Thinking through Poetry

Field Reports on Romantic Lyric

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Conclusion

Lyric—The Idea of this Invention

It Must Be Abstract

Begin, ephebe, by perceiving the idea
Of this invention, this invented world,
The inconceivable idea of the sun.

You must become an ignorant man again
And see the sun again with an ignorant eye
And see it clearly in the idea of it.

Wallace Stevens, "Notes Toward
a Supreme Fiction"[1]

But resistance is not agency. Conflating resistance and agency blinds us to the kinds of agency that do in fact exist beyond the human... [I]f we limit our thinking to thinking through how other people think we will always end up circumscribing ontology by epistemology...

Eduardo Kohn[2]

More than a decade ago, *PMLA* asked me to write a review article for their Theories and Methodologies section. My topic was the new formalism.[3] I opened that essay on a note of surprise at the movement's incuriosity about its grounding concept, the concept of form itself. Nowhere in the literature did I find references to form from the perspective of performance or disability studies, much less from the richer though more alien fields of systems theory, postclassical physics, cognitive science, and so-called evo-devo theory (evolution and development). In those research sectors, what we call form goes by different names: closure, for instance, or intentionality, system, entity, individuation, cognition, organism, agency. I am not saying the fit is perfect. What I am saying is that borrowing frameworks from one discipline

[1] Wallace Stevens, "Notes Toward a Supreme Fiction," *The Collected Poems of Wallace Stevens* (New York: Vintage, 1990), 380. "*It Must Be Abstract*" is the first subheading of the poem.

[2] Eduardo Kohn, *How Forests Think: Toward an Anthropology beyond the Human* (Berkeley: University of California Press, 2013), 91, 94.

[3] See Chapter 6. For an update and clarification of aspects of that review essay, see *Critical Inquiry* 44 (2017) for my response to Jonathan Kramnick and Anahid Nersessian's "Form and Explanation," *Critical Inquiry* 43 (2017), 650–69.

for use in another (key item in Jonathan Culler's fourfold definition of theory) can be an excellent thing to do.[4]

To point my direction, I will say now that the common paradigm among these sectors is self-organization (or self-assembly), and the common process, recursion. That is the connect with lyric form, one of my topics here. The other topic is method, and there too, I will be taking a leaf from the sciences, arguing for an epistemic pluralism, and, edging out farther on that limb, an ontic pluralism as well, such that we can allow (and maybe even expect) not just different kinds of explanations for different levels of study, but different kinds of objects emerging at different scales and through different techniques of inquiry and display. Some humanities reference points for this claim would be the big data theorists, Barbara Herrnstein Smith's radical relativism,[5] and the sociology of science that descends from Bruno Latour.

Before going into that, though, I need to update my opening observation. The scholarly landscape has changed over the past decade, changed in ways that would seem to have obviated my call for a conceptually new formalism. I refer to the upsurge of digital-and-network-theory, animal and ecostudies, biopolitics, and object-oriented ontology.[6] These new materialisms are the growth industry of our discipline, and they are terrific. But one thing they have not yet delivered on is their potential for modeling (or, remodeling) the traditional or established categories of form and genre. Romanticists will disagree, citing our field's explosion of interest in the life and physical sciences of the period as the exception to that claim about untapped potential. I am not convinced. My sense of much of this work is that it belongs to the genre of contextual recovery—part of the larger historicist project of undoing our habits of projecting our own disciplinary divides onto an earlier discursive field.

That is a great and a crucial thing to do but I mean something else: namely, using those recovered resources to get at logical and formal features of the imaginative literatures of the period. That too is happening, and it started happening with Timothy Morton's "Ambient Poetics." More recently, one thinks of Amanda Jo

[4] Jonathan Culler, *Literary Theory: A Very Short Introduction*, 2nd edn. (Oxford: Oxford University Press, 2011), 14–15. I would also call attention to a standard of meta-theoretic accountability when borrowing from foreign disciplines, a standard that Bruno Latour has explained as the principle of irreduction (*The Pasteurization of France* (Cambridge, MA: Harvard University Press, 1988), Part 2, pp. 153–238). Brian Cantwell Smith, in *On the Origin of Objects* (Cambridge, MA: MIT Press, 1996) gives a very useful, hands-on summary of this. I condense Smith's longer account, using his language exclusively, pp. 77–9: Irreduction means never giving pride of place to any theoretical assumption or piece of theoretical ordnance. For every premise, framework, analytic device, procedures, etc., you must be prepared to say where you got it (namely, the situation where that device or distinction first arose) and how much you paid for it (admitting and trying to make up for distortions that come from using techniques in situations different from those in which they were originally developed. It means 'fessing up to those aspects of your subject matter that the technique ignores or idealizes away from, and trying to adjust for that violence.

