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ACHIEVEMENTS OF THE ACADEMY OF SCIENCES USSR IN 1954

[Comment: This report gives the fundamental results of the scientific activity of the Academy of Sciences USSR in 1954, as set forth by Academician A. V. Topchiyev, chief scientific secretary of the presidium of the academy, in an address at the academy's annual meeting on 2 February 1955. The report discusses the peaceful use of atomic energy and other problems in the physicomathematical and chemical sciences, problems of the technical sciences and industry, natural resources, biology, the social sciences, publications and information, cadres, international relations, and organization for scientific research.]

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The great extent and varied character of the work conducted by the Academy of Sciences USSR makes it impossible to describe it completely in one report.

Before our traditional annual session, there were meetings of the departments, at which reports of the Academician-Secretaries were given. It is, therefore, expedient only to dwell on some of the basic results and trends of scientific work, as well as on some questions of planning and organization of the scientific process.

The scientific investigations stipulated by the plan of the academy for 1954 were fulfilled in all basic respects. Unfortunately, however, there were lags in some departments, caused for the most part by weak control and inexperience on the part of department and institute directors. Thus, the Department of Physicomathematical Sciences did not fulfill 18 out of 432 assignments, the Department of Chemical Sciences 11 out of 444, and the Department of Literature and Language 12 out of 130.

Results of Work in the Utilization of Atomic Energy for Peaceful Purposes

Scientific investigations conducted by the academy in 1954 were distinguished by the wider application of new methods which contemporary atomic physics puts in the hands of scientists.

In 1954, our scientists and engineers achieved great successes in the utilization of atomic energy. Their efforts were rewarded by the construction of the first industrial electric power station in the world, in which fissionable substances serve as fuel.

The atomic electric power station of the Academy of Sciences USSR has a useful capacity of 5,000 kilowatts, and since last summer has been providing current for industry and agriculture in surrounding regions.

Work on the creation of electric power stations operating on atomic energy, with a useful capacity of 50-100,000 kilowatts, is now being carried out.

In attempting to further the development of international cooperation in the field of utilizing atomic energy for peaceful purposes, our government has expressed its readiness to hand over the scientific and technical experience acquired by the Soviet Union and to submit a report on the first industrial atomic power plant in the USSR and its work to an international conference on the problem of utilizing atomic energy. This conference, as is known, is being held this year by a resolution of the Ninth Session of the General Assembly

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of the United Nations. Our government has also passed a resolution extending scientific, technical, and industrial assistance to a number of countries in the development of research on the utilization of atomic energy for peaceful purposes, in particular in the planning and construction of experimental atomic reactors and of elementary particle accelerators.

In the past year, investigations of various means of producing power through atomic energy were continued. Some of them aimed at developing methods for a direct conversion of atomic energy into electric power, and others into electrochemical energy.

Much research was conducted on the utilization of atomic energy for other purposes than the production of power, particularly on the utilization of isotopes as sources of penetrating and ionizing radiation, and also as indicators in the method of tagged atoms. This work was conducted by numerous institutions of the Academy of Sciences USSR and the academies of sciences of the Union Republics, by branch institutes and by production organizations. The academy coordinated this research on a nation-wide scale through the Scientific Council under the president of the academy.

Some of the results obtained in the work on peaceful use of atomic energy should be noted.

Radioactive isotopes, including radioactive cobalt, iodine, phosphorus, and sodium, are being very successfully used in medicine. New data has been obtained on the nature and the mechanics of the action of various kinds of nuclear radiation on chemical elements and processes, and the possibility of their use for the intensification and activation of important chemical processes (polymerization, oxidation, vulcanization, etc.) has been demonstrated. Nuclear radiation is being widely used for the creation of new, more effective means for the automatic control and guidance of various technological processes. During the last few years, a number of instruments have been built on the principle of using this radiation, permitting many technological processes to be converted to automatic operation. Among such instruments are, specifically, radioactive meters showing the boundary of separation between two media, calipers for constant contactless measuring and regulation of the thickness of metallic, paper, rubber, and other sheets, for the control of metal tubes with walls of different thickness, and the thickness of coatings of various materials.

Other results worth noting are: the application of nuclear radiation for "cold" sterilization of food products, and also for the breeding of highly productive forms of microorganisms; the activating effect of radiation on the biological synthesis of ergosterol by microorganisms has been discovered; the possibility of forming, under the influence of radiation, hereditarily fixed cultures having an increased capacity for forming ergosterol, which is the initial product for commercial production of Vitamin D and a number of other valuable chemical elements, has been worked out.

During the past year, further use of the tagged atoms method has been found in science and practice. Many important results of research carried out by this method were reported by the Academician-Secretaries. I shall list some of these works.

The tagged atoms method has found wide use in biology; it has permitted deeper penetration into the complex processes existing in plant and animal organisms. New interesting data has been obtained, which permits the explanation of the chemistry of the metabolic process in the brain tissues, the liver, the muscles, and in other organs and tissues.

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Zoologists have applied the tagged atoms method to the study of the effectiveness of certain fishery arrangements. In particular, they have developed a system of counting young fish in hatchery ponds; experiments have been made on mass tagging of young fish released from the hatcheries for the purpose of counting those which reach the sea.

The same method has helped to demonstrate that the physiological processes in plants proceed very rapidly. Thus, the products of photosynthesis move from the leaves to the roots (in sugar beets, pumpkins, etc.) at a speed reaching 70-100 cms per hour. This is of practical importance to agriculture in the coordination of methods of tending plants with the "tempo" of their active life.

The use of tagged atoms has helped in determining the method of the formation of saccharose, nicotine, and other economically valuable substances in a plant organism.

In 1954, more than 30 scientific institutions in the Soviet Union carried out large-scale experiments with tagged superphosphates in order to determine the best means and periods for the introduction of phosphate fertilizers for agricultural crops. More dependable data has been obtained on the rate and speed of the assimilation of phosphates by plants in relation to the depth of cultivation and the character of fertilizer distribution in the soil, the dimensions of the superphosphate granules, and on a number of other questions of practical interest to a rational system of applying fertilizers.

The nutrition of plants other than through the roots shows a possibility of ensuring an additional supply of phosphate at definite periods of their growth and a subsequent raising of the yield.

