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9 May 1983

USSR Report

SCIENCE AND TECHNOLOGY POLICY

No. 12

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On the Awarding of 1982 USSR State Prizes in the Field of Science and Technology.

After reviewing the data submitted by the USSR Council of Ministers Committee on Lenin and USSR State Prizes, the CPSU Central Committee and the USSR Council of Ministers decree the following:

The 1982 USSR State Prizes in Science and Technology are to be awarded to the following:

1. Abalakin, Viktor Kul'mich and Brumberg, Viktor Aleksandrovich, doctors of physico-mathematical sciences, department heads at the Institute of Theoretical Astronomy, Academy of Sciences USSR; Krasinskiy, Georgiy Al'bertovich, candidate of physico-mathematical sciences, senior scientific associate at the above institute; Aleksandrov, Yuriy Nikolayevich, candidate of technical sciences, senior scientific associate at the Institute of Radio Engineering and Electronics, Academy of Sciences USSR; Petrov, Gennadiy Mikhaylovich, candidate of physico-mathematical sciences; Shakhovskiy, Anatoliy Mikhaylovich, candidate of technical sciences, laboratory chief at the above institute; Kisluk, Mikhail Dmitriyevich, doctor of technical sciences, professor at the Moscow Institute of Electronic Mechanical Engineering; Kolyuke, Yuriy Fedorovich, candidate of technical sciences, senior scientific associate; Tikhonov, Valentin Fedorovich, candidate of technical sciences, laboratory chief; Sukhanov, Konstantin Georgiyevich, candidate of technical sciences, division chief--all associates of a scientific research institute; Petrov, Grigoriy Matveyevich, candidate of physico-mathematical sciences, chief of the laboratory of the Nikolayevsk branch of the Main Astronomical Observatory of the Academy of Sciences USSR; Stepanyants, Viktor Arkad'yevich, candidate of physico-mathematical sciences, senior scientific associate at the Applied Mathematical Institute imeni M. V. Keldysh, Academy of Sciences USSR--for a series of works on the development of a single relativity theory on the motion of the interior planets of the solar system.

2. Abrikosov, Aleksey Alekseyevich, corresponding member of the Academy of Sciences USSR, division chief at the Theoretical Physics Institute imeni L. D. Landau, Academy of Sciences USSR: Brandt, Nikolay Borisovich, doctor

of physico-mathematical sciences, department head at Moscow State University imeni M. V. Lomonosov; Chudinov, Sergey Miklaylovich, doctor of physico-mathematical sciences, docent at the above university; Vonsovskiy, Sergey Vasil'yevich, academician, deputy director of the Institute of Physics of Metals, Ural Scientific Center of the Academy of Sciences USSR; Tsidil'kovskiy, Isaak Mikhaylovich, doctor of physico-mathematical sciences, laboratory chief; Neyfel'd, Edgar Arturovich, junior scientific associate--both workers at the above institute; Kopayev, Yuriy Vasil'yevich, doctor of physico-mathematical sciences, senior scientific associate at the Physics Institute imeni P. N. Lebedev, Academy of Sciences, USSR: Ivanov-Omskiy, Vladimir Ivanovich, doctor of physico-mathematical sciences, sector chief at the Physico-technical Institute imeni A. F. Ioffe, Academy of Sciences USSR: Gel'mont, Boris L'vovich and Stafeyev, Vitaliy Ivanovich, doctors of physico-mathematical sciences; Ogorodnikov, Viktor Konstantinovich and Smekalova, Kseniya Pavlovna, candidates of physico-mathematical sciences, senior scientific associates at the above institute--for a series of works on the prediction, detection and analysis of unslotted semiconductors and exiton phases.

3. Anan'yev, Yuriy Alekseyevich, doctor of physico-mathematical sciences, senior scientific associate; Denisyuk, Yuriy Nikolayevich, corresponding member of Academy of Sciences, USSR, division chief; Stasel'ko Dmitriy Ivanovich, candidate of physico-mathematical sciences, laboratory chief--both at the State Optical Institute imeni S. I. Vavilov; Stepanov, Boris Ivanovich, academician of the Academy of Sciences of Belorussian SSR, director of Physics Institute of the Academy of Sciences, BSSR; Apanasevich, Pavel Andreyevich, corresponding member of the Academy of Sciences, BSSR, deputy director; Ivakin, Yevgeniy Vasil'yevich, candidate of physico-mathematical sciences, senior scientific associate; Rubanov, Aleksandr Sergeyevich, doctor of physico-mathematical sciences, laboratory chief--all associates of the above institute; Brodin, Mikhail Semenovich, academician of the Academy of Sciences, UkSSR, senior scientific associate of the above institute; Soskin, Marat Samuilovich, doctor of physico-mathematical sciences, all division chiefs of the Physics Institute of the Academy of Sciences, UkSSR; Odulov, Sergey Georgiyevich, candidate of physico-mathematical sciences, senior scientific associate at above institute; Styrkov, Yevgeniy Ivanovich, candidate of physico-mathematical sciences, senior scientific associate at the Kazan Physico-Technical Institute of the Kazan branch of the Academy of Sciences; Sokolovskaya, Albina Ivanovna, candidate of physico-mathematical sciences, senior scientific associate of the Physics Institute imeni P. N. Lebedev, Academy of Sciences USSR--for the series of works "Physical Foundations of Dynamic Holography and New Techniques for Transformation of Spatial Structure of Light Beams", published in 1969-1980.

4. Syrovatskiy, Sergey Ivanov, doctor of physico-mathematical sciences, work supervisor; Bulanov, Sergey Vladimirovich, Dogel', Vladimir Aleksandrovich, candidates of physico-mathematical sciences; Dhodzhayev, Andrey Zakirovich, junior scientific associate of the Physics Institute imeni P. N. Lebedev, Academy of Sciencies USSR; Somov, Boris Vsevolodovich, Frank, Anna Glebovna, candidates of physico-mathematical sciences, senior scientific associates at the above institute; Zhugzhd, Yuzef Danilovich, candidate of physico-mathematical sciences, senior scientific associate at the Terrestrial

Magnetism, Ionosphere and Radio Wave Propagation Institute, Academy of Sciences USSR; Shmelevaya Ol'ga Pavlovna, candidate of physico-mathematical sciences, junior scientific associate at the above institute; Imshennik, Vladimir Sergeyevich, doctor of physico-mathematical sciences, laboratory chief at the Institute for Theoretical and Experimental Physics: Sasorov, Pavel Vasil'yevich, candidate of physico-mathematical sciences, senior scientific associate at the above institute; Ostrovskaya, Galya Vsevoldovna, doctor of physico-mathematical sciences, senior scientific associate at the Physico-technical Institute imeni A. F. Ioffe, Academy of Sciences USSR--for the series of works "The Dynamics of Current Layers and Solar Activity," published 1966-1980.

5. Alekseyev, Anatoliy Semenovich, corresponding member of Academy of Sciences USSR, director of the Computation Center of the Siberian Department of Academy of Sciences USSR; Babich, Vasiliy Mikhaylovich and Petroshenya, Georgiy Ivanovich, doctors of physico-mathematical sciences, laboratory chiefs; Krauklis, Pavel Vladimirovich and Molotkov, Lev Anatol'yevich, doctors of physico-mathematical sciences, senior scientific associates, workers at the Leningrad branch of the Mathematical Institute imeni V. A. Steklov, Academy of Sciences USSR; Buldyrev, Vladimir Sergeyevich, doctor of physico-mathematical sciences, professor at Leningrad State University imeni A. A. Zhdanov; Molotkov, Ivan Anatol'yevich and Yanovskaya, Tat'yana Borisovna, doctors of physico-mathematical sciences, senior scientific associates at the above university--for the series of works "Development of Asymptotic Methods for the Theory of Diffusion of Seismic Waves and the Use of These Methods for Estimating the Dynamic Fields in Geophysics," published 1950-1980.

6. Pisarenko, Georgiy Stepanovich, academician of the Academy of Sciences of UkSSR, director of the Institute of Strength Problems, Academy of Sciences of UkSSR, work supervisor; Troshchenko, Valeriy Trofimovich, academician of the Academy of Sciences of Ukrainian SSR; Valentine Vladimirovich, doctor of physico-mathematical sciences, deputy director; Lebedev, Anatoliy Alekseyevich, corresponding member of the Academy of Sciences of Ukrainian SSR; Krasovskiy, Arnol'd Yanovich, doctor of physico-mathematical sciences; Tret'yachenko, Georgiy Nikolayevich, doctor of technical sciences; Kvitke, Aleksandr L'vovich; Kozlov, Igor' Andreyevich--all candidates of technical sciences, division chiefs, associates of the above institute; Umanskiy, Emmanuil Solomonovich, doctor of technical sciences, professor at the Kiev Polytechnical Institute imeni 50-Letiya Velikoy Oktyabr'skoy Revolyutsii--for the monograph "Strength of the Materials and Design Elements under Extreme Conditions" in two volumes, published in 1980.

7. Vol'pin, Mark Yefimovich, corresponding member of Academy of Sciences USSR, laboratory chief at the Institute of Elementary Organic Compounds imeni A. N. Nesmeyanov, Academy of Sciences USSR: Shilov, Aleksandr Yevgen'yevich, corresponding member of Academy of Sciences USSR, deputy director of the Institute of Chemical Physics, Academy of Sciences USSR--both work supervisors; Ilatovskaya, Margarita Aleksandrovna, candidate of chemical sciences, junior scientific associate; Shur, Vladimir Mordukhovich-Berovich, candidate of chemical sciences, senior scientific associate--both workers at the Institute of Elementary Organic Compounds imeni A. N. Nesmeyanov; Academy of Sciences

USSR; Borod'ko, Yuriy Georgiyevich, doctor of chemical sciences, laboratory chief; Denisov, Nikolay Timofeyevich, Nikonov, Luiza Aleksandrovna and Shilovaya, Alla Konstantinovna--all candidates of chemical sciences, senior scientific associates, workers at the Institute of Chemical Physics, Academy of Sciences USSR--for the series of works "Chemical Fixation of Molecular Nitrogen With Compounds of Intermediate Metals," published 1964-1980.

8. Ovchinnikov, Yuriy Anatol'yevich, academician, director of the Institute of Bioorganic Chemistry imeni M. M. Shemyakin, Academy of Sciences USSR; Khesin-Lur'ye, Roman Beniaminovich, corresponding member of Academy of Sciences USSR, Laboratory chief at the Institute of Molecular Genetics, Academy of Sciences USSR--both work supervisors; Sverdlov, Yevgeniy Davidovich, doctor of chemical sciences; Lipkin, Valeriy Mikhaylovich; Molyanov, Nikolay Nikolayevich; Monastyrskaya, Galina Sergeyevna--all candidates of chemical sciences, senior scientific associates at the Institute of Bioorganic Chemistry imeni M. M. Shemyakin, Academy of Sciences USSR; Mindlin, Sof'ya Zakharovna; Nikiforov, Vadim Georgiyevich; Bas, Irina Aleksandrovna; Zograf, Yuriy Nikolayevich--all candidates of biological sciences, senior scientific associates at the Institute of Molecular Genetics, Academy of Sciences USSR--for a series of works on "The Structure and Genetics of the RIK-Polymers," published 1968-1980.

9. Artsikhovskiy, Artemiy Vladimirovich, corresponding member of Academy of Sciences USSR; Sakharov, Anatoliy Mikhaylovich, doctor of historical sciences--both work supervisors; Gorskoy, Anatoliy Dmitriyevich, doctor of historical sciences, department head at Moscow State University imeni M. V. Lomonosov; Yepifanov, Petr Pavlovich, doctor of historical sciences, professor; Leont'yev, Aleksey Konstantinovich; Shul'gin, Vladimir Sergeyevich; Gromov, Gennadiy Gerasimovich--all candidates of historical sciences; Orlov, Oleg Vladimirovich, candidate of philological sciences--all docents, workers at the above university; Rogov, Aleksandr Ivanovich, candidate of historical sciences, senior scientific associate of the Institute of Slavic and Balkan Studies, Academy of Sciences USSR; Vzdornov, Gerol'd Ivanovich, candidate of art studies, senior scientific associate at the All-Union Scientific Research Institute of Restoration; Il'in, Mikhail Andreyevich, doctor of art studies--for the scientific work "Outline of Russian Culture of the 13-17th Centuries," in six volumes, published 1969-1979.

10. Shvedova, Natal'ya Yul'yevna, doctor of philological sciences, sector head at the Institute of Russian Language, Academy of Sciences USSR, work supervisor; Ivanov, Valeriy Vasil'yevich, doctor of philological sciences, deputy director; Kovtunova, Irina Il'inichna; Lopatin, Vladimir Vladimirovich; Ulukhanov, Igor' Stepanovich--all doctors of philological sciences; Kruchinina, Irina Nikolayevna; Lyapon, Mayya Valentinovna; Robinson, Vera Aleksandrovna--all candidates of philological sciences, senior associates, workers of the above institute; Dmitrenko, Svetlana Nikolayevna, Sukhanovaya, Maria Semenovna, candidates of philological sciences, junior scientific associates, all workers at the above Institute; Bondarko, Aleksandr Vladimirovich, doctor of philological sciences, sector chief at the Leningrad branch of the Institute of Language Studies, Academy of Sciences USSR; Bryzgunova, Yelena Andreyevna,

candidate of philological sciences, docent at Moscow State University imeni M. V. Lomonosov--for the scientific work "Russian Grammar" in two volumes, published in 1980.

11. Gladkov, Ivan Andreyevich, doctor of economic sciences, work supervisor; Vinogradov, Vladimir Alekseyevich, corresponding member of Academy of Sciences USSR, director of the Institute of Scientific Information for Social Sciences, Academy of Sciences USSR; Kapustin, Yevgeniy Ivanovich, corresponding member of Academy of Sciences USSR, director; Vorob'yev, Yuriy Fedorovich, doctor of economic sciences, sector chief; Markova, Anna Nikolayevna, doctor of economic sciences; Kalinin, Valeriy Dmitriyevich; Kamusher, Lidiya Nikolayevna; Lelyukhina, Nina Dmitriyevna--all candidates of economic sciences; Lapina, Svetlana Nikolayevna, scientific associates, workers at the Institute of Economics, Academy of Sciences USSR; Kossoy, Avram Iosifovich, candidate of economic sciences, former scientific associate at the above institute; Zhamin, Vitaliy Alekseyevich, doctor of economic sciences, deputy director of the Institute of Natural History and Technology, Academy of Sciences USSR; Lokshin, Rafail Aleksandrovich, doctor of economic sciences, deputy division chief in Gosplan USSR--for the scientific work "The History of the Socialist Economics of the USSR" in seven volumes, published 1976-1980.

12. Blokhin, Nikolay Nikolayevich, academician, director of the All-Union Oncological Center of the Academy of Medical Sciences USSR; Chaklin, Aleksandr Vasil'yevich, doctor of medical sciences, division chief at the above scientific center; Vikhert, Anatoliy Mikhaylovich, corresponding member of the Acad of Medical Sciences, USSR, division chief; Zhdanov, Valentin Sergeyevich, doctor of medical sciences, division chief, workers at the All-Union Cardiological Scientific Center of the Academy of Medical Sciences, USSR, Matavaya Yevgeniya Yevgen'yevna, doctor of medical science, former senior scientific associate of the above scientific center; Avtsyn, Aleksandr Pavlovich, academician of Academy of Medcial Sciences USSR; Kolychena, Nelli Ivanovna, doctor of medical sciences, laboratory chief at the Kazakh Scientific Research Institute of Oncology and Radiology; Sedov, Konstantin Rafailovich, academician of the Academy of Medical Sciences USSR, department chief at Irkutsh Medical Institute; Shmidt, Yevgeniy Vladimirovich, academician of the Academy of Medical Sciences USSR, director of the Scientific Research Institute of Neurology, Academy of Medical Sciences USSR; Smirnov, Vladimir Yevgen'yevich, doctor of medical sciences, laboratory chief at the above institute; Charkviani, Levan Iosifovich, doctor of medical sciences, department head at the republic oncological scientific center of the Ministry of Health of the Georgian SSR; Mitrofanov, Mikhail Petrovich, doctor of medical sciences, department head at Riga Medical Institute--for a series of works on the geographical pathology and epidemiology of cardiovascular, oncological and neurological diseases.

13. Kochemasova, Zinaida Nikolayevna, doctor of medical sciences, department head at the First Moscow Medical Institute imeni I. N. Sechenov; Khomenko, Aleksandr Grigor'yevich, corresponding member of Academy of Medical Sciences USSR, director of the Central Scientific Research Tuberculosis Institute--both work supervisors; Bakanova, Dvoyra Yakovlevna, candidate of medical sciences, bacteriologist at Central Clinical Hospital No 1; Dykhno, Marina Mikhaylovna, doctor of medical sciences, professor at the First Moscow Medical

Institute imeni I. M. Sechenov; Kassirskaya, Nina Georgiyevna, candidate of medical sciences, senior instructor at the above institute; Dorozhkova, Inna Rafailovna and Zemskova, Zoya Sergeyevna, doctors of medical sciences, senior scientific associates at the Central Scientific Research Tuberculosis Institute--for a series of works--On the Clinical Significance of the Transformation of Medicinal Stability and the Quantitative Changes in Microbateriological Populations During Tuberculosis Chemotherapy.

14. Esin, Oleg Alekseyevich, doctor of technical sciences, work supervisor; Gel'd, Pavel Vladimirovich, corresponding member of the Academy of Sciences USSR, department head at the Ural Polytechnical Institute imeni S. M. Kirov; Barmin, Leonid Nikolayevich, Popel', Stanislav Iosifovich, Khlynov, Vadim Vladimirovich, doctors of technical science, department heads; Nikitin, Yuriy Petrovich, Toporishchev, Gennadiy Aleksandrovich, doctors of technical science; Sotmikov, Anatoliy Ivanovich, doctor of chemical science, professors, workers at the above institute; Vatolin, Nikolay Anatol'yevich, academician, director; Lepinskiy; Boris Mikhailovich, doctor of chemical sciences, laboratory chief, workers at the Metallurgy Institute of the Urals Scientific Center of the Academy of Sciences USSR; Yavoyskiy, Vladimir Ivanovich, department head at the Moscow Steels and Alloys Institute--for a series of works on "Research, Construction, Properties and Interaction in Metallurgical Smelting" published 1957-1980.

15. Shestoperov, Sergey Vladimirovich, doctor of technical sciences, department head at the Moscow Highway Institute--for the development of scientific principles for the creation of durable, frost-resistant concrete for transportation and hydrotechnical construction.

II. In Technology

1. Yegorova, Yekaterina Ivanovna, candidate of chemical sciences; Kosetov, Vitaliy Vasil'yevich, candidate of technical sciences--both division chiefs; Gorfunkel', Yuriy Mikhaylovich, candidate of technical sciences, laboratory chief; Bulatova, Valentina Mikhaylovna, senior scientific associate; Miklaylov, Nikolay Alekseyevich, fitter--all workers in the Ikhtinskiy scientific production association Plastpolimer; Ivanchenko, Anatoliy Ivanovich, candidate of technical sciences, deputy director of a Ukrainian scientific research and design institute for the development of machines and equipment for the processing of plastic materials, rubber, and synthetic leather; Koblyanskiy, Vladislav Anatol'yevich, shop chief at the Dneprodzerzhinsk production association Azot; Medvedev, Vladimir Dmitriyevich, division chief at the Leningrad Scientific Research and Design Institute for Chemical Machine Building; Smorodin, Aleksandr Alekseyevich, director of the alcohol plant of the petroleum organic synthesis production association Salavatnefteorgsintez imeni 50-Letiya SSSR; Uvarov, Vladislav Kuz'mich, shop chief in the Gurlovka styrene production association Stirol imeni Sergo Ordzhonikidzhe; Faidel', Garri Isakovich, candidate of technical sciences, deputy director of the Scientific Research Institute of Plastic Materials--for the development of industrial introduction of a highly effective process and equipment for the production of shock-resistant polystyrene.

2. Akhiyarov, Vler Khatipovich, candidate of geomineralogical sciences, chief geophysicist of the Tyumen' thematic expedition; Nelepchenko, Oleg Mikhaylovich, candidate of technical sciences, chief geophysicist of the Tyumen' geological production administration all workers at the Main Tyumen' Geological Directorate; Kuznetsov, Oleg Leonidovich, doctor of technical sciences, director of the All-Union Scientific Research Institute of Nuclear Geophysics and Geochemistry; Petrosyan, Leonid Grigor'yevich, doctor of geomineralogical sciences, deputy director; Bespalov, Dmitriy Fedorovich, candidate of technical sciences, laboratory chief; Shimelovich, Yuriy Semenovich, doctor of physicomath sciences, division chief--all associates of the above institute; Voronkov, Lev Nikolayevich, chief of a group from the state geophysical trust Tatneftegeofizika; Zaychenko, Vladislav Yur'yevich, candidate of geomineralogical sciences, chief of an administration of the Ministry of Geology USSR; Karus, Yevgeniy Villiamovich, doctor of physicomath sciences, general director of the scientific production association for petroleum and gas geophysical work; Krylov, Dmitriy Alekseyevich, candidate of technical sciences, chief of a group from the Mangyshlak petroleum geophysical trust Mangyshlakneftegeofizika; Muslimov, Renat Khaliullovich, candidate of geomineralogical sciences, deputy general director of the Tatneft' production association imeni V. D. Shashin; Sultanov, Sagdiya Akhmadiyevich, doctor of geomineralogical sciences, deputy director of the Tatar State Scientific Research and Planning Institute for the Petroleum Industry--for the development and introduction of highly effective impulse methods of wide-strip acoustic and neutron logging for increasing the effectiveness of the search, prospecting and development of oil and gas deposits.

3. Baranov, Ivan Andreyevich, chief engineer; Karimova Saima Safiyevna, chief geologist; Sorokin, Vladimir Timofeyevich, chief; Pakhomov, Aleksandr Nikolayevich; Polyakov, Nikolay Pavlovich--chief geologist of groups; Kotkov, Aleksandr Semenovich, drilling foreman; Stepanov, Prokopiy Petrovich, former senior technician-technologist; Minkin, Lazar' Moiseyevich, former group chief--all workers of a South Yakutsk geological prospecting expedition of the Yakutsk Geological Production Association; Koshlyak, Valentin Semenovich, deputy division chief in this association; Bredikhin, Ivan Semenovich, candidate of geomineralogical sciences, general director of the Polyarnyy-Ural Geological Production Association; Kobelyatskiy, Igor' Aleksandrovich, former RSFSR deputy minister of geology--for the establishment of a coal mineral and raw material base for the South Yakutsk territorial production complex.

4. Veprintsev, Boris Nikolayevich, doctor of biological sciences, laboratory chief at the Institute of Biophysics, Academy of Sciences USSR, work supervisor; Krasts, Igor' Viktorovich, candidate of biological sciences and Chemeris, Nikolay Konstantinovich--both junior scientific associates at the above institute; Ivanov, Yevgeniy Grigor'yevich, leading designer; Khokhlov, Anatoliy Matveyevich, candidate of technical sciences, laboratory chief; Reshetnikov, Veniamin Ivanovich, division chief--associates of the Special Design Bureau for Biological Instrument Making, Academy of Sciences USSR; Kononov, Boris Semenovich, candidate of technical sciences, director of an experimental plant for scientific instrument making, Academy of Sciences USSR; Shvedov, Viktor Ivanovich, lathe operator at the above plant--for the development, creation and introduction of a complete set of precision instruments for microsurgery and measurement of the electrical characteristics of a living cell.

5. Yudin, Vadim Mikhailovich, academician at VASKhIL, Gigineyshvili, Nikolay Simonovich, doctor of agricultural sciences, senior scientific associate at the All-Union Scientific Research Institute of Animal Husbandry, VASKhIL; Mengliyev Mirkhalik Mengliyevich, candidate of agricultural science, director; Mengbayev, Khurram Mengbayevich, animal husbandman, workers at the State Pedigree Plant imeni Yu. A. Gagarin (Kumkurganskiy Rayon, UzSSR); Shadmanov, Yulbars, former senior sheperd at the above plant; Fishchenko, Oleg Petrovich, candidate of agricultural science, deputy chief of the All-Union Association of Karakul Lamb Raising; Ukbayev, Khisemidull Iskhakovich, candidate of agricultural sciences, general director of the scientific production association "Karakul"; Nikulina, Galina Aleksandrovna, animal husbandman at the state pedigree plant "Kabodiyen" (Kabodiyenskiy Rayon TaSSR); Sapronov, Slava Sergeyevich, senior scientific associate at the Turkmen Branch of the All-Union SRI of Karakul Lamb Raising; Grigor'yants, Tebekka Isaakovna, chief specialist of an administration of the Ministry of Agriculture of the Uzbek SSR; Vasin, Boris Nikolayevich, doc tor of biological sciences; Stoyanovskaya, Varvara Ivanovna, candidate of agricultural sciences--for the development and introduction into production of new types of lambs of the karakul species of grey, rose and white color and Bukhara and Surkhan-Darya brown.

6. Yarnykh, Vladimir Sergeyevich, academician of Vaskh'nil [All-Union Academy of Agricultural Sciences imeni V. I. Lenin], director of the All-Union Scientific Research Institute of Veterinary Sanitation, work supervisor; Polyakov, Anisim Aleksandrovich, academician of Vaskhnil; Zakomyrdin, Aleksandr Andreyevich and Simetskiy, Mark Arkad'yevich--both doctors of veterinary sciences, laboratory chiefs at the above institute; Malygin, Aleksey Ivanovich, deputy chief of the administration for the poultry raising industry in the Ministry of Agriculture USSR; Bondarenko, Ivan Moiseyevich, candidate of biological sciences, chief virologist; Repin, Vladimir Mikhaylovich, division chief--all workers at the above ministry; Burtsev, Vladimir Ivanovich, doctor of veterinary sciences and Sukhin, Dmitriy Yemel'yanovich, candidate of technical sciences--both laboratory chiefs of the All-Union Scientific Research Institute of Veterinary Virology and Microbiology; Chernyshev, Vladimir Vasil'yevich, candidate of veterinary sciences, former senior scientific associate at the above institute; Safonov, Georgiy Anatol'yevich, candidate of biological sciences, director of a Pokrovsk biopreparation plant; Kharlamov, Vladimir Terent'yevich, candidate of veterinary sciences, division chief at the All-Russian Production and Scientific Association of the Poultry Raising Industry--for the development and introduction of aerosol forms of chemical and biological preparations for preventing and combatting infectious diseases of animals.

7. Dzhavad-Zade, Mir-Mamed Dzhavad Ogly, corresponding member of Academy of Medical Sciences USSR, rector of the Azerbaijan State Doctors' Advanced Training Institute imeni A. Aliyev; Savchenko, Nikolay Yevseyevich, academician of the Academy of Sciences of Belorussian SSR, department head at the Minsk Medical Institute; Shimkus, Eduard Martynovich, doctor of medical sciences, department head at the Krymsk Medical Institute--for the development and introduction into clinical practice of modern methods of diagnosis and pioneer reconstructive organ-saving operations for the treatment of patients with congenital abnormalities of the kidneys and urinary tracts.

8. Krylov, Viktor Solomonovich, doctor of medical sciences, division chief at the All-Union Scientific Center for Surgery, Academy of Medical Sciences USSR, work supervisor; Stepanov, Georgiy Agasiyevich, doctor of medical sciences, department head; Akchurin, Renat Sulemanovich, Milanov, Nikolay Olegovich--both candidates of medical sciences, senior scientific associates, workers at the above scientific center; Natsvishvili, Georgiy Archilovich, doctor of medical sciences, director of the course at the Tbilisi State Institute for Doctors' Advanced Training; Kuzanov, Ivan Yegorovich, candidate of medical sciences, senior scientific associate at above institute; Lebedev, Lev Valeriyevich, doctor of medical sciences, department head at the Leningrad Medical Institute imeni Akademik I. P. Pavlov; Vavilov, Valeriy Nikolayevich, candidate of medical sciences and Gorbunov, Georgiy Nikolayevich, senior scientific associates at the above institute; Dryuk, Nikolay Fedorovich, candidate of medical sciences, department head at the Kiev Scientific Research Institute of Clinical and Experimental Surgery--for the development of special microsurgical operations in traumatic amputations of fingers and wrists.

9. Bashilov, Gennadiy Nikolayevich, director of the Scientific Research Institute of Heavy Machine Building of the production association Uralmash; Vasil'kovskiy, Vitaliy Pankrat'yevich and Glushkov, Leonid Aleksandrovich--both deputy chief designers of divisions, associates at the above institute; Antipov, Boris Fedorovich, chief engineer and Sorokin, Anatoliy Nikolayevich, mechanic--both workers at the Vyksunskiy Metallurgical Plant; Uzlov, Ivan Gerasimovich, doctor of technical sciences, director of the Institute of Ferrous Metallurgy; Shifrin, Moysey Yevelevich, candidate of technical sciences, laboratory chief at the above institute; Rykov, Valeriy Aleksandrovich, chief mechanic and Babushkin, Anatoliy Pavlovich, rolling press operator--both workers at the Nizhnedneprovsk Pipe Rolling Plant imeni K. Libknekht; Rozental', Foma Yefimovich, division chief at the Ukrainian State Institute for the Planning of Metallurgical Plants; Shovskiy, Leonid Vasil'yevich, chief of an administration in the Ministry of Railways--for the development and introduction of progressive technological processes and highly effective automatic equipment for the flow-line production of seamless rolled railroad wheels.

10. Glazkov, Gariy Mikhaylovich, leading designer of the All-Union Scientific Research, Planning and Design Institute for Metallurgical Machine Building; Granovskiy, Simon Pavlovich, doctor of technical sciences and Mekhov, Nikolay Vasil'yevich, candidate of technical sciences--both senior scientific associates; Tselikov, Nikolay Aleksandrovich, candidate of technical sciences, laboratory chief--all workers at the above institute; Smelov, Yevgeniy Sergeyevich, chief engineer of the production association Elektrostal'tyazhmash; Vinogradov, Fedor Terent'yevich, division chief; Tolpik, Tevio Isaakovich, chief engineer of the proejct--all workers of the Elektrostal' Scientific Research, Planning, Design and Technological Institute of the above association; Reves, Ivan Stepanovich, deputy division chief of Gosplan USSR; Bogomolov, Semen Stepanovich, fitter at the First State Bearing Plant (production association GPZ-1); Fedorenko, Valeriy Nikolayevich, expert on heating installations at the Dneprovsk Metallurgy Plant imeni F. E. Dzerzhinskiy; Mosharov, Aleksandr Andreyevich, senior designer of a shop of the Zhdanovsk metallurgical plant

Azovstal' imeni S. Ordzhonikidze; Golodov, Nikolay Nikitovich, former shop chief at the above plant--for the development of automated ball rolling mills and an essentially new technology for hot and cold rolling.

11. Gol'shteyn, Boris Grigor'yevich, candidate of technical sciences, deputy general director of the Moscow Scientific production association for construction tools and finishing machines, work supervisor; Shishulin, Yuriy Pavlovich, general director; Batuyev, Nikolay Matveyevich, senior scientific associate; Goppen, Albert Adol'fovich and Nikolayev, Igor' Vladimirovich--both division chiefs, workers of the above association; Klushin, Nikolay Aleksandrovich and Ryashentsev, Nikolay Pavlovich--both doctors of technical sciences, laboratory chiefs at the Institute of Mining Operations in the Siberian department of the Academy of Sciences USSR; Vasil'yev, Yuriy Mikhaylovich, candidate of technical sciences, laboratory chief at the All-Union Central Scientific Research Institute of Labor Safety; Kapustin, Arkadiy Yakovlevich, director of the Daugavpils plant Elektroinstrument; Sutyagin, Oleg Yakovlevich, chief designer of the Sverdlovsk production association Pnevmostroymashina; Yakubovskiy, Petr Stepanovich, deputy chief designer of the Rostov-on-Don production association Elektroninstrument; Sotnikov, Genrikh Aleksandrovich, deputy chief of an administration of the Ministry of Installation and Special Construction Work USSR--for the development and starting of series production of vibration-safe hand-operated machines for construction and industry.

12. Gustov, Vil'gelm Feliksevich, doctor of technical sciences, sector chief; Nekrasov, Svyatoslav Aleksandrovich, candidate of technical sciences, deputy general director; Step, Khaim Yakovlevich, department chief--all workers of the Balashikha cryogenic machine-building scientific production association imeni 40-Letiya Oktyabrya; Ryzhov, Yuriy Vasil'yevich, chief engineer of the All-Union industrial association for cryogenic machine-building; Ivanov, Konstantin Nikolayevich, director of the State Institute for the Planning of Oxygen Industry Enterprises; Gorshkov, Vyacheslav Semenovich, division chief at the above institute; Petrikeyev, Vladimir Ivanovich, chief of an administration of the Ministry of Ferrous Metallurgy USSR; Pryanichnikov, Vladimir Ivanovich, chief of oxygen section of the above ministry; Petrov, Mikhail Alekseyevich, production chief at the Magnitogorsk metallurgical combine imeni V. I. Lenin; Mikhal'chenko, Aleksandr Ivanovich, chief of the main administration for the installation of technological equipment for metallurgical industry enterprises; Starikov, Vladimir Sergeyevich, production chief at a Novolipetsk metallurgical plant; Sergeyev, Yuriy Aleksandrovich, chief engineer of a trust for the installation of oxygen, cryogen, hydrogen and helium facilities and plants--for the development and starting of series production of KAR-30 and KTK-35 units for the production of oxygen to be used for intensification of the smelting of cast iron; also the introduction of a highly effective osygen-converter process for the smelting of steel.

13. Plotnikov, Vladimir Vasil'yevich, chief engineer, work supervisor; Borisenkov, Vasiliy Dmitriyevich and Moiseyev, Ivan Alekseyevich--both division chiefs; Dyboy Vyacheslav Anatol'yevich, department chief; Tkachenko, Aleksey Mikhaylovich, deputy division chief--both workers of a plant experimental design office; Zheltov, Mikhail Petrovich, general director of a production

association; Shilenkov, Yevgeniy Viktorovich, deputy general director; Bosov, Vasiliy Alekseyevich, chief of a technological bureau; Yeremin, Anatoliy Pavlovich, division chief; Karev, Vladimir Vasil'yevich, leading engineer; Krushevskiy, Leonid Yakovlevich, laboratory chief--all workers of the above association; Khanov, Mansur Abdulkhakovich, chief engineer of an administration of the Ministry of the Electronic Industry--for the development and introduction into production of the series Elektronika--100 mini-EVM [electronic computer] with a service set of peripheral devices.

14. Aronson, Aleksandr Yakovlevich, candidate of technical sciences; Kolesnikov, Aleksandr Pavlovich and Korovin, Aleksandr Nikolayevich--both sector chiefs; Babanov, Oleg Semenovich, chief--all workers of the SKB [design office] of the pipe-building association Leningradskiy Metallicheskiy Zavod; Khokhylin, Vladimir Nikolayevich, chief technologist and Ivanov, Nikolay Aleksandrovich, deputy shop chief--both workers of the above association; Mikhaylov, Lepen Petrovich, candidate of technical sciences, chief of the All-Union Planning, Surveying and Scientific Research Institute Gidroproyekt imeni S. Ya. Zhuk; Afonin, Aleksandr Yakovlevich, division chief in the Leningrad department of this institute; Lokhmatikov, Georgiy Propkop'yevich, manager of the All-Union Specialized Trust for the Installation of Hydroelectric Equipment; Loktionov, Stanislav Nikitovich, director of the Zeyskiy GES imeni 60-Letiya Leninskogo Komsomola; Kvyatkovskiy, Vladimir Stanislavovich, doctor of technical sciences--for the development of a plan and production technology and for the manufacture, installation and putting in operation of high-powered diagonal hydroturbines at the Zenskiy GES imeni 60-Letiya Leninskogo Komsomola.

15. Volodin, Vladimir Vladimirovich, division chief; Glazkov, Yuriy Petrovich, candidate of technical sciences, chief engineer; Fishler, Yakov L'vovich, candidate of technical sciences, chief designer for transformers--all workers of the Ural electrical heavy machinery association Uralelektrotyazhmash imeni V. I. Lenin; Zhuravin, Yuriy Demidovich, division chief in the All-Union Association for the Aluminum Industry; Kramskiy, Vladimir Antipovich, deputy chief engineer of the All-Union Scientific Research and Planning Institute of the Aluminum, Magnesium and Electrode Industry; Kul'kin, Yuriy Fedorovich, deputy chief designer of the Zaporozh'ye production assocation Preobrazovatel'; Sidorskiy, Mikhail Andreyevich, chief engineer and Sablin, Yuriy Aleksandrovich, shop chief--both workers of the above association; Meshcheryakov, Sergey Mikhaylovich, senior power engineer of a division of the Krasnoyarsk Aluminum Plant imeni 50-Letiya VLKSM; Nikulin, Aleksandr Diomidovich, deputy chief of an administration of the Ministry of Nonferrous Metallurgy USSR; Semchinov, Aleksey Matveyevich, chief specialist of the Leningrad department of the All-Union Scientific Research and Planning Institute for Full Electrification of Industrial Installations imeni F. B. Yakubovskiy; Ryabov, Valentin Ignat'yevich, electrical engineer--for the development and widespread introduction of highly effective electric feed systems for aluminum electrolysis on the basis of high-powered semiconductor rectifying units.

16. Belousov, Boris Yefimovich, division chief in the Ministry of the Communication Equipment Industry; Bol'shov, Vladimir Mikhaylovich, candidate of biological sciences, laboratory chief t the All-Union Scientific Research,

Planning and Experimental Institute of Medical Technology; Nikolayeva, Lidiya Fedorovna, doctor of medical sciences, director of a department of the All-Union Cardiological Scientific Center, Academy of Medical Sciences USSR; Karpov, Rostislav Sergeyevich, academician of the Academy of Medical Sciences USSR, deputy director of the Siberian affiliate of the above scientific center; Nikiforov, Leonard L'vovich, general director of the production association imeni S. P. Korolev; Kripaytis, Nikolay Ivanovich and Tishchenko, Fedor Mikhaylovich, candidate of technical sciences--both sector chiefs--for the development of a new complex of radioelectronic diagnostic instruments with built-in computers for automated examination of the cardiovascular system.

17. Rosselevich, Igor' Aleksandrovich, doctor of technical sciences, director of the All-Union Scientific Research Television Institute; Yesin, Viktor Timofeyevich, deputy chief engineer; Gulin, Anatoliy Ivanovich, deputy department chief; Luk'yanchenko, Yakov Iosifovich, candidate of technical sciences, division chief; Berlin, Boris Abramovich, laboratory chief--all associates of the above institute; Zimnev, Mikhail Mikhaylovich, director of the All-Union Scientific Research Institute of Radio Broadcasting Reception and Acoustics imeni A. S. Popov; Shakhnovich, Eduard Nikolayevich, director of a trust for sanitary-technical work in the central part of RSFSR; Yushkyavichyus Khenrikas-Al'girdas Zigmo, deputy chairman of the USSR State Committee for Television and Radiobroadcasting; Palitskiy, Vladimir Mikhaylovich, deputy chief of an administration of this committee; Serov, Valeriy Miklaylovich, deputy chief of the industrial construction main administration in the Moscow gorispolkom; Batalov, Leonid Il'ich, chief of an architectural planning workshop of the institute for the planning of Moscow city industrial and transport installations; Sheykhetov, Vladimir Iosifovich, division chief at the Novosibirsk precision machine-building plant--for the development of a complex of new (third generation) up-to-date standard color television apparatus and the organizing of industrial production of it for equipping the country's television centers. Also, the establishment of a base for multiprogram television broadcasting from the city of Moscow.

18. Ashimov, Muse Ali Ogly, doctor of technical sciences, senior scientific associate of the All-Union scientific research and planning institute for the preparation for the transport and processing of natural gas; Buyerakov, Anatoliy Vadimovich, director of the All-Union scientific research, planning and design institute for the development of gas industry equipment; Tutel'yan, Karekin Oganesovich, deputy chief engineer of the above institute; Runenkov, Eduard Aleksandrovich, chief of the Turkmenneftegazstroy [Turkmen Oil and Gas] production association; Kanashchenkov, Vladimir Sergeyevich, fitter brigade leader of the Shatlykgazstroy [Shatlyk Gas Construction] Trust in the above association; Zhabrev, Igor' Pavlovich, doctor of geomineralogical sciences, chief of an administration for gas industry equipment in the above association; Talday, Viktor Andreyevich, chief of the All-Union industrial association for gas extraction in Turkmen SSR; Khalnepesov, Khydyr Meredovich, deputy director of the production association of Shatlykgazdobycha [Shatlyk Gas Extraction Trust]; Leshchinskiy, Yuriy Yevgen'yevich, head of a section of the Central Committee of the Communist Party of Turkmenistan--for the development and introduction of scientific technical solutions ensuring rapid installation of the large Shatlyk gas extraction complex on the basis of progressive technology and native equipment of large unit capacity.