[5] Barbara Herrnstein Smith, *Contingencies of Value* (Cambridge, MA: Harvard University Press, 1991).

[6] Lawrence Buell gives an excellent critical chronology of environmental and ecocriticism. "Ecocriticism: Some Emerging Trends," *Qui Parle: Critical Humanities and Social Sciences* 19.2 (Spring/Summer 2011), 87–115.

Goldstein's exploration of form in Goethe, Blake, and Shelley, along the lines of a Lucretian materialism whose currency during the period she demonstrates in a truly paradigm-shifting way.[7]

The kind of work I have in mind is similar to this but occurs at a higher level of generality—the level of poetics. Because the validity of my contribution is tied to its level of analysis (and I believe this to be true of all critical work), I will take a minute to scale that level, borrowing from the schema of critical operations that Culler advances to situate his own work on lyric[8] and from Franco Moretti's mapping of his work on genre.[9] (I save a second influential account of poetic and lyric form, by Mary Poovey, for later.) At one end of "the things we do," Culler sets "literary criticism," which studies "particular works and relations."[10] (This is where I put most Romantic-period science studies.) Moretti's counterpart to this temporality is *l'histoire événementielle*, a term he takes from Fernand Braudel, where it describes the timeframe at which traditional historiography operates. Roughly, the short term, defined by events. For Moretti, "Most critics are most at ease" at the "events" end of the scale, which is where they find concrete individual works and "the individual case."[11] At the opposite end of the scale, the time of "nearly unchanging structures," is where theorists like to live. "High theory," Culler would say, which "designates," he says, "discourses that come to exercise influence outside their apparent disciplinary realm because they offer new and persuasive characterizations of problems or phenomena of general interest: language, consciousness, meaning, nature and culture, the functioning of the psyche, the relations of individual experiences to larger structures, and so on."[12] Moretti's equivalent to this timeframe (again, from Braudel's lexicon) is the famous *longue durée*. In biological terms, *longue durée* would correspond to the level of evolutionary or species change, in contrast to developmental, ontogenetic, and taxonomic history. Those three terms describe the temporality of individuals and classes (or, of species considered as individuals, following one school of evolutionary theorists, e.g., David Hull).[13]

Moretti prefers the middle level—mezzanine, as it were, to Braudel's balcony and orchestra. Culler too zeroes in on "theories of... the middle range," another name, he says, for what used to be called "poetics."[14] For Moretti, what lives in the

[7] Timothy Morton, "Why Ambient Poetics? Outline for a Depthless Ecology," *Wordsworth Circle* 33.1 (Winter 2002); Amanda Jo Goldstein, *Sweet Science: Romantic Materialism and the New Logics of Life* (Chicago: University of Chicago Press, 2017). Buell's distinction between biopolitics and biopoetics is especially clear and helpful; Goldstein's work belongs to the latter category.

[8] Culler, "Why Lyric?" *PMLA* 123 (2008), 201–6; also note his *Literary Theory*.

[9] Franco Moretti, *Graphs, Maps, Trees* (London: Verso, 2005).

[10] Culler, *Literary Theory, passim.*

[11] Moretti, *Graphs, Maps, Trees*, 14.

[12] Culler, *The Literary in Theory* (Stanford, CA: Stanford University Press, 2007), 1, 2, 4.

