

stitutions and the “boundary work” concerning fundamental and applied science (p. 317). In his chapter on the global relationships in which French space science and rocketry programs took place in the 1960s, John Krige argues for the importance of pursuing global histories (in this case of space-related projects) while retaining the “national as a key analytic category”: an “interdependent actor,” not one that is autonomous (p. 245). All of these chapters invite the reader to look beyond a Cold War historiography that focuses on physics and the United States, lest that be considered the standard story applied to all disciplines and all nations.

The last two chapters, by George Reisch and Elena Aronova, discuss how scholars thought about science during the Cold War by looking at *Sputnik's* influence on Thomas Kuhn's *The Structure of Scientific Revolutions* (Reisch) and the connection between Big Science and “Big Science Studies” in the United States and the USSR (Aronova). Scholars who study how we think about science and technology will likely find these chapters particularly valuable.

In his concluding remarks, coeditor Krige challenges readers to “break the national frames” of historical analysis and focus more on the “interdependence and interconnectivity” involved in a global view of Cold War science and technology (p. 440). This well-developed and well-written volume—a significant contribution to Cold War historiography—should help scholars throughout the science studies community to do just that.

Kristine C. Harper

Kristine C. Harper is Associate Professor of History at Florida State University. She is the author of Weather by the Numbers: The Genesis of Modern Meteorology and a coeditor of Exploring Greenland: Cold War Science and Technology on Ice (forthcoming from Palgrave Macmillan). Her research focuses on the history of atmospheric sciences.

Slava Gerovitch. *Soviet Space Mythologies: Public Images, Private Memories, and the Making of a Cultural Identity.* xviii + 232 pp., illus., bibl., index. Pittsburgh, Pa.: University of Pittsburgh Press, 2015.

Slava Gerovitch. *Voices of the Soviet Space Program: Cosmonauts, Soldiers, and Engineers Who Took the USSR into Space.* xiv + 305 pp., illus., bibl., index. London: Palgrave Macmillan, 2014.

Doug Millard (Editor). *Cosmonauts: Birth of the Space Age.* 256 pp., illus., bibl., index. London: Science Museum, 2015.

Many of us of a certain age (“the prime demographic,” in the eyes of university fund-raisers) grew up with the Space Race, watching rockets and astronauts soar off launchpads, cheering the American successes, and wondering what the secretive Soviet Union would do next. While both governments employed astronauts and cosmonauts as ideological warriors and national heroes, the Soviet Union maintained a tight control over information (and disinformation), while NASA proclaimed its openness. In the decades since the collapse of Communism, historians have benefited immensely from waves of archival materials, recollections, artifacts, and other information appearing about the Soviet space program.

Soviet space accomplishments are a justified point of pride for Russians today: public surveys rank Yuri Gagarin's flight as second only to the defeat of Nazi Germany as the proudest moment in Soviet history. These two books by Slava Gerovitch and the Science Museum coffee-table book of its “Cosmonauts” exhibition provide non-Russian readers with a rich brew of cultural history, excursions into Russian national identity, and history of the Soviet space program. These three quite different presentations complement each other well.

Voices of the Soviet Space Program consists of thirteen interviews done from 2002 to 2011 with cosmonauts, space engineers, and military officers. Reflecting emigration from the Soviet Union/Russia,

five interviewees lived in the United States. These interviews are not part of a comprehensive collection like the Oral History Project of NASA's Johnson Space Center (www.jsc.nasa.gov/history/oral_histories/oral_histories.htm) but were done, like so much in Russia, by access to friends of friends. These informal vertical and horizontal networks played an important role in the success of the Soviet space program. Left unclear is why these people and not others were selected and agreed to be interviewed.

Soviet Space Mythologies collects seven of Gerovitch's essays; there is some minor overlap, despite editing (e.g., pp. 24 and 28). The topics include the construction of Soviet and post-Soviet space history myths, images, and propaganda; competing visions of spaceflight and the appropriate role of cosmonauts; and the construction of professional, personal, and public identity by engineers, cosmonauts, and other space personnel. The chapter on Yuri Gagarin's flight embeds these topics in a stimulating collection of official documents, interviews, recollections, and other unofficial materials that create a faceted but coherent picture of the social and political environment in which Chief Designer Sergei Korolev sent the first human into space.

The major theoretical theme running through the essays and *Voices* is the importance of myths and countermyths in creating public, professional, and private histories. Both books belong to the field of memory scholarship, with a focus on cultural memory and on collective and communicative remembering. Simply put, the subjective oral traditions—the myths and countermyths created and disseminated by actors in the Soviet space program—played an important role in creating their professional cultures and “defined their private identity as much as the master narrative shaped their public image” (*Mythologies*, p. xv).

The ten chapters of *Cosmonauts* range from a brief historical overview by Asif Siddiqi to interviews and perspectives with participants, including the necessary cosmonauts but also spacesuit designers and other researchers. The great-granddaughter of Konstantin Tsiolkovskii and the daughters of Sergei Korolev and Valentina Tereshkova, the first woman to fly in space, provided essays. The photographs of the objects on exhibit (including the Soviet manned lunar lander) are superb.

The major historical themes in the three books are the intense institutional rivalries, the clash between the engineering cultures of aviation and rockets, the creation of idealized Soviet public personae for the cosmonauts, in contrast with the all-pervasive secrecy and the deep military world in which the space engineers worked, the battles between the space engineers and the cosmonauts (reified in the levels of automation), and, sadly, a pervasive anti-Semitism, yet another self-inflicted Russian wound. Gerovitch dedicates *Voices* to the memory of Valery Spitkovsky, a refusenik—and a promoter of U.S.-Russian contacts, including these interviews.

