JPRS 68897

7 April 1977

USSR

TRANSLATIONS ON USSR SCIENCE AND TECHNOLOGY
PHYSICAL SCIENCES AND TECHNOLOGY
No. 8

U. S. JOINT PUBLICATIONS RESEARCH SERVICE

NOTE

JPRS publications contain information primarily from foreign newspapers, periodicals and books, but also from news agency transmissions and broadcasts. Materials from foreign-language sources are translated; those from English-language sources are transcribed or reprinted, with the original phrasing and other characteristics retained.

Headlines, editorial reports, and material enclosed in brackets [] are supplied by JPRS. Processing indicators such as [Text] or [Excerpt] in the first line of each item, or following the last line of a brief, indicate how the original information was processed. Where no processing indicator is given, the information was summarized or extracted.

Unfamiliar names rendered phonetically or transliterated are enclosed in parentheses. Words or names preceded by a question mark and enclosed in parentheses were not clear in the original but have been supplied as appropriate in context. Other unattributed parenthetical notes within the body of an item originate with the source. Times within items are as given by source.

The contents of this publication in no way represent the policies, views or attitudes of the U.S. Government.

PROCUREMENT OF PUBLICATIONS

JPRS publications may be ordered from the National Technical Information Service, Springfield, Virginia 22151. In ordering, it is recommended that the JPRS number, title, date and author, if applicable, of publication be cited.

Current JPRS publications are announced in Government Reports Announcements issued semi-monthly by the National Technical Information Service, and are listed in the Monthly Catalog of U.S. Government Publications issued by the Superintendent of Documents, U.S. Government Printing Office, Washington, D.C. 20402.

Indexes to this report (by keyword, author, personal names, title and series) are available through Bell & Howell, Old Mansfield Road, Wooster, Ohio, 44691.

Correspondence pertaining to matters other than procurement may be addressed to Joint Publications Research Service, 1000 North Glebe Road, Arlington, Virginia 22201.

BIBLIOGRAPHIC DATA SHEET	1. Report No. JPRS 68897	2.	3. Recipient's Accession No.
4. Title and Subtitle TRANSLATIONS ON USSR SCIENCE AND TECHNOLOGY - PHYSICAL SCIENCES AND TECHNOLOGY No. 8			5. Report Date 7 April 1977 6.
7. Author(s)			8. Performing Organization Rept. No.
9. Performing Organization Name and Address Joint Publications Research Service 1000 North Glebe Road Arlington, Virginia 22201			10. Project/Task/Work Unit No. 11. Contract/Grant No.
12. Sponsoring Organization Name and Address As above			13. Type of Report & Period Covered 14.
15. Supplementary Notes			

16. Abstracts

The report contains information on aeronautics; astronomy and astrophysics; atmospheric sciences; chemistry; earth sciences and oceanography; electronics and electrical engineering; energy conversion; materials; mathematical sciences; cybernetics, computers; mechanical, industrial, civil, and marine engineering; methods and equipment; missile technology; navigation, communications, detection, and countermeasures, nuclear science and technology; ordnance; physics; propulsion and fuels; space technology; and scientists and scientific organization in the physical sciences.

17. Key Words and Document Analysis. 17a. Descriptors

USSR
Aeronautics
Astronomy
Astrophysics
Atmospheric Sciences
Chemistry
Computers
Cybernetics
Earth Sciences
Oceanography
Electronics
Electrical Engineering
Energy Conversion
Materials
Mathematics
Mechanical Engineering
Civil Engineering
Industrial Engineering
Marine Engineering
Methods
Equipment
Missile Technology
Navigation and Communications
Detection and Countermeasures
Nuclear Science and Technology
Ordnance
Physics
Propulsion and Fuels
Space Technology

17b. Identifiers/Open-Ended Terms

17c. COSATI Field/Group 01,03,04,07,08,09,10,11,12,13,14,16,17,18,19,20,21,22

18. Availability Statement Unlimited Availability Sold by NTIS Springfield, Virginia 22151	19. Security Class (This Report) UNCLASSIFIED	21. No. of Pages 62
	20. Security Class (This Page) UNCLASSIFIED	22. Price PC A04

FORM NTIS-35 (REV. 3-72)

THIS FORM MAY BE REPRODUCED

USCOMM-DC 14952-P72

JPRS 68897

7 April 1977

TRANSLATIONS ON USSR SCIENCE AND TECHNOLOGY
PHYSICAL SCIENCES AND TECHNOLOGY

No. 8

CONTENTS PAGE

CYBERNETICS, COMPUTERS AND AUTOMATION TECHNOLOGY

Adoption of Automated Control, Management Systems Discussed
(F. Kezling; LENINGRADSKAYA PRAVDA, 6 Jan 77)..... 1

Inefficient Use of Computers: Complaint and Official Reply
(SOVETSKAYA ROSSIYA, 6 Oct 76)..... 5

Call for Greater Utilization, by Ye. Chashchin, L. Flaum
New Programs for Computer Use

Automated Control Systems in Kirgiz Sugar Industry
(N. Imanaliyev, V. Rodionov; SOVETSKAYA KIRGIZIYA, 8 Jan 77)..... 9

Glushkov Discusses 'Cybernetic City'
(V. Rybin; SOTSIALISTICHESKAYA INDUSTRIYA, 26 Dec 76)... 13

MATERIALS SCIENCE AND METALLURGY

Diverse Applications of Magnetic Fields Reviewed
(A. Merkulov; KRASNAYA ZVEZDA, 23 Jan 77)..... 18

New Methods of Producing Superpure Metals
(A. Alekseyev; SOTSIALISTICHESKAYA INDUSTRIYA, 3 Mar 77)..... 20

SCIENTISTS AND SCIENTIFIC ORGANIZATIONS

Siberian Department of USSR Academy of Sciences
(EKONOMICHESKAYA GAZETA, Feb 77)..... 23

CONTENTS (Continued) Page

New Forces of Science - General Meeting of the Academy of Sciences USSR
(LENINGRADSKAYA PRAVDA, 26 Dec 76)..... 28

Belorussian Academy of Sciences Presidium Elections
(SOVETSKAYA BELORUSSIYA, 29 Jan 77)..... 29

Scientists Recently Elected to Active Membership in Academy of Sciences USSR
(TRUD, 3 Feb 77)..... 30

Academician L.D. Faddeyev
(LENINGRADSKAYA PRAVDA, 26 Dec 76)..... 32

Academician I.A. Glebov
(LENINGRADSKAYA PRAVDA, 26 Dec 76)..... 34

Leningrad Residents - New Corresponding Members of Academy of Sciences USSR
(LENINGRADSKAYA PRAVDA, 28 Dec 76)..... 36

Academic Vacancies in the Armenian Academy of Sciences
(KOMMUNIST, 17 Dec 76)..... 42

Session Marks 50th Anniversary of Georgian Geology Institute
(ZARYA VOSTOKA, 12 Dec 76)..... 44

Baku Session on Process Simulation in Petrochemistry
(BAKINSKIY RABOCHIY, 20 Nov 76)..... 45

Physicotechnical System for Training Cadres
(Ye. Velikhov, A. Prokhorov; IZVESTIYA, 25 Jan 77)..... 47

Scientific-Technical Information Progress
(N. V. Turtanov Interview; VYSHKA, 8 Feb 77)..... 51

Irkutsk Meteorologists Complete First Year of City Climate Study
(V. Khodiy; PRAVDA, 4 Jan 77)..... 54

CYBERNETICS, COMPUTERS AND AUTOMATION TECHNOLOGY

ADOPTION OF AUTOMATED CONTROL, MANAGEMENT SYSTEMS DISCUSSED

Leningrad LENINGRADSKAYA PRAVDA in Russian 6 Jan 77 p 2

[Article by F. Kezling, general director of the Lenelektronmash Scientific-Production Association: "Automated Control System: Calculation, Comprehensiveness, Efficiency"]

[Text] Up until recently any article dealing with improvement of production control and management would begin with agitation for an automated control system. Today there is no need for this. The development and adoption of these systems has become a component part of our nation's technology policy. Hundreds of automated control systems are in operation and are producing profit.

The contribution of the people of Leningrad toward development of these systems is quite substantial. In the last five-year plan alone more than 150 Leningrad industrial enterprises were working on the adoption of economic-mathematical methods and computer hardware in control and management. More than 100 automated control systems went into operation during the five-year plan -- three times as many as in all the preceding years. The results from adoption of these systems are expressed in a very substantial sum -- 37 million rubles. In 1975 alone the adoption of ASU [automated control/management systems] enabled Leningrad industry to turn out additional output with a value in excess of 180 million rubles.

Today it is inconceivable to manage a large enterprise without the employment of ASU, let alone a production association, and it is difficult to make day-by-day decisions and to pursue a precise technical policy or prepare production schedules. Therefore all-out development of these systems in the current five-year plan constitutes one of the most important problems. Their utilization directly influences improvement in efficiency and quality of the performance of work forces and helps supervisors and specialists, as was emphasized by L. I. Brezhnev in his address at the October (1976) CPSU Central Committee Plenum, "to affirm modern methods of production planning and organization and to be vigorous implementers of scientific and technological advances."

Many design organizations in Leningrad are working on ASU. In order to ensure coordination of efforts among the various design teams, already in the early years work on ASU began to be coordinated within the framework of Leningrad industry as a whole. The Lenelektronmash Scientific-Production Association, which is the lead organization in developing these systems, could not fully encompass the entire scope of these activities. The interbranch territorial coordination plan for adoption of ASU, set up under the direct supervision of the Leningradskaya Oblast CPSU Committee, was to take into account the interests and capabilities of all enterprises and organizations in the city and oblast. Drawn up in the last five-year plan, this plan made it possible to achieve substantial economic effect from the utilization of ASU.

More than 800 enterprises and organizations took part in drafting the new coordination plan for adopting ASU in the period 1976-1980. It was incorporated into the comprehensive plan of economic and social development of Leningrad and Leningradskaya Oblast during the 10th Five-Year Plan.

Without going into the details of the entire plan, we should note that it calls for a high rate of development of automated control and management systems. The number of enterprises and organizations adopting ASU will increase by 70 percent. The main accent will be placed on building integrated ASU, that is, systems of management not only of the economy of an enterprise but also direct control of production processes. The number of EDP centers will increase by 50 percent, and they will be equipped with 170 percent more computer hardware, including the latest units (third-generation computers).

In carrying out this extensive program, however, it is essential to focus principal attention on the quality of planning, design and operation of ASU. Precisely this becomes the deciding factor when it is a question of efficiency and effectiveness of their utilization, the return an enterprise receives when it spends enormous amounts of money on purchasing the latest hardware and on maintaining highly-skilled personnel.

As chairman of the interbranch territorial scientific-technical council on the comprehensive problem "Adoption of economic-mathematical methods and computer hardware in management of Leningrad industry," I am constantly encountering various approaches to this problem by designers and production specialists, and I am constantly evaluating the results of adoption of ASU at various enterprises. And we still frequently note that some ASU, under construction for years, are in an unsatisfactory state, and for an extended period of time their development is of an experimental nature.

Many specialists are well aware of how effectively the computer hardware is operating at the Svetlana Association, the Association imeni Karl Marx, at LOMO, at the Association imeni Kozitskiy, at the Bolshevik Plant, and at

Glavzapstroy. The business executives and party organizations of these enterprises personally monitored implementation of all measures, ensuring a high level of ASU operation.

The automated production control system at the Zvezda Association is working well. Savings from its adoption totaled 1.2 million rubles during the Ninth Five-Year Plan. And this was obtained not by mechanizing computation operations but as a result of improving the day-by-day, production and technical-economic planning systems as well as technical preparation for production. Quality of enterprise management has improved substantially, and the professional qualifications at the executive level have improved. The labor productivity of management personnel rose 18 percent, and 170 jobs were eliminated.

Nevertheless, in spite of such success stories, in spite of the fact that many enterprises have amassed considerable experience in building efficient management and control systems, adoption of economic-mathematical methods and computer hardware is still proceeding at too slow a pace and is not always accompanied by adequate results. There are various reasons for this, one of which is the poor quality of engineering design solutions and their poor link with specific production conditions.

A state design institute (GPI-3) designed an ASU for the Pervomayskaya Zarya Association, designed only for ideal manufacturing processes, where all textiles received from suppliers are immediately inspected, measured, with substandard product rejected. However, the association is currently lacking measuring equipment, racks, and production space. In the future of course one must plan on optimal conditions, but one must also take into consideration the specific situation, for otherwise all the advantages of automation will remain on paper alone.

