5487

OTS: 60-41,305

JPRS: 5487

20 September 1960

NEW CONQUESTS OF SOVIET SCIENCE

By A. Berg

- USSR -

Price: ~~$0.50~~

U. S. JOINT PUBLICATIONS RESEARCH SERVICE
205 EAST 42nd STREET, SUITE 300
NEW YORK 17, N. Y.

JPRS: 5487

CSO: 4796-N

NEW CONQUESTS OF SOVIET SCIENCE

[Following is the translation of an article by academician A. Berg entitled "Novyye Pobedy Sovetskoy Nauki" (English version above) in Promyshlenno Ekonomicheskaya Gazeta (Industrial Economic Gazette), Moscow, 22 April 1960.]

Today, the day on which the entire country together with leaders the world over is celebrating the 90-th anniversary of the birth of the great leader and teacher of the workers V. I. Lenin, a Resolution has been promulgated concerning the award of Lenin premiums to authors of outstanding work in various fields of science and technology.

This resolution reflects the remarkable victories of the soviet people in the building of a new society and in the development of science, technology and culture.

Our scientists, engineers and workers have overcome the earth's gravity and have created artificial

celestial bodies that have broken through to cosmic space. Our country's pennant has been placed on the moon. Our socialist science and technology have shown humanity the hidden side of the moon.

These remarkable victories include the widely publicized investigations of cosmic radiations and the magnetic fields of the Earth and the Moon, carried out by the member-correspondent of the AS USSR, S. N. Vernov, by the doctor of physical and mathematical sciences A. E. Chudakov and by the scientific collaborators Sh. Sh. Dolginov and N. V. Pushkov. Soviet scientists have developed methods and the original instrumentation for the investigation of different types of radiation and of magnetic fields at great heights and in cosmic space. By these means they have discovered and have studied the belt of radiation around the earth and have established the general picture of the distribution of charged particles in cosmic space. By the application of radically new types of magnetic instruments developed by them, they have measured the magnetic field of the earth's radiation belt, have proved the existence of electric currents beyond the ionosphere, and have proved the absence of a lunar magnetic field.

The Lenin premium is a worthy evaluation of the scientific worth of these investigations.

The high title of laureate of the Lenin premium has been awarded to academician V. A. Fok for his basic on the quantum field theory, that is a stepping stone for for the development of further work in this area. The strict method of secondary quantization developed by V. A. Fok, has been widely used in the meson theory of nuclear reactions.

The Lenin premium has been awarded also to N. G. Chetayev for work on the stability of motion and in analytical mechanics. This work has important practical aspects in the construction of precision instruments and in other fields of science and technology. Chetayev's ideas are used not only in the field of mechanics but in the qualitative theory of differential equations as well.

The Resolution concerning the award of the Lenin premiums points out the fundamental work of doctor of biological sciences A. E. Kriss, entitled "Marine Microbiology (deepwater)". This work has been generally recognized as an outstanding achievement of the science of oceanology and microbiology, an achievement that has laid the foundations for a new branch of science - oceanic microbiology.

A. E. Kriss, over a period of many years studied the microflora of the Black and the Caspian seas, as well as that of the oceans over the vastness of the

expanse from the Arctic to the Antarctic. A new and most important achievement of this soviet scientist is the quantitative appraisal prepared by him of oceanic microflora at different geographic latitudes.

Professors S. D. Ponomarev, N. N. Malinin and V. I. Fedos'yev, as well as docents V. L. Biderman, K. K. Likharev and V. M. Makushin have been awarded the Lenin premium for their three-volume treatise in the field of computations for structural strength in machine-building. In a form that is convenient for use in actual practice, this treatise brings together all of the latest scientific discoveries in the field of strength, hardness, creep, stability and vibration. The authors have devised computation methods for elastic instrument parts used in automatic control and direction instruments, new designs of springs of various types of construction, that are widely used in modern machine building in connection with the automation of production processes. Published for the first time are the authors' own designs of rubber cord and metallic rubber structural parts that are being ever widely used in modern engineering as amortizers, pneumatic tire covers and the like.

Doctor of technical sciences Ya. Z. Tsypkin developed one of the important aspects of the modern theory of

automatic control - the theory of discrete automatic systems, including relay and pulse systems. In connection with the use of computer installations in automation, the theory of discrete systems is acquiring ever increasing importance.

