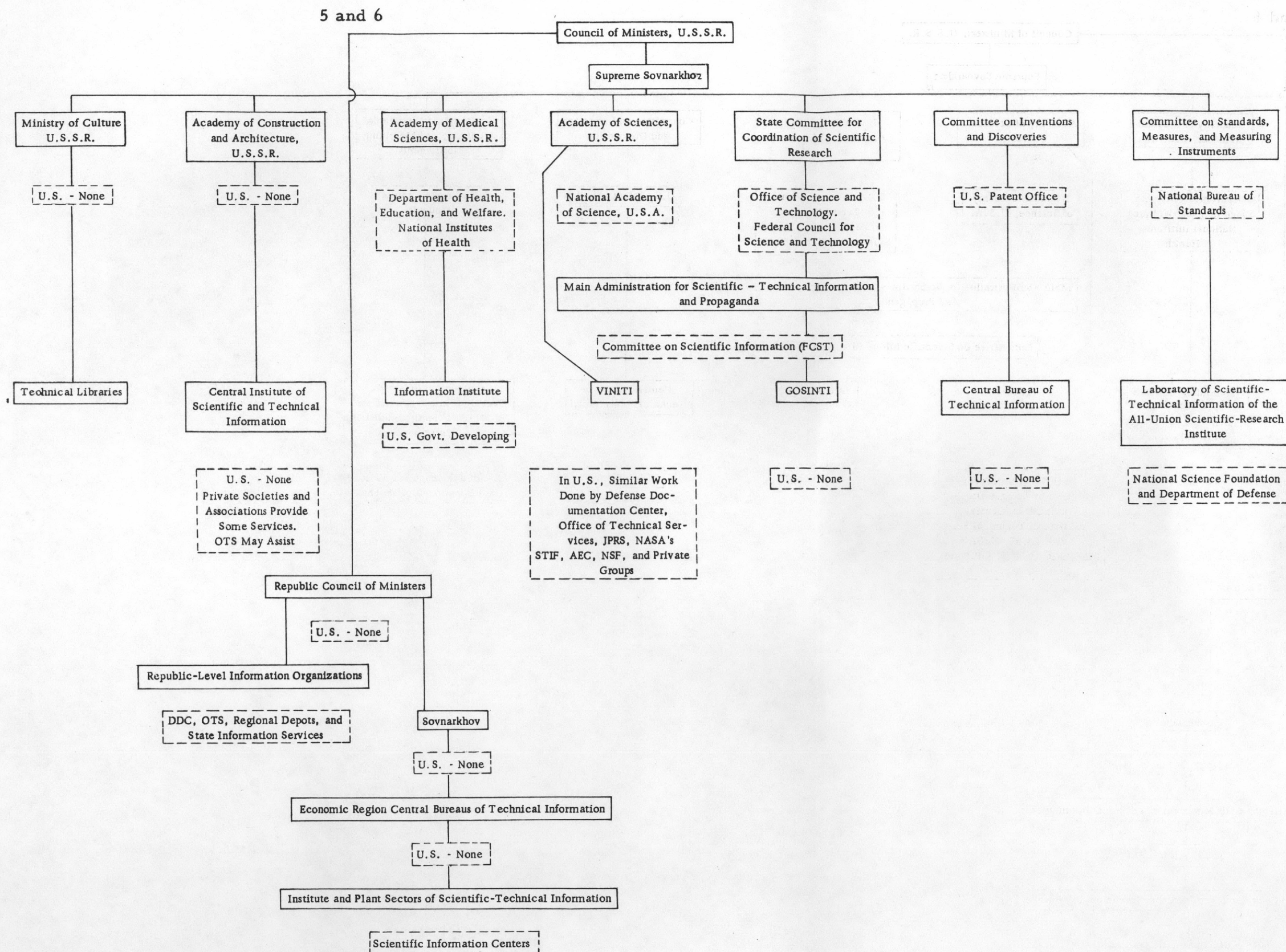
Scientific Information Centers

FIGURE 1. CHART OF ORGANIZATIONS INVOLVED IN THE SOVIET SCIENTIFIC INFORMATION NETWORK, SHOWING EQUIVALENT U. S. AGENCIES

