

bacteria as well. If lifeforms can just swap bits and pieces of DNA, does the whole project of mapping out evolutionary relationships between organisms fall apart? The 'Tree of Life' would be a knotted mass of interconnected, DNA-trading species. Ingraham thinks this messy vision is not the case. He feels that horizontal DNA transfer is not widespread enough, nor does it involve enough core cellular functions, to scupper branching classification.

The final part rounds out the story in a more speculative, philosophical mode. These are short discussions on the future potential of microbiology and some of its possibly unanswerable questions. What might that topic *du jour*, the human body's microbiome, have in store for us? Can microbiology illuminate the origins of life? *Kin* gestures to tantalizing pathways.

Microbes, as Ingraham reminds us, have remarkable characteristics and their investigation using genetic tools can help establish evolutionary relationships, a project begun with Charles Darwin's *Origin of Species*. *Kin* is both an intriguing and a frustrating guide to twentieth-century microbiology.

Laura Dawes

Laura Dawes Writing and Research

JOANNA RADIN, *Life on Ice: A History of New Uses for Cold Blood*. Chicago and London: The University of Chicago Press, 2017. Pp. xii + 305. ISBN 978-0-226-41731-8. \$40.00 (hardcover). doi:10.1017/S0007087418000225

Irradiated fruit flies, cell cultures and radioisotopes, as their spokespeople have shown, all crossed the threshold from *explanandum* to technology. Taking the next step, historians of the twentieth-century life sciences have gone from considering the ecological character of the scientific workplace – 'What Tools? Which Jobs? Why Right?' as Clarke and Fujimura put their series of interpenetrated questions in 1992 – to exposing the infrastructure that allows diverse sites of knowledge production to hang together. What can we learn by looking at blood, that humour of such storied intrigue throughout human history, in this way? In *Life on Ice*, Joanna Radin shows how banks of human blood outgrew the forms of inquiry they were intended to support. Her history takes us from a St Louis lab where a Catholic priest forged a science of life at low temperatures to the Solomon Islands, Melanesia and the Amazon on 'salvage biology' voyages aboard the *Alpha Helix*. Radin never takes the easy road when treating the ethical entanglements of extractive biomedicine, and her careful treatment does justice to the complex narratives contained in vials of human blood.

The chapters of *Life on Ice* are ordered roughly conceptually and chronologically, and a brisk introduction is all one needs from a writer as energetic and effortlessly synthetic as Radin. The first of three sections focuses on the development of blood and tissue freezing, introducing ideas about cold as intervening in the boundary between life and death as they developed in tandem with the new technology. The second section highlights two orientations of cold-blood accumulation in global Cold War science: as a resource to manage future risks to the health of changing populations, and as an anxiety-ridden effort to preserve lives from 'primitive' societies on the wane, understood as living relics of a shared human past. Radin then brings us into present ethical concerns around blood reuse in the third section, after charting the 1970s blood-collecting missions of the *Alpha Helix*, a floating laboratory funded by the National Science Foundation, which serves as an exemplar of the institutional heft and global aspirations undergirding human biological material gathering.

On the surface, this is a book about temperature, and Radin pays close attention to how the uptake of refrigeration technology was dependent on users endowing it with meanings and uses beyond those intended. The real payoff, however, is how cold storage allows her to discuss shifting notions of biological time. *Life on Ice* is typically (and institutionally) consanguineous with Keith Wailoo's *Drawing Blood* (1997), which observes at its outset that a key development in medical testing has been the idea of latent disease, or a spectrum of diseases-in-waiting. Where Wailoo

used blood to look at medical professionalization, Radin scales up the idea of latency into ‘a practical form of biotemporal reasoning’ spanning the Cold War life and human sciences, through which the value of living samples could be reliably insured on the basis of their potential (p. 52). Her discussion of ‘latent life’ seamlessly weaves together the working categories of biologists and anthropologists with those of their contemporary intellectuals like Reinhart Koselleck, who argued that the perception of accelerated time was a key facet of modern life.

The results are captivating. Radin shows how investigators who saw themselves as working to forestall a quickly receding past or anticipate a rapidly changing future assembled ‘biobanks’ under the auspices of collaborations like the World Health Organisation and the International Biological Program that live in suspended animation to this day. As such, another one of the book’s strengths lies in restoring the messy connections, in both lab and field, between anthropologists, geneticists, epidemiologists and other biomedical researchers. Chapter 3 offers an especially rich discussion of these relationships informed by a broad and deep engagement with sources. Radin documents how American human geneticist James V. Neel accumulated ‘primitive’ blood to explore the relationship between disease and genetic adaptability, situating ‘those who gave their blood not as members of dynamic and evolving communities but as frozen baselines, relics of the past’ (p. 85). Interest in stable and ‘cold’ societies – the term used by French anthropologist Claude Lévi-Strauss – bridged biological and anthropological discussions, but this ‘ability to make bodies speak through the molecules that were latent in their blood’ often precluded discussion with their human counterparts about their changing societies (p. 117). Readers will recall Warwick Anderson’s *The Collectors of Lost Souls* (2008), not simply due to Carleton Gajdusek’s presence but also for the careful attention paid to how materials participate in social relations. However, where Anderson invokes Joseph Conrad to frame the tragedy of the ‘whiteman’, Radin nods to scholars working to re-engage the fluid meanings of biological material and restore dynamism and dignity to indigenous narratives and concepts of personhood.

At a time when historians of science have refocused their attention on the archive, *Life on Ice* provides a compelling way to think about how biological and medical collecting practices changed during the twentieth century. Radin masterfully inverts the infrastructure of frozen blood to uncover the residue of diverse endeavours comingled with the moral hazards of biocolonialism. Harder to see is when and how it became invisible in the first place. One might wish for a more thoroughly historical account of exactly what happened to these freezers of blood between the mid-1970s and the late 1990s, especially for the last chapter on blood reuse in the twenty-first century to feel more connected to the rest of the book. Though arguably out of scope, it would have been fascinating to read a more extended take from a scholar as gifted as Radin on flashpoints that made salvage practices visible through public-health crises, like the one around HIV alluded to throughout. Nonetheless, this is a much-needed account marked by its sense of adventure and keen sensitivity to its multiple intended and well-deserved audiences. Ultimately, *Life on Ice* lends coherence to the idea – pun intended – of a distinctive Cold War biomedicine.

MICHAEL F. MCGOVERN
Princeton University

MYLES W. JACKSON, *The Genealogy of a Gene: Patents, HIV/AIDS, and Race*. Cambridge, MA and London: MIT Press, 2015. Pp. 336. ISBN 978-0-262-02866-0. \$37.00 (hardcover).
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Identified in the mid-1990s, CCR5 (a protein expressed on the surface of leukocytes) elicited a frenzy in the HIV medical and scientific communities. Its role as a gateway receptor for HIV infection of T cells sparked high hopes for some kind of prevention or therapy against the deadly virus. This book explores in very minute detail how the gene coding for the CCR5 protein has been handled in contemporary ‘bio-capitalism’, i.e. ‘the product of biotechnology, which sees biological