

# Emergence

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**Abstract:** Histories of science in the past decade have increasingly used the language of “emergence” to explain the effects of which their histories give account. More than a linguistic fad, this word registers an intentional, persuasive, and important theoretical position and ethical stance that is located in critical relation to causal accounts of history. Attending to the death of Frantz Fanon (1925–1961) helps make apparent the key criticisms of causal models of history—namely, that they are often reductive, indebted to projects of settler colonialism, and inadequately equipped to address the surfeit of possibilities that historical materials make available to scholars. For historians of science, Karen Barad’s “agential realism” offers the most relevant, if challenging, articulation of emergence theory and relational visions of history. It posits that establishing difference—individuation—is part of the process of “emerging” and that different states or objects continue to be “entangled” even when their distinct contours appear. The approach is appealing because it understands historical scholarship not as a thing of the past but as an ethic of the future—opening worlds of possibility in a political moment that demands better ways of living and dying together.

This essay is an invitation to think about “emergence theory” as a mode of historical explanation. The invitation comes with a plea: for an extra dose of goodwill and generous reading in order to think together about some strange—and strangely appealing—ideas in the historiography of science. This may be worth doing because emergence theory has been a direct response to the well-known conservative bent of causal histories, and it is at work whenever the verbs “emerge” and “entangle” appear in historical scholarship.

## FRANTZ FANON’S CAUSE

“What shocks me here in this bed, as I grow weaker, is not that I’m dying, but that I’m dying in Washington.” In the circumscribed world of the hospital where he survived for three months, Frantz Fanon (1925–1961) occupied himself by writing letters, this one to a friend in Africa. His

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disbelief that he would die in the United States, a place he once called “a country of lynchers,” magnified his regret that he was dying of leukemia, he told his friend, “considering that I could have died in battle with the enemy three months ago when I knew I had this disease.” The appeal of death in a literal battle, compared to death in a metaphorical battle with cancer, came with good cause: “We are nothing on this earth if we are not, first of all, slaves of a cause, the cause of the people, the cause of justice, the cause of liberty.”<sup>1</sup>

The “cause” to which Fanon referred was anticolonialism and, specifically, the Algerian War of Independence (1954–1962). Fanon was black; he was born in the French colony of Martinique in 1925, lived most of his adult life in the French colonies of North Africa, and died at the early age of thirty-six in the political and scientific epicenter of a place he hated with a passion: the United States of America.

When he passed away on 6 December 1961, Fanon’s doctors recorded the cause of death: chronic granulocytic leukemia. Fanon’s writing and his biography teach otherwise.

It does not take Frantz Fanon to observe that “causes of death” allow only a narrow set of factors to count as relevant in bringing about the end of a life—those that can be isolated from other aspects of existence, imagined in advance, and associated closely in time and space with the outcome. The problems with “causes of death” share many of the limitations of “causes” in historical explanation more generally. No matter how capacious or expansive in time and space a list of causes might be, the concept disqualifies relational, dynamic, multiscalar forms of explanation that more aptly characterize effects, including Fanon’s death.

Fanon himself was trained as a doctor in metropolitan France. He went to medical school after serving France in World War II, during which time he became disillusioned with the Enlightenment promises of the French state because of the persistent, vicious, endemic racial discrimination he experienced from his fellow (white) citizens. With his medical degree in hand, Fanon went to French colonial Algeria, where he practiced psychiatry, helped lead the anticolonial movement, and became an accidental political theorist. Merging his medical practice, anticolonial leadership, and activist writing, he articulated a political etiology of disease and a new explanation of death: colonialism itself.<sup>2</sup> Whereas American doctors would assign the cause of Fanon’s death to biological processes, Fanon would explain his death and those of his fellow colonial subjects by way of the political economy of capitalism carried out through settler colonialism and dependent on institutionalized racism.