[13] David Hull, "Are Species Really Individuals?" *Systematic* Zoology 25.2 (June 1976), 174–91; Gerry Webster and Brian Goodwin, *Form and Transformation: Generative and Relational Principles in Biology* (Cambridge: Cambridge University Press, 1996); Webster, "Causes, Kinds, and Forms," *Acta Biotheoretica* 41.4 (December 1993), 275–87, and "Structuralism and Darwinism: Concepts for the Study of Form," *Dynamic Structures in Biology*, ed. Goodwin and Atsuhiro Sibatani (Edinburgh: Edinburgh University Press, 1989), 1–15.

[14] Culler, *Literary in Theory*, 14. For another fascinating exploration of "midlevel" critical work, see John Frow, "On Midlevel Concepts," *New Literary History* 41 (2010), 237–52. The "regime of reading (like that of genre and discourse) is a midlevel concept, having neither the specificity of the concept of

middle are genres: "temporary structures... morphological arrangements that *last* in time, but always only for *some* time; Janus-like creatures, with one face turned to history and the other to form... [constituting a] more 'rational' layer [more rational than events, that is]—a layer where flow and form meet."[15] Hear the resonance with Culler's comment on his method: "a claim about a generic model is *not* an assertion about some property that all examples of the genre possess. It is a claim about fundamental structures [I would say, a structure-generating field] at work even when not manifest, and which direct attention to certain aspects of a work, which mark a tradition and an evolution." The middle space (Culler's poetics, Moretti's genres) appeals to those who want to "produce something more fundamental than characterization of existing literary modes." I share that desire. (Culler calls it the "crucial theoretical impulse.")[16] Where I differ from Culler is in my turn toward formal models that themselves integrate history, not in the way of mimesis (in Braudel's idiom, events), and not as literary history, *à la* Culler, but, rather, history conceived as routine, runnings, coupling, enaction, and transaction (more to come on this).[17]

text nor the generality of the concepts of literature or of the social. Yet the ontological status that I want to ascribe to these midlevel concepts is not that of a middle ground, a point of mediation between the general and particular" (p. 248). For Frow, what is distinctive about the "openended midlevel ontology" is that its "constructs are effects of repetition, have no fixed or durable existence, are not expressive of their components, and are not the expressive components of higher order entities such as 'the social'" (p. 250). Also, see Brian Cantwell Smith, *On the Origin of Objects*, who studies "middle complexity systems, that generate lifelike intentions out of inorganic parts" (p. 33). Smith studies the computational realm because it is "midway between matter and mind... stands in excellent stead as a supply of cases of middling complexity" (p. 20) and "an intermediate realm between a proximal though ultimately ineffable *connection*, reminiscent of the familiar bumping and shoving of the world, and a more remote *disconnection*, a form of unbridgeable separation that lies at the root of abstraction and of the partial (and painful) subject–object divide" (p. 3). For Smith, this is the richest domain for theorizing "what organization comes to, of what a unit consists in, how entities arise ..." (p. 19). Another research sector that studies specifically midlevel processes is that of ontogeny—its concern, the organism in its lifespan, as opposed to both the level of "pure" genetic determination and of evolutionary speciation.

[15] Moretti, *Graphs, Maps, Trees*, 14.

[16] Culler, *Theory of the Lyric* (Cambridge, MA: Harvard University Press, 2015), 48–9; see this work for a fuller treatment of the subject.

[17] For a sample of this language, see Francisco Varela, Evan Thompson, and Eleanor Rosch, *The Embodied Mind: Cognitive Science and Human Experience* (Cambridge, MA: MIT Press, 1991), 173: "the enactive approach consists of two points: (1) perception consists in perceptually guided action and (2) cognitive structures emerge from the recurrent sensorimotor patterns that enable action to be perceptually guided"; "For the enactive approach, the point of departure is how the perceiver can guide his actions in his local situation. Since these situations constantly change as a result of the perceiver's activity, the reference point for understanding perception is no longer a pregiven, perceiver-independent world but rather the sensorimotor structure of the perceiver.... Thus the overall concern of an enactive approach to perception is not to determine how some perceiver-independent world is to be recovered; it is, rather, to determine the common principles or lawful linkages between sensory and motor systems that explain how action can be perceptually guided in a perceiver-dependent world." Or, p. 205: "To situate cognition as embodied action [enaction] within the context of evolution as natural drift provides a view of cognitive capacities as inextricably linked to histories that are *lived*, much like paths that exist only as they are laid down by walking. Consequently, cognition is no longer seen as problem solving on the basis of representations; instead... the enactment or bringing forth of a world by a viable [not optimal] history of structural coupling.... For coupling to be viable, the perceptively guided action of the system must simply facilitate the continuing integrity of the system (ontogeny) and/or its lineage (phylogeny)." From Richard Levins and Richard Lewontin, *The*