19. Fisenko, Georgiy Lavren'yevich, doctor of technical sciences, deputy director, work supervisor; Mochalov, Aleksey Matveyevich and Pustovoytova, Tamara Konstantinova--both candidates of technical sciences, senior scientific associates, workers of the All-Union Scientific Research Institute for Mining Geomechanics and Mine Surveying; Sapozhnikov, Vasiliy Timofeyevich, doctor of technical sciences, laboratory chief at the Ural affiliate of the above institute; Galkin, Aleksey Mikheyevich, candidate of technical sciences, chief engineer of the Sork molybdenum combine imeni F. E. Dzerzhinskiy; Gusev, Robert Mikhaylovich, deputy director of the Chelyabinsk coal extraction production association; Zoteyev, Vadim Gavrilovich, candidate of technical sciences, laboratory chief at a mining operations institute; Il'in, Aleksandr Ivanovich, candidate of technical sciences, deputy director of the All-Union scientific research, planning and design institute for the drying of mineral product deposits, special mining operations, ore geology, and surveying; Revazov, Maksim Aleksandrovich, doctor of technical sciences, department head at a Moscow mining institute; Pevzner, Mark Yeremeyevich, doc tor of technical sciences, laboratory chief at the Scientific Research Institute of Mining and Chemical Raw Materials--for determining the scientific principles pertaining to landslide occurrences and developing and introducing measures for preventing and combatting these in the pits and quarries where the open method of extraction of mineral products is employed.

20. Bochkarev, Leonid Mikhaylovich, candidate of technical sciences, sector chief; Ushakov, Konstantin Ivanovicy, doctor of technical sciences, director; Lobanov, Pavel Aleksandrovich, senior engineer--all associates of the State Scientific Research Institute of Nonferrous Metals; Ramazanov, Mnaydar Ramazanovich, candidate of technical sciences, director; Ivanov, Aleksey Vissarionovich, chief engineer--both workers of the Almalyk mining and metallurgical combine imeni V. I. Lenin; Shurchkov, Vladislav Pavlovich, director; Grents, Ioganes Kasparovich, shop chief; Begmuratov, Danavay Mamatkulovich, smelter--workers of the copper works in the aforementioned combine; Zubarev, Valerian Ivanovicy, chief specialist in the State Institute for the Planning of Nonferrous Metallurgy Enterprises; Kiselev, Boris Nikolayevich, general director of a production association for the planning, adjusting, modernizing and repair of power equipment; Tyumentsev, Vitaliy Georgiyevich, deputy chief of an administration of the Ministry of Nonferrous Metallurgy USSR; Sheynkman, Lev Kel-manovicy, candidate of technical sciences--for the development and industrial introduction of a technology and equipment for a highly effective head process of autogenous oxygen-jet smelting employing sulfur and heat from the waste metallurgical gases in the Almalyk mining and metallurgical combine imeni V. I. Lenin.

21. Galkin, Dmitriy Prokhorovich, Minister of Ferrous Metallurgy of Ukrainian SSR; Dobronravev, Aleksey Ivanovich, candidate of technical sciences, deputy chief rolling mill operator; Radyukevich, Leonid Vladimirovich, director; Shubin, Yevgeniy Vasil'yevich, senior foreman--all workers of the Magnitogorsk Metallurgical Combine imeni V. I. Lenin; Lipukhin, Yuriy Viktorovich, director of the Cherepovets metallurgical plant imeni 50-Letiya SSSR; Tamashevskiy, Leonid Andreyevich, assistant shop chief at this plant; Pimenov, Aleksandr Fedorovich, doctor of technical sciences, laboratory chief at the Central Scientific Research Institute of Ferrous Metallurgy imeni I. P. Bardin;

Skorokhdov, Vladimir Nikolayevich, candidate of technical sciences, senior scientific associate at this institute; Polukhin, Vladimir Petrovich, doctor of technical sciences, laboratory chief at the Moscow Steel and Alloy Institute; Shcherbakov, Pavel Ivanovich, chief engineer of an offset plate plant; Emidiyet, Anatoliy Grigor'yevich, deputy chief engineer of the PRAVDA publishing house and the PRAVDA printing office imeni V. I. Lenin; Mirer, Aleksandr Grigor'yevich, candidate of technical sciences, laboratory chief at the All-Union Scientific Research, Planning and Design Institute of Metallurgical Machine Building--for the development of a technology and organization of production of very high precision cold rolled plate for offset printing.

22. Balakshin, Pavel Nikolayevich, chief engineer; Dybtsyn, Aleksandr Aleksandrovich, general director; Virachev, Nikolay Aleksandrovich, cellulose operator; Kabakov, Anatoliy Mikhailovich, cellulose worker--all workers of the Kotlas cellulose and paper combine imeni 50-Letiya VLKSM: Balin, Nikolay Nikolayevich, general director of the production association of the Syktyvkar lumber complex imeni Leninskiy Komsomol; Brezhneva, Taisa Timofeyevna, candidate of technical sciences, laboratory chief; Potolitsyn, Al'bert Nikolayevich and Synchikov, Vladislav Mikhaylovich, production chiefs and workers at the above mentioned association; Bakareva, Nina Mikhailovna, laboratory chief at the Central Scientific Research Institute of Paper; Makushina, Alla Vsevoldovna, candidate of technical sciences, laboratory chief at the Ukrainian Scientific Production Association of the Cellulose and Paper Industry; Iyevlev, Ivan Stepanovich, chief of the All-Union Komi lumber association Komilesprom--for the development of new, highly productive technologies for the production of paper and cardboard on the basis of utilization of greenwood in the production association Syktyvkar, the industrial complex imeni Leninskiy Komsomol and the Kotlas cellulose and paper combine imeni 50-Letiya VLKSM.

III. For Textbooks

1. Krasnov, Nikolay Fedorovich, doctor of technical sciences, department head of the Moscow Higher Technical School imeni N. E. Bauman for the textbook "Aerodinamika [Aerodynamics]," published in 1980 (Third Edition).

2. Krafarov, Viktor Vyacheslavovich, academician, department head in the Moscow Chemicotechnological Institute imeni D. I. Mendeleyev for the textbook "The Principles of Mass Transfer," published in 1979 (Third Edition).

3. Mishustin, Yevgeniy Nikolayevich, academician, division chief in the Institute of Microbiology, Academy of Sciences USSR and Yemtsev, Vsevolod Tikhonovich, doctor of biological sciences, department head at the Moscow Agricultural Academy imeni K. A. Timiryazev--for the textbook "Microbiology," published in 1978 (Second Edition).

For Vocational and Technical Schools

1. Atabekov, Vil'yam Borisovich, former chief power engineer of an administration of the Moscow gorispolkom--for the textbook "Repair of the Electrical Equipment of Industrial Enterprises," published in 1979 (Fourth Edition).

[Signed]

Secretary of the CPSU
Central Committee

L. Brezhnev

Chairman of the
Council of Ministers USSR

N. Tikhonov

7962
CSO: 8144/0500

SIXTH ALL-UNION SCIENTIFIC AND TECHNICAL SOCIETIES CONGRESS HELD

Moscow TRUD in Russian 26 Jan 83 pp 1, 2

[Unattributed report: "For Further Development of Science and Technology"]

[Excerpts] More than 1,300 delegates assembled in the Great Kremlin Palace on 25 January for the Sixth All-Union Congress of Scientific and Technical Societies. They will sum up the results of the work that has been done and discuss the tasks confronting the enthusiasts of technical progress.

The congress delegates were greeted on behalf of the academy of sciences' scientists by thrice hero of socialist labor A. P. Aleksandrov, president of the USSR Academy of Sciences. He spoke about the successes of our science and economy and the scientific and technical society organizations' important role in the solution of many problems connected with the introduction of advanced equipment.

Enormous machine building capacities have been created in our country. We produce more machine tools than any country in the world. However, our machine building output's reliability and service life give rise to justified criticism. What exactly is the problem? A number of enterprises are not sufficiently demanding in their attitude to output quality. There are departures from the blueprints, deviations from prescribed production techniques and incorrect processing rates. There are quite a lot of these small things, and this eventually leads to the production of low-quality components.

The speaker went on to make proposals for improving the process of creating machine building products and raising their quality and durability. The president of the USSR Academy of Sciences emphasized that it would be a very good thing if the scientific and technical societies were also to participate energetically in this work.

V. P. Yelyutin, corresponding member of the USSR Academy of Sciences and USSR minister of higher and secondary specialized education, mounted the rostrum.

The VUZes, in whose collectives scientific and technical society primary organizations have everywhere been created, are resolving in conjunction with the scientific and technical societies the tasks of raising the quality of specialists' training and the tasks of developing scientific research and introducing scientific achievements into production, the speaker said.

Student design and production technology offices have now been created in the country's VUZes. The All-Union Council of Scientific and Technical Societies and the Sectorial and Republican Councils and Boards of the Scientific and Technical Societies are cooperating energetically with the VUZes scientific councils. The Ministry of Higher and Secondary Specialized Education and the Komsomol Central Committee, in conjunction with the All-Union Council and Central Board of Scientific and Technical Societies, are systematically holding an All-Union competition for the best scientific work by students in the natural and technical sciences and in the humanities.

The floor was then given to Ya. P. Ryabov, First Deputy Chairman of the USSR Gosplan.

The speaker noted that the conditions in which the national economy will develop in the eighties make the demand for a-celerating scientific and technical progress imperative.

Scientific and technical societies, in solving these tasks, should pay attention to more closely linking the themes of scientific and technical conferences and meetings and schools of advanced experience with the tasks of developing science and technology. It is necessary to increase the fruitfulness of public surveys. It is necessary to introduce more widely into the practice of scientific and technical society boards and councils the public discussion of draft plans and to ensure further effective monitoring of the fulfillment of plan targets. The scientific and technical public must be more widely involved in monitoring the fulfillment of plans for the creation and introduction of new equipment into the national economy.

CSO: 1814/62

RSFSR PAPER ON ADOPTION OF TECHNICAL INNOVATIONS

Moscow SOVETSKAYA ROSSIYA in Russian 2 Mar 83 p 3

[Article by Professor N. Lapin: "The Optimum Percentage"]

The discussion on problems of putting advanced ideas and technical solutions into practice which began in SOVETSKAYA ROSSIYA after the CPSU Central Committee November 1982 Plenum is exceptionally opposite. The tasks set before the country of a sharply increasing labor productivity, intensively developing the economy and further increasing the people's prosperity demand primarily the resolution of questions of the rapid and broad assimilation of efficacious new development.

Some 20-30 years ago we were experiencing a period of extensive development of innovations, that is, immeasurably more innovations were being proposed than put into practice. Thus in the 10 years from the mid-fifties to the mid-sixties, the number of new types of machinery, equipment and instruments developed increased by over threefold, but only about 20 percent of them were being assimilated. It is true that this also had its positive side: industry had a wide range to choose from and innovations underwent a kind of "survival test." Unfortunately, this undoubted plus was greatly outweighed by the minuses caused by the wastage produced by lengthy period (10 years or more) taken to put promising articles into production and the small scale of output which completely failed to satisfy demand.

It goes without saying that such a situation could not last long and from about 1965 onward attention was focused on the task of adopting as many new development projects as possible. Because of this, the number of technical innovations assimilated annually in the next 15 years increased fourfold and more. While the number of solutions being proposed fell by one-third. As a result, by the early eighties, the proportion of developments being adopted was 75 percent. There is very reason to believe that in the next few years that proportion will increase to 80-90 percent.

One should not think, however, that this increase is unfailingly of benefit to the national economy. Suppose that the adoption of innovations reached 100 percent. What would that mean? Industry would have to take everything that science gave it--it would not be able to choose, and this would lead to the introduction of poor-quality, uncompetitive goods on which money had been spent with no benefit to technical progress. Thus, the optimum proportion of

innovations actually introduced should, it seems, be somewhat between 70-80 percent, and if that is the case, we are already close to the danger limit. It is worth giving some thought....

But the optimum percentage for the adoption of innovations is still not the be-all and end-all. I have already mentioned the sometimes utterly inadequate scale on which innovations are put into production. As regional investigations show, 80 percent of new developments are only introduced at one or two enterprises, about 20 percent at three or four enterprises and only 0.6 percent at five or more production units. As a result, machinery or equipment is considered to have been introduced but the potential for supplying all those who need it is virtually nonexistent. This often leads to the oreinvention of the wheel and to the outright copying, with some cosmetic design changes, of innovations that are in short supply.

By the midseventies, for example, nearly 140 types of computers were being produced in the country which despite being different externally and in their design characteristics were completely interchangeable. The same situation could be observed in the production of television. It is not surprising that the production of new types of goods doubled on occasions during a single 5-year period. Whereas, for example, 1,700 types of products were put into production annually during 1966-1970, that number rose to 3,300 in 1971-1975. That figure continued to rise in the next 5-year plan period, too, and reached 3,700 in 1980.

The question arises: is it not better to put fewer new types of goods into production but to ensure considerably large-scale production? Just such a trend has been noticed in recent years. For the first time, in 1981, the number of new types of industrial products did not rise but actually fell, to 3,600. This means that the number of enterprises assimilating and producing a single item according to a single production technique is beginning to rise and this process must continue. It will help to improve product quality, reduce prime costs and make it possible to satisfy demand more quickly.

But another element is absolutely necessary for all this: That is, to substantially reduce the time taken to bring new developments into wide-scale production. This often takes 10-12 years: In one 5-year plan, samples of new items are built which are included in the targets...For the next 5-year plan, time and again it happens that everyone "supports" the introduction of a new development but with the best will in the world those on whom this depends cannot include it in the next year's plan.

So it transpires that planning in this instance not only does not help progress but even applies a very powerful brake on it. To restore the plan's functions it would seem necessary to leave in it its distinctive scope for accommodating new developments and types of products which could be assimilated as the need arose. The main criteria for the selection of "candidates" for such a reserve should be, of course: the fundamental novelty and promising nature of the new development, public demand for it and that it should be as efficacious as possible.

For example, a new type of machine tool is proposed which will increase labor productivity by 15 percent but will cost three times as much as the existing machine tool. Another type of machine tool, on the other hand, only increases labor productivity by 7 percent but at the same time is one-third cheaper, which of the two should be preferred? Judging by the figures alone, it is surely better to choose the latter--it will pay for itself more quickly. But that could be a mistake. After all, we know nothing about the machine tools' reliability, how they fit into the production process or how economical they are to run. Perhaps the first machine tool is waste-free in operation and even opens up an entirely new avenue in manufacturing which will help the entire sector to progress.

Such an assessment could now be made at the top level (the Academy of Sciences, the USSR State Committee for Science and Technology and certain other bodies). At all subsequent levels, from sectoral scientific research institutes down to plant services, this assessment acquires a clear intradepartmental hue. However, the majority of interesting and promising innovations are intersectorial in nature. Their introduction requires a pooling of the ideas and efforts of many specialists and, ideally, the creation of an organization whose main and only task, not just one of many, would be to prepare innovations for production and introduction. The activity of such an organization should be evaluated not by the mere fact of the introduction of an innovation but by the scale of its assimilation and by how well the national economy's need for it is satisfied.

I should also like to draw attention to the need to train experts with a mastery of the fundamentals of theory and of the methods of organizing and administering the adoption process. Putting it briefly, the solution of the problem of the adoption of innovations, like other problems, requires a comprehensive approach.

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DOLGIKH READS CPSU GREETING TO SCIENTIFIC-TECHNICAL CONGRESS

Moscow DOMESTIC TELEVISION SERVICE in Russian 1400 GMT 25 Jan 83

[Text] The Sixth All-Union Congress of scientific-technical societies began its work in the Great Kremlin Palace in Moscow today. Representatives of the 11,000,000-strong detachment of the Soviet scientific-technical intelligentsia are discussing ways for more active participation by scientists, engineers, technicians and workers in improving production and introducing the achievements of science and technology into the practice of the national economy.

Taking part in the work of the congress are comrade Grishin, Dolgikh, Ryzhkov, comrades Baybakov and Novikov, deputy chairman of the USSR Council of Ministers, heads of departments of the CPSU Central Committee, leaders of ministries and departments and public organizations, eminent scientists and production innovators.

With prolonged applause, the participants in the congress greeted the message of greetings from the CPSU Central Committee, which was ready by comrade Dolgikh, candidate-member of the Politburo, secretary of the CPSU Central Committee.

The Central Committee of the Communist party of the Soviet Union warmly and cordially greets the delegates of the sixth All-Union Congress of scientific-technical societies and all those engaged in science and production, by whose labor and skill scientific-technical progress in the national economy is ensured.

Together with all the Soviet people, the scientific-technical societies are actively engaged in fulfilling the decisions of the party's 26th Congres and the May and November 1928 Plenums of the CPSU Central Committee. By involving millions of Soviet people in creative scientific-technical work, the scientific-technical societies, through all their activities, are furthering the unity of science and production. Effective participation in socialist competition in honor of the 60th anniversary of the formation of the USSR has also been a vivid demonstration of the creative activity of the organization of scientific-technical societies.

At the November 1982 Plenum of the CPSU Central Committee, special emphasis was placed on the fact that reserves for raising the effectiveness of production and its intensification must be sought in an acceleration of scientific-technical progress and the broad and rapid introduction into production of the achievements of science, technology and advanced experience. One of the most important tasks of the societies is active participation in the nationwide struggle to further enhance labor productivity on the basis of the achievements of science, technology and advanced technology, complex mechanization and automation of production processes, and in reducing manual work.

Organizations of scientific-technical societies should concentrate their efforts on work to implement the USSR food program, first and foremost on raising the yield of agricultural crops, growth in the productivity of stock-breeding, ensuring that produce is stored and processed in a proper manner, and in creating highly-productive and reliable equipment for the countryside.

Great possibilities lie in tackling the tasks for rational and economic use of raw-material, fuel-and-power and other material resources. It is vital to direct the efforts of the scientific-technical public towards creating and introducing energy-saving technology low- or no-waste technology, reducing materials consumption, raising the quality of produced output and achieving the highest possible long-term results.

It is the duty of the scientific-technical societies to make their contribution to work in improving the management and planning of the economic mechanism and to promote the introduction of scientific-technical organization of labor and production. The societies must devote close attention to strengthening labor, production and technological discipline.

It is the lofty vocation of all members of scientific-technical societies to constantly display initiative and activeness in tackling the tasks of scientific-technical progress, to intensify public control over the implementation of the achievements of science and technology, and to strive for an enhanced role for engineering and economic services in ensuring the fulfillment of plans and socialist pledges for 1983 and the 115th T-Year Plan as a whole.

The Central Committee of the Communist Party of the Soviet Union wishes the Sixth All-Union Congress of scientific-technical societies fruitful work, and expresses the firm assurance that the scientific-technical societies will work even more actively and persistently for progress in the country's science and technology, for the successful implementation of the decisions of the 26th CPSU Central Committee for the great tasks of building communism.

The Central Committee of the Communist Party
of the Soviet Union.

A review report was delivered by academician Ishlinskiy, chairman of the All-Union Council of scientific-technical societies, hero of the Soviet Union.

The Congress will continue its work tomorrow.

Camera provides shots of delegates in the conference hall. It then cuts to shots from left to right of Ryzhkov, Dolgikh and Grishin seated in the Presidium. Camera shows Dolgikh reading the message of greetings sent to the Congress by the CPSU Central Committee. Camera also shows academician Ishlinskiy, chairman of the All-Union Council of scientific-technical societies reading a report.

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ROLE, FINANCING OF GOAL-DIRECTED PROGRAMS DISCUSSED

Moscow PRAVDA in Russian 9 Nov 82 p 3

[Article by I. Nesterov, director of the West Siberian Institute of Geological Oil Exploration, corresponding member of the USSR Academy of Sciences, Lenin Prize winner: "There Are Ways To Maneuver on the Basis of Integrated Programs"]

[Text] The development of both science and technology in the 11th Five-Year Plan must be applied to an even greater extent to resolving economic and social problems in Soviet society, to more quickly setting the economy on the path of intensive development, and to raising the effectiveness of social production. Coping with a task of this scale means more energetic improvement of the forms of organizational research is necessary. One of these forms is goal-directed programs. Our collective verified their advantages with its own experience.

In the last five-year plan, we subordinated all the planned scientific themes to the fulfilling of seven large, integrated programs which were approved by the RSFSR Ministry of Geology. It must be acknowledged, however, that we failed to achieve the desired effect. The reason was that the financing system remained as before. Every change in the program could be backed with additional resources only when authorized by the following year's plan. Still more time was lost due to the fact that only the ministry had the right to revise the fulfillment time of the themes. And even if the work managed to get done ahead of schedule, those who had done it preferred to wait for the scheduled defense of their report, rather than once more appeal to a higher level.

Since last year the procedure has been changed: the goal-directed programs are approved by the ministry, as before, but the tasks for the people who carry them out are approved locally. Instead of the 200-300 themes which the institute ordinarily carries out during a five-year period, the plan includes 30 programs, each of which is financed by Gosbank as a unified whole. This organization of research makes it possible to use the allocated funds more flexibly, directing them to the most important part of the work at a given moment. This is immediately apparent in the amount of time that the work takes. Last year more than 300 goal-directed tasks were carried out. Under the old system of theme financing, this would have required at least two to three years.

Thus, when a program was formed to study the raw materials base for producing construction materials in West Siberia, it originally called for studying resources and utilization methods only of traditional raw materials. In the course of the work, it became clear that Tyuman' Oblast has large deposits of silicon materials, especially diatomites. Several goal-directed tasks were immediately inserted into the thematic plan. As a result, it was shown that diatomites not only make it possible to use sand, clay, and limestone in building, but also have a wide range of application. Under the old organization of scientific works, we would have received these results only after a year and a half or two years.

Another example. At many fields in West Siberia, water is injected into the oil beds. It used to be that when this was done, bacteria also penetrated into the ground. Intensive formation of carbonates and hydrogen sulfide began. This threatened not only a reduced oil yield of the beds, but also a shut-down due to strong corrosion of the gas-refining plants. The laboratory of the microbiological institute was given a goal-directed task which had not been foreseen earlier. In a short time the collective development substances to fight the bacterial contamination of the underground levels, using chemical industrial wastes to produce them. And again the time required for discovery and adoption was shortened by three to five times.

It stands to reason that undertaking new methods of organizing research will not be managed without difficulties. I will touch only on those which are "introduced" from without. In many institutes, specialists who are performing similar work and receiving identical salaries hold differing posts: different sources of financing also impose their "stamp" on the staff schedule [setka]. This policy is scarcely warranted. And another thing. In my opinion, in the case of bank financing of a program as a unifire whole, it is necessary to stipulate the use of both state budget appropriations from all sources, and, where necessary, capital investments. Accordingly, in it must be included the entire volume of necessary work and all of its forms, including the adoption of the results of research, while outlays, prior to being written off, must be calculated on balance as a part of uncompleted production.

Behind this list of finance procedures there are problems whose solution concerns many people. Sometimes the formal adherence to some point of regulations causes more damage to the national economy than any natural disaster. Conversely, frequently orders are given (without sufficient right to do so) which interrupt the work rhythm.

Thus, according to existing regulations, it is not allowed to introduce the results of completed research in production using appropriations for science. With respect to certain other sources of financing, it is forbidden...to invent and to conduct research. In our institute there was a case when an invention awarded a medal by the Exhibition of the Achievements of the National Economy resulted in a large fine for its author--the bank imposed it. This happened because the research resulting in the invention was carried out using appropriations for geological exploration work, than for science. Yet this kind of thing is forbidden by the instructions, even though the work is planned by the institute. Is this sort of petty tutelage tolerable?

Besides scientific-production associations, the country has many organizations whose institutes are members of production enterprises. Practice here is outrunning jurisprudence--no legal base underlies such a "symbiosis': there are no bylaws and no unified personnel schedule. From the example of our institute, it is obvious what this leads to. Our institute is subordinate to Glavtyumen'-geologiya. Scientific research in Glavtyumen'geologiya is also done by specialized production parties. It stands to reason that someone ought to coordinate their efforts. Our institute's services would be fully equal to this, but the director in this case must be invested with authority corresponding to that of the main administration. The juridical norms, however, do not provide for this.

Frequently higher organization, having approved the themes of scientific works, then procede to give tasks whose completion sometimes uses up more time than the planned research. Our institute's collective spends an average of about 50,000 man-days on this every year.

Of course, scientific establishments should be flexible, to effectively change the directions of research in response to practical questions. But when specialists are taken away from their basic work without sufficient reason, this affects the quality and the time required to do the work. Furthermore, not insignificantly, it reflects on the pay of staff members whose salary is directly connected to fulfilling the planned tasks on time. The USSR State Committee on Science and Technology, the Ministry of Finance, and the State Committee of Labor, one would think, should work out a unified document regulating the rights and responsibilities of scientific organizations and the departments that run them, regardless of the sources of financing.

Undoubtedly, these and other irregularities are a sort of disease of growing, but we must not be slow with their "treatment." Because converting to the goal-directed program approach to work--and experience shows this clearly--is a reliable way to significantly increase the effectiveness and rate of scientific inquiry.

12255
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IMPORTANCE OF FUNDAMENTAL SCIENCE IN UNIVERSITIES DISCUSSED

Moscow PRAVDA in Russian 17 Nov 82 p 3

[Article by Professor I. Tarapov, rector of Khar'kov University, doctor of physical-mathematical sciences, under the rubric "Effective Use of the Scientific Potential": "The Foundation of Creativity"]

> [Text] Leading universities of the country are setting up a powerful base for conducting deep, integrated, basic research, with strong schools in the most important trends, especially the natural sciences. Such schools also exist in Khar'kov University.

The traditions of the mathematical school established by A. Lyapunov and V. Steklov are being successfully continued by a large group of talented scientists under the leadership of Academician A. Pogorelov and Academician V. Marchenko of the Ukrainian Academy of Sciences. Their work has largely determined the modern condition, in this country, of divisions of mathematics such as higher geometry, function theory, probability theory, steady motion theory, and equations of mathematical physics.

The university school in nuclear physics founded by Ukrainian Academy of Sciences Academicians F. Sinel'nikov and A. Val'ter is well known for its major contribution to explaining the mechanism by which nuclear reactions occur. Presently, under the direction of USSR State Prize Laureate Professor I. Zalyubovskiy, a study is being done of the quantum characteristics of atomic nuclei, with the goal of further improving the model of the atomic nucleus and better understanding the nature of nuclear power.

The physical-chemical school established in the last century by N. Beketov and now led by Professor V. Aleksandrov is credited with a number of basic works in the field of the physical-chemical properties of aqueous and nonaqueous solutions. In particular, discoveries were made about the important laws of interaction between the dissolved substance and molecules of the solvent.

Well known both in this country and abroad is the work of N. Nagornyy's scientific school of gerontology, now led by Ukrainian Academy of Sciences Academician V. Nikitin. This collective experimentally demonstrated the role of unfavorable changes in the molecular composition of the chromosomes in the aging process of the organism.

Public interest in theoretical research manifests itself most clearly in those periods when the indusputible practical significance of the achievements of basic science is widely realized, as well as the prospects of quick embodiment of theoretical ideas in practice. Thus it was, for example, in the past-war period, when the practical significance of basic theories of atomic physics became clear, along with work in cybernetics and discrete mathematics, the theory of jet propulsion, questions of heredity, and plasma theory. It was during these years that the popularity and prestige of university physical-mathematical specialties grew and appropriations to broaden the educational-scientific base of universities increased.

Our era is characterized by the rapid development of applied research on the basis of the successes of fundamental research. The material base of technical VUZes traditionally involved in production has been strengthened. But the universities too, having accumulated a solid supply of theoretical works, are beginning to develop applied divisions of science on the basis of them, which is making it possible to strengthen the scientific-laboratory base of the VUZ. This is part of the general process of merging science and production.

Khar'kov University also has not remained on the sidelines of these changes. Themes which have an immediate relation to topical problems of modern physics and biology are acquiring an ever more prominent place in the works of mathematicians. Academician A. Pogorelov, who obtained ground-laying results in studying the curving of convex surfaces, devoted a cycle of works to the mechanical problems of the stability of shells. The fundamental results in diffraction theory obtained by Ukrainian Academy of Sciences Academician V. Marchenko became the source for a number of applied works at the Khar'kov school of radiophysicists, headed by Ukrainian Academy of Sciences Academician V. Shestopalov.

The fruits of the theoretical works of nuclear physicists have received broad practical application. The importance of physical chemists' research for the national economy is manifesting itself in an appreciable way. It has served as the basis for methods of controlling production processes and automatic regulation, which has made it possible to work out metrological means of certifying new instruments for the physical-chemical analysis of liquids. The prospect is at hand for creating technological processes with a significantly diminished or even completely eliminated need for water. On the basis of this research, in the tenth five-year period a collective of the physical chemistry department carried out two state budget jobs and seven contract-based works, with a total economic effect in excess of 800,000 rubles.

Recently, there have also appeared fundamental investigations, on the interface with applied investigations, which are immediately oriented toward the creation of new technologies. Such work, for example, is being done under the leadership of Professor Ya. Geguzin on the physics of agglomeration [spekaniye] and diffusion processes in real crystals.

Also characteristic are the investigations directed by Professor Ye. Nechiporenko. On the basis of theoretical research in the field of diffusion and the interaction of materials with active environments, a method and technology have

been proposed for producing high-temperature heaters, able to be used for extended periods at temperatures up to 2,000 degrees. Industrial testing of experimental models has shown that the innovations are four to five times longer lasting than familiar units.

These examples testify to the fact that applied works are especially effective when they are based on the achievements of fundamental research. But, as we observed at the 26th CPSU Congress, full-bodied stream of scientific-technical progress will run dry if it is not constantly fed by fundamental research. Nevertheless, universities are running into trouble in developing it.

The popularity and prestige of the physical-mathematical disciplines is declining among young people. Therefore, serious concern is needed to develop traditional scientific schools, especially for physics and mathematics, and to prepare a reserve of talented young people. The effectiveness of these measures largely depends on successful vocational guidance for young people. Unfortunately, organs of public education are continuing to lost interest in physical-mathematical schools and classes for deeper study of physics and mathematics. This, in my opinion, must be corrected.

Another important issue is the financing of fundamental research. As a consequence of the growth in the volume of applied works in universities which are financed by contract the portion paid by state budget financing has fallen to 14-15 percent. Appropriations for the development of fundamental research, thus, have turned out to be sharply reduced. This disproportionality can cause a slowing in the rate of progress of fundamental science and can lead to exhausting the base for applied research also.

While by no means disparaging the role of applied developments, it is necessary to note that the effectiveness of fundamental research often does not lend itself to ordinary evaluation by rubles. People sometimes forget that theoretical research at a certain stage may have only cognitive significance. This is the internal logic of scientific investigations of unknown natural phenomena.

And as regards higher education, how can you put a ruble value on its effect on the quality of training of future specialists. From this point of view the fundamentality of university education, built on the base of theoretical disciplines, is not only "stable" against the danger of becoming obsolete, but also ensures the high flexibility of university alumni, and their preparation for rapid changes in science and technology.

In connection with the growth in the volume of VUZ scientific research, great importance attaches to its material base. Unfortunately, expanding the contract-financed works in universities has not sufficiently promoted the strengthening of this base. In particular, sectorial ministries lack the capacity to support them using funds for capital construction, inasmuch as university research is not technical in nature (technological applications, experimental products, and so on). As a result, both the broadening of the educational-scientific base of universities, and the creation of experimental-design production in them, entail difficulties.

It is worthwhile to institute in the Ministry of Higher and Secondary Specialized Education a special fund made up of contributions by sectorial ministries both for special-purpose financing for fundamental research, and for strengthening the scientific base of universities. For they have no specialized patron sector as the technical VUZes do. Under these conditions, in my view, it is appropriate to have a centralized resolution of the questions which are so important for universities.

Fundamental research has always been profitable, not requiring large expenditures. At the same time, a scientific school is created slowly and at the expense of great effort. Every weakening of the front of theoretical research is felt in applied research.

Fundamental science can also be likened to the nourishing environment of university education. And so the interdependent upgrading of theoretical research and cadre training in fundamental disciplines demands our constant attention and concern.

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CHANGES IN TECHNICAL DISSERTATION PROCEDURES URGED

Moscow PRAVDA in Russian 16 Dec 82 p 3

[Article by A. Dobrolyubov, candidate of technical sciences, director of the laboratory of the Belorussian Academy of Sciences Institute of Technical Cybernetics: "For the Sake of a Dissertation. Effective Use of Scientific Potential."]

> [Text] Once I heard from a "seasoned" colleague: "I didn't work for three years while I was preparing my dissertation." For a while I was glad for my comrade--he had a load off his mind. But I was also sorry that for so many years he had lost touch with living concerns. I recalled that it had been the same way for many others. Then I thought: is this really unavoidable?

Our small scientific laboratory is creating an automated design system (ADS) for various engineering devices. The package of computer programs we are developing should simplify the work of the designers, improve the quality of the projects, and shorten the time required to complete them. We have already managed to get a lot done. Our programs are being used in many enterprises with a substantial economic impact.

The successes, however, could be significantly greater, if it weren't for... leading staff members' trying (or being required) to prepare and defend dissertations. If is paradoxical, but true. The reason is that in many trends of science, especially technological science, a situation has been created where the interests of business and the struggle to defend a dissertation are in conflict.

Every scientific collective and its administrator has to pose itself problems of a two-fold nature. First and most basic--what is the collective doing and for whom at the fruits of its work intended? What does the use of these results give to production? How many new machines, instruments, and computer programs are developed? But the question more often asked is: how many candidates and doctors of science does the collective have, and how fast is their number increasing in a certain period? How many articles have been published, how many reviews written about colleagues' dissertations, and so forth.

The higher the indicators of the second type, the better the work is considered to be going. Unfortunately, the converse relationship is not all that rare: the more dissertations, the fewer new machines, instruments, computer programs.

Circumstances today force the scientific associate of a scientific-research institute to be concerned above all with the writing of this dissertation--candidate's or doctor's. Otherwise, regardless of his talents, he is threatened with the prospect of being included in the category of "failures." So the staff member is often concerned above all with "dissertation indicators": the number of articles published, reports made at conferences, developing new methods (this is, ones which are distinguishable from those suggested by other people), even when they promise little usefulness. It is not surprising that in the scientific-research institute there is sometimes no one "to work on the plan"--the staff members...are doing their dissertations. For example, it is difficult to force graduate students to prepare the ADS program packages needed for industry, since this is considered "technical" work, and not "dissertationable." In the name of "dissertationableness," competitors for scientific degrees strive to get into the sphere of "pure" science, to formulate and prove some theorems, to write up methodical instructions.

Defending dissertations based on computer program packages which have been developed, and the construction of machines and instruments, is almost never done. This is considered, for some reason, "undissertationable." But that is precisely what is needed for production, for industry! In the course of developing them, also, scientific and technical peaks are frequently scaled.

Of course, I am talking primarily about the technical sciences. Here, in my opinion, the dissertation process requires definite changes. It is essential that an engineer who has decided to write a dissertation not be required, as often happens, to give up the practical affair of creating machines and instruments and operate on the principle of "theory at any cost" (which frequently leads to a scientific-seeming exposition of elementary things). It is necessary that he continue work which has engineering and practical meaning, and that he realize that in the technical sciences this is fully "dissertationable." In short, here it is necessary to strive to meet the requirements expressed at the November 1982 Plenum of the CPSU Central Committee: "It is essential to create the conditions, both economic and organizational, which will stimulate high-quality, productive labor, initiative, and enterprise."

It would seem reasonable to impose somewhat different requirements on dissertations defended, for example, by VUZ teachers and by associates of sectorial scientific-research institutes or enterprises. Such a differentiation is accepted in many industrially developed countries. With us, though, these requirements are identical, although in the VUZ the important thing is the educational process, and in the scientific-research institute or enterprise--the obtaining of new, effective results. The VUZ dissertation can be about educational method; the industrial dissertation is most often applied. The requirements imposed on dissertants today are basically the VUZ ones. In essence, many of the "dissertation doers" in scientific-research institutes are following in the footsteps of educational, rather than research establishments.

I believe that a dissertation on the technical sciences, prepared in a sectorial scientific-research institute or in production, should have, as a result, an engineering, practical nature. And the demands on it should be largely distinct from the demands on a VUZ dissertation.

Simplification is needed both in the preparation procedure and the defense of the work. Today at dissertation defenses, in effect "there is no defense, since there is no attack." But on the other hand, there is a protocol element which is equal to the volume of the dissertation itself. During a scientific mission abroad, I once had occasion to witness a dissertation defense in a technical specialty in the Manchester University of Science and Technology. Three invited professors talked to the author of the dissertation for about four hours, with a break to have a cup of coffee and look at the operating unit which the dissertant had developed. And it seemed that this was a more businesslike procedure than a twenth-minute report by the dissertant in a ceremonial setting.

In any case, at sectorial scientific-research institutes and enterprises, things should be arranged so that the dissertant's concern for his dissertation does not prevent but rather promotes his active participation in carrying out the planned research and technical applications. From this will come both the training of higher qualified cadres, and scientific-technical progress.

12255
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UKRAINIAN INTER-DEPARTMENTAL SCIENTIFIC-PRODUCTION COMPLEXES DISCUSSED

Moscow IZVESTIYA in Russian 8 Dec 82 p 2

[Article by Ya. Podstrigach, chairman of the Western Scientific Center of the Ukrainian Academy of Sciences, academician of the Ukrainian Academy of Sciences: "More Energetically Adopting the Achievements of Science in Production"]

[Text] For a long time it has been the custom that every enterprise is supposed to utilize its capacities 100 percent. But where is that window, that channel, through which we, the scientists, can be "introduced," with our developments, to production? You cannot do this if enterprises don't have capacity in reserve. Furthermore: innovations are assimilated with difficulty and temporarily lower an enterprise's indicators, and this means that they deprive their collective of being in the forefront and receiving the corresponding rewards. Under these conditions, it is unprofitable for manufacturers to adopt scientific-technical innovations. Especially since, as was noted at the November 1982 CPSU Central Committee Plenum, they are held responsible for failing to meet the production plan, whereas for half-hearted attempts to adopt new technology--well, at the most, they are scolded.

These circumstances were an incentive to seek out organizational ways of using scientific results in the national economy, ways which would be founded on the mutual interests of scientists and manufacturers.

IZVESTIYA has already made mention of a new form of such cooperation which has come up in the western region of the Ukraine. Academic, scientific-research, and educational institutes of various departments, along with design organizations and industrial enterprises, have combined into interdepartmental scientific-production complexes, in which the associations have taken shape on a voluntary basis. The appearance of such associations has made it possible to introduce all-round interdepartmental planning for adopting innovations. Through their efforts, six goal-oriented programs are being realized, including some which, in their significance, go beyond the boundaries of the individual oblasts and the entire region.

Today we can already point to results of the work of social complexes and associations. The length of the cycle "from scientific idea to production" has been cut down to less than a half. Works totalling 33 million rubles have been completed in a few years. More than 300 developments have gotten their start in life, yielding an economic effect of 223 million rubles.

The practical activity of these new-formed associations has led to the creation of new links of organizational support for the adoption process, involving the use of shared material-technical and cadre resources. It entails inter-departmental laboratories, in which scientists and manufacturers collaborate fruitfully.

About 40 such laboratories are now working on the most urgent points of the goal-oriented programs. They are of two types. The first, and most wide-spread, are formed on the economic-contractual principle. Each member which agrees to join such a collective provides the necessary specialists and the stipulated funds and equipment, and also includes a portion of the work to be done in its own new technology plan.

For example, a joint laboratory was set up for researching and testing hydraulic systems and hydraulic transmissions, in which a number of L'vov enterprises manufacturing lift trucks, buses, and truck cranes had interests. This adoption link, in the form of the Avtoprom Association, has succeeded in accomplishing a lot. In particular, it has produced and tested a standard hydromechanical transmission, and is currently developing testing stands for hydraulic power systems and jib cranes. The joint work has led to the idea that a specialized hydrosystems plant is necessary in L'vov's future.

At the Drogobych Drill Plant, a problem-solving, goal-oriented laboratory has been operating for several years, studying drilling equipment. The Ministry of Chemical and Petroleum Machine Building has given it financing and labor quotas through the Ukrainian Academy of Sciences. The portfolio of the collective, a structural subdivision of the Physical-Mechanical Institute of the Ukrainian Academy of Sciences, already contains many works which were adopted in the plant and have received recognition outside of the western region of the Ukraine. The laboratory has gotten a new client--the Ministry of Coal Industry of the USSR. The Ministry has allocated its share of appropriations for research, development, and organization of mass production of cutting instruments for different types of drilling in mines.

One can cite a large amount of evidence for the obvious advantage of similar laboratories. For example, a joint collective of scientists and manufacturers helped the Drogobych Experimental-Mechanical Specialized Equipment Plant to create technical equipment and adopt the technique of induction heat treatment of high-strength, heavy drill pipes. This took seven years off the time needed to organize large-series production, and saved about eight million rubles of capital investment.

A collective of specialists of several enterprises and institutes is conducting work for the L'vov Association of Radioelectronic Medical Equipment; they are working out an original unit for registering bio-physiological information. For this it has been necessary to develop a cathode ray tube with a fiber-optical screen.

Through the efforts of the joint scientific-research laboratory in the Ukrzapadugol' Association, headed by scientists, a number of innovations were adopted, including a technique of applying a metal-protecting coating in the construction of mining equipment. It extends the life of the hardware by five or six times, that is, until practically all the coal is excavated.

