

Introduction: What Is a Field? Transformations in Fields, Fieldwork, and Field Sciences since the Mid-Twentieth Century

Cameron Brinitzer, *University of Pennsylvania*
Etienne Benson, *University of Pennsylvania*

Abstract: In recent decades, scholarship in the history of science has explored the emergence and development of sciences in which fields serve as privileged sites of knowledge production. Much of this work has focused on the field sciences' formative period from the late nineteenth century to the mid-twentieth century, and it is the definitions of the field, fieldwork, and field science emerging from the study of this period that have come to dominate the historical literature. Those definitions cannot, however, account for transformations that have taken place across many field sciences since the mid-twentieth century. Examining a diverse set of disciplines and contexts, the contributions to this Focus section reveal the specific conceptual and material contours of fields, fieldwork, and field sciences during this more recent period and suggest a number of unanswered questions and topics for future research.

Fields as research sites and fieldwork as a distinct set of research practices are foundational to many sciences today, but it was not always so. On the contrary, the field, fieldwork, and the field sciences in their modern forms all date to the nineteenth century. Since the publication of a landmark *Osiris* volume entitled *Science in the Field* in 1996, a wide-ranging body of

Cameron Brinitzer is a doctoral candidate in the Department of History and Sociology of Science at the University of Pennsylvania. Department of History and Sociology of Science, University of Pennsylvania, Cohen Hall 303, 249 South 36th Street, Philadelphia, Pennsylvania 19104-6304, USA; camarcus@sas.upenn.edu.

Etienne Benson is Associate Professor in the Department of History and Sociology of Science at the University of Pennsylvania. Department of History and Sociology of Science, University of Pennsylvania, Cohen Hall 303, 249 South 36th Street, Philadelphia, Pennsylvania 19104-6304, USA; ebenson@sas.upenn.edu.

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scholarship in the history of science has explored the emergence and development of sciences that made fields privileged sites of knowledge production.¹ Much of this work has focused on the formative period from the late nineteenth century to the mid-twentieth century, and it is the definition of the field sciences emerging from studies of this period that has continued to orient recent scholarship, including some work on earlier and later periods of scientific activity. In this Focus section, we suggest that a too-faithful adherence to this definition obscures important transformations of fields, fieldwork, and field sciences since the mid-twentieth century. Spanning the period from the 1950s to the present and including a range of human and natural sciences, the contributions to this Focus section show that posing the seemingly straightforward but surprisingly unexamined question “What is a field?” yields new insights and suggests as yet unexplored research directions.

The urgency of this question is heightened by an array of transformations in the field sciences taking place at present—transformations that are simultaneously material, technical, social, political, ethical, and epistemological. Advances in telecommunications and remote sensing technologies, along with new data-sharing practices, are increasingly making it possible for scientists to gather and analyze “field data” without ever having to set foot in the field.² Epistemic objects that were once investigated only in the field—such as culture and climate—are increasingly being studied in the laboratory or with computational models, at the same time that standardized methods of fieldwork are being rendered obsolete by rapid environmental change.³ Changes in the politics and economics of government-funded science since the end of the Cold War have also reconfigured the social organization of fieldwork and relations between experts and nonexperts.⁴ Moreover, field scientists across the human and natural sciences are grappling with their disciplines’ often violent foundations and ongoing complicities with colonialism, racism, and other forms of injustice.⁵ Collectively, we suggest, these recent and contemporary transformations challenge the existing historiography of the field sciences and compel us to reexamine the historical record and present-day scientific practices for alternative conceptualizations and materializations of fields, fieldwork, and field sciences.⁶

As the following essays demonstrate, the period since the mid-twentieth century has witnessed profound changes in the field sciences. During this period, many of the patterns, practices, and conditions of field research that had been established by the mid-twentieth century were reworked, reframed, and sometimes rejected outright. One reason for these shifts was that by the 1950s most

¹ Henrika Kuklick and Robert E. Kohler, eds., *Science in the Field, Osiris*, 1996, N.S., 11.

² See Jennifer Gabrys, *Program Earth: Environmental Sensing Technology and the Making of a Computational Planet* (Minneapolis: Univ. Minnesota Press, 2016); and Stefan Helmreich, “From Spaceship Earth to Google Ocean: Planetary Icons, Indexes, and Infrastructures,” *Social Research*, 2011, 78:1211–1242.

³ See Paul Edwards, *A Vast Machine: Computer Models, Climate Data, and the Politics of Global Warming* (Cambridge, Mass.: MIT Press, 2010); and Adriana Petryna, “Wildfires at the Edges of Science: Horizonizing Work amid Runaway Change,” *Cultural Anthropology*, 2018, 33:570–595, <https://doi.org/10.14506/ca33.4.06>.

