

Canadian cultural activity had very little to do with previous cultural experience, and much to do with particular political circumstances. She herself points out that cultural lobby groups like the CAC had no discernible success in getting their message accepted until other factors induced the Liberal government to act. Where then is the link between the pre- and post-1950 situations? The "long lineage" did not, it seems to me, cause the eventual move to federal government intervention in the cultural field; the real push for that came from other roots, including not only those Tippet mentions but also such factors as growing concern in the late 1940s over the potential of television for further seducing the Canadian public toward mass culture and Americanization, and generally altered notions about the responsibility of the state in fields previously considered private.

Tippett's book is best when it sticks to the description of the multitude of cultural endeavours engaged in by ordinary English Canadians, amateurs and professionals, who shared an instinctive sense that this type of activity is an important aspect of the human experience. What she describes so effectively is truly the "making" of culture—and a culture—by its lived practice.

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Kendall E. Bailes. *Science and Russian Culture in an Age of Revolu-*

tions: V.I. Vernadsky and his Scientific School, 1863-1945.

Bloomington and Indianapolis: Indiana University Press, 1990. (Indiana-Michigan Series in Russian and European Studies). Pp. xii, 238. \$29.50 U.S.

This is very much a book for the 1990s. First, its subject, Vladimir Vernadsky, was "one of the first scientists to emphasize the basic unity of earth, humans, and the cosmos through the exchange of matter" (p. 181); his work is therefore of major importance to environmentalists everywhere. Second, the rediscovery of Vernadsky's writings in the Soviet Union was a significant part of the intellectual origins of the move towards "glasnost." Third, its author learned that he himself was suffering from AIDS, and completed the book in a desperate race against time that ended with his tragic death in 1988. His first book, *Technology and Society under Lenin and Stalin: Origins of the Soviet Technical Intelligentsia* (Princeton, 1978) became an instant classic. Incisive, generous, stimulating, yet unassuming, Bailes was the brightest star in his generation of American scholars of Soviet history; it is sad to realize that these are the last words we shall have from his pen.

The first half of the book deals, brilliantly and thoroughly, with Vernadsky's childhood and education, his early scientific work, and his social and political activity up to the outbreak of World War I. The second, less satisfactory half, traces Vernadsky's work

during the period of war and revolution from 1914 to 1922, describes the influence on Soviet science of the Vernadsky school, and offers an assessment of Vernadsky's legacy as a scientist and philosopher of science.

According to Bailes, family life and school experience taught Vernadsky patterns of interaction with authority that help explain his behaviour as an adult in both Imperial and Soviet Russia. From his family he received a tradition of scholarship, his intellectual curiosity, liberal political sympathies, and an interest in Slavic languages and literatures. Family and schooling also provided a warm, supportive childhood environment and sense of confidence that led him to repudiate revolution as a means of improving society.

While other university students were becoming radicals and revolutionaries, Vernadsky was devouring Darwin and von Humboldt. He and a handful of well-off friends constituted a special group at St. Petersburg University—the so-called *kulturniki*—who took attending classes seriously, and saw it as their duty to raise the scientific and cultural level of Russian society. Bailes portrays them as trying to forge a “middle way” between the narrow careerism of the conservatives and apoliticals on the one hand, and “the revolutionary impatience they considered so wasteful and superficial” (p. 16) on the other. Here Vernadsky met his lifelong friend Sergei Oldenburg, who became Secretary of the Academy of Sciences. This “Oldenburg circle” was “an important seedbed of Russian liberalism” (p. 28); its members—unlike the

revolutionary terrorists or the early Russian Marxists—went into education, research, local self-government, and eventually the Constitutional Democratic (Kadet) party.

No popularizer himself, Vernadsky nevertheless believed deeply in the importance of educating the people: “practical knowledge and a scientific world view, he felt, went hand in hand with the establishment of a popular government” (p. 30); however, it would take time and work to make scientific knowledge part of the Russian popular consciousness. Socialism troubled him deeply: he feared for the future of education and science under a socialist regime; as a strong nationalist, he also feared that if socialism came to a country as uncultured as Russia, it might prevent it from becoming strong. (In 1990 it is difficult not to describe such thinking as prophetic.)