Unfortunately we have not yet succeeded in completely avoiding deficiencies in building ASU, connected with the fact that they are being designed by some organizations on the basis of obsolete methods. Sometimes certain solutions are mechanically transferred from one project to another, without taking into consideration changed production process and structural features as well as the enterprise's preparedness to work with computer hardware. Is this not the reason for the skeptical attitude toward ASU by some industrial managers and the occurrence of all kinds of "psychological obstacles"?

This was the case, for example, at the Krasnyy Treugol'nik Association, where failure in automation of management was predetermined by the fact that the standards-reference base had not been prepared. The poor efficiency of the ASU at Sevzapmebel' is directly connected with poor monitoring of its utilization by supervisory personnel and insufficient participation by the association's specialists in developing the system. More than 3 million rubles have been spent in recent years on building

this system, and yet only slightly more than 100,000 rubles have been saved through its employment.

We are presently very close to a stage in the development and adoption of automated management and control systems where such errors and deficiencies should and can be eliminated, when we must be moving toward industrial methods of ASU design on the basis of the most advanced electronic computers.

In the last five-year plan designers had to build ASU from the ground up, as they say, while today designers have at their disposal so-called applied program packages -- to a certain measure already prepared solutions to various problems. While yesterday the general principles and patterns of automated control of various facilities were unknown, today, in proceeding with development of an ASU, we can specify a concrete growth in designated enterprise performance indices. In the Ninth Five-Year Plan an ASU produced an output volume increase of 2-4 percent, while 4-8 percent is expected in the 10th Five-Year Plan, and labor productivity will increase not by 2.5-5 but by 4-10 percent.

Of course we cannot assume that now that we have reached this new stage, everything will work out by itself. Execution of the interbranch ASU adoption plan requires first and foremost maximum unification of the efforts of the organizations which design and install these systems. Only large organizations, with EDP centers and highly-qualified cadres, are capable of accomplishing the task of achieving a sharp increase in the effectiveness of automated management and control systems. Those dozens of design establishments which are today involved in developing ASU in Leningrad cannot design systems with sufficiently high technical-economic indices. Expenditures also prove to be unwarrantedly high. Therefore it is high time to consolidate these small organizations into a large enterprise.

In our opinion the most important task is securement of broad exchange of information among Leningrad enterprises. It is essential that this information be effective, that is, to a certain degree offering the possibility not only to establish successes or deficiencies, but also helping adopt the experience and know-how of the top enterprises.

It is essential in this present five-year plan to settle the question of setting up collective-utilization EDP centers in Leningrad, centralized computer maintenance and repairs, with a broadening and improvement of personnel training. It is quite obvious that some enterprises do not need their own ASU, while at others it is inadvisable to automate operations which are performed easily and simply with traditional methods.

We should resolve all these problems primarily from the standpoint of efficiency of ASU utilization. This same criterion should be the guide in evaluating their performance.

3024
CSO: 1870

CYBERNETICS, COMPUTERS AND AUTOMATION TECHNOLOGY

INEFFICIENT USE OF COMPUTERS: COMPLAINT AND OFFICIAL REPLY

Call For Greater Utilization

Moscow SOVETSKAYA ROSSIYA in Russian 6 Oct 76 p 2

/Article by Head of Omsk CPSU Gorkom Industrial-Transport Section and Chairman of City ASU Coordination Council Ye. Chashchin and Senior Engineer of Omsk Center for Scientific and Technical Information L. Flaum: "Not an Electronic Gin but a Working Tool"/

/Text/ In Omsk the first "work permit" for an electronic computer was made out at the Motor-Building Plant imeni P. I. Baranov. This was back at the time when there was heated discussion about what "thinking electronics" was capable of. At the beginning of the Ninth Five-Year Plan, four plant computer centers were in operation in the city. Now at large enterprises alone there are 21 computer centers in operation.

An ASU coordination council attached to the CPSU gorkom has been set up. It is responsible for the analysis of computer use and the introduction of automated production control systems, dissemination of experience, and increasing personnel skills. Specifically, council sessions are held right at the enterprises, and seminars are conducted for specialists and Party workers. At the university for technical progress attached to the House of Technology of the Scientific and Technical Center, specialists whose professions entail the use of computer hardware are trained continuously and systematically.

However, it must be said that as yet not even all the city's large enterprises and associations enjoy the services of computers. Several managers did not succeed in quickly overcoming the "psychological barrier" of the first stage of the introduction of electronic computer equipment because they did not understand the need for extended and comprehensive preparation for the use of "control electronics". The average load of a digital electronic computer in this city now amounts to only nine hours per day. And this is not peculiar to Omsk--the situation that has arisen does not stem from local conditions alone.

Several years ago, the only automated production control systems in operation in Omsk were at the Elektrotochpribor Plant and the Sibelektromontazh Trust. Then 11 more ASUs were developed. Now approximately 1,500 tasks are performed with the aid of computers, including more than 1,200 economic tasks, and this directly assists in improving the quality and efficiency of control.

The ASU is justifiably called the electronic accelerator of scientific and technical progress. At the Radio Plant imeni Popov and the television plant, electronic computer equipment ensures timely and efficient planning and daily monitoring of the progress of production not only for the plant as a whole, shops, and sections, but also for each component, and for each individual worker's shift assignment. Also, the preparation of all materials, instruments, and equipment needed to carry out the assignment is scrupulously checked. In addition, the computer "knows" what resources have been delivered to the plant warehouses and what portion of them have been expended, and performs a number of the tasks involved in the technological preparation of production, the planning and monitoring of economic indicators, and personnel management.

Norms are more soundly based and the rhythm of production is more even--there is no calm at the beginning of the month or storm during the second half of it. Losses within shops have been reduced. In a word, the ASU itself campaigns for the systematic use of computers.

At the motor-building plant, on the other hand, the available computers are not used effectively enough. Our builders and assemblers, and our planning, design, and scientific-research organizations have fallen seriously behind in the introduction of ASUs. The higher educational institutions are afraid of getting down to business.

The distribution of computer time is revealing. Wherever automated control systems are functioning successfully, 72 percent of the computer load consists of economic tasks, 23 percent of production preparation tasks, and 5 percent of scientific and technical computations. However, for Omsk as a whole only 30 percent of computer time is assigned to control needs, and this cannot be considered satisfactory.

Unfortunately, far from all ministries and departments display the necessary initiative or give the aid needed by subordinate enterprises and organizations.

One of the on-the-spot sessions of the City ASU Coordination Council was held at the Siberian Plant. The metal workers had done much to further systematic use of computer equipment. However, while receiving information from the computer, the workers of the plant's functional services continued to duplicate documents by hand. The fact is that mistakes were encountered in the computer information resulting from shortcomings tolerated when the ASU was first introduced, in many cases by the directors of the enterprise's functional services themselves, who were insufficiently trained in the use of computer equipment. Considerable alterations are sometimes needed in order to eliminate the mistakes.

Efficient computer use and further development of automated systems depend on many factors. During the course of an investigation conducted by the Coordination Council, it was ascertained that standard ASU designs are lacking and that the documents used in production are not standardized. This impedes the use of developments, even those made by related enterprises.

Not yet solved is the problem of training ASU service personnel. Higher educational institutions, including those in Omsk, have begun to train specialists for computer centers. But future engineers in other professions are not being taught everywhere to work under the new conditions. Specifically, errors of this type are tolerated in the training of technologists of petrochemical and petroleum processing enterprises. The organization in cities such as Omsk of special technical schools for the training of computer operators and technicians is a question that cannot be put off.

Another problem needs to be solved: enterprise computer centers are attached to administrative-management subdivisions, and this conflicts with the very nature of their work. When computer centers operate on three shifts (and, incidentally, many women work in them), no additional payment is provided for the night shift. As a result, personnel turnover increases. Obviously, piece-rate wages should be introduced for individual categories of workers.

Despite the general shortage of computer hardware many computers are, so to speak, underemployed. The large amount of time lost, particularly by small computers, can be eliminated by assigning computer hardware to general collective use. Unfortunately, departmental and organizational obstacles prevent this. Since in the future we will not be able to get along without collective computer use or a powerful group computer center, this problem must be solved. Specialists are also concerned about the purely technical problem of linking up new computers with those produced earlier, for example with the Minsk-32.

In a word, many difficulties and unresolved problems lie in the path of utilizing "control electronics". But dozens of trades essential to production have already acquired computers, and this proves that today plants and factories cannot get along without computer hardware and automated control. This was emphasized in the "Basic Guidelines for the Development of the USSR National Economy during 1976-1980", adopted by the 25th CPSU Congress. The following task was assigned: "Ensure the further development and increased efficiency of automated control systems and computer centers, systematically combining them into a single State system for the collection and processing of information for accounting, planning, and management. Set up collective-use computer centers". Life itself convinces us that only on this basis can the quality of production control be improved.

New Programs For Computer Use

Moscow SOVETSKAYA ROSSIYA in Russian 6 Oct 76 p 2

/Text/ The editorial office has been informed by V. Myasnikov, Chief of the Main Administration for Computer Hardware and Control Systems of the State Committee for Science and Technology of the USSR Council of Ministers, that the problems of increasing the efficiency of computer utilization were accurately set forth in the article "Not an 'Electronic Gin' but a Working Tool", published in Sovetskaya Rossiya on 6 October 1976. A broad work program aimed at solving them has been mapped out and is being implemented. Specifically, ASUs are to be developed at basic enterprises and their advanced experience is to be widely disseminated. Automated control systems are being set up on the basis of modern computer hardware, using economic and mathematical methods, standard design solutions, and applied program packages. The use of standard design solutions makes it possible to reduce ASU development time by 20-40 percent. Measures have been taken to ensure the program compatibility of different computers.

Comrade Myasnikov observed that the article also correctly pointed out the need to convert to the new form of computer utilization--by building collective-use computer centers. During the present five-year plan six such centers are to be organized.

8964
CSO: 1870

AUTOMATED CONTROL SYSTEMS IN KIRGIZ SUGAR INDUSTRY

Frunze SOVETSKAYA KIRGIZIYA in Russian 8 Jan 77 p 2

[Article by N. Imanaliyev, director of the Institute of Physics and Mathematics, corresponding member of the Kirgiz SSR Academy of Sciences; and V. Rodionov, director of the Information-Computer Center, Ministry of Food Industry Kirgiz SSR: "Sector Automated Control System. Improving Economic Administration"]

> [Text] Our country has adopted a course of action aimed at creating a nationwide automated control system (OGAS). It operates on many levels. The first level is the automated control system of technological processes (ASUTP) in enterprises, followed by an automated control system over the entire enterprise (ASUP), a group of enterprises of one sector (OASU) and, finally, the OGAS.

Kirgiziya has operating more than 10 information-computer centers (IVTs). They are only beginning to handle the tasks of ASU for individual subsystems. In our opinion, it is necessary to set up more information centers to adopt ASU in all the ministries. Then, on that basis, it is necessary to organize collective-use computer centers in individual sectors of industry and on that basis a republic automated control system (RASU).

The Ministry of Food Industry is adopting three systems: Kirgizpishcheprom [Kirgiz Food Industry] OASU, Kirgizsakhar [Kirgiz Sugar Industry] ASU, and Frunzekhleb [Frunze Bread Industry] ASU. They are making successful use of theoretical research from the Kirgiz Academy of Sciences institute of physics and mathematics.

The staff of the automation, accounting, planning and administration section of the institute together with specialists of the ASUP IVTs division of the Ministry of Food Industry have worked out a functional complex of interconnected economic-mathematical models, algorithms, and programs to optimalize beet sugar production. These methods serve as the theoretical basis for setting up the Kirgizsakhar ASU. It incorporates six ASUP's of the Chuyskaya Valley: the the Tokmak, Kantskiy, Novo-Troitskiy, Ak-Su, Kara-Baltinskiy, and Kaindinskiy refineries. Instead of a costly computer,

a portion of one has been installed--a complex of ASU technical facilities. So far this is adequate for receiving and interpreting material coming in from the main computer in the ministry's IVTs and passing on the necessary information to it. The complex costs 50,000 rubles, but its effectiveness is measured in millions of rubles! You have to agree that this is very beneficial for the enterprises.

The first phase of the Kirgizsakhar ASU consists of these subsystems: technical-economic planning and analysis of economic activities, operational administration, administration of material-technical supply, bookkeeping and analysis of business activity, and administration of the harvest operations in the sugar beet zone of the Chuyskaya Valley. The latter subsystem, in particular, required the solution to problems such as the optimum assignment of sugar beet farms to specific refineries, distribution of raw materials to the various enterprises, and others.