Note: Most U. S. Government organizations involved in the U. S. information network are not directly comparable with those of the U.S.S.R.
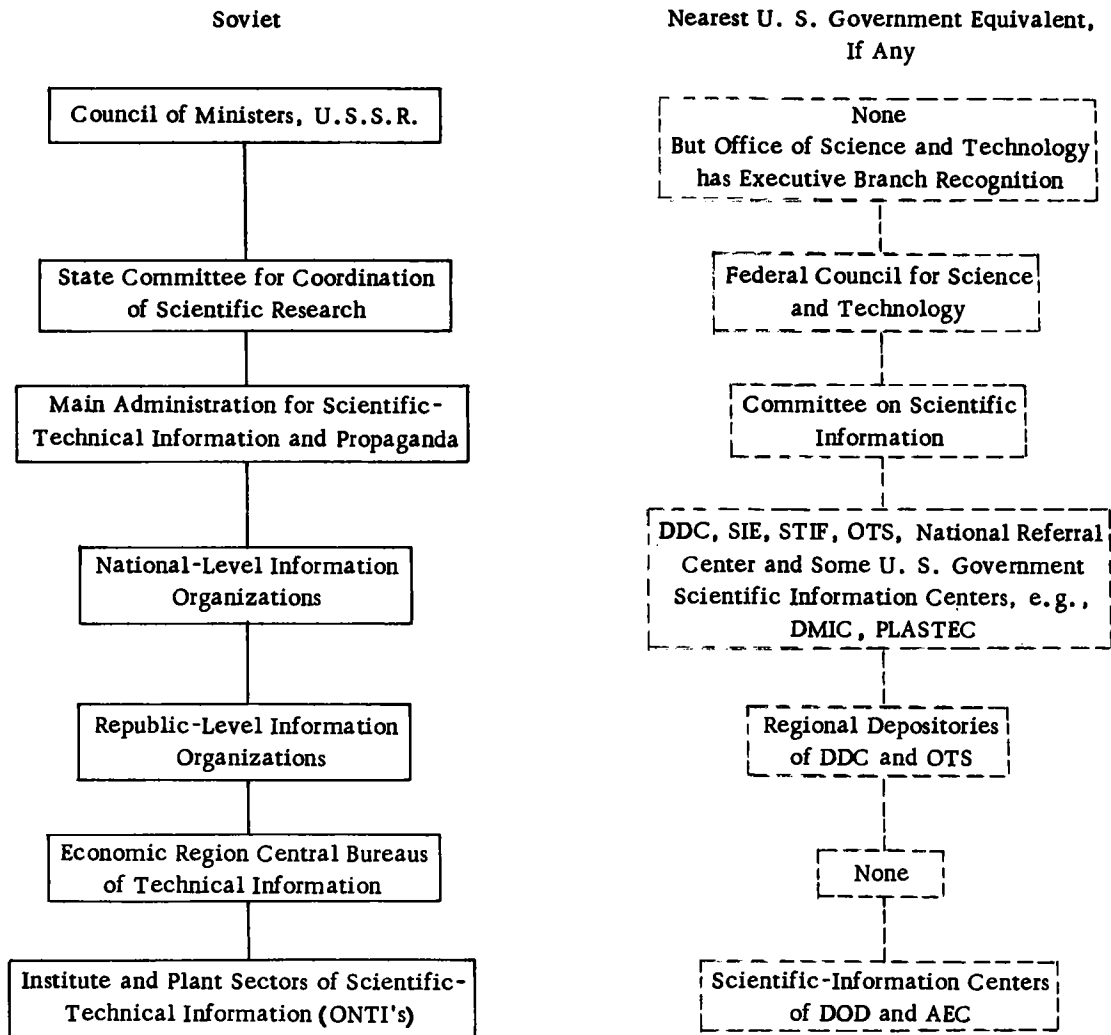
Soviet

Nearest U. S. Government Equivalent,
If Any

| Council of Ministers, U.S.S.R. |

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┌─────────────────────────────────────┐
│              None                    │
│ But Office of Science and Technology │
│   has Executive Branch Recognition   │
└─────────────────────────────────────┘
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| State Committee for Coordination
of Scientific Research |

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┌───────────────────────┐
│ Federal Council for Science │
│      and Technology    │
└───────────────────────┘
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| Main Administration for Scientific-
Technical Information and Propaganda |

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┌─────────────────────┐
│ Committee on Scientific │
│      Information     │
└─────────────────────┘
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| National-Level Information
Organizations |

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┌────────────────────────────────────────┐
│ DDC, SIE, STIF, OTS, National Referral  │
│   Center and Some U. S. Government      │
│  Scientific Information Centers, e.g.,  │
│              DMIC, PLASTEC              │
└────────────────────────────────────────┘
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| Republic-Level Information
Organizations |

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┌─────────────────────┐
│ Regional Depositories │
│    of DDC and OTS   │
└─────────────────────┘
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| Economic Region Central Bureaus
of Technical Information |

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┌──────────┐
│   None   │
└──────────┘
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| Institute and Plant Sectors of Scientific-
Technical Information (ONTI's) |

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┌────────────────────────────┐
│ Scientific-Information Centers │
│       of DOD and AEC       │
└────────────────────────────┘
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FIGURE 2. CHART OF THE VERTICAL ADMINISTRATION OF THE SOVIET SCIENTIFIC
INFORMATION NETWORK, WITH U. S. GOVERNMENT EQUIVALENTS

The processing of Soviet and foreign published information is centralized in U. S. S. R. institutions that resemble U. S. documentation centers. These Soviet clearinghouses process world literature covering the natural and engineering sciences, medicine, construction and architecture, patents, and Soviet industrial standards and specifications. [1,3] For example, the collecting, abstracting, and disseminating of world literature in the natural and engineering sciences are done by the All-Union Institute of Scientific and Technical Information (VINITI), which is subordinate to both the Academy of Sciences, U. S. S. R. , and the State Committee for Coordination of Scientific Research.

