

no standard by which commercial aviation might be measured in comparison to military aviation, let alone private aviation, which accounts for 95% of civil aircraft in the United States.

In lieu of a theme, the editors identify four categories into which the twelve essays fit reasonably well. The categories are 'innovation and the technology of flight', 'civil aeronautics and government policy', 'aerial warfare' and 'aviation and the American imagination'. In their Introduction the editors note that 'progress' is a theme 'suggested but not developed in a focused way by these essays' (p. 10). They might have added that it is a vexed issue, which John Staudenmaier and others have warned historians of technology to approach with great caution. Claims of technological progress always raise the question of 'progress for whom'. In the marketplace, at least, progress usually entails winners and losers.

Still, on the evidence of this book, ideas of progress fit tolerably well with an emphasis on technology, less well with emphases on government policy, war and the imagination. All three authors in the technology section, including co-editor Roger Launius, use the term. Roger E. Bilstein, described by the editors as 'the dean of serious aerospace history' (pp. 6–7), invokes it repeatedly in his synthetic overview of the technology of aviation. Launius uses it in explaining the role of government support for aeronautical research. And Braun employs it to explain European contributions. The most emphatic invocation of progress appears in John Morrow's 'Brave men flying: the Wright brothers and military aviation in World War I'. Amidst colourful stories of romance and carnage above the battlefields of Europe, Morrow notes that 'the aircraft manufacturers ... evolved with the industry, or were left behind by aviation *progress*. The rapid *progress* of aeronautics left the Wright brothers in its wake, and by 1917 their most significant participation in aviation was a patent suit that may well have delayed the *progress* of the American aircraft industry' (pp. 178–9; emphases added). This passage is arresting on several grounds. First, it humanizes the Wrights by noting that not all their contributions were positive. Second, it ascribes agency to progress, suggesting that this technology advanced autonomously and teleologically towards some better state. And third, it embraces a notion of progress as good. All of the authors invoking progress in this collection use the term in this sense.

Maybe they are right. Surely aeroplanes now fly faster, farther, more cheaply and more safely than ever before. The most modern aeroplanes even produce less noise and other pollution. Of course, we still have pollution, congestion, inequities of access and strategic bombing. Judged in their own frame of reference, aeroplanes surely progressed over their first century. Judged in the larger social context in which they function, talk of progress is more problematic. The contrast brings to mind the late Melvin Kranzberg's 'first law': technology is neither good nor bad, nor is it neutral.

Technology may be seen as getting better, as progressing, in the sense that it operates more efficiently and effectively than before. Whether or not that translates into social, economic, political or cultural 'progress' depends on how the better technology is employed. It is revealing that the authors in this collection addressing policy, war and culture find less occasion to speak of progress than those who address technology. But, as Launius suggests, it would be an interesting question to explore. In the meantime, this book offers useful and stimulating insights into this most American of technologies.

ALEX ROLAND
Duke University

SLAVA GEROVITCH, *From Newspeak to Cyberspeak: A History of Soviet Cybernetics*. Cambridge, MA and London: MIT Press, 2002. pp. xiv + 369. ISBN 0-262-07232-7. £25.95 (hardback). doi:10.1017/S0007087406417891

There are many contexts for the emergence of cybernetics: technical and scientific innovation; a culture of mechanization, automation and computation; the merging of disciplinary boundaries

from mathematics to physics to biology. In this history of cybernetics in the former Soviet Union, Slava Gerovitch considers the fate of the science as a form of political and ideological language. Throughout a sometimes detailed exploration of Soviet academic politics in the Cold War era, the author's experience of the USA, where this research was completed, informs and enhances personal knowledge of his native country.

In the West cybernetics is closely associated with Norbert Wiener, who gave it both name and fame when he published *Cybernetics, or Control and Communication in the Animal and the Machine* in 1948. But the component concepts – notably mechanical analogues of the nervous system and mathematical models of communication – had all been current (if under-marketed) for several decades. Even Wiener's term was not new; it had first been used by Ampère in 1843. What brought these elements together into a new science of self-regulating systems was the common perception that, to be accounted a mature and 'complete' science on a par with nineteenth-century physics, twentieth-century biology had to forsake mere observation in favour of mathematical and mechanistic models. Significant contributions came from scientists and mathematicians of Russian origin, among them Markov, Oparin and Rashevsky. Gerovitch introduces us to many more, in a story that moves from perilous dissent under Stalin to decay and desuetude in the Brezhnev years.

Taking the long view of Soviet cybernetics, Gerovitch develops a perspective from which it emerges as, appropriately, a self-regulating system. He argues that the ambiguities and accommodations of the politically nuanced language of newspeak found a natural affinity with cyberspeak. At first cybernetics was a code – a cover for mild dissidence, admired as a replacement for, as Gerovitch puts it, 'the vague and manipulative language of ideological discourse in fields that mathematics had not yet reached' (p. 199). Cybernetics promised a grand and ideologically neutral unification of human knowledge. But such unification had necessarily to engage with political debate and institutional disputes. Cybernetical language thus became political language – a medium for scientists to criticize the philosophers. This delicate balance was not to last. 'Well trained in newspeak techniques', Gerovitch comments, 'some philosophers now adopted cyberspeak as a new ideological language' (p. 257). Adopted, adapted, universal but diluted, cybernetics in the Brezhnev years was, he argues, 'transformed from a vehicle of reform into a pillar of the *status quo*' (p. 279). By the 1970s it had become unrecognizable to its first mathematically trained proponents, who now felt the need to disown it as a pseudo-science. The promised language of truth and objectivity had become the newspeak it had once ridiculed.