A complex of tasks formulated for the information, mathematical, and technical support of the subsystem "administration of harvest operations" has been in use for the last two years at the Ak-Su sugar combine and the Novo-Troitskiy sugar refinery. It has also been checked at other enterprises in the republic.

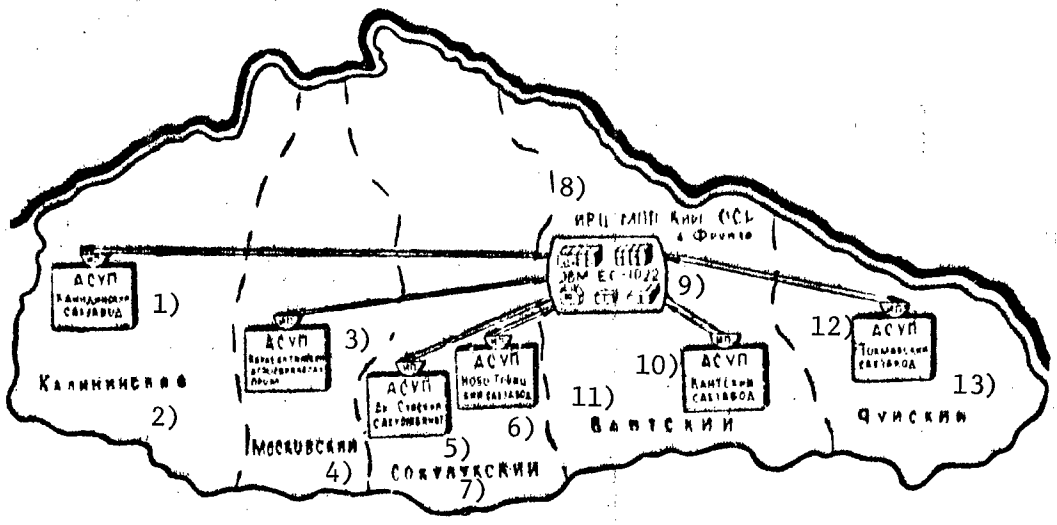
An analysis of the operational results of the subsystem has shown that the Novo-Troitskiy sugar refinery has been sustaining losses amounting to millions for a number of years. Why is this? The computer has the answer: primarily because of the lowered sugar content in the beets.

The plant's raw materials zone comprises 13 farms. As of 1 November Sokulukskiy Rayon had fulfilled its sugar beet delivery plan by 132.1 percent. On the basis of a contract agreement the plant pays farms in the rayon 29 rubles per ton of planned sugar beets; for above-plan deliveries it pays 14.5 rubles more. As a result, the enterprise has paid 1.2 million rubles to farms in Sokulukskiy Rayon for above-plan sugar beet deliveries. This amount is equivalent to the annual losses sustained by the refinery.

The same thing is true of the Kantskiy sugar refinery. For a number of years it has been sustaining annual losses amounting one half million rubles. At the same time, the farms of Sokulukskiy and Kantskiy rayons are overfulfilling their plans and earning profits. One would think that by processing additional raw material the refinery would produce more sugar. But the enterprise is not able to recover its losses, because the farms are delivering sugar beets having a low sugar content. In Sokulukskiy Rayon the sugar content is 12.1 percent; in Kantskiy Rayon it is even lower--11.6 percent.

With the use of computers, schedules for harvesting the crop have been worked out. By complying with them every refinery can earn additional profits of about one million rubles per year. The computer has also suggested a more efficient variant of beet storage.

In this way, the ASU is making it possible to tap hidden reserves of production; it is helping to eliminate shortcomings in the organization of labor, supply, beet storage and so on. If properly and competantly used, the new system pays for itself in a short time. Designing the system requires about one million rubles; acquisition and operation of the computers and auxiliary equipment add up to the same amount. But the tasks handled by the ASU help to save hundreds of millions of rubles!



Sugar Beet Zone of Kirgiziya's Chuyskaya Valley

Key:

1. Kaindinskiy Sugar Refinery ASUP
2. Kalininskiy
3. Kara-Baltinskiy Sugar Refinery ASUP
4. Moskovskiy
5. Ak-Su Sugar Beet Combine ASUP
6. Novo-Troitskiy Sugar Refinery ASUP
7. Sokulukskiy
8. Kirgiz SSR Ministry of Food Industry IVTs in Frunze
9. YeS-1022 [?] Computers
10. Kantskiy Sugar Refinery ASUP
11. Kantskiy
12. Tokmak Sugar Refinery ASUP
13. Chuyskiy

The industrial operation of the Kirgizsakhar ASU shows that processing data on the Minsk-32 computer makes it possible to obtain more complete and reliable information on the procurement of sugar beets by the republic's refineries, also routine information necessary for administering harvest operations; it makes it possible to automate the labor-intensive process of keeping accounts with sugar beet suppliers. In addition, the print-out tables produced by the computer are distinguished by by their compact format and graphic quality, and they have the force of law for settling accounts between refineries and farms.

By means of the Akkord-1200 PP sending and receiving equipment, for the first time in the republic two-way communications are set up between the computer in Frunze and the data terminals at the Tokmak, Kanskiy, Kara-Baltinskiy, and Ak-Su refineries. Information punched on tape concerning the delivery of beets to the enterprise comes in to the Ministry of Food Industry's IVTs. Processed on the computer, it is then transferred back to punched tape, which is returned to the refinery by wire. There it is deciphered by a special apparatus and then fed into the printing device. The printout is ready.

The organization of such a system of communications confirms the idea of the possibility of processing information in a unified computer center. It is not necessary for each sugar refinery to acquire its own computer. This reduces by dozens of times the expenditures necessary to set up the ASU in the Ministry of Food Industry or any other industry.

On the example of the sugar beet industry alone we have become convinced of the advantages of the new way of operation. But a number of problems arise. Primarily there is the problem of personnel. Specialists are needed: engineers, economists, and mathematicians who have mastered economic-mathematical methods and are able to work with electronic computers. There are two VUZ's training them in the republic--the Frunze Polytechnical Institute and the University. But the enrollment is small. With each passing year the shortage of personnel is becoming more acute.

A second problem involves the payment of wages to highly qualified specialists employed in adopting the ASU. None of the computer centers of the republic except for the Kirgiz SSR Central Statistics Administration computer center have the capability of introducing the bonus system of wages for high-quality and timely work performed. Thus there is high personnel turnover and it takes more time to develop and adopt ASU's.

A third and no less important problem is the psychological barrier against innovation. But all of these problems can be solved. All it takes is more vigorous and efficient effort. The benefits will soon be forthcoming.

6854
CSO: 1870

GLUSHKOV DISCUSSES 'CYBERNETIC CITY'

Moscow SOTSIALISTICHESKAYA INDUSTRIYA in Russian 26 Dec 76 p 4

/Article by V. Rybin: "Cybernetic City"/

/Text/ In Kiev there is a cybernetic city. This is not a journalistic figure of speech--it is what the place where the buildings of the Institute of Cybernetics of the Ukrainian SSR Academy of Sciences are located has been officially named. When you arrive there and hear the bus driver announce the stop and see reflected in the wide windows of the institute's 12-story main building the forests and clouds above them, you begin to dream of the megalopolis of the future, automated throughout, raising its multi-storied buildings above nature's unspoiled landscapes....

When I met with the institute's director, academician Viktor Mikhaylovich Glushkov, I began to sketch for him the fantastical picture I had imagined and the unusual name evoked by it--"Cybernetic City"....

"But imagine that this is no fantasy," said Glushkov, grinning slyly.

"But can you imagine it?"

"A megalopolis, no, but the city of the future--fully."

"A dream city?"

"No, a totally real city, on the construction of which we are now working."

He asked me to go to the window, which opened on a view of a picturesque panorama of forests and meadows. In the distance the city outskirts showed white.

"Above all, the city of the future constitutes a union of living accomodations and work," said Glushkov. "You see the building on the right? We are building an apartment house there.... What happens now? After working eight hours a scientific worker is shut off from his work, as if by a wall. But is it possible for a scientist to forget about his work even for a

minute? When you, for example, leave the editorial office, can you stop thinking about an unfinished article?"

"But I don't leave unless I have finished it."

"You do everything in a single session?"

"Sometimes I finish writing at home."

"In the same way a scientist thinks things through at home. Often unexpected ideas come to you at home as well. When you are, so to speak, cut off. But suppose a display were put in every apartment?"

Glushkov showed me a unit--an original synthesis of a television set and a typewriter.

"The display makes it possible to 'talk' with the computer at any time. Suppose you come up with an idea and dictate it to the computer so that it can 'think it through' while you wash up, have supper, rest. But then what happens? A new idea does not let a scientist eat or sleep. He continues to think about it so as not to forget it by the next day.

"Well, if there is a display in the apartment, then whether you want to or not you will have to take the second and third step on the road to the future. Let's say you go on a visit and you order the computer to switch all telephone calls to another number. Or you put the teapot on the range and order the computer to heat it until such-and-such a time. If you are delayed, you telephone and change the program. If you don't phone, nothing terrible will happen: the computer will turn off the electric range in time.

"They have gone further. Let's say your son has become ill and the doctor won't let him go to school. The display will show and tell everything that is happening in class. If the teachers put together a special program, which is not difficult, the computer can handle each student individually. And you don't do sloppy work, you don't rush. If you make a mistake, the computer will immediately remind you of the forgotten rule. It is possible that when a display tied into a computer appears in the home, school will become totally different, the approach to the teaching system will change, and the efficiency of the education process will increase.

"The computer will also keep track of our health better than any doctor. The doctor is simply not able to carefully review an entire medical history, and some of them are true encyclopedias. It is no secret that sometimes a medication will be prescribed for a patient's current illness regardless of the fact that for his last illness this medication was contraindicated."

"But won't we still have to go to the doctor, just the same?"

"There will also be a display in the doctor's office. But sometimes the doctor will go to the patient. He will turn on the personal display and

question the computer, and it will answer any question on the medical history. And, in general, when a doctor receives a patient, he will spend more time looking at him instead of at a piece of paper. Scribbling is the scourge of modern medicine. Everything must be written down without fail, and there is not enough time to write everything down.

"Or take an extreme case--a heart attack. There, at the boundary between a person's life and death, the doctor bears an enormous responsibility. He must think a hundred times before employing heart massage, injections, or anything else. But there is no time for thinking. So he 'consults' the computer and immediately learns what in any given case will happen to the patient in 5 minutes, 10 minutes, or an hour...."

"For pity's sake!"--I could not contain myself. "All this is too unreal."

"But we are already storing medical histories in the computer," said Glushkov. "And have you seen our general-purpose medical chair? True, it's not fully ready. When it has been made, come and see it. We will sit you down in that chair and we will immediately know everything--your temperature and pulse, how your heart is functioning....

"And what are the prospects for the use of computers in medical statistics? Any general information can be obtained at once: who is going to the doctor with what illness: workers of which professions, which shifts; smokers; bachelors; anything you want. This alone can help us to detect incipient epidemics...."

"Let's go back to the home display," I suggested.

"We'll go back to the home display. This remarkable device will surely reduce the number of persons asking for medical assistance. It will make it possible to consult the doctor for any illness without seeing him.... You're not tired?" Glushkov asked, and looked at the clock.

"All that is magnificent," I acknowledged, understanding that it was time to conclude the conversation. "Thank you for the beautiful dream."

"That does it!" exclaimed Glushkov. "I am not talking about a dream, but about a reality. I repeat: all this will come to be. The plan for the social development of the cybernetic center micro-rayon has been approved by the Kiev Party gorkom.

"And when personal displays have been installed in the apartment, a great many things in everyday life will change. What do you think, can a computer replace, for example, the personal savings bank book?"

"Perhaps."

"It not only can but should. Automation of the savings bank will result in wages being entered directly in the savings bank book, or, more accurately,

under your code in the computer. And the computer on your instructions will 'pay' for all your everyday services--rent, dry cleaning... And why not pay for purchases in the same way? There is also a store in our city, and all information on the availability of goods can be put into the computer. You ask through your display what there is in the store, you order, and your purchases are delivered to your home. Of course, if you wish, take your money and go and select the goods. However, I think people will quickly fall out of the habit of doing this. It is one thing to choose a suit--you have to see it yourself--and quite another to buy a loaf of bread or 200 grams of sausage in a standard package. It will please everyone, I think, if the computer takes the order and delivers the goods."

