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## Introduction

### *Entangled Temporalities*

▼ **SPECIAL ISSUE ARTICLE** in *Entangled Temporalities*

▼ **ABSTRACT** The introduction discusses knowledge production as the negotiation of entangled temporalities embedded in the materials, methods, and institutions of a variety of incongruous practitioners. We begin by exploring the reasons for the rise of temporal multiplicity as a thematic focal point in recent scholarship. From here, we proceed to show what studying entangled temporalities can offer histories of knowledge. First, it enables historians to trace affective and material connections in ways that break with accepted geographies, periodizations, and disciplinary borders. From medieval South Asia to modern-day Siberia, temporal negotiation seems prompted by anxieties over the loss of knowledge and the search for permanence; by the maintenance or foreclosure of bonds of empathy; and by the divergent and occasionally conflicting affordances of artifacts that configure and manipulate time. Second, a focus on temporal entanglements also challenges established conventions and practices of historiography, opening a pathway of reflexivity for historians to write in alternative ways.

▼ **KEYWORDS** Time; Entanglement; Reflexivity; Loss; Empathy; Mediation; History of Knowledge

▼ **ISSUE** Volume 4 (2023)

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**Cite this article:** Hansun Hsiung, Laetitia Lenel, and Anna-Maria Meister, 'Introduction', *Journal for the History of Knowledge*, 4 (2023), 9–32  
<<https://dx.doi.org/10.55283/jhk.17017>>

DOI: 10.55283/jhk.17017

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BREPOLS

“[T]he most stable patterns owe their stability to rhythmic discord. They are the statistical patterns of a temporal disorder, and nothing more than this. Our houses are built with an anarchy of vibrations. We walk on an anarchy of vibrations. We sit down on an anarchy of vibrations. The pyramids of Egypt, whose function is to contemplate the unchanging centuries, are endless cacophonies.”

*Gaston Bachelard, 1936*<sup>1</sup>

Knowledge is bound up in time—and never only one. Seemingly stable objects, Gaston Bachelard tells us, are “statistical patterns of a temporal disorder [...] built with an anarchy of vibrations”: even the pyramids of Egypt, monuments of eternity, are for him “endless cacophonies.” As a result, shifts in timing and temporal perspective have world-making potential. They bring new kinds of objects before the beholder and new kinds of beholders before the object. Our special issue thus argues that rhythmic anarchy is epistemically *constitutive*. At the heart of all instances of investigation, creation, and sense-making are polyphonic—and at times cacophonous—compositions of interwoven and competing tempos, rhythms, and time scales. In the end, our epistemic objects, and we as inquiring subjects, are but a temporary reconciliation of entangled temporalities.

By speaking of temporalities as entangled, we stress not only that time is multiple, but that these multiplicities are intricately interwoven. Previous treatments of temporal multiplicity have often been premised on archaeological and geological models, speaking of time in terms of layers and strata.<sup>2</sup> Alternatively, Foucauldian genealogy’s lineages of unexpected descent express difference and multiplicity not through layered simultaneity, but through the othering of past origins. Entanglement, in contrast, offers a significantly more complex material and conceptual model. Emerging first among anthropologists as a metaphor to emphasize the codependency between humans and material artifacts in ways parallel to Pickering’s “mangle,” entanglement has entered the vocabulary of science and technology studies and the history of science most notably in the work of Michelle Murphy, who uses the term to highlight “recursive loops, sideway movements, circuits of appropriation, and other vectors of connection” across uneven, fragmented, and frequently antagonistic social spheres.<sup>3</sup> Similarly, entanglement in this issue stresses knotted topologies through which the differing temporalities embedded in the materials, methods, and institutions of a variety of incongruous practitioners come to be enlaced

<sup>1</sup> Bachelard, *The Dialectic of Duration*, 137–38; the book was originally published as Gaston Bachelard, *La dialectique de la durée*.

<sup>2</sup> Koselleck, *Zeitschichten*; Foucault, *Les mots et les choses*; Foucault, *L’Archéologie du savoir*.

<sup>3</sup> Murphy, *Seizing the Means*, 12; Pickering, *The Mangle of Practice*; Thomas, *Entangled Objects*.

and entwined. Acts of knowing must negotiate with this temporal enlacement and entwinement. Across disciplines and geographies, and behind apparently stable patterns of action and investigation, our contributions demonstrate that knowledge always involves the fraught and fragile coordination and connection of multiple times, held together in provisional tension yet always threatened with undoing. The unexpected affinities and frictions revealed by attention to these temporal negotiations allow us to challenge both established categories of knowledge as well as established conventions of historiography. In our articles, ninth-century South Asian philosophers and late imperial Chinese Muslim scholars share similar fears over loss with twentieth-century biologists conducting research into cicadas' life cycles in the United States. Architects, librarians, and naturalists are all seen grappling with temporalities of storage and containment, devising structures that might outlast the lifetime of lethal radioactivity, stem the ever-expanding accumulation of print, or collect prehistoric specimens exposed by thawing permafrost. To elicit these comparisons and contrasts, several contributors experiment with narrative strategies that position both themselves and their subjects in plural temporal relations. In short, entangled temporalities create opportunities for histories of knowledge not only to fulfill their goal of remapping connections between periods, geographies, and disciplines, but also to become a site for creating new reflexive practices of historical knowledge production.

This introduction explores the above claims in three sections. The preliminary section examines reasons for the rise of temporal multiplicity as a focal point of recent scholarship, highlighting in particular the impact of global, material, and environmental turns. We argue that after several decades of attempts to pluralize time, the task ahead lies in understanding how actors have worked to negotiate and move between this plurality. From here, we proceed to show what studying the negotiation of entangled temporalities can offer histories of knowledge: pathways of connection and practices of reflexivity. The critical work of temporal negotiation, we argue, is often prompted by anxieties over the loss of knowledge and the search for permanence; by the way in which knowledge production maintains or forecloses bonds of empathy; and by the divergent and occasionally conflicting affordances of artifacts—how epistemic tools and spaces differentially configure and manipulate time. Following such temporal threads enables historians to trace surprising pathways that connect knowledge across varied borders—from the ninth to twenty-first centuries; from biology and medicine through to architecture, history, and philology; across Eurasia and over the Atlantic. It also enables historians to interrogate the stability of those temporal assumptions at the foundation of their craft: how one applies 'context' to define and delimit an object of study; how one narrates actions, events, and sequences. Ultimately, to grasp knowledge as the negotiation of temporal entanglements is to conceive of histories of knowledge

as something more than merely one additional subfield among many. Rather, histories of knowledge can serve as a means by which to renegotiate historical practice itself.