The story of Soviet cybernetics thus presented was a battle over vocabulary, between scientists wanting a pure, politically free terminology, ideal and mathematical, and ideologists wishing another kind of universality with nothing left out of politics. Comparisons and contrasts with the fate of cybernetics elsewhere are instructive. In general, though the science had its roots in mathematical formulations, extending the boundaries of precision and logic from the statistics of thermodynamics into the fuzzy world of communication and behaviour, the mathematical underpinnings diluted as the claims broadened. In the West, shorn of its precision, cybernetics rapidly faded, leaving only a faintly sinister aura – the fear of a world controlled by machines. In the USSR, by contrast, it was the initial claim to mathematical verity that first aroused suspicion, marking cybernetics as a science of behaviour standing outside ideology. In the post-Stalin era, with the mathematical rigour taken away, what was left proved an ideal vehicle for the ideology of 'scientific socialism': universal, amenable to pragmatic interpretation, yet with all the cachet of approved words such as 'rational', 'objective', 'progressive' and 'scientific'. In the Soviet case, cybernetical language was employed as much as a means of concealment as of precision. Gerovitch describes the contrast in academic language between the USSR and the USA as between acceptance of ambiguity and a desire for at least the appearance of precision. Yet, for each community in its own way, the search for a universal scientific language – the desire to pin

everything down with ‘precise language’, to reduce the world to the certainties of mathematics – remained central.

Derived from a doctoral thesis, *From Newspeak to Cyberspeak* probably contains more information on cybernetics in the old USSR than anyone will ever need. It is nevertheless a welcome achievement: scholarly, well researched and unrivalled in the expertise with which it tells a story of singular interest.

D. J. CLARK
University College London

GARLAND E. ALLEN and ROY M. MACLEOD (eds.), **Science, History and Social Activism: A Tribute to Everett Mendelsohn**. Boston Studies in the Philosophy of Science, 228. Dordrecht, Boston and London: Kluwer Academic Publishers, 2001. Pp. x + 388. ISBN 1-4020-0495-8. £85.00, \$124.00 (hardback).

doi:10.1017/S0007087406427898

It was only after reading this collection of essays that I first met Everett Mendelsohn. The setting was the international history of science congress in Beijing in late July 2005, where he delivered a wonderful political analysis comparing J. D. Bernal and Robert Merton in the 1930s. Its beauty lay principally in the context: a symposium on science and political engagement where many of the papers were strong on empirical research but weak in conveying a clear sense of the political contexts and traditions under review. Mendelsohn’s performance was all the more inspired and inspiring. Indeed, his impressive depth of knowledge in a wide sphere of fields, his political conviction and instinct (rare among academic historians) and glorious warmth of humanity kept all around thinking. He radiated joy and enthusiasm at the prospect of the symposium and promptly led the collective excitement as the debate exploded over four intense sessions.

Mendelsohn’s work has been multifaceted. As a professor at Harvard he helped resuscitate methodologies for exploring social context in the history of science. More than any other, he made the works of Boris Hessen and Edgar Zilsel parts of the standard analytical toolbox for generations of historians since the 1960s. He has made fascinating and path-breaking contributions in the fields of history of biology, genetics and the atomic scientists movement, to name a few. However, his lasting contribution is as a politically engaged activist historian, whose research has been eclectic in response to the many fronts on which he campaigned. From the civil rights movement and the anti-Vietnam War movement through to the Palestinian–Israeli conflict, he has worked to use his knowledge and his experience in pursuit of a more humanistic world.

The series of essays contained here mirrors this extraordinary achievement. Wide-ranging, analytically stimulating and reflective, they demonstrate Mendelsohn’s effect and legacy. Those on the history of the life sciences include a startlingly original piece on ‘the radical nature of the *Encyclopédie*’ by Shirley Roe and also excellent essays on ‘Mendel’s hypothesis’ by Raphael Falk and the rise of molecular biology by the late Lily Kay. Each succeeds, in Mendelsohnian fashion, in being rich in empirical content while also reflective on the subtle and overt political issues evoked in the historical record and its context.

The sequence of papers listed as ‘perspectives on the social studies of science’ and ‘science, society and social responsibility’ are more uneven. While there are some interesting pieces on, for instance, the ‘dark side of progress’ by Jean-Jacques Salomon (‘China, “qi” and the challenges of engaged scholarship’), these tend to illustrate the extent to which the project of the 1970s and early 1980s to develop a political history of science with a distinct emphasis on political engagement of scientists has lost its way. ‘Engagement’ drifted into some very strange territory, leaving one to wonder why it is a divisive issue in modern history of science and why Mendelsohn’s own political engagement should be so controversial. There are, however, some real pearls here, such