The experience of interdepartmental goal-oriented scientific-production complexes with associations and laboratories, which has been approved by the Ukrainian and USSR Academies of Science, leaves no doubt that we have every ability to strengthen the union of science and production. It is necessary only to manifest creative initiative, and not fear to give up obsolete concepts and opinions.

Once it was considered progressive to set up within large production associations scientific-research, design, and technological institutes and design bureaus with a radius of influence on the entire sector. Specialists with candidate's and doctor's degrees employed in enterprise technical services transferred to them. Then some scientific-research institutes and design bureaus detached themselves from those that had created them. Let us recall that earlier, enterprises had their own laboratories and resolved many problems of scientific-technical progress using their own resources. In most cases they have been abolished. A "de-sciencing" of the organism of enterprises has occurred.

In this connection, I cannot help but mention that it is easier for us scientists to find a common working language in those cases, unfortunately rare, where engineering posts in administrative services are held by candidates of science. For example, at the L'vov Kineskop Association they constitute a large group which serves as the inspiration for adopting innovations which are developed in close cooperation with scientists. Hence, for example, the successes of picture tube manufacturers. Without constructing a single square meter of additional space the association obtained 96 percent of its additional volume of production by raising labor productivity. By implementing scientific-technical developments, raising the quality of output, improving technology, and economizing on raw materials, they have achieved in five years an economic effect of 40 million rubles.

This example is excellent proof that today, all-around improvement of effectiveness has become the task of tasks, and a production association or large plant cannot get along without functioning scientific-technical progress service. Functioning, I repeat, like those which are found in the structure of enterprises and are considered worthwhile.

Some may object: why is it necessary to have still another service if we have chief technical specialists whose direct official responsibility it is to introduce innovation? To reason thus means to ignore the demands of reality. The chief engineer and chief technologist of an association are required to deal with a mass of daily, routine problems on whose resolution the rhythm of production depends. They are tangled up in routine. Let us return to the quite recent past. When we began, in L'vov, to adopt an integrated quality control system for labor and output, it was believed that all of the enterprise's specialists would be involved with it. But time has shown that where there is no functioning quality control service, the system hangs in abeyance and does not bring the expected results. It is well known that a job entrusted to everyone, rather than specific individuals, remains without rudder or sail.

As in the case of the new quality control service, the proposed service, which is called upon to be involved with scientific-technical progress, should have its own research problems laboratory. It is certainly justified, for it will become a channel through which scientists' advanced formulations will flow into the shop more rapidly than usual--regardless of which institute originated them. More than once it has been demonstrated: when an enterprise has just a small "scientific shop," engineers prove to be more active, they get used to research work, some of them start preparing their dissertation. This is a circumstance to be welcomed.

The search for organizational ways of integrating science and production goes on. We are among that number, in the western region of the Ukraine, where interdepartmental goal-oriented scientific-production complexes of associations and laboratories have been set up. To continue this search is the urgent command of the time. The November 1982 CPSU Central Committee Plenum directs us to do this.

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NOVOSIBIRSK EFFORTS IN INTEGRATING SCIENCE, PRODUCTION

Moscow IZVESTIYA in Russian 29 Nov 82 p 2

[Article by V. Bokov, Second Secretary of the Novosibirsk Obkom: "Science--Production--Efficiency"]

[Text] At the November CPSU Central Committee Plenum, speeding the pace of development of the country's economy was noted as one of the most important tasks. The working people of Novosibirsk Oblast, which has an enormous industrial and scientific potential, were also called upon to make a substantial contribution to the accomplishment of this goal. This oblast accounts for almost half of the all-union production of electrothermic equipment as well as a significant portion of the hydro- and turbo-generators, radio equipment, looms, and seeding machines. Here machine building and metal processing are highly developed. A large proportion in the volume of industrial production is taken up by the construction industry: the prefabricated reinforced concrete industry, large-panel residential construction, and the production of cement and other construction materials.

A substantial portion of the oblast's industrial production is manufactured in response to orders from Siberian enterprises. Issuing this output serves the purpose of speeding the economic development of Siberia and the economic opening up of its new regions. And this assists in the successful completion of important tasks of the five-year plan--satisfying the country's demand for Siberian oil, gas, coal, and metals.

The oblast's output is exported to 79 countries of the world. This testifies to the high level of its technology.

Novosibirsk Oblast produces a significant amount of agricultural output, taking an active part in forming food reserves for Siberia and the whole country.

Novosibirsk Oblast's most important characteristics is its highly developed scientific potential. Some of the country's largest research complexes of the Siberian branches of the USSR Academy of Sciences, VASKhNIL, and the USSR Academy of Medical Sciences have been set up here.

"If we really want to advance the cause of introducing new technology and new methods of labor," said General Secretary of the CPSU Central Committee Comrade

Yu. V. Andropov at the last plenum of the party's Central Committee, "it is necessary for the economic organs, the academies of science, the State Committee on Science and Technology, and the ministries not simply to propagandize them, but to detect and eliminate the specific difficulties which impede scientific-technical progress. The combination of science and production should be helped along by methods of planning and a system of material incentives."

These remarks of CPSU Central Committee General Secretary Comrade Yu. V. Andropov apply equally well to the system of work in oblast, rayon, and plant links. Some experience in this direction has been accumulated in Novosibirsk Oblast.

Collectives of academic institutes have for many years been exerting beneficial influence on very different aspects of oblast life, especially on increasing the scientific-technical level of production. The scientific collectives' introduction of highly effective applications to major enterprises, and from there to whole sectors of industry, has proved its worth.

Sibsel'mash, for example, introduced the Sigma automated control system worked out at the Siberian Department of the USSR Academy of Sciences, which was developed for use in machine- and instrument-building plants. It was submitted for adoption to 300 industrial enterprises.

The cooperation between enterprises and academic collectives becomes especially successful when it is carried out under a unified, integrated plan with sectorial scientific-research institutes. A vivid example of this can be seen in the collaboration between 15 collectives of institutes of the Siberian Department of the USSR Academy of Sciences and the Novosibirsk Aviation Plant imeni Chkalov, which is participated in by 10 sectorial and departmental scientific-research institutes. This makes it possible to systematically realize an adoption plan consisting of 80 themes which encompass the handling of major problems of modern production.

Considerable experience has been accumulated in collaboration between academic institutions, sector institutes, and design bureaus working under the scientific supervision of the Siberian Department of the USSR Academy of Sciences located near Akademgorodok--the so-called "adoption belt." The economic effect of applying the work done in this "belt" has come to a quarter of a million rubles in the last 10 years.

Today 20 long-term programs of collaboration between academic institutes, ministries, and departments are being realized. This work produces 10 rubles for each ruble spent.

Much has been done in the oblast to concentrate science's attention on production, but it would be wrong to overestimate the successes achieved in this direction. Substantial reserves can be mobilized by strengthening the role of collectives of sectorial scientific-research institutes, project-planning and design organizations, and VUZes in the economy of the oblast and Siberia as a whole.

In Novosibirsk and the oblast more than 100 such scientific-research institutes, design bureaus, and their departments and branches are operating. They employ tens of thousands of scientific associates, engineers, and technicians. These collectives are assigned important tasks in improving engineering and technology in machine building, the production of plastics, non-ferrous metals, radio engineering, products of light industry, and food products. Sectorial institutes and design bureaus have been concentrating on designing unique electric furnaces, generators and motors, machine tools, and production lines intended for a variety of uses. They are working out new methods of prospecting for minerals, extracting them, concentrating them, and refining them.

A number of these sectorial scientific-research institutes and design bureaus have become full-fledged collectives, whose findings are being used not only in Siberia, in our country, but abroad as well. One such collective is the Central Scientific-Research Institute of Tin, Antimony, and Mercury. This institute is responsible for the technical level of the complex system of production processes in extracting, concentrating, and metallurgically processing tin--an extremely important component of many sectors of modern industry. From there the new, highly-effective technology goes to out country's enterprises and is being purchased by foreign firms. In large part, this is due to the fact that the collective of this department of the Central Scientific-Research Institute actively developed its ties with academic scientific institutions. Jointly with the Institute of Hydro-dynamics of the Siberian Department of the USSR Academy of Sciences, centrifuges for refining liquid metal were developed and adopted. With the Institute of Mining they are conducting work on the use of highly efficient oscillating conveyors in mines. Together with the Institute of Chemical Kinetics and Combustion, they found and are using new, effective flotation reagents for concentrating ores.

Researchers and development engineers of the Central Scientific-Research Institute of Tin see clearly the important tasks that our time sets before them. They are concerned about how to increase the yield of valuable components from ores and how to increase the output of the basic product without large capital investments. And they are succeeding.

However, far from all scientific-research institutes and design bureaus are up to such a high level of standards. It is not hard to find explanations for this: in certain collectives highly-qualified scientific associates are lacking, the experimental-production base is poorly developed, work plans are being put together from shallow, short-sighted themes, and there are even collectives which have failed to create an environment of creative curiosity.

The point, of course, is not only to find the reasons for lagging, but, most of all, to eliminate them. That is why during the past few years the Novosibirsk obkom, gorkoms, and raykoms have discussed at their plenums questions of creating the conditions for strengthening the bond between science and production, and the widespread economic adoption of the achievements of science.

In accordance with the decree of one of these plenums, an aid council was created, under the Novosibirsk Obkom, to promote scientific-technical and

social-economic development, with the aim of coordinating the efforts of manufacturers and scientific colllectives. More than 700 scientists, specialists, and innovators of production are working in the sections of the council. The council is working out 24 regional goal-oriented programs, 10 of which have already been realized. One such plan--making use of the ashes from the Novosibirsk Thermoelectric Plant--was suggested by an article in IZVESTIYA; the Novosibirsk gorkom and gorispolkom are continuously checking on its progress.

Making up the council are 10 sections corresponding to the basic sectors and groups of related sectors of production in the oblast.

One of these sections is the machine building and metal processing section. The main task of this section is to strengthen the ties between enterprises and scientific-research institutes at the sector and intersectorial level. Some of the most promising themes for enterprises are under its control. Among them are the use of powder metallurgy, the adoption of advanced instruments, the reinforcement of components with specialized coatings, and the adoption of robots and manipulators in production. For the 11th five-year period it is planned to install more than 500 robots and to develop automated shops, for example, in the Berd Radio Plant and the Elektroagregat Association.

The power engineering section has developed an integrated regional program for improving and developing the oblast's power system. This program combines major innovative research works--such as studying the operation conditions and seeking the most effective engineering designs for the coal slurry pipeline [gidrougleprovod] from Kuzbass to Novosibirsk Thermoelectric Plant No 5--with topical problems such as rationalizing energy consumption.

The aid councils, under the chairmanship of raykom and gorkom secretaries, and leading scientists, are operating in cities and rayons of the oblast. They are helping to find ways to economize on raw materials and to raise the number of articles produced.

In the matter of adopting the results of research in production, the best results can be reached only when constant, unremitting attention is paid to it. That is why, in summing up the results of competition between collectives of enterprises, cities, and rayons, some of the central criteria of judging are questions of adoption of achievements of science and technology, and the use of integrated systems to control the quality of production. Collectives of enterprises of the oblast and Novosibirsk attach great importance to taking part in realizing the program for integrated assimilation of Siberia's natural resources.

Thus the interaction between collectives of industry, construction, transport, and science has gradually formed into a clear-cut territorial system, which has received the title "Science--Production--Efficiency." Its essence is behind the exposition "Raising Efficiency and Work Quality Based on Faster Adoption of Scientific Achievements in Novosibirsk Oblast," which is displayed in the "Standards of the USSR" pavilion at the Exhibition of the Achievements of the National Economy.

In order for this system to operate consistently and without hitches, there is still much work to accomplish. The most advanced, promising scientific developments frequently take place at the juncture between different sectors of production. As a result, none of the sectors is willing to adopt them. It remains to formulate and set in motion a mechanism for directing the adoption of such developments.

Life suggests the necessity of organizing the material-technical supply of the scientific-research institutes and design bureaus in a new, more efficient way. The birth and realization of a brilliant technological idea often do not fit into the timeframe provided for requisitions on materials and parts which are acceptable for ordinary production.

Local party organs and aid councils will have to more carefully monitor the work of scientific-research institutes and design bureaus handling problems of storage, transport, and processing of foodstuffs. It is necessary to utilize all the capacities of scientific and design organizations, regardless of which sector they belong to, for all-out assistance in raising the scientific-technical level of the agriculture-industrial complex. Similar goals are being pursued by an interdepartmental coordinating council for adopting the achievements of science and advanced experience in agriculture. It is operating under the Novosibirsk Oblispolkom.

The Novosibirsk Obkom and oblast party organizations see the sure path to achieving their goals in an integrated solution to problems of raising the scientific-technical level of production and the social development of the city and countryside.

The decisions of the November Plenum of the CPSU Central Committee and the session of the USSR Supreme Soviet provide clear-cut guidelines to the further raising of the national economy's scientific-technical level.

12255
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LENIN, STATE PRIZES PROMOTE ADOPTION OF SCIENTIFIC ADVANCES

Moscow IZVESTIYA in Russian 7 Nov 82 p 3

[Article by V. Yelyutin, first deputy chairman of the Committee on the Lenin Prize and USSR State Prize in the Field of Science and Technology, under the USSR Council of Ministries: "On the Way to Integrating Science and Production"]

[Text] Comrade L. I. Brezhnev has called the integration of science and production a real need of the modern era. The scientific collectives of the country are making an ever more weighty contribution to solving the strategic task proposed by the Communist Party--to advance all sectors of the national economy onto the frontiers of science and technology. This is attested by the results of a competition of works nominated for the USSR State Prize in the field of science and technology for 1982, which were announced on the eve of two great holidays of the Soviet people--the 65th anniversary of Great October and the 60th anniversary of the formation of the USSR.

The prizes have been awarded to cycles of research on solid-state quantum theory, celestial mechanics, plasma physics, and also non-linear optical media.

Among the State Prize winners are the authors of computational methods for calculating dynamic poles in geophysics. New mathematical methods for calculating the strength of materials and members of construction under extreme use conditions, which were worked out by the research collective of the Kiev Polytechnical Institute in collaboration with scientists of the Ukrainian Academy of Sciences Institute for Problems of Strength and with specialists of industry, have already been introduced in sectors of the national economy such as atomic power, aircraft and shipbuilding, petrochemical machine-building, and a number of others.

In the field of chemistry, works were singled out concerning the study of reactions between molecular nitrogen and transition metal compounds, laying the foundations for essentially new chemical methods for fixing atmospheric nitrogen. The creators of highly effective techniques for producing shock-resistant polystyrenes also became laureates.

Over 23 million tons of coal per year--such is the capacity of the explored reserves of the Neryungrinskiy and Vostochnyy sections of the Chul'makanskiy high-coking coal field, which were prepared and put into production by the

Yakutskgeologiya Geological Production Association. Implementation of the results of this work, which has been awarded the State Prize, will make it possible in the future to solve problems of developing the fuel and raw materials base of the eastern regions of the country. The creation and practical economic adoption of progressive technology in prospecting, exploration, and development of oil and gas fields, assigning the priority of Soviet geophysics to the field of acoustic and neutron methods of logging oil and gas wells, has in Tataria alone made it possible to discover additional new oil deposits.

A synthesis of the theoretical achievements of modern biology, the newest methods of experimental medicine, and the technical capabilities of instrument-building--such is the foundation of new precision instruments for microsurgery and microphysiology of the living cell. As a result of other prize-winning work in biology, the primary structure of the most important protein being studied in world science--RNA-polymerase--has been established, and the foundations have been laid for a new, basic direction in modern biology and genetics.

A State Prize has been awarded to an authors' collective for a multi-volume monograph on the history of the USSR's socialist economy, which generalizes the enormous experience our country has accumulated in building the economy. The fundamental "Russkaya grammatika" [Russian Grammar] has substantially enriched linguistics in this country and the world. Basic research into the problems of spiritual life in Russia during the Middle Ages has been summarized in "Ocherki russkoy kul'tury XIII-XVII vekov" [Studies of Russian Culture of the 13th-17th Centuries].

Already new types of chemical and biological preparations for preventing and fighting infectious diseases of agricultural animals have been put to work for the Food Program of the USSR. Their use in livestock farming adds more than 50 million rubles per year to the economy. Other work in the field of agriculture, resulting in the development of new breeds of astrakhan sheep, also yields an appreciable economic effect--13.5 million rubles per year.

Among the achievements of medical science which were awarded the State Prize is a cycle of research on the geographical pathology and epidemiology of cardio-vascular disorders and malignant tumors. The high level of science and the use of achievements from very different branches of modern knowledge combined with clinical purposefulness also characterize works on the creation of new microsurgical operations, effective methods of diagnosing and treating (with reconstructive surgery) congenital disorders of the kidney and urinary tracts, and also in the field of the experimental study of problems of the pathogenesis of tubercular disorders.

More than 100 author's certificates and 50 patents for inventions bear out the superiority of designs of mass-application manual vibration-safe construction machines (14 million such machines have been manufactured). Their use has made it possible to obtain an economic effect greater than 700 million rubles. The introduction of progressive technological processes and the

automation of equipment for flow-line production of rolled rail wheels exceeds by 20 to 40 percent the best indicators of labor productivity in this sector of transport machine-building.

Prizes were awarded to the creators of the first ball-rolling mills in the world, which have raised modern technology of hot and cold rolling to a new level. The mastery of series production of new air-fractionating equipment for ferrous metallurgy became yet another outstanding achievement of Soviet machine-builders. In the power supply of the aluminum industry, ever broader use is being made of new, highly effective systems of powerful, semi-conductive, rectifying units.

At the level of the latest microelectronics achievements, works has been carried out on the creation of a family of Elektronika-100 mini- and micro-computers, which combine low cost and improved technical characteristics. About 50 of the inventions have been realized in a complex of radioelectronic instruments with built-in computers for automated diagnosis of cardio-vascular disorders. The problem of multi-program television broadcasting from Moscow has been successfully solved as a result of the development and industrial implementation of a new generation of standard color television equipment.

Advanced well-drilling equipment and technology has made it possible to put an enormous natural gas production and refining complex based on the unique Shatlyk Field into commission twice as fast. The complex of engineering solutions to combat landslide phenomena in open-cut mining has no analogs in this country or abroad.

Scientists and specialists of the metallurgy industry were represented among the State Prize winners by the creators of an essentially new technique for cold-rolling steel, which found broad application in the production of high-quality offset plate for the polygraph industry. The metallurgists also created a complex of new technological developments and equipment for autogenous oxygen-torch smelting. A considerable contribution to the theory of metallurgical processes has been made by a cycle of research into the construction, properties and interaction of metallurgical melts, which was combined in the monographs of 17 collectives.

As early as the 1930's, work on the problem of the durability of concrete was begun, under the leadership of V. S. Shestoperov. The scientists presented theoretical substantiation and experimental evidence of the possibility of obtaining concretes with an exceptionally high number of frost-resistant cycles, and the practical introduction of the results of the work on preparing plasticized concrete alone made it possible to reduce the consumption of cement by 10 percent.

Over 620 million rubles were contributed to the national economy by high-output technological processes of producing paper and cardboard using significant volumes of deciduous wood instead of the scarce coniferous.

State Prize were awarded to four textbooks for VUZes and professional-technical schools: "Osnovy massoperedachi" [Essentials of Mass Transfer] by V. V. Kafarov, "Aerodinamika" [Aerodynamics] by N. F. Krasnov, "Mikrobiologiya" [Microbiology] by Ye. N. Mishustin and V. T. Yemtsov, and "Remont elektrooborudovaniya promyshlennykh predpriyatiy" [Repairing Electrical Equipment of Industrial Enterprises] by V. B. Atabekov.

Works in the field of science and technology which were awarded USSR State Prizes in 1982 testify convincingly to the fact that the close concord and consistent integration of science and production have today become an inalienable feature of the endeavors of the country's scientific collectives. Guided by the directives of the Communist Party, Soviet scientists are applying all their knowledge and strength to further intensifying the scientific quest and more quickly introducing forward-looking scientific and technical ideas into economic practice.

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COLLABORATION BETWEEN USSR, GDR ACADEMIES DISCUSSED

Moscow IZVESTIYA in Russian 28 Oct 82 p 5

[Article by Werner Scheler, president of the GDR Academy of Sciences: "Coordination in Science. Steps Toward Integration"]

[Text] The 33 years of the GDR's existence are 33 years in the history of our science which have been marked by great successes. On 7 October 1949--the day the GDR was formed--the German Academy of Sciences in Berlin became the academy of sciences of the first German state of workers and peasants. Now having more than 50 institutes and other scientific-research establishments in which over 20,000 people work, the GDR Academy of Sciences unites about 10 percent of the entire scientific-research potential of the republic. As the center of theoretical scientific research, it is in close connection with scientific quests in industry and agriculture, in medicine and the public education, and in all spheres of the life of society.

Cooperation with the USSR Academy of Sciences has always had particular importance for the continuing development of academic science in the GDR. The traditional good and mutually beneficial relations (severed during the time of fascism) between the former Russian Academy of Sciences and the former Prussian Academy of Sciences, linked with the names Leibniz and Euler, were infused with new, qualitative aspects after the Second World War. The basis of our relations today is the likeness of our world-view and the social-economic structure of our states, also cooperation and collaboration in the political, economic, scientific, and cultural spheres.

Twenty-five years ago, the first official agreement between our academies was entered into. Ties with the mighty scientific potential of the Soviet Union became the indispensible condition for planning and organizing our scientific-research work.

The responsibility and tasks confronting the GDR Academy of Sciences are determined by its position as a leading scientific center, as well as by the importance attached to science in the further development of socialist society in the GDR. The 10th Congress of the Socialist Unity Party of Germany has set great tasks in the field of basic research, and especially those areas which are particularly important for implementing the GDR's economic strategy. For example, to further accelerate the intensification, rationalization, and

automatization of production, making broad use of microelectronics, electronic control systems, automatic equipment, and modern computer technology, also to develop the energy base and make rational use of energy resources, especially hydrogenous coal, and also nuclear energy.

Cooperation in the area of science and technology makes scientific-technical progress, the great moving force of increasing the productivity of labor, into a factor which has cardinal significance for strengthening the political and economic power of the socialist commonwealth as a whole and each state individually. This accounts for the multitude of different types of cooperation that appeared in the 1970's between the USSR Academy of Sciences and the GDR Acadeny of Sciences. Modern forms of collaboration are characterized by the fact that the main directions of scientific-technical progress are being jointly worked out on the basis of long-range programs, efforts are being concentrated on the basic tasks of primary significance for science and the national economy, and a conversion is being made to concrete thematic work plans and systematic implementation of them.

The 1981-1985 plan for scientific collaboration between the two academies includes over 200 topics. They relate to work in such fields as nuclear energy, solid-state physics and materials science, plasma physics, microelectronics, quantum electronics, laser spectroscopy, scientific instrument construction, use of light conductors, solid-state mechanics, hydromechanics, methematics, cybernetics, inorganic, organic, and physical chemistry, molecular genetics, protein research, microbiology, genetic technology, and so on.

Work is being done jointly in the field of Marxist-Leninist philosophy, the elaboration of economic problems in scientific-technical progress, the history of peoples of the socialist community, problems of the theory of state and law, problems of economic science, literary science, and philology.

Our cooperative efforts with the USSR Academy of Medical Sciences are also multi-faceted, especially in the field of cardio-vascular function, cancer research, infectious diseases, virusology and immunity, brain function, genetics and medical microbiology, and also in pharmacy and hormone function. Thus, for example, the results of collaboration between the GDR Academy of Sciences Central Institute of Heart and Circulation Research and the USSR Academy of Sciences Oncological Scientific Center and Institute of Experimental Pathology and Therapy led in both countries to improved diagnosis, therapy, and prevention of cardio-vascular and cancer disorders.

Currently there is not only important task in the GDR Academy of Sciences scientific-research work plan that is not also included in the plan for collaboration with our Soviet colleagues. This cooperative effort has invaluable significance for our academy. It is highly important for us that the USSR is conducting basic work in all fields of theoretical research, including such fields as we in the GDR do not have the capability to study. Therefore, one could say that the GDR's concentration of theoretical research on individual basic tasks which have great significance for the national economy and the public is made possible by the division of labor with the

Soviet Union. And such important areas of research as, for example, nuclear energy or space exploration could hardly have developed in the GDR without the support of the Soviet Union.

The 26th CPSU Congress and the 10th Congress of the Socialist Unity Party of Germany set our academies new, still more crucial tasks, including systematic intensification and constant qualitative development of collaboration and cooperation in scientific research. In coming years, as was noted at the friendly meeting between comrade L. I. Brezhnev and E. Honecker in the Crimea, 11 August, along with other interested socialist countries, the USSR and the GDR intend to concentrate still greater efforts on developing science and technology and adopting modern technology in industrial and agricultural production. Scientists of the GDR are filled with resolve to make their worthy contribution to the solving of pressing problems of the national economy.

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ROLE OF SCIENTIFIC-TECHNICAL PROGRESS IN IMPROVING QUALITY OF PRODUCT

Moscow EKONOMICHESKAYA GAZETA in Russian No 3, Jan 83 pp 11-14

/Article: "Scientific-Technical Progress and Raising Product Quality"/

/Text/ This year in schools of communist labor and a number of others they are offering a course entitled "Scientific-technical progress and the economy". The standard program of this course was published in edition number 35 of this newspaper in 1982. The texts on the first two topics were published in No 43 and No 48 for 1982. This article provides information on the third topic "scientific-technical progress and raising product quality".

Improving the quality, reliability and service life of products using the achievements of science and technology is an important factor in the intensification of production. By product quality we are to understand the aggregate of the product properties which result in the ability to meet specific requirements in accordance with the purpose of the product.

Every day practice convinces us that better always means more. The more completely a certain manufactured article satisfies production and consumption the less requirement there is for it. The opportunity to conserve labor and material reserves and to use them for other purposes also presents itself. This is the essence of the economic concept of raising product quality.

The achievement of high final results and manufacturing a product that equals the best world and domestic models can be ensured primarily through the extensive adoption of progressive equipment and technology, and the scientific organization of labor and production.

The 26th CPSU Congress has set the task of significantly raising product quality for all goods that are manufactured, to expand and update the assortment of manufactured articles in accordance with the modern demands for the development of the national economy and scientific-technical progress. The solution of this task is most closely linked with raising the technical, technological and organizational level of

production, with improving the system of planning and economic incentive, and with the growth of skills and mastery among the workers. In speaking of this it is necessary to emphasize that each manufactured article is the result of the labor of dozens if not hundreds of collectives. For this reason the achievement of its high quality requires coordinated labor, high degree of responsibility and conscientiousness on the part of each specialist and worker at all stages of technological progress.

Quality - the Concern of Each of Us

In his speech at the November (1982) Plenum of the CPSU Central Committee General Secretary of the CPSU Central Committee Yu. V. Andropov pointed out the need to create such economic and organizational conditions, which would stimulate quality and productive labor, initiative and enterprise. And the other way around: poor work, the lack of enterprise and irresponsibility must in the most direct and inevitable manner be reflected in the system of bonuses, duty assignment and the moral authority of the workers.

In many labor collectives a situation of high exactingness upon the quality of the product being manufactured has been created. The Magnitogorsk metallurgical combine, the Perm' telephone plant, the Leningrad transportation junction, the construction brigade of N. Zlobin - these are but a few examples of leading collectives at which the criteria of high work quality are at the center of attention.

A conscientious attitude to work, the innovative search for ways to improve quality of labor and product yield enormous national economic savings. This can be demonstrated in the example of the tire manufacturers.

At present on the average for a month they manufacture five million automobile tires. If these tires lasted as long as they did about ten years ago, it would be necessary to produce about one million more each month. The improved quality tires, for example, which are manufactured out of a nylon cord rather than a viscose cord, have made it possible to conserve some 20 to 30 percent of the capital investments, which it would be necessary to spend in order to expand the tire factories and to build new enterprises for the production of synthetic rubber, carbon black and chemical fibers.

The customers who buy the improved tires also receive a considerable advantage. In particular one must consider that nearly one fourth of the costs in operating an automobile are for tires. This means that the greater the quality of the "shoes", the less need there is for them and there is a reduction in the operating costs. And not just for the item "tires". Specialists have estimated that the use of nylon tires reduces fuel consumption by 10 to 20 percent and raises the carrying capacity of automobiles by some 20 to 30 percent, which is the same as increasing their number. In the 11th Five-Year Plan the tire manufacturers have been given the task of further raising the service life of tires.

New Technology at the Work Place

What the basic trends of the influence of scientific-technical progress upon product quality?

First of all the creation and adoption of new, improved equipment. The most remarkable here is the switch from the manufacture and use of individual machines to the creation and adoption of their systems. What is more such systems, which encompass the entire production process, including transport, loading and unloading and control operations.

In machine building the chief technical means for raising product quality is electronics, which is taking over the control of the processing equipment, and primarily that which does not require highly-skilled manual labor or which functions in mediums that are dangerous for men. The first word in this goes to the automatic manipulators - the industrial robots, and also to the specialized equipment of a high precision and cleanliness of processing.

One can refer to the experience of the Petrodvorets watch plant, where the emphasis in the battle for quality has been placed upon the adoption of automated systems. Mini-robots, which have been built into the automated production lines, have completely taken over the assembly of watches. They have freed the watch assemblers from a monotonous and boring manual labor and have increased the precision of assembling the mechanisms. And while during the years of the 9th Five-Year Plan this plant produced largely second - class watches, now it turns out only watches of the first and highest class of accuracy. At present one in three of the "Raketa" watches is marked with the state Mark of quality.

The adoption into production of essentially new equipment using chemical and electrophysical processing methods, atomic and quantum technology, lasers and ultrasound, the magnetic field and plasma is of enormous importance for improving the technical-economic characteristics of product. Such equipment is controlled by electronics. An example of this is the electrochemical machine tools with an adapted-program control. An electric spark performs the role of cutting in these machine tools. The spark can process parts of any configuration without the subsequent finishing operations. On such machine tools, and they are manufactured at the Troitsk machine tool plant in Chelyabinskaya Oblast, the form for stamping the protector for automobile tires is manufactured 30 times more rapidly than on milling machine tools.

Improving technological processes also has a substantial influece upon product quality. The adoption of progressive methods for the comprehensive processing of raw materials, the use of waste-free technologies, which guarantee both the intensification of the production process and the protection of the environment are of primary concern here.

The developments of scientists provided the production workers with such progressive types of technologies, which realistically make it possible to increase the service life of machinery and equipment some 2 to 5 times. For example, the volumetric-surface tempering of ZIL-130 semiaxles has almost eliminated instances of their breaking over the entire service life of the motor vehicle. And the new technology for hardening drilling equipment has extended the service life of heavy drilling pipes some 5-fold.

Another achievement of scientific-technical progress is pulse laser welding. Anyone who is familiar with the production of electrovacuum and semiconductor instruments and integrated circuits knows that their quality is largely determined by the precision of the welding. And now this problem has been solved: pulse laser units provide a high degree of precision in welding, which means that the quality of the instruments is higher.

An important trend is the adoption into production of structural materials possessing high physical, chemical and mechanical properties - super fire resistant, super conducting, and super clean. As an example we shall take polypropylene. It is light and durable, an excellent nonconductor. It can be used to make parts for ships and aircraft, parts for automobiles and machine tools and for home appliances. Pipes and film, superdurable and light cables, "permanent" rugs, tricot and footwear - this is only a partial list of the uses of this new material, which is to be produced by the Tomsk petrochemical combine.

Of course, metal has been and remains the primary structural material. But it has a terrible enemy - corrosion. While acting upon unprotected metal articles, it "consumes" its quality. However, ways have been found to preserve the durability properties of metal and to raise its resistance to corrosion. This is the metal-base laminates. Soviet scientists have created a technological process of hot milling composition materials. Manufactured articles made of this material exceed the traditional ones by some 15 to 20 times in durability; their reliability is increased by 8 to 10 times.

Still the future rests with reinforced plastics. They are light and very durable and possess excellent anticorrosion properties. These qualitative characteristics open the way for them into nearly all sectors of the national economy. For the time being they are expensive and difficult to obtain. However plastics are increasingly being used in technology and in everyday living. For example, in this five year plan in the automotive industry it is planned to undertake an extensive program for the adoption of plastic parts. Polymers will be used in the manufacture of hoods, fenders and gasoline tanks for trucks and passenger cars.

Each of these trends in scientific-technical progress provides for the improvement of the qualitative characteristics of product, and its use creates favorable conditions for speeding up the development of science and technology.

The state plan for the economic and social development of the USSR in 1983 calls for important steps to be taken to raise the technical level of production and on this basis to improve product quality. More than 1,000 assignments for assimilating new types of articles and more than 300 assignments for adopting into production new technologies, means of mechanization and automation have been included in the plan. Altogether for the 1983 plan it is planned to assimilate nearly 4,000 new models of machinery, equipment, instruments and materials.

The State System of Standards

The standard, a set of rules, norms, a system of technical-economic indicators and also requirements which apply to a specific article, is an important means for raising the technical level of production and product quality. Standards regulate the technical level of product, its reliability, service life, economic, esthetic and ergonomic characteristics.

In addition to standards, technical specifications (TU) are used. They define a set of requirements which apply to the manufacture, quality control, packaging and transport of a specific kind of product.

The state system of standardization, which has been created in the Soviet Union, allows the enterprises and ministries through the development of state and sectoral standards, enterprise standards or technical specifications, to establish high, progressive requirements for quality and to to monitor their compliance at all stages of the development, production and operation.

More than 23,000 state standards, some 45,600 sectoral standards, and more than 7,000 republic-level standards and 137,000 technical specifications are in effect in the national economy. In accordance with the established system, state standards are reviewed every five years.

Standards must advance not only behind the pace of technical and economic development, but must keep ahead of them and be the purveyors of all that is new, and influence the efficiency of production. While at the end of the 9th Five-Year Plan the average "age" of standards for a specific product was 6 to 7 years, by the start of the 11th Five-Year Plan this figure had fallen to 4.2 years.

At present the problem of switching to a system of standards that are ahead of development is being resolved. They are being created at the same time with the scientific-research and experimental-design developments of new product. The basis for these standards are the scientific technical forecasts of those promising requirements, which will apply to all types of product. This, in turn, will oblige the enterprises to put into production those manufactured articles which meet the predicted requirements of the national economy.

For example, in the chemical machine building sector a key trend in the raising of product quality is to reduce the consumption of materials. At enterprises of the sector they are developing and adopting the latest technological processes. The free forging is being replaced by drop forging; and special progressive methods for casting and obtaining finished parts from metal powders are being used. The use of economical types of rolled metal and metal substitutes is being expanded. And all of these technical innovations, and several of them will be in use in a few years, are reflected in standards, which already today are preparing the plant production specialists and instructors for the development of new models of product.

On the basis of state and sectoral standards plant standards are developed. Their main purpose is to organize the manufacture of a product at an enterprise so that the efforts of all participants can be directed toward a united end and to ensure that the concern for the technical level and product quality is at the center of attention of each worker. The requirements of plant standards are the law for each worker. At those enterprises, which have adopted comprehensive quality control systems, these standards are broken down into seven groups:

-basic (they describe the system itself, the objects of control, the goals, criteria, structure, list of GOST's and OST's for controlling product quality);

-general (how to adopt GOST's and OST's, to carry out "quality days", to organize the work of the certification commissions, etc.);

-functional (what and how to do what must be done in process of controlling product quality);

-organizational (who and what must be done in process of controlling quality of product);

-production-execution (who influences quality);

-production-technological (what influences quality);

-parametric (product characteristics).

Enterprise standards (STP) serve as the organizational-methodological base and legal basis for the comprehensive quality control system. They create the required continuity of the technical policy and of improving the organization of production; most important, they regulate quality control at all stages in the creation of a manufactured article. The following tasks are handled using STP.

First.- predicting product quality. It must be accomplished at the designing stage so that the tendencies in the development of a given type of production can be studied, as can the achieved level of equipment and technology, the prospects for their development and consumer demand.

Second - production planning. Enterprise standards regulate the system for developing draft plans to improve quality and establish a system of indicators for the work of the enterprises and of their subelements, a system of norms and a system for certifying the manufactured articles. Through the use of standards the enterprises regulate the planning of the technical level of manufactured articles as well.

Third - ensuring material-technical supply. For example, there are standards for the input control of materials and parts at warehouses, and also for packaging, storage, product transport and the marking of technological packaging. These and other standards establish a system for providing the subelements of the enterprises and associations with needed materials, semimanufactures, assembly units, tools and rigging in accordance with standard-technical requirements.

Fourth - technological provision of high quality product and labor. STP takes in a rather large set of problems having to do with control, the engineering preparation of the production facility, its technology, monitoring of the precision of the product being manufactured. With their help the progress of technological processes is monitored. The transfer of technological documentation into production is regulated; and the system for making revisions to the documentation is closely watched.

Fifth - providing unity and reliability in measurements, metrological control and tests of the quality of raw materials, materials, assembly units and parts, assembled units and finished product.

One of the key tasks being solved by STP is the organization of material and moral incentives, the evaluation of the quality of the labor of the workers and labor collectives. At many enterprises STP closely coordinates the system of material incentives with the moral incentives; this in turn has an effect upon the awarding of bonuses. In particular, a worker who satisfactorily completes a product the first time through for a period of one year and a worker who has won the right to do his own quality control receive "outstanding quality worker" medals. The medal and a certificate are presented at a solemn ceremony. A pennant is hung at the work place of those who have excelled. They also receive a one-time bonus.

The Impact of Quality

The creators, manufacturers and consumers have a vested interest in and are active participants in raising the technical level and quality of a product.

At the stage of product manufacture an enterprise strives to make certain that the product provides the customer with a savings and also that it is economical in operation. The depends largely upon the quality of the design workup, the organization of production, reductions of losses from waste, alterations, and claims for replacement. The

selling of an improved quality product provides an enterprise with increased income. Product quality in new conditions has an influence upon the size of the material incentive fund, the social-cultural measures fund, the housing contruction fund, and the fund for the development of the production facility. It has been established that up to 70 percent of the additional profit from the sales of a new high-efficient product and product bearing the State mark of quality is added to the funds for the economic motivation.

For customers the effect of raising product quality is reflected in the fact that as the result of increasing the reliability and service life of machinery and mechanisms and other consumer goods, the use of these products is extended and repair expenses are reduced. Increasing the quality of products that are used in production and in the home significantly improves working and living conditions for the Soviet people.

On the scale of the national economy improving quality, for example, of the means of production promotes the speeding up of scientific-technical progress, the growth in public labor productivity. This also expands opportunities for export.

Key: 1) Effect of raising product quality; 2) for the manufacturers of product; 3) better use of resources, reducing losses from waste, alterations and claims for replacement; 4) growth in income from the sales of high quality product;

(Key: continued)

5) increasing the funds for economic stimulation and bonuses for high quality product; 6) moral forms for motivating competition leaders for high quality; 7) for the product customers; 8) meeting demand with a smaller number of high quality manufactured articles; 9) expanding and updating the assortment of manufactured articles available to buyers; 10) reducing costs in the operation and utilization; 11) creating more favorable conditions for labor, living and relaxation of the people; 12) for the national economy; 13) more fully meeting the growing needs of the population; 14) speeding up technical progress in the national economy; 15) growth in national economic savings per unit of outlays; 16) expanding export opportunities.

Evaluating the Technical Level of Production and Product Quality

Categories of quality

Industrial product that is manufactured by enterprises depending upon technical level and quality is broken down into three categories of quality: highest, first and second.

The highest category (Mark of quality) of quality includes product which according to its indicators of technical level and quality exceeds the best domestic and foreign achievements or equals them, while determining technical progress in the national economy.

The first category of quality includes product that fully satisfies the requirements of customers and which can be improved to a level that meets the conditions for product of the highest category of quality.

The second category of quality includes product that is outdated. Such product needs to be updated or taken out of production and replaced by a new product.

The certification of product into quality categories is done by special commissions, which must contain representatives from the product consumers.

In June 1980 a new regulation on product certification was approved. This regulation defines the manufactured articles that are subject to certification: a product that is regularly manufactured by enterprises, a list of which is approved by the ministry. Certain kinds of product are not subject to certification, in particular: product that has not been processed (ores, crude oil, etc.); product that is used solely for defense; spare parts for manufactured articles that are no longer in production; food products, medical products, perfumes and cosmetics, and books.

The division of all product into three categories of quality makes it possible to have a general concept of the technical level and quality of product and to plan work for improving product.

Qualitative characteristics of product depend largely upon the technical level of production. Data on the number of workers engaged in manual labor and those using mechanized means to do their job is crucial among the generalizing indicators used to estimate the technical level of production. Plans incorporate assignments for decreasing the number of personnel engaged in manual labor and for transferring workers from manual labor to mechanized and automated labor.

As already noted, the quality of manufactured articles depends largely upon what technology is to be used for manufacturing the product. It is for good reason that it is believed that the reason for nearly one half of equipment failures can be found in the shortcomings of the technology used to manufacture them. Experience of leading enterprises demonstrates that even in the original manufactured article in order to maintain its high quality there must be no less than 70 to 85 percent normalized and standardized parts and assemblies.

The technical level of production can also be evaluated according to the average age of the equipment and measuring instruments, and the extent of specialization and concentration.