The method of tagged atoms has proved to be very fruitful in the study of chemical reactions. Valuable results have been obtained, extending and broadening our knowledge in this sphere. A study of the reactions of the hydrogen exchange of aldehydes has been made, and the rules governing these reactions have been established. With the help of radioactive sulfur, the reactions of the formation and disintegration of polythiamates have been studied; the data obtained permits conclusions as to their linear structure to be drawn. It is interesting to observe that a similar surmise was first made by D. I. Mendeleev, and has been discussed in scientific circles for 80 years. With the help of the kinetic method of using tagged atoms, which permits the establishment of the succession of the elementary stages of a reaction and the measurement of their speed at different moments during the process, the mechanics of the oxidation of butane, cyclohexane and crude-oil cracking have been successfully studied.

The tagged atoms method has not yet, unfortunately, found its due application in studies of the mechanics of the formation of organic compounds. This is, to a great extent, the fault of the Institute of General and Inorganic Chemistry imeni N. S. Kurnakov.

In the technical sciences, the tagged atoms method has been used in the study of diffusion and interatomic interaction in alloys, in the study of the stability and wear of metals and machine parts, in the study of cast iron and steel, in the carrying off and solubility of salts in thermal apparatus working at high parameters, etc. In 1954, such research was already being carried on in large enterprises of the metallurgical, machine-building, and textile industries.

A large-scale study was made of the wear of machine parts and instruments by branch institutes and plant laboratories. The Institute of Machine Science, where the specialists on wear have been concentrated, is the only place where

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this work was poorly conducted. And I would like to recall that as far back as 1952, the Presidium of the Academy entrusted the guidance of such research to the institute. The Institute of Automatics and Telemechanics also does not take a sufficiently active part in the work, although it should have taken the initiative in using these progressive methods of scientific research as widely as possible.

Among the work on theoretical and experimental nuclear physics, we must note research in the field of the quantum theory and the theory of elementary particles. This work has, to a considerable degree, assisted in the elimination of contradictions in the existing theory, and in overcoming mathematical difficulties.

Work on cosmic rays was basically directed at the investigation of protons and neutrons possessing high and superhigh energies, with atomic nuclei, and the study of the nature and properties of elementary particles. The joint experimental work of scientists of the academy and of Moscow University has, to a large extent, clarified the picture of the elementary action of nuclear interaction which takes place in that region of energy not attainable by even the most powerful modern accelerators.

Study of the recently discovered elementary particles has shown the presence in cosmic rays of charged particles of a new type, having a mass exceeding the mass of the nucleon, and differing, apparently, in their stability from analogous particles. Similar work has been carried out at the same time by investigators abroad with the help of a different method.

In the field of study of the beta- and gamma-spectra of radioactive elements, a number of scientific institutions have worked on gathering further information on the system of decay of various unstable nuclei. In some cases, this research has permitted making important generalizations, as, for instance, on the closeness of the decay system and the systems of lower excited states of certain nuclei. A system of levels of the cerium-140 nucleus, a nucleus with a charged neutron shell and having unusually high excitation energy of the first level, has been established. This information has considerable importance for defining more precisely the so-called shell theory of the structure of nuclei.

We have cited only individual instances of the extensive work carried out in our country on the use of atomic energy for peaceful means. One must, however, remember that we are at the very beginning of the atomic age. Each year, atomic energy will penetrate further and further into the various fields of science and the national economy. The development of new ways for using atomic energy for peaceful ends is an important task for all the scientists of our country and especially for the Academy of Sciences USSR.

Other Problems of the Physicomathematical and Chemical Sciences

We shall consider briefly some other problems of the physicomathematical and chemical sciences, research of which gave the most significant results in 1954.

In the field of physics and mathematics, further development of the most important problems of theoretical physics, semiconductors, calculating techniques, luminescence, acoustics, physical methods of prospecting, etc., were continued.

Among the investigations in the field of theoretical physics, one should mention the work on the quantum theory of waves, the theory of metals, and the theory of superconductivity, which are being successfully conducted in the Physics Institute imeni P. N. Lebedev.

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In work on the problem "Semiconductors and Their Technical Application," new data has been obtained, which defines more accurately the physical basis of the theory of rectification in semiconducting instruments and the theory of physical processes of amplification in crystal instruments; large scale research was done, and recommendations have been worked out for the utilization of new materials for these instruments.

In the recently formed Acoustics Institute, much work is being done on the problem of the diffusion of waves in various nonhomogeneous media, and also on the problem of diffusion of waves over uneven surfaces.

In the field of calculating techniques, a series of important mathematical computational problems, formerly requiring many years of labor-consuming work by thousands of highly qualified specialists, have been solved with the help of high-speed machines. The calculation and issue of basic mathematical tables have been organized. Five large collections of tables have been published during 1954 alone, while during the preceding 9 years, the Institute of Mathematics and the Institute of Precise Mechanics and Calculating Techniques together issued only one collection, per year.

Work was completed on the inverse problem of Galois during 1954. A valuable monograph *Matematicheskiye Metody Massovogo Obsluzhivaniya* (Mathematical Methods of Mass Servicing) was written.

The Laboratory of Spectral Analysis of the Physics Institute imeni P. N. Lebedev has obtained important results on the control of metal production by the spectral analysis method. The introduction of this method will permit improvement and acceleration of control of the quality of steel and alloys. Thus the analysis of phosphorus in steel by this method requires one fourth to one fifth the time required for a chemical analysis.

Interesting results have been obtained in research on the theory of waves of finite magnitude. A calculation method has been worked out for forecasting the temperature of the sea and the time when ice will appear in coastal regions.

It should be noted that the academy has devoted insufficient attention to developing the very promising problems of low temperature physics and the physics of ultrasonics.

In the field of geophysics, interesting information connected with the development and improvement of prospecting methods and seismic depth sounding methods has been obtained. In particular, the depth of high frequency seismics, especially important in prospecting for oil, has been greatly increased.

A cross section of the earth's crust in Central Asia was studied to a depth of 500 kilometers and new information on the "roots" of mountains was obtained by the seismic depth-soundings method.

The aerogravimetric expedition of the Institute of Geophysics completed a high-precision relative determinations of the acceleration of gravity.

The fundamental directions of research in the field of the chemical sciences were: the solution of theoretical questions relating to the further development of the theory of chemical structure and the reactivity of chemical substances; the development of the scientific principles of heterogeneous catalysis; the synthesis of intermediate products of the industry of basic organic synthesis from natural gas and the gases from oil processing; the chemistry of high molecular compounds, rare and dispersed elements, organo-elemental compounds, biologically active elements, and complex compounds; geochemistry, hydrochemistry, analytical chemistry.

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Among the most important achievements of the chemical sciences is the development of methods of synthesis of various organic compounds, having a practical significance for the national economy, public health services, and the development of new techniques.

