Book Reviews

Debacle

The Lysenko Affair. DAVID JORAVSKY. Harvard University Press, Cambridge, Mass., 1970. xvi, 462 pp., illus. $13.95. Harvard University Russian Research Center Studies, No. 61.

The main events involved in the Stalinist suppression of the biological sciences have long been known to students of Soviet politics and to many scientists in the non-Soviet world. However, only within the last few years, especially since the publication in 1969 in the United States, but not in the U.S.S.R., of the important book *The Rise and Fall of T. D. Lysenko*, by Zh. Medvedev, has it become possible to delineate in detail the interaction between biology, agriculture, and politics in Soviet Russia. Another major work by Medvedev, this one dealing with international scientific cooperation and related questions, has recently become available in the West in the Russian language and will soon be published in English.

David Joravsky has diligently and objectively studied the data which have, in recent years, become available on Lysenko, V. R. Vilyams, I. V. Michurin, I. I. Prezent, and other cranks, quacks, and political intriguers who eagerly assisted Stalin in the near-destruction of biological science in Russia, and in the process did heavy damage to Soviet science in general, to intellectual freedom, to agricultural productivity, and to the Soviet people's standard of living. He has also, apparently exhaustively, analyzed data available in the relevant official Soviet publications. Joravsky takes a multifactorial, wide-ranging approach to the task of explaining the triumph of pseudoscience and the debacle of "standard science." He attributes influence, for example, to economic "backwardness," to aspects of the despotic Russian political tradition, and to the impoverishment and dislocation resulting from the Bolshevik revolution and the civil war that followed it. However, his main and overwhelming preoccupation is with Stalin's peculiar interpretation of the Marxist-Leninist concept of the "criterion of practice." Stalin, according to Joravsky, was convinced that "practical utility and theoretical truth were fused in every intuitive judgment that he made." Elsewhere Joravsky writes that this doctrine amounted simply to the dictum that "the boss knows best." Since Lysenko and his henchmen knew how to please the supreme political "boss," they became, in turn, the bosses of agricultural science. As Joravsky emphasizes, prior to the ascendancy of Lysenko the Soviet leadership had lavishly supported competent scientists such as Vavilov, Tulaikov, and the American H. Muller. The lavish allocation of resources by the Soviet authorities to both pure and applied science, combined with the patriotism of most Soviet scientists, were sources of great strength to Soviet science, which to a high degree counterbalanced, in the long run, the counterproductive policies that made possible the triumph of Lysenko. Also—and this had both positive and negative consequences—as professed Marxists the Soviet leaders were doctrinally committed to the material support of science, both as "scientific" Marxists and as Russian revolutionaries committed to rapid national socioeconomic development. When, in the early and middle 1930's, Stalin became angrily aware that established science could not quickly provide the scientific and agricultural miracles he demanded, the green light flashed for those who stridently charged that advocates of slow but steady progress were in reality disguised "enemies of the people," who should be unmasked, driven from the temple of science, and annihilated.

In an atmosphere of fierce political pressures, quasi-theological fanaticism, and irrational impatience, Lysenkoite promises of rapid increase in agricultural productivity seemed to offer hope of salvation. Only if one makes an effort to understand the climate of those times in a scared and confused country can one understand how the nostrums of quacks became the guiding maxims of governmental policy. Given such a framework of analysis, the appeal of the patently absurd claims for "vernalization" of seeds, forced feeding of gestating cows in order to increase butterfat content in cows' milk, midsummer planting of potatoes, destruction of all stocks of *Drosophila*, not to mention the hounding, arrests, and even executions of anti-Lysenkoite biologists, become much more understandable than they would be without the historical analysis supplied by analysts such as Joravsky and Medvedev.

Joravsky is at great pains to demonstrate, successfully in this reviewer's opinion, that Stalin-Lysenko stupidity and brutality were not a product of the direct application of Marxist theory. Still less were they the product of consensus among Soviet leaders. As he points out, Stalin's interpretation of Marxism was only one of many that were current among Soviet communists. Lenin had defended the autonomy of natural science—up to a point—and Bukharin, among others, in the early 1930's befriended anti-Lysenkoite biologists. However, too often Joravsky tends to lump the members of the ruling "group" or the "regime" or the "system" together, thus seeming to contradict data he adduces to demonstrate that Lysenkoism was not supported unanimously by the party.

This reviewer finds himself in general agreement with Joravsky's main argument and hopes that his book will be widely read, both by scientists and by students of communist politics. This is a solid, honest, erudite study, which offers a wealth of data and an abundance of provocative hypotheses. The footnotes and bibliography are extremely valuable. However, in this reader's judgment the book has defects which, if not taken into account, can reduce the influence it deserves to exert. Much of the work seems to have been hastily written. It would have benefited by careful editing.

It appears that Joravsky never fully sorted out the interrelations among the categories of analysis that he uses. The study lacks a dominant structure. It abounds in semantical and even in logical inconsistencies and contradictions. One does not know, for example, quite how to reconcile Joravsky's view that Lysenkoism won out because of the

influence of "group" or "system" needs of a psychological character with his predominant emphasis on the baneful role of Stalin's "political realism." This reader thinks these two lines of interpretation are complementary, but Joravsky does little to clarify the relationships between them. Among other seeming contradictions that are left to the reader to resolve, the view that the pragmatic Kremlin began to abandon Lysenkoism in the late 1930's, and especially from 1950 on, clashes with abundant evidence offered regarding its efflorescence from 1948 to 1952, and also with evidence, adduced by Medvedev and others, of its continued, though of course greatly reduced, influence even after Khrushchev's ouster.