The Indicators of Quality

To evaluate the quality of a product and its technical-operating properties a system of indicators is used. For example, the quality of a diesel engine is measured by more than 50 criteria; an ordinarly watch is measured by more than 60 criteria. But each manufactured article has its own primary generalizing indicator, which characterizes its most important property. For example, ballbearings - service life, tires - mileage, and machine tools - precision in machining a part. This indicator is used to judge a change in quality.

Let us assume that the resource of a new engine model is equal to 15,000 motor hours, while the resource of the older version was 10,000 motor hours. How has the quality level changed? 15,000 divided by 10,000 equals 1.5. This means that the quality of the engine, as estimated according to the most important indicator, has risien 1.5-fold. The same engine can be evaluated according to the amount of materials used in it or the rate of the expenditure of fuel and lubricants per 100 kilometers travel of the motor vehicle. Let us examine several quality criteria.

First, the content of substances that are useful to man and production in each type of product. For example, metal in ore, precious components in alloys, and fat in milk.

Second, the reliability of a manufactured article in operation. These properties are estimated according to the coefficient of reliability.

For example let us take a look at a milling machine that has operated some 3,600 hours over a one year period and during this time was idle some 400 hours due to breakdowns and repairs. The coefficient of reliability will be .9, which was determined by dividing 3,600 + 400 by 3,600. This coefficient is also used when evaluating the reliability of a part or assembly. If they differ, the total evaluation of the reliability of a manufactured article is defined as the sum of the coefficient of the reliability of the parts comprising it.

Third, the service life, which characterizes the ability of the article to retain its useful properties for a specific period of time, after which it is irrational or impossible to use it.

Fourth, the technological aspect of the manufacture and repair of a manufactured article. The greater the reliability of each of its parts and assemblies, the fewer the outlays of the total labor for its repair.

Fifth, there are the economic and aesthetic indicators. These include a set of the qualitative characteristics of a manufactured article, which affect the hygienic and psychological and physiological working conditions and day to day living of the person who uses a particular manufactured article.

Sixth, there are the economic characteristics. These include, for example, the level of the labor intensiveness, materials intensiveness, energy intensiveness of producing the product, the sum total of the outlays per unit of useful effect, in particular the use of metals per ton of carrying capacity of a dumptruck or the production cost of a tire per 1,000 kilometers travelled.

Seventh, the grade. Grade depends upon the finish, durability and flavoring properties. It is used when evaluating the subjects of consumption. But subjective criteria play an important role in this. For this reason for many consumer goods specialists have come up with a grading system: a coefficient of significance is applied to each individual indicator of product quality.

When evaluating product quality indicators on transportability, standardization and unification, patent and legal aspects, ecological and safety are used. Each of these determine some aspect of the utility of the manufactured articles. Together, they determine their quality.

The System of Monitoring

In order to precisely evaluate all parameters of the quality of a manufactured article and to prevent the irrational predominance of one property over another, to detect waste and eliminate it during the production cycle. each manufactured article is subjected to a system of technical monitoring. At enterprises this work is performed by the departments of technical control (OTK); within sectors departmental inspectorates for quality and control laboratories of the USSR State Committee for Standards do this job.

Recently some 152 lead sectoral organizations were added to these. These new organizations will conduct tests on more than 6,000 groups of key types of product that is manufactured by the enterprises of 28 sectoral ministries and departments. This includes television sets, radios, gas heaters, machine tools and electric motors, synthetic washing agents and childrens toys. The evaluation of their technical level and quality is the basis for making decisions on the feasibility of putting new manufactured articles into production, while subjecting them to state certification and determining their export opportunities.

The OTK services of the enterprises operate on the basis of the Standard regulation on the department (administration) of technical control of an industrial enterprise (association), which was approved by a USSR Council of Ministers decree of 11 December 1979.

The primary task of the OTK is to prevent the manufacture (supply) of a product that does not meet the requirements of standards and technical specifications, the approved models, the design and technological documentation, the conditions of supply and contracts, or a product that is not fully assembled. The OTK's must strengthen technological discipline and through their adherence to principle and exactingness raise the responsibility of workers and specialists at all levels of production for the quality of the product being manufactured.

In the realm of construction the intermediate monitoring of the quality of the work being performed is the job of commissions created in the construction organizations. In several instances these commissions are made up of representatives from the design organizations and state control inspectorates. The customer also has a say in the intermediate monitoring. The acceptance of completed construction projects is done by a state acceptance commission. The defects or unfinished work noted by this commission, which are to be taken care of, are listed in a defect report and a time period is set for them to be eliminated. After the defects are taken care of, the commission signs a formal document declaring that the project has been accepted for operation; the commission also provides an evaluation of the work of the builders.

We will now take a close look at the organization of technical control of product quality in the production association Sreduralmebel' /Central Urals Furniture Production Association/. The organization of this task is structured by stages of the technological cycle of the manufactured article. The main purpose of the monitoring is to ensure that state standards are met and that the requirements of technical documentation are observed; also, it is determined that the product corresponds to the model standards.

The first stage is the selection, designing and putting into production of new models of furniture. A system of normative-control of the design and technological documentation is used; also the metrological expertise is brought into play. The monitoring helps to detect errors in blueprints, circuits and technological charts.

The second stage is production. The departments of the chief mechanic and chief production engineer together with the metrological service monitor the precision of the technological equipment, rigging and instruments. The OTK along with the central laboratory monitors the quality of the raw materials, materials, semimanufactures and assembly units as they are delivered.

The third stage is sales. The OTK and the sales department are responsible for the monitoring. They gather and accumulate information on change in the quality of a manufactured article during transport, sales and operation. They also take care of bookkeeping and analysis of claims for replacement and organize warranty repair. They also perform control checks of the conditions for storing an association's product within the trade network.

For the 11th Five-Year Plan at the Sreduralmebel' production association it is planned to increase the percentage of manufactured articles bearing the highest category of quality by 2.6-fold - to 50 percent. The conditions have been created for this. Within the association some 28 new production lines have been installed; the degree of labor mechanization in the primary production facility has reached 66 percent; and new materials and technological processes have been adopted. The extent of equipment availability and the efficiency of the metrological service has risen.

Special attention must be given to this service because metrological support to production is a key task of any product quality control system. The basis for this is the standard base of the nation. Ours is the most complete base in the world, including more than 100 sets of state standards, which in their precision are equal to the best achievements in the world or exceed them. This is creating reliable technical conditions for all measurements of the qualitative properties of manufactured articles. And several billions of these measurements are made every year.

Now as the technology improves and it is standardized and technological discipline is strengthened, metrology specialists are more frequently resorting to random statistical monitoring using indestructible methods - ultrasound and magnetic methods. For example, at the Zlatoust metallurgical plant more than one half of the rolled metal is monitored by the use of these progressive approaches.

The efficiency of monitoring quality depends upon the technical means of metrological support to production. Metrology specialists through their measurements of product parameters or the parameters of the technological processes check the reliability of more than 320 million different measuring instruments each year; altogether within the national economy there are more than 800 million such instruments. In the 11th Five-Year Plan more than 2,000 new types of means of measuring and monitoring product quality will be designed and implemented into production. Within the USSR State Committee for Standards some

33 metrological support programs for high quality product output have been developed and approved. These programs embrace a wide circle of manufactured articles from the ferrous and nonferrous metallurgy, the petrochemical and light industries.

Technological Discipline

The level of product quality depends directly upon how well technological discipline is observed within the production cycle and how well the worker and specialist sustain the sequence of manufacturing a part or unit, their technical parameters, precision and period of time of each technological operation.

The smallest errors in executing chemical processes, drying, painting, forging, welding, baking, and so forth, can ruin materials and finished products beyond hope and negate the labor of many people.

Technological discipline cannot be separated from essential labor discipline or from the conscientiousness of each worker and the sense of responsibility for the task assigned.

In present-day conditions the production of manufactured articles, as a rule, is broken down into a large number of operations; and in the final analysis the quality of the finished product depends upon the quality of how each operation is performed. For example, a complicated highly productive machine tool can prove to be unusable or unreliable in operation because a small part was made or installed poorly, without careful attention to the blueprint.

It is a good idea to analyze the status of technological discipline in the brigade, section and shop. It is important in specific examples to demonstrate how even the smallest violations can affect the quality of a manufactured article, can promote waste, and reduce the efficiency of the product for the customers.

Concern for a strong technological discipline has been put at the center of the struggle for high product quality at leading enterprises. This is supported by a considerable amount of work to improve the technical level of production, which provides stability for the technical modes and high quality of the manufactured articles. For example, at the Moscow Hard Alloy Combine imeni S. P. Solov'yev the workers' self quality control of product is being put on a solid foundation of new equipment and technology. For the manufacture of a hard alloy instrument powder metallurgy methods are being put to use; and new high-precision presses are being installed. In addition, several labor intensive operations for manufacturing press-powders are being automated; and the improved quality of the raw materials is making it possible to increase the precision of forging manufactured articles.

But such progressive types of equipment as automatic manipulators provide the greatest effect in strengthening technological discipline. They are not subject to boredom, a change in attitude or other human weaknesses, which have a negative effect upon the strict observation of assigned technological modes. Recently, for example, a robot created at the NIItraktorsel'khozmash /scientific-research institute of the tractor and agricultural machine building industry/ was put to work. Its "job" is to service the metal cutting and multi-tool machine tools as well as the NC /numerically controlled/ equipment, which have been built into a single production line. The robot has two "hands" for grasping and it can handle billets and remove and stack finished manufactured articles in a holder.

Another excellent example of the influence of the achievements of science and technology upon strengthening technological discipline is the use of ultrasound for dyeing fabrics. The traditional technology is labor intensive and takes a lot of time. For example, in order to a good job of dyeing woolen fabrics it is necessary to keep them in the dye for nearly seven hours at a temperature of 100 degrees. The least infraction of this and the fabric is not completely dyed and quickly fades. But at the Krasnokholmsk worsted combine they have introduced a pulse ultrasound unit. It has helped to reduce the amount of time required by one third, to reduce costs for heating, and to reduce the amount of dye by one sixth. But the most important consideration is that there was a sharp improvement in the technological mode, an increase in precision, and at the same time the qualitative characteristics of the fibers were increased - their color became even and durable.

However, any of the newest machinery and intensive technological processes will fail to yield the expected effect without a high professional mastery, creativity and initiative of the workers and of the entire collective.

The Krasnoyarsk machine building plant is a good example. The "Biryus" refrigerators from this plant can be found in more than 10 million apartments. Such popularity can be explained largely by the fact that they are of a high quality. The refrigerator is reliable and relatively spacious; it provides for the rapid freezing of food and it is pleasant in appearance. It has earned the State Mark of Quality.

But behind this mark and popularity of the "Biryus" can be found the enormous and extensive work of the plant collective to steadily increase the technical level of production. The main trend has been comprehensive mechanization and automation of production processes, the adoption of efficient technologies, and the organization of a clear input and output quality control of the parts and finished product.

For example, some 22 automated lines and 21 flowline production lines and 47 floor and suspended conveyors were manufactured and installed at the plant using their own efforts. Particular attention was given to the preparation sections, where product quality begins. Each of them was converted into mechanized and automated production facilities. Robots and waste-free forging have been used extensively here. And in the shop that paints housings they have introduced the technology for painting in an electrico-static field. A unit for the vacuum evaporation and filling the unit with khladon has provided a high degree of precision in filling and has eliminated defects and waste. It has also raised labor productivity some 5-fold.

Experience in Raising Product Quality

Initiatives of the Labor Collectives

In our industry and in other sectors of the national economy a great deal of experience has been accumulated in organizing socialist competition for raising product quality: "the five-year plan of quality is guaranteed by the workers", "from the high quality work of each to the high efficiency of the labor of the collective", "the guarantee of quality from design to manufactured article", and "engineering support for the workers' initiative". In December 1982 the CPSU Central Committee approved the initiative of the collectives of several enterprises of the USSR Ministry of Tractor and Agricultural Machine Building, the USSR Ministry of Machine Building for Animal Husbandry and Fodder Production, and the USSR Ministry of Machine Building for Light and Food Industry and Household Appliances to undertake a socialist competition under the slogan "high quality, reliable and efficient equipment for the food program".

The initiators of the new competition are the collectives of the production associations such as the "Minsk Tractor Plant imeni V. I. Lenin", the "Tselinogradsel'mash" /Tselinograd Agricultural Machine Building Plant/, "Gomsel'mash" /Gomel' Agricultural Machine Building Plant/ and the Plavsk "Smychka" Machine Building Plant, which made additional pledges to the end of the current five-year plan to raise the technical level, quality and reliability of the equipment that they manufacture for agriculture and the food industry sectors.

In particular, the Minsk tractor builders pledged to raise the motor capacity of the "Belarus'" tractors by another 1,000 hours to 9,000 hours. This is the same as producing an additional 10,500 tractors in 1985. They also promised to produce all "Belarus'" tractors with the State Mark of Quality.

In speaking of the effectiveness of competition in raising product quality it is important to emphasize that quality is high when all subelements and services of the enterprises and associations, the designers, manufacturers and consumers actively participate in the competition. Their efforts are directed primarily at speeding up scientific-technical progress, improving the interaction of all related

organizations. They are drawing up creative contracts, creating comprehensive brigades, which are made up of representatives of the enterprises and organizations, which have a vested interest in improving the quality of a certain type of product, and are devising coordinated standards of the enterprises. All of this provides for the raising of the technical level of production, a reduction in the amount of time required for the development, adoption and assimilation of new kinds of high quality manufactured articles.

The experience of competition among the related enterprises is particularly valuable in this regard. The greatest losses in quality take place at the junctions of the sectors and along the long path from design to finished product. A qualitatively new step in this competition has been the initiative of some 28 Leningrad enterprises and organizations, which have jointly pledged to ensure a high technical-scientific level, short time periods and a minimum of costs for the construction of the Sayano-Shushenskaya hydroelectric power station. At present more than 200 Leningrad enterprises and organizations are participating in the competition of the related industries for the high quality of the construction work on the Ust'-Ilimskaya Complex, the Kostromskaya GRES, Atommash and several other construction projects.

New forms for the organization of labor, especially the brigade form, are opening up new possibilities for improving product quality. The advantages of the brigade form of labor organization can be seen in the example of a specific brigade with which you are most familiar. Especially a brigade in which all workers complete product at the first presentation or in which all workers have their own personal trade marks. At the Alma-Ata "Porshen'" Plant OTK controller brigades have been organized. A specific production section or shop has been established in each of these brigades. The brigade of controllers must:

-ensure the timely and qualitative acceptance of finished product;

-perform a random monitoring of manufactured articles at control posts on the technological production lines;

-systematically ensure technological discipline at the work places;

-check the quality of parts after each adjustment or readjustment of equipment;

-sort product and analyze the reasons for rejection.

The quality of the labor of the controllers in such a brigade is evaluated according to KTU. If a brigade fulfills its requirements with fewer personnel, then half of the salary of the absent controllers is distributed among the members of the brigade in accordance with a specific coefficient of labor participation.

Three indicators of the work results of the "subdepartmental" shop or section are considered in awarding bonuses to the OTK brigades. First, observation of the quality standard, which was established for each month. Second, the level of return of product by the customer or shop-consumer, but with the stipulation that this level will not be higher than that achieved in the same month during the previous year. Third, that the level of complaints not exceed the corresponding period of the preceding year.

What has the brigade received from the brigade organization and motivation for the labor of OTK controllers? Within a short period of time the basic product of the "Porshen'" plant has reached the level of the best domestic and foreign models. At present some 75 percent of the manufactured articles that are produced bear the State Mark of Quality.

At enterprises where competition has been organized under the slogan "from the high work quality of each to the high efficiency of the labor of the collective", a "quality - efficiency" system is now in effect. The value of this system is that it is directed not at the individual worker but at the brigade which is working on a single order with pay pegged to final results. Each brigade is assigned a "degree of quality" and distinctive stages for the sequential accomplishment of a high level of quality by raising skill levels and mastering progressive work methods.

A comprehensive working control is built into the technological chain - the interoperational barrier to poor quality product. On the part of the software a regulating control of technology, rigging and equipment is introduced in order to create the most favorable conditions for the manufacture of articles of a high precision and reliability. The effectiveness of encouraging high-quality work is achieved by increasing the amount of the bonus in pay.

The "stages of quality" are used at enterprises of various sectors by taking into consideration their specific nature. But the essense is the same in all cases - at first the workers compete to complete the articles on the first time through and then for the right to work under their own personal trade mark. Those who already have this right compete for the title of "exemplary worker of quality". Those who have won this honor then compete for the highest title "golden hands - master".

Each such stage is not easily accomplished. To reach each stage requires that one must raise his skill level and professional mastery and assimilate a newer, more complicated piece of equipment of technological process. But in any event it is necessary to rigorously fulfill the requirements of technological discipline and to produce manufactured articles of the assigned quality.

Counter planning plays an important role in the development of the initiative of workers and engineers and technicians. Its importance is that it directs the competition participants to look for ways to improve product quality. Primarily this is to be accomplished by making greater use of the opportunities of new equipment and progressive technology, and improving the organization of labor and production.

Raising the quality of work in product output is at the center of attention of competition participants in the 11th Five-Year Plan.

Thus, agricultural workers are faced with the task of ensuring the further growth of production and improving product quality in farming and livestock raising.

The construction workers face the task of reducing the amount of time required for construction and of completing production capacities and cultural and domestic facilities and housing units on a timely basis or ahead of schedule. They must also reduce the amount of unfinished construction work.

The transportation workers have the job of fully meeting the requirements of the national economy and the population for shipping capacities on a timely basis; they must also reduce the amount of time required to deliver cargoes and ensure the safe delivery. Finally, they must improve the quality of service to passengers.

In the services area workers must expand the amount and types of services, adopt progressive forms, and improve the quality of the service.

The Impact of KSUKP

Improving product quality is a complex task. It deeply touches upon all aspects of the activity of an enterprise and all aspects of the life of the labor collectives. This means that in solving this problem it is necessary to use a comprehensive approach, which can be provided by the use of KSUKP /comprehensive system of controlling product quality/. The present-day stage in the work for the well-planned raising of the technical-economic level and consumer properties of articles is characterized by the extensive adoption and assimilation of these systems.

According to data for the beginning of 1982, KSUKP systems are now in use at 20,000 industrial enterprises and another 6,000 enterprises are now engaged in developing them. In certain sectors of industry - power machine building, heavy industry, construction and road machine building and in the automobile industry, comprehensive systems are being adopted at almost all enterprises. In the USSR Ministry of the Electrical Equipment Industry, the USSR Ministry of the Electronics Industry, the USSR Ministry of Instrument Making, Automation Equipment and Control Systems, and several other ministries, sectoral product quality control systems have been created. In several all-union republics, including Latvia, Belorussia and Armenia, republic systems are being developed, and in Krasnoyarsk Kray and Dnepropetrovskaya Oblast

on the basis of KSUKP regional systems for raising the efficiency of production have come into being.

The KSUKP systems have demonstrated their high efficiency. The output of manufactured articles bearing the highest category of quality has increased sharply - a two to four-fold increase; there has been a noticeable drop in losses from waste, and the cycle for assimilating new kinds of product has been cut in half. The massive adoption of systems has meant that on the whole for industry the percentage of product bearing the State Mark of Quality has risen over the past seven years by about 2.5-fold.

For example, enterprises in Novosibirskaya Oblast with the active assistance of scientists have created a territorial system of "science - production - efficiency". Within the framework of this system many important problems of standardization and metrological support to production have been solved, which can be clearly seen in the technical level of product. The percentage of manufactured articles bearing the highest category of quality of the total that is subject to certification has reached 46 percent.

In Sverdlovskaya Oblast KSUKP has been assimilated by 450 enterprises. This has helped them to achieve a stable level in the output of high quality product. At the start of 1982 some 1,776 manufactured articles were produced bearing the State Mark of Quality; out of the total product more than 36 percent is subject to certification. The total economic savings from the adoption of KSUKP is estimated to be 5.7 million rubles.

The experience of individual collectives attests to the high efficiency of the KSUKP. This system is effective at those enterprises where the mechanism for the interaction of production with the scientific-research institutes and planning and design organizations, the product consumers and raw material suppliers is well organized, and where the entire collective for the management of the entire system and political and educational work is directed at raising the quality of the final results of labor.

The metallurgists, chemical industry workers, refractory materials specialists, miners and transportation workers of one of the leading enterprises of the ferrous metallurgy industry - the Nizhniy Tagil Metallurgical Combine imeni V. I. Lenin - are constantly seeking for new reserves for improving the technical-economic properties of the manufactured articles. Today within the shops of this plant they are manufacturing more than 1,100 shapes and sizes of rolled metal using 132 grades of steel.

For the first time in the Soviet Union an oxygen convertor shop with 100-ton assemblies has been put into operation at the combine, the technology for the conversion of pig iron containing vanadium has been assimilated, and the Soviet Union's only shop for the production of wide strip girders with parallel facets of floors is now in operation.

More economical kinds and shapes of rolled metals using low-alloy steels are being created; and the technology of thermal processing and use of smaller tolerances is being improved. The final result of this gigantic effort in improving the technical level of production and product is that combine is manufacturing some 30 kinds of manufactured articles bearing the State Mark of Quality. Their use within the national economy is yielding an annual economic savings in excess of 32 million rubles.

The "quality" ASU /automatic control system/ is helping to monitor all work in raising product quality. This system was created on the base of modern computers and mathematical-statistical methods. What criteria are used in this system?

First, indicators of the growth in the output of product bearing the highest category of quality. Second, a reduction in waste and production losses. Third, a savings in materials and fuel and energy resources. Fourth, metrological indicators, which characterize the results of tests for the quality of the rolled metal. And, fifth, the amounts of time required for the delivery of metals with guaranteed properties.

KSUKP systems are constantly being improved by taking into consideration the specific nature of production, experience and the recommendations of science. At present the specialists are giving a great deal of attention to the problem of automating KSUKP on the basis of machine oriented standards of an enterprise, which with the help of computers make it possible to gather, process and release information on the various levels of management for making sound and timely management decisions.

At several enterprises they are working on automated subsystems for monitoring product quality within the framework of ASUP /automated system for controlling an enterprise/. Special importance is attached to saturating the system with economic contents. We are speaking about inputting into the system criteria for evaluating the achieved level and reserves for raising quality, evaluating expense, defects, and influencing final results. This is necessary to raise the efficiency of management decisions.

The experience of the system approach to raising the technical-economic properties of product is now receiving more attention. The workers of the national economy are now faced by the problem of expanding the spheres of application of KSUKP. This is to be done primarily by adopting them in planning and design and scientific-research organizations, which are developing new designs of manufactured articles and technological processes. This must guarantee the technical level of a manufactured article at the design stage. And the level must correspond to the highest requirements.

An important trend is the development and adoption of comprehensive systems for managing the quality and efficiency of production in agriculture, in the transportation sector, in construction and in consumer services, in health care, at repair enterprises. The experience of using KSUKP in these sectors of the national economy is being accumulated in several regions of the Soviet Union, particularly in L'vovskaya Oblast. In Moscow, Leningrad and Kiev city systems for controlling quality have been created and are now operating successfully.

The study of leading experience of developing and using KSUKP, its dissemination and assimilation will ensure the attainment of high final results of labor and will help to put to better use the scientific-technical and production potential of the enterprises, sectors and regions, and to successfully fulfill the assignments of the five-year plan for raising product quality.

In your studies it is desired that you discuss the directions in which we are pursuing the rise in product quality in the shop, section, and in the brigade, and how the indicators of quality are taken into consideration when adding up the results of the socialist competition, and what must be done to improve the quality of the product that is being manufactured.

You should also analyze how the experience of the leading organizations is being used and examine the forms of participation of your classmates in controlling product quality, the efficiency of applying plant standards. The students will be helped by this analysis to fulfill practical assignments; the example topic of these assignments was published in issue No 46 of Ekonomicheskaya Gazeta in 1982.

An important spot in the practical studies must be given to the analysis of the indicators of the quality of the product being produced by the shop, section, or brigade. Data on the certification of product for the interplant Mark of Quality can also be put to use.

The study of this topic can lead to the discovery of new reserves for raising product quality, particularly at the work place, section and in the shop.

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EFFICIENCY OF DIRECT SCIENTIFIC TIES BETWEEN CEMA NATIONS

Moscow EKONOMICHESKAYA GAZETA in Russian No 3, Jan 83 p 20

/Article by V. Gavrilov, senior scientific worker of the Institute of Economics of the World Socialist System of the USSR Academy of Sciences: "The Effect of Direct Ties"/

/Text/ At recent congresses of the communist and workers parties of the CEMA member nations, one of the reserves for raising the efficiency of socialist economic integration was to improve the use of direct ties between sectoral ministries, production associations and the enterprises and organizations of the cooperating nations. It is difficult to overestimate the importance of this reserve for the development of specialization and production cooperation through the use of the very latest achievements of scientific-technical progress.

The present agreements for international specialization and production cooperation are chiefly based upon existing technologies and contain the requirements that the various sides share the product that is now being produced. At the same time the production cooperation requires such an organic coordination with scientific-technical cooperation, which is now emerging at the stage of accomplishing scientific-research and experimental design work.

In the past the primary content of scientific-technical cooperation frequently amounted only to developing the design for a piece of machinery or solving a given technological problem. The adoption and assimilation of scientific results were subjected to the examination of each of the participants.

The experience that has been accumulated demonstrates that cooperation is most efficient when it is undertaken from the joint creation of models of new equipment and then continues by stage in the production and sales spheres.

For example, due to the direct scientific-technical cooperation of the mining and metallurgical combine imeni V.I. Lenin in Almalyk (USSR) and the Mansfeld combine (GDR) with the participation of specialists from several Soviet scientific-research institutes a device for the

production of rolled copper wire using the casting and milling method was created. The leading experience of the Soviet metallurgists in milling equipment and the achievements of the Mansfeld combine in the operation of smelting ovens was put to use. The device that was built meets the very latest requirements.

Another example is the creation by Soviet and Bulgarian machine builders of transport and loading systems, which are used with success at the Kama truck plant. From the start joint design bureaus were created, at which both production specialists and tool makers and supply specialists worked with the designers. Then dozens of machine building enterprises from Bulgaria and more than 20 Soviet machine tool building plants were involved in the task. As a result a new machine building direction was created for the Bulgarian machine building sector - the production of transport and loading systems. This production effort is now a leader in the world production of such a product.

International cooperation helps to reduce the time periods for creating unique equipment.

Such a program-target approach becomes crucial at the present stage of the development of national economies, when many structural shifts are taking place within the framework of individual subsectors and types of production facilities. However, such an approach is being slowed by the lack of developed forms of cooperation at the middle and lower levels.

The joint development and production of new equipment based upon cooperation must have direct production-technical contacts between those involved in the cooperative venture. There is no room in this for an impersonal exchange between unnamed suppliers and customers; but the coordination of cooperative ties to specific production-economic units is absolutely necessary. Requirements of time demand the "personification" of such ties. A joint plan for the solution of any production-technical task now requires that the specific executors be named and that the actual production capacities, scientific potential and other key elements be clearly defined and coordinated.

Direct ties can lay the organizational-economic and contractual-legal foundation for the formulation of the economic mechanism for managing the production-technical cooperation within the sector. The creation of such a mechanism is connected with arranging the economic contractual relations between the national production and scientific-technical organizations, by including the later in a joint planned activity. A sectoral ministry as a governmental organ manages this process and guides it by concluding international agreements.

Sectoral coordination of plans is required to ensure the comprehensive planning of ties in science, technology and production in order to attach to the relations for specialization the character of a comprehensive production-technical cooperation. Moreover the organization and regulation of this process begin with the joint development of scientific-technical documentation for the production of the future specialized manufactured article. At the initial stage of the work i i possible to involve the future manufacturers of the designed articles in the cooperative undertaking and together with the planning organs to establish the amounts of production and to distribute among the partners the individual links of production and the product elements. At the same time the foreign trade organizations, based upon the designed technical-economic parameters of the specialized product, find it possible at this early stage to reach agreement on the contract prices. This represents the comprehensive planning of cooperation for the entire reproduction cycle: "science - technology - production - sales."

The sectoral coordination of plans not only ensures the development of comprehensive cooperative programs but also the transfer and transmission of intergovernmental legal requirements into the internal tasks to specific executors, and the establishment between them of direct ties.

Direct ties are more than just a form of establishing contacts between scientific institutes and industrial enterprises, which are participating in carrying out the interdepartmental agreements. They lay the foundation for the independent development by them of a joint-coordination plan for solving the tasks that have been set - a unique netted schedule of cooperation, in which the time periods for executing the scientific work, developing the technical draft and working documentation, creating the finished model, its introduction into production, and so forth, are established. The plan is formulated by concluding economic contracts directly at the level of the organizations which are actually doing the work.

In the Soviet Union the basic ways of formulating the prerequisites for the development of direct production ties for cooperation are defined in the USSR Council of Ministers decree "regarding the further improvement of cooperation between the ministries and departments of the USSR, the associations, enterprises and organizations with the appropriate organs, enterprises and organizations of the other CEMA member nations in the field of science, technology and international specialization and production cooperation" (July 1981).

The setting and development of direct ties between economic entities with the goal of deepening production cooperation between them promotes the attraction of production collectives to the creative participation in the international division of labor.

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ROLE OF SCIENTIFIC RESEARCH IN THE NATIONAL ECONOMY DISCUSSED

Tashkent OBSHCHESTVENNYYE NAUKI V UZBEKISTANE in Russian No 7, Jul 82 pp 24-33

[Article by Kh. G. Gazizov and B. R. Gazinazarov: "Some Questions Involving Accelerated Incorporation of Scientific Research Results in the National Economy"]

[Text] The course of intensive development of the national economy adopted at the 26th CPSU Congress can be realized only with more effective use of scientific research results in production. This question is assigned great importance in our republic as well. Presently in Uzbekistan more than 80,000 people are involved in the sphere of scientific research and development of new techniques and technology. This includes approximately 35,000 scientific and scientific teaching personnel. Their creative search in close collaboration with production provides the national economy with a yearly economic gain of hundreds of millions of rubles.

Still, we have significant unused reserves for increasing the effectiveness of science. In the resolution adopted at a meeting of the active membership of the Uzbekistan party organization "On measures for further increasing the effectiveness of scientific research and accelerating scientific and technical progress in the republic in light of the directives of comrade L. I. Brezhnev" and the statement on this subject made by Sh. R. Rashidov in his article, "The High Duty of Uzbekistan's Scientists", it is noted that the effectiveness of scientific research, incorporation of scientific and technical achievements and the rate of scientific and technical progress still do not correspond completely to contemporary demands and the tasks for further increasing the effectiveness and quality of scientific research. "The immediacy, effectiveness and quality of the scientific research being done often remain on a low level, and over half of the scientific developments are not assimilated and are reflected only in reports."[1]

The transition from an extensive to an intensive path of national economic development certainly requires considerable expenditures. Therefore at the annual general meeting of the USSR Academy of Sciences, it was indicated that "Scientific and technical achievements in the 11th Five-Year Plan can and should compensate for the growing additional expenditures of labor and means in the national economy."[2]

As a result of this, at the UzSSR Academy of Sciences, including the Economics Institute, research is being conducted to search out reserves and developments directed at increasing the effectiveness of science and scientific activities.

Significant possibilities for increasing the effectiveness of science through accelerated assimilation of its achievements are opened up by further strengthening of mutual ties between science and production, which assumes closer interaction of economic, organizational, social, legal, industrial and other parties in the "research--production--consumption" process. More complete accounting of the demands of production and an improved mechanism for interaction between science and production are possible only with the application of a programmed and directed approach at all stages of this process. To accomplish this in the system of the UzSSR Academy of Sciences, several changes must be made in planning, stimulation and organization of operations, specifically, an incentive fund should be created from withholdings from the actual effect of incorporating developments, and the like.

Improving ties between science and production requires a joint approach to studying all aspects of national production. Science in the republic is represented by a system of scientific organizations of the UzSSR Academy of Sciences, industrial scientific research and planning and design organizations, testing and experimental production organizations, VUZes, scientific-production associations, production associations, scientific research laboratories at industrial enterprises, and so on. On the whole, all this can be represented as the academic, industrial, VUZ and factory sectors of science. From this it is clear how complex and important it is to unite these resources of scientific forces into one channel and direct their efforts toward solving general scientific and technical problems and urgent production tasks.

The inherently complex nature of the contemporary stage of scientific research and the development of science and technology is becoming even more complicated. This is a result of the ever-increasing specialization and automation of scientific and production activities due to the growing complexity, expense and necessity of their intensive development. Therefore the problem of accelerated incorporation must be resolved jointly, because of its place in the "research--production--consumption" process and its role in increasing the effectiveness of scientific research.

The "research--production--consumption" process consists of successive stages of basic and applied research, scientific research developments, assimilation or incorporation into production, distribution and exploitation of new products. Drawn into this process are many scientific research, design, planning, construction and installation, start-up and adjustment and other organizations and institutions. Each of these stages includes a number of phases in which the corresponding organizations participate. For example, fundamental research consists of theoretical research, selection of ideas and investigative work. The closer one gets to the final stage of the process, the more modifications there are in the composition and content of the work being done, and there are changes in the participants, specifics and organization of the work.

The complexity and many-sided nature of the process generates many problems of varied character and content, that can be resolved only through a united, directed approach, taking into account the peculiarities of each stage. Only under this condition can the achievements in the science of management be applied effectively in solving the problem of improving ties between science and production and accelerating the corresponding operations with proper effectiveness. So, application of a united, direct method of planning to all stages has made it possible to shorten the "research--production" process in the UkSSR Academy of Sciences and the Siberian Department of the USSR Academy of Sciences to one-half to one-third of its average length throughout the Soviet Union. It is possible to apply this method at the UzSSR Academy of Sciences also, but first it is necessary to conduct some important preliminary work, beginning with strengthening the groups of economists locally, improving the entire system of obtaining and processing data, accounting and reporting and other measures, which will allow increases in the reliability of data and practical management of the activities of laboratories and institutes. Here it is appropriate to mention that shortening the "research--production" cycle by just one year throughout the entire USSR could provide an economic effect of 5-6 billion rubles, according to estimates by the USSR State Committee for Science and Technology.

A decisive role in accelerating this process belongs to improved management of scientific and technical progress on the statewide level. Continuous increases in financing for science, creation of new, highly effective forms of ties between science and production, solving many of the social and economic tasks, strengthening the material and technical base of science, and a number of other measures for increasing the effectiveness of scientific research in the USSR are evidence of the state's great attention to the development of science in the country.

The effectiveness of scientific research also depends on creation of the appropriate conditions for normal functioning of the mechanism of the "research--production" process and demands specific training of scientific and technical personnel for carrying out the outlined tasks. Combining these points under a single management and organizational influence was expressed in the formation of production associations, scientific-production associations, military-consumers' associations, joint institutes, scientific centers and other effective forms of organization and management of the national economy.

A scientific-production association, for example, combines on the one hand all the stages from the conception of a scientific idea to making a test model and incorporation into production, and on the other hand, a united, directed, organizational, administrative, legal and economic influence is realized. This promotes acceleration of the work, increased effectiveness and quality of scientific research. However, creating an association is not always advisable or possible everywhere. Therefore, forms of ties between science and production such as economic agreements, agreements for creative collaboration between science and production, and joint programs are also practiced widely. Industrial scientific research laboratories and design bureaus at enterprises are being created and strengthened.

In contemporary research interaction among sciences is being practiced more and more, and more and more participants are being involved in united, joint scientific and technical problems, the solutions for which are being worked out successfully through joint programs on the basis of a programmed and directed approach. With the corresponding scientific and technical potential in production, the presence of a complex of social and economic conditions favorable to intensive realization of operations, high results are achieved, which are expressed in acceleration of the "research--production" process and increased effectiveness of scientific research due to its prompt application in the national economy.

When considering the essence of the process of creation and assimilation of new products, several of its specific features should be pointed out. Characteristic of the process of scientific and production activity are the uncertainty of the results of scientific production, the inability to repeat operations, the unique nature of the operations, the incomparable nature of expenditures and results, the difficulty of evaluating results of scientific activity, and so on. These features change as the idea moves from research to production, and at the level of industrial production it is possible to standardize and formalize operations. These peculiarities and features characteristic of the stages of creation and incorporation of new products, should be at the center of attention when developing plans, and organization and accounting of these operations, and also when solving the question of incentives for participants and performers and defining the proportional participation in the resulting effect.

In our opinion, with the proper quality of operations and their correspondence to the demands of production, the essence of two factors: 1) the peculiarities of activity in the sphere of science and the originality of its products, and 2) a sharp increase in expenditures in the chain of elements and stages of the "research--production" process (which causes a shortage of material and manpower resources), is one of the basic reasons for having difficulties in incorporation. This results in a high proportion of unincorporated developments (approximately 45 percent) and excessive time spent moving from fundamental research to incorporation of results into production and series manufacturing of new technology. These factors are to some extent objective for production; it cannot overcome them on its own. Therefore it is of immense importance to improve as much as possible the management of scientific and technical progress in the country.

The peculiarities of scientific activity and the difference in the growth of expenditures in the organization of operations in the "research--production--consumption" process are, in our opinion, primary objectives in improving the mechanism of incorporating results of scientific research and experimental design work into production. Ignoring or taking inadequate account of these peculiarities gives rise to well-known difficulties, expressed in "interdepartmental barriers", lack of coordination among the activities of planning agencies and industrial ministries, insufficiency and lack of correlation, or imbalance, in providing material, technical and manpower resources, and so on. This in turn can lead to delays in incorporation. For example, some necessary scientific research has been done on the topic of "technical and economic bases for

effective utilization of hollyhock concentrates", but the absence of a testing and experimental installation and lack of allocated land for cultivating hollyhock is delaying further mass incorporation of the results of this research in the national economy. More or less the same picture can be observed in several other scientific research operations.

Another important direction and condition for accelerated incorporation of scientific research results into production is strengthening of ties between science and production by bringing the level of their scientific and technical potential closer together. This can be achieved by shortening routine processes and freeing up part of the work day of workers in ministries and departments for self-education and creative work. The coming changes in management of the national economy in connection with the transition to an intensive path of development demand from workers at all levels of management a qualitatively new approach to labor activity, an increase in skill level, and greater responsibility for performance and production and industrial discipline.

In the chain of elements and stages of the "research--production" process, and the organization of operations through an organic union of science and production, an important role belongs to testing and experimental bases (OEBs), as the transitional stage from science to production, where an idea is transformed into a concrete product. When considering the role and importance of the OEB in accelerating the incorporation of scientific and technical innovations into production, the following points, in our opinion, are necessary:

1) Development of OEBs for institutes of the UzSSR Academy of Sciences in proportion to the direction of research, taking into account the demands of production; resources and sources of financing them must be sought out;

2) Provide OEBs with the necessary equipment, tools, instruments, materials, and so forth;

3) Improved utilization of scientific equipment and instruments; with this as a goal, it is clear that centralized bases should be created within the system of the UzSSR Academy of Sciences for renting scientific equipment and instruments.

Currently the provision of testing and experimental bases for institutes of the UzSSR Academy of Sciences is still inadequate. Only around 15 percent of the institutes are provided for.

The question of financing science is one of the most pressing problems and one of the most difficult to solve. But apparently at some stage, capital investments in science should be considered in the overall balance aside from their temporary increase. After all, every ruble spent on science gives a return that is certainly greater than that in construction and reconstruction of enterprises. Before saturating institutes of the UzSSR Academy of Sciences with necessary OEBs, it is obvious that expenditures on their creation and also on reconstruction and improvement of existing OEBs should be increased. The effectiveness of scientific research institutes that have OEBs is, as a rule, significantly greater than that of scientific research institutes without OEBs.

In some cases a shortage of testing and experimental bases can be supplemented by implementing operations directly at industrial enterprises. This is possible and especially effective when the work is carried out on the basis of an agreement between a scientific research institute and the enterprise.

The practice of bringing new technology at enterprises to series production should be replaced by the practice of creating high quality articles, reliable models of instruments and new technology in small series by workers of scientific organizations and industry with effective utilization of the possibilities of OEBs and production reserves.

This is aided by the growth in the amount of thematic scientific research work done under economic agreements, which in 1978 accounted for approximately 18 percent of the total expenditures in the institutes of the UzSSR Academy of Sciences, and in the near future the plan is to increase this to 30 percent, with primary financing of the majority of applied research by economic agreements. The increase in the proportion of work done under economic agreements should be accompanied by corresponding changes in the organization of work, improved planning and incentives. It is also advisable to resolve the question of expanding the rights of institutes, allowing them to allocate and distribute funds of means from economic agreements, with, of course, the corresponding bases and proper control over expenditure of the means.

Agreements on creative collaboration between scientific organizations and production are also a long-range and progressive form of interaction between science and production which opens up considerable reserves of scientific and technical creative work that are inherent in the socialist system of management. This form is practiced primarily in those cases where a scientific research institute is already conducting research on the required topic and additional financing is not needed. Coordination of plans of scientific organizations with production needs can serve as a powerful stimulus for strengthening the ties between science and production.