"How is it possible for it to deliver the goods?"

"That belongs not to tomorrow's, but to the day after tomorrow's cybernetic city. We expect in time to equip the home with pneumatic conveyors. Let's say you ordered through your display two steaks for dinner from the 'Cookery.' And, if you please, within a minute they plop onto your kitchen table. Simultaneously the computer deducts from your account the cost of the two steaks."

"And if there is no money in the account?"

"I think that in that case they will give them to you on credit. Until payday. With appropriate comment to the accounting office as to your immoderate appetites. Since all those who enjoy the computer's services work in our institute, there certainly won't be any abuses."

"You are speaking in the present tense..."

"I am speaking about the present time. We are now working on all this."

"And what if the computer is cheated?"

"Try it," Glushkov grinned. "Here is the display. Press the key for the beginning of transmission."

I pressed it, and on the television screen the sign "Beginning: give the code" lit up.

"The code consists of seven characters."

Since I didn't know any code, I pressed the first seven numbers that came to hand. And the computer immediately told me that I had made a mistake.

"Let's assume that you know my code. Dial it."

Glushkov named seven characters, and I pressed the required keys. But I saw on the screen a strange statement: "Time."

"The computer 'knows' how I dial my code, and it is saying that the time does not conform...."

In this dialogue with the computer you feel awkward. You have the impression that a living person is sitting behind the wall and making a fool of you.

"Let's suppose that you built such a cybernetic city, in the full sense of the word, right here. What next?" I asked Glushkov.

"That in itself would be an interesting experiment. However, everything that our institute is doing is designed for widespread introduction in the national economy, in life, and in the home. We now have the requisite conditions in our cybernetic city--there are computers and communication lines, and the acquisition of displays would present neither technical nor economic problems. All that is necessary is that all those who live in the city be put under the same administration, that is that they all work in our institute, which is also feasible...."

And the experiment will begin--the first technical and sociological experiment of this type. It will test the reliability of this road to the future, the road the prospects of which were revealed to us by the scientific and technical revolution.

8964
CSO: 1870

DIVERSE APPLICATIONS OF MAGNETIC FIELDS REVIEWED

Moscow KRASNAYA ZVEZDA in Russian 23 Jan 77 p 4

[Article by A. Merkulov, engineer: "Magnetic Fields at Work"]

[Text] Streams of molten metal... To become useful to human beings the metal goes through a long, complex path of industrial processing. But before reaching the first operation, pouring, it must be transported from the smelting furnaces. This problem is now being handled by magnetohydrodynamic units, electromagnetic pumps and troughs.

These devices are used to transport magnesium and magnesium alloys, tin, zinc, mercury, and other liquid ferrous and nonferrous metals. Depending on the direction of action of the magnetic field the pumps propel the liquid metal along or, when industrial conditions require, slow down its movement and regulate the discharge. The chief advantages of this method of transporting are its complete hermetic state, noiselessness, simplicity of control, and the possibility of full automation.

Magnetic and electromagnetic methods are beginning to be used more and more today not just to intensify production processes but also to raise the quality of semifinished articles and finished goods. Permanent and alternating magnetic fields have a significant effect on the process of crystallization of ingots as well. Their action causes the grains to break down, which makes it possible to eliminate structural irregularities in the metal and increase its industrial plasticity.

The fundamentally new technology developed in our country for continuous pouring of deformable aluminum alloys using an electromagnetic field to shape the ingot has completely eliminated defective products and saved the state a large amount of money.

Special mention should be made of superstrong magnetic fields. A substance acted on by such fields sometimes shows unexpected and surprising properties similar to those caused by superhigh temperatures and pressures. Superstrong magnetic fields (hundreds of thousands and millions of oersteds) can even change the structure of metals.

The group of scientists directed by academician V. Sadovskiy at the Institute of the Physics of Metals at the Ural Scientific Center carried out an interesting project on strengthening steel. Seeking a way to change soft (austenitic) steel into a harder kind (martensitic), they tried to affect the metal with high temperatures and pressure. Not obtaining the needed results, they decided to subject the austenitic steel to the effect of a superstrong pulsed magnetic field (it had been believed previously that austenitic steel was without magnetic properties and thus not subject to the effect of a magnetic field). They suddenly found that the austenite atomic lattice easily changed into martensite when acted upon by the magnetic field.

A curious conclusion was drawn from the experiments: a phenomenon called superparamagnetism was discovered in austenitic steels.

We have now learned to use powerful pulsed magnetic fields not only to forge metal and correct deformation of parts but also to chip ice off the wings of airplanes. More and more new technological processes arising out of the effect of magnetic and electromagnetic fields on materials are appearing. They are helping resolve the problem of concentrating iron and nonferrous ores and rare metals in a new way.

Working magnetic fields are beginning to be used widely for assembling the most diverse machines and for analyzing not only the structure of metal castings but also the internal defects in semifinished articles and finished goods. Magnetic introscopes have truly
eyes today.

Another example of a pure magnetic technology today is magnetic stamping. And not long ago Soviet scientists and inventors developed an original new "two-component" method for magneto-thermal metalworking. The crux of it is the simultaneous action on the metal of the heat, which brings the outside layers of a semifinished part to the melting point, and the magnetic field, which removes the melt.

The examples cited (and a full enumeration of them is practically impossible today) illustrate that electromagnetic fields are capable of carrying out a true technical revolution in all branches of science, technology, and production without exception.

Electromagnetic hydrodynamics has even been applied in ship engineering. Electromagnetic logs can measure a ship's traveling speed with a precision down to a few hundredths of a knot. In other words, they are dozens of times more exact than current meters and hydraulic devices. In short, the sphere of application of magnetic fields in science and engineering is very broad.

11,176
CSO: 1870

MATERIALS SCIENCE AND METALLURGY

NEW METHODS OF PRODUCING SUPERPURE METALS

Moscow SOTSIALISTICHESKAYA INDUSTRIYA in Russian No 52, 3 Mar 77 p 4

[Article by A. Alekseyev]

[Text] When in diggings in the Valley of the Pharaohs the English archeologist Carter discovered the tomb of Tutenkhamon, the press recalled about that event: "In the tomb, filled almost to bursting with gold, the greatest value from the point of view of the history of culture is presented by a very small amulet of iron found there..."

Why is it surprising? One is struck above all by the fact that already in that distant time man knew how to smelt iron. But something else is still more unlikely: the iron which had lain many centuries in the tomb had not been subjected to the destructive effect of corrosion. And, as it was made clear later, it was saved by its high purity.

And so, pure iron... What's that? A priority of ancient peoples? A puzzle which goes in its roots into gray history? Not at all. Modern specialists also know how to make stainless steel and iron of excellent purity.

How are materials of such unique purity obtained? Let us look into one of the shops of the experimental plant at the Central Scientific Research Institute of Ferrous Metallurgy imeni I. P. Bardin. Here they are preparing an electron-beam furnace for smelting. Externally it is a very impressive piece of equipment, covered with cables, cooling pipes and vacuum hoses. Beside it is a panel.

"What's happening now deep inside the equipment," I asked the scientific secretary of the institute, Vladimir Leonidovich Shakhov.

"You have turned your attention to the panel, of course. From it an operator controls the smelting conditions and directs the work of the furnace. You see, the pointer on the vacuum gage is at the marking of 10^{-5}. That is a very low vacuum. In the working chamber there are practically no air or impurities which would hinder the purity of the experiment.

And now voltage is fed to the electron "gun", and a powerful beam of electrons is absorbed into the metal pig in the form of a sharp needle.

It is impossible to look into the illuminator with the naked eye. An optical pyrometer indicates that the heat of this laboratory "sun" is more than 2000 degrees. Why is such an enormous temperature required?

"The conditions are especially selected," V. L. Shakov continued, "so that impurities are vaporized out of the smelted sample. Highly volatile impurities are then pumped out by a vacuum pump and all the rest are condensed and settle on special "cold" screens. Then special automatic equipment gradually rotates the sample, placing ever newer sections of the sample under the electron "needle."

Drop by drop, very pure metallic "tears" flow into a massive copper crystallizer cooled by water. Solidifying, the metal is transformed into an ingot. The iron thus obtained contains a total of 0.009% of impurities. Here it is, long-awaited, especially pure...

"Obtaining pure and superpure materials is not at all a goal in itself," V. L. Shakhov continues his account. "The need for them increases from year to year. Such materials are needed by many branches of industry. The purity of the starting, or as metallurgists call it, the charging material makes it possible to obtain alloys with properties set in advance and, and this is the main thing, those properties can be reproduced repeatedly in different melts. Is that important? Very. Mass production cannot depend on the whims of an alloy, if the quantity and composition of impurities in it are different."

Now the investigators are searching for a very promising industrial method of obtaining pure materials. The technology must be highly productive and economical.

The use of especially pure iron has already made it possible to obtain new alloys with remarkable properties. One of the latest is strong pure iron containing nickel, which has excellent permeability. In comparison with earlier known, that property is 10-20 times as great in the iron-nickel alloy. Such material is greatly needed, for example, in instrument-making and electronics -- its use will help to substantially reduce the dimensions of various instruments.

Interesting prospects are also opening up in the production of materials for heater elements. The alloys based on iron used today contain considerable amounts of various impurities -- carbon, sulfur and some others. At high temperatures in them, as a rule, pitting corrosion forms and the spiral burns up. Pure materials, however, increase the quality of heater elements, and, of course, many household electrical instruments will become more reliable and cheaper.

...In 1900 there was a total of ten grades of steel and nonferrous metals at the disposal of the creators of locomotives, the most powerful machine of that time. But about a hundred are used for the construction of a modern automobile, and in an airplane they can number up to 300. At the present time there are

tens of thousands of types of steels and alloys for very varied purposes. And in most of them, as before, the old friend of man, the working metal, iron, is used. It was not without reason that as long ago as the 18th century the Russian teacher Vasiliy Levshin wrote that if the price of things were determined by their utility, iron would be considered the most precious of materials.

2174
CSO: 1870

SCIENTISTS AND SCIENTIFIC ORGANIZATIONS

SIBERIAN DEPARTMENT OF USSR ACADEMY OF SCIENCES

Moscow EKONOMICHESKAYA GAZETA in Russian No 8, Feb 77 p 3

[Article: "In the Central Committee of the CPSU"]

[Text] The CC CPSU examined the question "On the Work of the Siberian Department of the USSR Academy of Sciences on the Development of Basic and Applied Scientific Research, Improving its Effectiveness and Implementing Scientific Achievements in the National Economy and in Personnel Training."

In the approved decree it was noted that in carrying out important assignments of communist construction posed by the 25th CPSU Congress, the Academy of Sciences and its scientific departments contribute greatly.

The Siberian Department of the USSR Academy of Sciences with it institutes, branches, and experimental and production subdivisions has become a large scientific center. Here important basic and applied research is carried out. It provides for strengthening the nations scientific - technical potential and for growth in the influence of Soviet science.

The creation of the Siberian Department of the USSR Academy of Sciences directly influenced and incluences the development of production power and the education and culture of eastern areas of the country. It caused the Far Eastern and Ural Scientific Centers of the Academy of Sciences, the Siberian departments of the All Union Academy of Agricultural Sciences imeni V. I. Lenin and the USSR Academy of Medical Sciences to come into existence. It also promoted a broadening in the network of higher educational institutions.

Deciding conditions in the founding and development of the Siberian Department of the USSR Academy of Sciences were such factors as continuous assistance of party and State agencies, attention of the USSR Academy of Sciences, correctly choosing pressing scientific directions, the transfer of prominent scientists to Siberia from central areas, and the enthusiasm and selflessness in the work of the entire collective of the scientific center. Construction organizations made an important contribution in speeding up the creation of a material basis for science in Siberia.

The CC CPSU noted with satisfaction that the scholars of the Siberian Department of the USSR Academy of Sciences got remarkable scientific results in the theoretical and applied division of mathematics and mechanics, in nuclear physics and the physics of semi-conductors, in quantum electronics, in the theory and practice of catalysis, the study of the process of combustion and explosion, and in biological studies on genetics and selection in plants and animals. Academic departments actively participate in working out theoretical bases of exposing the main forms of mineral raw material.

On the basis of fundamental scientific studies, the Siberian Department of the USSR Academy of Sciences conducts a great deal of applied studies and works. At many of the largest enterprises they are using a new technology of welding and punching components with the help of explosions, new chemical reactors, and automated systems of managing production. In western Siberia the highly productive and standing "Novosibirskaya - 67" variety of wheat has been divided into districts and is spreading. A map of Siberia's seismic district division was made and an engineering seismic evaluation of the Baykalo - Amurskaya highway route was given. Considerable assistance has been given in working out plans for developing the fuel and energy balance of the country.