In other words, I turn toward models that will not tolerate the pernicious polarity between history and form that has dominated debate about lyric in recent years. Virginia Jackson and Yopie Prins give the definitive rebuke to that binary thinking in their *Lyric Theory Reader.*[18] Their long introduction builds a narrative of both pre- and nonnormative nineteenth-century lyric, and their sampling of essays leaves no doubt that the received view of lyric as the genre of inwardness, reflexivity, and reflection, and also of literariness par excellence represents the victory of just one historical development among many others. One cannot read their anthology without seeing how very high the overhead is on continuing to subscribe to the form/history binary; basically, how big the hit one must take in terms of quality and quantity of inventory.

For those unfamiliar with that binary, I take a minute to rehearse it, using the highly schematic terms that its participants often favor. The debate about lyric pits formalists against historicists: in effect, Aristotelian realists against Baconian nominalists. Culler is a realist about genre; on his view, there is a lyric template (in his phrase a "calling") that different languages, eras, and cultures fill with their own materials. Culler's realism has a structuralist bent. He posits "a set of norms or structural possibilities that underlie and enable particular discursive practices"—an "abstract model"—through which different languages and moments within the

Dialectical Biologist (Cambridge, MA: Harvard University Press, 1985), 104: "We do not further our understanding of evolution by general appeals to 'laws of nature' to which all life must bend. Rather we must ask how, within the general constraints of the laws of nature, organisms have constructed environments that are the conditions for their further evolution and reconstruction of nature into new environments." From Varela, Thompson, and Rosch, *The Embodied Mind,* 198–9, on structural coupling between organism and environment: "We emphasize that the very notion of what an environment is cannot be separated from what organisms are and what they do... The species brings forth and specifies its own domain of problems to be solved by satisficing [rendering viable, not optimal]... Living beings and their environments stand in relation to each other through *mutual specification* or *codetermination.* Thus what we describe as environmental regularities are not external features that have been internalized, as representationism and adaptationism both assume. Environmental regularities are the result of a conjoint history, a congruence that unfolds from a long history of codetermination. The organism is both the subject and object of evolution"; from p. 145: "the greatest ability of living cognition consists in being able to pose... the relevant issues that need to be addressed at each moment. These issues and concerns are not pregiven but are *enacted* from a background of action, where what counts as relevant is contextually determined by our common sense." And from pp. 155–6: "knower and known, mind and world, stand in relation to each other through mutual specification or dependent coorigination; from mind as computer to mind as emergent network, not prior or subsequent to action but part of it.... *interpretation* is... enactment of a domain of distinctions out of a background." And from p. 121: the mind is "a heterogeneous collection of networks of processes," and the ego-self is "the historical patterns among moment-to-moment emergent formations." Antonio Damasio, *Descartes' Error: Emotion, Reason, and the Human Brain,* 226: "The self is a repeatedly reconstructed biological state based on primordial [i.e., subsymbolic sense impressions] representations of the body which are distributed over several brain regions and coordinated by neural connections." Marvin Minsky, *Society of Mind* (New York: Simon and Schuster, 1985) lays the ground for (and gives the layman access to) the general theory of mind comprising the narrower studies listed above. See pp. 18 and 23 (on mental agents and agencies); 48 and 129 (circular causality); 56, 71, 79, 89 (on intention, consciousness, intelligence, memory); and 319 (for a picture of the balance between insulation and interaction within the architecture of a mind-society). Also see pp. 326–32 (Glossary and Bibliography) for invaluable definitions of not only the terms but the basic principles of mind-as-society.

[18] Virginia Jackson and Yopie Prins, eds., *The Lyric Theory Reader: A Critical Anthology* (Baltimore: Johns Hopkins University Press, 2014).