In the Institute of Organic Chemistry imeni N. D. Zelinskiy, a new type of synthetic rubber was developed under laboratory conditions from technically accessible raw materials (monomers). Preliminary evaluation indicates that it has better properties as compared to the existing industrial emulsion rubber.

A new reaction of cyclization of paraffin hydrocarbons accompanied by the formation of five-membered rings has been discovered and studied. This enlarges the prospects of using hydrocarbon raw materials and gives a new idea on the problem of the origins of cyclic hydrocarbons contained in crude oil.

The Institute of Organoelemental Compounds studied some new types of phosphor organic compounds, which indicate the possibility of obtaining a number of valuable preparations having increased insecticide properties. One of them surpasses all previously known phosphor organic compounds in its effect on the harmful eurygaster.

New methods have been developed for synthesizing new types of organic compounds of phosphorus, silicon, titanium, fluorine, and chlorine.

The Institute of High Molecular Compounds obtained, as a result of research in the field of polymerization, laboratory samples of copolymers with increased resistance to heat and suitable for manufacture of transparent plastics. The synthesis of a new type of nonacid ion exchange resin containing hydroxyl groups has been developed. These resins should find wide application in the industrial refining of antibiotics.

The Institute of Physical Chemistry has developed a ferrocenone element with high specific energy and power indexes. Nonpolarizing electrodes for gauging low currents in the sea have been developed and are already being used at one of the polar stations. The same institute has made a study of the mechanics of anodic oxidation of binary aluminum alloys, has established the regularity of the growth of oxide coatings, and has clarified the mechanics of corrosion in dry and humid soils.

The Institute of the Chemistry of Silicates has successfully introduced into production the progressive technology of grinding and polishing plate glass. This has permitted a sharp increase in the productivity of automatic machines and an improvement in the quality of production.

An organosilicon coating, which, when used to process various materials, makes them waterproof while admitting air, has been developed.

The Institute of General and Inorganic Chemistry imeni N. S. Kurnakov has developed a new method of desorption, with liquid ammonia, of gold and silver cyanides from industrial cyanide solutions, permitting improvement and simplification of the process of extracting gold and silver from ores.

Work on Problems in the Technical Sciences and the Problem of Introducing Scientific Results Into Industry

In the field of the technical sciences, there has been considerable development in research on radio engineering and electronics, the theory of automatic control, the theory of plasticity, gas dynamics, the theory of combustion, the theory of stability, the theory of mine pressure, etc.

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A notable achievement of the Institute of Radio Engineering and Electronics is the development of the theory and the construction of models of special electron tubes for ultrahigh frequencies.

Considerable success has been achieved in the development of the theory of the process of intermittent control in nonlinear systems. The Institute of Automatics and Telemechanics has worked out a number of electronic installations which permit modeling diagrams of automatics and the processes taking place when various systems are controlled.

An experimental industrial installation for reprocessing Baltic shale on the principle of a method proposed by the Institute of Power Engineering imeni G. M. Krzhizhanovskiy has been put into production. The introduction of this method permits a one third to one half reduction in the cost of the oil and an increase of output of 1.5 to 2 times.

Frequency regulators proposed by the same institute have been installed and are in operation at the Shcherbakov, Dnepr, Zuyev, and Tsimplanskiy hydroelectric power stations.

The Institute of Automatics and Telemechanics has completed the development of a method and the equipment for directing the drilling of wells along a coal seam in subterranean coal gasification.

The Institute of Metallurgy imeni A. A. Baykov has created a new technique for reprocessing complex ores, which considerably increases the output of metals contained therein. Industrial tests are being made of the method of desulfurization of cast iron outside the blast furnace. Alloys have been obtained possessing many properties valuable to modern practice.

On the basis of theoretical and experimental research conducted by the Institute of the Physics of Metals of the Ural Affiliate, Academy of Sciences USSR, together with the Trust "Uralstal'konstruktsiya," an induction apparatus for heating metal structures when they are welded under low temperature conditions has been developed.

The Institute of Mining, together with the West Siberian Affiliate of the Academy of Sciences USSR, has investigated means for intensifying the drilling of deep wells in hard rocks and ores.

As a result of research on the technique of coking, the Institute of Mineral Fuels has obtained, from a model, batches of metallurgical fuel from the low-clinkering coals of the Donbass, Kuzbass, Karaganda, and Bureya.

The Institute of Petroleum has produced equipment for radiometric research of wells and for locating oil deposits; they have proposed new, highly active catalysts from raw materials which are readily available, and which ensure a gasoline with an octane rating of about 80.

New technological processes for processing crude oil and heavy oil waste have been developed: high-speed cracking, hydrogenation under pressure, and the removal of asphalt from crude oil by dissolving it in compressed hydrocarbon gases.

The introduction of these processes into the oil industry will permit considerable intensification of the conversion processes of oil and will ensure better utilization of petroleum stocks.

The Institute of Mechanics has been successful in solving theoretical problems. Important results were obtained in the theory of plasticity, the statics and kinematics of free-flowing media, in the field of wave dynamics,

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and also on some problems of gas dynamics. A theory of plastic flow has been formulated, which, together with the previously developed theory of modeling processes in the processing of metals by pressure, will permit a better approach to the planning of complex technological operations.

The hydraulic method of protecting the blades and chambers of turbodynamos from cavitation erosion, which was developed by the Institute of Mechanics, is being widely introduced in the installations of the Canal imeni Moskva.

Great theoretical interest and practical significance is attached to the work done by Academician P. L. Kapitsa on the hydrodynamic theory of lubrication of rotating parts. P. L. Kapitsa has evolved a hydrodynamic equation for the flow of a viscous layer when a cylinder or ball is rolled over it. It shows that (owing to the formation of an oily layer), the pressure of the ball bearing at the place of contact is distributed over a wider area than under static load, and that therefore the stress on the metal is considerably reduced when rotating. Further application of this theory will make possible a new approach to the rational construction of ball bearings, an important part of modern machines.

The theory of lubrication of rotating parts can also be extended to transmission gears.

A number of important investigations, the results of which are being adopted by industry, have been mentioned; the sum total of such work cannot be considered satisfactory, however, because many institutions of the Academy of Sciences USSR have not taken advantage of all possibilities in this important matter.

Ministries and agencies must take steps to introduce all the results of scientific research work completed by the Academy of Sciences USSR during 1954. Many of the institutes of the academy, however, have not given due attention to coordination with ministries of measures which would speed up the introduction of their work into the national economy. The experience of the Institute of Organoelemental Compounds, which worked in close contact with the Ministries of the Consumer Goods Industry, the Chemical Industry, and the Food Industry USSR, and succeeded in introducing into production artificial resins, and fibers made from them and other materials, has shown the important results which can be obtained when cooperating with industry.

