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Joanna Radin. *Life on Ice: A History of New Uses for Cold Blood.* Chicago: University of Chicago Press, 2017. 288 pp. $40.00, cloth, ISBN 978-0-226-41731-8.

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Within the constellation of interests of historians of science, technology, and medicine, it is easy to overlook those familiar artifacts—like deep freezers—that quietly make up the infrastructure of contemporary science, in favor of more obviously dramatic topics. And yet, ***Life on Ice*** demonstrates why we should: it is a very good example of an attentive historical analysis that reveals how incorporating freezers into biomedical science disrupted the standard chronological temporality of living objects. Joanna Radin suggests that we may consider the freezer as a "temporal prosthesis" that can "mutate our relationships to space and time" and shows how, in the years of the Cold War, biomedical scientists' use of their new ability to freeze tissue reflected highly temporalized views about the history and the future of different cultures and indigenous groups (p. 183). Thus, the simple artifact that is the freezer raises important social, ethical, and epistemological questions of interest to scientists as well as historians of science.

Her argument is grounded in an account of how and why biomedical scientists collected and froze blood from indigenous peoples for use in scientific research still to come. She shows how blood came to be constituted as a resource for the future, as cryobiology was enrolled in the creation of a biomedical infrastructure for public health and research. This project, in turn, reflected ideas about indigenous groups as being in equilibrium with their environment, and threatened by the very modernity that simultaneously enabled the "salvage" of their body parts.

The author uses archival sources bookended by ethnographical insights from her time at contemporary frozen serum archives and secondary literature that is notably wide ranging, drawing from history of medicine, but also anthropology and philosophy. The resulting book is an enlightening and lively exploration of temporalities and their relevance for the histories we tell of twentieth-century biomedical research. Moreover, Radin also recognizes the archival nature of collections of frozen blood as examples of an "artificial memory system" (following Geoffrey Bowker) and, consequently, the common ground between the work of blood collectors and that of historians (p. 7).

In this account, the biobank is part of the creation of a whole low-temperature, tissue-based infrastructure for biomedical science; its history enables us to trace "how ideas about what life is and how it has been valued have changed and continue to change over time" (p. 3). Radin shows how these collections are shaped by the historical context of the Cold War and, more broadly, by projections and assertions of what it means to be mod-

ern. The freezer, by maintaining frozen life, also encompassed expectations about the future of peoples and sciences (such as epidemiology and anthropology) and powerful ideas about the constitution of Western and non-Western societies, a cleavage upon which many of the other identities follow (such as researcher-researched, curator-donor, or "cold"-"warm"). The ability to freeze blood, then, was shaped by, and led to, certain ideas regarding the relationships between people, between "objects" and their owners, and between values and body parts. Yet these forms of value, of labor, and of life changed over time—while the frozen blood remained static.

The book's first section, "The Technoscience of Life at Cold Temperature," is dedicated to the emergence of cryobiology in the early twentieth century. It explores the role of Swiss biophysicist —and Catholic priest—Basil Luyet (1897-1974) and introduces the concept of latency, which recurs throughout the book as an important theoretical tool. Latency refers both to the liminal state of life at low temperature and the potential of frozen blood samples for as-yet unspecified future uses. It is precisely this potential that is kairological —"present, while presently absent"—that provides the justification for the removal of blood samples from chronological time (p. 9).

The second part of the book, "Temporalities of Salvage," further explores temporal orientation by contrasting "life for the future" and "life from the past" (the titles of chapters 2 and 3 respectively). In chapter 2, Radin explores how cryopreservation comes to be adopted as a tool for epidemiology and public health as scientists come to envisage a frozen infrastructure for blood. She identifies "reconfigurations" in the realm of geopolitical, scientific, and field-lab relationships that are part of bringing about this future. If that chapter focuses on historical actors looking ahead to the future, chapter 3 is rather about their nostalgic attitudes to the past. Telling the story of the International Biological Programme's Human Adaptability studies carried out by James Neel in the Amazon, Radin suggests that in the ways they coordinated their efforts to salvage blood, human biologists were predicated in "nostalgia, guilt and regret" (p. 7). These ideas animated the project of salvaging, in the form of blood, examples of "baseline" peoples; "cold" societies entropically were condemned to disappearance as they came into contact with other "hot" modern ones. They constructed the idea of "primitive" peoples as being the result of natural selection between people and their environments.

The final section, "Collecting, Maintaining, Reusing, Returning," focuses on histories of blood collections. Chapter 4 describes three voyages carried out in the research vessel *Alpha Helix* in association with the International Biological Programme: Albert Damon's (1971) and Carleton Gajdusek's (1972) to Melanesia, and James Neel's to the Amazon (1977). These are a starting point to explore scientists' efforts to operate and maintain this "frozen infrastructure," and reveal "new kinds of 'ships'—kinship, ownership, stewardship" that are inseparable from the project of using these specimens in later years (p. 8). Finally, chapter 5—in my view, the most accomplished—turns to the fate of the collections in recent years. Using the idea of freezing and thawing as an act of unfreezing relationships and meanings, Radin takes us through the different perspectives that indigenous groups and scientists assigned to these materials. The struggle over blood in the freezer provides, paradoxically, a mirror to the changing social relations and the "reassessment of the ethical and political dimensions" of research with human body parts (p. 12).

Life on Ice is a welcome contribution to the topic of biological collections and postcolonial science and technology studies. It combines careful historical accounts with broad-ranging interests, leading to a narrative that is rich in fascinating detail (such as that on James Lovelock's early work on cryobiology). It is written in a nimble

and warm style that is distinctive for its lively language and extensive use of metaphor, even if the latter is a double-edged sword, as it can at times obscure the important message. Still, this book rewards the reader with a considered reflection on the unique challenges that the freezer—and the archive—present us with as they mediate the multiplicity and complexity of our lived time(s). Radin demonstrates the value of bringing into our accounts how temporalities, "complex and culturally produced ways of imagining and existing in time," shape the questions that we ask of the archives (be they of blood or tissue) that we delve into. Rather than freezing the past, she suggests, historians should be sensitive to its latency, by being "attentive to the unspoken events and concealed emotions that shape our assumptions about the present" (p. 12). This work, with its insistence on the vitality of those thought frozen in the past, illustrates what such a perspective can achieve.

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