Always more a theorist and a generalist than an experimentalist, Vernadsky throughout his life jumped from one theme to another, always working on new scientific frontiers; he tended to leave the detailed work and the narrow specialization to others, especially his own pupils and associates. When he entered the earth sciences in Russia, where they were undeveloped, in the 1890s, he was able to get in on the ground floor; during the rapid industrialization of that decade, the field quickly grew in importance. Among his students at Moscow University, his moral authority and scientific competence were revered; they also held him in great personal affection: “a man of rare purity and beauty,” as his famous student

Fersman put it (p. 74). In 1901, Vernadsky formed the Mineralogical Circle at Moscow University, a group of about twenty carefully chosen colleagues, graduate students, and even undergraduates, who "shared a common direction and common goals in mineralogy" (p. 77). The common direction was their shared emphasis on explaining the origin of minerals as parts of the history of the earth, and the physical and chemical processes by which minerals had been created. This emphasis reflected both the growing sophistication of chemistry and the influence of Darwinism; later on the discovery of radioactivity also profoundly affected the Vernadsky school. Vernadsky soon realized that he was learning as much, if not more, from his students and colleagues than they were from him.

Although he wrote to his wife that "science will always be more important than social service" (p. 68), he became increasingly involved in social and political activities. Bailes claims that Vernadsky was "a master of the politics of mobilizing moral indignation among his colleagues" (p. 80). By 1905 he was a national political figure, one of the Kadet inner circle, although how this happened is not well explained. For him, the progress of science was intimately related to the progress of democracy and humanitarianism; hence he took time (too much?) away from his research to help organize the Union of Liberation ("a popular front of change-oriented intellectuals"), the Academic Union, and the Constitutional Democratic party, all of them key players in the liberal movement of 1905. Vernadsky

emphasized the special moral responsibility of university professors to "act as guardians of the interests of science and knowledge...our first duty is not to let the higher educational institutions suffer during this period of great social upheaval" (p. 99).

When the Revolution of 1905 ended in failure, a disappointed Vernadsky went back to science, but he soon fell foul of the regime and resigned from Moscow University during the 1911 purge of radicals and liberals. He then moved to St. Petersburg as Director of the Mineralogical Museum. Bailes is particularly interesting on Vernadsky's intellectual development during these years; an unusual interest in mysticism combined with fresh questions about the nature of the cosmos led to a new environmental awareness. After a visit to the nickel and cobalt mines at Sudbury, Ontario, Vernadsky wrote movingly of the desecration of nature by technology.

The chapter covering the years 1914-22 is the least satisfactory in the book. There are, for example, only two skimpy paragraphs on the crucial period between the fall of the autocracy and the Bolshevik revolution, during which time Vernadsky was a member of the Kadet Central Committee. What did he think of its change of direction—amply documented by William Rosenberg—away from intellectual liberalism to the defence of commercial and industrial interests? All we are told is that he did not like the Whites and was "fed up with politics" by 1920. Why? On page 145, we are told that the Civil War was a period of great scientific creativity

for Vernadsky, but on page 147, we are told that it got in the way of his work. We are given little sense of what he was doing in St. Petersburg after the Bolsheviks took power, and no explanation at all of his decision to go to Paris in 1922. Most alarming of all is a nine-page section on relations between the Academy of Sciences and the Bolsheviks in which Vernadsky is lost entirely. It is here, especially, that one recalls the trying circumstances under which the manuscript was completed. Nevertheless the overall approach is sound: like other recent writers on this period, Bailes stresses the extent to which pragmatism rather than ideology guided the Bolsheviks in their early dealings with scientists and technologists.

In 1925, convinced that communism was no longer a dangerous ideology, Vernadsky returned to the USSR. As under the Tsars, he criticized the regime for its failings; he spoke out against the purges, and criticized the state of Soviet science under Stalin. Yet he was not imprisoned, and both he and his school survived. Bailes attributes his survival to several factors: he had returned from abroad voluntarily; he was a strong Russian nationalist who emphasized the importance of applied science for defence and the economy; he was a scientist of international renown; and perhaps most important in Stalin's eyes, he was not a plotter. Later, Vernadsky deplored the slowness with which the USSR began to pursue research in atomic energy, and called for co-operation with American scientists.

The book ends not with a conclusion but with a final chapter on Vernadsky's legacy. Unfortunately but perhaps understandably, there are some structural problems here. It may well be that the war and the revolution were responsible for a major shift in his work and thinking, from an exclusive concern with non-living matter before 1914 to a concern with the relationship between living matter and the rest of nature from the mid-twenties onwards; it must be said, however, that no adequate basis for this claim was laid in the appropriate chapter. Also there are hints here that Vernadsky's decision to return to the USSR may have had a good deal to do with his inability to secure support either in France or America for the establishment of a laboratory to study the chemical relations between living and inert matter. Here again, one wishes that this information had been supplied at the proper moment. Had Bailes been able to work for a few months longer, the book would surely have had a more satisfying conclusion. None of this should take away any of the credit due to his research assistant for helping to bring the project to completion despite what must have been an enormous emotional strain.

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Terry Crowley. *Agnes Macphail and the Politics of Equality*. Toronto: James Lorimer and Company,