VINITI publishes the Abstracts Journal (Referativnyy Zhurnal), Express Information (Ekspress Informatsiya), and Achievements of Science (Itogi Nauki). The Abstracts Journal appears in 24 series covering broad subject areas and a number of subseries of specialized subject areas under separate cover. The Express Information is a series of specialized unbound summaries of foreign publications that are processed and published on a rush basis. The Achievements of Science are retrospective digests or state-of-the-art studies that are published irregularly as monographs. VINITI also is the coordinator of research and development of systems for automation of documentation and machine translation.

The U. S. has no counterpart of VINITI. However, if one adds together the services of Joint Publications Research Service, OTS, NASA, DOD, AEC, the National Science Foundation, and the abstract journals of our professional societies, industrial facilities, and private publishers, all of the services that VINITI provides the Soviet scientist are available to U. S. scientists through U. S. services. In addition, the U. S. facilities provide more of the results of defense research than VINITI does of Soviet defense research.

The processing and disseminating of Soviet and foreign patent literature are centralized in the Central Bureau of Technical Information of the Committee on Inventions and Discoveries of the Council of Ministers. The Laboratory of Scientific-Technical Information of the All-Union Scientific-Research Institute of the Committee on Standards, Measures, and Measuring Instruments collects and disseminates information on Soviet industrial standards and specifications. Plans, blueprints, and drawings are collected, stored, and disseminated upon request by the State Scientific-Research Institute of Scientific and Technical Information (GOSINTI). [4] Although these clearinghouses publish a limited number of analytical or state-of-the-art reports [e. g. , the Itogi Nauki (Scientific Achievements) of VINITI], they are primarily documentation centers like the U. S. 's Defense Documentation Center (DDC) or NASA's Scientific and Technical Information Facility. They collect, process, and disseminate information and publish abstract journals that constitute a large part of the input to the lower level organizations in the information network, including the research-institute ONTI's. Many U. S. Government information centers are related to U. S. documentation centers in precisely the same way.

Soviet information and data are collected from the ONTI's of research institutes and industrial plants and disseminated by national-level information institutes organized to serve some particular branch of industry. [2] Among them

are: the Central Information Institute of Ferrous Metallurgy, the Central Information Institute of Nonferrous Metallurgy, and the All-Union Scientific-Research Institute of Technical-Economic Information on Radioelectronics. These agencies are charged with (1) the collection, preparation, and dissemination of primary information and data from plants, research institutes, and design organizations throughout the Soviet Union, (2) publication of collections of papers, analytical reports, monographs, and reference materials on the development of their branches of industry, and (3) maintenance of information and data holdings on their industries. Besides Soviet information, these institutes also receive foreign information from institutions such as VINITI. These national-level industrial information organizations also publish analytical or state-of-the-art reports that have been prepared by lower level institutions, and by the republic, regional, and institute-level (ONTI) information organs.

In the U. S. Government scientific-information network, there are no equivalents to these Soviet industry-oriented national-level facilities. The nearest U. S. equivalent would be a professional or trade society publication for subject orientation, and the regional information depots of DDC and OTS for multiple-discipline coverage. In addition, the U. S. Department of Commerce is searching for a mechanism to help segments of our industry. For example:

> "The Office of Technical Services is engaged in a series of studies to make its services more useful to the business community. Local business groups are being visited to learn their interests in technology, and cooperation with trade associations is being examined. With National Science Foundation funding, a survey of information needs of the textile industry is being undertaken by OTS. This survey will seek to determine what scientific and technical information is desirable and useful for dissemination to the textile industry, the current sources of technical information, and ways in which textile information services may be improved with a view to enhancing the technical and economic position of the textile industry of the United States. If this survey proves to be beneficial, it would be a precursor of surveys for other industries." [5]