⁴ See, e.g., Sara Wylie, Nicholas Shapiro, and Max Liboiron, “Making and Doing Politics through Grassroots Scientific Research on the Energy and Petrochemical Industries,” *Engaging Science, Technology, and Society*, 2017, 3:393–425.

⁵ See Deborah A. Thomas, “Decolonizing Disciplines,” *American Anthropology*, 2018, 120:393–397; Ryan Cecil Jobson, “The Case for Letting Anthropology Burn: Sociocultural Anthropology in 2019,” *ibid.*, 2020, 122:259–271; Paul Wolff Mitchell, “Editor’s Introduction: The Morton Cranial Collection and Legacies of Scientific Racism in Museums,” *History of Anthropology Review*, 2021, 45, <https://histanthro.org/news/observations/editors-introduction-morton/>; and Margaret M. Bruchac, “Colonizing the Indigenous Dead,” *ibid.*, <https://histanthro.org/news/observations/colonizing-the-indigenous-dead/>.

⁶ Our formulation is inspired by studies of the materialization of concepts, including John Tresch, “Cosmologies Materialized: History of Science and History of Ideas,” in *Rethinking Modern European Intellectual History*, ed. Darrin McMahon and Sam Moyn (New York: Oxford Univ. Press, 2014), pp. 153–172.

of the early pioneers of field science had passed into memory, leaving as their legacies the practices, concepts, and values that have since come to define the field sciences for many historians. For scientists who have come of age since the mid-twentieth century, however, these field traditions have sometimes seemed less like expansive frontiers than like overgrazed pastures.⁷ Even as they have kept fieldwork at the center of their personas and practices, field scientists have experimented with alternative research methods, brought the field into co-constitutive relationships with new sites (including offices, clinics, and computers), and used humor, irony, and performative staging simultaneously to claim the field tradition as their rightful inheritance and to distance themselves from aspects of it that they see as undesirable or outdated (see Etienne Benson's essay in this Focus section).

Changes in global infrastructures and temporalities of scientific research in the post–World War II decades also contributed to a refashioning of fieldwork traditions. Expanding infrastructures of transportation made it possible for scientists to reach previously inaccessible field sites with relative ease and to replace long expeditions and immersive residencies with brief, repeated visits. As techniques of automated sensing, remote imaging, and field recording became widely available and telecommunications networks expanded, it even became possible for some researchers to gather field data without visiting the field at all.⁸ Taking advantage of these infrastructural conditions, postwar field scientists developed practices that differed significantly from those of preceding generations, thereby making new scientific objects available for study. In the case of behavioral ecology, for example, new kinds of field camps allowed researchers to return to distant sites to study particular animal populations over decades and generations, even amidst profound environmental, social, and political changes (see Erika Milam's contribution to this Focus section).

Foundational connections between fieldwork and colonialism, which have long been a subject of interest among historians of the field sciences, have also undergone major shifts since the mid-twentieth century.⁹ In the post–World War II decades, colonial justifications for fieldwork were largely replaced by new discourses of national self-determination and economic development, accelerating shifts that had begun in the prewar years.¹⁰ Explicitly anti-racist research programs in the human field sciences aimed to demonstrate that all humans shared certain universal traits, while also seeking to document cultural and biological differences among human populations that sometimes served similar discursive purposes as race.¹¹ In practice, rather than eliminating colonial practices or colonialism, the period since the mid-twentieth century has been marked by a series of mutations of colonial relations that have often been masked or elided by new discursive formations, just as the persistence of race was masked by the turn to culture.¹² Field research remained deeply implicated in projects that were colonial under other names and in novel forms—as did research in laboratories and clinics constructed on colonized land (see Laura Stark's essay in this Focus section).

⁷ See Robert E. Kohler, *Landscapes and Labscapes: Exploring the Lab–Field Border in Biology* (Chicago: Univ. Chicago Press, 2002).

⁸ See Edwards, *Vast Machine* (cit. n. 3); and Judith Kaplan, "Intelligible Pitch: A Shared Topos in Mid-Twentieth-Century Ethnomusicology and Anthropological Linguistics," *History of Humanities*, 2021, 6:137–161.

⁹ See Henrika Kuklick, *The Savage Within: The Social History of British Anthropology, 1885–1945* (New York: Cambridge Univ. Press, 1991).

¹⁰ See Helen Tilley, *Africa as a Living Laboratory: Empire, Development, and the Problem of Scientific Knowledge, 1870–1950* (Chicago: Univ. Chicago Press, 2011).