On the other hand, some Ministries do not give enough attention to problems of speeding the introduction of new technology into the national economy. But it is still the presidium, the departments, and the institutes of the Academy of Sciences that are primarily to blame, in that a number of results of scientific work (important for the development of heavy industry, and its heart, machine building) have not been introduced into industry. It cannot be tolerated that the achievement of the main purpose of scientific creative genius -- assistance to the progress of production -- should be delayed because of all kinds of noncoordination and other bureaucratic interference.

Study of Natural Resources

Much work has been done during 1954 on the comprehensive complex study of the natural wealth of our country.

The Institute of Geography has investigated the geomorphological, climatic, and other conditions in the areas of new agricultural reclamation; they have produced a preliminary plan for a natural division into districts of the territory where virgin and waste lands are being reclaimed in five oblasts of Northern Kazakhstan and the Altay Kray.

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On the basis of material obtained by the Aral-Caspian Expedition, the Council for the Study of the Productive Forces has worked out a proposal for the further development of cotton growing in Central Asia, agriculture and irrigation in the lower reaches of the Amu-Dar'ya, and the use of pastures in Ust'-Urt and other desert areas in Kazakhstan for cattle breeding. Together with the Institute of Economics, they have developed and sent proposals for the development of industry and agriculture in the Buryat-Mongolian ASSR.

Resulting from work on stratigraphy, tectonics, petrography, mineralogy, and other branches of geology, the Institute of Geological Sciences has prepared monographs giving theoretical principles for searching and prospecting for a number of useful minerals: Fosforitomosnyye formatsii i klassifikatsiya fosforitovykh zalezhey (Phosphorite-Bearing Formations and the Classification of Phosphorite Deposits), Verkhnemelovoy i kaynozovskiy magmatizm i metallogeniya Vostochnogo Sikhote-Alinya (Upper Cretaceous and Cenozoic Magmatism and Metallogeny of Eastern Sikhote-Alin), and others. Geological maps of a number of areas in Central Asia and the Far East have been completed.

An expedition of the academy has discovered a new type of boron formation, a fact which changes considerably the prospecting indications for boron formations and the criteria of their industrial evaluation.

A number of important scientific deductions have been made regarding the geology and petrography of the Polar Urals.

The Institute of Oceanology continued its exploration of the northwestern part of the Pacific Ocean. The work of the 1954 expeditions showed that the submarine Hawaiian mountains stretch as a solid range from the Hawaiian Islands to the submarine Mount Obruchev and Komandorskiy Islands, thus dividing the northern part of the Pacific Ocean into two separate basins. The structure of the ocean bottom has been found to be very complex, as opposed to the prevailing opinion on the leveling of the sea bed. New types of animals inhabiting the ocean have been discovered, as have new zoogeographical features of the distribution of bottom fauna and plankton.

The Institute of Frost Studies has carried out investigations on the problem of the origin and propagation of subterranean vein ice in the north and northeast of the country. The frost and hydrogeological conditions of exploitation of the most important coal and iron ore deposits and the construction of large industrial installations in the east were successfully studied.

One of the substantial shortcomings in the geological activities of the academy's institutions is the poor development of scientific research directed at learning the laws of the entire complex of geological processes and phenomena in their natural historical development. This is, to a large extent, explained by the fact that the Department of Geological and Geographical Sciences has not, up to now, directed the large-scale geological research being conducted on the territory of the USSR. It is only the participation and leadership of the institutions of the Academy of Sciences USSR that can raise the scientific level of such projects as the generalization of material on drilling with casing (opornoye bureniye), the compilation of the multivolume work Geologiya SSSR (Geology of the USSR), and other tasks.

The situation with regard to the use of physical methods in geological research is still bad. It should also be noted that the Presidium of the Academy is still not giving sufficient assistance to some institutes of the Department of Geological and Geographical Sciences. In particular, normal conditions have not been created for the work of the Institute of Frost Studies, which is conducting investigations of importance to both science and practice.

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A serious defect of all the expedition activities of the academy's institutes is their poor cooperation with institutions of other departments; the result of research are not given to local interested parties fast enough. This also applies to exploration done in the areas of virgin and waste lands.

Problems of Biology

The scientific research in the field of the biological sciences, done on the basis of using the tagged atoms method, has already been mentioned. In 1954, the scientific institutions of the Department of Biological Sciences continued both the development of theoretical problems and work of assistance to agriculture.

Theoretical research in the field of biological sciences dealt with the following problems: protein and metabolism; heredity and its variability; problems of Pavlov's physiology; questions of radiobiology; the nature of microbes and the control of microbiological processes; cellular and noncellular forms of animate matter and their interrelationship in development; the flora and fauna of the USSR; problems of forestry, soil science, photosynthesis; and others. Positive results have been obtained in all these fields.

A number of completed works related to the solution of essential practical questions can be mentioned.

The Soil Institute imeni V. V. Dokuchayev, jointly with the Ministry of Agriculture USSR, has performed a preliminary computation of unreclaimed virgin lands and has given direct assistance to local agricultural and planning organizations in selecting lands for sowing. Land suitable for cultivation has been designated in a number of oblasts of the Transbaykal and the Far East for the establishment of new areas for grain production.

The Botanical Institute imeni V. L. Komarov has carried out geobotanical work in the areas of virgin land reclamation in Kazakhstan, Altay, and Western Siberia.

The Main Botanical Garden continued work on the production of new and more promising types of wheat.

The Institute of Plant Physiology imeni K. A. Timiryazev succeeded in finding a way of overcoming the decrease of protein content in hard summer wheats through irrigation by means of supplementary feeding of nitrogen by spraying during the period when the ears are being formed. Research on the physiology of wheat has been done when the soil was cultivated according to T. S. Mal'tsev's method in the Shadrinskiy Rayon, Kurganskaya Oblast.

The Institute of Genetics has obtained new, early-ripening types of maize.

Practical assistance to agriculture has been given by complex research on the problem of drying seed grain done by the Institute of Biochemistry imeni A. N. Bakh together with the West Siberian and Ural Affiliates, Academy of Sciences USSR, and a number of scientific research institutes. In many areas of the USSR, the harvest moisture reaches 20-30%. Preservation of seeds with high humidity leads to their qualitative deterioration and a lowering of yield. The institute has developed a system of drying seed grain in driers, and also a system of drying grain destined for food.

The Institute of Microbiology, while studying nitrifying bacteria, has proved for the first time the possibility of oxidation of ammonia by noncellular compounds of such bacteria; intermediate products have been obtained, and the dependence of the activity of bacteria on the conditions of their habitat has been established.