At the next level below the national level are the information institutes of the various republics. These institutes (1) prepare and disseminate to higher and lower level organizations the scientific and technical information generated by republic enterprises and research organizations, (2) disseminate the scientific-technical information prepared at the higher level by the national-level industrial information institutes, and (3) prepare and publish, with the permission of the State Committee for Coordination of Scientific Research, special information collections and state-of-the-art reports on the branches of industry in which the republic is strongest, and (4) maintain information holdings of republic significance. Here again the U. S. has no equivalent. However, many U. S. states provide specialized scientific-information services of the types provided by the Soviet republics. Typical subjects treated by state scientific-information services include agriculture, conservation, and geology. These state services utilize not

only internally developed information but also information produced by U. S. Government facilities such as the Departments of Agriculture, Health Education and Welfare, Interior, and Commerce. Each state scientific-information service is oriented to the needs of that state. [8]

Below the republic information institutes, and just above the ONTI's, there are 94 regional information organizations called economic region (sovnarkhoz) central bureaus of technical information. [5,6] These bureaus (1) coordinate the scientific-technical information activities of the ONTI's in plants and research institutes subordinate to the sovnarkhoz, (2) participate in the dissemination of scientific-technical information generated by the various levels in the national information network, (3) publish and disseminate posters and leaflets about the successes of advanced facilities in the sovnarkhoz and lists of topics or areas recommended for innovation and invention, and (4) maintain holdings of information and data that are significant to the industrial development of the economic region. The U. S. has no equivalent of the sovnarkhoz. Scientific-information services for an economic region could be obtained in the U. S., nevertheless, from state, Federal, or private scientific-information services.

Although the high-level U.S.S.R. organizations just described perform highly centralized information functions, the 4000 ONTI's are decentralized. These organizations provide information directly to the production or research worker and perform functions like those of a U. S. information center. The ONTI's (1) establish direct communications with the users of information in the research institute or plant, to determine their information requirements and to obtain from them information that is valuable to other information users in the Soviet Union and as feedback to improve their own acquisition programs, (2) collect, evaluate, and condense information on a day-to-day basis in specific areas of effort of the institute, (3) participate in the dissemination of information from all the higher levels in the information network, and (4) prepare materials for the information institutes at the higher levels, for dissemination to other production facilities and research organizations and for publication.

ORGANIZATION AND FUNCTIONS OF AN ONTI

The organizational and functional details of Soviet ONTI's are similar to those of many U. S. scientific-information centers (whether Government or non-Government). Similarities or differences between U. S. scientific-information centers and Soviet ONTI's are highlighted below. Details on functions of U. S. scientific-information centers are given elsewhere. [4]

The ONTI within a Soviet research institute is administered according to the management principles of its research institute (see Figure 3). The ONTI Chief is responsible for its operation (he, in turn, is responsible to the institute's director). In line below him are the Assistant Chief and the Senior Engineer
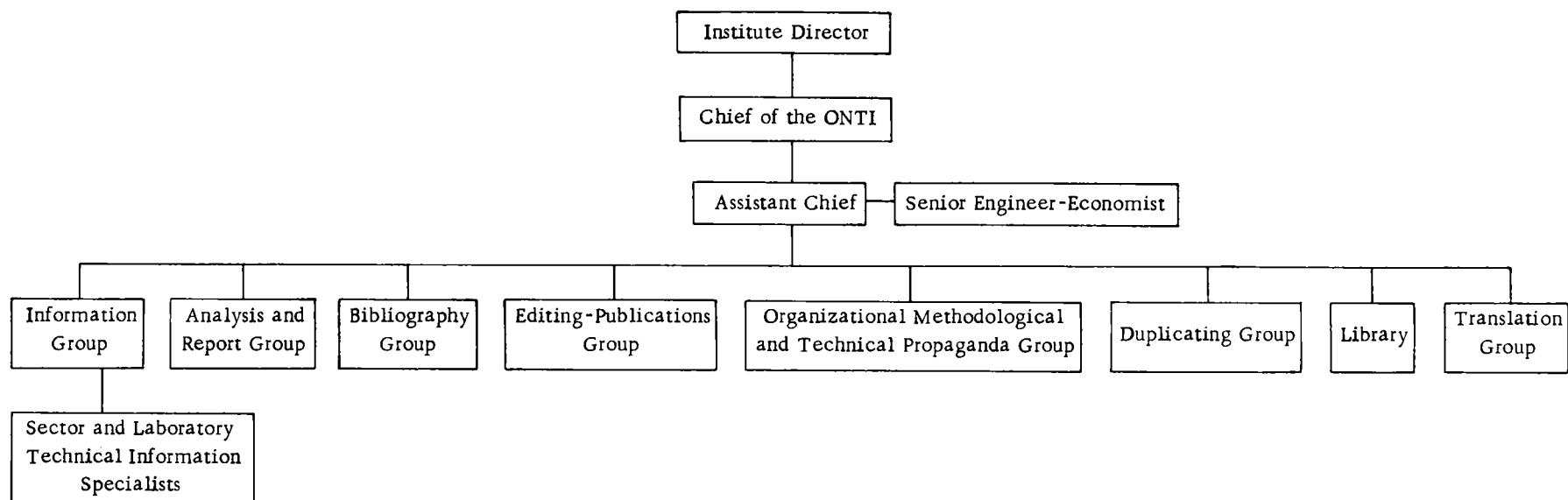
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                          ┌─────────────────────┐
                          │  Institute Director │
                          └──────────┬──────────┘
                                     │
                          ┌──────────┴──────────┐
                          │  Chief of the ONTI  │
                          └──────────┬──────────┘
                                     │
              ┌──────────────────┬───┴──────────────────────────┐
              │ Assistant Chief  ├── Senior Engineer-Economist   │
              └──────────────────┴──────────────────────────────┘
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| Information Group | Analysis and Report Group | Bibliography Group | Editing-Publications Group | Organizational Methodological and Technical Propaganda Group | Duplicating Group | Library | Translation Group |