The veneration for the visionary thinker Konstantin Tsiolkovskii and Chief Designer Sergei Korolev permeates all three books. Tsiolkovskii did not appeal only to future space engineers. Lurking in the background of Gerovitch's works but fully displayed in *Cosmonauts* is cosmism, “a philosophy of human potential and spiritual destiny to harness science and technology . . . to liberate us from the natural limitations of our single planet” (*Cosmonauts*, p. 182). John Bowl's chapter on artistic visions of space and the April 1927 Moscow exhibition on spaceflight well illustrates the deeper Russian links among spaceflight, art, and philosophy.

Korolev's coffee mug, his only “souvenir” of his years in Stalin's prison system, stands apart from the exhibit's engines and drawings of the early Soviet space program as a understated reminder of the arbitrary power of the Soviet state. His daughter's essay about her grandmother's efforts to help her son tells the story encapsulated in the mug. Gerovitch describes Korolev as a “systems manipulator,” and not a Hughesian systems builder (*Mythologies*, p. 39), who succeeded by harnessing his unofficial vertical and horizontal networks (especially the Council of Chief Designers) and a system of personal responsibility and direct orders.

One of the biggest and longest battles revolved around the role of the cosmonauts in their spaceships. Were they cogs in a machine whose role was to enhance the machine, engineers monitoring (but only in the last resort operating) the automatic control systems, or actual pilots? The resultant foci on automated systems was “neither fixed nor predetermined; rather it evolved over time and diversified across different institutes and projects” that reflected a “series of debates, negotiations, and compromises” and not “a single, dominating approach” (*Mythologies*, p. 100).

A Mercury spacecraft had fifty-six switches and seventy-six indicators, compared with four switches and thirty-five indicators in a Vostok. One reason for the latter's high level of automation was its initial design as a robotic reconnaissance satellite. Original intent as well as a belief in the reliability of automatic control as preferable to the unpredictability of humans meant that the early cosmonauts were observers, not pilots.

Unlike in the United States, where the astronauts formed a unified group that utilized their publicity to increase their role in actual spaceflight, the cosmonauts never formed a single group or bargained collectively against the spacecraft engineers and ground control operators. Indeed, the split between the military and civilian cosmonauts was so great that Ludmila Lazutkina spent three days not knowing whether her husband, Aleksandr Lazutkin, a civilian cosmonaut, had survived a fire in *Mir* in February 1997.

Gerovitch notes but does not fully delve into the significance of the language of space activities. The American phrase "space exploration" has a different sense than the Soviet words "conquering" (*pokorenie*) and "mastering" (*osvoenie*) (*Mythologies*, p. 4). A bit of analysis might have proved illuminating.

In addition to a short bibliography and the splendid photographs, *Cosmonauts* contains a timeline. Perhaps appropriately, the last entry is the December 2013 lunar landing of a Chinese rover.

Jonathan Coopersmith

Jonathan Coopersmith is an associate professor of history at Texas A&M University. His latest book is FAXED: The Rise and Fall of the Fax Machine.

Niles Eldredge. *Eternal Ephemera: Adaptation and the Origin of Species from the Nineteenth Century through Punctuated Equilibria and Beyond.* xix + 376 pp., illus., figs., bibl., index. New York: Columbia University Press, 2015. £35 (cloth).

This fascinating and well-written book, which explores several episodes in the history of the search for a rational, naturalistic explanation for the origin of species, is not, in the main, a history of science intended for historians. Rather, it seems to have been written more for paleontologists and evolutionary biologists with an interest in their nineteenth-century antecedents. It was also written to draw attention to what Niles Eldredge sees as the close parallels between his own late twentieth-century theory of punctuated equilibria and Darwin's flirtation with geographical speciation in his early transmutation notebooks.

Eldredge begins in 1801, when the French naturalist Jean-Baptiste Lamarck first developed his theory about the evolution of new species. Lamarck "painted a picture of slow, steady, inexorable change of species through time" (p. 7). Species, in Lamarck's view, are unstable and somewhat arbitrary units—they have undergone continuous, progressive change over time. Extinction is an illusion. Instead, species have slowly transformed into descendants. The appearance of stability in the geological past is another illusion, an artifact of the fragmentary nature of the fossil record. Lamarck fully expected to see more and more evidence of the intergradation of species over space and time as fossil collections grew in size and scope.

In contrast to Lamarck, the Italian geologist Giambattista Brocchi came to see species as real and more or less stable. Indeed, he saw them as analogous to individual organisms, with a first (birth) and last (death) appearance in the fossil record. Between speciation and extinction species remained relatively unchanged. This pattern was precisely what Brocchi observed in the fossil record. Furthermore, just as individual organisms give birth to a succeeding generation of organisms, species, by analogy, give rise to new species. Exactly how new species arise remains a mystery, yet, as Eldredge puts it, "the clear implication is that species have births through natural causes every bit as much as they suffer extinction" (p. 38).

Eldredge suggests that the Edinburgh professors Robert Grant and Robert Jameson then introduced a young Charles Darwin to Lamarck's and Brocchi's radical ideas when he studied medicine there in 1825–1827. Thus, when Darwin departed England on HMS *Beagle*, in 1831, he was already ruminating on various models for the transmutation of species. Eldredge provides a detailed accounting of Darwin's natural history researches during the course of the voyage, showing how many of the young naturalist's