Agreements on creative collaboration and economic agreements have many common elements and their development is interrelated. It demands creation of scientific research laboratories, operating successfully in VUZes, industrial ministries, in the UzSSR Academy of Sciences, and so on. Functioning in the system of institutes of the UzSSR Academy of Sciences, financing through means from economic agreements and fulfilling topics coming from production needs--this is the economic and organizational substance of scientific research laboratories. Together with centralization of financing and more effective utilization of the scientific research potential of academic institutes, there is also overlapping of basic elements of scientific and production activities, the boundary between them fades, there is less of a negative effect from factors such as uncertainty and qualitative distinctions in the nature of the work, and so on; favorable conditions are created for effective control and accounting of expenditure of means. All this contributes to intensification of the process of an organic merging of science and production. In 1979, at the "Kibernetika" scientific-production association, three scientific research laboratories were created for industrial ministries. All in all, there are plans to create around 20 of these laboratories in the UzSSR Academy of Sciences.

A great deal of work is also being done to strengthen the factory sector of science, which increases the possibilities of turning large plant scientific research laboratories into base support points for testing new products; it will also promote increased interest on the part of production in the results of their work that is of a scientific research nature. This will reduce the current shortage of testing and experimental bases at institutes of the UzSSR Academy of Sciences.

There is still a significant proportion of scientific research and experimental design work that is finished but not yet incorporated, or incorporated at only one enterprise. This large organizational and economic problem can be resolved to some degree by taking into account more fully the principles and peculiarities inherent in science, scientific work and production while constantly improving planning and management. One of the first tasks that should be solved is conversion of some of the scientific organizations over to a new system of planning and material incentives for creating and incorporating new techniques and progressive technology, the basis of which "would be the direct dependence of economic stimulation of the collective and individual workers of academic institutes on the economic effectiveness achieved in the national economy as a result of utilizing specific developments of scientific research. With this goal, in 1972 three institutes of the Siberian Department were converted to the system as an experiment."[3] This conversion "was partial--only to the extent that these institutes carry out scientific research of a purely practical nature, financed primarily by economic agreements with various customers."[4]

Converting academic scientific research institutes to a similar system of planning and economic incentives should be done very carefully in those departments involved in theoretical and fundamental research, since it is important, without ignoring the fine traditions and rich experience of scientists, to find ways and methods of working that will provide positive results. When adopting advanced methods, existing local peculiarities should be taken into account as well.

In our opinion, this type of conversion of part of the scientific organizations under the conditions of the UzSSR Academy of Sciences is possible, but demands a great deal of preliminary work and careful selection of subjects for the experiments. In the first place, apparently, incorporation should be distinguished as an independent stage requiring material and labor expenditures, and specific people in each institute should be indentified who will be constantly engaged in incorporation and the necessary considerations. As an analysis of practice shows, the reliability of data provided by institutes does not always reflect reality. The infludence of vagueness is too great, work on one topic drags on for a long time, and years pass before concrete results are obtained. With a group of qualified economists involved in questions of planning scientific research and experimental design work, the reliability of data is increased, as is the possibility of obtaining the data practically. Creation and strengthening of economic services in institutes of the UzSSR Academy of Sciences is the primary and most important task on the path toward improving planning and incentives. This can also serve as a favorable precondition for the transition from traditional to thematic planning.

The traditional system of planning "from below" is associated with processing a large volume of varied, essentially routine data by hand. Not having free time for creatively resolving the many urgent questions, both current and long-range, middle-level management workers must work according to the old method. This kind of planning allows duplication, trivial subjects, and isolation from the demands of production and from the development of the country as a whole. As a result, the plans of science are not coordinated properly with the plans of production, and planning itself falls behind the demands of the contemporary stage of the country's development. Traditional relations and ties between organizations and people, well-known inertia, and so on, do not permit practical reorganization of the economy, planning and overall management of the national economy and of science in particular.

Without practical, highly skilled management of scientific and technical progress at all levels, without practical and reliable scientific and technical data, it is very difficult to speak about the transition to intensive labor methods, to accelerate the development of science and increase its effectiveness.

The gap between the possibilities of management and the demands of the national economy leads to isolation of scientific research from production needs, and a weakening of the ties between science and production. From this it is obvious that a qualitative rise in the level of management of scientific and technical progress is required.

Collectives of the UzSSR Academy of Sciences are persistently striving to increase the effectiveness of scientific investigations and strengthen the ties between science and production. In collaboration with experienced workers they are creating high-yield, wilt-resistant varieties of cotton, fertilizers with microelements, low-toxicity defoliants, effective herbicides, anti-wilt preparations, and much more. Here the role of fundamental research in accelerating and increasing the effectiveness of incorporation should be given special mention. It is fundamental research that determines all future scientific and technical progress. Therefore its ties with the demands of production, both current and long-range, need to be strengthened even more. It seems to us that with the goal of further improvements in the existing system of interaction between science and production, a number of social, economic and organizational steps must be taken.

It is necessary to take a critical approach to adopting and utilizing advanced methods, scientific achievements and the practical experience of management of scientific research in the USSR and abroad.

When working out measures for the development of science, technology, production and culture, the principles and specifics of each stage, level, republic, region and so forth, should be taken into account and followed.

Improving ties between science and production requires correct utilization of the actions of several principles and factors, taking into account possible consequences and an "opposite reaction". For example, integration is one of the most powerful factors in strengthening the interaction of science and pro-

duction from the standpoint of increasing the effectiveness of incorporation through accelerating the work being carried out. But superfluous integration can conflict with the specialization needed to increase qualification levels, and so on. The peculiarities of developing fundamental research, which determines the future of science and production, must also be taken into account.

Considering the experience of the Siberian Department of the USSR Academy of Sciences, we should look at the possibility of consolidating part of the academic institutes and scientific institutions at the industrial level under industrial enterprises as main research organizations for developing separate types and systems of machinery.

Effective interaction can be achieved by providing scientific research institutes and industrial enterprises with the necessary manpower, financial and material resources.

Organization of joint operations between a scientific research institute and an industrial enterprise for conducting research and verifying its results in industrial conditions can be realized following a decision by the corresponding ministries.

Interaction of academic institutes with industrial enterprises can be successful when optimal relations are established among subdivisions of fundamental and applied science, planning and design institutions and enterprises, and organizations specializing in incorporation. Temporary groups of production workers, scientists, organizers and other specialists can be organized before incorporation is completed.

One of the most important questions in increasing the effectiveness of scientific research is creating and equipping testing and experimental bases, establishing an optimal correlation between expenditures on developments and their incorporation, and planning and management of science. In connection with this, the following points are necessary:

1) There must be accelerated development of testing and experimental bases for scientific research institutes, industrial ministries, and VUZes through allocation of additional funds, the volume of which should reach 15-20 percent of the total financing for science in the republic;

2) Testing and experimental bases must be provided with the latest equipment and instruments, through developing domestic instrument building and purchasing essential equipment abroad;

3) The system of financing for scientific institutions must be changed from that of items of expenditure to acquisition of research machinery and equipment. These means, together with economic agreements, form a common fund for technical equipment which should be transferable so that at the end of the year an enterprise is not forced to make unjustified acquisitions;

4) With the aim of improving utilization of unique instruments and equipment, specialized rental points or centers for collective use of instruments and scientific equipment should be established in the republic.

A significant portion of the results of scientific research and experimental design work does not reach mass practical application in the national economy. The cycle of the "research--production" process is interrupted because of a lack of an intermediate, connecting link and lack of interest on the part of scientists, as well as production workers, in the results of the expected economic effect. Effective measures must be taken to create this interest among both parties.

Acceleration of the "research--production" cycle depends to a significant degree on timely technical and economic substantiation of the planned research. In connection with this, the Presidium of the UzSSR Academy of Sciences decided to create economic groups in all institutes of the UzSSR Academy of Sciences to determine the economic effectiveness of their scientific research and experimental design work.

This decision, however, has not been carried out completely. A great hindrance to accelerating the "research--production" process is the insufficient provision of data, and primarily, the almost complete absence of corresponding accounting and reporting of scientific organizations. The existing system of document circulation provides only the initial and final points of research, and the most important element--the research process--is left under its own control. Without this it is difficult not only to plan and analyze scientific activity properly, but also to control prompt performance of intermediate phases and stages of scientific research and experimental design work. Statistics on the economics of science are in the initial stage of development. Definite means are needed for their formation and development which take into account the peculiarities of science and scientific activity. The accounting and reporting system operating in industry cannot be completely suitable for science.

The transition to intensive methods of work assumes an intensified role for practical control, organization and management. This in turn requires additional information on the course the work being carried out. Increased effectiveness of scientific work should be at the center of attention of management and planning organs. The level of effectiveness can be judged only on the basis of complete and reliable data.

Cost accounting is still not widely practiced in science--that is, management on the basis of expenditures being commensurate with results. In the majority of cases, the economic effect obtained through incorporation does not reflect sufficiently the proportional participation of scientific, planning and experimental design organizations and does not compensate completely production's expenditures on assimilation and exploitation of new items.

Well-known methodological difficulties arise in determining the size of the economic effect, where it is formed, and consequently also in further stimulation of organizations for their participation. In the first place, the interest of scientific collaborators and production workers in disseminating the measures being incorporated must be increased. Here the experience of workers at several institutes of the Siberian Department of the USSR Academy of Sciences with a new system of work incentives can be utilized. It stipulates

that part of the enterprise's income from using new techniques is to be allocated for the use of the collectives of scientists that created the new technology. The initiative of industrial enterprises and industrial ministries is of immense importance in accelerating scientific and technical progress. Without the reverse connection, "production--science", the effective functioning of the mechanism for interaction between science and production would be impossible. It is necessary to have two-way, mutually agreed upon interaction on the basis of agreements and other kinds of connections between scientific organizations and production. Utilization of advanced methods at the current stage is one of the most pressing problems. Methods and forms of utilizing advanced methods are determined by the specifics of the concrete local situation.

Improved planning and economic incentives for the "research--production" process should be realized on the basis of developing a directed and dynamic mechanism for joining science and production, in which all factors are coordinated and which is balanced according to all basic indicators, and which requires the participation of representatives not only of economic sciences, but also of philosophical legal, psychological and other sciences.

Consideration of the possibilities of creating large scientific and technical complexes in the republic, headed by academic institutes (following the experience of the Electric Welding Institute imeni Ye. O. Paton of the UkSSR Academy of Sciences), is within the authority of the USSR State Committee for Science and Technology, the USSR State Planning Committee and the UzSSR State Planning Committee.

Realization of these and other measures will, in our view, promote increased effectiveness of scientific research, acceleration of incorporation of its results in the national economy in the interest of further improvements in all its sectors, in light of the decisions of the 26th CPSU Congress.

FOOTNOTES

1. PRAVDA VOSTOKA, 24 May 1980.

2. PRAVDA, 19 March 1981.

3. "Opyt Sibirskogo Otdeleniya Akademii Nauk SSSR v Sovershenstvovanii Svyazi Nauki s Proizvodstvom" [The Experience of the Siberian Department of the USSR Academy of Sciences in Improving Ties Between Science and Production], KazNIINTI [Kazakh Scientific Research Institute of Technical Information and Technical and Economic Research], Ekspress-Informatsiya, ser. 23.01, No 86 (616), 1979, pp 21-22.

4. Ibid., pp 22-23. (Further on, various aspects of this experiment are described; there is a list of funds, etc., pp 22-23).

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SCIENTIFIC-PRODUCTION COMPLEX CONCEPT DISCUSSED

Dushanbe KOMMUNIST TADZHIKISTANA in Russian 19 Dec 82 p 3

/Article by A. Vakhobov, doctor of technical sciences: "The 'Zarina' Scientific Complex"/

/Text/ In order to adopt scientific research and developments into practice as quickly as possible interdepartmental scientific-production complexes (NPK) are being created. They are functioning successfully within the USSR Academy of Sciences and in several republic-level academies as well. The scientific-technical association for scientific instrument building of the USSR Academy of Sciences, the scientific-technical complex in the Ukraine, the "Solntse" NPO of the Turkmen SSR Academy of Sciences - these are a few of the well-known examples. Only one experimental scientific instrument building plant of the USSR Academy of Sciences is producing 11.2 million rubles worth of product each year. The scientific-technical complex of the UkSSR Academy of Sciences, which was created at the base of the Institute of Problems of Materials Sciences, has combined the efforts of five thousand scientists, engineers and technicians, workers and employees.

The advantages of creating the associations are to be found not only in increasing the amount of work that can be done, but also in the fact that a scientific worker who is engaged in performing fundamental research is able to more quickly see the final result of his labor. Moreover, the scientific workers and production workers are working on a unified, scientific-technical program.

The NPK concentrates its activity on the creation and adoption into the national economy within as short as possible time periods of the latest models of equipment, instruments and materials, new technological processes, which correspond in technical-economic indicators to the greatest achievements of domestic and foreign technology. The activity of the NPK must be constructed on combining centralized management with economic independence and initiative of the complex itself on a cost accounting basis.

Such an organization of the labor of scientists and production workers makes it possible within the system of the academy of sciences to be free of budgetary allocations, the shortage of which is being felt more and more with the passing of each year.

In creating the scientific-production complexes state budgetary money is not the source of financing; rather, the money comes from the ministry, or a group of enterprises which have an interest in acquiring the product of the NPK. This gives rise to an interesting triangle of "science - production - customer".

The development of science, the accumulation of knowledge, and fundamental research stimulate the development of production. Production provides the customer with a useful product, who in turn uses this product for his own purposes to stimulate and develop his own undertakings. This is a direct tie in the "science - production - customer" chain. The customer, pleased with the product from the NPK, allocates money for the development of scientific research and developments. There is a reverse connection within the chain of the triangle. In the final analysis all three sides come out ahead.

One could have examined the aspects of the direct and reverse connections more carefully. However, the purpose of this article is not to popularize the advantages of the NPK but to take a detailed look at the circumstances which have made it possible to ponder about the creation of such an association within the system of the Tajik SSR Academy of Sciences. The proposal to organize within the Institute of Chemistry imeni V. I. Nikitin the "Zarina" scientific-production complex was approved at a session of the presidium of the academy.

The "Zarina" NPK represents a union of two subelements - a scientific-research and an experimental-production organization. The scientific-research organization is comprised of three laboratories, two of which are departmentally subordinate to the Institute of Chemistry. The third laboratory is sectorally organized within the "analytical chemistry" department of the Tajik State University (TGU) imeni V. I. Lenin. A second cell consists of three experimental-production laboratories, which were created within the SKTB /special design and technological bureau/ of the Tajik SSR Academy of Sciences. The combining of these subelements is of undoubted usefulness to the Institute of Chemistry imeni V.I. Nikitin.

The technical-economic estimates, which were jointly worked out by the workers of the Tajik SSR Gosplan, demonstrate the following. If one takes into consideration the total expenses for maintaining the "Zarina" NPK and the costs associated with publishing the planned materials, the total outlays for the NPK amount to 4.1 million rubles over a period of five years. The amount of product sold over this same time period will reach 11.2 million rubles with an average per-worker output within the scientific subelement of 20,800 rubles and within the production subelement of 79,500 rubles. The difference in 7.1 million rubles can partially be used for the development of the complex, the acquisition of

scientific equipment, securing the financial situation of the Institute of Chemistry, creating an economic incentive fund, and for social and domestic needs. On the whole for the "Zarina" complex in the per ruble estimate for investment the return will amount to two rubles and 73 copecks.

In addition to what has been said, the creation of the "Zarina" NPK leads to the solution of several social problems, including the problem of the purposeful training of staff by the Tajik University and the problem of the full employment of the population. This final matter is connected with attracting for the most part the graduates from the middle schools from distant kishlaks in the Varzobskoye Canyon, because the "Zarina" is located at the site of a former Kondar mine of the Takobskoye ore administration. In the near future it will be possible to create within the NPK a student design bureau by bringing in the Tajik Polytechnical Institute.

The idea of organizing an NPK was reached in 1968, when the "metallurgy of pure metals" laboratory was created. In time, having accumulated experience in performing scientific research, it established contacts with numerous enterprises and scientific-research institutes in the Soviet Union. Within the aktiv of the laboratory there are several adopted developments at the Novokuznetsk aluminum plant and at the Isfarinskiy hydrometallurgical plant with an economic efficiency of nearly three million rubles. Within the walls of this laboratory some 13 doctoral dissertations have been defended. And especially pure aluminum, calcium, barium, strontium and several alloys using these metals have been obtained. And a comprehensive program on the problem of "protecting metals from corrosion" has been developed.

All of this has made it possible for the "metallurgy of pure metals" laboratory to take the initiative in organizing the scientific-production complex. The USSR Ministry of the Electronics Industry's order for the assimilation and organization of the production of especially pure aluminum and its alloys served as the impetus for this move. The aluminum and aluminum alloys are to be used in microelectronics manufacturing. Within a short period of time with the help of leading Soviet organizations for the first time in Soviet practice an especially pure aluminum was obtained; it was given the designation of OSCh-18-4. The experimental production of this aluminum was organized and highly sensitive instrument methods for analyzing the admixtures were developed. It was possible to achieve this through the combined efforts of the chemistry department of the Tajik State University, the Institute of Chemistry and the SKTB of the Tajik SSR Academy of Sciences.

In establishing and developing this work to obtain aluminum of an enhanced purity, a great deal of help was provided by the scientific-research institutes of VAMI /All-Union Scientific-Research and Design Institute of the Aluminum, Magnesium and Electrode Industry/ and Giredmet /State Order of October Revolution Scientific Research and Design Institute of the Rare Metals Industry/ of the USSR Ministry of

Non Ferrous Metallurgy, GEOKhI /Order of Lenin Institute of Geochemistry and Analytical Chemistry imeni V.I. Vernadskiy/, physical problems, physics of solids and chemistry of the USSR Academy of Sciences, and several institutes of the academies of sciences in the Ukraine, Belorussia, Kazakh SSR and the Uzbek SSR.

The problem was solved comprehensively. The results speak for themselves: during the past three years the "metallurgy of pure metals" laboratory completed contracts valued at 720,000 rubles and sold some 500,000 rubles worth of commodity enhanced purity aluminum. The chemistry department of the Tajik State University acquired several unique analytic instruments. The students of the faculty became more interested in the chemistry of substances of a high purity.

The state commission, which gave high marks to the results of the research that was performed, has proposed that the production of the high purity aluminum be expanded in 1983 to 1.2 million rubles. For these purposes the USSR Ministry of the Electronics Industry has without charge given the Institute of Chemistry more than eight railroad cars full of equipment. At the same time the USSR Ministry of the Electronics Industry has made new contracts for the assimilation of the production of other types of product.

The importance of the "Zarina" NPK is clear. Still, several workers, upon whom depends the adoption of the new form of integrating science and production, are displaying a reluctance to get going. Very little remains to be done - to examine and confirm the regulation concerning the "Zarina" NPK and to make changes to the structure of the scientific-research Institute of Chemistry of the Tajik SSR Academy of Sciences. It is necessary to understand and completely support the initiative of the scientific workers, who are agonizing over their creation, the first swallow in the form of the scientific-production complex of the Tajik SSR Academy of Sciences.

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COOPERATIVE EFFORTS OF BELORUSSIAN AND LITHUANIAN ACADEMIES OF SCIENCE

Moscow IZVESTIYA in Russian 5 Jan 83 p 3

/Article by K. Smirnov, special correspondent for Izvestiya, Minsk-Vil'nyus.- Kaunas: "Key to Speeding Up: The Experience of Competition and Cooperation Between the Academies of Sciences of the Belorussian SSR and the Lithuanian SSR"/

/Text/ Physicists from the Belorussian and Lithuanian academies of sciences are together studying the interaction of light with substance, high-speed processes in vapors and solutions of organic compounds, the influence of laser radiation on condensed mediums and biological objects. Together they are creating methods and means for automating optical-spectroscopic research, new means for measuring and monitoring industrial exhausts, in particular the solid and gaseous exhausts from thermal electric power stations into the atmosphere.

The Institute of the Physics of Semiconductors of the Lithuanian SSR Academy of Sciences and the Institute of the Physics of a Solid Body and Semiconductors of the Belorussian SSR Academy of Sciences are researching the problem of how radiation affects the properties of semiconductors in strong electrical fields.

The Belorussian Institute of the Mechanics of Metal-Polymer Systems and the Lithuanian Institute of Chemistry and Chemical Equipment are engaged in the development of new materials "metal - polymer", of polymer coatings on metals.

Biologists from both republics with the help of a new growth regulator have increased the productivity and improved the quality of potatoe tubers. The work was crowned by a joint patent for the invention.

The laboratory of plant physiology of the Institute of Botany of the Lithuanian SSR Academy of Sciences was the initiator of research that was shared with the Belorussian biologists on growing plants in the Salyut orbital stations.

> Joint scientific conferences and expeditions have become a tradition. During the 10th Five-Year Plan alone the Belorussian and Lithuanian scientists jointly published more than 30 monographs, books and scientific collections of articles. Power industry workers prepared several articles on the problem of thermal and mass transfer and mathematics - 18 editions of "Software for a Unified Computer System." Historians assembled a collection of articles regarding the "Energetic Friendship of the Belorussian and Lithuanian Peoples (1941-1945)" and a monograph devoted to the friendship and cooperation of the two brotherly peoples in conditions of a developed socialist society.

In the film "Nine Days in a Single Year" you may remember the slogan that was hanging from the wall of the institute which called upon the scientists to discover a new particle during the current quarter? A good many years have passed since this film was made. But even today the arguments continue: what is competition in science?

Meanwhile such competition has become a fact of life. And for today the purely theoretical discussions are not so important as to whether or not they are possible; what is important is to know what kinds of reserves are built into competition for solving the problem that was raised in the speech of General Secretary of the CPSU Central Committee Comrade Yu. V. Andropov at the November (1982) Plenum of the CPSU Central Committee: not to merely propagandize the achievements of science, new technology and new methods of labor, but to uncover and eliminate the specific difficulties which hinder scientific-technical progress.

Today it is important to use the idea of competition in forms which speed up the research effort and introduce its results while carefully considering the specific nature of scientific creativity and which will protect competition in science from profanation and from the requirement to "discover new particles during the current quarter."

The experience of the interaction between scientists from different republics attests to this. And, in particular, the nearly ten year experience of competition between the two large collectives of researchers and the academies of sciences of the Belorussian and Lithuanian republics.

> Academician N. Borisevich, President of the Belorussian SSR Academy of Sciences: "Our competition and our joint five-year plans for cooperation, which include both scientific studies and many other aspects of the life of the two republics' academies, have withstood the test of time. One can conclude that the forms of cooperation that have evolved during the competition have been fruitful and have organically evolved into a common process of strengthening friendship between the large collectives of researchers - the academies of sciences of Belorussia and Lithuania."

The cooperation between the academies is inscribed in the competition of the two republics as an important component for an entire front of economic, social and cultural construction. And very characteristic for the present stage of the development of our nation, which is to be found in the customary combination of words: the friendship of peoples, which signifies a most precious commodity of our socialist structure. This phrase has come to mean a great deal in the scientific-technical field.

During the course of the competition from year to year the system of specific stable, long-term factors stands out more and more in bold relief.

The first of these factors is the emphasis upon traditional economic, scientific, cultural and historial ties between the two neighboring peoples. The Belorussians and Lithuanians have much in common, including many points of contact in history. (It is enough to remember, for example, that the Belorussian Skorina was the first to publish a printed book in Russia; this event took place in Vilnius.) But still, these ties only really flourished at a qualitatively new level under Soviet power, when Belorussian and Lithuania found the socialist form of government in the brotherly family of the USSR.

In recent years an organizational basis for competition has been formed. In 1975 a joint decree of the presidiums of the Belorussian and Lithuanian academies of sciences led to the creation of a special interacademy commission which monitors the competition and provides the methodological management for the competition. Not less than two times in a five-year period, representative delegations from both of these academies headed by the presidents meet first in Minsk and then in Vilnius. At these meetings the delegations take a look at the results and conclude new contracts for competition and cooperation. The five-year contracts are augmented by contracts between the academies for each year.

Every year the competition results are added up and new contracts are made for cooperation between the individual academy institutes. And here again there is representation at the highest level. Meetings are held first in Belorussia and then in Lithuania. And it is here that we see the second important feature: the unity of the competition and cooperation.

The reference points of the competition are essentially the reference points for the cooperation: joint scientific-research work and the adoption of their results into the national economy, the joint training and increasing the skills of the scientific personnel, the joint utilization of the experimental base and laboratory equipment, cooperation in publication and reviewing activity, joint public-political and mass-cultural measures, and the propaganda of scientific knowledge among the workers.

In Kaunas, at the Institute of Physical-Technical Problems of the Power Industry, during a chat with the institute director, doctor of technical sciences Yu. Vilemas, and other institute managers and leading Lithuanian scientists and power engineers, we had an impromptu "round table" on this topic. Here are some of the opinions expressed during conversation at the round table:

"If it weren't for the cooperation between the Belorussians and ourselves, we would have no sense of competition. To endorse pledges and then work separately, each for himself - what kind of competition is that?"

"Cooperation is more than just shaking hands. It is when we take what is new from each other."

"If there is no contact, formalism reigns in competition. When there is contact we have no time to worry about grades."

No less important is the fact that cooperation encompasses the entire life of the academies, including public and cultural life. Of course, most attention is given to scientific work. No one will assert that ten joint cross-country races are more important than a single discovery. Still it is not so insignificant - contact is more than just sitting next to each other at an experimental device or at a seminar, but sitting around a campfire, for example. This is especially important for young people.

It is for good reason that they say that the friendship of todays young scientific workers and laboratory assistants is the friendship of tomorrow's academicians. A great deal of attention during the competition is given to the interaction of the best scientific schools of both republics, the joint training and raising of skills of the scientific personnel.

There is yet another feature of cooperation. Its organizers and participants sense a feeling of realism and of the different stages in the development of the competition and the feasibility of the problems at each stage, a scientifically scrupulous concern that the words of the contracts are identical to the real state of affairs, a sharp and operational reaction to the discrepancy between word and deed.

The scientists who have stood at the source well understand that not everything will work out right away, but it is important to take that first small step before mastering the road. While in 1973 the cooperation between the two republics was based upon ten bilateral institute level contracts, by this time this number has tripled. And while at first the work that was done jointly could be counted in units, now there are more than 40 of them.

Of course, science is developing on its own and in close interaction with economic and social progress of society. But the competition

between the research collectives is not just something that is called a competition from without; it is one of the regularities of the development of science under socialism and one of the ways to speed up this development.

The present stage in the competition between the academies of sciences of Belorussia and Lithuania is in flux. The needs for differentiation and cooperation, which focus attention upon themslves, are reflected in the principles and forms of the first stage in the competition. But these readily apparent, superficial ties have by this time been largely established.

> Yu. Matulis, president of the Lithuanian SSR Academy of Sciences, corresponding member of the USSR Academy of Sciences: "In what direction must cooperation develop in the future? I think that the reference point must be a comprehensive, program approach to joint efforts. Competition has been raised to a level where full-blooded ties between related institutes can be enriched and deepened by combining the efforts of research collectives of various profiles to solve the comprehensive problems that are faced by both Belorussia and Lithuania. Here is an example. At one time the Institute of Physical-Technical Problems of the Power Industry of the Lithuanian SSR Academy of Sciences participated in a review of proposals for the construction of the Ignalinskaya atomic electric power station (AES). In 1976 the Lithuanian SSR Academy of Sciences created a commission on atomic power, which was headed by the vice president of the academy, A. Zhukauskas. Since that time our institutes are doing a great deal of work on economic, thermal, biological, ecological research. In recent years the academic institutions of Belorussia have actively joined in."

We had a long discussion with the academician-secretary of the department of biological sciences of the BSSR Academy of Sciences L. Sushchena, also a corresponding member of the USSR Academy of Sciences, about research on the construction of the Ignalinskaya AES. The AES is being built on the border of the two republics. The construction of this power station in one of the most picturesque areas of the Soviet northwest is objectively closing the interests of geographers and economists and physicists and biologists and providing them with such a large number of problems that they can only cope with them by combining their efforts.

The institutes of economics of both academies are jointly, on a contract basis, developing a plan for the future development of industry and agriculture in the vicinity of the power station. The scientific biology centers are performing research connected with ensuring the ecological balance in this area and predicting the effect of the new power facility upon the ecosystem of Lake Drukshyay, which is to become the cooling reservoir for the AES.

The work of the Belorussian and Lithuanian biologists is not solely of interest to this specific project. They are testing general principles of the ecological service of the atomic power stations. Moreover, the research is being performed in contact with the power industry workers, designers and builders of other atomic electric power stations.

Thus, there is a comprehensive problem that encompasses research of various profiles. But at the same time the academies of the two republics are attacking this problem in their customary manner -- on the basis of bilateral contracts between related institutes. In reality the time has come for more integral ties, agreements and joint research, which combine in a comprehensive program the efforts of various institutes. And the object of such comprehensive efforts can be more than just the Ignalinskaya AES.

Time demands greater integration and a more thorough approach to other key positions of competition. The sharing of the experimental base within the framework of cooperation is of particular interest in this regard.

Scientists from the Institute of a Solid Body and Semiconductors of the BSSR Academy of Sciences are setting up experiments using the SVCh /superhigh frequency/ equipment of the Lithuanian Institute of the Physics of Semiconductors.

Lithuanian mathematicians have helped their Belorussian colleagues to organize a computer process on the BESM-6. In turn the Belorussians have shared their programs for the YeS computer with the Lithuanians.

The Institute of Thermal and Mass Exchange of the BSSR Academy of Sciences has invited colleagues from the Lithuanian Institute of Physical Technical Problems of the Power Industry to work on its optical diagnostic equipment.

Most frequently the need to perform common work on various equipment, which their partners possess, arises within institutes that are of the same profile. The cooperation between the academies has simplified the solution to this problem and has removed many unnecessary formal barriers. At the same time this cooperation has strengthened those real ties, which to the touch have been tested earlier by the related institutes.

New possibilities for the shared utilization of the material-technical base are being opened up in connection with the creation of academic centers for the collective use of unique equipment.

Both academies are closedly connected with the national economy, are fulfilling significant amounts of contract work, and are striving to adopt their developments into practice. At a recent meeting of the

Belorussian and Lithuanian scientists discussion centered upon the more efficient use of competition and cooperation to speed up the joint adoption of the developments of the academies in both republics. For example, when adopting in Belorussia a new idea that was developed by the Lithuanian Academy of Sciences, the related institute of the Belorussian Academy of Sciences must be included; and when necessary the corresponding sectoral scientific-research institute must also be included.

In Kaunas in the shops of the silk combine imeni P. Zibertas I became familiar not only with the new hydrolooms from Czechoslovakia, new fabrics and the new technologies for processing them. It was here that I encountered the concept of the trilateral creative agreement, that is already in practice. Those participating in this concept include the Belorussian academy Institute of Physics, the Lithuanian sectoral scientific research institute of the textile industry and the combine imeni P. Zibertas. The adoption of their joint work (intensification of the processes of boiling and thermal stabilizing of the artificial silk fibers) at enterprises in the RSFSR, the Ukraine, Belorussia, Moldavia and Lithuania has by this time yielded economic savings of approximately 2.8 million rubles.

Yes, one can of course argue about the role of competition in science. One can also argue about the criteria for evaluating the labor of the research collectives. However, one must remember what is most important: competition between scientists has become a reality of our times. It has its value, its heights, problems and horizons. And this is not only a topic for discussion but the subject of serious research for those scientists who are studying the problems of competition in a developed socialist society. It is no accident that at several recent scientific practical conferences, devoted to these problems, the organization and development of competition in the sphere of science received a great deal of attention.

Concluding remarks of the President of the USSR Academy of Sciences, Academician A. Aleksandrov:

I am convinced that a well organized socialist competition between research institutes, especially those whose work mutually augments and develops each other or which are devoted to various aspects of a single set of phenomena, is a useful undertaking. It promotes the expansion of the scientific range of interests of the participants, the active transfer of new methods and research results and their improvement in the joint work. At present when computers, means of automation and automated systems for analyzing and processing data of an experiment are being incorporated in scientific research, the unity of software, standard equipment solutions, etc., are of great importance. All of these problems can best be solved in conditions of competition.

Today a real result of competition is the speeding up of research and the possibility to share a better grade of equipment and instruments than what is readily available within a given institute, the opportunity to work in conditions of a constant comradely skilled discussion of both the results and ideas as they arise, and to concentrate thought and work in the most complicated directions.

The establishment of permanent and friendly ties always leads to a creative process - joint discussion. The implementation of a truly socialist, creative competition, rather than a formal one, promotes the successes of all those who participate in the competition. The competition and cooperation of the Belorussian SSR and Lithuanian SSR academies of sciences is an excellent example of this.

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KIRGHIZ SSR ACADEMY OF SCIENCES PROFILED

Frunze SOVETSKAYA KIRGIZIYA in Russian 30 Dec 82 p 3

/Article by L. Zholmukhamedova: "The Difficult Path to Inventions"/

/Text/ We all have days when it seems that suddenly our hearts are beating harder and our thinking becomes clearer and more fruitful. Then there is no room for doubts or failures. We can do anything. Everything is possible. Perhaps this is happiness? Perhaps this is the living warmth of happiness which having penetrated the web of commonplaceness, reminds us how strong and talented we are?

Ryspek Esenkulovich Sadykov, the chief scientific secretary to the presidium of the Kirghiz SSR Academy of Sciences and a doctor of agricultural sciences and professor, can recall quite a few such days. And all of them have been workdays.

Today is a long, ordinary and happy workday for him. And by the way we need to use another adjective to describe the day - difficult. Otherwise there is no good reason to call the presdium of the academy of sciences a headquarters; the coordination of efforts, the planning of scientific-research and adoption work, adding up results, meetings for discussion - all of these are the things that the academy does and lives for and that are concentrated in this organization. There is a lot of work.

The telephone rings. Sadykov barely hangs up when it rings again. It is true that these telephone calls were related to our discussion. We were remembering the creation in Frunze of a branch of the USSR Academy of Sciences in 1943 when Vladimir Georgiyevich Yakovlev called. Yakovlev, the director of the Institute of Biochemistry and Physiology, began his work in this branch. The next caller made Sadykov remember the greatest achievement of the republic's scientists - the discovery of the "phenomenon of the natural separation of Uranium-234 and Uranium-238 isotopes". This discovery led to the creation of new nuclear geochronological methods and the modeling of the accumulation of hydrogenous uranium processes in natural systems. And since our talk began to touch upon interesting work of scientists, we had to remember the work of the chemists, who are developing an original trend in

the chemistry and biochemistry of carbohydrates - the creation of low-toxic medicinal preparations. And we cannot forget the first comprehensive target program of research on the scientific justification of the comprehensive use of mineral, raw material, land, water and power resources in Issyk Kul'skaya Oblast and in regions of the Chuyskiy Valley. This problem found its way into the Basic directions for the economic and social development of the USSR. Nor can we forget about the second comprehensive program on the intensification of sheep growing and goat farming within the republic; this program was approved by the planning organs.

The Kirghiz SSR Academy of Sciences is still young. In 1954 it was established in the form of a branch. At present the Kirghiz SSR has more than 8,000 scientific and scientific-pedagogical professionals, including 2,800 doctors and candidates for the degree of doctor of sciences. The Kirghiz SSR Academy of Sciences is comprised of 17 scientific-research institutions. It is the leading center and coordinator of nearly all scientific research that is performed in the republic. It is young, but still it has an impressive record.

"Yes, this is only possible in a socialist nation," says Sadykov as he pages through a notebook. "The establishment of sciences and its development in the Kirghiz SSR is completely linked with the victory of the October Revolution. A national written language has been created and a literary language is being formed and developed. Scientists from Moscow, Leningrad and other leading scientific centers in the Soviet Union have made an enormous contribution to solving the problems that are connected with this. From illiteracy to [illegible] global scientific plans - this is a clear example of the triumph of Lenin's national policy for our party. And today the scientific institutions of the USSR Academy of Sciences are helping us a great deal.

"For example, over a period of several years the Tyan'-Shan'skaya high mountain physical-geographic station has been working in cooperation with and along with the methodological assistance of the faculty of physical geography and paleo-geography of the geography department of Moscow State University.

"The cooperation of the geologists, chemists, physicists, and other scientists is traditional and fruitful. If we were to attempt to even briefly list the addresses of the scientific institutions with which our scientists have been working over the past years, the list would take up too much space. The Uzbek SSR, the Ukraine, Far East, Belorussia, Latvia. For all intents and purposes we are working with all scientific institutions in the Soviet Union. Every year hundreds of young scientists from the Kirghiz SSR improve their skills in the leading scientific centers."

Sadykov looks at his watch: he must visit the agricultural institute today. Concern for a scientific replacement is among the most crucial worries. And so he visits the institute and has a look at the young people. He chats.

"Tomorrow is another workday," smiles the scientist.

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IMPROVED FINANCIAL MANAGEMENT OF SCIENTIFIC PRODUCTION ASSOCIATIONS DISCUSSED

Leningrad VESTNIK LENINGRADSKOGO UNIVERSITETA, EKONOMIKA, FILOSOFIYA I PRAVO in Russian No 17, Iss. 3, 1982, pp 22-26

/Article by N.A. Yevdokimova: "Improving the Organization of Finances at a Scientific Production Association"/

/Text/ The financial side of economic activities at any level of management is assigned to a separate area and includes financial relations with regard to the planned formation, distribution and utilization of monetary funds. To be specific, at enterprises (associations) these relations are developed with other enterprises and organizations in the process of paying for output, and with higher organizations and the state budget when distributing pure profit. When naming the basic directions in the improvement of financial organization at a scientific production association, one must include the following: work to improve the level of financial planning, the expansion of its own financial base, changes in the interrelations with the state budget, the shift to accounting for finished scientific output, and the expansion in the sphere of bank credit utilization. The level of financial relations is largely determined by the development of self-financing relations, the the level of financial planning as the initial unit in the organization of finances.

Under current circumstances the financial plan exerts an active influence on all aspects of economic activity, and the main financial functions are realized with its assistance: the supplying of resources, distribution, the provision of incentives and monitoring functions.

At the stage of developed socialism it is essential to improve financial planning because of the growth in the financial resources throughout the national economy, as well as in its individual economic units. Improvements in financial planning are complicated not only by the increased volumes of financial resources and the need to strengthen financial monitoring of their utilization, but also as a consequence of re-organization within the national economy and the establishment of major production-economic and scientific-production complexes.

Consequently, the expansion of the production scale, increases in the level of concentration and specialization, the emergence of new organizational

forms for primary management units, and the expansion (and contraction) of self-financing rights and obligations of the structural units which make up an association, all leave their mark on the nature of financial relations, as well as on financial planning. There arises a need to unite the finances of the diverse units which make up these complexes and to redistribute the financial resources among the enterprises and organizations which comprise the association.

The methodological basis for financial planning at any unit of the national economy is the nature of the financial relations which mediate the activities of the given unit. For example, the financial plan of a production association (or enterprise) unites all the sources of financing for the development of production. They include costs, the fund for production development, credit resources, allotments from higher organizations, profits, including the means of the unified fund for the development of science and technology, which is being created now. In the scientific-production associations the financial plan of the production sections does not include in the general sources the financial resources which go into the associations of the scientific research subdivisions, and consequently, they do not encompass the pre-production stage of expanded production. This task must be resolved by compiling a unified plan within the scientific production organization, by combining within it various stages in the process of expanded production: the preparation of production, the actual manufacture of output, its realization to consumers and the arrival of monetary resources into the unified payment of the given association's account. With the means obtained the scienitific proruction association must cover its own basic expenditures for scienitific and production activities, and it must form its own profits.

One component of the measures to establish a unified financial system for the association should include an examination of the need to compile a single balance of income and expenditures for the scientific production association. The income portion of this balance must include all the financial resources which come from all the types of activities of the subdivisions which comprise the scientific production association. In the expenditures portion the total amount of monetary resources must be distributed according to the areas of expenses. When there is no single financial plan, but a multitude of balances instead, the introduction of unified payment accounts within the individual scientific production associations does not solve the problem of how to organize a single system of finances for the association. Bringing together the payment accounts must be considered as the logical continuation of measures to improve planning and accounting.

Relations with the state budget constitute one of the concrete forms of financial relations at all levels of economic functioning. The latter make up one of the sections of the associations' financial plans and they are expressed in the appropriations received from the budget and in various payments into the budget from obtained profit. In accordance with the 12 July 1979 decree of the CPSU Central Committee and the USSR Council of Ministers, "On Improving Planning and Strengthening the Influence

of the Economic Mechanism on the Improvement of Production Effectiveness and Work Quality," basic directions have been stipulated for the improvement of profit distribution and the interrelations of associations with the state budget. They amount to an increase in the income base for the achievement of expanded production within economic units; to the strengthening of the relationship between the size of income remaining within the economic unit and the effectiveness of production and the quality of work; to a to a guarantee of payments from profit going into the state budget under any possible outcomes of plan fulfilment with regard to profit; to an increase in the concern for the adoption of intensive plan targets and to an increase in the responsibility for the effective utilization of the production capital and other resources assigned to the economic unit.

