250th ANNIVERSARY OF THE FOUNDATION
OF THE ACADEMY OF SCIENCES OF THE USSR -
PROBLEMS OF MATERIALS SCIENCE

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The Academy of Sciences was founded in St. Petersburg in February, 1724, by an edict of Peter I. The event occurred at a time when modern concepts of natural science came into being and experimental work was initiated on a large scale in the fields of mechanics, physics, chemistry, mineralogy, and other sciences. The Academy provided a stimulus to the creation of the first research institutions, which were subsequently to grow rapidly in size and importance. With the Academy have been associated the establishment and development of science in our country and progress in the key branches of learning. In the two and a half centuries of its existence, the Academy of Sciences has given the world countless major discoveries, which have become an integral and important part of world science. With the names of many scientists working in the Academy are linked not only individual outstanding scientific achievements but also the creation of new trends in science.

Within a few years after its foundation, the St. Petersburg Academy of Sciences established an observatory and a physical laboratory. These were followed later by a chemical laboratory and the Kunstkamera — the first natural science museum in Russia. In the 18th century, nearly all the major trends in physical, mathematical, and natural sciences were already represented in the Academy. Within the walls of the St. Petersburg Academy, successful investigations were being conducted thanks to which it very rapidly became one of the world's most famous scientific institutions. The works of D. Bernoulli and L. Euler published in St. Petersburg constituted an important stage in the formulation of the principles of mathematical analysis and its application to mechanical and astronomical problems.

At first, the Academy was staffed by scientists invited to come to Russia from other countries. After about 10 years, however, the Academy began to fill with Russian scientists, many of whom had graduated from the university forming part of the Academy of Sciences. In 1741, M. V. Lomonosov began his scientific activities at the Academy. A brilliant naturalist and founder of materialistic philosophy in Russia, Lomonosov was to exert an immense influence on the development of Russian science. In particular, his physicochemical studies made a very valuable contribution to Russian and international science. To him, too, must be given credit for the development of the atomic-molecular concept, which became embodied in his kinetic theory of heat, molecular theory of gases, and other theories.

The work of Lomonosov and other Academy scientists helped to provide a scientific base for the development of metallurgy, mining, and other branches of industry, which were springing up at that time in Russia. At the same time, with the direct participation of the Academy, new higher institutions of learning were founded. The first of them was the Moscow University (1755).

In spite of difficulties and obstacles resulting from the strict control exercised by the czarist administration, against which the leading scientists had to wage a continual struggle, the Academy of Sciences succeeded in the first hundred years of its existence in doing a great deal of fruitful work. Much effort was concentrated in those years on exploring Russia's natural resources, opening the northern sea route, and organizing many geographical expeditions, although theoretical investigations, too, received considerable attention.

Of great importance in that early period was the work of Academicians S. E. Gur'ev, M. V. Ostrogradskii, and P. L. Chebyshev, thanks to whom great advances were made in mathematical physics and
theoretical mechanics, in the development of the theory of probability and the theory of mechanisms, and in other important areas of mathematics. In the first half of the 19th century, the Academy became one of the main centers of physical investigations, dealing with problems of terrestrial magnetism, electricity, etc. Outstanding among the chemical scientists working at that time at the Academy of Sciences were I. D. Zakharov, V. M. Severgin, and the man who laid the foundations of thermochemistry, G. I. Gess. Worldwide recognition was gained also by N. N. Zinin, who founded the Russian school of organic chemistry, and A. M. Butlerov, who put forward the theory of chemical structure. In the second half of the 19th century, the distinguished geologist and mineralogist A. P. Karpinskii* began his scientific work.

At the end of the 19th and the beginning of the 20th century, the Academy had among its members many scientists who were indeed its pride. The academicians elected during that period included the founder of geochemistry, V. I. Vernadskii, the great physiologist I. P. Pavlov, mathematician and ship designer A. N. Krylov, the originator of physicochemical analysis, N. S. Kurnakov, and crystallographer E. S. Fedorov. The numerous important scientific investigations and discoveries of that period enriched science and greatly enhanced the international prestige of the Academy of Sciences.

Advances in science and an urgent need to develop the economy of the country created serious scientific and technological problems, whose solution was entrusted to the Academy. Exploration of new organizational forms began. Thus, shortly before the revolution (1915), a commission was set up for the study of Russia's natural productive capacity. The task of the commission was to organize systematic, large-scale investigations of the natural resources of the country, recruiting for this purpose all prominent scientists. Under the conditions of prerevolutionary Russia, however, the commission, meeting a bureaucratic attitude to all its initiatives, found it impossible to commence its task.

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The Great October Socialist Revolution opened up a new epoch in the history of our country's science. It transformed science into an active force for the economic, social, and spiritual regeneration of the peoples of Russia and vastly broadened its social basis. It was only the October revolution that enabled science to rise to a position of great importance and honor. Advancement of science became, for the first time in history, a matter concerning the whole of the state and evidence of the party's and the nation's constant solicitude for science.

Members of the Academy were given the task of not only fully maintaining all traditional investigations but also initiating work in areas which had previously been totally neglected in Russia or at best received only little attention. In April, 1918, V. I. Lenin, in his "Outline of a Plan of Scientific and Technical Tasks," presented to scientific institutions a comprehensive program of investigations designed to effect a speedy reorganization of industry and boost Russia's economy.

The Academy of Sciences was expected to carry out scientific studies and, in addition, to take the lead in an exploration of the natural resources of the country and in an analysis of the best distribution of industry in the country. Leading Soviet scientists enthusiastically responded to the call of the party and the government. Already in those difficult years of the civil war prospecting commenced for deposits of rare metals, potassium salts, clays, Tikhvin bauxites, and constructional materials. At the same time, investigation of the Kursk magnetic anomaly started and work began on the drawing up and realization of Lenin's electrification plan.

Next, scientists from the Academy proceeded to establish scientific bases for many important branches of the country's industry, including the platinum, ceramic, and radium industries. As a result of their efforts, it became possible to produce on an industrial scale highly radioactive substances from the country's own radium ores, and new methods were developed for the manufacture of optical glass. Petrochemical researches were expanded.

With all its resources strained to the maximum in combating an economic crisis, the country yet found means to finance the scientific investigations of the Academy and even to widen their scope and to set up new scientific institutions. In the 1920s, more than 50 research institutes were established, some of which were to be concerned with problems of an applied nature, while others were to carry out funda-

* A. P. Karpinskii was the first president to be elected, in May, 1917, from among the academicians themselves. Prior to that, and contrary to the statute of the Academy of Sciences, senior civil servants used to be appointed as presidents.