Book Reviews

Scientists and Autocracy

Science in Russian Culture, 1861–1917. ALEXANDER VUCINICH. Stanford University Press, Stanford, Calif., 1970. xvi, 576 pp. $18.50.

Autocratic government, a decadent established church, a backward economy, and extreme polarization of classes did not prevent a flowering of science in Russia during the half century surveyed in this important book. Indeed, the autocratic government was the chief promoter of the flowering, even though "the leading scientists were building a new ideology incompatible with the sacred values of autocracy" (p. 479). That paradox is Vucinich's central thesis, of crucial importance not only to students of Russian history but also to all those who have been puzzling over the evolving interaction between science and a variety of social systems.

Unfortunately, the reader must work fairly hard to assemble the evidence bearing on the author's central thesis, for his book is rather diffuse. Many pages read—or resist reading—like inscriptions on public monuments: long lists of dead names and claims to bygone fame. Moreover, the conventional division of the book into chapters on institutions and fields of science is ill suited to the author's central thesis, to which he returns intermittently, analyzing, on the one hand, the ideological commitments of scientists and, on the other hand, the philosophical inferences that were drawn from science. Vucinich pulls these themes together in a "Conclusion" that pictures V. I. Vernadskii, geochemist, philosopher of science, and militant liberal, as the personification of the scientific forces undermining the tsarist system. But the reader who has carefully studied the richly diverse evidence scattered through the preceding chapters wonders whether Vernadskii's politics were really typical, and whether his sort of philosophy of science really tended to undermine "the sacred values of autocracy."

Vucinich never proves his culminating assertion, that Vernadskii's "political philosophy expressed the sentiments of a majority of the scholarly community" (p. 480). I am not asking for statistical tabulation, such as Merton's count of Protestants and Catholics among 17th-century scientists. Intuitive judgments, expressed in such rough terms as "nearly all," "most," "few," and "almost none," are probably less misleading than numbers in measuring such subtle matters. What bothers me is the abundance of discordant judgments scattered through the book. Vucinich shows that academic autonomy was almost the only issue in the repeated clashes between Russian scientists and their government; that many scientists were explicitly committed to the autocracy, even if, like Mendeleev, they hoped that it would modernize the country; that many—perhaps a majority—shared Pavlov's commitment to the ivory tower, his disdain for political ideology; that natural scientists who were involved in radical movements even for brief periods can be counted on the fingers of one hand. (Vucinich mentions N. A. Morozov and E. S. Fedorov; I would add A. N. Bakh and P. K. Shternberg.) And there is much more evidence in Vucinich's book suggesting that Leo Tolstoy may have been right in his judgment of scientists: a new type of bureaucratic official, helping the powers that be to rule more efficiently. (See the acidulous quote on p. 37.)

I would like very much to believe Vucinich right and Tolstoy mistaken, to be convinced that science and democracy were—and are—natural allies, even if many timid or shortsighted scientists saw—and see—themselves as servants of the powers that be or refugees in Epicurus's garden. I am therefore heartened to learn that Russian scientists, defending academic autonomy for themselves, defended it also for their radical students. I am also heartened to see that science was invoked by radical social thinkers to support their condemnation of the tsarist system, especially in the 1860's, when the so-called Nihilists denounced all paths to truth except science, which they interpreted in an aggressively materialistic way. But Vucinich also shows how the naive scientism of the Nihilists gave way to "modern philosophies of science," as he calls those that acknowledge other paths to truth, religion included. He not only describes the spread of such philosophies in Russia, he repeatedly indicates his belief that they accurately interpreted the "new science" of the 20th century, "a science that was unhampered by the old materialistic and mechanistic ontology" (p. 251). How then can he hold to his main thesis, that science was corroding the sacred values of autocracy? How can he escape agreement with the reactionary physicist Bachinskii, who argued that "the elevation of science above all ontological controversies would inevitably separate it from ideology and would ensure its neutrality in a world of clashing values and ideals" (p. 373)? Nowadays many people regard science as an enterprise that can coexist with any ideology or regime, so long as its professional autonomy is conceded. Precisely because I long to share Vucinich's contrary view, that science is inherently subversive of tyrannical regimes, I was disappointed by the lapses in his defense of that view.

Space does not permit adequate comment on the many other interesting issues in this book, such as the paradoxical strength in mathematics and weakness in physics that the Russians displayed in the period under review, or the even more paradoxical decline in the achievements of Russian chemists as their number increased. One of the best chapters is a penetrating analysis of social theories that have been put in the shade by the triumph of Leninism. The weakest sections are those dealing with biology and soil science, where Vucinich repeatedly falls victim to some of the crotchets of Soviet historians of science.