Western tradition mobilize their distinctive materials.[19] Historical poetics, conversely, argues that different discursive communities attach the name "lyric" to their own unique practice, which may or may not be normative for that group. When it wants to track intertextuality across different groups and eras, historical poetics uses the concept of remediation, which it develops in powerful ways.[20]

My own bias is and has always been toward the situated readings, explanatory force, and constructivist notions of form that go with historical poetics. At the same time, and here I go back to Culler's hallmark of "theory," I have always borrowed "writings from outside the field of literary studies."[21] My own position, a pragmatic one, is thus somewhere in the middle. I agree with the nominalist emphasis of the historical poetics group, but I also think that by postulating a continuum you get to see and do things you otherwise would not. For instance, I like to search out deep layers of formal dynamics interlocked with reader response, and for that I need a more robust notion of lyric than historical poetics allows. I generally get a lively response to work of this kind in class and in scholarly conversation. It strikes a chord, and I take that resonance seriously. It follows that if we want genres for that (or any other kind of critical work), then we should equip them to do it. In that spirit, I will pitch in on the formalist side, not just because I like working on the middle level, as I said, but for institutional reasons. Of the two foolishly polarized terms, formalism has been the underdog with respect to popularity and prestige; it is also the more traduced, often through its own self-description. By contrast, historicist poetics needs no defense: it has become our scholarly default and it is eloquent about its methods and in its metacommentary.[22]

There is another reason to go formalist. In the classroom we still, presumably, teach or at least still talk about genres, forms, and traditions. In other words, some kind of more or less traditional formalism persists, some premising of "abstract models and structural possibilities."[23] That being the case, we do well to think about those latent models and how answerable they are to our changed understandings of textuality and individuation. We might also consider how consistent they are with the discipline's topical interests these days (e.g., affect, ecology, soundscape, the posthuman). Mostly not consistent, in my view: a case of uneven development between ideas on the one hand and methods on the other.

Another reason for working on this level is that a historicist poetics which defines itself over/against formalism risks bringing back on a naïve empiricism: that is, belief in the possibility of theory-independent and also level-neutral

[19] Culler, *Theory of Lyric*, 48.

[20] Prins's work on early phonograph technology, American railroad schedules, and Robert Browning's poetry marks the gold standard for remediation study. "Voice Inverse," *Victorian Poetry* 42 (Spring 2004), 43–59.

[21] Culler, *Literary Theory*, 3.

[22] Two recent studies, Caroline Levine's *Forms: Whole, Rhythm, Hierarchy, Network* (Princeton, NJ: Princeton University Press, 2015), Sandra MacPherson, "A Little Formalism," *English Literary History* 82 (Summer 2015), 385–405, and a response to both, Kramnick and Nersessian's "Form and Explanation," show robust new pushback against that generalization, as do some of the works cited most favorably in my 2007 review essay, "What is New Formalism?" See Chapter 6.

[23] Culler, *Theory of Lyric*, 48.

description. That belief took a long time and a lot of hard work to banish, and having to do that all over again seems a terrible waste. There is also a positive reason for seizing this plane of inquiry: by positing a system—that is, actively testing a model or theory—you sometimes get to see things only visible under magnification or through certain techniques of display. For instance, inertias and transformations linking seemingly isolated objects and events.

You will ask: where exactly are those inertias and transformations, those new things one can see? Are they artifacts of the method, generated by the theory-level account, or are they in the text? In model-speak, are they in the source or the target? Of course, the minute you frame the question that way, answers fly out the window. So, you remind yourself that the object you start with—the reality of the text, so to speak—is not an unmediated given but a particular kind of critical object and temporality. An experimental object. Likewise for forms, models, structures, and relations (the instruments of theory); they too are objects, and, as we know from Latour et al., very complex and multifocal objects, not just physicalized abstractions. My point here is that instead of privileging one or the other—target or source, text or theory—in either a genetic or causal way, you set them beside each other, and set for each its own critical agenda.