This reviewer finds plausible Joravsky's thesis that under Soviet conditions, especially in the 1930's, it was all too easy both for the supreme political chiefs and their Lysenkoite junior partners to engage in a self-serving combination of self-deception and conscious fraud. However, he feels that an aspect of the situation to which Joravsky pays insufficient attention is that some of the information on which official agricultural and scientific policies were based was, so far as the users of the information knew, generated by "scientific" methods. The trouble seems to have been that the agronomists and agricultural officials who conducted "experiments" in the field to test Lysenkoite methods were woefully lacking in mastery or even knowledge of such techniques as controlled experiment and replication, and were oblivious to the scientific values of consistency, rigor, and objectivity.

Joravsky seems to overlook, or at least leave in almost total obscurity, possible relationships between the Bolsheviks' destruction of private property, the market economy, and other sources of countervailing power, and the helplessness of scientists vis-à-vis politicians in Soviet Russia. Whatever one's preferences regarding economic systems may be, it seems clear that in a collectivistic dictatorship the fate of science is likely to be grim if a dictator decides to impose his possibly ignorant and misguided preferences on scientists, many of whom, in such a setting, unlike that provided in a more pluralistic socioeconomic structure, may literally find themselves with no place to hide and with no source of livelihood.

We should restrain the impulse to sweeping generalization on the basis of even the most interesting case study. However, it appears to this reviewer that non-Soviet readers in the 1970's can derive from such studies as Joravsky's increased understanding not only of the problems confronting their Soviet colleagues but also of problems that are increasingly at the forefront of public attention in the West. In an era when, even in America, doubts are voiced in some quarters regarding the very legitimacy of the scientific enterprise, it is salutary to be reminded, by reflection on relevant aspects of Soviet experience, of the dependence of many values, both material and nonmaterial, on the vigor and security of a nation's scientific and intellectual community.

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A Worldwide View

Global Effects of Environmental Pollution. An AAAS symposium, Dallas, Texas, Dec. 1968. S. FRED SINGER, Ed. Springer-Verlag, New York, and Reidel, Dordrecht, 1970. xii, 218 pp., illus. $12.

The purpose of the symposium from which this volume results was to "discuss the worldwide effects which may arise from local pollution, and to try to uncover hitherto [unsuspected] effects which might have serious consequences." In addition, it was felt that the symposium would help to provide a public forum in preparation for the United Nations Conference on Human Environment to be held in Sweden in 1972. The proceedings volume contains edited versions of the papers that were given (plus a few additional invited contributions) and a brief review of the panel discussion that followed the presentations. The book is divided into four sections, with a brief introduction (in general, a preview) to each. A number of the papers could have been placed in any of the sections, however. There is a great variation in the quality and length of the papers, but although some seem trivial or parochial, most represent significant contributions to what is known concerning the global environmental problem.

The earth's atmospheric envelope has been constantly evolving, chiefly as a result of degassing from the earth's interior. Although the changes that have taken place over geological ages are the result of natural processes, man's activities during the past century have contributed significantly to local and global variations in the concentration of the so-called trace gases. The first section of the book deals with the origin and distribution of atmospheric constituents. The evolution of the oceans and of life provided the necessary conditions for cyclic exchange among the atmosphere, biosphere, and oceans. An interesting background paper by F. S. Johnson on the processes by which the major constituents (N_2, O_2, H_2O, and CO_2) developed to their present state and the resulting time constants for the different exchange processes constitutes the lead article. In the same section, the sources and distribution of some of the minor gases (CO, SO_2, and NO_x) are discussed separately by Louis Jaffe and by Elmer Robinson and Robert C. Robbins. These two papers summarize what is known of the concentration and variations of these contaminants. Whereas at present most of the NO and NO_2 and SO_2 enters the atmosphere through natural or biological sources, it is pointed out that practically all atmospheric CO is man-made, with approximately 60 percent coming from motor-vehicle exhaust. Jaffe also indicates that the CO cycle in the atmosphere is still imperfectly understood and that no adequate sink has yet been suggested. In this same section Syukuro Manabe reviews some of his previous calculations of the possible effect of changes in the concentration of atmospheric CO_2 on the surface and free air temperatures. Manabe correctly points out that such calculations need to be made more realistic by extension of the radiation models to three dimensions and inclusion of atmospheric motions. There is also a need, not mentioned in this paper, for including in such a model a mechanism for cloud generation, variations in cloudiness being closely linked with the energy cycle of the earth-atmosphere system. (There is a very brief comment on some aspect of the role of clouds in a later paper by Manabe on page 156.)

Man's activities through the extensive use of inorganic fertilizers and through direct contamination of the atmosphere resulting, for example, from increased automobile exhaust and industrial combustion processes have seriously disturbed the natural nitrogen cycle. This is the chief topic of the second section of the book. In the first article of this section, Barry Commoner, in an excellent overview of the