My task as a historian is to explain effects. And I am curious whether it is possible to dispense with “causes” altogether and to consider why historians of science might want to do so. In Fanon’s case, the point is not to adjudicate between the two explanations of his death; nor is it to argue for a both/and approach, in which distal “structural causes,” such as racism, made some people vulnerable to proximate biological causes of death, such as infections or cancer. By thinking through emergence theory and taking Fanon’s own explanation seriously, the point, rather, is to observe that understandings of human biology were inflected with the arrangements of capitalism, colonialism, and racism, which themselves were constituted through understandings of human biology—while at the same time the practices of science, colonialism, capitalism, and racism were not reducible or equivalent to each other.

<sup>1</sup> Quoted in Peter Geismar, *Fanon* (New York: Random House, 2000), p. 185, citing Giovanni Pirelli’s Italian translation of Fanon’s original letter in French: Pirelli, *Opere scelte di Frantz Fanon* (Turin: Einaudi, 1973). Simone Browne also cites Geismar’s English translation of Pirelli’s rendering: Browne, *Dark Matters: On the Surveillance of Blackness* (Durham, N.C.: Duke Univ. Press, 2015), p. 3.

<sup>2</sup> Frantz Fanon and Adolfo Gilly, *A Dying Colonialism*, trans. Haakon Chevalier (New York: Grove, 1994). See also David Macey, *Frantz Fanon: A Biography*, 2nd ed. (London: Verso, 2012).

## RELATING AND RESPONDING

Historians of science in the past decade have increasingly used the language of “emergence” to explain the effects of which their histories give account. More than a linguistic fad, this word registers an intentional, persuasive, and important theoretical position and ethical stance that is located in critical relation to causal accounts of history.

To give one example: Norton Wise recently described the historical method he used to recognize and to explain how scientists constituted the objects of the modern physical sciences in late nineteenth-century Berlin, as well as the practices that sustained and were sustained by those new objects. “I aim, first, not for a story of causes or influences, in the sense of pushes and pulls, but of conditions of possibility,” Wise writes. “That is, I aim for a historical narrative within which the choices and actions of members of the Berlin Physical Society emerge as an unfolding of possibilities available to them within their context.”<sup>3</sup> Packed into this phrasing is an appealing critique of the way in which causal accounts of history imply a stable and standard (versus “unfolding” and contextual) set of factors that are predetermined by the historian and retrospectively applied. In causal accounts of history, these factors are deployed to isolate and steady objects amid circumstances in which, emergence theory would have it, phenomena are continuously constituting each other and differentiating from each other. Wise expresses the key criticisms of causal models of history leveled by many philosophers of science—namely, that causal models are reductive: convenient but inadequately equipped to recognize and explain the surfeit of possibilities that historical materials make available to scholars, who are implicated in explanations through their agencies of observation.<sup>4</sup>

For historians, the key idea to emphasize is interdependence. Things in the world—people, ecologies, ideas, entities—are effects of processes of relating. These relational processes could take any number of shapes, but since the intensification of capitalism (and, with it, settler colonialism and techniques for creating bounded hierarchical categorizations, e.g., around race, gender, species, life, environments) settler states both pared down the acceptable, dominantly visible ways of existing in the world and also, importantly, curtailed the readily available ways of *imagining* how the world worked.<sup>5</sup> Settler states supported ideas and enforced practices that privileged the existence of bounded, atomized objects (including individuals) over processes of relating. Colonialism and capitalism, two mutually reinforcing arrangements, have persisted by working to clip interdependences as both material and ontological possibilities. Relational visions of history—in which materials, ideas, and life-forms can be seen as constituting each other—are now being expressed through the theory and language of “emergence.”

Theories of historical emergence are of a piece with theories of emergence used among physicists and biologists to explain phenomena in their fields.<sup>6</sup> As a historical theory, emergence is a

<sup>3</sup> M. Norton Wise, *Aesthetics, Industry, and Science: Hermann von Helmholtz and the Berlin Physical Society* (Chicago: Univ. Chicago Press, 2018), p. ix. Wise critiques the concept of “explanation” more broadly and makes a case for “understanding” in Wise, “On the Narrative Form of Simulations,” *Studies in History and Philosophy of Science Part A*, 2017, 62:74–85, <https://doi.org/10.1016/j.shpsa.2017.03.010>.