Between critical method and critical object, agreement is the rule; it cannot be otherwise. Defining the object and determining the method of inquiry are two sides of the same coin, a fact that everything in our training works to conceal. But because of that fact, i.e., the codetermination of object and method, there is no rule for noncontradiction among different critical constructs of the same object. This is what I meant earlier by tying validity in interpretation to analytic level. No rule for inter-theoretic synonymy, is the position developed by Hull,[24] who argues a different

[24] This view is associated with David L. Hull, Roger Buck, William Wimsatt, and Kenneth Schaffner: Hull, *Philosophy of Biological Science* (Englewood Cliffs, NJ: Prentice-Hall, 1974), "Are Species Really Individuals?" *Systematic Zoology* 25 (1976), 174–91, and "The Ontological Status of Species as Evolutionary Units," *Foundational Problems in the Special Sciences*, ed. R. Butts and J. Hintikka (Dordrecht: D. Reidel, 1977), 91–102. See also Gerry Webster, "The Relations of Natural Forms," *Beyond Neo-Darwinism*, ed. Mae-Wan Ho and Peter Timothy Saunders (London: Academic Press, 1984), 207: "the partial failure of the original project of Rational Morphology [from, as he says, 'the perspective of modern philosophy of science'] and the consequent development of certain Darwinian notions can be seen to be a result of a faulty methodology stemming from a faulty ontology; a failure to recognize that reality must be conceived as ontologically stratified, that natural kinds are not primarily of the 'order of fact' and that empirical laws can have exceptions. Once this is recognized, the way is open . . . for a revival of the 'rational' project" (of William Bateson, D'Arcy Wentworth Thompson, Hans Driesch, C. H. Waddington, and Francis Galton). And Brian Cantwell Smith describes his "irreductionist foundationalism," and "successor metaphysics" (he calls it "metaphysics for the twenty-first century") as excluding "the presupposition that foundations must be *rational*, in the sense of coming up with the basic logical constituents of reason" (*On the Origin of Objects*, 89–93). Also rejected is the assumption "that foundations need to deal with the vanishingly *small*, for example, in the sense of coming up with the world's fundamental physical constituents" (p. 93). The views that I sum up here are anti-reductionist in three senses: "epistemological reduction, physical reduction, and theoretical reduction." Hull, *Philosophy of Biological Science*, 3.

Finally, William Paulson, *The Noise of Culture: Literary Texts in a World of Information* (Ithaca, NY: Cornell University Press, 1988), 39, 43, 44, 73–9, 167–76, for a fine discussion of the concept of self-organization, particularly with regard to the semi-autonomous relationship between levels within a dependent hierarchy, and between explanations appropriate to each. Paulson draws on Yuri Lotman,

kind of explanation at the level of ontogeny (developmental classes) from explanations appropriate at the species level, or phylogeny. Or, in our idiom, one might productively venture a big-data construct of the novel different from that of a close reading, without feeling the need to contrive an encompassing figure to dissolve the contradiction.

As noted earlier, the abstract model I propose is self-assembly and the critical object I build on that model is a particular literary form: lyric poetry, understood in this context as the kind of poem that readers from the eighteenth century on have recognized as (among other things) lyric. Certainly, this is not the only lyric kind and never has been, but it is, as Prins and Jackson have shown, the one that has not only eclipsed many others but that often stands in for general definitions of literariness. This dominance is a historical fact and it offers itself to a rich variety of explanations opening onto gender, class, and much else. Ultimately, explanations of this kind target questions of fit: historical fit, between writing and reading, medium and mediation, conventions and communities. The best instance of this I know is by Adam Mazel: a magnificent recovery of the riddling, rhyming, gaming verse cultures of the later nineteenth century in Britain.[25]

For students of the middle level (students of genre) questions of fit take a different form. In my case (because I am agnostic, or just nervous about formal claims), the question is: what is it about certain texts that makes me feel I am in the presence of lyric? The question is at once old-fashioned (harking back to reader-response, rhetorical study, and European formalism) and, in its friendliness to some new approaches (e.g., cognitive studies; actor/network theory; ecopoetics), my question looks forward, not back. Before going on, let me say strongly that in my exemplary question—what is it about certain texts that makes me want to say "lyric"?—my term "texts" is highly pondered and specific to this exercise. At a different level of study—the sociological, for example—the unit of inquiry would be cultural institutions, or media technologies, or conditions of reading and writing, or simply different works, as opposed to texts. (See below.) Again, my mantra: different levels, different objects of analysis.

