SOCIOLOGY

Russia as Science Leader

Marked advances in many areas of science and technology and an increasing conformity with the principles of world-wide science are seen in Russia since Stalin's death.

➤ RUSSIA has become a major scientific power in the ten years since the end of World War II.

Now her leaders are engaged in a "conscious and well-planned attempt" to make the Soviet Union the world's most powerful scientific nation.

Soviet science has moved in this direction since the death of Stalin.

This is the conclusion of Dr. John Turkevich, Eugene Higgins Professor of Chemistry at Princeton University, a lecturer on government and science at the Woodrow Wilson School of Public and International Affairs and a leading student of Russian affairs.

The nation's capital first had a chance to read his report when it was circulated as a private, unclassified document around the Pentagon.

It is also appearing as part of a general study of Russia since the death of Stalin in a full report in the *Annals of the American Academy of Political and Social Science,* Philadelphia.

"The last three years have seen a change in Soviet science," Dr. Turkevich states. Stalin's death unleashed what had been a philosophically isolated and hamstrung national science on the world.

"Recent years have shown marked advances in many areas of Soviet science and technology and an increasing conformity with the principles of world-wide science," Dr. Turkevich points out.

The unleashing has meant the Russian scientist has broken through or been permitted through the Iron Curtain. He has come out of his shell and isolation. Science in Russia, Dr. Turkevich explains, is no longer discussed as an expression of Communism.

It is now science itself, with its own "principles, traditions and universality."

Examples of rapid advancement in Russian science are evident in every field of scientific endeavor from astronomy to zoology. During the last two years alone the Russians have established new institutes of biophysics, nuclear problems, electronic and radio engineering, acoustics, organometallic compounds and automotive engineering. They have also set up a mathematical computer center.

The Russian leadership since Stalin has been molding, with scientific precision, the scientific potential of that country. Scientists are treated with great respect and favoritism.

The president of the USSR Academy of Sciences, for example, "occupies a position of prestige and power in the Soviet Union unlike that of any other scientist in any other country."

Keystone to the Russian effort to create a scientific army that will "blitzkrieg" its way to world leadership is the training of scientific and technological personnel.

For the Russians, as well as any other nation in the world, training scientists and engineers is what Dr. Turkevich describes as "a long-time investment."

Nevertheless, it is already evident that the Russians are graduating more trained scientific personnel in many fields than is the United States.

The Russians begin training their young for careers in science at seven years of age, when they first enter elementary school. In the primary grades, 30% of the youngsters' study is in science. In the secondary schools, it is 46% of the curriculum.

This inculcation of scientific training is beginning to pay off for the Russians. Although the United States graduates more students from colleges each year, the Soviet Union is graduating more scientific personnel.

In engineering, for example, Dr. Turkevich reports that the number of Russian graduates rose from 30,000 in 1952 to 63,000 in 1955, as compared to the United States, where the number of engineering graduates decreased in this same period from 30,000 to 23,000.

The importance of scientific training in higher education was underlined, Dr. Turkevich states, by the opening on Sept. 1, 1953, of the new building of Moscow University. In all, the University, which has been set up "solely for the training of scientists," has a complex of 27 basic buildings and 10 service buildings with a total of 1,693 laboratories, 21 auditoriums, 141 recitation rooms, 6,000 rooms for living quarters, a library of 1,200,000 volumes and a faculty of 2,300.

Another important feature of Russian scientific development is the dissemination of scientific information. Long isolated from world science, Dr. Turkevich explains, the Russians carefully and methodically translate and distribute foreign scientific journals and information.

Two years ago, he reports, the Academy of Sciences decided to publish an abstract journal called Referaty, "which will cover all fields of science."

This journal "may be the most ambitious and comprehensive scheme in existence for extracting the essence of scientific results (both Russian and foreign), sorting it according to subject, and making an index to the information so obtained," Dr. Turkevich states.

"As the world moves into the nuclear age," Dr. Turkevich concludes, "it should be apparent to all who consider the Soviet scene that Soviet science represents a tremendous potential for scientific and technological progress, that some of this potential has been translated into success and that the Soviet leadership is making a conscious, well-planned attempt to assume the scientific leadership of the world."

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ASTRONOMY

Meteor Probe by Radar

➤ AN EXHAUSTIVE SEARCH to catch invisible meteors by radar beams will be launched by Harvard College Observatory and Massachusetts Institute of Technology's Lincoln Laboratory.

A 1,000,000-watt transmitter and six receiving stations will be set up in southern Massachusetts to detect the meteors, "shooting stars" 500 time fainter than the flashes seen by the naked eye.

Three Harvard Observatory astronomers outlined the sky-probing plans at the American Astronomical Society meeting in Columbus, Ohio.

To obtain a direct measure of the length of the electron trail a meteor produces as it shoots through the atmosphere, the Harvard equipment will bounce radar pulses off the ionized trail at six different points. Receiving antennas, tuned to a 30 megacycle frequency and each covering an acre of ground, will catch any returned echoes. These "slave" stations will relay the echoes back to the transmitter by microwave radio.

From the time delays and shapes of the echoes, meteor velocities and orbits can be determined.

Because the meteor's velocity at six different points will be known, the amount of atmospheric drag can be measured.

Hourly calibration of the "slave" stations will allow calculation of the number of electrons at each reflection point from the echo strength. Thus, the ionization curves of individual meteors will become known, aiding in a study of the contribution of meteors to the ionosphere's electron content and to the forward propagation of radio signals.

The program will continue during the International Geophysical Year, which starts July 1, 1957, and continues through Dec. 31, 1958. Dr. Fred L. Whipple, director of the Smithsonian Astrophysical Observatory, and Drs. Gerald S. Hawkins and Curtis L. Hemenway reported the plans to the meeting.

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