### A Theme as Old as Time?

Why entangled temporalities, now? That question, for the skeptic, perhaps contains within it an even more fundamental doubt: why time, again? After all, something like “time studies” already seems to bear the typical hallmarks of a well-established academic field: dedicated journals such as *Time & Society*, published since 1992; scholarly organizations, such as the International Society for the Study of Time established in 1966. And yet, despite this vast and longstanding literature, our present conjuncture also appears marked by a concentration of energies on the topic of time, with scholars announcing a “temporal turn” in history and cultural studies, and *Past & Present* dedicating a recent thematic section to the “History of Temporalities.”<sup>4</sup> In this section, we offer a select synthesis of recent historical work on time, outlining the trends against and through which this work situates itself, and how these intersect with debates in the history of science. At the most general level, we suggest that contemporary interest in global history, materiality, and climate change has prompted a movement of pluralization—at one pole, the fragmentation of time into a multiplicity of temporalities; at the other pole, the investigation of how temporalities interact. An understanding of this movement here serves as the groundwork for our arguments in the next two sections on the ways in which entangled temporalities might inform histories of knowledge.

Across disciplines, historically-oriented work over the past three decades could be characterized by its shared resistance against a certain notion of time as abstract, unified, and linear. That notion of time was closely linked to the concept of modernity. Railways, telegraphs, and synchronized clocks; newspapers and novels; factories and schools: industrialization, capitalism, and the nation-state were said to have produced a standardized experience of time divorced from the multiple ‘natural’ local rhythms of premodern societies.<sup>5</sup> These claims buttressed stadial accounts of historical development: behind their narratives of modernity, eighteenth-century models of “civilization” and

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4 Rothauge, “Es ist (an der) Zeit”; Edelstein, Geroulanos, and Wheatley, “Chronocenosis,” 5; Champion, “The History of Temporalities.”

5 For the classical argument regarding a distinctly modern temporality, see Koselleck, *Vergangene Zukunft*; Koselleck, *Zeitschichten*; Hartog, *Régimes d'historicité*; on capitalism and the nation-state, respectively, see Thompson, “Time, Work-Discipline”; Anderson, *Imagined Communities*; on railways, see Schivelbusch, *Geschichte der Eisenbahnreise*; on clocks, standardization, synchronization, and telegraphy, see Dohrn-van Rossum, *History of the Hour*; Galison, *Einstein's Clocks, Poincaré's Maps*.

Hegelian sequences of dialectical progress still linger.<sup>6</sup> Insofar as modern time was subject to change, that change could only ever be directed forward as a kind of “acceleration.” Every new technological innovation allegedly narrowed the gulf between future and present, ultimately incorporating the former into the latter, giving way to a phenomenon of an extended present or “frenetic standstill.”<sup>7</sup>

Since the 1990s, scholars of anthropology, art history, history, and sociology have collectively sought to undo this image of modernity’s singular time, monolithic and totalizing, in order to explore the power asymmetries produced by time in its constant multiplicity.<sup>8</sup> One major arena for exploring such plural asymmetry was found in global histories that moved beyond the West.<sup>9</sup> Postcolonial theorizing made apparent that modernity functioned as an exclusionary temporal scheme in colonialist discourses, a logic summarized pithily in Dipesh Chakrabarty’s “not yet”—colonized peoples not yet civilized, not yet developed, not yet modern.<sup>10</sup> For some, the solution was to posit “multiple” or “alternative” modernities in distinction to those of the West.<sup>11</sup> A more robust model accounting for interconnectedness was found in the suggestion that global modernity itself be conceived as a fabric of temporal “unevenness.”<sup>12</sup> Here, the simultaneity of plural times is understood to shape sites of political struggle: hauntings and counter tempos which resisted the imposition of modern mechanical time, often understood as Western, as well as ongoing processes of ruination which blur any easy demarcation between colonial past and postcolonial present.<sup>13</sup> The pluri-temporality of global unevenness applies too to those technologies that allegedly instituted modern time. Seeking to write in a manner “both global and historical, and which engages directly with more than a tiny minority of white males,” recent histories of technology have decoupled technology from associations with novelty, innovation, and futurity.<sup>14</sup> Stressing instead the persistence of the old and outmoded in the present, as well as the presence of futuristic technologies

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6 On stadial theories of civilization, see Mazlish, *Civilization and Its Contents*; on Hegel’s idea of historical progress and its influence on historiography, see Collingwood, *The Idea of History*; for a key instance of Hegelian art history, see Riegl, *Die spätromische Kunst-Industrie*.

7 Bauman, *Mortality, Immortality and Other*; Nowotny, *Time*; Rosa, *Social Acceleration*.

8 For a definitive statement of this program from the sociological perspective, see Adam, *Time*.

9 We would not wish to imply that challenges to modernity have not also come from within the historiography of Europe, simply that the problem began to be more actively flagged in non-Western historiography. For recent medieval and early modern problematizations of modernity, see, e.g., Burke, “Foreword”; Truitt, *Medieval Robots*.

10 Chakrabarty, *Provincializing Europe*; for an earlier critique from anthropology, see Fabian, *Time and the Other*.

11 Eisenstadt, “Multiple Modernities”; Gaonkar, *Alternative Modernities*; Sachsenmaier, Riedel, and Eisenstadt, *Reflections on Multiple Modernities*.

12 Harootunian, *Overcome by Modernity*; Mitchell, *Questions of Modernity*; Dirlik, *Global Modernity*; Hill, *National History*; Gluck, “The End of Elsewhere.”