In sum, Vucinich has once again earned our respect for his great industry and equal courage in grappling with the largest issues in the development of science within its Russian context. Along with his earlier volume of the same title, which surveyed developments down to 1861, this sequel will be the indispensable reference work for readers who have no Russian. For those who do, the most obvious comparison is the monumental *Istoriia estestvoz-*

naniia v Rossii (three volumes; Moscow, 1957–62), a collective product of the Institute of the History of Natural Science at the Soviet Academy of Sciences. The Russian work is so overwhelmingly detailed, and so fearful of controversial interpretations, that it can be used only as a reference work. Bolder in interpretation and more selective in detail, Vucinich's book can be read. It will be a richly rewarding experience for those who give it the thoughtful study it deserves.

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Business and the University

The Corporation and the Campus. ROBERT H. CONNERY, Ed. Published for the Academy of Political Science, Columbia University, by Praeger, New York, 1970. x, 188 pp. Cloth, $7.50; paper, $2.50.

In these papers from a conference jointly sponsored by the Academy of Political Science and the Council for Financial Aid to Education, spokesmen from higher education analyze a number of different issues confronting the universities, and spokesmen from the corporate world either respond or indicate areas of possible cooperation between education and the business community. The overall impression is that the spokesmen for business are responsible, far-seeing, and willing to accept the necessity for substantially increased corporate support for higher education during the '70s. There is little carping about troubles on the campus although one might have expected some of this to creep in. There is little complaint that universities may have been somewhat inefficient in their past management of affairs and funds. Nor is there much of the "bear" mentality implying that higher education during the '70's should be much less expansionist.

Indeed, the positive things stated should make those concerned with the management of higher education exceedingly hopeful for the future. Major business units and leading universities are expected to assume responsibility for remedying some of the critical social and environmental ills of the society. Although other segments will be asking the business community for assistance, the corporate world should try hard to maintain increased rates of giving to higher education, perhaps even at the rate of a 10-percent increase each year for the decade. There is general recognition that enlightened leadership in corporations is essential if corporations are going to act responsibly, and there is evidence that each year more and more top leadership in business is becoming converted to providing assistance for higher education.

Although the papers delivered by members of the academic community seem adequate, they typically do not reflect as much willingness to change, to grow, and to examine previously held assumptions. Indeed, the voices from the university sound quite orthodox. Thus universities employing their customary instrumentalities are urged simply to redirect the focus of attention and try to solve such vexing questions as the improvement of the urban condition. Looking back over the research record of American universities since World War II, a speaker pleads for support to do more of the same in the future—this in spite of some strong suspicions that, except for major breakthroughs in the health sciences and physical sciences, university research may very well have been quite ineffective and unproductive during those two decades. There is seemingly some recognition that institutions ought properly to concern themselves with such matters as Black studies and changed admissions patterns for disadvantaged youth; but there seems to be no disposition to examine radical new ways of dealing with those matters. Particularly with respect to management and governance of higher education do these representatives from the university seem self-satisfied. The argument is advanced that universities are peculiar entities to whose operations short-run measures of efficiency do not properly apply. Rather, there is almost the implication that serendipity is to be expected and used as the criterion of university success. Several spokesmen do examine the possibilities of some financial and management palliatives, but none raises the question of whether or not the fundamental deployment of resources characteristic of universities might be seriously reexamined.

The book is a substantial contribution to the literature of higher education, for it does bring together under one cover much of an emerging conventional wisdom about institutions and the corporate world. And the book does hang together much better than is typical of conference proceedings. A possible salutary use of the book, since it is not overly long, might be as a working paper for seminars of university boards of trustees, which the boards of at least major universities might consider holding. Because the corporate world is reasonably well represented on such boards of trustees, such seminars might help insure the wider reading which *The Corporation and the Campus* deserves but which it probably will not receive.

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Bacterial Genetics

The Molecular Basis of Gene Expression. BENJAMIN M. LEWIN. Wiley-Interscience, New York, 1970. xii, 446 pp. + plates. $18.

The literature concerning the molecular events attendant on gene replication and gene expression is vast and adorned by numerous experiments of great ingenuity and sophistication. In his new book Benjamin Lewin has succeeded in bringing together lucidly and succinctly the most important recent information as it pertains to bacteria and bacterial viruses. There are over 700 references, most of them to papers published in the last decade. The bibliography is complete through 1969, and there are even some references to papers published in 1970.

The book is divided into four parts. The first part is a refresher course on both general and microbial genetics plus nucleic acids. It is useful if you have forgotten first principles, but no substitute for a general genetics course. In the second part the author shifts into high gear and maintains the pace through the rest of the book. This section deals with the code, protein synthesis, and transcription, with separate chapters on the ribosome and transfer RNA. A good example of the clarity and succinctness of the writing is found in the four-page discussion of nonsense codons. The author moves quickly from general considerations to a brief but successful analysis of the subtle, logical experiments of Brenner and his colleagues which led to the recognition of the UAA, UAG, and UGA codons as nonsense.

The third section of the book is an account of the regulation of gene ex-