¹¹ See Joanna Radin, "Latent Life: Concepts and Practices of Human Tissue Preservation in the International Biological Program," *Social Studies of Science*, 2013, 43:484–508; and Sebastián Gil-Riaño, "Relocating Anti-Racist Science: The 1950 UNESCO Statement on Race and Economic Development in the Global South," *British Journal for the History of Science*, 2018, 51:1–23.

¹² See Lee Baker, *Anthropology and the Racial Politics of Culture* (Durham, N.C.: Duke Univ. Press, 2010).

For many peoples who had accumulated long experience as subjects of field science or whose lands and homes were conceptualized and materialized as field sites, the period since the mid-twentieth century has also been one of reworking, reframing, and, in some cases, rejecting.¹³ Like the field scientists who have come of age during this period, many subjects of the field sciences have approached these practices not as innovative and unfamiliar but instead as well established and available for enrollment in their own political and epistemological projects. Through forms of both resistance and hospitality, they have sometimes been able to transform field scientists into allies. These developments are perhaps most obvious in anthropology, but examples can also be found in ecology, geology, and other natural sciences, where the residents of places where field scientists did their work challenged the latter's claims about and to their land.¹⁴ Such examples call our attention to the fact that fields and fieldwork not only have colonial histories, as scholars have long recognized, but also postcolonial histories of resistance, critique, and—sometimes—collaboration (see Rosanna Dent's essay in this Focus section).

By the late twentieth century, the accumulation of these varied transformations in fields and field sciences had also led to significant material and conceptual changes in the relation between labs and fields. Objects of study that had once justified enormous investments in research in the field—because it was thought that it was only there that they could be found and studied—began to be investigated in laboratories. At the same time, many of the objects and practices that had been conventionalized in prewar fieldwork traditions, particularly in anthropology, became targets of critical reflection and conceptual reformulation, leading some field scientists to begin constituting laboratories themselves as sites for fieldwork.¹⁵ Although there is no doubt that fields have continued to be defined at least partly in relation to labs throughout the late twentieth and early twenty-first centuries, the traffic of epistemic objects, field concepts, and research techniques across disciplines and sites of science in this period has rendered the classic opposition between fields and labs highly misleading, even as a rough heuristic (see Cameron Brinitzer's contribution to this Focus section).

Of course, the field/lab dichotomy remains important to the ways that many scientists talk about their work today, and for that reason it cannot be jettisoned entirely. Rather than taking contemporary uses of these terms as descriptions of fixed qualities of certain sites or practices of research, however, it is more useful to understand them as expressions of scientists' personas, epistemological premises, rhetorical aims, and affective investments. It is not only that the borders between fields and labs have been repeatedly blurred and complicated since the mid-twentieth century, but also that what counts as a field or a lab can shift from moment to moment within a single scientific project. When scientists describe their sites of work as laboratories in one breath and fields in the next, it is clear that their understanding of those terms is much more flexible than that of many historians of the field sciences. Those sites cannot be defined in abstract, universal terms; they must be situated in particular historical moments and ethnographic contexts (see Stefan Helmreich's essay in this Focus section).

¹³ On ethnographic rejection see Audra Simpson, *Mohawk Interruptus: Political Life across the Borders of Settler States* (Durham, N.C.: Duke Univ. Press, 2014).

¹⁴ See Warwick Anderson, *The Collectors of Lost Souls: Turning Kuru Scientists into Whitemen* (Baltimore: Johns Hopkins Univ. Press, 2008); Megan Raby, *American Tropics: The Caribbean Roots of Biodiversity Science* (Chapel Hill: Univ. North Carolina Press, 2017); and Leandra Swanner, "Instruments of Science or Conquest? Neocolonialism and Modern American Astronomy," *Historical Studies in the Natural Sciences*, 2017, 47:293–319.

¹⁵ See, e.g., Laura Nader, "Up the Anthropologist: Perspectives Gained from Studying Up," in *Reinventing Anthropology*, ed. Dell Hymes (New York: Pantheon, 1969), pp. 284–311; and James Clifford and George E. Marcus, eds., *Writing Culture: The Poetics and Politics of Ethnography* (Berkeley: Univ. California Press, 1986).