13 Barak, *On Time*; Stoler, *Imperial Debris*.

14 Edgerton, “Creole Technologies and Global Histories,” 75.

in the past, these histories suggest that “time was always jumbled,” and that “old and new things...disappear and reappear, and mix and match across the centuries.”<sup>15</sup>

This temporal plurality holds true at scales other than the global. The course of time studies, stressing the “circulation of multiple times within the single instant,” has been to highlight the diversity of temporalities in every human practice, event, and artifact.<sup>16</sup> The recent turn towards examining materials and materiality in situated practice has thus also been one major force for renewed interest in questions of time. Predisposed to artifactual analysis, archaeology, and art history have provided fruitful examples. The former, operating under the banner of “contemporary archaeology,” has problematized the distinction between antiquity and the present through a critical look at the ways material antiquity structures present experience and memory.<sup>17</sup> Art historians have attempted to show how artworks hold together in tense suspension seemingly divergent and often incompatible times.<sup>18</sup> Media studies have also witnessed a growing interest in material-artifactual analysis as a means by which to unpack the implicit micro-temporalities embedded in technical processes, adopting “the temporal perspective of the apparatus itself.”<sup>19</sup> As technologies that process, store, and transmit signals, media allow for “time axis manipulation,” rewinding, pausing, fast-forwarding, speeding up, and slowing down.<sup>20</sup> The case of digital media in particular reveals further complexities, with end-user practices predicated upon successfully timed communication between an assemblage of machines—the electronic signals of hardware and the algorithms of source code—operating on a “microtemporal” plane not only imperceptible to human users, but also often anticipatory of their actions.<sup>21</sup> Digital media technologies are therefore “time-critical,” both in the sense that they structure our possibilities of temporal experience—listening to a podcast at twice the speed—and in the sense that they depend crucially on coordinated subperceptual timing.<sup>22</sup>

Elements of the above are on clear display in how the history of science specifically has approached time. This is perhaps unsurprising given the field’s emphasis on the study of practices and instruments. “Observation creates time,” writes Lorraine Daston, and we might rephrase this at a level of higher generality to say that practices—including the instruments through which they

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15 Edgerton, *The Shock*, xii.

16 Burges and Elias, “Introduction,” 4.

17 Holtorf and Piccini, *Contemporary Archaeologies*; Buchli, Lucas, *Archaeologies of the Contemporary*; Olivier, *The Dark Abyss*; Graves-Brown, Harrison, and Piccini, *The Oxford Handbook*; DeSilvey, *Curated Decay*.

18 Nagel and Wood, *Anachronic Renaissance*.

19 Ernst, “From Media History,” 141.

20 Kittler, “Real Time Analysis”; Krämer, “The Cultural Technique.”

21 Hansen, “Ubiquitous Sensation,” 63–88; Ernst, *Digital Memory*, 50, 143–45.

22 Ernst, “From Media History”; Volmar, *Zeitkritische Medien*.

are enacted—create *times*.<sup>23</sup> One distinct node within the history of science, most prominent in scholarship on biotechnology and the life sciences, has explored how the technical ability to manipulate the temporality of living matter becomes implicated in concepts as basic as the “biological,” the “cellular”—indeed, “life” itself.<sup>24</sup> Another node of research has focused on the configuration and manipulation of time across certain spaces and tools. Spaces such as the archive, observatory, museum, zoo, and farm; tools such as the railroad, telegraph, database, freezer—each of these make their own respective demands on rhythm, tempo, and synchronization, while also expressing latent notions of progress and futurity.<sup>25</sup> Finally, historians of science have evidenced concern for what we might call knowledge-making in the face of temporal “extremes,” from research and research objects that outstrip a career or even a human life-span, to knowledge rooted in objects and practices of split-second duration.<sup>26</sup>

Yet perhaps the most striking engagement with temporalities in recent histories of science has emerged around questions of the environment. According to Dipesh Chakrabarty’s memorable argument, anthropogenic climate change, by thrusting human agency into a geological timeline, places observers before the impossible task of thinking in both human and planetary time—or, as he puts it, thinking “simultaneously on contradictory registers.”<sup>27</sup> Put differently, Chakrabarty suggests that climate change exposes the limits of historical models—models such as those proposed by the *Annales* school—which would place human, societal, and environmental temporality onto separate scales. Instead, the Anthropocene forces us into a novel task of temporal reconciliation. This task is further complicated by the explosion of the “environment” itself into an interdependent web of multispecies communities each operating according to their own temporalities. Pointing to soil ecology, for example, María Puig de la Bellacasa has underscored the need for coordination between different living tempos of earthworms, bacteria, protozoa, nematodes, arthropods, fungi, decaying plants, roots, burrowing animals, and even humans that live within (or even as) a single community of environmental matter.<sup>28</sup>

23 Daston, *Observation as a Way*, 7.

24 Rheinberger, “Zeit und Biologie”; Landecker, *Culturing Life*; Landecker, “Living Differently in Time”; Landecker, “Antibiotic Resistance”; Wellmann, *The Form of Becoming*; see also, e.g., Roosth, *Synthetic*, esp. 150-72; Roosth, “Life, Not Itself.”

25 See, e.g., Daston, *Science in the Archives*; Schaffer, “Astronomers Mark Time”; Jardine, Kowal, and Bangham, “How Collections End”; Friese, *Cloning Wild Life*; Radin, “Planning for the Past”; see also the other contributions in Vidal and Dias, *Endangerment, Biodiversity and Culture*; on the telegraph, Galison, *Einstein’s Clocks, Poincaré’s Maps*; on the database, Bowker, *Memory Practices*; on the freezer, Radin, *Life on Ice*; Radin and Kowal, *Cryopolitics*.

26 On the long extremes, see e.g., Bowker, *Memory Practices*; Daston, “The Sciences of the Archive”; Galison, “The Future of Scenarios”; Galison, “The Half-Life of Story”; Daston, *Science in the Archives*; Radin, *Life on Ice*; Radin and Kowal, *Cryopolitics*; on short extremes, see Schaffer, “Astronomers Mark Time”; Canales, *Tenth of a Second*.

27 Chakrabarty, “Postcolonial Studies”; more generally, see Chakrabarty, “The Climate of History.”

28 Puig de la Bellacasa, “Making Time for Soil.”

Debates over how historians might address climate change therefore raise a counter-question necessarily linked to the trend of pluralization: if times are indeed multiple at every scale, and between entities at the same scale, then what work of reconciliation must occur at the interstices between temporalities? Here, as argued most forcefully by Deborah Coen, the history of science has a vital role to play. Moving beyond Chakrabarty's paradox of essential incongruity, Coen instead asks how knowledge about the environment has been structured by practices of constructing—and thinking across—different temporal and spatial scales. Calling this a “history of scaling,” Coen in effect urges that those contemplating temporal plurality insist not on the incommensurability of each time, but rather uncover the strategies through which one moves between them.<sup>29</sup>

It is in this sense that we understand entangled temporalities as a necessary theme for histories of knowledge. Histories of knowledge have aimed at offering a “global” alternative to the narrower constrictions of “science”; they claim to emphasize “the materiality and mediality of knowledge.”<sup>30</sup> This being the case, it would be vital to recognize that knowledge is never simply situated ‘in its own time,’ but instead pieced together through constant negotiations across and between scales, tempos, and rhythms, in a manner that calls into question the neat contextual frames by which the historical discipline operates. Histories of knowledge must analyze the fragile *détente* which holds together the multiple temporalities embedded in artifacts, bodies, social processes, institutional timelines, and the rhythms of everyday life—including their own. It is these potentials to which we turn in the next section.