Progressive forms are being successfully achieved in connecting science and production on the basis of long-term scientific - technical research programs combined with ministries and implementing the results of the finished works, organizations of complex brigades of scholars and workers of the industry, special purpose financing of prospective jobs, and the creation in the Siberian Department of USSR Academy of Sciences of branch special construction bureaus and experimental productions of industrial ministries and agencies. Over the last five years over 700 large-scale completed projects were handed over to production and agriculture.

On the basis of the Novosibirsk State University and scientific research institute divisions, a system for training personnel for scientific centers, higher educational institutions, industry and agriculture in Siberia has been established.

In close connection with the natural sciences and the practice of communist construction, studies are being conducted in the area of social sciences. In the five volume publication "History of Siberia" the historical progress of the multinational population of Siberia is examined. The studies of the Siberian schools for archeologists received widespread recognition.

In its favorable evaluation of the work done by the Siberian Department of the USSR Academy of Sciences, the CC CPSU noted that in the department's work there are shortcomings and unsolved problems. Slowly research is being conducted on the complex utilization of the natural wealth of the nation's eastern regions. The Presidium of the Siberian Department of the USSR Academy of Sciences does not devote sufficient attention to the work

of certain scientific centers and subsidiary departments. The level of work of individual institutes does not yet meet the increased requirements. Scientific power, material and technical resources are still poorly concentrated in the most important trends of science connected with speeding up scientific - technical progress.

The necessary coordination of studies of academic scientific departments and institutes of the Siberian departments of the All-Union Academy of Agricultural Sciences imeni V. I. Lenin and the USSR Academy of Medical Sciences, ministries, and branches and higher educational institutions of Siberia is not being done. Plans of scientific research of branch scientific research institutes and special design offices located in the Novosibirsk Akademgorod do not always agree with the subjects of academic institutes.

The production instrument making base has not been developed sufficiently. This owes to the fact that the potential of academic institutes in creating modern instruments and means for automation are not being used to the fullest. Publishing work, the system of material and technical supply, housing and domestic conditions for scientific workers of the department must be improved.

Party organizations of some institutes do not conduct actively enough ideological - political education in scientific offices, in their mobilization for a thorough and comprehensive development of scientific problems connected with carrying out the tasks set forth by the party for the rapid development of the economy of eastern areas of the country.

The CC CPSU approved the work of the Siberian Department of the USSR Academy of Sciences in developing science and applying its achievements in the national economy. These promoted strengthening the scientific - technical potential, the development of production powers, and the education and culture of Siberia and the Far East. The CC CPSU recommended that in accordance with the resolutions of the 25th CPSU Congress, the regulations and conclusions presented in Comrade L. I. Brezhnev's speech at the grand meeting in honor of the 250th anniversary of the USSR Academy of Sciences, academic departments should concentrate their attention on the utmost development of fundamental and applied studies, on improving efficency and quality of work of scientific - technical institutes and their branches, on intensifying the coordination of their work, improving the forms and methods of managing them and of further expanding and strengthening ties with production, and speeding up the process of implementing scientific achievements in the national economy. It is necessary to achieve steadfast improvement in the level of the studies in the area of social sciences devoting particular attention to the problems of developing the economy of eastern parts of the nation, to the study of and general conclusions on historical experience in the struggle for winning the Great October Socialist Revolution, socialist and communist construction in Siberia, and in the ideological - political labor and moral education of the workers.

To attain these goals it is necessary to ensure the further development of personnel training for scientific-research departments of Siberia and the Far East, their proper distribution, the creation of a collective atmosphere in work and favorable conditions for creative growth, the raise the responsibility of scholars for the quality of scientific work, and to concentrate their efforts on the utmost acceleration of scientific - technical progress especially on the main and newest trends in science and technology.

The decree notes the necessity to improve the role of scientific collectives of the Siberian Department of the USSR Academy of Sciences in carrying out assignments and preparing recommendations connected with the development of Siberian production powers, to provide for the active participation of the department in developing ways of farming territorial-production complexes, problems of complex development of new regions in Siberia especially those adjacent to the construction area of the Baykal - Amur highway, and in studies for the further development of mineral - raw material and fuel and power base including the Kansk-Achinskiy coal basin and the Noril'skiy Metallurgical Mining Combine, in search of rational ways for the complex utilization of natural resources and preserving the environment.

The USSR Academy of Sciences has been charged with studying new forms of organization, prospects for developing science and network of academic scientific departments in the country bearing in mind the work of the Siberian Department of the USSR Academy of Sciences, the Ukrainian SSR Academy of Sciences and the academies of sciences of other union republics and scientific centers.

The CC CPSU underscored that the steadfast growth in the scientific - technical potential of Siberia and the Far East must count on the utmost acceleration in the development of production power in eastern regions of the country.

The State Committee on Science and Technology of the USSR Council of Ministers with the participation of the USSR Academy of Sciences, ministries and branches has been entrusted with working out the regulation on branch scientific research institutes and special construction bureaus located in Akademgorod of Novosibirsk having provided for strengthening the role of the Siberian Department of the USSR Academy of Sciences in choosing the directions and in planning and evaluating the effectiveness of their scientific technical work.

The CC CPSU favorably treated the proposals of the USSR Academy of Sciences on the further development of the scientific-production base of the Siberian Department of the USSR Academy of Sciences, the consolidation of scientific and scientific - auxiliary personnel, on improving their housing conditions, on developing a network of medical, sanitation, and child-care institutions, trade enterprises and domestic services.

The CC CPSU turned the attention of ministries and branches to the necessity of taking measures for speeding up the construction and implementation of the material - technical base of organizations within their jurisdiction in Akademogorod of Novosibirsk together with housing and cultural and domestic units.

The CC CPSU obligated the Novosibirskaya, Tomskaya, Irkutskaya, Buryatskaya, Yakutskaya oblast committees, the Krasnoyarskiy Kray Committee of the CPSU to direct the work of party organizations of the institutes, branches and other subdivisions of the Siberian Department of the USSR Academy of Sciences on the further intensification of party influence on all links of scientific institutions, to pay constant attention to the combined cooperation of scientific and production collectives which provides for the guarantee of a qualitatively new level of their work, more widely attract trade union, komsomol organizations, prominent scholars toward educating scientific youth in the spirit of Soviet patriotism, toward forming its Marxist-Leninist world outlook, and to guarantee the further intensification of propaganda on the achievements of Soviet science.

The CC CPSU expressed confidence in the fact that the scholars of the Siberian Department of the USSR Academy of Sciences, all of its collectives and party organizations will direct their efforts on carrying out historical tasks set by the 25th CPSU Congress and that they will make a worthy contribution to the development of Soviet science and to building a communist society in our country.

8714
CSO: 1870

SCIENTISTS AND SCIENTIFIC ORGANIZATIONS

NEW FORCES OF SCIENCE - GENERAL MEETING OF THE ACADEMY OF SCIENCES USSR

Leningrad LENINGRADSKAYA PRAVDA in Russian 26 Dec 76 p 3

/Text/ The general meeting of the Academy of Sciences of the USSR convened in Moscow 23-24 December. Selections for membership in the Academy were made at the meeting. As a result, all basic regions of natural and humanitarian sciences were replenished with eminent Soviet scientists, who have made significant contributions to the development of different branches of science and technology, becoming active members and corresponding members of the Academy of Sciences.

New active members and their areas of specialization include: A.V. Pogorelov, A.A. Samarskiy, L.D. Faddeyev -- mathematics; B.K. Vaynshteyn, L.V. Kaldysh -- general physics and astronomy; I.A. Glebov -- physico-technical problems of power engineering; V.P. Makeyev, G.P.Svichshev, A.S. Yakovlev -- mechanics and control processes; N.S. Yenikolopov and V.V. Korshak -- general and technical chemistry; B.N. Laskorin -- physico-chemistry and technology of inorganic materials; A.A. Krasnovskiy -- biochemistry, biophysics and chemistry of physiologically active compounds; O.G. Gazenko -- physiology; Yu. V. Bromley -- history.

The 76 newly elected corresponding members include representatives of different areas of knowledge.

Academician R.Z. Sagdeyev, director of the Institute of Space Research of the Academy of Sciences of the USSR, delivered a paper "Studies of the Earth from Space (a joint experiment of scientists of the USSR and the GDR) on the "Soyuz-22" Space Ship." Sagdeyev noted that the experiment "Raduga" (Rainbow) which includes the use of original multispectral photo apparatus developed by specialists of the GDR and the USSR for the study of the natural resources of the earth is an important practical step for working out a constantly acting system of scientific control over processes originating on earth.

Crew members of the "Soyuz-22" spaceship USSR Cosmonauts V.F. Bykovskiy and V.V. Aksenov attended the meeting. General Secretary of the Academy of Sciences of the GDR, K. Grote expressed appreciation to Soviet scientists for their objective assistance in the establishment of the school of space research in the GDR.

2791
CSO: 1870

SCIENTISTS AND SCIENTIFIC ORGANIZATIONS

BELORUSSIAN ACADEMY OF SCIENCES PRESIDIUM ELECTIONS

Minsk SOVETSKAYA BELORUSSIYA in Russian 29 Jan 77 p 3

[Text] In concluding its work on 28 January, the general meeting session of the Belorussian Academy of Sciences elected the new membership of the Academy Presidium.

Belorussian Academician N. A. Borisevich, a corresponding member of the USSR Academy of Sciences, was elected President of the Belorussian Academy of Sciences. Belorussian Academicians K. K. Atrakhovich (K. Krapiva), V. A. Belyy and A. S. Makhnach were elected vice-presidents of the Academy, and Belorussian Academician A. S. Dmitriyev was elected Presidium secretary. Belorussian Academicians A. A. Akhrem, N. P. Yerugin and A. K. Krasin were elected Academy Presidium members.

The general meeting session of the Belorussian Academy of Sciences approved academician-secretaries of the departments of sciences who were elected at general meetings of the departments. The following were elected academician-secretaries of departments: physical and mathematical sciences -- Belorussian Academician F. I. Fedorov; physical-technical sciences -- Belorussian Academician P. I. Yashcheritsin; chemical and geological sciences -- Belorussian Academy of Sciences corresponding member N. I. Mitskevich; biological sciences -- Belorussian Academician I. A. Bulygin.

Department assistant academician-secretaries and bureau members were also elected.

Taking part in the work of the general meeting session of the Belorussian Academy of Sciences were A. T. Kuz'min, Secretary of the Central Committee of the Belorussian Communist Party; N. L. Snezhkova, Deputy Chairman of the Belorussian Council of Ministers; A. T. Korotkevich, chief of the Department of Science and Academic Institutions of the Belorussian Communist Party Central Committee.

11052
CSO: 1870

SCIENTISTS AND SCIENTIFIC ORGANIZATIONS

SCIENTISTS RECENTLY ELECTED TO ACTIVE MEMBERSHIP IN ACADEMY OF SCIENCES USSR

Moscow TRUD in Russian 3 Feb 77 p 2

/Text/ Academician V.V. Korshak was graduated from an engineering trades school and began to work as a joiner in railroad shops of Romny Station of Chernogovskaya Oblast at the age of 16 years. However, he dreamed of becoming a chemist and performed experiments in a small home laboratory in the evenings. Two years later he entered Moscow Chemico-Technical Institute. After completion of post-graduate work, he remained as a teacher and has now headed the Chair of Plastics Technology for 39 years.

Several new polymers were developed under the direction of Vasiliy Vladimirovich Korshak at the laboratory of high-molecular compounds of the Institute of Elemento-Organic Compounds of the Academy of Sciences of the USSR.

Polymers for use in manufacture of artificial vessels and organs also are being developed. "Silar" is a film for selective separation of gases. Scientists are studying the possibility of using it during development of an artificial lung.

Academician V.V. Korshak has been awarded the State Prize USSR twice.

Academician B.N. Laskorin, Lenin Prize Laureate and Honored Inventor of the RSFSR is a leading Soviet scientist in the area of chemistry and hydrometallurgy of non-ferrous and noble metals. Boris Nikolayevich Laskorin is a graduate of Kiev University. At the age of 41 years, he defended his doctoral dissertation and became a corresponding member of the Academy of Sciences USSR 10 years later (in 1966).

