Атомн. энергия — мирное использование

THE ATOM SERVES PEACE

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From the very first days of its existence the Soviet state devoted great attention to the development of science, viewing it as one of mightiest factors of technical progress.

The extensive development of physics was started by the organisation in 1918-1929 of the Petrograd Roentgenological, Radiological and Cancer Institute, the Moscow Institute of Physics and Biophysics, and the Petrograd Optical Institute. The first scientific team to conduct fundamental studies in the field of nuclear physics was the staff of the Leningrad Physical-Technical Institute which brought forth such outstanding atomic scientists as Academicians Igor Kurchatov, Anatoly Alexandrov, Abram Alikhanov, Lev Artsimovich and many others.

A big contribution to progress in this field was made by nuclear physicists from the Lebedev Physical Institute in Moscow.

In the pre-war period Soviet scientists had made a number of very important discoveries which brought them to the threshold of obtaining and utilising atomic energy. The selfless work of scientists, designers, engineers, technicians, and workers during the war and the first post-war year made it possible to commission on December 25, 1946 Europe's first uranium-graphite reactor which was built under the superivision of Academician Igor Kurchatov. The first crumbs of plutonium, the metal of the nuclear age, were also produced. A new period began in the history of mankind, the period of the utilization of atomic energy for peaceful purposes.

The world's first atomic power station went into operation in Obninsk on June 27, 1954. A reactor with nuclear overheating of steam was commissioned in 1964 at the Beloyarsk atomic power station named after Igor Kurchatov. The Novo-Voronezhskaya atomic power station began to generate electricity in the same year and the Ulyanovskaya atomic power station in November 1965. The generating capacity of "factories of atomic electricity" already now exceeds a million kilowatts.

A series of efficient industrial atomic reactors for big atomic power stations are to be created in the USSR in the next few years. Apart from that, the capacities of the Beloyarsk and Novo-Voronezhskaya stations will be increased to 300,000 kW and 600,000 kW respectively. The Bilibinskaya atomic power station is being built on the Chuckchee peninsula.

Atomic stations and installations of small and medium capacities are being built for the needs of the Soviet Union's national economy. For instance, the transportable large-block TES-3 atomic station with a water-cooled power reactor of 1500kW is designed for operation in areas where it is unprofitable to build large power staions. It "burns" only 14 grammes of nuclear fuel a day.

Recent years are characterized by rapid progress in the field of the direct transformation of nuclear energy into electrical one. There already exist several installations with thermo-electric transformers. Thus, the 5 kW "Beta-2" type generator can power an automatic meteorological station for ten years. The 500 Watt nuclear high-temperature power plant "Romashka" on fast neutrons had worked for more than 15,000 hours at the Kurchatov Atomic Energy Institute.

Studies conducted with an experimental reactor on fast neutrons provided the necessary data for an atomic power station with a thermal capacity of one million kolwatt now being constructed on the coast of the Caspian Sea. It will not only provide the industry on Mangyshlak peninsula with electricity but also supply steam for the powerful desalination installations which, in their turn, supply the population of the town of Shevchenko and its enterprises with fresh water. This station is remarkable also for the fact that its reactor will not only burn nuclear fuel but also produce it. The creation of reactors on fast neutrons will make it possible in the future to provide the atomic power industry with an inexhaustible fuel base.

In the next few years Soviet physicists will deepen their knowledge of the processes taking place in the submicroscopic world of the nucleus. They will be assisted in this by the world's biggest 70 thousand million electron-volt proton smasher that was just completed near Serpukhov.

Soviet scientists are making a substantial contribution to the solution of the problem of controlled thermonuclear synthesis. About a hundred various experimental installations that helped to obtain plasma of high parametres were designed and built in the 15 years of research into this problem. The creation of new installations with different methods of heating plasma will undoubtedly bring closer the time of the accomplishment of a controlled thermonuclear reaction in laboratory conditions.

A series of different research reactors have been created in the Soviet Union and now practically every Union Republic and many specialized organisations have their own atomic centres. The "MR" reactor in the Kurchatov Atomic Energy Institute and the "SM-2" reactor with the record stream of neutrons in Melekess are unique. The BOR-60 experimental reactor on fast neutrons, now being built at the Research Institute of Atomic Reactors in Melekess, will be of great importance. The studies conducted on research reactors help Soviet specialists to solve quickly and efficiently various problems of the peaceful utilization of atomic energy.

Soviet science and technology have achieved big successes in the utilization of radioactive isotopes and nuclear radiations.

Numerous istruments based on the utilization of ionising radiation of radioactive isotopes have become standard equipment in many branches of industry and agriculture. Most extensively used are relay radiation instruments, various gauges of thickness, density, of the level of liquids and loose bodies, ionising defectoscopes, concentration gauges, analysers, hygrometers, gamma-therapeutical equipment, etc.

Extensive use in recent years is being made of radioisotope instruments-neutralisers of static electricity which is a veritable curse of some enterprises of the chemical and textile industries. Geophysical apparatuses and apparatuses of activation analysis, instruments for the prospecting and surveying of tin deposits allow to determine the depth of occurrence and the thickness of the seams of the ore body, and to control the working of mineral deposits.

More than ten thousand different radioisotope instruments are introduced into the national economy every year.

This brings an annual economy of more than 200 million roubles, while the cost of the instruments is recouped already during the first year of their use.

Soviet industry produces more than 800 compounds traced by radioactive and stable isotopes, and over 100,000 sources of radiation.

As to the assortment and volume of their production, the USSR holds one of the leading places in the world, and exports isotope products to more than 30 countries.

The USSR also helps other countries to set up their own atomic centres for the peaceful use of atomic energy and to train skilled specialists. Beginning from 1955, the Soviet Union helped to build 26 various atomic installations in socialist and developing countries and to train several thousand specialists in the field of atomic science and technology.

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