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In the past year, microbiological research has been carried out for the first time in the region of the North Pole. These investigations have established that the entire mass of water under old ice, as well as the bottom of the ocean, is populated with microorganisms.

The method proposed by the Institute of Biochemistry has been used to organize production of vitamin B₁₂, which is important in fighting pernicious anemia.

The most urgent task of the biological sciences is still to give active assistance in carrying out the resolution of the plenums of the Central Committee of the CPSU on the problems of development of agriculture. This applies also to problems of grain as well as to those of technical crops and fodder, and especially to problems of animal husbandry, where our scientists have not performed their duty.

The following must also be mentioned about problems of biology. As is well known, a violent discussion has recently developed in numerous biological journals. The fact that these publications conduct discussions on urgent vitally important problems should be welcome. Unfortunately, however, the tone of some of these writings is insulting in character and thereby prevents the clarification of scientific truths.

The Department of Biological Sciences must speak authoritatively on certain debatable theoretical problems.

Of course, in science, the truth emerges as factual experimental material is gradually collected and a correct materialistic generalization is made. Perhaps there are not yet enough facts to draw general conclusions, but it is time that some limited conclusions should be drawn.

The scientific community is waiting to hear particularly what the bureau of the department, a collection of the most prominent scientists in their respective fields, will say with regard to the discussions on species and their evolution, on the role of noncellular types of living matter, and other biological problems.

Work in the Social Sciences

Of the books published during 1954, a textbook on political economy, which helps to raise the level of work in the fields of economic, philosophic, historical, and other social sciences, must be mentioned first of all. This textbook is an important achievement of Soviet economic science.

Members of the Institute of Economics have made certain attempts to strengthen the ties with economic and planning organs, and, in particular, they took part in working out scientific methodic problems of the Sixth Five-Year Plan for the development of the national economy of the USSR, and studied problems of the economics of industry and agriculture. On the question of the economics of modern capitalism, the Institute issued a monograph Imperialisticheskaya Bor'ba za Istochniki Syr'ya (The Imperialistic Struggle for Raw Material Sources).

In the field of philosophy, a book entitled Bazis i Nadstroyka v Sovetskom Obshchestve (Foundation and Superstructure in Soviet Society) was published in the last year, and a textbook on logic for higher educational institutions is ready for publication. In addition, a number of other works on economics and philosophy have been issued.

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The monographs Pravo Gosudarstvennoy Sotsialisticheskoy Sobstvennosti (The Law of State Socialist Property) and Grazhdansko-Pravovaya Okhrana Sotsialisticheskoy Sobstvennosti (Civil Law Protection of Socialist Property) have been published on the subject of law.

A series of works in the field of history has been published and prepared for publication. Many years of work spent in writing the multivolume Ocherki Istorii SSSR Perioda Feodalizma (Outline of History of the USSR in the Period of Feudalism) have ended. Volume I of the textbook Istoriya SSSR (History of the USSR) is ready for printing. Volumes III and IV of Istoriya Moskv (History of Moscow) have been published; they give a convincing picture of the outstanding part played by Moscow in the social-economic, sociopolitical, and cultural development of our country.

In connection with the 50th anniversary of the first Russian revolution of 1905-1907, collections of documents have been prepared for the printers.

Special attention has been given to the elaboration of the history of socialist society. A conference on this subject was held in Moscow, as well as a session in Tallin. A special session of the Academy of Sciences USSR was devoted to the 300th anniversary of the reunion of the Ukraine with Russia.

A collective work entitled Angliyskaya Burzhuznaya Revolyutsiya XVII Veka (The English Bourgeois Revolution of the 17th Century) has been published. The first volumes of Vsemirnaya Istoriya (History of the World) have been prepared.

Studies of urgent scientific problems connected with the building of socialism in the people's democracies and the history of the literatures of Slavic nations have been made. The first volumes of Istoriya Pol'shi (History of Poland) and Istoriya Bolgarii (History of Bulgaria) have been published, and the second volumes of these books, together with the first volume of Istoriya Chekhoslovakiya (History of Czechoslovakia) have been sent to the printers.

Among the books on Oriental studies, the single-volume Istoriya Mongol'skoy Narodnoy Respubliki (History of the Mongolian People's Republic) compiled by Soviet and Mongol scholars must be noted.

In the series Narody Mira (Peoples of the World), the book Narody Afriki (Peoples of Africa) has been published; this is the first book presenting the ethnography of all the peoples of the African continent. Two other volumes in this series, dealing with the peoples of Siberia and the peoples of Australia and Oceania, are in process of being printed.

Anthropologists have obtained interesting data on the origin of man and the most ancient settlements in the territory of the Soviet Union. The skeletons of men of the Upper Paleolithic era permit following up the relationship between the ancient population of the Central Russian Plain and that of the areas of Central and Western Europe and Near Asia.

The work of the Khorezmskaya expedition on the study of ancient irrigation systems was of great interest to science as well as to the national economy.

Excavations in Novgorod produced new, interesting finds: letters to prominent Novgorod "posadniks" [deputies of the ruling prince], a document of importance regarding the history of the appearance of the "Russkaya Pravda," an agreement between the peasants and feudal lords regarding the amount of quit rent, and alphabet on a small wooden board, representing the first school appliance known to science. A model of a building which was found gives an idea of Russian architecture in the 10th century.

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Volume II of Istoriya Russkogo Iskusstva (History of Russian Art) and the book Russkaya Arkhitektura Pervoy Poloviny XVIII Veka (Russian Architecture of the First Half of the 18th Century) have also been published.

There was a considerable increase in the scope of works on the history of the natural sciences and engineering. The Institute of the History of the Natural Sciences and Engineering has prepared the first volume of Istoriya Yestestvoznaniya v Rossii (History of the Natural Sciences in Russia) for publication. Of great interest are: documents about A. F. Mozhayskiy, which are ready for publication; a collection Iz Istorii Nauki i Tekhniki Kitaya (From the History of Science and Engineering in China); and a monograph on the Czech scientist Bol'tsano [Bolzano?], as well as many other works, are in process of being printed.

The study of problems on the history of religion and atheism has been revived, due to a certain extent to V. D. Bonch-Bruyevich. A commission has been set up to coordinate research data. This, however, is only the first step in the realization of the resolutions of the Central Committee of the party on scientific atheistic propaganda. It is essential to stress the scientific and politico-idealistic meaning of this work, which should receive serious attention from the academy.