A new technological method of complex processing of ores and concentrates for the purpose of producing non-ferrous and noble metals was developed and implimented on large industrial scales under the supervision of B.N. Laskorin. This method permits the intensification of some production processes 10-fold and even 100-fold. Many hydrometallurgical enterprises are being reconstructed on the basis of the new process.

The technological methods developed provide a reliable scientific and technical basis for the development of waste-free industrial production.

2791
CSO: 1870

SCIENTISTS AND SCIENTIFIC ORGANIZATIONS

ACADEMICIAN L.D. FADDEYEV

Leningrad LENINGRADSKAYA PRAVDA in Russian 26 Dec 76 p 3

/Text/ There are few specialists in mathematical physics in the Soviet Union or abroad who are equally proficient in both physics and mathematics and have the capacity to interpenetrate these sciences. Lyudvig Dmitriyevich Faddeyev is just such a specialist.

L.D. Faddeyev's scientific activity involves mathematical problems of contemporary theoretical physics, mainly quantum mechanics, field theory, general theory of relativity and the theory of Lie group representations.

The most important of his more than 60 studies are the studies of the quantum theory of scattering, the quantum problem of three particles and field theory with infinite dimensional groups of invariance. L.D. Faddeyev's monograph "Mathematical Problems of the Quantum Theory of Scattering for a System of Three Particles" was widely acclaimed in the Soviet Union and abroad. A cycle of works on the correct posing and investigation of problems of scattering for three particles received the State Prize for 1971.

L.D. Faddeyev has represented Soviet science abroad many times. He was a member of the delegations to mathematical congresses in Stockholm and in Niece.

He works diligently in training young specialists at the Department of Physics of Leningrad University, where he heads the Chair of Mathematical Physics. L.D. Faddeyev initiated the organization of a new course of theoretical physics for mathematicians at LGU /Leningrad State University/.

At the age of 42, Faddeyev's students already include two people with the Doctor of Science degree and more than 10 candidates of sciences.

L.D. Faddeyev heads the Leningrad section of the Mathematical Institute imeni V.A. Steklov of the Academy of Sciences of the USSR. The laboratory of mathematical problems of physics established here under his supervision consists wholly of his students. Thus, there is complete justification to speak of the establishment and formation of the scientific school of L.D. Faddeyev.

2791
CSO: 1870

SCIENTISTS AND SCIENTIFIC ORGANIZATIONS

ACADEMICIAN I.A. GLEBOV

Leningrad LENINGRADSKAYA PRAVDA in Russian 26 Dec 76 p 3

/Text/ From electrician and a peasant by birth to academician, Doctor of Technical Sciences, director of the All-Union Scientific Research Institute of Electrical Machinery Construction -- this marks the path of I.A. Glebov. Igor' Alekseyevich has acquired well-deserved authority as an eminent scientist in electrical engineering and electrical technology both in the Soviet Union and abroad.

In his scientific works, Professor Glebov has studied the problem of the development of new, up-to-date energizing systems for powerful hydrogenerators and turbogenerators and synchronized compensators. During this work he considers comprehensively both the scientific and technical aspects of the problem and the ensurance of the stability and reliability of operation of the power systems.

The coordination of scientific research and experimental design operations conducted by Soviet scientists and specialists in this specialty, occupy a major place in I.A. Glebov's work.

I.A. Glebov's studies concerning modelling of power systems and their elements are of great scientific and practical importance. Thanks to this, electrodynamic models were developed in some organizations of the Soviet Union. In his studies, I.A. Glebov has examined many important problems of stability of electrical systems.

He also studied the effect of energizing systems on the stability of parallel operation of synchronous generators, as a result of which areas

of beneficial use of different energizing systems were determined and some fundamentally new positions were advanced.

Igor' Alekseyevich participates actively in the work of the Scientific Council on Cybernetics at the Presidium of the Academy of Sciences of the USSR and also the Scientific Committee of the USSR dealing with large electrical networks. He has conducted intense educational work in colleges of our country for more than 30 years.

2791
CSO: 1870

LENINGRAD RESIDENTS - NEW CORRESPONDING MEMBERS OF ACADEMY OF SCIENCES USSR

Leningrad LENINGRADSKAYA PRAVDA in Russian 28 Dec 76 p 3

V.P. Zakharchenya

/Text/ Leningrad PRAVDA has contained numerous articles concerning Boris Petrovich Zakharchenya's work in the area of the physics of a solid. His research not only stands at the forefront of science and has a fundamental nature but also determines the development of new trends in the optics of crystals.

Since 1952, Boris Petrovich has been at the Physico Technical Institute imeni A.F. Joffe of the Academy of Sciences of the USSR studying spectra of semi-conductors at low temperatures and the effect of electrical and magnetic fields upon them. He discovered an entire series of new, physical phenomena upon which contemporary electro-optics and magneto-optics of semi-conductors are based. B.P. Zakharchenya was awarded the Lenin Prize in 1966 for this research.

In 1970, B.P. Zakharchenya began a study of optical orientation of electrons and nuclear spins in semi-conductors. This new cycle of studies was deservedly praised by the scientific community and the author was awarded the State Prize of the USSR in 1976.

Two years ago, upon the suggestion of B.P. Zakharchenya, studies concerning the use of phase transitions of metals -- semi-conductors in opto-electronics were begun at the FTI /Institute of Physiotherapy/.

Results were received quickly. Original film devices capable of contrast changing of light with insignificant heating were developed. The prospects for use of this device are very promising.

Doctor of Technical Sciences, Professor of the Chair "Theoretical Principles of Electrotechnics" of the Leningrad Polytechnical Institute imeni M.I. Kalinin, K.S. Demirchyan has written more than 80 scientific papers.

Kamo Seropovich Demirchyan specializes in the solution of problems of electrical engineering and maintains close contact with important national-economic problems in this area. Many of his papers were produced upon request of major industrial enterprises and scientific research institutes: the unions "Electrosila" "Elecktoapparat" the VNII /All-Union Scientific Research Institute/ of Electrical Machinery and others.

K.S. Demirchyan

K.S. Demirchyan's scientific studies in the area of the theory of complex electric circuits and systems contains some new ideas which permit a substantial increase in the effectiveness of use of the EVM /electronic computer/ for the solution of practical problems. K.S. Demirchyan advanced important studies in the area of the theory of an electromagnetic field. These studies are used extensively in the design of electrical engineering devices of maximum horse powers -- turbogenerators, hydrogenerators, transformers and electrical apparatus.

K.S. Demirchyan conducts significant scientific research and educational work, being the director of the Scientific Research Institute of Physico-Technical Problems of Electrical Engineering at the Leningrad Polytechnical Institute imeni M.I. Kalinin.

Problems of the theory and practice of automatics and control processes comprise the area of scientific activity of A.A. Vavilov, Professor, Doctor of Technical Sciences and rector of the Leningrad Institute of Electrical Engineering imeni V.I. Ul'yanov (Lenin).

Aleksandr Aleksandrovich has achieved significant successes in the area of development of new structures, algorithyms of control and their realization in automatic systems. He supervised the development, on this basis, of a system of control of movement, a system of control of drives of feeds of machine tools, of an entire series of processes of contemporary technology and processes of mass production of articles.

A.A. Vavilov

He developed multichannel regulators of general industrial purpose which already are in series production.

Professor Vavilov is presently supervising studies in the development of automatic control systems of production and technological processes and systems of automation of design and control of a scientific experiment. He is one of the initiators of the organization of the inter-sector, complex, scientific program "Automation of Collection and Processing of Information and Control of Technical Means of Study and Mastery of the World Ocean."

A scientist and educator who heads one of the leading colleges of Leningrad, Communist A.A. Vavilov was a delegate to the 25th Congress of the CPSU.

Professor Guriy Timofeyevich Petrovskiy, Doctor of Chemical Sciences, deserves his reputation as an eminent specialist in physical chemistry and the technology of optical materials. He is scientific director of a major, specific trend in the physical chemistry and technology of silicate materials and other inorganic materials. He is the author of more than 100 scientific articles. He has presented many addresses at international and All-Union symposia. He has also conducted extensive original research.

G.T. Petrovskiy

His numerous papers concerning the study and synthesis of fluoberyllate glasses are especially interesting. These studies provided very important practical results and revealed new principles concerning the structure of this group of glasses and was especially important for the general theory of the vitreous state.

G.T. Petrovskiy presently heads one of the basic, major subdivisions of the State Optical Institute imeni S.I. Vavilov. He is a member of many scientific and scholarly councils and a member of the editorial board of the journal "Physics and Chemistry of Glass" of the Academy of Sciences of the USSR. He heads the basic Chair of Technology of Optical Glassmaking of the Leningrad Technological Institute imeni Lensovet.

At the age of 45, at the peak of his creative capacities, Communist scientist G.T. Petrovskiy was informed of his selection as a corresponding member of the Academy of Sciences of the USSR.

Director of the Institute of Evolutionary Physiology and Biochemistry imeni I.M. Sechenov of the Academy of Sciences of the USSR, head of the laboratory of the evolution of the adaptational-trophic function of the nervous system, Doctor of Biological Sciences Vladimir Aleksandrovich Govyrin is one of the most eminent scientists in the area of the physiology of the autonomic nervous system whose works are known widely in our country and abroad. His basic research is concentrated on the further development of the fundamentally important, central problem of L.A.Orbela's theory concerning mechanisms of adaptational trophic influences of the sympathetic nervous system on tissue.

V.A. Govyrin

V.A. Govyrin is the author of 50 scientific papers. He has contributed greatly to the revelation of mechanisms of the effect of the sympathetic nervous system on the activity of heart muscle and skeletal muscle, a problem which has been a subject of constant discussion since the time of the classical studies of I.P. Pavlov and L.A. Orbelia.

Data obtained by V.A. Govyrin and the collective headed by him have not only great theoretical interest but also considerable practical value.

V. A. Govyrin conducts much scientific-organizational work. He is a member of the Central Council of the All-Union Physiological Society imeni I.P. Pavlov, the board of the Leningrad Society of Physiologists, Biochemists and Pharmacologists and a member of the editorial board of the journal "Achievements of the Physiological Sciences."

Production biology of water ecological systems is a completely new scientific trend which was developed by G.G.Vinberg, Doctor of Biological Sciences, head of the Laboratory of Fresh-Water and Experimental Hydrobiology of the Zoological Institute of the Academy of Sciences of the USSR. Professor Vinberg's works in the area of the theory of biological productivity of ecological systems have great importance for the solution of such an urgent problem as the rational use of natural resources. Concurrently, he is working out problems of fundamental importance to the general theory of ecology.

G. G. Vineberg

Professor Vinberg has published nearly 150 papers. These include several monographs which were received as major events in the scientific world. Georgiy Georgiyevich is widely known not only as the head of the laboraties of the Zoological Institute of the Academy of Sciences of the USSR but also as president of the All-Union Hydrobiological Society, a member of the Ichthyological Commission of the Ministry of the Fishing Industry, head of the section of fresh waters of the special committee of the International Biological Program, member of the Bureau of the Scientific Council of the Academy of Sciences of the USSR on the problem "Hydrobiological Processes and Means of Control of Them," a member of the Soviet-American Committee for Protection of Reservoirs from Pollution, director of one of the projects of the international program of UNESCO "Man and the Biosphere."

The Arctic and Antarctic Scientific Research Institute is figuratively called headquarters of the poles. Oceanologist Aleksiy Federovich Treshnikov has been associated with this institute for 37 years. He came to the institute with several associates. Now this Hero of Socialist Labor, recipient of the Order of Lenin three times, State Prize USSR laureate, Doctor of Geographical Sciences, Professor A.F. Treshnikov heads the institute. He became its director in 1960.

A.F. Treshnikov

Oceanologist A.F. Treshnikov participated in 25 expeditions, wintered in the Arctic and the Antarctic four times, headed the drift on the SP-3 /expansion unknown/ and has headed antarctic expeditions.

The name of A.F. Treshnikov is inseparably associated with the history of the organization of high-latitude aerial expeditions during which the underwater Lomonosov mountain range was discovered. His papers (more than 100) are devoted to important problems of oceanography. He was the first to investigate problems of the penetration of the Pacific Ocean waters in the region of the North Pole in the monograph, "Morphological Sketches of the Land Locked Seas of the Antarctic," which presented, for the first time in Soviet geographical literature, the characteristics of the relief of the bottom and shores of these seas and their association with the general relief of the Antarctic.

He enjoys the fame of a pioneer. He is not only a scientist but also a man of letters, author of popular books which captivate youths and the holder of many scientific titles and ranks.