In considering practical measures for the realization of these points of the decree, the possibility of a two-alternative approach to the problem with regard to various scientific production associations should be noted. For scientific production associations which have a significant mass-production output, all of the above mentioned directions are practically realizable. Profits obtained from the realization of mass production is the foundation of the income base for these scientific production associations. These associations have the opportunity of shifting to a normative method of profit distribution and relations with the state budget, without significant allotments from it. That is, for these associations the question of shifting them (as they are ready) to principles of self financing is the right one.

For scientific production associations which shift the development and test models for mass production to production associations in the economic sector, the problem of self-financing must be considered from the viewpoint of expanding the association's own financial base. This problem is largely resolved by expanding the volume of projects completed using customers' means and means from the unified fund for the development of science and technology (UFDST). In the last 10 years the UFDST has come to occupy a significant place among the sources of financing for science, increasing from 10.4 percent in 1971 to 47.2 percent in 1980. During these years appropriations from the budget were reduced from 31 percent to 7.2 percent. Income based on economic agreements amounted to 35.7 percent in 1980.[1]

For scientific production associations, customers' means constitute self-financing means, which can help not only to cover the expenses for the fulfilment of projects, but also provide for the earning of profits. The UFDST is a source of self financing which provides for the development of science and technology only at the sector level. But its magnitude depends entirely on the effectiveness of the work of the associations which come under the ministry (or agency). In addition, the methodological guidelines for the formation and use of the UFDST stipulate that part of the unified fund is to be put at the disposal of the major production and scientific-production associations to finance measures for the development of science and technology which have been specified by the plan.[2]

The cost of industrial projects which are related to the introduction and mastery of new equipment and which are carried out through UFDST means are accounted for in the total volume of output, with a payment deducted for normative profits according to the appropriate groups of items.[3] In this way these scientific production associations create the conditions for expansion of their own financial base. But the system of self-financing does not exclude the possibility of using means from the state budget.

One of the most important measures for improving the finance-credit mechanism in the sphere of scientific research and development is the shifting of sector scientific organizations to a system of payment for work which has been fully completed and accepted by the customer. This shift is to be completed in the 11th Five Year Plan. The significance of this measure is expressed in the strengthening of the influence of the finance-credit mechanism on the effectiveness of scientific-technical and planning projects and in the accelerating of the application of their results to the national economy. The essence of this measure comes down to the following. When work is carried out on the basis of customers' orders (agreements), the customers (and a scientific production association, as well as ministries and industrial associations, may act in that capacity in specified cases), the organizations which carry out the work are paid after its completion and acceptance have been verified according to the established procedure. In this process, firstly, the role of the banking institutions is increased because they must monitor the correctness with which the agreements are concluded; they must prevent any unjustified splitting up of the work. Secondly, when this measure is realized, the process of settling up will take place through payment demands, i.e., the basis is created for the implementation of a single system of payment within the scientific production association for industrial and scientific output. Moreover, while taking into account the specific features of scientific output, the period for the acceptance of payment commission can be extended by the bank up to 10 days upon application of the customer. And thirdly, when this system of payment is introduced, the sphere of bank credit utilization is expanded. Thus, up to the planned deadline for the handing over of work, the organizations' expenses are covered through bank credit, and the resources for this are the customer's means, which are released as the transition is made to a system in which accounts are settled without any intermediate payments. And fourthly, the financing becomes continuous, because when the planned deadline for handing over the work is missed, the crediting of the expenses is continued, but with a loan at a higher rate of interest for the use of the funds. This increases concern for speedy completion of projects and responsibility for missing planned deadlines. Also contributing to this is the fact that profits provide the means for payment of the higher interest, and when profits are insufficient, the money comes from the organization's development fund.

When issuing credit, Gosbank takes into account the working capital which the organizations carrying out the work have. At the present time there is the experience of the Glavelektrotyazhmash /Main Administration of Turbo-generators, Hydrogenerators and Large Electrical Machines Production/ of the

Ministry of the Electrical Equipment Industry, where the scientific organizations are provided with their own working capital. Some authors think that this system does not provide the people carrying out the work with sufficient incentive to reduce expenses on a project, and they suggest the use of credit.[4] In our view, the need to use bank credit arises from the very self-financing basis for the conduct of the work. When scientific organizations are provided with the normative amount of working capital, it cannot be assumed that this will supply the organization fully with the necessary means. If industrial enterprises are forced to utilize borrowed means, then the self-financing scientific organizations must all the more make use of this source in connection with the specifics of the science.

In addition to the above indicated directions in the utilization of credit by scientific-production (and production) associations, the bank grants credit for the payment of projects which are financed through the means of the unified fund, if these projects are fulfiled in less than the time specified by the plan. In exchange for a guarantee from higher organizations, associations may be granted credit for the implementation of highly effective measures for the development of science and technology which were not specified in the plan. Further, the credit and interest for its used are eliminated over a period of two years from the time it was granted, and UFDST means act as the source for the reduction of the payments.[5]

When examining the question of credit utilization for the development of science and technology, we assume that it is necessary to proceed from the premise that in this area the extension of credit must be arranged with consideration for the principle of supply, i.e., the opportunity to use bank credit for science and technology appeared only when there was provision for sources to pay it off (from the UFDST, the organization's development organization, profits, its own working capital).

All of the indicated measures are elements for the practical realization of the clause in the July (1979) decree of the CPSU Central Committee and the USSR Council of Ministers on shifting scientific research, design and planning-design and technological organizations, as well as pilot enterprises, scientific-production and production associations (enterprises) of industrial ministries to a self-financing system for the organization of work on the creation, development and introduction of new equipment on the basis of customer orders (agreements).[6]

When the proportion of budget appropriations is reduced, the funds from the UFDST and income from economic agreements are increased, and use is made of an organization's own working capital and bank credit, the system of financing moves from one of "being provided for" to one that is self-sustaining.

FOOTNOTES

1. A.F. Ashanina, "Financing Scientific Research Through Income Derived from Economic Agreements," FINANSY SSSR, No 10, 1981, p 35.

2. "Sovershenstvovaniye khozyastvennogo mekhanisma: Sb. dok." /Improving the Econmmic Mechanism: A Collection of Documents/, Moscow, 1980, p 174.

3. Ibid., pp 28-29.

4. A.F. Ashanina, op. cit., p 36.

5. "Sovershentsvovaniya khozyastvennogo mekhanizma," p 204.

6. Ibid., p 28.

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ECONOMIC-TECHNICAL COOPERATION BETWEEN USSR AND GDR

Moscow PRAVDA in Russian 20 Dec 82 p 4

[Article by PRAVDA correspondent Yu. Kaz'min, Berlin: "Uniting Efforts: Facets of Cooperation"]

[Text] In recent years the word "vzaimodeystviye" [interaction, cooperation] has been encountered more and more frequently in official documents dealing with economic and scientific-technical cooperation among the nations of the socialist community, in speeches by their party and government officials, and in the mass media. This capacious word perhaps describes most accurately those relations which have been established among the brother nations.

In the last decade, for example, approximately 490 industrial and other economic installations were built in the socialist countries with the economic and scientific-technical assistance of the Soviet Union. In the German Democratic Republic alone the big Bocksberg and Enschwalde thermal electric power plants were built on the basis of Soviet equipment and with the participation of Soviet specialists.

The people in the GDR have high regard for the job done by Soviet specialists and the quality of our equipment at nuclear power generating plants in operation in this country and at the Intersputnik space communications system receiving and transmitting station. Production lines, machinery and machine tools bearing the mark of Soviet manufacturers are operating at the Ost Metallurgical Combine, the Schwedt complex of oil refineries, and at the Leuna Chemical Combine. A complete set of equipment was shipped from the USSR to a large-panel building construction plant in Bautzen and to a dry rayon pulp shop. Shipments of oil, ore, metal, and other raw materials and supplies from the Soviet Union are of decisive importance for this country's economy.

The German Democratic Republic in turn supplies the Soviet Union with consumer goods, various industrial equipment, mining equipment, machinery, machine tools, and farm equipment spare parts. The GDR fills important orders for the Ust-Ilimsk Paper Pulp Plant and the Kiyembayev Asbestos Mining and Beneficiation Combine.

A list of the parameters of mutually beneficial cooperation between the two brother nations would most likely fill dozens of pages. This is still far from

the limit, however. There are considerable unutilized possibilities and reserve potential. Formulation and ratification of the "Expansion of Cooperation Between the USSR and the GDR in the Area of Consumer Goods Manufacture" program constituted additional, convincing evidence of this. This program calls for extensive participation by the German Democratic Republic in building new and rehabilitating a number of existing light industry facilities in the Soviet Union. The foundation for this program was laid down at the Crimean meetings of the leaders of our parties and governments in 1981 and 1982, at which it was decided to concentrate to an even greater extent in coming years joint efforts toward development of science and technology and adoption of modern industrial processes.

In June 1981, during a meeting of the intergovernmental commission on economic and scientific-technical cooperation between the USSR and the GDR, officials from the ministries of light industry of the two countries reached an agreement on practical measures in this area. A working group was formed.

It became clear from the very outset that implementation of the new program will require solving a great many very serious scientific, engineering, construction and organizational problems, as well as effective, precise coordination of common efforts. Nine permanent branch groups were established for this purpose, which are responsible not only for determining specific solutions but also for their implementation.

At the first stage of cooperation by these groups, qualified experts thoroughly studied the preliminary specifications prepared by the Soviet side. Then, considering the capabilities of GDR light industry, production tasks were detailed and concretized. Thus the basic parameters of participation by the German Democratic Republic in this area of cooperation crystallized.

In June 1982, at a meeting of the intergovernmental commission on economic and scientific-technical cooperation between the two countries, the USSR and GDR ministries of light industry were instructed to implement in the course of the current five-year plan all coordinated program points, and to implement the most labor-consuming points in 1986. A total of more than 20 enterprises, shops, and sections are scheduled for construction, renovation, and technical rehabilitation.

In the Moldavian town of Ungeny construction will begin on a spinning mill, which will employ modern technology in the production of high-quality thread made of polyester staple fiber. Following renovation, the Moscow Krasnyy Vostok Factory will manufacture a large variety of sewn glove products. Production lines for the manufacture of men's, ladies', and children's footwear with a fabric top and polyvinyl chloride bottom are to be installed at three footwear enterprises in Moscow and Leningrad. Specialists from the GDR are retooling the Moscow Textile-Haberdashery Association, by incorporating a new high-output knitting process.

Shops for processing waste materials from silk mill spinning and weaving operations will appear in Lutsk, Namangan, Cherkassy, Orenburg, and Lisichansk. An agreement on retooling nine wearing apparel enterprises is presently in the implementation stage.

Wolfgang Berndt, chief of the international cooperation department of the GDR Ministry for Light Industry, related new developments he sees in the formulation and implementation of this program: "Our economic and scientific-technical cooperation is becoming stable and long-term; there is occurring further interaction of the economic ties between the two brother nations. Development is proceeding precisely in the direction specified at the 26th CPSU Congress and the 10th Congress of the Socialist Unity Party of Germany, as well as the program of specialization and co-production between the GDR and the USSR up to the year 1990.

"Up to the present time two-year cooperation plans have been drawn up between our ministries, and of course I mean light industry. Now there is a realistic basis for five-year and longer-term programs. This will give greater effectiveness to traditional scientific and technical ties and will make it possible to present them in material form and will greatly strengthen production relations...."

Specifically what GDR workforces are taking part in carrying out the new program? They include first and foremost large light industry combines and appropriate scientific research and design organizations. For example, the Berlin Garment Industry Efficiency Improvement Center, Berlin's Fortschritt Wearing Apparel Factory, the Damenmode People's Enterprise in Plauen, and an outerwear factory in Magdeburg. An industrial textile combine and its scientific center in Dresden are responsible for designing and building shops to process waste material from silk mill spinning and weaving operations.

And this is a far from complete list. Many associated enterprises in the GDR which manufacture equipment, machinery, and various means of automation and mechanization are also taking most active part in implementing this program.

The 31st Session of the Intergovernmental Commission on Economic and Scientific-Technical Cooperation Between the USSR and the GDR was held last week in Berlin. Execution of previously agreed-upon measures was discussed, and new facilities were designated at which work will be carried out to intensify the manufacture of consumer goods and to improve their quality. The commission specified concrete ways to accomplish technical rehabilitation and improvement of manufacturing processes at approximately 80 enterprises of light industry and other branches of industry which manufacture goods for the general public.

Special emphasis was placed at this meeting of the intergovernmental commission on coordinating economic plans for the period 1986, 1990 and execution of previously-signed agreements. It was pointed out that the new stage of economic and scientific-technical cooperation between the USSR and the GDR is characterized by considerable opportunities for substantial intensification of production, for improving efficiency and quality of labor. It was noted that socialist economic integration fosters strengthening of the economies of the brother countries and improved living standards for our peoples. Precisely this objective is promoted by the program of cooperation between the two brother countries in the area of consumer goods manufacture.

The program is gradually taking on concrete form. Workers, engineers, and technicians from the two brother countries are working on its implementation. These unified efforts constitute a guarantee of its successful accomplishment.

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SCIENTIFIC, TECHNOLOGICAL ADVANCE IN GDR

Moscow PRAVDA in Russian 29 Nov 82 p 4

[Article by Herbert Weiz, member of the Central Committee of the Socialist Unity Party of Germany, deputy chairman of the GDR Council of Ministers, minister for science and technology, Berlin: "From Idea to Production: Following the Policy Stated at Party Congresses"]

[Text] Implementing the decisions of the 10th Socialist Unity Party of Germany Congress, aimed at securing peace and the future prosperity of this republic, requires considerable development of the nation's economy, and particularly on the basis of acceleration of scientific and technological advance. The following task was specified as one of the main tasks in party economic strategy: to secure maximum growth of economic might by extensive utilization of scientific and technological advances in all branches and sectors of the economy. The main areas and directions of scientific and technical effort in the Germany Democratic Republic were specified in conformity with these demands.

Comrade Erich Honecker, general secretary of the SED Central Committee, has stated time and again that the achievements of the scientific and technological revolution have become a direct and principal reserve potential for increasing economic might and boosting the efficiency of the economy, and that any real, substantial progress in development of modern productive resources, both today and in the future, begins in the realm of scientific search and discovery. In particular, new technological solutions connected with development of microelectronics, robotics, microbiology, mechanics, optics, chemistry, and materials science will pave the way toward boosting labor productivity, toward making production processes more efficient, as well as toward more complete processing of raw materials and energy resources.

Under socialism science and technology serve the people. What is investigated and how obtained results are utilized are determined by people's needs, the essential requirements of our socialist society. We base our advances on the foundation of those scientific and technological achievements of past years which have provided a high scientific and technological level of the leading branches and sectors and an increase in the rate of production and economic effectiveness. In 1981, for example, total labor productivity growth was grounded on implementation of scientific and technical solutions; for the first time we succeeded in securing an industrial output growth of 5.9 percent

with unchanged consumption of primary energy, while output of products bearing the Seal of Top Quality increased by approximately one third.

This characterizes the great capabilities of our research scientists, engineers and innovators, and the increased potential of their performance results. However, proceeding from the demands of the 1980's, achieved results can be taken only as initial results. Aggravation of the international situation and problems of raw materials and energy resources, which have become complicated throughout the world, demand a more reasoned, purposeful approach toward solving problems connected with boosting labor productivity, achieving savings in materials and energy, and securing increased effectiveness of scientific research and technology in general.

In connection with the relatively limited nature of the natural resources of the GDR and the high degree of external economic interrelationships caused by this, the task is specified that there shall be invested into every finished product the greatest possible amount of inventive ideas, with maximum utilization of raw material resources and supplies at all stages of processing, and transition where possible to no-waste technology. Industrial products should meet the requirements of high reliability and durability, possess the highest parameters of productivity with minimum weight, and possess comparatively low energy and materials requirements. More must be done to establish the requisite scientific lead in a number of leading branches of industry, in order to reach the performance levels specified by national economic plans.

One urgent task is that of achieving further growth of scientific and technological potential, concentrated and orderly utilization of this potential for solving immediate economic problems. The SED and government of the GDR are urgently focusing on obtaining and incorporating in production scientific and technical research and development results which are far superior to those of past years and which provide the possibility of achieving a higher degree of intensification.

At the end of last year the SUPG Central Committee Politburo issued a decision aimed at achieving an appreciable increase in the contribution by science and technology toward the nation's economy. It stated the task of sharply improving the quality of management and planning in the area of science and technology and of taking another step toward more closely combining the advantages of socialism with the achievements of the scientific and technological revolution. Advanced to the forefront was the demand to implement at the earliest possible time and with maximum effect measures corresponding to the principal directions of scientific and technological progress and the needs of the nation's economy. In the current five-year plan we are to achieve considerable advance in many branches with the aid of extensive development and application of microelectronics and robotics. High hopes are also being placed on projects involving a radical decrease in consumption of motor fuel, thermal energy and electric power, utilization of lignites, potassium salts, other raw materials produced in this country and secondary resources, research aimed at developing special plastics and chemical fibers, as well as raising the technological level in machine building. Plan timetables and a schedule of execution of

designated measures have been coordinated, from basic research and experimental design activities to develop new products and industrial processes to their adoption into production.

Scientific manpower and resources of the GDR Academy of Sciences and higher educational institutions have also been enlisted into the process of moving technical innovations into the economy. Basic research can provide a powerful impetus for development of new equipment and processes as well as revolutionary transformations in development of the material and technological foundation. We attach the greatest importance to building even stronger bridges between science and production in such promising areas as electronics and laser technology, nuclear power engineering and organic chemistry, mechanics and materials science.

One of the decisive factors utilized in the interests of boosting the level of science and production is constant deepening of cooperation between the GDR and the USSR, particularly in areas which determine present and future scientific and technological advance. This has found expression in 160 intergovernmental and interministerial agreements. GDR research scientists know that increasing our resources with the aid of the great potential of the Soviet Union takes place in full measure when we make our own substantial contribution to the common cause.

Implementing the decisions of the party congresses, the government of the GDR reorganized industrial management. There are presently operating in this republic 157 central-subordination industrial and construction combines. These basic economic units possess great intellectual and material potential. Proceeding from the position that scientific and technological innovations influence the entire process of reproduction -- from commencement of research to sale of the finished product -- the general managers of the combines and enterprise executive personnel have an enormous responsibility. Supported by the workforce, it is their job to determine the goals and tasks of scientific research and development and to ensure that each such project is completed in not more than 2 years and that expenditures generate considerable savings both for the combine and for the nation's economy as a whole. A uniform guideline document has been drawn up for this purpose, which is binding on all combines and scientific organizations. This document specifies scientific and technical tasks prior to commencement of research and experimental design activities, specifies the anticipated economic result and the funds allocated for the project. Goals are specified in such a manner that research and development project results correspond to the world state of the art at the moment they are adopted into production. Future customers, the major co-production partners, suppliers of component items, as well as foreign trade agencies are enlisted in the process of formulating and substantiating specific tasks.

This document makes it possible to help improve in a purposeful manner the correlation between expenditures on and results of research and development projects. Project financing and economic evaluation are performed on the basis of this document. Our society spends a total of 8.9 billion marks each year on science and technology, that is, approximately 4.2 percent of our national income. This is a considerable sum, and this is why it is so important that expenditures generate savings exceeding these outlays severalfold.

Today scientific and technological advance determines growth and development of the economy more than ever before. Scientific research acquires economic weight, however, only when research results are expressed in the form of new products obtained at low cost and in the requisite quantity, or when research results in the development of a new, highly-productive, materials-saving industrial process. In order for the creative labor of research scientists to generate maximum return on investment, it is essential to bring a new product into series production as quickly as possible. To achieve this combines are working intensively to increase production of means of achieving efficiency and special industrial equipment. As a rule this work is performed by combine manpower and resources, which today frequently proves to be a bottleneck in incorporating scientific and technological advances into production.

Essential for increasing the effectiveness of science and technology are considerable efforts on the part of teams of research scientists, engineers, and innovators. How can their efforts be intensified? He who achieves better results should also receive greater moral and material reward. In order to strengthen the socialist principal of remuneration according to quality and quantity of labor, the spectrum of possibilities of material incentive for scientific innovation has been greatly broadened. Special supplements to basic wages for excellent labor indices have proven effective, for example, as have specific-purpose bonuses, which in the future will be employed even more extensively.

In short, efforts are directed toward achieving maximum effect from joining public and personal interests in the area of further scientific and technological advance in this country.

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JUBILEE SESSION OF USSR ACADEMY OF SCIENCES

Moscow PRAVDA in Russian 9 Dec 82 p 2

[TASS news report: "Soviet Science on the March: Jubilee Session of USSR Academy of Sciences General Meeting"]

[Text] In no other country in the world has science received such acknowledgement and prestige as in the USSR. Its development in our country has always been the business not only of scientists but of the entire people and party. Scientists gathered in Moscow on 8 December for the Academy of Sciences General Session Jubilee Meeting dedicated to the 60th anniversary of the establishment of the USSR, aware of their great duty to the people and party.

The assembled gathering included representatives of Moscow's scientific community as well as delegations from the academies of sciences of the union republics, as well as the academies of sciences of the People's Republic of Bulgaria, Hungarian People's Republic, Socialist Republic of Vietnam, GDR, Democratic People's Republic of Korea, Cuba, Mongolian People's Republic, Polish People's Republic, Socialist Republic of Romania, Czechoslovak Socialist Republic, and the Socialist Federal Republic of Yugoslavia.

Applause greeted meeting participants comrades K. U. Chernenko, B. N. Ponomarev, and M. Z. Zimyanin. The presidium also included top officials of the USSR Academy of Sciences and the academies of the union republics, as well as presidents of academies of the socialist countries.

Those present at the meeting elected with great enthusiasm an honorary presidium consisting of the Politburo of the CPSU Central Committee.

Those present honored with a minute of silence the memory of Leonid Il'ich Brezhnev -- a great political leader and stateman of the contemporary era, who displayed constant concern for the development of science and strengthening of our homeland's scientific potential.

Academician A. P. Aleksandrov, president of the USSR Academy of Sciences, who opened the meeting, stressed that Soviet scientists have firmly embraced the appeal to speed up practical implementation of scientific achievements, an appeal addressed to them from the speaker's stand at the November CPSU Central Committee Plenum. The president noted that we stand today at a high level in

almost all areas of science, and we are the world leaders in a number of scientific trends.

"On this joyous day, gathered together at this jubilee session," stated A. P. Aleksandrov, it is pleasant for us to acknowledge that our country has arrived at the 60th anniversary of establishment of the USSR with a result which no other country in the world can claim: in all the union republics in which before the revolution one was hard put to find even a dozen literate individuals, today we find at work scientists whose names are known not only in this country but abroad as well. The republic academies are playing a leading role in many areas of Soviet science. Is this not the most vivid result of the Leninist nationalities policy in the area of harmonious development of all the nationalities and ethnic groups in the USSR?"

Academician V. A. Kotel'nikov, vice-president of the USSR Academy of Sciences, presented a report entitled "60th Anniversary of Establishment of the USSR and Development of Soviet Science."

"The 60th anniversary of our Soviet multinational state," stated the scientist, "is vivid evidence of the triumph of the Communist Party's Leninist nationalities policy and the historic achievements of socialism. Unification of the Soviet republics into a single amicable family on the basis of full equality fostered to the greatest degree the rapid scientific-technological and social advance by our homeland, which today is the world leader in many areas of modern science."

Soon after the victorious Great October Revolution the principle of government organization of science was advanced in this country and began to be implemented. In his famous "Draft Plan for Science and Technology" in April 1918, Lenin assigned the Academy of Sciences the task of development of research on problems connected with efficient distribution of productive resources, supplying the nation's economy with mineral raw materials, and electrification of industry, agriculture, and transportation. Lenin's ideas made a deep imprint on subsequent academy activities and on the development of all Soviet science.

During the first years of Soviet rule, in spite of physical devastation and civil war, new research institutes -- both academy and branch -- began to be established.

The scientific establishments of the Academy of Sciences and other agencies began to develop particularly rapidly in Leningrad and Moscow, where our central scientific institutes were established and subsequently strengthened.

Moscow and Leningrad continue today to be this country's principal scientific centers. Simultaneously with their development, the task of extending scientific research to all union republics was stated from the very beginning. From the very first years of Soviet rule, economic and social policy in this country stipulated boosting Russia's former ethnic hinterlands to the level of development of the central region as rapidly as possible. And this task was successfully accomplished. A most important role here was played by close cooperation among all this country's nationalities, and particularly by selfless assistance by the Russian people.

Our country's first national Academy of Sciences following the October Revolution was established in the Ukraine. Founded in 1919, it has preserved a grateful memory of the Russian scientist-enthusiasts who took part in its founding and development.

A group of professors, instructors, a library and laboratory equipment were sent to Tashkent in February 1920 by a special train, taken from the civil war front, for the purpose of development of science in Central Asia. This mission, unprecedented in the history of science, resulted in establishment of a state university in Tashkent in the fall of that year, by a decree of Lenin; this university played an enormous role in the development of science in Central Asia and Kazakhstan.

In 1922 a combined Institute of Belorussian Culture -- Inbelkul't -- was established in the Belorussian SSR. The Belorussian Academy of Sciences was subsequently (1929) formed on the basis of this institute.

Combined expeditions working in various parts of the country, bringing together geographers, geologists, botanists, zoologists, geodesists, economists, and scientists of other areas of specialization, were of inestimable help in carrying out the tasks assigned to young Soviet scientists. Development of many of this country's regions and exploitation of large storehouses of mineral raw materials are linked with the names of the organizers of these expenditions -- eminent scientists A. Ye. Fersman, N. S. Kurnakov, Ye. N. Pavlovskiy, D. I. Shcherbakov, K. I. Skryabin, D. V. Nalivkin, and many others.

The results of these efforts were very soon in evidence. During the prewar five-year plans scientist research fostered the vigorous industrial development of this country's eastern regions, establishment of the USSR's second coal and metallurgical base, and development of large-scale power systems.

The first USSR Academy of Sciences branch in the Transcaucasus was established in 1932, with Georgian, Armenian and Azerbaijan divisions, and scientific research facilities in Kazakhstan and Tajikistan. By the end of 1940 the Azerbaijan, Armenian, Georgian, Kazakh, Tajik, Turkmen, and Uzbek affiliates of the USSR Academy of Sciences had been established in the republics.

The Georgian SSR Academy of Sciences was established at the beginning of 1941. The Great Patriotic War did not stop the development of new combined academy scientific establishments in the union republics. The academies of sciences of Armenia and Uzbekistan were organized in 1943, as well as the Kirghiz affiliate of the USSR Academy of Sciences.

Scientists evacuated eastward from Moscow, Leningrad, the Ukraine, and Belorussia took active part in scientific research work together with the scientists of the republics of Central Asia and Kazakhstan.

Academies of sciences of the Latvian and Estonian SSR were organized in the first year after the war, and the Lithuanian Academy of Sciences, which had been established in 1941, resumed its operations. These academies, relying on the considerable assistance of scientists from Moscow, Leningrad, and other

Soviet cities, and utilizing their indigenous-nationality scientific personnel, became major scientific centers, the research results of which have been utilized far beyond the borders of their republics.

The Moldavian affiliate of the USSR Academy of Sciences was redesignated a republic academy in 1961.

At the present time the 14 republic academies have approximately 370 scientific establishments, employing 193,000 persons, including 1400 academicians and corresponding members, and approximately 3200 doctors of sciences.

The speaker further discussed in detail the development of science in the RSFSR. In 1931 the USSR Academy of Sciences specified measures to achieve further development of scientific activity in the peripheral areas. It was acknowledged necessary to establish academy scientific establishments first of all in those regions where intensive exploitation of natural resources was taking place or was planned, where industrial enterprises and power complexes were being built in conformity with the five-year plans. The Khibinskaya Mountain Station was established on the Kola Peninsula; it was later redesignated the academy's Kola Scientific Research Base. This was followed by establishment of the Ural and Far Eastern affiliates, and a northern base in Syktyvkar. During these same years teams of young physicists, mechanical engineers and other specialists were sent to Sverdlovsk and Tomsk from the USSR Academy of Sciences Leningrad Physics-Technical Institute, who established the first scientific research subdivisions of physics-technical specialization and vigorously engaged in training engineer personnel for the rapidly growing industry of the Urals and Siberia.

During the Great Patriotic War the work activities of the scientific research establishments of Moscow, Leningrad, Kharkov, Kiev, and other cities which were evacuated eastward were focused on defense needs. The Western Siberian and Kazan affiliates of the USSR Academy of Sciences were established during these years.

After war's end there was observed a continued strong upswing in the development of science in the RSFSR. The Kola, Komi, Karelian, Dagestan, Crimean, Sakhalin and Yakutsk scientific research facilities were redesignated academy affiliates. In 1957 the Siberian Department of the USSR Academy of Sciences was established, based on the Western Siberian, Eastern Siberian, Far Eastern and Yakutsk affiliates, as well as the Sakhalin Combined Scientific Research Institute. The Ural and Far Eastern scientific centers of the USSR Academy of Sciences, as well as large research centers in Saratov, Kuybyshev, and Ivanov became an important stage in the development of science in the Russian Federation.

Thus today academy science in the RSFSR, not including Moscow and the Moscow area, Leningrad and the Siberian Department, is represented by more than 70 scientific establishments, employing approximately 24,000 persons.

Science is also developing extensively and in the most diversified directions in other areas of the Russian Federation. The affiliates and scientific centers

in the RSFSR as well as the Siberian Department of the USSR Academy of Sciences, combining general scientific research with projects aimed at development of the corresponding regions, are devoting considerable attention to study of the history, culture, and languages of the peoples inhabiting those areas.

The speaker further stated that the Soviet State is lavishly expanding resources on the development of science. Scientists conducting basic research today have at their disposal highly-developed experimental facilities. These include powerful high-energy charged-particle accelerators, nuclear research reactors, other physics facilities, unique optical and radio telescopes, as well as space hardware. Facilities include powerful presses and other research equipment, as well as a large fleet of research vessels.

Soviet science has to its credit a great many major achievements, of which our people can be proud. Outstanding achievements in space exploration constitute a truly epochal achievement of Soviet science and technology. These truly historic accomplishments are connected with the fruitful activities of a number of scientific research teams, headed by academicians S. P. Korolev, M. C. Keldysh, as well as other outstanding scientists and designers.

We began conducting basic-research investigations of the atomic nucleus back in the prewar years, research which led to a number of important discoveries and enabled our country in short order to lay down the foundations of peaceful utilization of the energy of the atomic nucleus. The team of scientists led by Academician I. V. Kurchatov deserves enormous credit for this. Nuclear power engineering was also developing successfully in this country, and a nuclear-powered icebreaker fleet was built.

The scientist stated that the development of science in the USSR has played an important role in the development of our aircraft industry, radio electronics, chemistry, geology, medicine, agriculture, and many other areas in which in many instances we blazed pioneer trails.

Our social sciences, which comprise the scientific foundation for guiding the development of Soviet society, have achieved a high level.

We know that the development of science has always required contact among the scientists of different countries. This is particularly essential in the contemporary era, when the most important problems of science and technology have assumed a global character and can be solved only through the joint efforts of scientific establishments and scientists from many countries throughout the world. Our international cooperation is growing and becoming stronger year by year, particularly cooperation with scientific establishments and scientists in the brother socialist nations. Scientific contacts with the capitalist and developing countries are also increasing, in spite of attempts by imperialist forces to impede this process. The USSR Academy of Sciences is engaged in scientific cooperation with scientific establishments and scientists of more than 100 countries.

Considerable attention is devoted to cooperation with foreign countries in exploration and exploitation of space.

Soviet scientists, together with the party and with our entire people, inalterably advocate peace and cooperation among all nations, regardless of their social systems. Soviet scientists fully support our country's peace initiatives, which are directed toward eliminating the threat of nuclear catastrophe and toward establishing a lasting peace on earth. They are doing a large and noble job of uniting the world's scientists in the campaign for disarmament.

Academician V. A. Kotel'nikov stated in conclusion that the anniversary of our multinational, unified Soviet State is a genuine triumph of the all-conquering ideas of Lenin, a triumph of science, the ideals of peace and progress. The efforts of this country's scientific establishments and scientists are presently directed toward implementing the historic decisions of the 26th CPSU Congress and subsequent party Central Committee plenums, toward all possible assistance to science in solving pressing problems of building communism and toward accelerating practical implementation of scientific advances.

A broad picture of scientific research being conducted in this country was presented by the presidents of the academies of sciences of the union republics who addressed the meeting: B. Ye. Paton, N. A. Borisevich, A. S. Sadykov, A. M. Kunayev, Ye. K. Kharadze, Yu. Yu. Matulis, A. A. Zhuchenko, A. K. Malmeyster, M. I. Imanaliyev, M. S. Asimov, V. A. Ambartsumyan, A. G. Babayev, as well as N. A. Guliyev, acting vice-president of the Azerbaijan SSR Academy of Sciences, and A. A. Keyerna, vice-president of the Estonian SSR Academy of Sciences. They stressed that establishment of and rapid progress by the republic academies during the years of Soviet rule is a result of establishment of the USSR 60 years ago and selfless assistance by the Soviet State, Russian scientists, and fraternal mutual support on the part of the Soviet republics. Development of science began virtually from zero in many republics. Today the activities of the national academies frequently extend beyond the boundaries of that republic, assuming all-union and frequently international significance as well.

Each of the republic academies described by the speakers has its own unique countenance, which in large measure is determined by the capabilities and requirements of that republic's economy. The traditional interests of the scientists of the Ukraine, for example, are close to the tasks of a number of major industries, such as metallurgy and metalworking.

Major scientific results have been achieved in Belorussia pertaining to the physical-mathematical and technical sciences, as well as biology. Suffice it to mention theory of optical properties of crystals, methods of investigation of complex molecules, development of lasers with stepless retunable emission frequency, and other achievements by this republic's scientists.

The speakers noted in particular work in the area of bioorganic chemistry, biology and chemistry of cotton performed at academy institutes in Uzbekistan, as well as work connected with the mining and processing of mineral raw materials, traditional for the scientists of Kazakhstan; the successes of the Georgian school of mathematics, as well as Georgia's physiologists; research by Azerbaijan's scientists, who have developed advanced petrochemical processes, and Lithuanian physicists, who have discovered basic properties of semiconductors.

The active role played by Moldavia's academy institutes in the development of that republic's agroindustrial complex and the contribution made by Latvia's scientists toward magnetohydrodynamics and theory of organic synthesis are widely known throughout the country. The scientists of Kirghizia are actively participating in improving equipment for the mining industry. The scientists of the Tajikistan Academy of Sciences are giving considerable practical assistance to builders in this country's seismic-hazard areas. Research conducted by Armenia's astrophysicists, Turkmen scientists who established the scientific principles of developing arid land use, and Estonian experts in atmospheric physics and crystal spectroscopy are highly regarded in the scientific world.

The session participants enthusiastically sent a letter of greeting to the CPSU Central Committee. Fostering in every possible way the scientific-technical and social advance of our homeland, the letter states, its economic and defense might, and a steady rise in the people's standard of living and cultural standards, Soviet scientists see as their primary duty in the future achieving an increase in the contribution of science to the cause of building communism. Our country's scientists view the Peace Program for the 1980's advanced at the 26th CPSU Congress as a great international security charter, as a fighting platform of action against the threat of nuclear war.

On behalf of the multimillion-person army of scientists, the session participants expressed enthusiastic support for the decisions of the November (1982) CPSU Central Committee Plenum and voiced unanimous support for the points and conclusions contained in Yu. V. Andropov's speech at the plenum. The scientists assured the CPSU Central Committee, the Presidium of the USSR Supreme Soviet, and the USSR Council of Ministers that they will make every effort to carry out the historic plans of the Leninist party for the sake of the triumph of communism and peace on earth.

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PROGRESS IN LATVIAN SCIENCE REPORTED

Moscow PRAVDA in Russian 8 Dec 82 p 3

[Article, published under the heading "Soviet Latvia: Horizons of Science," by Hero of Socialist Labor A. Malmeyster, president, Latvian SSR Academy of Sciences: "Comprehensively, Purposefully"]

[Text] Science in Soviet Latvia has taken an enormous step forward since the republic joined the friendly family of brother peoples. Today it occupies a leading-edge position, and the scientific results achieved by Latvian scientists have earned widespread and deserved recognition. But we must mention how generously we were assisted initially and continue to be helped today by our colleagues in other republics, and the fruitfulness of the firm and continuous ties with them in all areas of scientific investigation is obvious!

Latvia's scientists see as their primary duty working together actively with all working people in order to foster the further strengthening of our country's economic might. During the current five-year plan academy establishments are taking part in working on 10 combined programs and 21 programs pertaining to solving major scientific and technical problems, ratified by the USSR State Committee for Science and Technology, Gosplan, and the USSR Academy of Sciences. In addition, there are 10 combined republic programs to carry out. The purpose of this work is to help accomplish better and faster the important tasks facing the economy of Soviet Latvia. I should like to stress that the very fact of establishment and implementation of specific-purpose combined programs pertaining to solving complex scientific and technical problems attests to strengthened mutual ties between science and production.

The entire Soviet people and the working people of Latvia are presently engaged in implementing the Food Program. Our scientists are also making a contribution. The people at the Power Engineering Physics Institute, for example, will be working on problems of efficient utilization of electric power and thermal energy in agricultural production. The staff of the Institute of Organic Synthesis is developing highly effective agricultural crop growth and development regulators. The theoretical principles of optimizing mineral feeding of plants taking into consideration an aggregate of environmental factors are being elaborated at the Institute of Biology. The Institute of Microbiology imeni A. Kirkhenshteyn has devised a process for producing a highly-effective enricher of low-protein livestock rations -- lysine. Scientists

at the Institute of Economics have directed their efforts toward investigation of a qualitatively new form of organization of agricultural production -- the rayon agroindustrial association.

Another most important area of investigation is the development of new, advanced technologies. Considerable results in this area have been achieved by the staffs of the institutes of physics, power engineering-physics, and wood chemistry. The people at the Power Engineering-Physics Institute, for example, have devised a number of methods of improving industrial processes of manufacturing semiconductor devices. The Tallinn Electrical Equipment Plant imeni M. I. Kalinin has adopted a method of cleaning and protecting the surface of semiconductors utilizing liquid phase. Annual savings total 800,000 rubles. The institute has developed 18 different instruments for contactless nondestructive testing of the parameters of layered semiconductor structures. They have gone into widespread practical use.

The research conducted by the staff of the Institute of Mechanics of Polymers is known far beyond the republic's borders. It works primarily on problems of developing new component materials and products made from composite materials with a set of prescribed properties. The Institute of Inorganic Chemistry is successfully conducting basic research in the area of plasma chemistry and plasma technology of inorganic compounds.

Formulation of rational scientific and scientific-organizational principles of search for, study and practical adoption of new medicinal preparations has become an urgent demand of our time. A Soviet scientific center which has been working successfully in this area for more than 20 years now is the Institute of Organic Synthesis of the Latvian SSR Academy of Sciences, a large scientific establishment which is widely known for its specific research to obtain new physiologically active compounds which regulate various functions of the human organism.

It was noted at the November (1982) CPSU Central Committee Plenum that our country possesses large reserve potential in the economy and that such reserve potential must be sought in acceleration of scientific and technological progress, extensive and rapid incorporation into production of the achievements of science, technology, and advanced know-how. Academy establishments were assigned the direct task of not limiting themselves to dissemination of new equipment and new methods of labor, but to pinpoint and eliminate specific difficulties which impede scientific and technological progress. Our republic's scientists are presently directing their efforts toward accomplishing these tasks.

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DRAWBACKS OF SCIENTIFIC RESEARCH INCENTIVE PAYMENT SYSTEM

Moscow PRAVDA in Russian 2 Dec 82 p 3

[Article, published under the heading "Effective Utilization of Scientific Potential," by V. D'yakovskiy, deputy director for mining scientific research projects, Unipromed' Institute, Sverdlovsk: "How and for What an Institute Is Paid"]

> [Text] Scientific research, design and experimental design organizations bear great responsibility for scientific and technological advance. Practical realities insistently demand that they actively assist in the adoption of all new and progressive things and at the same time conduct serious research.
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> Unfortunately many of them do not operate as is demanded by the present stage of scientific and technological progress. Proposed technical and engineering solutions are not always in conformity with this level.

It was noted at the November (1982) CPSU Central Committee Plenum that it is essential to create conditions -- economic and organizational -- which would stimulate high-quality productive labor, initiative and enterprise. On the other hand, poor work performance, inertia, and irresponsibility should have the most direct and unavoidable effect on financial compensation, on job position, and on the moral authority of personnel.

This is correct. How should the operations of a branch scientific-research institute be organized so that it is fully in conformity with the demands of the time?

In the 11th Five-Year Plan branch institutes are being converted over to a cost-accountability system of organization of research on the basis of contract service orders, which will also determine volume of research. Research effectiveness will also be assessed in a new way: not by conditional economic effect but by reduction of production cost at enterprises as a result of adoption of scientist proposals. The same principles will apply to payment for fully completed research the fruits of which have found practical application.

Several years ago some scientific research institutes, including in the USSR Ministry of Nonferrous Metallurgy, were experimentally changed over to such a

system of planning and economic incentive. Our Ural Scientific Research and Design Institute for the Copper Industry -- Unipromed' -- has been operating on the principle of cost accountability for almost 10 years now. Considerable experience has been amassed during this time, which makes it possible to appraise the unquestioned advantages and to determine certain drawbacks of the system.