Ya. Z. Tsypkin developed a single, simple yet exact method for studying different operating regimes of relay systems. In the field of the pulse system theory of automatic control, he solved the basic problems of the analysis and the synthesis of such systems. A series of common properties for systems of relay and similarity have been uncovered on the basis of the theory built up by Tsypkin.

For work in the field of engineering, the Lenin premium has been awarded to the following workers in scientific research institutes: S. M. Feinberg, V. V. Goncharov, G. A. Stolyarov, T. N. Zubarev, P. I. Khristenko, V. F. Kozlov and O. I. Lyubimtsev, for the creation of a series of water-aqueous reactors. These reactors operate on thermal neutrons. Ordinary water is used as substitute and coolant, while the nuclear fuel is enriched uranium.

These reactors have many valuable properties. The basic assembly of the reactors is a heating element of very simple construction and technology. A thinner shield results in high intensity neutron beams.

The Lenin premium has also been awarded to the following group of scientists: A. I. Leipunskiy, O.D. Kazachkovskiy, I. I. Bondarenko and L. N. Usachev for investigations in the field of nuclear reactor physics operating on fast neutrons. A new theory of such reactors has been created on the basis of these investigations. Control methods have been devised. In 1959 the world's first test reactor operating on plutonium oxide was put in operation.

For the discovery and exploration of the USSR's largest Gazlin natural gas field, the Lenin premium has been awarded to doctor of geological mineralogical sciences A. A. Askirov and to P. N. Yenikeyev, S. I. Il'in, E. V. Kalyushov, L. G. Zhukovskiy, K. A. Sotiriadi and V. I. Chernov.

The Gazlin field is situated on the territory of the Uzbek SSR, 90 to 110 kilometers Northwest of the city of Bukhara. The deposits are enormous: limits of the producing area are 33 to 38 kilometers in length and 8 to 12 kilometers wide. The discovery and exploration of the Gazlin field are of great significance to the national economy and improve the energy-fuel ratio in our country.

The widespread use of natural gas in industry has lead to the use of this efficient fuel in metallurgy. For introducing the use of natural gas in

blast furnaces, the Lenin premium was awarded to a large group of metallurgists. By increasing the regeneration properties of gases as a result of the increase of hydrogen in them, and by making possible an increase in the heat of the blast , soviet metallurgists have succeeded in greatly reducing the use of coke and raising the productivity of the furnace.

The Lenin premium has been awarded to professor A. V. Ulitovskiy and to N. M. Averin and B. G. Krasin'kov for developing a method of obtaining thin and superthin metal threads directly from the liquid phase. In this way soviet scientists have created a new field of metallurgy -- micrometallurgy.

In the space of one cubic centimeter, A. V. Ulitovskiy and his students have created new high frequency circuits with an electromagnetic capacity of up to 50 kw. On the basis of this work high-frequency super high-temperature furnaces were created that permit the fusion of certain refractory metals.

Among our country's best passenger planes is the airliner IL-18, for the creation of which the Lenin premium has been awarded to chief construction engineer S. V. Il'yushin, to motor engineer A. G. Ivchenko and others. The IL-18 carries from 73 to 111 passengers and up to 8 tons

of freight in baggage-freight compartments. The plane ensures flight safety and provides the necessary passenger accommodations in flight.

For the creation of a new type and the development of new species of sugarbeets with single-seed fruit, the Lenin premium has been awarded to O. K. Kolomiets, M. G. Bordonos, I. F. Buzanov, V. P. Zosimovich, G. S. Mokan and A. V. Popov.

A beetroot with a single-seed fruit has only one shoot, instead of 2 to 4 like the ordinary variety. Its shoots do not become intertwined, therefore, but lie evenly in the row. This promotes growth and greatly reduces manual labor.

The development of new operating techniques for the heart and major blood vessels is one the greatest and most important achievements of soviet medical science. They are being conducted by the well known surgeons A. A. Vishnevskiy, P. A. Kupriyanov, E. N. Meshalkin and B. V. Petrovskiy. For the first time in the history of world medical practice these surgeons developed and successfully accomplished 12 different types of operations on the heart and major blood vessels, and improved considerably on another 25 types propsed by foreign surgeons.

The brief description of the work pointed up

in the Resolution of the Committee for the award of the Lenin premiums shows their great importance in the further development of soviet science and engineering.

2166 E N D

This publication was prepared under contract to the
UNITED STATES JOINT PUBLICATIONS RESEARCH SERVICE
a federal government organization established
to service the translation and research needs
of the various government departments.