Those who encounter head of the group of general history of the Leningrad Section of the Institute of History of the Academy of Sciences USSR Viktor Ivanovich Rutenburg are impressed by the depth and extensiveness of his knowledge about Italy. Viktor Ivanovich is one of the leading specialists in the history of Italy and of western European feudalism as a whole. He has written more than 130 scientific papers.

V.I. Rutenburg

In his works based on documentary data of Soviet and foreign archives, V.I.Rutenburg worked out the problem of the genesis of capitalism in Italy, studying the primary methods and forms of capitalist exploitation in Western Europe.

Another trend in his research was the working out of problems of the cultural legacy obtained by the Italian people from the epoch of the Renaissance. Some of V.I. Rutenburg's studies are closely connected with the study of the history of religious ideology and church institutions.

Some of V.I. Rutenburg's studies are of a general methodological nature and facilitate the practical use of data of historical science in the contemporary ideological struggle.

His scientific activity has received international acclaim. Many of his works were translated and published in the GDR, Hungary, Romania, France and Italy and reviews of them have appeared in Poland and Czechoslovakia.

2791
CSO: 1870

ACADEMIC VACANCIES IN THE ARMENIAN ACADEMY OF SCIENCES

Yerevan KOMMUNIST in Russian 17 Dec 76 p 3

[Announcement of vacancies by Armenian SSR Academy of Sciences President Academician V. A. Ambartsumyan; Armenian SSR Academy of Sciences Presidium Chief Scientific Secretary Corresponding Member S. A. Bakunts: "From the Armenian Societ Socialist Republic Academy of Sciences"]

[Text] The Armenian SSR Academy of Sciences in accordance with Paragraphs 16 and 17 of its charter hereby announces the following existing vacancies for full members (academicians) and corresponding members of the Armenian SSR Academy of Sciences in the following specialties:

	Full Members	Corresponding Members
Physics	1	2
Astronomy	--	1
Control Processes	1	--
Control Theory	--	1
Atomic Power Engineering	--	1
Chemistry	1	1
Biochemistry	--	1
Geology	1	1
Pharmacology	--	1
Medicine	--	1
Modern and Recent History	1	--
Literature	1	--
History of the CPSU	--	1
Economics	--	2
Linguistics	--	1
Total	6	14

Those elected to be full members (academicians) of the Armenian SSR Academy of Sciences, in accordance with Paragraph 12 of the Charter of the Armenian SSR Academy of Sciences, are scholars who have enriched science with works of first-class scientific importance.

Those elected to be corresponding members of the Armenian SSR Academy of Sciences, according to Paragraph 13 of the Charter of the Armenian SSR Academy of Sciences, are those scholars who have enriched science with outstanding scientific works.

The councils of scientific institutions and VUZ's, state and social organizations, full members and corresponding members of the academies of sciences have the right, within one month of this announcement, to submit to the Academy of Sciences, in writing, with supporting reasons, the name of their candidate for full membership or corresponding membership in the Armenian SSR Academy of Sciences with respect to the vacancies indicated in this announcement.

For candidates for full membership (academicians) and corresponding membership in the Armenian SSR Academy of Sciences it is necessary to forward the following documents in Armenian (one copy) and Russian (two copies): substantiated presentated (resolution) of the council or the state or social organization along with the results of secret balloting, or in the case of presentation on the part of academicians and corresponding members a letter with the appropriate supporting reasons concerning promotion of the candidate, an autobiography, an individual form from the cadre records, a list of scientific works done (Form No 3), an appraisal of the production-social activity of the candidate, and three 4.5 by 6 cm photographs.

These materials are to be sent to: Armenian SSR, 375019, Yerevan-19, Pros Prospekt Barekamutyan, 24, Presidium of the Armenian SSR Academy of Sciences, Personnel Division.

6854
CSO: 1870

SCIENTISTS AND SCIENTIFIC ORGANIZATIONS

SESSION MARKS 50TH ANNIVERSARY OF GEORGIAN GEOLOGY INSTITUTE

Tbilisi ZARYA VOSTOKA in Russian 12 Dec 76 p 2

[Article: "Geologists' Scientific Session"]

[Text] A jubilee scientific session dedicated to the 50th anniversary of the Geology Institute imeni A. I. Dzhanelidze of the Georgian SSR Academy of Sciences was held in Tbilisi. It was participated in by outstanding Soviet geology scientists, representatives of scientific centers, VUZ's, and producing geological organizations of Moscow, Leningrad, Georgia, Armenia, Azerbaydzhan, and the North Caucasus.

The session was opened and on behalf of the presidium of the Academy of Sciences the collective of the institute was greeted on the occasion of the glorious date by Georgian SSR Academy of Sciences Vice-President Ye. Kharadze.

On behalf of the CC CP Georgia, the Presidium of the Supreme Soviet, and the Goergian SSR Council of Ministers the collective of the institute was congratulated on the half-century jubilee by the director of the division of science and educational institutions of the CC CP Georgia, Academy of Sciences Corresponding Member E. Sekhniashvili.

A paper entitled "The 50th Anniversary of the Geology Institute" was given by the institute's director, Georgian SSR Academy of Sciences Academician P. Gamkrelidze.

The scientific papers given at the session by members of the institute dealt with the results of recent research.

6854
CSO: 1870

SCIENTISTS AND SCIENTIFIC ORGANIZATIONS

BAKU SESSION ON PROCESS SIMULATION IN PETROCHEMISTRY

Baku BAKINSKIY RABOCHIY in Russian 20 Nov 76 p 3

[Article: "From Mathematical Model to Industrial Unit"]

[Text] Urgent problems of mathematical simulation and optimalization of technological processes in the chemical, petroleum refining, and petrochemical industry were discussed at an All-Union scientific session held in Baku on 19 November. In a resolution adopted by participants, the representatives of this country's key scientific institutions in this field mapped out the tasks of efforts involved in simulating chemical-technological processes and equipment; they mapped out specific ways to implement them.

At the request of the Azerinform correspondent, the results of the session's work are commented on by USSR Academy of Sciences Corresponding Member M. G. Slin'ko, deputy chairman of the scientific council on the problem "Catalysis and its Industrial Utilization" of the USSR Council of Ministers State Committee on Science and Technology.

"The basic way to develop the chemical industry is to create technology lines, reactors, and equipment of high unit capacity. This tendency will be continued in the future for purposes of insuring the further rise in the production of mineral fertilizers, polymer materials, and chemical fibers, petroleum refining products, and so on.

"For this reason it has become quite essential to work out an accurate program of development of intensive processes and equipment of high productivity. At present the growth in capacities of some of them has approached the limit of existing capabilities of machine building, transport, and installation.

"What is the solution? Evidently, to create new processes that are more productive and effective. In this, a larger role is played by the theory of chemical technology, especially the application of the results of theoretical findings to resolve scientific-technical problems. These problems were also discussed at the session in Baku.

"The technical-economic level of industrial processes is determined these days by the volume and depth of knowledge concerning the physical-chemical principles of production operations. For this reason, participants in the session focused special attention on the development of fundamental research in academic institutes and in industry. This circumstance also dictated the selection of the place where the session was held: Baku is a major petrochemical center; it has the country's only Institute of Theoretical Problems of Chemical Technology of the Azerbaydzhan SSR Academy of Sciences.

"The findings of recent research presented in Baku once again confirm the advantage of the method of mathematical simulation compared with the empirical method of selecting designs. Thanks to this modern method, the Soviet Union has set up a number of reactors of great unit capacity; existing facilities have been strengthened. For example, through the joint efforts of the scientific staffs of the Baku Institute and the production workers of the Sumgait SK Plant, on the basis of simulation, the capacity of the equipment for the production of styrene has been considerably increased.

"The session worked out a program for the further development of efforts to fulfill the tasks assigned by the 25th CPSU Congress to the chemical and petrochemical industry of the country."

6854
CSO: 1870

SCIENTISTS AND SCIENTIFIC ORGANIZATIONS

PHYSICOTECHNICAL SYSTEM FOR TRAINING CADRES

Moscow IZVESTIYA in Russian 25 Jan 77 p 2

[Article by Academicians Ye. Velikhov and A. Prokhorov]

[Text] The time in which we live has been called a scientific and technical revolution. Science has occupied a most important place in the modern world. The swift pace of development, the rapid accumulation of knowledge, the appearance of many new directions, and the necessity of introducing scientific achievements into national economy within increasingly short periods of time have engendered a multitude of problems. The most important among them is the training of cadres of researchers.

The physics remains up to now probably the most dynamic field of science. But the most important thing is that physics is also the largest "factory" of applied scientific-technical directions, which are changing the outlook of whole branches of industry, give rise to new ones, and even influence the tenor of our life.

The enormous importance for the state of new directions which are conceived in the womb of this domain of science has compelled long ago physicists to take up seriously the problem of the training of cadres. Thirty years ago, immediately after the end of the war, there was created the VUZ of a new type--The Moscow Physicotechnical Institute [MFTI], which during its existence has brilliantly proved the efficiency of the so-called "the MFTI system" for the training of cadres which is rooted in the experience of the Leningrad Physicotechnical Institute of the Academy of Sciences USSR and Leningrad Polytechnical Institute, where A. Ioffe had widely practiced the individual training of students by the leading scientists.

At present "the MFTI system," has received universal recognition, and may serve in our opinion as an example to all fields of science and advanced technology. Its essence is expressed by the fact that within this VUZ the students receive fundamental university education and fundamentals of specialization, whereas the main knowledge of their future specialty they acquire in the so-called base institutes which are represented by the most important institutes of the Academy of Sciences USSR as, for example, the Physics Institute of the Academy of Sciences USSR.

While trained in such a collective scientific body the student of the MFTI joins the best traditions of the Soviet science and our scientific schools, which have developed not only their own methods of scientific research but also have close connections with industry. The students familiarize themselves, so to speak, at first hand with the methods of scientific management of important scientific-technical projects and elaborations, worked out in a number of Soviet scientific institutions, for example, in such an one as The Institute of Nuclear Energy imeni I. V. Kurchatov.

The practice shows that under conditions where there occurs a rapid accumulation of knowledge and sometimes also its "shift," so that a specialist, to work fast, has to relearn many times, the university knowledge is not a luxury but a vitally indispensible thing. It serves as a solid foundation on which there is being built a special education. Therefore, in contrast to ordinary technical VUZes, the MFTI, by the volume of fundamental knowledge offered to students, is close to a university. It is not a mere accident that the MFTI has been organized on the base of the Physicotechnical Faculty of the Moscow State University.

But the acquisition of a broad spectrum of general knowledge as the mathematicians say is "a necessary but insufficient condition" for a modern researcher. A young scientist should not only have knowledge and understand it but also know how to use it. All this can be provided only by practical scientific research work and the sooner it will start the better. After the intense and sufficiently profound training in theory and in general experimental physics the MFTI student of the third-institute which is solving concrete problems. The work in the collective and the sense of responsibility, which is inavoidably connected with it, are of a colossal educational importance. The multifacedness of various aspects of life of the collective which make up for the essence of the everyday scientific work is forming the young specialists. Here everything is of importance. Formal and informal discussions, seminars and libraries, mechanical, optical and glassblowing shops, credit for safety engineering and work with electronic computers, cooperation of workers within one working group and of groups between themselves--the ability to cope with all this is necessary to young scientists.

As a result of such education combining a wide and deep general training in a purely theoretical syllabus with an active work in a scientific research collective, with a properly selected direction of researches, there occurs a rapid growth and maturing of students and young specialists. The MFTI has also a program of serious post-graduate studies which permits the most capable students, parallelly with scientific research work carried out in a base institution, to prepare a dissertation in a properly scientific direction.

Of great educational importance is certainly the fact that with "the MFTI system" the youth from their student days participate in the solution of concrete, real problems, often of great practical significance. This develops a civic consciousness. Social sciences which students are studying in

VUZes and scientific research laboratories assume a concrete outlook. Young specialists are conscious of the importance of tasks set up before science and become imbued with a feeling of responsibility before the fatherland.

For scientific collectives the participation in the education of their own future replenishment is also of great importance. Unfortunately we suffer for the time being from a considerable disadvantage due to the fact that research and education are separated. The most actively working scientists are as though they are in one "camp," whereas the instructors of VUZes are in another. "The MFTI system" which permits the combined work makes it possible for the most creative and active scientists to prepare both replacement and to inculcate into the young generation the spirit of research and innovation. Let us note that for young scientists the teaching activity represents also a very useful training which permits, while preparing lectures and seminars, to better penetrate into fundamentals of science.