## Remapping Knowledges through Temporal Entanglements

As the contributions to this issue argue, wherever knowledge is at issue, there are temporal entanglements at play, and by extension a need for acts of negotiation. These entanglements and the practices used to negotiate them act as channels along which seemingly disparate pursuits can be meaningfully aligned. Our goal is to follow materials and methods through the multiple, crisscrossing migrations, in order to tease out unarticulated temporalities coordinated and contested across diverse artifacts, practices, and institutions. The quest by eighteenth-century German philologists to preserve their reputation for posterity, as Christian Flow shows, becomes a way of also understanding the documentary practices of women in their households. The mass extinction of periodical cicadas, as Erika Milam shows, inspires alternative ways to think through contemporary race relations in the U.S. The puzzle of too much to

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<sup>29</sup> Coen, “Big Is a Thing”; see also Coen, *Climate in Motion*.

<sup>30</sup> For instance, Sarasin, “More Than Just Another”; Elshakry, “Beyond a Singular History”; Marcon, “The Critical Promises.”



know and too little time among South Asian philosophers of the ninth century, as Eric Gurevitch shows, can be partly solved by turning to debates over the moral virtues of diet. Contributions such as these link what is on the surface incongruous. Simultaneously, all three of these projects are linked to one another by persistent anxieties over how to know in the face of loss (on which more later).

Most obviously, then, a focus on entangled temporalities highlights powerful points of comparison, connection, and contrast across many of the stubborn barriers that divide our academic landscape, crossing disciplines, geographies, and social categories. This resonates with one of the central claims of the history of knowledge, namely, to use knowledge formations to chart surprising connections and fractures different from those bequeathed to us by cultural history, social history, and the history of science.<sup>31</sup> Tracing temporal entanglements is not, as a result, a task of documenting how time proper has been conceptualized by specific disciplines as an epistemic object, or else debated in philosophical discourses. Nor is it a means to replace an old yet tenacious narrative of the history of science—one that “we know is gravely flawed if not outright false”—with an even larger grand narrative of the history of knowledge.<sup>32</sup> Rather, tracing entangled temporalities is a way to trouble the ways in which we categorize, systematize, and narrate knowledge. It is a strategy by which to continually disassemble contingent epistemic structures and reassemble them into unexpected formations, forging new assemblages for analysis while also calling reflexive attention to the power structures inscribed into our own scholarly conventions of historical time.<sup>33</sup>

Such an approach begins with a reflexive disassembly and reassembly of the fundamental practice of reading. As Christian Flow discusses in his contribution to this issue, reading and its attendant textual apparatuses articulate temporal assumptions tied to norms of legitimate scholarship: intensive and extensive, continuous and discontinuous, or in Flow’s case, “cursory” and “statary.” With this in mind, how should one go about reading this issue in a manner that takes into account the pluri-temporality of reading? One answer is to resist a linear presentation of contributions in the form of a sequential table of contents separated into subthemes. We thus present below a series of dynamic maps indicating possible routes by which to navigate contributions,

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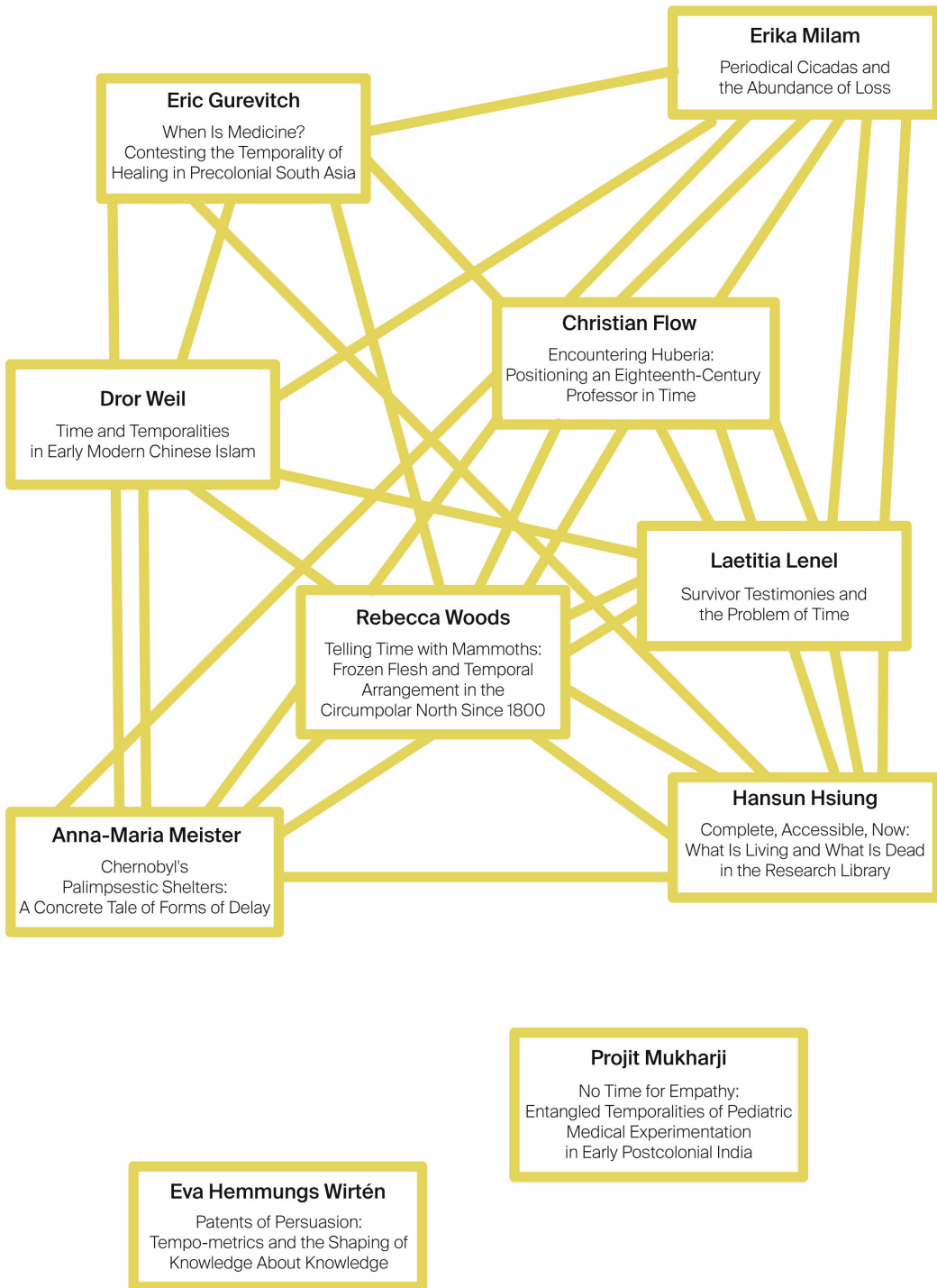
31 Daston, “The History of Science”; see also Burke, *What Is the History*; Lässig and Steinberg, “Knowledge on the Move”; Östling and Heidenblad, “Fulfilling the Promise.”