Cost accountability has compelled scientists to strengthen contacts with the production people and more persistently to seek optimal ways to implement their ideas. In short, scientific researcher activeness has increased considerably. They have begun approaching in a more thorough manner appraisal of the effectiveness of proposed solutions, which has resulted in additional savings. In the last 10 years, for example, return per expended ruble from utilization of research results generated by Unipromed' -- not conditional but actual -- has increased by a factor of 1.5.

At the same time the new system sometimes encourages the conduct of minor-significance projects which produce immediate effect. Often they can and should be performed by plant technical and research subdivisions, but they are often turned over to scientific research institutes, and this creates preconditions for wasting effort on trivial topics.

In addition, such a handling of the matter causes many investigators to stray "from the true path." Today specialists working on less complicated innovations but which produce effect more rapidly are in a more advantageous position than those who include in their plan large, substantial projects, which naturally require application of more serious effort and considerable expenditure of time, for incentive is set up in such a manner that the greater the effectiveness of project results, the smaller the percentage of contribution to the incentive fund. For example, if savings amount to only 50,000 rubles, up to 4-6 percent of this amount goes into the incentive fund, while if savings total 500,000 rubles, it drops to 2 percent. Therefore it is more profitable for research scientists to complete a dozen miner research projects than one major project, even if it is much more valuable: bonuses received for the latter will be from one third to one half as much.

Here is how this works out in practice. Pyrometallurgical process laboratory researchers proposed and adopted at the Karabash Copper Smelting Combine a method which made it possible successfully to utilize the extremely difficult-to-process high-silicon Gay ore. In two years savings totaled 1,700,000 rubles. And yet half as much was paid into the incentive fund as for 15 odd minor projects equivalent to normal technical assistance to enterprises. This induces scientific subdivisions and individual scientists to work on insignificant problems instead of concentrating efforts in mainline areas. Since savings per ruble spent serves as the principal indicator of the performance of a scientific subdivision, most frequently basic research is pushed to the background, and yet it is the fruits of this research which ultimately determine a branch's future.

Scientific-research institute plans should be ambitious and should harmoniously combine applied and basic research. Without an adequate scientific lead, any workforce will soon find itself in a dificult predicament. Institute

management and party organizations must keep careful watch to ensure that subdivision workforces are conducting further basic research and are more frequently employing stage-by-stage expert appraisal of research investigations.

There is also another problem. The results of some scientific research projects are not transmitted directly to production; some form the basis for subsequent designs. Incidentally, it is these which generate the most substantial economic effect. Return on funds invested in capital construction is determined in large measure by the level of the designs involved, which depends on the quality of recommendations by scientific research institutes. Today, however, it is not profitable for the researcher to transfer his research results directly into a design -- they will henceforth be considered the product of the designers, and the author will be refused recognition of the fact that actual savings were obtained on the basis of his ideas. This is acknowledged only if recommendations improve an already completed design which is in the process of execution.

Such cases are not a rare occurrence. The surface mining laboratory suggested to the design engineers a variant plan for expanding the configuration of pit No 2 at the Gay Mining and Beneficiation Combine which was 710,000 rubles per year more economical than the designated layout. When the design was implemented, however, they refused to acknowledge that savings had been achieved on the basis of the recommendations of these scientists.

Fairness demands that during practical execution of designs, savings achieved through utilization of scientific recommendations automatically increase the actual economic effect of the labor of research scientists. Then scientists will gladly recommend the results of their investigations for implementation in designs. This will increase incentive to become involved in large-scale projects which ultimately will generate greater return.

What funds should be used to reward institutes and the authors of recommendations? In my opinion, either a centralized ministry fund -- including a scheduled funding increase -- or from the increased profits of the new enterprise in comparison with the branch average for the given type of production. But this "medal" should also have a reverse side: the authors should bear personal liability for poor-quality scientific recommendations, while institutes should be punished in the form of fines: they should pay by loss of certain amounts from economic incentive funds.

Interaction should be strengthened between combined institutes, which have scientific and design-survey components. At the present time links between research scientists and designers are extremely limited here. At Unipromed', for example, projects being carried out by designers for scientific subdivisions comprise approximately 8 percent of the total volume of plan-specified targets. This situation should be reexamined, and combined institutes should permit designers to devote greater attention to the needs of the scientific component.

Incorporation of the n e w is as a rule a result of coordination between scientific research and design institutes on the one hand and production people on the other. It is necessary to specify a timetable for adoption and amount of payment for individual stages of research taking into account assigned tasks

and obtained results for each specific project. At the present time production people have less incentive than research scientists and designers to adopt a new innovation. This fact merits separate discussion. It is obvious, however, that as long as there is poor incentive for production people to adopt new equipment, difficulties on the road of scientific and technological advance cannot be avoided. Things must be arranged so that there is a campaign conducted not only for adoption but also for joint search for new solutions needed by production.

We should also state that scientific research institute work in the new conditions merits greater attention on the part of economists. Today this is a practical demand. Serious research by specialists in economics will help achieve further improvement of the economic management mechanism, which is very important for progress in all areas of production.

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AWARDING OF STATE PRIZES OF UKRAINIAN SSR IN SCIENCE AND TECHNOLOGY FOR 1982

Kiev PRAVDA UKRAINY in Russian 25 Dec 82 pp 1, 3

[Decree of Central Committee of Ukrainian Communist Party and of Ukrainian SSR Council of Ministers, signed by secretary of the Central Committee of the Ukrainian Communist Party V. Shcherbitskiy, and by the chairman of the Ukrainian SSR Council of Ministers A. Lyashko]

[Text] The Central Committee of the Ukrainian Communist Party and the Ukrainian SSR Council of Ministers, having considered the presentations of the Committee on State Prizes of the Ukrainian SSR in the field of science and technology attached to the Ukrainian SSR Council of Ministers, decree that the following state prizes of the Ukrainian SSR for 1982 be awarded:

In the Field of Science and Technology

1. To Iosif Il'ich Gikhman, corresponding member of the Ukrainian SSR Academy of Sciences, department head of the Institute of Applied Mathematics and Mechanics, Ukrainian SSR Academy of Sciences, Anatoliy Vladimirovich Skorokhod, corresponding member of the Ukrainian SSR Academy of Sciences, department head of the Institute of Mathematics, Ukrainian SSR Academy of Sciences, for their monograph "The Theory of Random Processes" (in three volumes), published during the period 1971-1975.

2. To Aleksandr Aleksandrovich Galkin, academician of the Ukrainian SSR Academy of Sciences (posthumously), to Boris Georgiyevich Lazarev, academician of the Ukrainian SSR Academy of Sciences, department head of the Kharkov Physicotechnical Institute, Ukrainian SSR Academy of sciences, Vladimir Mikhaylovich Azhazhe, candidate of physicomathematical sciences and laboratory head, Liba Shmuilovna Lazareva, candidate of physicomathematical sciences, and to Oleg Vladimirovich Chernyy, candidate of technical sciences, group leaders, Vitaliy Artemovich Poltavets, deputy laboratory head, to workers of the same institute, Vladimir Mikhaylovich Pan, doctor of physicomathematical sciences and department head, Yuriy Ivanovich Beletskiy, candidate of physicomathematical Sciences, sector head, to workers of the Institute of the Physics of Metals, Ukrainian SSR Academy of Sciences, Valentin Porfur'yevich Buryak, candidate of technical sciences and department head, Nikolay Ivanovich Matrosov, candidate of technical sciences and laboratory head, and to workers of the Donetsk Physicotechnical Institute, Ukrainian SSR Academy of Sciences, for a cycle of investigations "Development and Investigation of Superconductors with High Critical Parameters."

3. Tat'yana Esperovna Lipatova, doctor of chemical sciences and department head, Georgiy Aleksandrovich Pkhakadze, candidate of biological sciences and senior scientific associate, Lidiya Nikitichna Chuprina, junior scientific associate and to workers of the Institute of Organic Chemistry, Ukrainian SSR Academy of Sciences, Roman Aleksandrovich Veselovskiy, doctor of chemical sciences and department head, Rozaliya Viktorovna Gorbenko, chief of experimental production research installations and to workers of the Institute of the Chemistry of High Molecular Compounds, Ukrainian SSR Academy of Sciences, Sergey Aleksandrovich Shalimov, doctor of medical sciences and department head of the Kiev Scientific Research Institute of Clinical and Experimental Surgery, Nikolay Borisovich Sitkovskiy, doctor of medical sciences and department head, Andrey Konstantinovich Kolomiytsev, doctor of medical sciences, professor, Valentin Porfir'yevich Yatsenko, candidate of medical sciences, docent, and Timur Ivanovich Dan'shin, candidate of medical sciences and assistant and to workers of the Kiev Medical Institute imeni Academician A. A. Bogomol'ets for theoretical development of new biologically destructive medical polymers, experimental checking of them, development of production technology and introduction into clinical practice.

4. To Vladimir Vasil'yevich Morgun, doctor of biological sciences and department head of Institute of Molecular Biology and Genetics, Ukrainian SSR Academy of Sciences and work supervisor, Vasiliy Sidorovich Boreyko, candidate of biological sciences and senior scientific associate of the same institute, Vladimir Feodorovich Peresypkin, corresponding member of VASKhNIL [All-Union Academy of Agricultural Sciences imeni V. I. Lenin] and department head of Ukrainian Agricultural Academy, Ivan Petrovich Chuchmiy, candidate of biological sciences and laboratory head of Cherkassiy State Agricultural Experiment Station and Petr Kliment'yevich Shkvarnikov, doctor of biological sciences, professor, for a cycle of investigations "Development of Methods for Experimental Production and Practical Use of Induced Mutations in Plants."

5. Boris Aleksandrovich Mironov, general director of Production Association Kherson Combine Plant imeni G. I. Petrosvkiy, Boris Dmitriyevich Kozachok, chief, Arseniy Petrovich Orekhov, deputy chief of special design office, Gennadiy Matveyevich Arkhipov and Pavel Petrovich Baranovskiy, office chiefs of special design office, Ivan Fedorovich Striy, brigade leader of electric welders and to workers of the same association, Nikolay Vasil'yevich Tudel' and Viktor Yefimovich Poyedinok, candidates of technical sciences and laboratory heads, to Vasiliy Ivanovich Kiforenko, senior scientific associate, and to workers of the Ukrainian Scientific Research Institute for Mechanization and Electrification of Agriculture for development and introduction of the PPK-4 machine that implements the highly efficient technique of harvesting the entire biological yield of corn in one pass of the unit.

6. Vasiliy Dmitriyevich Bratus', corresponding member of the Ukrainian SSR Academy of Sciences and department head of the Kiev Medical Institute imeni Academician A. A. Bogomolets, Nikolay Yefimovich Povstyanyy, doctor of medical sciences and department head of the Kiev Scientific Research Institute of Hematology and Blood Transfusion, David Yevseyevich Pekarskiy, doctor of medical sciences and department head of Kharkov Scientific Research Institute of General and Emergency Surgery, Avram Shimonovich Lazaretnik, doctor of medical

sciences and chief of intersector experimental laboratory, Petr Mikhaylovich Perekhrestenko, candidate of medical sciences and deputy chief of main administration of Ukrainian SSR Ministry of Health, Sergey Andreyevich Smorshchik, candidate of biological sciences and department head of Ternopol' State Medical Institute, Semen Arkad'yevich Polishchuk, candidate of medical sciences and docent of Donetsk State Medical State Institute imeni M. Gor'kiy, Oganes Viktorovich Vartanyan, department head of Voroshilovrad Oblast Clinicat Hospital imeni F. E. Dzerzhinskiy, Nikolay Artemovich Ochered'ko, department head of Vinnitsa Oblast Clinical Hospital imeni N. I. Pirogov, and to Aleksey Aleksandrovich Fedorovskiy, doctor of medical sciences, professor (posthumously) for a cycle of investigations "Development of the Pathogenesis of Burn Trauma, Diagnosis, Treatment and System of Organization of Assistance and Rehabilitation of Patients Traumatized by Burns in the Ukrainian SSR."

7. To Nikolay Pavlovich Starodub, candidate of technical sciences and senior engineer, Viktor Nikolayevich Derevyanko, deputy chief engineer, Ivan Markovich Mukhe, candidate of technical sciences and department head, Nikolay Nikolayevich Krizhanovskiy, shop chief, Petr Grigor'yevich Grument, polisher, and to workers of the Kiev Production Association imeni S. P. Korolev, Vladimir Sergeyevich Kovalenko, doctor of technical sciences and dean of Kiev Polytechnical Institute imeni 50-letiya Velikoy Oktyabr'skoy sotsialisticheskoy revolyutsii, Vladimir Petrovich Bondarenko, candidate of technical sciences and department head, Vyacheslav Antonovich Rybitskiy, candidate of technical sciences and senior scientific associate, Vitaliy Ivanovich Mel'nik, chief technician of experimental plant and to workers of the Institute of Superhard Materials, Ukrainian SSR Academy of Sciences, and Vladimir Vasil'yevich Zametaylo, candidate of technical sciences and department head of special design technology office, Institute of Problems of Materials Science, Ukrainian SSR Academy of Sciences, for development and introduction of new highly efficient production processes, equipment and materials in tool production that guarantee a significant increase of labor productivity and product quality at the Kiev Production Association imeni S. P. Korolev.

8. Aleksey Anatol'yevich Rososhinskiy, doctor of technical sciences and department head, Vsevolod Avksen'yevich Lebiga, candidate of technical sciences and senior scientific associate, Aleksandr Georgiyevich Musin, deputy department head, Viktor Mikhaylovich Kisilitsyn, group leader, Vasily Petrovich Shevchenko, workers and to workers of the Institute of Electric-Arc Welding imeni Ye. O. Paton, Ukrainian SSR Academy of Sciences, Valentin Nikolayevich Dobrovol'skiy, doctor of physicomathematical sciences, professor, Sergey Pavlovich Pavlyuk, candidate of physicomathematical sciences and senior scientific associate and to workers of the Kiev State University imeni T. G. Shevchenko, Yuriy Borisovich Utrobin, chief engineer, Yevgeniy Aleksandrovich Al'perovich, department chief of special design office, Askol'd Avivovich Arosev, shop chief, and to workers of the production instrument building association for development of a new method and assimilation of high-performance industrial technology of welding and soldering of mass-produced semiconductor diodes.

9. Yuriy Grigor'yevich Gondharov, candidate of technical sciences and director, Bronislav Mecheslavovich Klimkovskiy, candidate of technical sciences

and laboratory head, and to workers of the Scientific Research and Experimental Design Institute of Automation of Ferrous Metallurgy, Mikhail Yevmenovich Ryabchiy, deputy minister of ferrous metallurgy, Ukrainian SSR, Dmitriy Vsevolodovich Pudikov, chief of technical administration of the same ministry, Boris Vasil'yevich Stanilovskiy, director, Aleksandr L'vovich Kremenchugskiy, shop chief, workers of the Makeyevka Pipe-Casting Plant imeni V. V. Kuybyshev, Vladimir Petrovich Martynenko, chief engineering, Aleksey Vasil'yevich Kabanov, department chief, workers of the republic industrial association of mining enterprises, Igor Vyacheslavovich Kulikov, canadidate of technical sciences and department head of the Donetsk Scientific Research Institute of Ferrous Metallurgy, and Viktor Fedorovich Karpenko, senior scientific associate of the Dnepropetrovsk Metallurgical Institute imeni L. I. Brezhnev, for development of an automatic industrial installation and technology for mass production of grinding bodies.

10. Georgiy Yevgen'yevich Pukhov, academician of Ukrainian SSR Academy of Sciences, and director of problems of modelling in power engineering, Ukrainian SSR Academy of Sciences, Rostislav Dmitriyevich Tsiptsyur, candidate of technical sciences and laboratory head, Oleg Viktorovich Iovenko and Aleksey Grigor'yevich Chachko, candidates of technical sciences and senior scientific associates, Stanislav Grigor'yevich Drovnik and Anatoliy Donatovich Dosenko, leading engineers, workers of the Kiev Institute of Automation imeni SSV s"yezda KPSS, Vitaliy Fedorovich Sklyarov, minister of power engineering and electrification of the Ukrainian SSR, Yuriy Aleksandrovich Petlenko, chief of training center of the same institute, Nikolay Nikolayevich Krasnoshtan, director of the Tripoli GRES imeni 60-letiya Velikoy Oktyabr'skoy sotsialisticheskoy revolyutsii, and Naum Semenovich Dolgonosov, senior brigade engineer of the Yuzhtekhenergo enterprise, production association for adjustment, improvement of technology and operation of electric power plants and networks, for development of theoretical bases, creation and assimilation of a complex of simulators for training and retraining of operators of the energy units of thermoelectric power plants.

11. To Aleksey Ivanovich Zavarov, candidate of architecture and director, Leonid Georgiyevich Dmitriyev, candidate of technical sciences and deputy director, Aleksandr Vasil'yevich Kasilov, candidate of technical sciences and chief engineer, Genrikh Borisovich Gil'man, candidate of technical sciences and sector head, Alla Mikhaylovna Anishchenko, candidate of architecture and chief project architect, Valentin Grigor'yevich Shtol'ko, candidate of architecture and head of architectural and design office, Genrikh Alekseyevich Avdeyev, chief engineer, Boris Arkad'yevich Bednarskiy, chief designer of the same office, workers of the Zonal Scientific Research and Design Institute of Standard and Experimental Design of Residentiaal and Public Buildings, Vasiliy Akimovich Ponomarenko, chief technician, Aleksandr Iosifovich Shamko, brigade leader of installers, and to workers of Kievgorstroy Trust No 6, for investigations, development and introduction of suspended roofs of public buildings and structures in the Ukrainian SSR.

12. Viktor Georgiyevich Lyubimov, chief of central planning-design and production office, All-Union Commercial Fishing Association of Azov-Black Sea Basin and work supervisor, Viktor Vasil'yevich Yegorshin, chief engineer,

Anatoliy Semenovich Bayandin, Sergey Karpovich Kele-Shaginov and Konstantin Alekseyevich Solodovnikov, chief project designers, Mikhail Dmitriyevich Sokolenko, department head, Boris Yefimovich Gergel', leading designer, and to workers of the same office, Sergey Sepanovich Kutepov, director of the Arshintsevo Fish Processing Branch of the Kerch Production Association of the Fishing Industry, Ivan Filipovich Gordiyenko, brigade leader of fitters of the same association, and Ivan Grigor'yevich Valyavin, chief designer of the Sevastopol Experimental Design Office for Underwater Research, for development and introduction of a complex of equipment into industry for production of salted and smoke-cured fish products.

13. Vladimir Ilarionovich Shinkaruk, corresponding member of USSR Academy of Sciences, director of Institute of Philosophy, Ukrainian SSR Academy of Sciences and work supervisor, Vadim Petrovich Ivanov, doctor of philosophical sciences and deputy director, Vitaliy Georgiyevich Tabachkovskiy, doctor of philosophical sciences and sector head, Mikhail Aleksandrovich Bulatov, candidate of philosophical sciences and senior scientific associate, workers of the same institute, Viktor Vasil'yevich Kosolapov, doctor of philosophical sciences and deputy director of Institute of Social and Economic Problems of Foreign Countries, Ukrainian SSR Academy of Sciences, and Aleksandr Ivanovich Yatsenko, doctor of philosophical sciences and department head of the Institute for Raising the Qualifications of Instructors of the Social Sciences attached to the Kiev State University imeni T. G. Shevchenko, for a cycle of investigations "Ideological Problems of Dialectical Materialism and Methodology of Social Theory."

For Textbooks for Higher and Secondary Specialized Educational Institutions

1. Ivan Mironovich Chizhenko, corresponding member of Ukrainian SSR Academy of Sciences, and Vladimir Semenovich Rudenko, doctor of technical sciences, and department heads, Vitaliy Ivanovich Sen'ko, candidate of technical sciences and professor, and workers of the Kiev Polytechnical Institute imeni 50-letiya Velikoy Oktyabr'skoy sotsialisticheskoy revolyutsii for the textbook "The Fundamentals of Educational Techniques," published in 1980 (second edition).

2. To Simon Samoylovich Rubin, doctor of agricultural sciences and department head of Uman Agricultural Institute imeni A. M. Gor'kiy, for the textbook "General Agriculture," published in 1976 (6th edition).

6521
CSO: 1814/48

TEXT OF MARCHUK SPEECH AT MEETING OF CENTRAL COMMITTEE OF UKRAINIAN COMMUNIST PARTY

Kiev PRAVDA UKRAINY in Russian 18 Dec 82 pp 3, 4

["Text" of speech by G.I. Marchuk, member of CPSU Central Committee and deputy chairman of USSR Council of Ministers, to session of Central Committee of Ukrainian Communist Party and of the Ukrainian SSR Supreme Soviet in honor of the 60th anniversary of the founding of the USSR on 18 Dec 1982]

[Text] Dear comrades! The CPSU Central Committee, the USSR Council of Ministers, the AUCCTU and the Central Committee of the Komsomol have considered the results of the All-Union socialist competition in honor of the 60th anniversary of the founding of the Union of Soviet Socialist Republics.

The Ukrainian Soviet Socialist Republic has been awarded the Red Banner of the CPSU Central Committee, the USSR Council of Ministers, the AUCCTU and the Central Committee of the Komsomol, which will remain permanently in the republic, for successes achieved in economic and cultural construction and the important contribution to development of a unified national economic complex and in honor of the 60th anniversary of the founding of the USSR (prolonged applause).

This award is the result of the selfless creative labor of workers, kolkhoz workers, engineers, scientists, all workers of the Ukraine and the remarkable result of the enormous mass political and organizational work of party, Soviet, trade-union and Komsomol organizations of the republic.

Permit me on behalf of the CPSU Central Committee, the USSR Council of Ministers, the AUCCTU and the Central Committee of the Komsomol to warmly and heartily congratulate you and in your person all workers of the Ukrainian SSR on the deserved award and to wish you further success in your work, new great labor victories, health and personal happiness (applause).

The peoples of our country, having been joined in the USSR, have been proceeding successfully for 60 years along the path of the building of communism. And today the Soviet Union stands before the entire world as a fraternal family of equal republics that are building communism together. The sociopolitical and ideological unity of our society is monolithic. The solidarity of the Soviet people around our native communist party and its central committee is

indestructible. The creation and strengthening of the USSR are the historical service of all Soviet nations and nationalities, each of which has contributed the best available to the common good. In turn, the USSR supports their comprehensive and free development, strengthening of their fraternal friendship and cooperation and their intimacy on the firm basis of socialist order and Marxist-Leninist ideology.

Inspired by the decisions of the 26th CPSU Congress and the November (1982) Plenum of the CPSU Central Committee, the Soviet people are struggling selflessly to implement the plans denoted by the party and are achieving ever-newer successes in the building of communism.

And today it is especially pleasant to note that the workers of the Soviet Ukraine are in the first ranks of the active builders of communism in our country (applause). This is one of the bright indications of the historical achievements of socialism, of the creative Leninist national policy of the CPSU and of the enormous vital force of our multinational state (applause).

The achievements of the Ukrainian Soviet Socialist Republic in all spheres of public life were widely revealed and new important tasks directed toward successful implementation of the decisions of the 26th CPSU Congress and of the May and November (1982) Plenums of the Party Central Committee, were posed in the report of Politburo member of the CPSU Central Committee, first secretary of the Central Committee of the Ukrainian Communist Party, comrade Vladimir Vasil'yevich Shcherbitskiy.

The important successes in the economic and cultural construction which the Ukrainian SSR has achieved, developing in a family of fraternal republics, evoke a feeling of deep satisfaction among all the Soviet peoples.

The tasks posed by the 26th CPSU Congress are being resolved successfully. A new important step in economic and social development has been made in the republic during the past 2 years of the 11th 5-Year Plan. The scales of production have increased and its technical level has been raised. Fulfillment and overfulfillment of the tasks on the output of the most important types of products have been guaranteed.

More than 22,000 completed scientific developments have been introduced, more than 4,000 shops, sections and plants from which more than 400,000 workers have been converted to mechanized labor, have been mechanized and automated in a complex manner within 2 years of the 5-year plan. One-third of industrial products subject to certification are being produced with the State Emblem of Quality.

Work to intensify conservation is being conducted persistently in the republic. A total of 580,000 tons of rolled ferrous metals, 2 million tons of fuel, 3.9 billion kilowatt-hours of electric energy and 16 million gigacalories of thermal energy have been conserved within 2 years.

A large volume of construction work has been completed. More than 250 of the most important production facilities have been turned over for operation.

The rural workers, having applied great efforts and skills, have cultivated a better harvest of grain crops, sugar beets and other crops than last year.

A social program is being implemented and national education, science and culture have achieved further development in the republic in full accord with the decisions of the 26th CPSU Congress.

Comrades! Our achievements and prospects in economic construction and many other fields of life are related in a specific measure to acceleration of scientific and technical progress.

The 26th Congress of our communist party again confirmed the significant role which scientific and technical progress has been called upon to play in the coming decade. The main feature of this economic development of the USSR during the 11th and 12th 5-year plans is completion of conversion to an intensive path of development. The course toward intensification has been fully reflected in the 5-year plan for development of the country for the period 1981-1985.

Main attention was devoted in previous years to an increase and expansion of production and economic potential. We doubled basic production funds during the past two 5-year plans. This is an outstanding achievement of our country. The center of gravity is now being transferred to intensification of output due to production potential and toward a further intensification of labor.

We are entering a period of intensive development of the national economy on the basis of extensive introduction of science and new technology. Technology, the role and significance of which are increasing sharply, is becoming an ever more binding link between science and new technology. These are the new principles for development of machines, new paths in development of structural materials and methods of welding, plasma, electronic and laser equipment, powder metallurgy, anticorrosion coatings, techniques of agricultural production and much more.

The base of technology at enterprises begins with tool and billet shops and ends in continuous production processes.

The tasks for creation of means of automation are of special significance to us. Computer technology and microprocessors, actively intruding into our lives, permit a fundamental change in the structure of control of machines and complex technical systems and creation of conditions for introduction of essentially new types of equipment.

The problems of conservation of labor, conservation of energy and conservation of raw material and of achieving high product quality were at the center of attention. Conservation of labor requires conversion to automated production and more extensive mechanization on the basis of widespread introduction of robots, flexible readjustable production and to creation of fully automated shops and even of plants. Conservation of energy requires the use of new catalysts, energy-conserving equipment and technology, while conservation of raw material requires solution of extensive and complex processing of mineral

resources, the use of waste-free techniques and efficient use of secondary resources. With regard to product quality, this is the most important problem for us since it generally reflects the inquiries and demands of society for development of equipment corresponding to the level of the best achievements.

Scientific research and planning-design organizations, associations and enterprises of the Ukrainian SSR are conducting extensive work to implement state scientific and technical programs.

I would especially like to emphasize the important role of the Ukrainian SSR Academy of Sciences, which is the fundamental headquarters of science in the republic. The outstanding achievements of the academy, of scientific research institutes and of the design offices of industry have created a firm foundation for development of theoretical research and solution of practical problems and were an important contribution to development of the national economy of the republic and of the entire country.

Comrades! The decisions of the November (1982) Plenum of the CPSU Central Committee and the tasks posed in the speech of General Secretary of the CPSU Central Committee, Comrade Yuriy Vladimirovich Andropov at this Plenum, contain a clear program of action for further strengthening of the economic and defense might of the USSR and realization of the most important task advanced by the 26th Party Congress--intensification of social production and an increase of the efficiency of the national economy. Problems of strengthening state and labor discipline are now being advanced to the forefront.

Permit me to express firm confidence that the workers of the Soviet Ukraine, under the supervision of the republic party organization, will make a worthy contribution to fulfillment of these decisions and to the economic and social progress of the country (applause).

The Soviet people inseparably link all their victories and achievements to the supervisory role of the communist party. The Soviet people have become convinced after many years of experience that the party is laying a true, Leninist road for them. The force and vitality of internal and foreign policy developed by the party are that it corresponds to the needs of social development and to the interests of the Soviet people.

Dear comrades! I have the great honor of handing over the Red Banner of the CPSU Central Committee, the USSR Council of Ministers, the AUCCTU and the Central Committee of the Komsomol to the Ukrainian SSR.

Permit me to carry out this honorable commission (prolonged applause).

Permit me again to warmly congratulate you all and in your persons all workers of the Ukrainian Soviet Socialist Republic on the high award and on the 60th anniversary of the founding of the USSR and permit me to wish you new important success in labor for the good of our great motherland and happiness and well-being (prolonged applause).

SPEECH OF ACADEMICIAN B. YE. PATON

["Text" of Speech by B. Ye. Paton, academician, president of the Ukrainian SSR Academy of Sciences, member of CPSU Central Committee and of the Central Committee of the Ukrainian Communist Party, deputy to the USSR Supreme Soviet and of the Ukrainian SSR Supreme Soviet and twice Hero of Socialist Labor, to the session of the Central Committee of the Ukrainian Communist Party and of the Ukrainian SSR Supreme Soviet, devoted to the 60th anniversary of the founding of the USSR]

[Text] Dear comrades! The workers of the Soviet Ukraine celebrate the great holiday of the Soviet people--the 60th anniversary of the founding of the USSR--with a feeling of deep satisfaction and patriotic pride. Created by the genius of Lenin and the will of the peoples, the Soviet Union has become an inexhaustive source of the cognitive creativity of the masses and the flowering of gifts and talents. The union state system has guaranteed the most favorable conditions for development of the country's productive forces and has placed the economic potential and the richest natural resources of the Soviet republics at the service of the entire multinational society.

The joining of the Soviet republics into a unified allied power contributed to establishment and development of attitudes of friendship, fraternity, cooperation and mutual assistance among the nations and nationalities of our country. The great Russian people rendered invaluable selfless assistance in overcoming their lag and in accelerating economic and cultural development.

The Soviet Ukraine is celebrating the 60th anniversary of the USSR in the flowering of its economy, science and culture. And we are proud of the fact that there is an important contribution of the republic's intelligentsia--scientists, engineers, agronomists, physicians, teachers and cultural workers --in its achievements.

They are multiplying the material and spiritual riches of our motherland with their inexhaustible creative labor and they are implementing the ideas of friendship and fraternal cooperation between peoples and ideas of humanism and peace. Soviet patriotism and proletarian internationalism, deep party spirit and the close relationship to the practice of the building of communism are specific features of our intelligentsia and the basis of its expectations and aspirations.

The 26th CPSU Congress emphasized with special force the increasing role of the intelligentsia in all the life of society.

One of its most numerous detachments--the scientific and scientific-productive intelligentsia--is a worthy representative of the workers of science. The contribution of the scientists of the two-time winner of the Order of the Ukrainian SSR Academy of Sciences in acceleration of scientific and technical progress in the republic and in the country will increase continuously. During the 10th 5-Year Plan alone, they introduced more than 3,000 achievements in the national economy with a total saving of approximately 3 billion rubles. More than 4,000 new types of machines, equipment, apparatus, instruments and

means of automation and more than 400 automated control systems were developed through their efforts jointly with production workers.

Together with all workers of our republic, the scientists of the academy, implementing the plans of the party, are working persistently on solution of important scientific and national economic problems and tasks for spiritual development of Soviet society.

Workers of higher schools and secondary specialized educational institutions are doing much to train highly qualified personnel for the national economy. During the past 30 years alone, 7.5 million specialists have been trained in the republic, who are displaying bright examples of true service to the party and people in all sectors of the national economy and culture.

Health workers are manifesting great concern about the health of Soviet workers. Their achievements in prevention and effective treatment of diseases and prolonging the life of workers are well known.

Soviet teachers are giving all the generosity and passion of their soul to education of the rising generation. They are inoculating young people with an unquenchable thirst for knowledge and are carrying in their minds and hearts ideas of friendship, collectivism and a warm love toward their motherland.

The work of the rural intelligentsia, which is making an important contribution to development of the agroindustrial complex and the productive forces of agriculture, is of important significance.

The artistic intelligentsia--writers, artists, composers, actors and movie arts workers--are working with enormous creative enthusiasm. They are revealing the phenomena of social life and the most important processes of modern times from clear class positions. Concentrating the best features and traditions of Ukrainian, Russian and other national cultures, literary and artistic figures are striving to be at the pinnacle of those requirements which the party is placing before them and are intensifying the social and ideological direction of their work. Our heroic contemporary, the man of labor and the builder of the new life, occupies an ever more important position in the works of literature and art. They include the best works of our literary classics, of the leading figures of Soviet art of different genres that embody the Soviet form of life.

Scientific works and artistic workers, which unmask concepts and outlooks foreign to us, acquire exceptional timeliness under conditions of aggravating the antagonism of two systems and they provide a worthy response to the ideological diversions of foreign subversions centers.

Comrades! The 26th CPSU Congress and the subsequent Plenums of the Central Committee posed important and responsible tasks to the intelligentsia of our country. A special place is allocated to our science in their decisions, which, as Politburo member of the CPSU Central Committee and First secretary of the Central Committee of the Ukrainian Communist Party Vladimir Vasil'yevich Shcherbitskiy noted, should "open the prospects for development, to move forward and to continuously feed the national economy with new solutions and new developments."

We still have many unresolved problems where science is called upon to speak its piece. Our efforts and the potential of science must be concentrated on these problems, fundamental and applied research must be developed with even wider scope and persistence and the organic daily link to production must be strengthened in the interests of accelerating scientific and technical progress and further intensification of the national economy.

The intelligentsia of the Soviet Ukraine greeted with deep satisfaction and gratitude the communication that our republic had been awarded the Red Banner of the CPSU Central Committee, the USSR Council of Ministers, the AUCCTU and the Central Committee of the Komsomol for the success achieved in economic and cultural construction, for the important contribution to development of the country's unified national economic complex and in honor of the 60th anniversary of the founding of the USSR. This high mark obligates the numerous vanguard of the intelligentsia to labor with even greater inspiration and efficiency on solution of the tasks advanced by the party.

Permit me on the solemn day of celebration of the 60th anniversary of the Union of Soviet Socialist Republics to assure our party and its Leninist Central Committee headed by General Secretary of the CPSU Central Committee Comrade Yu. V. Andropov that the intelligentsia of the Soviet Ukraine is doing everything that depends on it so that the plans of the building of communism are implemented (prolonged applause).

6521
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PROMOTION OF SCIENTIFIC INNOVATIONS URGED

PM141155 Moscow SOTSIALISTICHESKAYA INDUSTRIYA in Russian 24 Nov 82 p 3

[Article by Hero of Socialist Labor Acad I. Glebov, chairman of the Soviet of the Union Commission on Science and Technology of the USSR Supreme Soviet, under the rubric "Deputies Speaking": "To Create in Order To Introduce"]

[Text] The Standing Commissions on Science and Technology of both chambers of the USSR Supreme Soviet played a great role in preparing the country's draft plan and budget for next year, which are being discussed at the session today. Hero of Socialist Labor Acad I. Glebov, chairman of the Soviet of the Union Commission on Science and Technology, says what questions special attention was devoted to and speaks about the conclusions and recommendations made there:

Not only the members of our commissions but also, I believe, all deputies share the concern voiced in Comrade Yu. V. Andropov's speech at the last CPSU Central Committee plenum in connection with the problems of scientific and technical progress and the difficulties of introducing the achievements of science and technology into production. "If we really want to advance the cause of introducing new technology and new labor methods," he emphasized, "Central economic organs, the Academy of Sciences, the State Committee for Science and Technology and ministries must not simply propagandize them but must expose and eliminate the specific difficulties which hinder scientific and technical progress."

It was from this viewpoint that the draft plan and budget for next year were analyzed in the process of the work of the two chambers' joint preparatory commission on science and technology. The strenuous nature of the state plan for the development of science and technology was obvious. It has set more than 1,000 targets for starting up the production of new types of output and more than 300 targets connected with introducing new technological processes and with measures for production mechanization and automation. In all accounting for ministries; and departments' own plans, approximately 4,000 new types of machinery, equipment, instruments and materials are to be assimilated next year. At the same time more than 2,000 types of obsolete products are to be taken out of production.

How valid are these plans? To what extent do they reflect the leading directions of scientific and technical progress? Do the necessary conditions exist

to insure that the considerable appropriations for the development of science--and next year they will increase 6.2 percent--yield the maximum return?

It was no accident that these questions occurred to deputies. The results of the first 9 months of this year showed that certain targets for science and technology are not being fulfilled in full and that a number of very important directions of technical progress are not enjoying proper development. In particular, the rate of the development and introduction of waste-free technologies and of the creation of new equipment for the comprehensive automation and mechanization of production processes in agriculture leaves something to be desired.

The deputies were especially concerned at the fact that the targets of comprehensive scientific and technical programs--the chief foundation of production intensification--have been fulfilled only 94 percent in recent months. An analysis of the reasons showed that ministries and departments still do not devote paramount attention to these programs or insure the necessary concentration of resources and funds for their fulfillment.

One of the most acute questions today is the creation of experimental plants and models and the construction of pilot bases and experimental production facilities of scientific research institutes and design bureaus. In many sectors the funds allocated for these purposes do not exceed 1 percent of total capital investments. But even this, as a rule, is not fully assimilated: Last year, for example, the plan for this item was fulfilled only 65.4 percent by the main ministries. The plans for commissioning such projects are, on average, fulfilled only 44 percent.

On examining this question the deputies arrived at the conclusion that the lack of proper responsibility and attention to the creation of experimental and pilot bases reduces the efficiency of the use of the country's scientific and technical potential. Having no opportunity to verify proposed decisions experimentally, scientific research institutes and design bureaus inordinately drag out the time taken to create and introduce innovations under development. As a result, it frequently turns out that by the time the work is complete, the "novelty" is already obsolescent.

Endeavoring to take a comprehensive approach to the problem, the two chambers' joint commission also devoted considerable attention to questions of organizing a research system. We proceeded from the point made at the 26th party congress that this system must be considerably more flexible and mobile, not tolerating fruitless laboratories and institutes.

However, the reductions which we are making in the size of personnel are frequently of an "average statistical" nature--one and the same percentage applies to all. Collectives whose creative potential is doubtful and whose return is small suffer least of all from this. Conversely, strong scientific research institutes and design bureaus with strenuous plans frequently have their "wings clipped" as a result of such a wholesale approach. The USSR State Committee for Science and Technology is already taking steps to put the network of scientific establishments in order and to liquidate inefficient organizations and subdivisions. However, the commission deemed it necessary to recommend that work be continued more actively in this direction.

CSO: 1814/58

MOSCOW TV ROUNDUP OF 1982 SOVIET SCIENTIFIC EVENTS

[Editorial Report] OW180121 Moscow Domestic Television Service in Russian at 1025 GMT on 30 December carries its regularly scheduled 60-minute "Life of Science" program, devoted to a review of Soviet scientific events in 1982. The program is presented by journalist Nataliya Georgiyevna Chernyshova and begins with a roundtable discussion moderated by Chernyshova, with Academician Anatoliy Petrovich Aleksandrov, president of the USSR Academy of Sciences; Academicians Yevgeniy Pavlovich Velikhov, Yuriy Anatolyevich Ovchinnikov Valdimir Aleksandrovich Kotelnikov and Petr Nikolayevich Fedoseyev, vice presidents of the USSR Academy of Sciences, and Academician Georgiy Konstantinovich Skryabin, chief scientific secretary of the USSR Academy of Sciences.

Answering a question on important scientific work in 1982, Aleksandrov says: "This year, we paid particular attention to the state of scientific development in our union republics." The panel goes on to note the worldwide significance of certain regional Soviet scientific works, citing examples in astronomy and electrometallurgy. Turning to problems of implementing scientific research in industry, Aleksandrov says: "For instance, we have reached agreement with many ministers about organizing joint laboratories or certain joint centers where we, our academic workers, together with production collectives are working out--sometimes from the very beginning of the development--this or that task. Since production or branch institute workers already participate in this, later on it transfers quote smoothly to industry. We do not see any obstacles here, but this is the case with a few ministers, a few ministries. It does not go as smoothly with others."

A video clip of an interview with G.A. Abilsiitov, director of the Scientific Center of Technological Lasers of the USSR Academy of Sciences, follows in which Abilsiitov discusses development of laser technology and says: "In a year, perhaps two, machines will already be working using components treated by lasers." Abilsiitov shows a motor vehicle part and talks about the use of laser technology which produces zero deformation, compared to existing methods of treatment. He notes that laser technology increases the durability of components up to three or four times.

The panel then discusses the question of artificial protein synthesized from methanol and ethyl alcohol. Turning to agricultural problems, Ovchinnikov notes that the responsibility of the Academy of Sciences and its institutes is to create new crop varieties and livestock breeds.

A video report on topics covered by a "Life of Science" program in 1982 follows, including a report on a new cargo movement system implemented in Klaypeda.

The panel then turns to the question of agricultural machinery, Aleksandrov says: "Let's say we properly implemented in our machine building industry those methods of hardening, defense against corrosion and so on which exist today. This would be equivalent to doubling or trebling our machine building capacity, perhaps more." A video clip from the institute of experimental mineralogy shows an interview with V.A. Zharikov, corresponding member of the USSR Academy of Sciences, who demonstrates apparatus used in analyzing the formation of minerals.