In the field of linguistics and the history of literature, work has been completed on Russkiy Orfograficheskiy Slovar' (Russian Orthographic Dictionary), the most complete of such dictionaries compiled during the Soviet era. Volume II (in two parts) of the scientific Grammatika Russkogo Yazyka (Grammar of the Russian Language), dealing with syntax and concluding this large work, and Volume III of a dictionary of modern Russian literary language have been published.

There will soon be published collections on problems of the study of texts and of modern foreign literature. Volume II of a monograph on the creative work of Mayakovskiy is being prepared. On the occasion of the Second All-Union Congress of Soviet Writers, which has played an exceptionally important role, not only in the development of belles lettres, but also in Soviet literary criticism, outlines of the histories of Russian, Ukrainian, and Belorussian Soviet literatures, valuable monographs on Tolstoy, Gogol', Fonvizin, and many others were published.

Literaturnoye Nasledstvo (Literary Heritage), continuing its great and important work, has prepared current volumes of historical and literary material on Gertsen, Ogarev, and the Decembrist writers.

There was some improvement in the preparatory work on scientific editions of Russian classical writers. Five volumes of the writings of Belinskiy were published. The publication of a 30-volume collection of Gor'kiy's works is nearing completion. Publication has been started of collections of works by Gertsen and Lermontov.

The total results, however, of work in the field of social sciences cannot be considered to be satisfactory.

A lagging in literary science, pointed out in the greetings of the Central Committee of the CPSU to the Second All-Union Congress of Soviet Writers, is characteristic even in the case of our literary institutes, which do not do enough work on theoretical research and urgent problems of modern Soviet literature.

The unsatisfactory state of work on scientific problems (the series Problemy Sovetskoy Nauki [Problems of Soviet Science]) constitutes a serious shortcoming in the activities of the departments of social sciences. The Department of Economic, Philosophical and Legal Sciences has not yet even set up groups of scientists for doing this work.

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A struggle for the purity of the Marxist-Leninist theory is an essential condition for the further development of Soviet social science. The firmness of the principles of Marxism-Leninism is an inviolable law for the development of all Soviet science.

Some theoretical workers, however, have recently tried, under the guise of "discussion", to revise the Marxist theory, the principles of Marxism, and the general line of our party. Individual economists have expressed rules completely alien to Marxism and the general party line on some topics of socialist economics, have revised the radical principal premises of Marxism on the preferential growth of the production of the means of production, on the more rapid rate of growth of the production of the means of production as compared to the output of consumer goods, and so on. Among these economists, there were some members of the Institute of Economics (P. Mst. slavskiy and others).

Under the cover of fighting dogmatism in science, the vulgarizers of Marxism tried to foist upon the editorial boards of the journals Voprosy Ekonomiki (Problems of Economics) and Voprosy Filosofii (Problems of Philosophy) a discussion on the basic questions of the Marxist-Leninist theory of Economics. Although the editorial boards of these journals declined the articles of these newly emerged revisionists, they did not submit their views to public criticism, and the journal Voprosy Ekonomiki even printed the vicious article of I. Vekua. In this, the editorial board showed lack of principle and conciliatoriness in the consideration of the most important questions of Marxist-Leninist theory. It must be said that the administration of the Institute of Economics has committed a serious error in not rebuffing the action of the revisionists.

The importance of discussion as a creative method for the development of science is evident, but it cannot be permitted that, under the guise of discussion, attempts are made to revise the basic premises of the Marxist-Leninist theory and the general line of our party, since this can only harm our scientific and practical work.

It should be noted that the work of our economists, philosophers, and jurists contained other errors and shortcomings which were justly criticised. The journal Voprosy Filosofii has not yet been able to throw much light on philosophical questions of natural sciences of Soviet and progressive foreign scientists. A. A. Maksimov, Corresponding Member of the Academy of Sciences USSR, who was in charge of the physics section of the journal, permitted serious mistakes in the evaluation of modern scientific achievements, and thereby discouraged natural scientists from participating in the work of the journal. There were also errors in the journal Sovetskoye Gosudarstvo i Pravo (Soviet State and Law), which does not, in general, sufficiently develop questions of theory.

It would be erroneous to assume that the need for strengthening the struggle for the party line in science and the stability of the principles of Marxism-Leninism concerns only the humanities. It must not be forgotten that the successes of our scientists in the realms of physics, chemistry, biology, physiology, and other branches of science, have been achieved primarily on the basis of Marxist-Leninist methodology and the principles of dialectical materialism.

The idea that each scientist should have his own school has been expressed more and more often of late. We are of the opinion that each scientist should have all the conditions necessary for creative work by himself and his students. One should remember, however, that such schools, being definite fields or trends in scientific work, can develop successfully only

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if they have as their foundation the Marxist-Leninist methodology, and inevitably become just "little schools" when they abandon the basis of this methodology and cease adhering to party line principles in science.

Publications and Scientific Information

The number of publications by the Academy of Sciences USSR has increased considerably during 1954. Originally, the plan for publishing books and journals by the academy's Publishing House was approved for 17,000 author's pages, but later was increased to 18,174 pages; in actual fact, 18,574 pages have been published, representing 125.3% of the preceeding year's publications.

A number of very valuable scientific works have been published, both of a theoretical and a practical character. More books giving direct practical assistance to the various branches of industry and agriculture were published than in the preceeding year. There is still much to be done, however, to increase the output of such publications.

Work on the publication of Referativnyy Zhurnal (Journal of Abstracts) has been increased in scope, the seven series of which contained more than 3,000 pages last year. In addition to new series of this journal, the new periodical Fiziologiya Rasteniy (Plant Physiology) began to appear in 1954.

The tremendous importance for the establishment and organization of scientific work in our country, that in 1954 alone, the Referativnyy Zhurnal (Abstract Journal) published over 100,000 abstracts, cannot be overestimated. The flow of world scientific literature is so great that no single scientist can now work productively without a well-organized information service. The organization of the Institute of Scientific Information and the publication of the Referativnyy Zhurnal, the size of which in the past year alone equals 35 volumes of the Bol'shaya Sovetskaya Entsiklopediya (Large Soviet Encyclopedia), required, of course, an enormous effort. It was even found necessary to delay the publication of less urgent works.

The publishing work of the academy continued to be hampered by the insufficiently careful preparation of manuscripts; problems in this connection were discussed in detail in November 1954 by the Presidium of the Academy of Sciences USSR with regard to progress in fulfilling the publications plan of the departments of social sciences. The presidium noted that the scientific standard of many works was not high; they contain mostly descriptive material and draw few scientific conclusions permitting judgement of the new points an author has derived from his investigation of a problem. Consideration was also given to the unnecessary length of some works and the poor preparation of manuscripts. The presidium passed a resolution directed at improving preparation of publications and a further increase in their numbers.