32 Daston, “The History of Science,” 149; for an example of grand narrative from the standpoint of the history of knowledge, see Bod, *World of Patterns*.

33 In saying this, we do not reject the need to reconstruct “knowledge systems,” “epistemic orders,” and “epistemic hierarchies.” What we propose, instead, is that this reconstruction a) be marked as provisional in a manner attentive to contingency, and b) be directed towards the disassembly of existing systems and orders. On reconstructing knowledge systems and epistemic hierarchies, see Daston, “The History of Science,” 142–50; Sarasin, “More Than Just Another”; Verburg and Burke, “Introduction.”

each trajectory sketching out a different journey, and thus pathway, through entangled temporalities.

In following the first map [Fig. 1], one encounters different temporal formulations around what we call “Anxieties of Loss and Promises of Permanence.” As Erika Milam shows in her analysis of the mass emergence and demise of periodical cicadas, loss as negative absence and knowledge-making as productive presence are existentially connected. Whether through individual death, species extinction, textual corruption, or more deliberate archival violence, knowledge and knowledge producers require protection against time, giving rise to practices of maintenance, updating, and future-proofing, as well as compensatory strategies for documentary gaps. Fears over the corruption of Sanskrit medical classics in ninth-century South Asia, for instance, underlie the philological quarrels treated in Eric Gurevitch’s contribution. Mortal lifespans being all too brief in comparison with the vast body of medical knowledge, scholars sought to resolve epistemic uncertainties regarding texts into ethical judgments of “knowing who to trust and what to read.” Dror Weil similarly begins with concerns over “the loss of authentic knowledge,” arguing that this anxiety prompted mid-Qing Chinese Muslim scholars to embark on a project to translate and adapt Islamicate knowledge for Chinese audiences. But it was not just past knowledge that was threatened with loss and corruption. In contrast to studies that focus on the temporalities of the *object*—stabilized in time to be observed, studied, and analyzed—Flow argues that strategies of “temporal positioning” were essential to the construction of *subjects*. Eighteenth-century Göttingen professor Johann Matthias Gesner’s self-fashioning as a disciplined philological observer was dependent on his imposition of temporal norms on scholarly practice, such as how quickly one should read, or when and how often one should publish. These norms were also a means to safeguard the image of his own scholarly self for the future. Notably, Flow’s treatment of Gesner recovers the hidden labor of female members of his household who were crucial in documenting and preserving his papers, yet concerning whom few testimonies remain. The question of what is lost and what is kept in archives is also the starting point for both Projit Mukharji and Laetitia Lenel. The surviving archives of medical experimentation on children in early postcolonial India, Mukharji notes, center wholly on the public reports of physician-researchers, thereby reifying the progressive, linear temporality promoted by the early postcolonial state. To recover instead the voices of those children upon whom experiments were performed, Mukharji turns from the medical to the literary archive, in the process exposing a different temporality of early postcolonial experience centered not on national progress, but on the rhythm of everyday familial lives. Laetitia Lenel explores the struggle to extend the witnessing of Holocaust survivors in the twentieth and twenty-first century through different attempts to migrate first-person accounts from bodies to archival media technologies. She shows how the passing of time and the different temporal affordances of bodies, media, and narrative formats also



## Anxieties of Loss

Figure 1. Anxieties of Loss and Promises of Permanence.

changed the memories preserved—and with that, the knowledge about the holocaust for future generations.