<sup>4</sup> Both Norton Wise and Karen Barad, whom I discuss later in this essay, borrow the phrase “agencies of observation” from the physicist Niels Bohr. Karen Michelle Barad, *Meeting the Universe Halfway: Quantum Physics and the Entanglement of Matter and Meaning* (Durham, N.C.: Duke Univ. Press, 2007); and M. Norton Wise and David C. Brock, “The Culture of Quantum Chaos,” *Studies in History and Philosophy of Science Part B: Studies in History and Philosophy of Modern Physics*, 1998, 29:369–389.

<sup>5</sup> Silvia Federici, *Caliban and the Witch: Women, the Body, and Primitive Accumulation*, 1st ed. (New York: Autonomedia, 2004); and Dipesh Chakrabarty, *Provincializing Europe: Postcolonial Thought and Historical Difference* (Princeton, N.J.: Princeton Univ. Press, 2007).

<sup>6</sup> Bruce Clarke and Mark B. N. Hansen, *Emergence and Embodiment: New Essays on Second-Order Systems Theory* (Durham, N.C.: Duke Univ. Press, 2009); Mark Bedau, *Emergence: Contemporary Readings in Philosophy and Science* (Cambridge, Mass.:

process through which phenomena continuously infuse and respond to each other as they establish contours that also keep them distinct. Power imbalances are part of the dynamic; the capacity to affect and be affected is unevenly distributed. The theory is unlike actor-network theory or the idiom of co-production because these approaches start with entities assumed to have identifiable, essential boundaries (e.g., “actants” or “institutions”) and aim to show the surprising ways that these (given) entities affect others.<sup>7</sup> Emergence theory, by contrast, posits that establishing difference—individuation—is part of the process of “emerging” and that different states or objects continue to be “entangled” even when their distinct contours appear. What is more, the practices of observation brought to bear on entangled, emergent phenomena help constitute them, and these practices also produce the effect of the observer. For historians, one example of states that are differentiated through our practices of observation might be “the past” and “the present.” The questions that emergence theory encourages historians to ask are not about what caused an effect but, rather, about how the processes of emergence, entanglement, disentanglement, and historical observation work in creating “the past” empirically—as an idea and a material possibility in the (differentiated) present.

In the history of science, the move toward emergence has stemmed in part from scholars taking seriously the quirky, misfit, or overlooked ideas of their historical actors as not only legitimate ways of imagining the world in the past but legitimate ways of imagining the world, period.<sup>8</sup> Historians, that is, have developed rather than diminished their “entanglements” with historical actors by allowing actors to change their own practices of observation. The philosopher, physicist, and feminist scholar Karen Barad is emblematic of this move. Barad has studied the physicist Niels Bohr’s claim that phenomena are in constant processes of differentiation and that these processes depend on the apparatuses through which the observer takes an interest in, or investigates, them—including the material apparatuses (e.g., instruments) and the apparatuses of the human mind that is doing the knowing.<sup>9</sup>

Barad can be difficult to parse, and a smart, helpful secondary literature is developing as a user’s guide to this important philosopher-physicist-feminist. Still, it is worth hearing Barad’s own formulation of her signal concept, “agential realism.” Barad introduces the concept to develop a theory of emergence that is akin to nonlinear dynamics and complex systems theory in physics and biology; it is not merely metaphor. Barad seeks to consider both matter (bodies, environments) and meaning (beliefs, languages) in historical explanations.

The agential realist account does not position human concepts, human knowledge, or laboratory contrivances as foundational elements of the [quantum] theory. On the contrary, rather than giving humans privileged status in the theory, agential realism calls on the theory to account for the intra-active emergence of “humans” as a specifically differ-

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MIT Press, 2008); William C. Wimsatt, “Emergence as Non-Aggregativity and the Biases of Reductionisms,” *Foundations of Science*, 2000, 5:269–297, <https://doi.org/10.1023/A:1011342202830>; and Emily Herring and Gregory Radick, “Emergence in Biology: From Organicism to Systems Biology,” in *The Routledge Handbook of Emergence*, ed. Sophie Gibb, Robin Hendry, and Tom Lancaster (London: Routledge, 2019).