The approved plan for publication of books and journals in 1955 calls for over 25,000 authors pages, representing an increase of 40% over the 1954 plan.

New journals will be initiated in 1955: Sovetskoye Vostokovedeniye (Soviet Oriental Studies); Istoricheskiy Arkhiv (Historical Archives); and Akusticheskiy Zhurnal (Acoustics Journal). During the current year, therefore, the academy will publish more than 50 periodicals. It is essential that more attention be devoted to their work. This refers particularly to the periodical Doklady (Reports), which is especially important, since, being the organ of the academy, it has the duty of publishing the first short reports on everything new produced by the research work of Soviet scientists. There have been delays during 1954 (up to 8 months) in publishing important works while the journal was filled with matters of lesser importance. This is primarily the result of a lack of team work by the editorial board.

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The aim of the publishing activity of the academy is not only to publish 25,000 pages, but also to present in them the best possible scientific information, to advise Soviet science, culture, and the national economy of the country of the greatest possible amount of theoretical and practical achievements.

Scientific Cadres

During the current year, as formerly, the number of scientific cadres in the academy has been constantly increasing, and their qualifications have become higher. The number of scientific workers increased by 1,855 persons during 1954, including an increase of 113 among doctors of sciences and 688 among candidates of sciences. At the same time, 1,225 scientific and technical workers have been engaged for work in the institutions of the academy.

A special feature of this increase in personnel is that it consisted mainly of young people. During the last 4 years, the academy obtained, according to plan, about 4,000 young specialists with a higher or special secondary school education; of these, 1,552 were accepted in 1954.

In many of the institutions of the academy, the training of highly qualified personnel is still lagging. Thus, not a single doctoral dissertation was defended in 1954 by members of a number of institutes, among them the Institutes of Geophysics, Physics Problems imeni S. I. Vavilov, Mechanics, and some others.

The manner in which specialists from other agencies are selected for work on doctoral dissertations in the academy is not satisfactory. For instance, ministries have often sent to institutes of the Department of Technical Sciences, as candidates for doctoral degrees, not the most capable men or those who show the most promise as scientists, but rather those who could not perform the work assigned to them.

The task of bureaus of departments and directors of institutes is to formulate practicable plans for raising the qualifications of scientific workers and to give the necessary support and assistance to those who are preparing doctoral or candidate dissertations. Young specialists should have all the necessary conditions for raising their qualifications and for demonstrating their abilities. Special attention should be given to the training of scientific personnel in various branches of physics, new fields of engineering, and other lines of science (theoretical physics, electronics, radiophysics, telemechanics, electrochemistry, kinetics of combustion, gas dynamics, etc.)

A special characteristic of heads of the academy's scientific institutions is that they must combine administrative and scientific activities, and must be up to the standards of achievement in their respective fields of knowledge. The heads of institutes must personally conduct planned scientific research, since they would otherwise have neither the authority nor the knowledge to direct correctly the activities of scientific groups in the academy. All these common truths have to be reiterated, for we still have some institute heads who think that they are required only to direct and not to carry out scientific work. "We direct and do not write," say some comrades from among the members of the administration of the Institute of Economics. There can be no doubt but that each leading worker must carry out research work. A resolution was passed long ago on the inadmissibility of holding several offices, especially by leading scientific personnel; there are still, however, many cases of persons holding several offices. This must be ended without delay.

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The responsibility of the bureaus of departments and institute heads for work with cadres must be increased, remembering that in any position, the directives of the party on the correct selection of personnel according to their political and professional qualifications must be unswervingly followed.

International Relations

The year 1954 brought about further development and strengthening of creative cooperation and ties between Soviet and foreign scientists.

The Academy of Sciences USSR has, during the past year, sent its representatives to participate in various international congresses, meetings, conferences, and consultations. Scientists of the academy took part in 65 international and national meetings, congresses and conferences. Soviet scientists traveled to the People's Republic of China, the GDR, the European Peoples' Democracies, India, France, England, Italy, Austria, Belgium, Holland, West Germany, Switzerland, the US, Pakistan, and Iran.

At the invitation of the Academy of Sciences USSR, the Soviet Union was visited in 1954 by delegations from the Czechoslovak and Slovak Academies of Sciences, the Bulgarian Academy of Sciences, the Arab Academy of Sciences in Damascus, the Institute of Sciences in Albania, a group of Indian scientists, and delegations of Norwegian scientific workers and British historians.

The academy has conducted scientific sessions commemorating the fifth anniversary of the People's Republic of China and the fifth anniversary of the GDR.

Representatives of the science of astronomy from 17 countries were present at a solemn session which took place in Leningrad on the occasion of the reopening of the restored Pulkovo Observatory. Foreign astronomers also participated in observations of the solar eclipse on 30 June 1954 from the territory of the USSR and in the work of the Fourth All-Union Conference on Problems of Cosmogony.

There has been a considerable increase in the number of books exchanged with foreign academies, universities, institutions of higher learning, research institutes, scientific societies, libraries, etc. In 1954, the Academy of Sciences USSR sent abroad as exchange items over 350,000 copies of books and journals.

It is desirable to establish even closer international relations for Soviet scientists, to organize a regular exchange of scientific information, especially with the peoples' democracies. Firm scientific ties between all the countries in the socialist camp should substantially assist the cause of the development of their economies and culture.

Organization of Scientific Research

In conclusion, let us dwell on some questions of the organization of scientific work. Much work has been done lately by the Academy of Sciences USSR on analysis of the present condition of science and the separation of the most important problems. Groups of scientists assigned to this work have, jointly with the representatives of production, drawn up plans for developing each of these problems. The results of the activities of these groups were widely discussed by the departments and in the Presidium of the Academy.

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This is a new qualitative stage in the planning of science. But it should be stressed that this work will produce the expected results only if the institutes, the leaders of work, and the bureaus of the departments place research on the designated problems at the center of their entire scientific and organizational activities. This is essential as much for improving the work of the institutions of the academy as for having the academy itself fulfill its role of a directing and coordinating scientific center.

It must be plainly stated that so far, the Academy of Sciences USSR has not yet become the kind of scientific center in our country which would ensure ideal centralization of the efforts of all Soviet scientists in the most important and decisive directions. We still lack sufficiently close contact with institutes subordinate to ministries and administrations and give them little help.

The Academy of Sciences USSR, in its capacity of highest scientific center of the country, must direct the work of the academies of sciences of the Union Republics and also of scientific institutions subordinate to administrations, must evaluate their work, give them scientific problems, utilize their forces, invite representatives of these institutions to its sessions, and have them read reports.