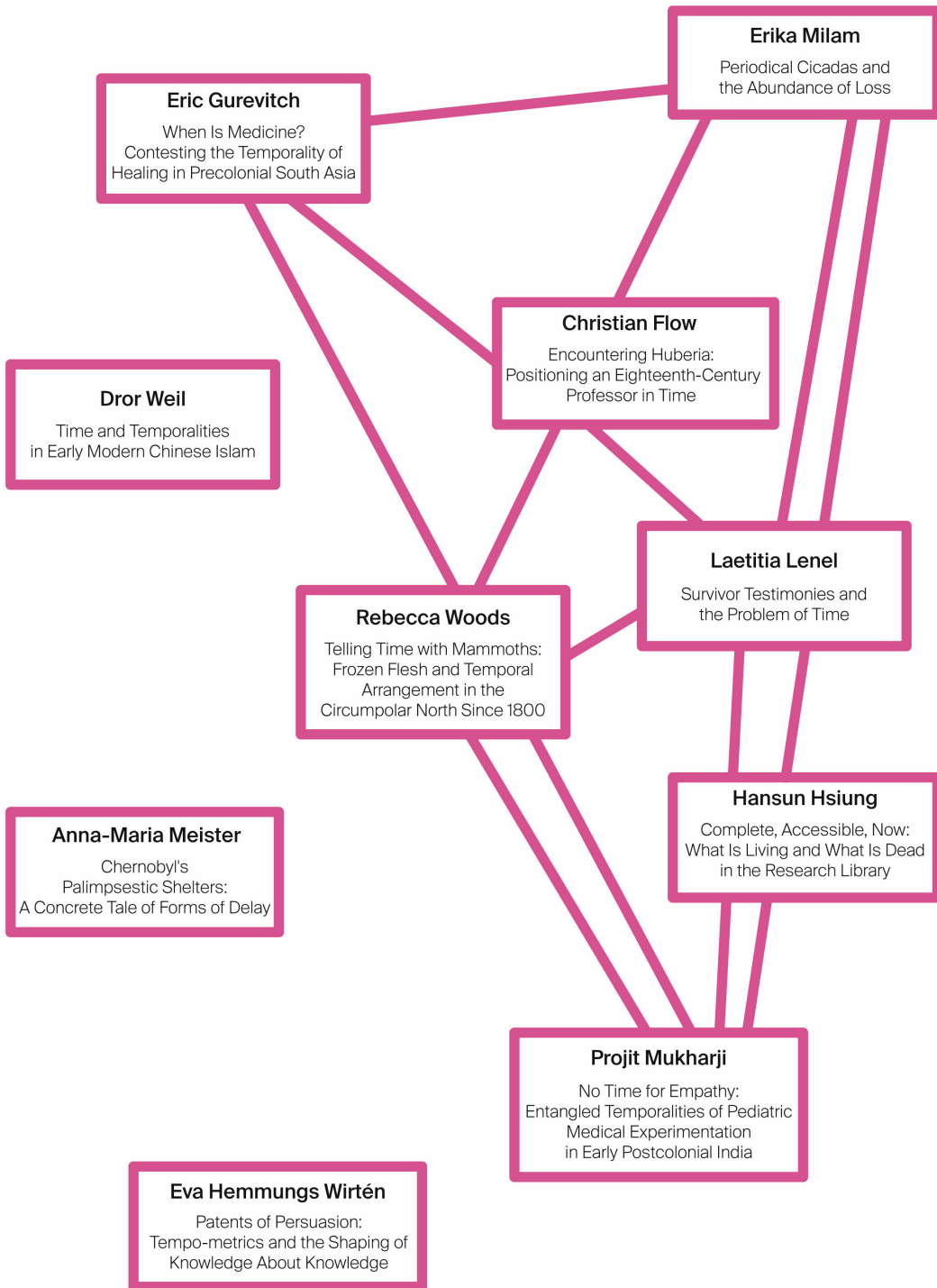
Against loss, knowledge requires maintenance. Acts of maintenance express care. This thread is traced in our second map, “The Maintenance of Empathy” [Fig. 2]. If empathy depends on “being with others in shared time,”<sup>34</sup> then how are different temporal frameworks generative of dispositions of care and practices of maintenance, or else a lack thereof? The recordings that Lenel studies are all motivated by the wish to preserve the immediacy and plasticity of the accounts of Holocaust survivors to prevent future oblivion, revision, or denial. In contrast, Mukharji addresses the failures of shared empathetic time in postcolonial India. Through a series of “temporal disidentifications,” patients, practitioners, and ethicists in the 1950s came to inhabit separate experiential realms, which opened up a space for medical researchers to deliberately inject children with malaria. However, the historian’s gaze might also turn not only to past divisions, but, as Milam and Rebecca Woods suggest, towards the imagination of species’ futures. In the case of Milam’s periodical cicadas, synchronized swarms act as fragile figures of hope for a multi-species “kinfulness,” serving to counter neo-Darwinian claims that “long-term survival requires enormous loss of individual life in the present.” This fragility becomes even more palpable in Woods’ paper, where melting permafrost due to anthropogenic climate change sets frozen mammals such as mammoths flowing into the present. Once studied as relics of mass geographical catastrophe, mammoths now serve as the basis for contested ethical visions in the face of climate crisis: on the one hand, they are keystones for intertwined projects of de-extinction and paleoecological restoration; on the other hand, they can be treated as “a symbol of planetary salvation,” urging us to come together to construct a “hospice for a dying planet.”<sup>35</sup>

Time is always embodied in physical materials. Reading this issue through our third map—that of “Artifactual Mediations”—illustrates the ways in which artifacts, including built spaces, create specific opportunities for the manipulation, redefinition, and contestation of temporalities [Fig. 3]. In Woods’ article on thawing mammoths, multitemporal entanglements are literally woven into the fur and soft tissues of an extinct animal. In Anna-Maria Meister’s analysis of the Chernobyl sarcophagus’ decay, materials like steel and concrete competed to withstand radiation erosion, while radioactive particles embedded themselves in human bodies. This quest for the construction of a shelter sought to contain the temporality of the fallout from that of the human bodies outside, while depending on the labor of these bodies to be maintained. However, this quest is not merely one of the material’s physicality, but one of its form as well: the architectural shape of the arch promised to overcome the art historical trope of the ruin. For Eva Hemmungs-Wirtén, the artifact in question

