Reviews

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Gerovitch, Slava, *From Newspeak to Cyberspeak: A History of Soviet Cybernetics*, MIT Press, 2002, ISBN 0-262-07232-7, 383 pp., $37.95.

Slava Gerovitch's *From Newspeak to Cyberspeak: A History of Soviet Cybernetics* is a marvelous account of the history of Soviet cybernetics, from its roots in the work of Norbert Wiener and Andrei Kolmogorov on control systems through its rise in Soviet society in the 1950s and 1960s, and its fall in the 1970s. Throughout, Gerovitch examines his subject through the distinctive, yet extremely appropriate lens of language. A proper understanding of science and technology anywhere in the world must consider the interweaving influences of political, ideological, economic, and social factors. Adding language to this mix is particularly appropriate in a study of science and technology in the Soviet context, where the rules of discourse provided the public stage within which all other activities were carried out and evaluated.

Gerovitch begins his account with a discussion of *newspeak*, the propaganda-sounding ideological language of Soviet discourse. Newspeak was pervasive. Any public endeavor had to be packaged and justified according to the rules and terminology of this linguistic medium. Filled with value-laden, meaningless terms (such as materialism, formalism, mechanism, reactionary, criticism, and subjectivism) that could be applied across a broad spectrum of scientific, social, and political activity, newspeak became the shared language of public discourse. It became a language of negotiation between the Soviet political and scientific communities, translating science into ideology and politics and vice versa. Gerovitch describes the relationship between Soviet scientists and politicians as a Möbius strip in which it is no longer clear who is on which side.

Originally branded as a "reactionary pseudo-science" and "ideological weapon of imperialism reaction" in newspeak (p. 306), cybernetics was rehabilitated in the late 1950s as part of the de-Stalinization of Soviet science. Gerovitch convincingly describes the fascinating transformation of cybernetics from an ideologically tarnished collection of man–machine analogies to an officially recognized, and almost canonized, philosophical framework of science, economics, and management. The language of cybernetics became the new language of public discourse—cyberspeak.

During the political thaw of Nikita Khrushchev in the late 1950s, Soviet cyberneticians openly challenged newspeak and promoted cybernetics as a new foundation of scientific objectivity, characterized by rigorous thinking, logical clarity, and quantitative precision. Aleksei Lyapunov (recipient of an IEEE Computer Pioneer Award in 1996) was an indefatigable proponent of the notion that cybernetics could provide a single overarching conceptual framework, methodology, and terminology for use in the entire family of life and social sciences. Through the efforts of the politically savvy former Deputy Defense Minister Aksel Berg, cybernetics rose to prominence within the Academy of Sciences and was included in the 1961 Program of the Communist Party as one of the sciences crucial to the construction of communism.

Soviet cybernetics became a victim of its own success. Cyberneticists sought to broaden the application of cybernetics to government and management, proposing an ambitious plan for nationwide, optimal planning and management. As a strategy, cybernetics ultimately foundered on the misplaced assumption that "optimal planning and control" (p. 256) of the Soviet economy could be achieved through the application of mathematical models and computing technology. (As one Soviet chemical plant manager put it, "If our machinists were not drunk, the efficiency would have skyrocketed without any computers" [p. 278].) As a philosophy of science and society, however, its failure can be observed through the linguistic lens. The scientific and political establishment appropriated the language of cybernetics for its own purposes. Basic principles of Soviet government were translated into cybernetic terms, with the Communist Party playing the role of controller in the scientific management of society. Like the terminology of newspeak, the vocabulary of cybernetics had become value-laden, but meaningless, and a tool in the hands of the establishment for the maintenance of the status quo.

Gerovitch clearly demonstrates that Soviet cybernetics is a much broader phenomenon than computing or information technology. Readers seeking a detailed account of the emergence of computing within the Soviet Union may be disappointed at not finding more detail on the work of Lebedev, Bruk, or on the Soviets' decision to adopt the IBM mainframe architecture in support of their economic planning and management efforts in the 1970s. However, the narrower field of Soviet computing cannot be fully understood without the background of cybernetics, and it is here that Gerovitch has done a great service to scholars of computing, technology, and science. Moreover, he has described the context within which Soviet science exist-

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ed in a readable, engaging fashion, full of the details of people, events, and political and intellectual currents that make such accounts interesting.

The audience for this book should not be limited to historians. Parallels exist between the role of language in science and politics as described by Gerovitch and contemporary society. Identifying the value-laden but meaningless terms that frame the discourse between scientists, politicians, and society today is left as an exercise for the reader.

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Vardalas, John, *The Computer Revolution in Canada: Building National Technological Competence*, MIT Press, 2001, ISBN 0-262-22064-4, 409 pp., $45.00.

Jim Cortada, a well-known author of computer history material, commented on the back cover that Varadalas' book is "a model study of how to look at the origins of computing in any nation." Although little known or appreciated, Canada has a long history in the development of digital electronics and computers. While little of the effort resulted in a major domestic computer manufacturing capability, it certainly provided Canada, and the world, with ideas and expertise that influenced many of the computer facilities we use today.

Vardalas begins with the story of how the University of Toronto began to construct its own computer, known as UTEC, and later purchased one of the first Ferranti Mark I computers. The Mark I was one of the earliest operational machines in North America and made significant contributions to various research groups both in Canada and the US. It—along with the group that ran it (headed by Kelly Gotlieb)—made huge contributions to both computer science and technological systems, ranging from the St. Lawrence Seaway to the earliest airline reservation systems.

Because of their experience in World War II, the Canadian military wanted to develop its own domestic self-reliance in various areas and saw digital electronics as being fundamental to their future role. Among the research they performed, was a project known as Digital Automated Tracking and Resolving (DATAR). This was an early command and control system for ships to exchange tactical and surveillance data. The project is briefly mentioned in another recent book (*When Computers Went to Sea: The Digitization of the United States Navy*, by David L. Boslaugh, IEEE CS Press, 1999), where it is credited as the origin of some of the concepts later adopted by the US Navy in their first command and control system. Vardalas details this project and the political situations it created. He does a masterful job weaving World War II history and its effects into the narrative of how the Royal Canadian Navy and the Defense Research Board did their work in that era.

When discussing complex technical issues (such as the role of analog versus digital signals in DATAR's usefulness in tracking both submarines and planes), Vardalas manages to give accurate, yet brief, descriptions that are easily understood by readers with little technical background. From this point of view the book is useful for both historians versed in the technology and those whose leanings are more to the social or business issues he raises.

He also does a wonderful job of putting the technology into perspective. From our 21st century view it seems obvious that the transistor was a superior device to the vaccuum tube. In chapter 3, however, Vardalas makes a point of giving evidence that this was not at all clear in the early 1950s.

Vardalas also describes how military technology quickly moved into civilian uses. He explains how the same people created first a postal-sorting machine and then a check-sorting facility that was used in major US banks during their system testing to automate the banking industry.

There are simply too many stories included in this work to comment on them all. It goes into detail on subjects ranging from the development of the Ferranti-Packard PF6000 computer (which later became the design for the British ICT 1900 series of machines) to the creation of systems to do numerical control of tools by the Sperry Gyroscope Company of Canada.

He brings all the stories together with a final chapter. Integrating the ideas into a bigger picture, he shows how all of this created the computer revolution in Canada and how it related to the rest of the world.

The level of detail is extraordinary and this is one of the joys of the book. Additional detail is available in 100 pages of endnotes. It must also be said that this level of detail occasionally makes the book a difficult read but fortunately it is possible to skim the parts that do not interest you without losing the overall thread of the story.

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