| Sector and Laboratory Technical Information Specialists |

FIGURE 3. STRUCTURE OF A HIGHLY DEVELOPED ONTI

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Economist. The latter, who is a staff assistant to the Assistant Chief, prepares annual, quarterly, and monthly work plans for the ONTI and its groups and supervises their execution.

The ONTI consists of a number of subdivisions or groups, which normally are broken down as (1) information, (2) analysis and report, (3) bibliography, (4) editing-publications, (5) organizational-methodological and technical propaganda, (6) duplicating, (7) library, and (8) translation. [2]

Only ONTI's in the larger research institutes are highly organized. ONTI's in smaller institutes such as the "Giproniselektroshakht" Institute have fewer groups that perform essentially the same functions. For example, "Giproniselektroshakht" Institute's sector of scientific-technical information consists of the following groups: (1) information and propaganda, (2) editing-publications, (3) translation, and (4) graphic arts. [7] Frequently, as in this case, the library is not a part of the ONTI.

The information organization in Soviet industrial plants is different from that of their research institutes. [8,9,10] For example, all technical information work at the Minsk Tractor Plant is directed by the plant's Chief Engineer, who draws up the information work plans, supervises their fulfillment, and arranges for temporary assignments of plant workers to other organizations to learn new and advanced production techniques. The sector of technical information and invention (the equivalent of an ONTI) at the Moscow Small Automobile Plant consists of a technical information and propaganda group, a library, and a technical office (kabinet).

The Information Group

The information group is staffed with engineers who coordinate the activities of the ONTI, including the acquisition and processing of scientific-technical information. [2] The size of this group varies with the size of the institute, but generally it has as many staff members as the institute has sectors or laboratories. For example, "Giproniselektroshakht" Institute's information and propaganda group has five information engineers to match the institute's five research sectors. [7] In the U. S. , scientists and engineers also participate directly in information center operations. [15]

The functions of the information group can roughly be described as follows: It

- Conducts the acquisition program by drawing upon the resources of information (e. g. , VINITI), research, and planning-design organizations and production plants working in the same and related areas,

- Screens domestic and foreign scientific-technical and patent literature,

- Prepares annotations and abstracts of selected items that supplement the acquisitions from organizations such as VINITI,

- Maintains a card file of the designs and drawings produced by the institute and of information acquired through exchanges with other establishments,

- Maintains card files both on the research and development activities of the parent institute and of other institutes working in similar areas and on the other inputs used to prepare state-of-the-art and analytical reports,

- Establishes close ties with the institute's researcher-user audience in order to learn their information requirements, to furnish them information pertinent to their needs, and otherwise to support the conduct of research in the institute, and

- Provides scientific information to other establishments upon request.

The information engineers in this group plan and conduct the institute's "information day". On "information day" the technical-information specialists and staff members of the institute come into the library, browse in the card files, and, if an item of interest is found, they study the full text. The information engineers also exercise methodological control over the work of the technical-information specialists (tekhnicheskiye informatory) in the individual sectors and laboratories of the institute. Modifications of both these techniques are in use daily in U. S. information centers. [16]

Within each sector and laboratory of the institute an engineer is appointed tekhnicheskiy-informator or technical-information specialist. He is relieved of research work and given the responsibility of filling the information needs of his fellow workers in the sector or laboratory. Because of his familiarity with the research and with the requirements for information to conduct this research successfully, he is able to meet the information needs of the researcher-user audience. The functions of the technical-information specialist are very personalized. They include

- Learning the information requirements of his sector and of its individual researchers and informing them of pertinent information as it is processed,

- Reporting regularly to the information group on those research projects that have been completed and those that are in progress within his sector,

- Determining his sector's need for lectures, symposia, conferences, and field trips and showing scientific-technical films,

- Visiting other research institutes, plants, and scientific-information establishments to study their achievements and information resources,

- Attending "information day" (about every 10 days) (this is a good idea, which might well be tried in the U. S. A.),

- Maintaining card files on his sector's research area,

- Determining the effectiveness of the information that is provided as feedback to the information acquisition program of the ONTI.