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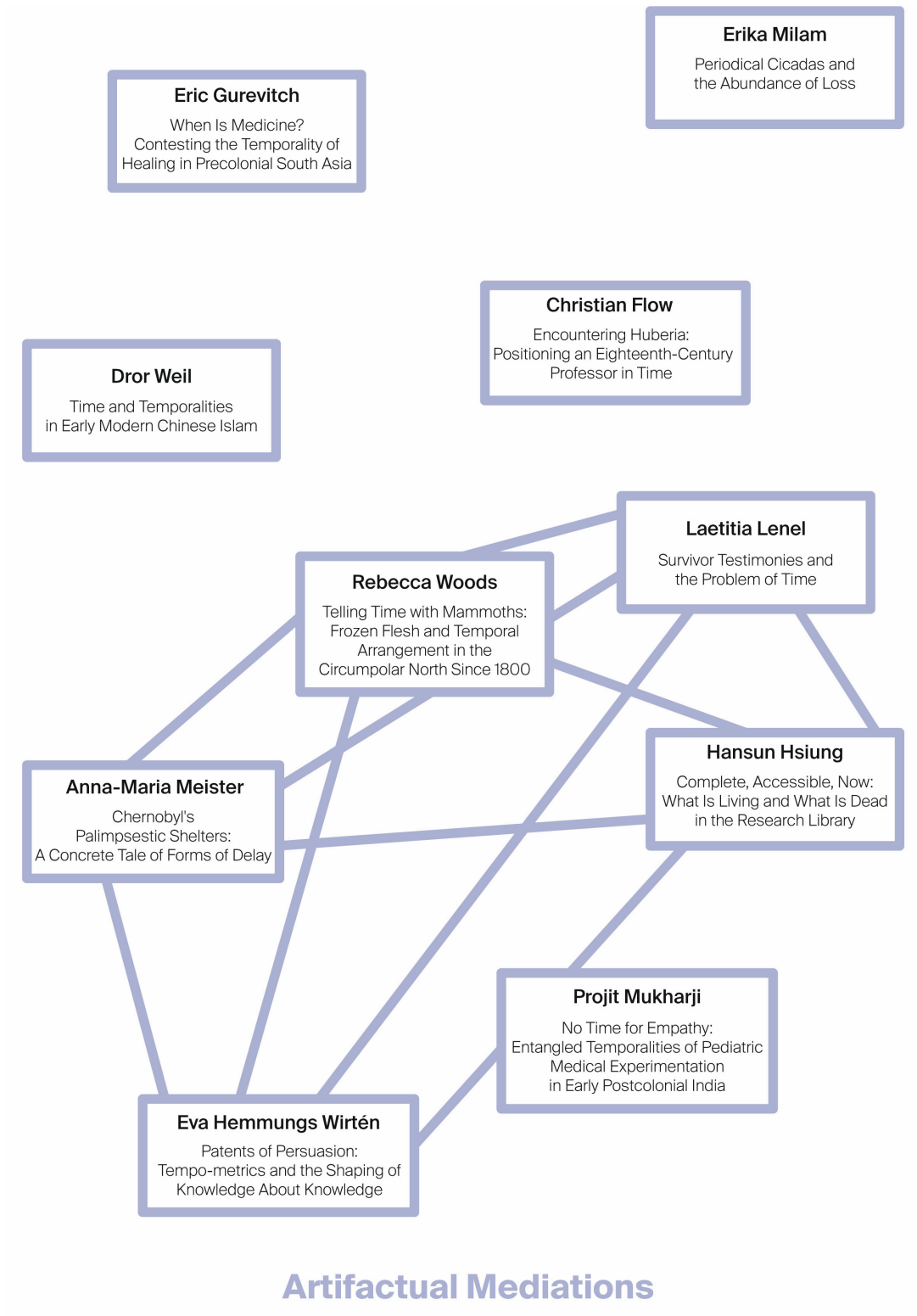
<sup>34</sup> Guha, “The Migrant’s Time.”

<sup>35</sup> Juno Parreñas, *Decolonizing Extinction*.



## Maintenance of Empathy

Figure 2. The Maintenance of Empathy.



**Figure 3.** Artifactual Mediations.

is Kenneth Eldredge's Automatic Reading System, which ushered in a new means for the U.S. Patent Office to recast its own history. As patent 3,000,000, the Automatic Reading System's capacity for faster information processing is dubbed "tempo-metrics" by Hemmungs-Wirtén, who stresses the manner in which this new technology redefined the progress and future horizons of the patent system in terms of acceleration and speed, performed through charts that instantiated "accumulation and quantification." Accumulation in its blunt physical sense, as Hansun Hsiung shows, was also a central contention in early twentieth-century American debates over the future of university research libraries. Faced with a proliferation of books that exceeded storage space, librarians were forced to rework their understandings of obsolescence, completeness, and speed of access in an attempt to rescue libraries from the burden of material overflow. The result was a shift away from libraries as physical repositories for books towards libraries as information bureaus coordinated by logistical infrastructures of communication and transportation technologies.

## Reflexive Histories of Knowledge

Approaching knowledge as the negotiation of entangled temporalities therefore opens up multiple channels of connection across fields, regions, and periodizations typically separated by specializations. In the process, it demonstrates how key categories, once the province of the history of science—the field in which many of us received our original training—can be productively reframed from a temporal perspective. Concepts like trust and authority, scientific personae, and epistemic virtues such as completeness and access appear in this issue as configurations of time. For Flow, persona is constructed as a "temporal profile": scholars coordinated the timing of practices and labor across domestic and learned spheres to ensure that upon death, their desired archival record would be left for posterity. For Gurevitch, trust is fundamentally troubled by mortality: finite humans without time to assimilate the mass of Sanskrit medical knowledge had to devise other means, often moral arguments, to assert their authority. For Hsiung, speed of access redefines completeness as a virtue: the demand that library collections strive to collect as much as possible faded as networks of telephones, and eventually the internet, promised quick information retrieval.

But the opportunities presented by histories of knowledge drive even deeper. Still young, the history of knowledge seeks its own array of "new questions, perspectives, frameworks, methods, themes, and concepts that are not part of existing discourses or practices."<sup>36</sup> We, in response, propose that rather than merely reproducing existing disciplinarity, histories of knowledge, through an insistent reflexive stance on epistemic practices, have the potential

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<sup>36</sup> Östling and Heidenblad, "Fulfilling the Promise."

to redefine what fields and disciplines are. Specifically, if knowledge is indeed a matter of unstable temporal entanglements, then an opportunity arises to rethink the nature of history itself, calling into question ingrained historicist approaches to contextual interpretation and narrative form.

Historical knowledge, as we see it, has been caught in a sort of tragic temporal loop: on the one hand, the relentless demand for rigorous contextualization in the hope of “resurrecting” or “re-enacting” the past—of hoping to see through what art historian Michael Baxandall has famously called the “period eye”; on the other hand, a lingering feeling that the past is irretrievable—that something of the fabric of lived experience, however ‘thick’ one’s contextual description, is always lost.<sup>37</sup> And yet, this tragedy itself rests on questionable assumptions of time: its irreversibility; its susceptibility to tranching into “periods,” each distinct from the next. An understanding of knowledge as always pluri-temporal offers license to disturb our own historicist conventions, viewing this loop as neither inevitable nor necessarily tragic, but rather rife with possibilities for cross-contextual connections, juxtapositions, and montages that actively challenge how historians work. Instead of asking if we can really know the past, we may, by rethinking what the ‘past’ itself is, construct new ways of knowing. Put differently, by bringing into view the epistemic implications of temporal entanglements, histories of knowledge function as a critical site for undoing and redoing our own knowledge practices.