The absence of close ties between the academy and institutes subordinate to administrations hurts both parties. Institutes are not sufficiently equipped with theories in their researches; they are strongly, and sometimes overwhelmingly, empirical. At the same time the academy is in danger of removing itself from, or lagging behind in, practical questions. Among institutes subordinate to administrations, there are some mature scientific installations, which in no case should remain hidden from the view of the academy. In some cases these institutes have achieved results of such importance that they cannot remain the property of a single institute or even of one single branch of industry. The task of the Academy of Sciences USSR is to make them the property of all Soviet science. In this way, institutes subordinate to administrations cannot develop without the participation, cooperation, and assistance of the academy, and the academy cannot productively develop without absorbing all the best which is offered by the institutes.

Scientific and technical societies must play an important part in bringing into the creative scientific process the widest range of scientists, teachers, engineers, and inventors. Scientific societies within the academy have recently become more active. An All-Union Astronomical and Geodetic Congress was recently held, as was the Second All-Union Congress of the Geographical Society of the USSR; congresses of physiologists, biochemists, and pharmacologists will also be held.

There are 25 scientific and technical societies in our country, which have over 450 republic and oblast branches and about 8,000 primary organizations at enterprises and institutions. These societies have memberships of tens of thousands of engineers, technicians, scientific workers, and inventors. The creative initiative of these promoters of technical progress is a powerful weapon in the struggle for the further development of Soviet science and practice in the fight against stagnation, routine, and conservatism. Unfortunately, the Department of Technical Sciences does not pay sufficient attention to the activities of these societies, although it has been shown in practice that conferences and other steps taken by institutes of the academy jointly with scientific and technical societies have given valuable results. Engineers, technicians and inventors need methodical scientific assistance from the academy, while the societies can give much help in introducing the results of scientific research work done by the

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academy's institutions into production. The Department of Technical Sciences must assume the role of a scientific center coordinating the activities of the societies.

Certain trends in the development of the academies of the Union Republics and especially of the affiliates of the Academy of Sciences USSR cannot be approved. These scientific institutions try, as a rule, to develop all branches of science without exception, regardless of their personnel capabilities or the needs of the national economy of the given republic or oblast.

It is essential that consideration be given to the creation of scientific research centers in many towns of the country.

It must be remembered, for instance, that V. I. Lenin gave great attention to the creation and work of the Nizhegorod Radio Laboratory, the first large Soviet radio engineering scientific research institute. On 5 February 1920, Vladimir Il'ich addressed his well-known letter to the head of this laboratory, M. A. Bonch-Bruyevich.

In Gor'kiy and other towns of our country, numerous scientific and engineering cadres have grown up. It can hardly be considered right that there are no academic scientific institutions in these towns. It is necessary, apparently, to study carefully the possibilities of establishing new scientific institutes outside Moscow.

In this connection, the examples of successful work of the Kazan', Ural, and West Siberian Affiliates of the Academy of Sciences USSR cannot be overlooked. The scientific work of other field institutions of the academy should be brought to the same level.

It will apparently be necessary to review the duties of the scientific councils of institutes of the academy and the bureaus of its departments. The scientific council of an institution of the Academy of Sciences USSR cannot limit itself to the interests of its own institute alone; it must have a feeling of responsibility for the development of the given branch of science in the entire country. Its duty is to unite not only the scientists of its institute, but also to direct the activities of scientists in the given branch of science on a country-wide scale. This will multiply our forces and will enable us to solve successfully the most complex problems.

Soviet science is developing under the guiding influence of principles and ideas expressed in the resolutions of our party. Under the leadership of the Communist Party and the Soviet Government, Soviet science has gained the first place in many important fields. This does not imply, of course, that we can disregard the achievements of science abroad. There are among our scientists, however, some who, under the guise of the struggle against cosmopolitanism, are ready to ignore the achievements of science abroad and to exaggerate their own achievements. This cannot be of benefit to Soviet science.

We must study carefully the experiences of science throughout the world; while criticizing and exposing its ideologically reactionary, undemocratic, and bourgeois trends, we must at the same time adopt everything positive offered by foreign sciences in the fields of natural sciences and engineering.

In putting into practice the slogan about overtaking and surpassing the achievements abroad, some of our scientists see only the quantitative aspects of the problem. Nevertheless, the slogan itself and its aim concern the qualitative aspect.

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One must not reason as some comrades do; if, they say, abroad somewhere there are 20 laboratories working on research on a certain series of problems, we can say that we have surpassed their standards only by establishing 21 or 22 laboratories at home. This is wrong. One should bear in mind that in the capitalist world, laboratories and institutes are in many cases brought into existence through a competitive fight between monopolies.

One of the important shortcomings of the academy's organization is the poor work of its departments in directing the activities of scientific institutions. The departments, which should be the leading scientific and organizational centers, offer no direct leadership to the institutions forming a part of them, and have very little influence on the work of these institutions. The present position, which places institutes organizationally not under the departments, but directly under the Presidium of the Academy, does not help in improving the leadership and causes parallelism in the work of the presidium and the departments.

At the same time, the structure of the presidium is unwieldy, and it has superfluous structural subdivisions which duplicate each other's work. A completely unjustifiable centralization exists in making separate scientific and organizational problems. In many cases, the presidium assumes the functions of the bureaus of the departments in passing on problems which should be examined and decided by groups of scientists in the departments and institutes themselves.

In order to concentrate the activity of the academy of Sciences USSR on the execution of its basic functions, the Presidium passed a resolution on 7 January 1955, listing a number of steps to be taken to improve the leadership of scientific institutions, increase the importance of the Departments, eliminate serious defects in the organizational structure, and get rid of excess personnel in the entire apparatus of the academy. In 1954, the presidium made efforts to improve the organizational forms of scientific work, and especially its leadership. All that has been done represents only the first steps in the proposed reconstruction.

There are still many shortcomings in all fields of our work, both organizational and also strictly scientific. Many important and true critical remarks have been made at meetings of the departments. The reports of the Academician-Secretaries have been widely discussed. An exception was, unfortunately, the report of Academician D. I. Shcherbakov in the Department of Geological and Geographical Sciences, probably because it was insufficiently critical. Shortcomings in the work of the presidium, the bureaus of the departments and especially the Bureau of the Department of Biological Sciences, were pointed out at the meetings.

The bureaus of departments and the presidium of the academy must carefully study the proposals submitted. The tried method of criticism and self-criticism, the clash of opinions, and the creative discussion of scientific problems must be fully utilized for the development of Soviet science.

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