U.S.S.R.—the subservience of science to social and political philosophy. It is important that this aspect of Soviet science should be generally known and understood because it is not confined to Russia. It could happen here.

The work of Russian geneticists, plant breeders and cytologists, during the early years of the Soviet régime, deserves the highest praise, as does the Soviet government for providing such generous support for scientific work. About ten years ago the influence of Soviet political philosophy began to appear in biological science, culminating in a public controversy regarding the relative roles of environment and heredity in 1939. Much of this controversy has been published in this country,[2] and a more damning indictment of the new Russian biology would be difficult to imagine. Vavilov, while recognizing the effect of environment on development, emphasized the progress of genetics and the role of heredity in plant breeding. Lysenko, on the other hand, upheld the Lamarckian (in his words "Darwinian") concept of variation, and rejected Mendelian heredity and genetics as a science. He also claimed that "any hereditary properties can be transmitted from one breed to another without the immediate transmission of the chromosomes." His discussion of "vegetative hybrids" resulting from grafting might well have been written in 1800; his views are neither original nor heterodox, but merely archaic.

Lysenko's attitude towards genetics presumably was influenced by his earlier work on vernalization. A winter wheat, which differs from a spring wheat by a single genetic factor, can be grown as a spring wheat if the seed is moistened and chilled for several weeks before planting. This discovery was made in the United States before the Civil War. Vernalization is also said to hasten the maturity of other crops. This technique has been tried in many other countries without sufficient success to warrant commercial utilization, but it has been used extensively in Russia.

Lysenko and his associates seem to have convinced the political authorities that only environmental effects are of value in plant improvement. Since 1939 the Soviet plant-breeding journals have been filled with articles by Lysenko's disciples, but we hear nothing from Vavilov, Karpechenko, Navaschin and the many other able scientists who are responsible for building the foundations for Russia's plant-breeding program. A few examples of the recent plant-breeding methods are typical of the new order. In one case scions of a yellow-fruited tomato variety when grafted on a red-fruited stock are said to produce progeny segregating for fruit color. Dolgusin claims that halves of the same plant, when grown under different environmental conditions and then crossed, produce progeny of increased vigor and fertility. The ovules are supposed to select the pollen grains most favorably affected by the environment. This selective power of the gametes is referred to by Lysenko as "marriage for love."

There are several reasons for the suppression of genetics in the U.S.S.R. A nationalistic attitude is reflected in Polyakov's[2] reference to genetics as a "foreign science." Another factor may have been a reaction to the distortion of genetic principles by the Nazis in their myth of racial superiority. The primary factor, however, appears to have been based upon political philosophy. It is particularly significant that the Lysenko-Vavilov controversy was reviewed by Mitin, head of the Philosophical Institute of the Academy of Science, and that he "more than other commentators" expressed "the attitude of the Soviet government."[2]

Our admiration for the Russian people and the military might of the Soviet Republic should not blind us to the fact that science has not been free in the totalitarian states where science must conform to political philosophy.

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NEWTON ON HEAT AS A MODE OF MOTION

IN reading lately Query 28 in Newton's "Opticks," I noticed a remark that gives his views on the nature of heat. It was new to me, and perhaps it will be interesting to other physicists. The passage in part is as follows: "A dense fluid can be of no use in explaining the phenomena of Nature, the motion of planets and comets being better explained without it. It serves only to disturb and retard the motions of those great bodies, and make the frame of nature languish: and in the pores of bodies, it serves only to stop the vibrating motions of their parts, wherein their heat and activity consists."

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SCIENTIFIC BOOKS

THE PLASMODIOPHORALES

The Plasmodiophorales. By JOHN S. KARLING. ix + 144 pp. 17 plates, 11 text figures. Published by the author. New York. 1942.

THIS book is based upon a "series of lectures presented to graduate and research students of mycology at Columbia University." Accordingly, the author attempts to present all sides of controversial questions

[2] *Science and Society.* A Marxian Quarterly. Summer, 1940.