During the years of its existence the Moscow Physicotechnical Institute graduated about 8,500 engineers, physicists-researchers, and 2,500 students have achieved post-graduate studies in the MFTI. About half of the graduates of all years have defended candidate's dissertations, and approximately 4-5 percent of them became doctors of sciences.

Almost 50 percent of all students and post-graduates of the MFTI are undergoing at present special training and conduct a research work at institutes of the Academy. At the same time about half of the graduates who passed through the base institutes of the Academy of Sciences USSR are annually directed to work in the leading branch scientific research institutes and design offices. We consider that the formula for training cadres in the MFTI: "through the Academy of Sciences--into industry" will continue to be developed and strengthened. As a matter of fact this is a very important channel for the introduction of fundamental knowhow and achievements of science which young specialists are bringing with them into industry.

It is very important that "the MFTI system" is exceptionally elastic and mobile in the training of cadres for the new incipient directions of science and technology which are always more "operative" than an unhurried VUZes' training.

During the 30 years of its existence the MFTI has several times changed main directions in the training of cadres of engineers-physicists-researchers. Whereas at the end of the 1940's "the MFTI system" was created in the main for training scientific cadres in the existing directions of the modern physics, mainly nuclear physics, then in the middle of the 1950's there appeared specialties of aeromechanics and radio engineering. At present the chief emphasis is being laid on producing researchers in electronics, biophysics, control and applied mathematics, plasma physics, and power engineering. There has begun also the training of specialists of a new type, viz.

physicists-constructors, etc. During recent years four new faculties (departments) were organized in the MFTI without a noticeable increase of the overall number of students. In particular, in the present year there will be created a faculty for the problems of physics and power engineering with base scientific institutes of the Moscow Region Scientific Center in Krasnaya Pakhra. As a rule, the training in a new specialty was organized practically at once in all years of study (including senior years) and within 1 1/2-2 years there were already graduations in new specialities, most needed to the country at the present moment.

The opinion is sometimes being viewed that "the MFTI system" is difficult to put into practice, since such a training of students is more costly than in the ordinary technical VUZes. But that is only true if we consider the cost of training young specialists separately, only from the standpoint of the higher school and not from that of the state as a whole. As a matter of fact it is not being taken into account that after the usual education in VUZes, institutes and design offices, or in enterprises, a young specialist actually continues his training for a period from one year to two years. He simply gets "accustomed" to the work, whereas the graduates of the MFTI are embarking on their work with full power without any "acclimatization," since already in the last years of studies they are being prepared exactly for such work.

Recently the Presidium of the Academy of Sciences USSR has discussed the activity of MFTI and it not only has approved it but also recommended it for its wide-scale expansion for training cadres in other fields of science and technology. At present the MFTI has to train cadres of biophysicists, biochemists, and specialists in medical cybernetics. It seems that the time has come to "debud" these directions, and to select some VUZes of other specialities and experimentally carry out training according to "the MFTI system", while supporting those VUZes which begin to adopt this system. Its effectiveness has been proved by life.

1015
CSO: 1870

SCIENTISTS AND SCIENTIFIC ORGANIZATIONS

SCIENTIFIC-TECHNICAL INFORMATION PROGRESS

Baku VYSHKA in Russian 8 Feb 77 p 3

/Interview with Deputy Director of the Administration for Scientific-Technical Information and Propaganda of the State Committee for Science and Technology of the USSR Council of Ministers N. V. Turtanov, by G. Gershgorn/

/Text/ Scientific and technical information and its efficient utilization further the development of improved technological processes and the creation of new technology and are one of the crucial factors in accelerating the pace of scientific and technical progress.

The All-Union Conference on Improving Scientific and Technical Information and the Exchange of Scientific and Technical Achievements by the Different Branches of Industry was recently held in Moscow. Deputy Director of the Administration for Scientific-Technical Information and Propaganda of the State Committee for Science and Technology of the USSR Council of Ministers N. V. Turtanov presented a report at it.

We asked him to answer a number of questions relating to the development of the state system of scientific and technical information during the Tenth Five-Year Plan.

/Question/ Nikolay Vasil'yevich, please describe our country's achievements in the area of scientific and technical information during recent years.

/Answer/ The directives of the 24th CPSU Congress provided for constant improvement of scientific and technical information and for the ensuring of the systematic communication to interested industries and enterprises of information on recent achievements and advanced experience in the area of equipment, technology, and the organization of production and management.

During the last five-year plan the state system for scientific and technical information was successfully developed and improved. At the present

time it includes 10 all-union information institutes, 89 central and branch organs of ministries and departments, 15 republic information institutes, and 92 intersector territorial centers in the autonomous republics.... The total number of permanent employees working in information organs climbed to 166,000 persons, and the State reference and data store contains more than 1.5 billion documents.

About 5.8 million scientists and specialists of all sectors of the country's economy are directly involved in reference and data support. Annually scientific and technical information organs collectively issue more than 600 million documents and more than 12 million handbooks on specific subjects, which constitute the result of the scanning, collection, evaluation, and analysis of a large number of information sources and which answer as completely as possible the concrete questions of enterprises and organizations regarding the most diverse trends in science, technology, and production.

During the last five-year plan a system was organized for the exchange between sectors of industry of information and of methods of utilizing scientific and technical achievements. Over five years, by means of this system over 10,000 scientific and technical achievements were introduced with a great economic impact.

/Question/ How will the scientific and technical information system be improved?

/Answer/ As the management of the country's economy improves, the scientific and technical information system will change. For example, the creation of production, scientific-production, and regional associations in the country makes it necessary to develop new forms of cooperation between the scientific and technical information services of these associations.

It is now urgently necessary to include in the scientific and technical information structure one more category of organs--basic extradepartmental sector organs, to coordinate the work of the individual groups of sector scientific and technical information organs.

This is because the existing central sector organs for scientific and technical information are now essentially departmental, not sector organs. The basic services should have the general reference and data stores for the sector services. This is necessary because of the automation of the scientific and technical information system and the development of interconnected automated systems.

Work is now in progress to organize new intersector territorial scientific and technical information centers, which will facilitate the transmission of the latest scientific and technical achievements and advanced production experience to all enterprises, regardless of their departmental subordination. By the end of 1980 the development of the network of intersector territorial scientific and technical information organs will have been completed.

Special attention will also be given to the establishment of scientific and technical information divisions (bureaus) at enterprises and in scientific-research and planning-design organizations.

It should also be stated that modern forms of reference and information services will be further developed, in particular the selective dissemination of information to ensure accurate, full, and timely transmission of essential information, which now finds the greatest recognition among scientific and production workers.

/Question/ How will international collaboration in the area of scientific and technical information develop?

/Answer/ The Soviet Union is actively participating in the establishment of the International System for Scientific and Technical Information of the member-countries of CEMA, with an International Center for Scientific and Technical Information. Work on the planning and introduction of a number of specialized and sector information systems will be continued. More than 30 USSR information organs will take part in the development of these systems.

On the basis of bilateral agreements, collaboration will develop in the area of scientific and technical information with a number of countries, including the U.S., Great Britain, and France, and also within the framework of different international organizations.

In addition to the enumerated basic courses of action, there are plans for other measures aimed at improving patent information, further strengthening and developing cost accounting in scientific and technical information organs, improving the organization of wage payment in information organs, increasing the use of foreign information materials, and so forth. Carrying out all these tasks will facilitate the successful implementation of the historic decisions of the 25th CPSU Congress.

8964
CSO: 1870

IRKUTSK METEOROLOGISTS COMPLETE FIRST YEAR OF CITY CLIMATE STUDY

Moscow PRAVDA in Russian 4 Jan 77 p 3

[Article by V. Khodiy: "Studying the Urban Climate"]

[Text] The annual cycle of observations under a program of climate studies of large cities has been completed at the Irkutsk Hydrometeorelogical Observatory.

"It was once said of Siberia that it has 12 months of winter, and the rest summer. Of course, even today the Baykal is not the Black Sea, but the climate here has warmed noticeably over the last 10 years...."

We are talking with Nadezhda Petrovna Formanchuk at the Irkutsk Hydrometeorological Observatory imeni Professor A. V. Voznesenskiy. The building was built 90 years ago. At that time, the observatory and the meteorologic premises attached to it were outside the city limits. Now housing is going up all around it.

Formanchuk heads the climatology department. No other natural phenomenon is so closely connected with people's lives as weather and climate. But even they do not remain unchanged under the influence of human activity. These changes are especially noticeable in the large cities. Their growth, the construction of multistory houses, district heating and the increase in street traffic alter the local climate characteristics substantially. In the cities, the temperature of the ground layer of air rises, fog is more frequent, and there are more clouds, which means fewer hours of sunshine; "islands" of heat generally form in the central portion. On a background of the surrounding landscape, the major cities themselves become "islands."

"Of course, cities are important points at which to follow man's effect on nature on a planetary scale, which is why we are engaged so actively in studying their climate," says Formanchuk.

Irkutsk is an ancient city, about 300 years old. The extensive construction of recent decades has occurred basically on open land, but in the city center

one- and two-story wood houses alternate with multistory stone ones. A whole system of rivers interflows within the city limits: the Angara, with its tributaries the Irkut and Ushakovka, and even with the Kaya flowing into the Irkut. The Irkutskaya GES is also here. If you add to this that some housing developments are in the river valleys and others are on the slopes of the surrounding hills, it is easy to understand that the microclimate differs in particular sections of the city.

A year ago, climatologists took to the streets of Irkutsk for the first time. They were assisted by meteorologists, aerologists, chemists and agrometeorologists. In addition to ten permanent hydrometeorologic service stations in the city and its environs, temporary observation points have been set up in unique terrain, on the GES dam, in parks, and in microregions of new construction projects. Air temperature and humidity, wind speed and direction are measured and observations of cloud cover and atmospheric phenomena, of the condition of surface soil, are also made along the major traffic routes.

In Eastern Siberia, spring lasts two months, summer -- three, fall -- two, and winter -- five. Nevertheless, an identical time segment is taken for each season -- five days. The microsurvey is conducted simultaneously at all points, every hour in the summer and fall and every three hours in the winter and spring. Students from upper classes of the Irkutsk Hydrometeorologic Tekhnikum and students of the university geography department work alongside Zoya Borisovna Karpenko and Valentina Ivanovna Kopylova, experienced specialists who have worked for many years as observers at taiga weather stations. For these students, this is a serious test: they must be able to evaluate atmospheric phenomena, surface soil condition and cloud cover quantitatively and qualitatively. It is not enough just to take instrument readings; this must be done at various heights of the surface layer of air. In order to determine the limit of the "industrial" atmosphere, the research also encompassed the area around the city. The climatologists call the observation stations located here "clean" atmosphere control points.

And here the researchers get their first results. What do they say? On average, Irkutsk is three degrees warmer than the suburban zone. There are several "islands" of cold and heat in the city, the temperature difference reaching five degrees. It was thought earlier that the Angara had a great effect on the city's climate. Apparatus was set up at various distances from the river. They showed that in the winter, the Angara's influences was limited by its valley and that only in the spring and fall did it increase to half a kilometer.

"In January, we begin a new cycle of observations under the program of climate studies of the large cities," says Candidate of Geographic Sciences M. Furman, the director of the Irkutsk Hydrometeorologic Observatory. "We set ourselves the goal of explaining what effect the "respiration" of the reservoir, whose mirror of water exceeds 150 square kilometers, has on the microclimate of Irkutsk. Its effect will be examined under the conditions of different types of construction projects. In particular, we are interested in the microclimate of stone and wood apartments. We want to know what processes occur over the city and are "climbing" up there using remote towers and airborne probes."

Many branches of the national economy need data on the cities' microclimate. Such data are essential in planning industrial projects and housing developments, in developing measures to protect the atmosphere from pollution and steps to record the wind load on structures. City designers and planners must know where to use perimeter development, where free development, and where a mixture. What number of stories should be chosen? Where best to locate children's playgrounds, stadiums, park zones? Data from climatologists are needed to answer these questions.

This is especially important in site selection and construction of new Siberian cities and settlements, and first of all in the taiga zone and in the strip adjacent to the Baykal-Amur Trunk Line. It is no accident that specialists of the Irkutsk Hydrometeorologic Observatory are beginning a microsurvey of the climate in Bratsk and Angarsk in 1977. Lately, each has grown from a small population center to a city of upwards of 200,000 residents.

11052
CSO: 1870

- END -