These are only some of the many transformations that have taken place in the field sciences since the mid-twentieth century. But they are enough to show that generalizations about fields rooted in the study of the field sciences' earlier, formative period are of little use for understanding more recent developments. The search for such generalizations, however, has continued to be one of the main aims of the research program launched with the 1996 *Science in the Field* volume, in which Henrika Kuklick and Robert Kohler defined the field sciences as "enterprises conducted at least partially out of doors, in uncontrolled settings" that were "qualitatively different from the closed and controlled workplace of the laboratory" and thus judged to be "site[s] of compromised work."¹⁶ Their emphasis on fields as "natural sites" or "natural places" was recapitulated in Kohler's *Landscapes and Labscapes*, which argued that even though hybrid practices spanning the lab-field border were and remain common, "natural places cannot be made so lablike that they become unnatural; laboratories cannot be made so natural that they lose the artifice that gives them their power." Such categorical statements, which treat the field as a "Weberian ideal type" defined "in terms of how it is unlike a lab," continue to shape much of the historiography of the field sciences today, even for periods and contexts where they apply only partially or not at all.¹⁷

The contributors to this Focus section approach fields as situated historical phenomena rather than ideal types, seeking to understand how they were conceptualized and materialized in particular contexts rather than characterizing them in transhistorical or sociological terms. As they show, fields after the mid-twentieth century were not necessarily defined in opposition to the lab or to lab work but instead were constituted through new relations to a wide range of scientific sites, novel technical practices, and new forms of historical self-consciousness. Field sites were not necessarily natural, outdoors, open, or uncontrolled; on the contrary, as the genre of laboratory studies that helped define Science and Technology Studies in the 1970s and 1980s proved, even the apparent paragons of controlled, closed, artificial, and indoor scientific spaces could serve as highly productive sites for fieldwork.¹⁸ Rather than being anxious about their low epistemic status relative to laboratory scientists, field scientists during this period often saw themselves as carrying on important scientific traditions—even as they poked fun at those very traditions and reworked them in fundamental ways.

We list these transformations of the field sciences since the mid-twentieth century not as a step toward a new set of sociological generalizations but, rather, as evidence for the need to approach fields, fieldwork, and field sciences as historical phenomena situated in particular times and places. That does not mean avoiding fundamental conceptual or philosophical questions about fields but, instead, approaching such questions as immanent to the historical contexts and processes under study. Although the essays in this Focus section concentrate on scientific activities since the mid-twentieth century, they also raise basic questions about the emergence, development, and traffic of field concepts across the physical, environmental, human, and life sciences from the early nineteenth century to the present. How, for example, did nineteenth-century theories of gravitational and electromagnetic fields inform life and mind scientists' use of field concepts to explain

¹⁶ Henrika Kuklick and Robert E. Kohler, "Introduction," in *Science in the Field*, ed. Kuklick and Kohler (cit. n. 1), pp. 1–14, on pp. 1–3. See also Jeremy Vetter, *Field Life: Science in the American West during the Railroad Era* (Pittsburgh: Univ. Pittsburgh Press, 2016); and Kohler and Vetter, "The Field," in *A Companion to the History of Science*, ed. Bernard Lightman (Malden, Mass.: Wiley, 2016), pp. 282–295.

¹⁷ Kohler, *Landscapes and Labscapes* (cit. n. 7), pp. 308, 6.

¹⁸ See, e.g., Bruno Latour and Steve Woolgar, *Laboratory Life: The Social Construction of Scientific Facts* (Beverly Hills, Calif.: Sage, 1979); and Sharon Traweck, *Beamtimes and Lifetimes: The World of High Energy Physicists* (Cambridge, Mass.: Harvard Univ. Press, 1988).

phenomena as varied as embryological development and visual perception?¹⁹ How did the identification of fields as objects of study—along with other historically specific conceptualizations and materializations of fields (e.g., in agriculture, warfare, and athletics)—influence the constitution of “the field” as a site for research?²⁰ How did “the field” become one of the very terms by which scientific activity is classified—by scientists as well as by practitioners in the “field” of the history of science?²¹ That such questions remain unanswered (and for the most part unasked) testifies to the importance of renewed attention to the questions of what fields are, have been, and might become.

¹⁹ See Donna Jeanne Haraway, *Crystals, Fabrics, and Fields: Metaphors of Organicism in Twentieth-Century Developmental Biology* (New Haven, Conn.: Yale Univ. Press, 1976), pp. 54–56.

²⁰ See Andi Johnson, “Manufacturing Invisibility in ‘The Field’: Distributed Ethics, Wearable Technologies, and the Case of Exercise Physiology,” in *Sports, Society, and Technology*, ed. Jennifer J. Sterling and Mary G. McDonald (Singapore: Palgrave Macmillan, 2020), pp. 41–71.

²¹ See Pierre Bourdieu, “The Specificity of the Scientific Field and the Social Conditions of the Progress of Reason,” *Social Science Information*, 1975, 14(6):19–47; Karin D. Knorr, “Producing and Reproducing Knowledge: Descriptive or Constructive?” *ibid.*, 1977, 16(6):669–696; and David Kaiser, “When Fields Collide,” in *Quantum Legacies: Dispatches from an Uncertain World* (Chicago: Univ. Chicago Press, 2020), pp. 316–348.