One way to enact this reflexivity involves experimenting with the temporal effects of narrative. Narrative, after all, does not only provide “a natural format for describing development and change through time,” but also structures our experience of time.<sup>38</sup> Feminist scholars have long pointed to the “totalizing and even totalitarian spirit” of linear narrative.<sup>39</sup> Instead, they have pushed for multivalent and non-linear strategies adequate for pluri-temporal subjects and subjectivities and an understanding of historical time as polytemporal. Prompted by discontent with the “teleological impulse that converts feminist movement into linear narration,” feminist scholars have called for multidirectional approaches to “histories in the plural,” opening up a “space of duration for feminism’s critical agency.”<sup>40</sup> By advocating for different modes of history writing, they have also argued for reconceptualizations of time and history.<sup>41</sup> Pointing to the alternative temporalities that queer subcultures produce, queer theory has similarly called for an “adjustment in the way in which we think about time.”<sup>42</sup> Building on earlier studies of “queer time” by Lee Edelman and

37 Michelet, *History*; Collingwood, *The Idea of History*; Baxandall, *Painting and Experience*.

38 Morgan and Wise, “Narrative Science,” 2; Carr, *Time, Narrative, and History*.

39 Kristeva, “Women’s Time,” 21.

40 Wiegman, “Feminism’s Apocalyptic Futures,” 810, 822–23; Friedman, “Making History,” act 35; see also Fernandes, “Unsettling ‘Third Wave Feminism.’”

41 Brown, *Politics out of History*; Grosz, *The Nick of Time*; Grosz, *Time Travels*; Browne, *Feminism, Time*; for an earlier example of a similar argument, see Ermarth, *Sequel to History*.

42 Halberstam, *In a Queer Time*, 6.



Jack Halberstam,<sup>43</sup> Carla Freccero has argued for a combination of analeptic and metaleptic approaches to the writing of history, disrupting sequence, cause, and effect.<sup>44</sup> Similarly, Elizabeth Freeman has focused on non-sequential interactions between past and present in experimental film, fiction, and performance art to emphasize the disruptive power of such entanglements.<sup>45</sup> Describing “queer time” as a “hiccup in sequential time,” she highlights queer time’s capacity to connect people beyond the chrononormativity and chronopolitics that organize individual human bodies.<sup>46</sup>

Histories of knowledge might benefit from such cues in feminist and queer theory, for these techniques make visible in actual writing and reading practice the ways in which historians can disturb singular linear temporality.<sup>47</sup> Some contributors, such as Lenel and Weil, stress how their own subject positions constitute part of the temporal entanglements they treat. In Lenel, the interviews of Holocaust survivors are experienced as a kind of mediatized watching and listening that moves back and forth indeterminately between the affordances of present technologies and past memories of encounters with survivors. Weil frames the cultural hybridity of his Chinese Muslim scholars and their practices through the ironies of his own experiences with conventions of dating among different scholarly communities today.

The problem of positionality points to further temporal entanglements less evident and yet no less decisive in the shaping of this issue: the time one gets to research and write; the timing of one’s position within a scholarly trajectory; the different temporalities, shared and separate, which we variously inhabit.<sup>48</sup> These entanglements have weighed on the production of this very issue itself. Mukharji’s article began by proactively taking up the call to destabilize the historian’s narrative temporality. Earlier versions extended Saidiya Hartman’s proposals for “critical fabulation,”<sup>49</sup> juxtaposing genres of memoir, clinical notes, and scholarly correspondence and keying these to discursive and typographical contrasts. Each section recounted the same episode of child experimentation while performing, respectively, disparate experiences of time. Now, after several rounds of reviews and editing, this multi-temporal telling has been

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43 Edelman, *No Future*; Halberstam, *In a Queer Time*; see also Muñoz, *Cruising Utopia*.

44 Freccero, *Queer/Early/Modern*; Freccero’s suggestion recalls Elizabeth Ermarth’s call for historians to draw inspiration from experiments in literary fiction, Ermarth, *Sequel to History*.

45 Freeman, *Time Binds*; Freeman, “Packing History, Count(Er)Ing Generations.”

46 Freeman, *Time Binds*, 3.

47 Beyond narrative, the attendant scholarly apparatuses of writing also play an important role in the construction of temporalities. As Clare Hemmings has argued, citational practices have been used to depict a history of feminist thought that unfolds in linear, sequential time. Against this, Hemmings proposes a lateral tactic of citation that incorporates muted voices coeval and co-extensive with regularly cited authors, through this exposing citations as a form of “empiricism that masks the selective nature of evidence,” Hemmings, *Why Stories Matter*, 22–23.

48 The list here is by no means exhaustive. For instance, it might be noted that the majority of contributors belong to a similar generational cohort of students at select U.S. and European institutions, or else spent time as faculty at those institutions.

49 Hartman, “Venus in Two Acts.”

reduced, per the dictates of scholarly convention, into the singular time of the historian's present. As voiced by the trenchant critique in the published version of his article, standards of narrative temporality conceal asymmetries within the historical discipline: scholars such as Mukharji who are diasporic migrants experience conflicting demands of conformity in their disciplines relative to a "community of departure" they have partly left behind and a "community of arrival" in which they are only partly integrated. The episode impressed on us as editors that in urging contributors to take a reflexive stance, we must sensitively negotiate with the contingencies of publication timing: whether one can afford to risk peer review approval relative to the moment in one's career, and whether one is under time constraints due to care responsibilities, including those that span several time zones.

The latter, in particular, have been exacerbated by the COVID-19 pandemic. This issue came together during that time, in snippets and cracks often stolen from other responsibilities, and in a shared space that was mostly virtual. Anxieties of loss and the need to maintain empathy took on immediate urgency, reminding us that knowledge is constructed through collaboration and friction between people and things, and in turn that those collaborations and frictions are premised on an imperfect negotiation of times in their plurality. "Entangled Temporalities" brings these negotiations to the fore. Our contributors demonstrate that knowledge is never simply 'of its own time,' or of any *one* time at all, but rather stitched together with diverse temporal threads. Through this example, we call upon historians of knowledge to approach the field as a reflexive venture, feeding the fruits of their research back to reconfigure their ongoing practice. Histories of knowledge are now amply historicizing knowledge production in various ways. The point, however, is to change it: namely, to challenge the conventions of knowledge production among historians themselves.

### **Acknowledgements**

The editors want to acknowledge that the thought and work going into this special issue has its roots in a series of discussions and collaborative workshops with Christian Flow, Richard Spiegel, and Janina Wellmann. A workshop organized by that group that we called "Timing Knowledge" in 2020 has additionally provided productive and valuable feedback from the participants and respondents.

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