The technical-information specialist provides liaison between the information group, the library, and his sector. He reports to the head of his sector or laboratory on the information needs and problems of the sector.

Since there is an information specialist for each sector or laboratory, the total number of information specialists under the ONTI of a research institute varies with the number of organizational subdivisions.

There is some difference of opinion in the Soviet Union (and in the U. S.) about what qualifications technical-information specialists should have. Some contend that they should be scientists or engineers. [2] Others feel that information specialists who process mainly foreign literature should be chosen for their mastery of foreign languages and that a special technical education is not necessary. [11] Still others believe that technical-information specialists should have a broad technical education, be familiar with two to three foreign languages, be familiar with information and patent work, and be able to digest and present the information concisely and clearly. [12] At a Soviet high-level meeting in December, 1961, it was decided either to create a special institute for training technical-information workers or to organize scientific-information departments at existing higher educational institutions — although there already are many library-science schools in the U. S. S. R. [13] It has been suggested that the number of information workers in the Soviet Union should be 0.01 per cent of the total number of scientific workers. [12] As of 1963 no specialized institute for the training of technical-information specialists is known to exist in the Soviet Union, but since 1959 VINITI has offered a graduate program leading to the Candidate's Degree in Scientific and Technical Information. [13] In the U. S. , Western Reserve, Lehigh, Drexel, and Georgia Tech are among the universities taking steps to increase their capabilities to train scientific-information specialists. [20] The need for training specialists in the U. S. has been noted by the National Science Foundation, as well as by other. U. S. Government agencies.

The Analysis and Report and the Editing-Publications Groups

An ONTI produces analytical or state-of-the-art reports, helps the institute's researchers prepare articles for publication, and seeks publishers for those articles.[2] This work is coordinated by two groups within the ONTI: the analysis and report group and the editing-publications group. The first group is responsible for the preparation of information digests and state-of-the-art reports. The second group maintains quality control over all the institute's publications.

The analysis and report group coordinates the preparation of reports on current and long-range research interests of the institute. The group also prepares digests of operational-type information in specialized subjects. Its products also include subject indexes of technical literature, abstracts, annotated bibliographies, translations and lists of translations, and catalogues of equipment designed by the institute. Before a report is begun, and during its preparation, the group screens, selects, and disseminates new information to the report writers as it is received and processed by the ONTI. Throughout the preparation of reports, the analysis and report group provides methodological guidance to the authors.

The editing-publications group draws up the annual and quarterly publication plans of the institute and the ONTI. The institute's director and its scientific council must approve the publication plans. This group works closely with the analysis and report group in the selection of the authors, editors, and reviewers. Its work also includes the preparation of graphic materials for the reports when the ONTI does not have a special graphic arts group.

The Bibliography Group

Storage and retrieval of scientific information are mainly the responsibility of the bibliography group, which

- Organizes and maintains the central card files of the ONTI,

- Provides reference-bibliographical services to the sectors, laboratories, and individual researchers of the institute upon the request of the head of the sector or its technical-information specialist,

- Compiles subject indexes to literature in accordance with the current and long-range research plans and needs of the institute,

- Annotates and catalogues articles from domestic, scientific and technical journals, and

- Prepares card files for publication as annotated bibliographies.

The Organizational-Methodological and Technical Propaganda Group

The administrative functions of the ONTI and the coordination of its relations with the rest of the institute are handled by the organizational-methodological and scientific-technical propaganda group. This group

- Provides methodological direction for the ONTI's activities as a whole,

- Arranges for study rooms and exhibits for the institute's staff,

- Prepares and conducts conferences and meetings for exchange of information among the institute's staff members,

- Arranges lectures, plant field trips, and temporary assignments to other establishments, and

- Reviews the work plans for the ONTI.

The Library

The library, besides its activities in support of the ONTI, engages in standard library operations. It

- Processes books, periodicals, and unpublished proprietary literature,

- Provides the reader-staff members with book loans, maintains reading rooms, and handles interlibrary loans,

- Organizes and maintains library catalogues and card files,

- Circulates proprietary unpublished literature,

- Compiles the library's "Bulletin of New Acquisitions",

- Organizes and conducts "information day" (discussed earlier), and

- Maintains the library's holdings.