Turning to urgent tasks in the food program, Ovchinnikov says: "Regarding chemical aspects, things are not going favorably for us in the use of pesticides in agriculture. We recognize this, and are doing much work in that direction. There is a shortage of pesticides, particularly in the special conditions which our agricultural crops meet in the north, say, or in Siberia. Achievements of fundamental science need to be used in order to create a modern pesticide, that is, a substance that kills agricultural pests. It is said that about 10,000-12,000 compounds need to be synthesized to find one beneficial one. But if this is done sensibly, perhaps it would take less than that."

A video clip then shows an interview with A.A. Sozinov, an academician from the Institute of General Genetics, on crop growing and analysis of the structure of wheat proteins. Fedoseyev then shows a book entitled "Soviet Science. Results and Prospects 1922-1982" [Sovetskaya Nauka, Itogii Perspektivy 1922-1982], published by the Academy of Sciences which is followed by more highlights from the "Life of Science" program in 1982, including a clip of the Ural Scientific Center, the Bashkir, Karelian and Dagestan affiliates of the USSR Academy of Sciences, clips of the jubilee session of the Ukrainian Academy of Sciences, showing Aleksandrov, Shcherbitskiy and Kapitonov in the presidium, and a clip of Tartu University's 350th anniversary.

Continuing on 1982 scientific achievements, Aleksandrov speaks about work being completed in the Soviet Union on the world's first superconductive generator for motors at rolling mills, which will increase productivity by 15 percent.

Chernyshova then interviews I.A. Zotov, deputy chief editor of a new scientific journal SCIENCE IN THE USSR [Nauka a SSSR] followed by an interview with V.P. Kartsev, director of the Mir Publishing House, on the publication of a new journal IN THE WORLD OF SCIENCE [B Mire Nauki]--a translation of the SCIENTIFIC AMERICAN journal. Kartsev says: "I must tell you that it was not easy to publish. There was a lot of opposition from a U.S. department, afraid that certain secrets would escape into the Soviet Union through this journal. I have to say that the editor of this journal and its publisher (Gerald Peel) gave a worthy rebuff to such views and said that certain Pentagon officials have simply gone mad over secrecy."

SCIENTIFIC ACHIEVEMENTS INTO PRODUCTION

PM211607 Moscow IZVESTIYA in Russian 7 Dec 82 Morning Edition p 1

[Editorial: "Scientific Achievements Into Production"]

[Excerpts] The acceleration of scientific and technical progress is one of the chief conditions for our economy's stable, onward development, and the introduction of scientific discoveries and inventions, as was emphasized at the 26th CPSU congress, is the decisive and most acute sector today.

Nevertheless, not all the targets for new equipment are yet being fulfilled within the times prescribed in the State Plan. Despite the fact that the targeted comprehensive programs incorporated in that plan clearly designate the organizations and enterprises which are to carry out every job, prescribe the times for completing every target and stage and allocate the necessary funds to ministries for realizing the programs, we still encounter shortfalls in the delivery of subassemblies, delays in the construction of projects and the low quality of planning and design documentation. A significant number of deviations from the plan targets are a result of the fact that ministries and departments do not fully provide the executors of targets for new equipment with the necessary material and financial resources, in which connection the commissioning of new projects so essential to the country is put off from year to year.

This year, in particular, the planned commissioning of the first two sections of a 1,150-kilovolt power transmission line will not take place, and the construction of the 1,500-kilovolt power transmission line from Ekibastuz to the center is in an unsatisfactory state. Oilmen have been unable to fulfill their targets for the introduction of progressive equipment through the fault of subcontracting enterprises which failed to deliver on schedule the necessary quantity of high-strength drill pipes and drill pump rods or to manufacture an experimental model of a drilling rig converted to hydraulic operation. As a consequence of lagging behind the schedule for the construction of experimental centers, laggardness has occurred in the development of new industrial techniques for the production of cabbages, tomatoes and a number of other crops.

The biggest failure to fulfill the State Plan for the development of science and technology has occurred with the USSR Ministry of Power and Electrification,

the USSR Ministry of Construction, the USSR Ministry of Petroleum Refining and Petrochemical Industry, the Ministry of Petroleum Industry, the USSR Ministry of Timber, Pulp and Paper and Wood Processing Industry and the Main Administration of the Microbiological Industry. Obviously, not all the responsible workers of these ministries or the leader of enterprises subordinate to them are fully enough aware of the fact that the fulfillment of state scientific and technical programs is a guarantee of the successful development of the entire national economy--both in the current 5-year plan and in subsequent 5-year plans.

Addressing the recent CPSU Central Committee Plenum, Yu. V. Andropov, general secretary of our party's Central Committee, devoted special attention to the great reserves in the national economy which must be sought in the acceleration of scientific and technical progress and the broad and rapid introduction of scientific and technical achievements and progressive experience into production. "Of course, this is not a new question," Yuriy Vladimirovich said. "It has repeatedly been raised at party congresses and Central Committee plenums. Nevertheless, things are moving only slowly. Why? The answer, too, has long been known: In order to introduce a new method or new equipment, it is necessary one way or another to reorganize production, and that affects the fulfillment of the plan, and especially, as people are called to account for wrecking the production plan, while, at most, they are only reproved for the poor introduction of new equipment.

"If we really want to advance the cause of introducing new equipment and new work methods, the central economic organs, the Academy of Sciences, the State Committee for Science and Technology and ministries must not simply propagandize them but reveal and eliminate the specific difficulties which hinder scientific and technical progress. Planning methods and the system of material incentives must help to unite science and production. Those who boldly introduce new equipment must not find themselves at a disadvantage."

The retooling of the national economy is the command of the time and one of the main ways to strengthen our state's might and improve the Soviet people's well-being. Great work is now being done in the country to improve the network of scientific research and planning and design organizations and to concentrate their efforts on key national economic problems. The ultimate effectiveness of this work will be the greater, the more reliable the links between science and production become and the more attention production workers devote to introducing scientific and technical innovations.

CSO: 1814/58

LIFE OF ACADEMICIAN KURCHATOV PROFILED

Moscow APN DAILY REVIEW in English 12 Jan 83 pp 1-8

[Article by Academician Anatoly Alexandrov, three times Hero of Socialist Labor]

"I am happy to have been born in Russia and to have devoted my life to atomic science of this great Land of the Soviets. I strongly believe and know for sure that our people and our government will use the achievements of this science only for the benefit of humanity." These words of Igor Kurchatov expressed best of all the sum and substance of his activities.

Academician Kurchatov lived a remarkable life. He made a tremendous contribution towards resolving the breathtaking problem of modern times--that of harnessing atomic energy for national defenses and for the promotion of peace and constructive endeavour.

Igor Kurchatov was born into a land-surveyor's family on January 12, 1903. In 1923, he graduated from the Crimean University. From 1925 on, he worked at the Leningrad Institute of Physics and Technology under the guidance of Academician A. F. Ioffe.

While still a budding scientist, Igor Kurchatov achieved remarkable results in the investigation of dielectrics which had been little studied until then. He created the foundations of the theory and laid the beginnings for an experimental study of a new class of material--ferro-electrics.

After the discovery of the neutron, there was a sharply heightened interest in nuclear physics and so in 1932, Igor Kurchatov switched the laboratory he was in charge of to this line of research. He was one of the pioneers of the science of the atomic nucleus in this country. Although many distinguished scientists felt at the time that this line of research would have no practical implications, Kurchatov vigorously addressed himself to this new area of activity. In 1935, he discovered a very important phenomenon in nuclear isomerism. In 1940, G. N. Flerov and K. A. Petrzhak, under his direction, carried out a series of research studies which led to the remarkable discovery of self-induced fission of uranium nuclei.

Recalling those early years, one can clearly see the immense role which Igor Kurchatov played in the development of nuclear physics both as an outstanding scientist and as uncommonly talented organizer. He had an amazing and rare gift of bringing people together. Igor Kurchatov was jokingly called a

"general" because he could muster a large force to attack every major task in hand. That was a salient feature of his person. He had extraordinary self-control and fulfilled any duty, whether scientific or social, honestly and thoroughly. His passion, consistency of purpose and organization, his ability to find for everyone of his colleagues the job he could do and like, and, at the same time, induce him to work to the best of his ability determined Kurchatov's place in the organization of research into nuclear physics.

In 1933, a group of research associates at the Leningrad Institute of Physics and Technology under his direction put into operation a high-voltage plant and a tube accelerating protons to an energy up to 350 kiloelectronvolt. Subsequently, Kurchatov directed the launching of the Soviet Union's first cyclotron at the Radium Institute as well as the construction of what was the biggest cyclotron in Europe at the time at the Leningrad Institute of Physics and Technology, and organized nuclear physics research at the Leningrad Polytechnic.

When the division of uranium nuclei struck by neutrons was discovered in the autumn of 1938, it became obvious that it was possible, as a matter of principle. to produce a self-sustaining nuclear chain reaction releasing stupendous amounts of energy. Yet there were extremely difficult practical problems to resolve before that could be actually achieved.

As far back as the spring of 1939, Soviet physicists had a clear idea of the importance of the problem and a number of theoretical and experimental works they had carried out made it possible for Igor Kurchatov to consider eventual military application of research into uranium fission and call for it to be developed as quickly as possible.

It was not long afterwards that the Great Patriotic War broke out. A large proportion of scientific workers joined the colors or turned to military occupations. In particular, Igor Kurchatov focused his interest on counter-mine protection of ships. Meanwhile, fascist Germany was going ahead with research on the uranium problem. It also became known that the US was developing atomic weapons in top secrecy.

On February 11, 1943, Igor Kurchatov was appointed a scientific director of research on the uranium problem. Early in 1943, he got down to organizing a new research establishment--Laboratory No. 2 of the Academy of Sciences of the USSR (presently, the I. V. Kurchatov Atomic Energy Institute). A full-scale research effort got under way at once.

News of the tests of an atomic bomb in the US and of its formidable destructive power came in the summer of 1945. That was followed by the blasts in Hiroshima and Nagasaki. Next came the Cold War against the USSR. The US, with its nuclear monopoly of the day, threatened the Soviet Union. It became obvious that the US monopoly of nuclear weapons had to be ended.

That realization was the major driving force behind subsequent development work. The Central Committee of the Soviet Communist Party and the Soviet Government extensively supported it and provided all the necessary assistance for it.

The magnitude of the task in hand was amazing. Geologists were to discover uranium-bearing fields, miners were to start the mining and extraction of uranium from ores, chemical and metallurgical engineers were to master the chemistry of uranium, obtain and explore that metal. It was necessary to develop the production of superpure graphite, work out the methods of analyzing various substances, develop the production and technology of the separation of the isotopes of uranium and the production of plutonium. Finally, it was necessary to identify the principles behind chain reaction and nuclear explosion. And all that had to be done in the country which had just lived through the hardest war in world history.

Kurchatov became engaged in extraordinarily varied activity, drawing others into a whirl of ideas, calculations and experiments. On the basis of the finest measurements that lay on the verge of the possibilities of the science of that time, he made far-reaching (and always correct!) extrapolations and forecasts. The pace and intensity of the quest demanded the utmost of human ability.

There was no more fitting person for the role of the scientific leader of the elaboration of the uranium problem than I. V. Kurchatov. He was not only a major authority in science, talented organizer and brilliant experimenter, but also a remarkably well-wishing man. Everybody felt it a joy to work with him.

On December 25, 1946, Kurchatov with his co-workers in Laboratory No 2, for the first time in Europe and Asia, carried out a controlled chain reaction of uranium fission in the first uranium-graphite atomic reactor.

The importance of the bringing of that first reactor into service can hardly be overestimated.

The principles were evolved and equipment was designed for the control of chain reactions. A sufficient quantity (several dozen micrograms) of plutonium was obtained in it. This enabled radio chemists practically to create a chemistry of plutonium and design a plant for its extraction. Metallurgists isolated metallic plutonium and by the bead of the metal smaller than the head of a pin determined its properties and developed a plutonium metallurgy.

Thus atomic science began giving rise to a powerful atomic industry of the Land of Soviets.

The solution of the uranium problem had a tremendous role, and these tasks were being successfully tackled by a special government body headed by different times by B. L. Vannikov, A. P. Zavenyagin, V. A. Malyshev, M. G. Pervukhin and Y. P. Slavsky. Together with them I. V. Kurchatov as scientific director of the program defined immediate tasks, and this undertaking of great significance progressed at an extremely fast pace. On September 23, 1949, under Kurchatov's leadership a successful test of an atomic bomd was carried out.

The ever increasing yield of atomic bombs, the development of the theory of explosion and a detailed study of the phenomena occurring in explosions led physical science theoreticians to substantiate the idea of thermonuclear

weapons. For their creation it was necessary to solve a number of complex technological problems. The accumulated experience helped to do this in a comparatively short time. Highly involved calculations were completed, and on August 12, 1953, under Kurchatov's guidance the first test of the new formidable weapon took place. The assignment of the Party was fulfilled: the country now had an atomic shield. Attacking it became tantamount to suicide.

Our science and industry ensured the defense capability of the country. The Soviet Union became a strong nuclear power. Unleashing a war against us proved impossible also because great advances had by then been made in rocketry. It was the outstanding feat of I. V. Kurchatov, S. P. Korolyov, M. V. Keldysh and all those who stood at the cradle of these new branches of technology. As soon as this task was achieved, Kurchatov took up research on the peaceful uses of nuclear energy.

Speaking at a session of the Supreme Soviet of the USSR, Deputy Kurchatov declared: "Atomic energy must be turned from the weapon of destruction, which it may become, into a mighty source of energy bringing well-being and happiness for all people on earth."

Atomic power stations became one of such sources. On June 27, 1954, in Obinsk the world's first atomic power plant, designed and built under Kurchatov's scientific leadership, was launched. At that time many power engineers laughed at this "toy of physicists" and even some participants of the project considered it an empty proposition. But Igor Kurchatov firmly believed in the future of the atomic power industry. The Novovoronezh APS with a water-moderated shell-type reactor and the Beloyarsk APS with a channel-type uranium-graphite reactor were conceived. Reactors of these two types, naturally much more improved, today form the basis of the atomic power industry of our country. At the end of the fifties, in a sharp polemic with sceptics who regarded the construction of atomic power plants as a futile expensive venture, Kurchatov found weighty arguments and got the right to an experiment: the decisions on the expediency of the construction of the first large APSs were confirmed. Recalling this now, twenty-five years later, one cannot but pay tribute to Igor Kurchatov's sagacity.

Kurchatov lived to see the launching of the world's first atomic-powered ice-breaker Lenin, the design and building of which he had enthusiastically backed, predicting a great future for an atomic fleet.

Kurchatov foresaw the broad development of the atomic science and the use of its achievements in many fields of technology. It was he who initiated the establishment of scientific centres with accelerators and reactors for investigations in many republics of our country.

During the last years of his life Kurchatov showed particularly great interest in the realization of a controlled thermonuclear reaction. He believed that this reaction would provide man with an unlimited energy source.

Igor Kurchatov decided to call on scientists of the whole world to remove the shroud of secrecy from thermonuclear investigations and to start joint work along this major line of research. The Soviet government supported Kurchatov's proposal and his famous report at Harwell, Britain, about Soviet studies into controlled thermonuclear reactions marked the beginning of active international cooperation in the field of the peaceful use of atomic energy.

At the same time, Kurchatov pointed out: "One can hardly expect complete frankness among scientists of different countries who are engaged in studies of controlled thermonuclear reactions as long as atomic and hydrogen weapons are not banned." I remember Kurchatov's deep emotions when he realized the results of the first thermonuclear weapon tests. He said "The use of this weapon must not be allowed." With great passion of his active nature he resolutely came out for the complete prohibition of nuclear weapons everywhere for all times, for the use of atomic energy only for the benefit of mankind, for world peace.

Igor Kurchatov took care of the future of our science and devoted much effort and energy to training scientists in the field of nuclear science and technology. He brought up a splendid galaxy of Soviet scientists and engineers.

Our country highly appraised Academician Kurchatov's titanic activity. The title of Hero of Socialist Labor was bestowed on him three times. He was awarded by many Soviet Orders and Medals. He was one of the first Lenin Prize Winners.

In Moscow, in Kurchatov Square, a granite monument to the scientist-patriot has been put up. The urn with his ashes was immured in the Kremlin wall. But for those who knew and worked with him Kurchatov is alive today too. He lives in the deeds of the institute which is named after him, in powerful nuclear ships, in the rapidly developing nuclear power industry of this country, in the striving for the use of atomic and thermonuclear energy only for peaceful purposes at the fountainhead of which he stood.

(Pravda, January 12. In full.)

CSO: 1812/103

COMPREHENSIVE MULTI-PURPOSE PROGRAMS

Moscow APN DAILY REVIEW in English 21 Dec 82 pp 1-9

[Article by G. Marchuk, Vice-Chairman of the Council of Ministers of the USSR and Chairman of the USSR State Committee for Science and Technology]

The New Year 1983 our great homeland has entered is going to be a responsible period for all Soviet workers. The successful fulfillment of the State Plan for the Economic and Social Development of the USSR, approved for this year, is of special importance to the Five-Year Plan as a whole. Emphasizing this, the November 1982 Plenary Meeting of the CPSU Central Committee urged Party and government organizations and work collectives to focus on intensifying social production and raising the efficiency of the national economu. There are considerable reserves for this. They should be sought in speeding up scientific and technical progress and in the large-scale and speedy introduction of scientific and technological achievements and advanced experience in production, Yuri Andropov, General Secretary of the CPSU Central Committee, pointed out in his speech at the Plenary Meeting.

The implementation of comprehensive scientific and technological programs is a distinguishing feature of the Eleventh Five-Year Plan. Drawn up by the State Planning Committee of the USSR, the State Committee for Science and Technology and the Academy of Sciences, these programs have been made an organic part of the Plan for the Economic and Social Development of the USSR for 1981-85.

In all, 170 state comprehensive scientific and technological programs have been approved. Forty-one of them are purpose-oriented programs meant to ensure the introduction of most effective scientific and technological achievements, including the quantity production of new products even in the current five-year plan period. More than 120 programs are aimed at solving major scientific and technological problems, developing technical means, production processes and materials to be introduced in the Twelfth Five-Year Plan period. Being a component part of the state plan, the scientific and technological programs are to be backed with funds, primary and other material resources.

The Road "From Idea to Introduction"

The programs are a new and more dynamic form of guiding scientific and technological progress. They make it possible to efficiently concentrate the efforts

of scientists, designers and production managers, directing them towards a definite goal--the development and speedy introduction in practice of new and improved machinery or technology.

For example, in accordance with the decisions of the CPSU's Twenty-sixth Congress, the country's fuel-and-power balance-sheet is to be restructured in the 80's. It is intended to lower the share of oil used as fuel, so that in the future to use it as a chemical and biological starting material. It is necessary to more widely use as fuel coal and natural gas, in the first place, Siberian coal many kinds of which can be produced by the more economical opencast method.

However, it is impossible to haul by rail, say, Kansk-Achinsk or Ekibastuz coal to the European part of the USSR owing to its chemical composition. There is only one way out: to generate power locally and to transmit it via power lines. But even here a problem arises: existing power transmission lines account for great losses of energy. Scientists of the technology sectors, Academy institutions and colleges have jointly prepared a project design of a d.c. power-transmission line of 1,500,000-volt capacity. The task has been set to line the Ekibastuz fuel-and-power complex with the European part of the country already in the current five-year period.

Hydraulic delivery means will be used for supplying coal to thermal power plants. For the first time in this country a 250-km coal pulp feed-line, to link Belovo with Novosibirsk, is under construction. Its throughput is 4.3 million tons a year.

All these are very complex technological approaches. They have so far had no precedent in the world. The purpose-oriented comprehensive programs for scientific and technological progress make it possible to secure the results needed by the country within the pre-set period of time. The road "from idea to introduction" is thus to be considerably reduced.

It is not out of place to recall here that the development of industries always proceeded on the basis of science and technology. The leaders of ministries and departments are well aware that the lines of production they are in charge of cannot be improved by different ways. Therefore, "sectoral" scientific and technological progress was a permanent feature. Unfortunately, the same cannot be said about the solution of inter-sectoral problems, including universal ones, on which the technological standards of all sectors of the national economy depend. Precisely here weak spots have been found out within the system of controlling scientific and technological progress. The state comprehensive programs provide for working out, primarily, major inter-sectoral problems.

Guidance of scientific and technological progress on the basis of purpose-oriented programs is of particular importance now that our national economy is being converted to a footing of intensive development. It is not a secret that many enterprises experience a shortage of manpower resources, an increase

in which cannot be expected soon. This means that it is inadvisable to build more plants. Instead of this it is necessary to make existing enterprises turn out twice and thrice as many products, for which purpose they should be fitted with improved machinery and equipment releasing manpower and raising labor productivity and introduce economical technologies saving on energy and resources.

Objective data also show that it has become more difficult to produce primary materials--oil, coal and ores, because deposits of these minerals, located near by and accessible, have been depleted in the main. Fundamentally new mining equipment and transport capable of operating at great depths and in rigorous climatic conditions are required.

It is no accident that some ministries and departments draw up their own programs for modernizing and technically retooling their enterprises. Every plant and every sector will be striving to obtain new ideas and approaches as regards machinery, equipment and technology, to look for more economical approaches saving on both labor, resources and energy, in place of the old ones.

The speeding up of scientific and technological progress is the principal means of economizing resources of all kinds through the development and use of fundamentally new types of machinery, technology and equipment on a large scale. It is this, above all, that is provided for by the comprehensive scientific and technological programs.

In Every Sphere of Activity

It is absolutely obvious that machine-building is to bear the brunt of responsibility for implementing the programs. Therefore, most of the comprehensive programs pursue the aim of developing the basis of machine-building itself, so as to speed up the process of renewing technological equipment in all the branches of industry and to drastically reduce manual and arduous work. In the first place, it concerns the coal industry, metallurgy, agriculture and construction.

There are great possibilities for this in the scientific and technological programs providing for the development and introduction of advanced mechanization and automation means in lifting-and-conveying, handling and warehousing operations, including automatic manipulators, and also container and package transportation for goods, the manufacture of standardized containers and packing. The fulfillment of assignments only under these five scientific and technological programs will make it possible to release by 1985 nearly 900,000 people from doing unskilled work. Industrial robots are to play a special role in the mechanization and automation of production. There is a special scientific and technological programs providing for a nearly 6-fold increase in the fleet of industrial robots by the end of the Eleventh Five-Year Plan period.

The comprehensive programs are intrinsically social-oriented. Many of them have a direct bearing on such important aspects of human life as consumer goods production, public health, working and living conditions. Specifically,

arrangements have been made for the introduction of new production processes and equipment for the manufacture of quality footwear, clothing, fabrics and other goods for which demand is high.

A wide range of problems to be tackled has been formulated in the Food Program of the USSR approved by the May 1982 Plenary Meeting of the CPSU Central Committee. The purpose of the Food Program is to ensure supply of food products of all kinds to the population and to considerably improve people's diets by producing most valuable foodstuffs. The November Plenary Meeting reaffirmed that measures aimed at fulfilling these tasks hold a central place in all of our plans. The Food Program is backed by 20 scientific and technological programs.

The choice of comprehensive scientific and technological programs for the Eleventh Five-Year Plan period and up to the year 1990 has been made on the basis of consideration for the current and future requirements of the national economy, as well as proceeding from the trends in the development of science and engineering defined in the Comprehensive Program for Scientific and Technological Progress till the year 2000.

Management and Control

Headquarters ministries, departments and organizations have been defined in respect to all the scientific and technological programs. Their task is to coordinate work between executors, to ensure a high level of newly-developed machinery and technology, and to supervise progress of all work. Besides, there are coordinating councils headed by prominent scientists and experts to take care of the programs.

A. P. Alexandrov, President of the Academy of Sciences of the USSR, is in charge of the purpose-oriented comprehensive program for the development of nuclear thermal and fast-neutron reactors for power and heat production and for energy=consuming chemical processes. There are 106 headquarters organizations taking part in the implementation of this program. Program assignments have been distributed in a planned manner among enterprises of different subordination, the deadlines for fulfillment fixed and financial backing provided. Roughly the same number of departments are working on assignments under the purpose-oriented program for developing laser devices and technology, with Academician Y. P. Velikov in charge of it. Dozens of research and educational institutes and production centers in different areas of this country are engaged in fulfilling the tasks set in the comprehensive program for developing and mastering production processes and technical means, including multi-layer piping, for building gas pipelines, 1,420 mm in diameter, to operate at a pressure of 120 atmospheres. V. A. Dinkov, Minister of the Gas Industry, is in charge of the program.

The USSR State Committee for Science and Technology has its own information network: science and engineering information centers in every Republic, territory and region. These centers have been instructed to keep track of the implementation of programs locally and to regularly report to Party and economic bodies on the progress of work, particularly not losing sight of the development of new machinery and technology on the basis of Soviet and international standards.

Reliance on standards is also necessary for being able to see to it that not a single part, not a single unit is manufactured with a violation of the accepted requirements.

A year ago, the USSR Information Centre for Equipment (ICE) was set up under the USSR State Committee for Science and Technology. It has been assigned the mission of checking up on compliance with technical standards in machine-building. It goes without saying that it would have been impossible to do this work without computers. Part of products will be supervised by the sectoral scientific and technical information centers, which have their own computing complexes connected with the computation center of the USSR ICE. Therefore, it is possible to check up on the technical standards of actually every manufactured article.

The Way Programs Are Implemented

The system of control enables one even today to speak about the way the scientific and technological programs of the Eleventh Five-Year Plan are being implemented. This question was specially examined at an enlarged plenary meeting of the USSR State Committee for Science and Technology, held last summer. The unanimous conclusion drawn by the participants in the plenary meeting--representatives of ministries and departments, and also Party officials of those Republics, territories and regions where these programs are being implemented--was very optimistic. A single system of purpose-oriented programs for scientific and technological progress at all levels--state, sectoral and regional--is taking shape.

It is hard to overestimate the importance of this system, if one visualizes, for example, the essence of such regional programs as the Siberia, the Urals, the Soviet Far East and other programs. They surely take more fully into account the local specific social, economic and natural-climatic conditions and make possible better coordination of academic, college and sectoral science.

At a special meeting of the collegium of the USSR State Committee for Science and Technology, the results of fulfillment of the state plan for the development of science and technology for the first nine months of 1982 were analyzed. It was pointed out that 472 new types of manufactured goods had been put in quantity production, whereas the figure for the corresponding period of last year was 415. Comprehensive mechanization and automation was carried out in 335 sections, shops and lines of production, 131 automated systems of controlling production processes were put in operation, and 103 advanced technologies introduced in production. Compared with last year, these are also higher results.

At the Novolipetsky Metal Works, for example, a unit for the continuous hot galvanizing of sheet steel (of 500,000-ton annual capacity) has been built. It has turned out an experimental batch of products. Such sheet steel is used for making complex automobile parts and in industrial construction. This is the first unit for continuous galvanizing by the hot method of similar capacity in the world.

The Ivanovo Special Production Association of Heavy Engineering named after the 50th Anniversary of the USSR has produced a batch of machine-tools for machining parts weighing up to 700 kilograms. These numerical program-controlled machine-tools with a 30-tool cartridge have extensive technological possibilities and are on a part with the best specimens in the world. Their application more than doubles labor productivity and gives an annual economic effect of 20,000 rubles per machine-tool.

In accordance with the state scientific and technological programs, 1,400 assignments and stages of work were fulfilled from January through September 1982 for developing, mastering and extensively introducing new equipment and technologies ensuring a saving on human, material, fuel and energy resources and on funds. Specifically, 11 new models of automatic manipulators and 13 models of lifting-and-conveying machines were introduced in production.

An analysis shows that a number of sections of the state plan for the development of science and technology have begun to be fulfilled more efficiently in the last few years. Gas production from large-diameter wells has grown, and there is an increase in coal production by the opencast method. A growth rate has increased in the manufacture of advanced types of metal-working equipment and press-forging plant.

The work of improving the mechanism of controlling scientific and technological progress continues.

(Ekonomicheskaya Gazeta No. 1, January 1983. Abridged.)

CSO: 1812/102

INTERNATIONAL COOPERATION OF THE USSR ACADEMY OF SCIENCES

Moscow APN DAILY REVIEW in English 4 Mar 83 pp 1-2

Moscow, March 3. TASS. In 1982 Soviet scientists developed and deepened contacts and cooperation with their colleagues from other socialist countries. Chief Learned Secretary of the USSR Academy of Sciences, Georgy Skryabin, said at an annual meeting of the Academy.

Skryabin said that cooperation sovered 357 themes. Hundreds of institutions and other research establishments of socialist countries participated in collaborative projects.

"Years of collaborative activities have yielded important results introduced in various economic sectors. The efforts of Soviet scientists were highly appraised: eleven were elected honorary members of the academies and scientific societies of a number of socialist countries and 44 received government decorations and other awards.

"In 1982 the USSR Academy of Sciences sent more than 5,000 its representatives to mount joint research projects, read lectures, arrange consultations, and participate in congresses and other international gatherings in socialist countries.

"The USSR Academy of Sciences effected scientific contacts with capitalist and developing nations in a complicated international situation," Skryabin went on to say. "The Western imperialist quarters were vigorously trying to curb scientific exchanges and cooperation with Soviet scientists. However, as the results of the past year show, the Western reactionary forces have failed to achieve this aim. Cooperation between Soviet and US scientists remained on the level of 1980-1981.

"Developments have shown," Skryabin remarked, "that the American scientists are interested in the maintenance and expansion of contacts with their Soviet colleagues. This was borne out by the proposals of American scientific institutions for signing direct cooperation agreements with institutes of the Academy of Sciences of the USSR. We are now considering these proposals and if they are of mutual interest we shall endorse them."

The Chief Learned Secretary reported at the meeting that the National Academy of Sciences of the United States, which on instructions from its government

had cancelled joint scientific measures of Soviet and American scientists, has now proposed to the Academy of Sciences of the USSR that some joint seminars on physics be resumed.

"The United States reactionary circles have not succeeded in imposing their position upon other countries with regard to scientific cooperation with the USSR. It was only the governments of Japan and the Netherlands and, to a certain extent, of Belgium that began creating obstacles to the fulfillment of the existing agreements," Skryabin said. "On balance, we note a substantial expansion of scientific contacts with capitalist and developing countries. Steady cooperation, for instance, proceeds with the FRG, Italy, France, Britain, Finland, Sweden, Austria and India. In 1982 scientific contacts were further developed with Latin America and Middle East countries," the scientist added.

(TASS, March 3. In full.)

CSO: 1812/102

WORLD OCEAN STUDIES

Moscow APN DAILY REVIEW in English 5 Mar 83 pp 1-5

[Article by Academician L. Brekhovskikh]

The role played by the World Ocean in the life of our planet is hard to overestimate. Some four-fifths of all transportation in the world is done through the world oceans and adjoining seas. About twenty percent of food protein is obtained by man from the oceans.

Off-shore oil and gas production accounts for almost a quarter of the world total and is rapidly growing. Valuable metals, such as copper, nickel and cobalt, will begin to be mined from the seabed in the next ten years. The very sea water is amazingly rich in various elements.

No long-term weather forecast is possible without due account taken of the oceans' influence. Changes in the climate, too, are determined to a considerable extent by the effect of the planet's water envelope.

Approximately every five years, scientists find new phenomena in the oceans, which change our views of the oceans substantially. It has been found, for example, that "rivers" about a hundred kilometers wide flow eastwards along the equator line in the Atlantic, Indian and Pacific Oceans at depths of 200-400 meters. The surface waters, on the other hand, flow in the opposite direction. In 1970, Soviet scientists discovered the existence of huge vortices 200 to 300 kilometers across in the Atlantic. Their kinetic energy exceeds that possessed by permanent currents by many times.

It has been comparatively recently established that the ocean is in fact a giant-sized many-layered sandwich, with each layer ranging in thickness from a few to several dozen meters. The properties of the water are almost constant within one layer but alter drastically as the boundaries are crossed. Horizontally, such layers may stretch for several kilometers.

In areas of the mid-ocean ridges, there have been discovered outlets of hot and heavily mineralized waters which were found to contain copper, zinc, iron, silver, cobalt, cadmium and other metals. Near underwater geysers were found bottom-dwelling creatures of gigantic size (for example, worms up to a meter long). In spite of the constant darkness that reigns at great depths, this new form of life is surprisingly colorful.

The World Ocean is a very intricate body, and it is necessary, therefore, to formulate a strategy for its studies, giving priority to those tasks which are to be tackled in the next decade, and especially in the next five-year period.

Physicists, for example, are to explore the nature of synoptic vortices in the oceans and to find out how they arise, interact with each other and with currents, and how they die.

Intensive investigations are to be carried out into the ocean-atmosphere interactions, which are essential to long-term weather forecasting and to evaluating trends in climate. The objects to be studied include exchanges of moisture, heat and momentum between the atmosphere and the oceans.

There has been relatively little research done in the interphase between ice and open ocean. This zone, however, exerts a great influence on the climate in high latitudes. It is there that the abyssal waters of the ocean are formed. A correct description of the triple ice-ocean-atmosphere interaction is very important for understanding trends in the terrestrial climate.

Surface and internal waves, turbulence, and the fine layered structure of the ocean also call for further study.

The main task in the chemistry of the oceans is to build up a quantitative chemical model of the ocean. To do so, account must be taken of the entry of chemical substances into the ocean through its surface, bottom and borders with the continents, and of the transportation and transformation of these substances.

Of fundamental significance is the determination of the flow of carbon dioxide from the atmosphere into the ocean. The steady supply of carbon increases the greenhouse effect of the atmosphere and leads to a warmer earth climate. Some of the carbon dioxide passes from the atmosphere into the ocean and its concentration there is approximately 50 times greater than in the air.

Biologists, for their turn, face a task of tremendous importance--that of studying life in the oceans which includes some 180,000 species, from tiny bacteria to huge mammals. It is also ncessary to analyze the effects of pollution on these creatures.

An important contribution must be made by marine biology to fisheries oceanology. Over the past ten years this part of science has made particularly rapid progress, especially in studying the biology of commercial fish species, their feeding habits, migration, growth, parasites, and genetics. Our progress is evaluating the degree of reproduction of the stock has been inadequate, though. The solution of this problem is connected with an analysis of the overall ecological situation--a picture of currents, water mixing, availability of nutrient substances, the harmful role of pollutants, etc. Biology of new fishing objects must be also developed.

Marine biology should be provided with facilities to develop shore-based sea farms and for transplanting some of the fish species to new areas.

Biologists, together with chemists and physicists, are to trace the routes by which pollutions spread in the oceans and the chemical changes which they undergo.

The main mission of geology and geophysics of the oceans is to put together a general picture of the structure of the earth's crust under the oceans. This task is extremely important for the further tapping of mineral resources. Extensive geological and geophysical survey needs to be done over wide areas of the continental shelf and in the high seas.

Methods of ocean studies are improving all the time. Space-assisted research has been making rapid strides lately. Apparently, only this research can narrow the yawning gap between the information received and the information needed on the oceans.

What can be obtained by space means? To begin with, these are temperature maps of the ocean surface. Temperatures are determined by spaceborne instruments with an accuracy of one degree. It is possible to obtain charts showing surface waves, particularly wind-caused waves, near-surface winds, a vertical cross-section of the atmosphere over the oceans, etc. Space altimeters will make it possible to record the actual form of the ocean surface, which is important in calculating sea currents. The same method can be used for detecting a tsunami, which is little noticeable in the oceanic expanses but which is likely to cause enormous damage when it rushes up the coast.

From outer space it is possible to determine the color of the sea water and thus pinpoint waters rich in chlorophyll, or areas abundant in life. Little explored regions, say in polar areas, and boundaries between open water and ice, can also be effectively studied from outer space.

Another method of oceanic studies, which has originated but recently, is a polygon-based one. Under it, several ships simultaneously survey physical processes occurring in the oceanic depths and in the atmosphere over a large area. One ship can also be used, but in this case it anchors stations with instruments at different depths. For months these stations keep record of the ocean characteristics, such as temperature, salinity and currents at various depths.

Remote methods of oceanic investigation are developing widely, as well. Nearly all of them rely on the use of sound waves, which alone can travel through the oceans over considerable distances. Improvements are being made in acoustic methods of the studies of bottom relief and deep-seated geological structures and also of fish detection. Studies are made of the scattering layers in the oceans, which are of a biological nature, and the underwater noises in the oceans. The latter carry a lot of information on underwater animal life, on eruptions of far-away volcanoes, and earthquakes and distant storms.

Deep research submersibles--both habitable and automatic--are beginning to be widely used.

Very interesting results can be shown by improving deep drilling techniques in the oceans, especially when it becomes possible to penetrate deep enough into the hard rocks.

Ocean studies have always been given high priority in our country. In 1921, Lenin signed a decree on the establishment of a floating research institute aboard the ship Perseus. At present, Soviet science sails first-class and perhaps the best research vessels in the world, which can conduct observations and process the findings for many months on end, as is done by our scientists. There are several dozens of such ships in the USSR. Research on them is carried out according to one comprehensive program, "The World Ocean, Its Investigation and the Utilization of Its Resources."

International cooperation is the key factor in studying the oceans for the benefit of mankind. No country, however powerful, can allot enough money to learn all about the various processes at work in the atmosphere over the oceans, on the ocean surface, in ocean depths and on and under the floor. International cooperation among scientists studying our planet has long traditions. The results obtained during the International Geophysical Year, the International Indian Ocean Expedition and also in work under the Global Atmospheric Research Program are hard to overestimate. The deep-sea drilling project, which made an epoch in the geology of our planet, was also an international undertaking although it was conducted from abroad an American drilling research ship. Soviet scientists took an active part in it.

Ocean studies continue. New discoveries await us ahead.

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ALEKSANDR DANILOV COMMENTARY CONDEMNING U.S. ECONOMIC SANCTIONS

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[Text] Recently, the American press came out with a sensational report: American scientists from Princeton have made an important discovery in the area of harnessing an unlimited energy source, by using thermonuclear synthesis. However, the western press did not stress that in Princeton, in this case, the work was carried out on a Tokamsk reactor which is a Soviet invention. This fact says a lot against the background of statements from the highest representatives of the American administration on the dependence of the Soviet Union, and other CEMA states, on western technology, and on allegedly being able to stop the development of socialist countries by withholding exports of sophisticated technical equipment to them.

By the way, the White House cannot be unaware that statements of this kind are ordinary demagoguery. After all, the President has already been forced to waive his embargo on the deliveries of equipment for the export pipeline constructed in the Soviet Union. Of course, he did it under pressure from West European firms which did not want to share the fate of such American firms as International Harvester and the Caterpillar Tractor Company which, in practice, have been bankrupted by the President's embargo.

But there was also another cause. The waiving of the restrictions was announced after reports in the American press that, according to assessments of certain services, the Soviet Union cannot only do without imported American equipment, but is also capable of constructing turbines for the compressor stations which are more efficient than the American ones.

As for personages in the United States, who, by virtue of their office, are committed to objective assessments of the scientific-technical potential of the socialist countries, they constantly stress the importance of cooperation between the East and West, and its significance precisely for the capitalist firms and capitalist companies. Here, for example, is a statement by John (Kaiser), a trade adviser to the State Department. In the competitive struggle, which has become more acute, and which the United States is now encountering, John Kaiser said, the Eastern Bloc represents a potential source of acquiring methods permitting the production of better and cheaper goods.

It is noteworthy that a similar view is appearing more and more frequently even in the press columns which speak on behalf of official Washington. And so, for example, the weekly U.S. News and World Report has printed an article which states, among other things:

Science in the states of the Soviet Bloc, achieves great successes and serves as an important contribution to the development of technology in the United States and in other states of the noncommunist world.

According to information from this weekly, in the last few years western firms have acquired from the socialist countries licences to a value of $50 million, including licences for such processes and equipment as high voltage power transmission lines, a surgical gun for stitching wounds, ultramodern welding methods, aluminum and copper casting in electromagnetic furnaces, and subterranean gasification of coal deposits. The weekly also lists all the restrictions which the Reagan administration applied under the pretext of Polish events. However, not daring to make open, critical statements addressed at the White House decisions, the weekly writes:

At present, many scientists are worried by the fact that the breach of contacts in the area of scientific-technical research may liquidate the exchange of information which is beneficial for both sides.

The weekly also reports that many American industrialists and scientists think that the United States is losing in the technical rivalry with the Soviet Bloc. The article printed in the columns of the U.S. News and World Report is very symptomatic. After all, for understandable reasons, until now the bourgeois press has been striving to hyperbolize the exceptional significance of western technology for the socialist countries. At the same time, potential effects of the restrictions policy promoted by the American President, forces one to draw other conclusions.

By joining their efforts, the CEMA countries can solve the most complex scientific-technical and technological problems. The American weekly, by the way, quotes many examples which confirm this fact. The contribution of the socialist community to the scientific development of mankind is growing at a rapid rate. One third of the total inventions registered in the world falls to the CEMA countries. Without the scientific-technical potential of the socialist states, the world economy cannot develop normally any more. The West is simply not capable of isolating the countries of the socialist community. Any attempt to create a blockade on thos countries, are fraught with danger which threatens precisely the inspirers of such actions. Wise-thinking politicians and economic activists in the West have been speaking about this for a long time. This state of affairs has finally been recognized in the United States.

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