<sup>7</sup> Bruno Latour, *Reassembling the Social: An Introduction to Actor-Network-Theory* (Oxford: Oxford Univ. Press, 2007); and Sheila Jasanoff, ed., *States of Knowledge: The Co-Production of Science and the Social Order* (London: Routledge, 2004).

<sup>8</sup> E.g., see Michelle Murphy’s concepts of alterlife and alterobjects in Michelle Murphy, “What Can’t a Body Do?” *Catalyst: Feminism, Theory, Technoscience*, 2017, 3(1):1–15, <https://doi.org/10.28968/cftt.v3i1.227.g247>; and Murphy, “Alterlife and Decolonial Chemical Relations,” *Cultural Anthropology*, 2017, 32:494–503, <https://doi.org/10.14506/ca32.4.02>.

<sup>9</sup> Barad, *Meeting the Universe Halfway* (cit. n. 4); Karen Barad, “Erasers and Erasures: Pinch’s Unfortunate ‘Uncertainty Principle,’” *Social Studies of Science*, 2011, 41:443–454, <https://doi.org/10.1177/0306312711406317>; and Barad, “Posthumanist Performativity: Toward an Understanding of How Matter Comes to Matter,” *Signs: Journal of Women in Culture and Society*, 2008, 28:801–831, <https://doi.org/10.1086/345321>.

entiated phenomenon, that is, as specific configurations of the differential becoming of the world, among other physical systems. Intra-actions are not the result of human interventions; rather “humans” themselves emerge through specific intra-actions.

For Barad, the knower is not “a supplemental system around which the theory revolves but . . . a natural phenomenon that needs to be accounted for within the terms of this relational ontology.”<sup>10</sup> Improvising with Barad, one might say that historians know this thing called “the past” only through material indexes in the present—for example, through the apparatus of the archive—in a way similar to scientists who know the brain through MRIs. In all fields that use emergence theory, it is necessary to attend to the mutual regard and response of a wide range of matter—bodies, landscapes, technologies, documents—and to recognize the observer (such as the historian) as part of the process of emergence.

A small shift in language—from “cause” to “emerge”—marks a broader experiment with clarifying the role of the historian in demarcating the legitimate objects and subjects of history. By forcing a choice, the term encourages historians to consider the processes and phenomena that are allowed to count as agents of history and, importantly, to be imaginable ways of making future worlds. In Fanon’s case, his death emerged from the arrangement of capitalism, settler colonialism, and the secular science that constituted his body in life and at his moment of death. Fanon altered how I constitute and am constituted by histories. My own analytic in the present emerged with my creations of the past.

No doubt, there is more work to be done on emergence theory, not least to develop historical methods that can distinguish between more or less persuasive claims. The work is well worth it, though, because the approach celebrates historical scholarship not as a thing of the past but as an ethic of the future—opening worlds of possibility in a political moment that demands better ways of living and dying together. Happily, this work is already under way. As Gregg Mitman writes, “For all the uncertainty and messiness of entanglement, I would rather live in a world where history leaves open the possibility of endless becoming and would prefer to acknowledge that even as human beings, we exist only as a result of symbiotic relationships, with each other, and with other living and nonliving things on this earth.”<sup>11</sup>

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<sup>10</sup> Barad, *Meeting the Universe Halfway*, p. 352. For a primer and an especially good introduction to Barad’s method of “diffraction” and critique of reflexivity à la the Strong Programme see Gregory Hollin *et al.*, “(Dis)Entangling Barad: Materialisms and Ethics,” *Soc. Stud. Sci.*, 2017, 47:918–941, <https://doi.org/10.1177/0306312717728344>.

<sup>11</sup> Gregg Mitman, “Living in a Material World,” *Journal of American History*, 2013, 100:128–130, on p. 130, <https://doi.org/10.1093/jahist/jat081>.