The Translation Group

A great deal of emphasis is placed on foreign scientific and technical literature in the Soviet Union. To make this information available to an institute's staff members, a translation group is maintained in many ONTI's. In addition to

furnishing written and oral translations, this group locates translations that have been done in other establishments and arranges for their acquisition. It also maintains a card file of available translations. Many U. S. information centers do not maintain an in-house translation capability. Instead they purchase translations. Indeed, U. S. scientific-information services and centers have indicated they are not greatly concerned with foreign scientific information. [6]

Before a complete written translation is undertaken, an item of interest is translated orally to the researcher. Then it is decided whether a complete or partial written translation is needed. Complete translations are sent to the State Public Scientific-Technical Library (GPNTB), the economic region's scientific-technical library, and to the institute's technical library. [5]

CONCLUDING OBSERVATIONS

An examination of the published literature describing the organization, functions, and objectives of scientific-information centers in both the U. S. A. and the U. S. S. R. suggests a remarkable similarity. The similarity is expected since it seems likely that scientists and engineers in any country would have similar information needs.

The national environments in which complexes of scientific-information services and centers are being developed are different, of course. In the U. S. A., the information service and center complex is developing within the concepts of a free economy (or capitalistic structure) and a free press. In the U. S. S. R. , the information complex is developing within a planned economy and a controlled press. In the U. S. A. there are statements relating to a decentralized scientific-information network. The U. S. S. R. claims it has a centralized structure. Both views are representations of national intent. Yet, as one studies what is happening, the trends suggest that both the U. S. A. and the U. S. S. R. are developing similar networks — modified, of course, to suit the peculiarities of the different national philosophies.

Detailed observations are as follows:

A comparison between U. S. scientific-information centers and those of the U. S. S. R. is possible notwithstanding inherent differences in economy, publication practices, and political organization.

It has been possible to obtain a somewhat more orderly view of the organization of the over-all Soviet scientific-information network than we have of that of the U. S. However, this may be an illusion brought about by a greater degree of ignorance of the details of the Soviet scientific-information organization structure, especially with respect to scientific information produced by military research. Also, the illusion may be a result of not being able to construct an

orderly organizational flow chart for even the major facets of the U. S. scientific-information network where it includes professional societies, journal publishers, commercial scientific-information services, and private industry's numerous scientific-information services and centers.

Notwithstanding statements that the Soviet scientific-information network is centralized and that of the U. S. Government is decentralized, the two programs are basically similar. Both have and are developing large centralized depositories. Both have many decentralized scientific-information activities, particularly specialized centers. Each has a complex of interdependent scientific-information activities. Neither seems certain of the details of the composition of its respective network.

The Soviet scientific-information program is larger than that of the U. S. Government's, but not necessarily larger than that servicing the over-all U. S. scientific and engineering community.

The organization and functions of the U.S.S.R.'s ONTI's and the U. S.'s scientific-information centers are remarkably similar. The Soviet Union reports it has 4000 ONTI's, whereas the U. S. has an estimated 250 (minimum) information centers. No significance should be attributed to the great difference in the numbers of centers reported, since man-power figures and information on skills and scope of Soviet ONTI's are not available. Also, there is an unknown number of scientific-information centers in the U. S. being maintained by private industry.

Soviet ONTI's are more interested in exploiting foreign publications than are most U. S. scientific-information centers. This attitude may result from the fact that the U. S. in particular and the West in general publishes more and better scientific and technical information than does the U.S.S.R. Hence, it is more profitable for the U.S.S.R. to exploit Western publications than vice versa.

ONTI's are mission-oriented, as are U. S. information centers.

The tenor of the content of Soviet publications describing the importance of exploiting scientific information to maximize scientific and engineering progress suggests a greater urgency and emphasis than is evident generally in the U. S.

The available literature does not reveal Soviet equivalents either of the U. S. Science Information Exchange (SIE) or of the U. S. National Referral Center for Science and Technology (NRC). These U. S. information services make it possible for a U. S. scientist or engineer to obtain project information of the who, what, and where (SIE) type, as well as information about specialized scientific-information collections and services (NRC). Possibly the State Committee for Coordination of Scientific Research maintains an equivalent of our SIE. And one would think that Dr. Arutyunov's Main Administration for Scientific-Technical Information and Propaganda would know where specialized scientific-information collections and services are to be found in the U.S.S.R. A

December, 1962, letter to Dr. Arutyunov inquiring about his method of obtaining data on Soviet scientific-information services failed to elicit even an acknowledgment. [21]

The Soviet equivalent of DDC could not be identified.

Within the U. S. there does not appear to be a master collection of plans, blueprints, and drawings, such as are held by GOSINTI. Such collections as do exist in the U. S. [8] are more narrow in scope than the collection reported for GOSINTI.

U. S. Government-supported information centers, while not so numerous as the ONTI's of the U.S.S.R. , must be in many cases larger in size and serve a greater audience than do the ONTI's. National-level information centers in the U.S.S.R. possibly approach in size and comprehensiveness U. S. Government information centers.

One significant difference (excluding economic and organizational considerations) between the Soviet scientific and technical-information complex and that of the U. S. is the recognition by the U.S.S.R. that information centers (ONTI's) are valid and important additions to every scientific institution.

REFERENCES

(1) N. B. Arutyunov, "An Important Stage in the Development of Scientific-Technical Information", Ekonomicheskaya Gazeta, 30 June 1962, p 5.

(2) G. I. Gol'dgamer, "Information-Bibliographical Work——An Important Stage of Scientific Research", Sovetskaya Bibliografiya, 1959, No. 5, pp 11-27.

(3) "Model Organization of Scientific-Technical Information. Conference on Problems of Organizing Scientific-Technical Information", Nauchno-Tekhnicheskaya Informatsiya, 1962, No. 1, pp 3-13.

(4) "Scientific Information Centers in the United States", G. S. Simpson, Jr., American Documentation, Vol 13, No. 1, January, 1962.

(5) "Status Report on Scientific and Technical Information in the Federal Government", June 18, 1963, Federal Council for Science and Technology.

(6) "Survey and Analysis of Specialized Science Information Services in the United States", NSFC-149, Final Report, September, 1962, I. J. Panning, B. A. Frautschi, W. H. Veazie, Jr., A. P. Lechler, and G. S. Simpson, Jr.

(7) G. M. Khazanov, "Centralized Preparation and Dissemination of Drawing Documentation", Nauchno-Tekhnicheskaya Informatsiya, 1962, No. 3, pp 28-30.

(8) "Directory of Selected Specialized Science Information Services in the United States", NSFC-61-68, U. S. Government Printing Office, $1.75.

(9) V. M. Retskin, "Organization of the Reference-Information Service in the TsBTI of the Leningrad Sovnarkhoz", Nauchno-Tekhnicheskaya Informatsiya, 1962, No. 3, pp 3-6.

(10) V. A. Glechik, "Experience of the TsBTI of the Kuybyshev Sovnarkhoz With Foreign Scientific-Technical Literature", Opyt raboty po tekhnicheskoy informatsii i propagande (Work Experience on Technical Information and Propaganda), 1962, No. 2, pp 21-25.

(11) D. P. Malyarenko, V. I. Svetlovskaya, "Scientific-Technical Information and Propaganda in the Scientific-Research and Planning-Design Institute Giproniselektroshakht (Donetsk)", Nauchno-Tekhnicheskaya Informatsiya, 1963, No. 5, pp 11-13.

(12) V. Shapiro, "Technical Information—Rich Source of Advanced Experience", Promyshlennost' Belorussii (Industry of Belorussia), 1962, No. 8, pp 45-47.

(13) V. A. Sadovnikov, M. Ya. Yasinovskiy, "Scientific-Technical Propaganda and the Exchange of Advanced Experience at the Moscow Small Automobile Plant. From the Experience of the Sector of Technical Information and Invention", Nauchno-Tekhnicheskaya Informatsiya, 1961, No. 1, pp 15-20.

(14) T. A. Vvedenskiy, "Organization of Technical Information in the Design Bureau of a Large Enterprise (From the Experience of the A. I. Likhachev Auto Plant)", Nauchno-Tekhnicheskaya Informatsiya, 1961, No. 1, pp 18-22.

(15) "Experience Obtained in Developing and Operating Scientific Information Centers", G. S. Simpson, Jr., and J. W. Murdock, Instrument Society of America Preprint 48SL61, January, 1961.

(16) "Battelle-DEFENDER Information System", Margaret Ann Long, Division of Chemical Literature, American Chemical Society, Preprint, September 10, 1963.

(17) L. Ya. Popilov, "The Organization of Scientific-Technical Information in a Sectoral Institute", Nauchno-Tekhnicheskaya Informatsiya, 1961, No. 1, pp 10-14.

(18) A. V. Blek, "Some Problems of Preparing Scientific-Technical Information Specialists", Nauchno-Tekhnicheskaya Informatsiya, 1962, No. 3, pp 14-15.

(19) V. A. Polushkin, "Improving the Scientific Qualifications of Workers in Scientific-Information Institutions (From the Experience of the All-Union Institute of Scientific and Technical Information)", Nauchno-Tekhnicheskaya Informatsiya, 1963, No. 1, pp 14-17.

(20) "The Education of Science Information Personnel---A Challenge to the Library School", Alan Rees, American Documentation Institute Annual Meeting, October 1963, Automation and Scientific Communication, Short Papers, Part II, page 343.

(21) Letter dated December 19, 1962, to Dr. N. Arutyunov from G. S. Simpson, Jr.