Lyric comes to mind when one has the impression of thought happening or consciousness occurring. I use the participial form to link up with Culler's central claim about lyric: "If narrative is about what happens next," he writes, "lyric is about what happens *now*."[26] He calls this special temporality "the lyric present," so familiar to us as to have gone unnoticed. "Henceforth," he writes (dating the genre of lyric from Sappho's only complete poem), "the effect of presence will be one of the fundamental possibilities of lyric." More modern instances are Keats's "my heart aches, and a drowsy numbness pains | My sense," Hopkins's "I wake and feel the fell of dark, not day," and Yeats's "I walk through the long schoolroom

Henri Atlan, and Anthony Wilden in the course of his exposition. "In the pragmatics of knowing, there must be different kinds of descriptions for different levels of phenomena" (p. 44).

[25] Adam Mazel, "The Work and Play of Rhyme in Victorian Verse Cultures, 1850–1900" (PhD diss., University of Michigan, 2014).

[26] Culler, "Why Lyric?" 202.

questioning." Or Rilke's "his torso | is still suffused with brilliance from inside, | like a lamp, in which his gaze, now turned to low, | gleams in all its power."[27]

The content that Culler assigns to the "now" is "calling"; on the one hand, a literal statement of vocation, and on the other, declaration of the belief that "language can sometimes make things happen."[28] My content for the "now" is, as I said, thinking. However, because that statement could be assimilated to a number of lyric scripts that I actively rule out, I list those first.

Thought happening does not mean (1) someone, like an author, thinking aloud or on paper; it does not mean (2) a representation or staging of thinking, as in dramatic monologue (which, Culler notes, has become the received definition of lyric). It does not mean (3) ideas being formulated or arguments made; neither does it mean (4) cognition, or act of mind, in the sense of reflection upon raw percepts or memory data. Finally, and this is important, it does not mean (5) thought to the second power (irony, metatext, self-reflexivity, or theory—this last most recently advanced by Stathis Gourgouris).[29] Those are five big things that I do not consider necessary or sufficient for feeling myself in the presence of lyric—things that "thought happening" does not mean.

As I use it, that phrase is both very limited and very large. Limited in that it is strictly an operational description and large because in addition to describing human (and other animal) minds, it covers things that are not typically considered candidates for thought: things like star formation, bacterial colonies, chemical reactions, traffic jams, social network effects, and economic recessions (so-called physical-causal systems).[30] Hence the counterintuitive nature of my wanting to model lyric as a complex self-organizing system. But the mind is also such a system, described for more than thirty years as an emergent global property of the brain, a thoroughly embodied brain, embedded in various action routines in the world. Maybe one reason why many of us keep conceiving lyric as the performance of someone thinking, even when we know better and when the lyric in question actively rejects that plot, is that a process resembling thinking does happen in the kind of poem that has been classified as lyric for a long time: poems that are densely coded, layered, and self-reflexive, although, as I noted at the outset, "recursive" is the word I prefer, chiefly because its application goes beyond conventionally defined agents, subjects, and mental states. That is the preview; toward the end, I will say briefly how self-organization differs from both organicism and

[27] Culler, *Theory of Lyric*, 16; Culler gives as examples Hopkins and Yeats; mine are Keats and Rilke ("Ode to a Nightingale" and "Archaic Torso of Apollo").

[28] Culler, "Why Lyric?" 204.

[29] Stathis Gourgouris, *Does Literature Think? Literature as Theory for an Antimythical Era* (Stanford, CA: Stanford University Press, 2003). Gourgouris's discussion of thinking, i.e., "the intrinsic cognitive properties of literature" (p. 3) leans toward the kind of postclassical or posthumanist stance of self-organization theory. On the other hand, he holds onto an older set of terms (e.g., irony, metatextuality) that can support his assertion of "literature's capacity to resist calculation, to defy the exigencies of the market, and to continue to harbor the key to society's imagination" (p. 3).

[30] Varela, Thompson, and Rosch, *Embodied Mind*, 99: "In such a system, the meaningful units are not symbols; they are complex patterns of activity among the many units that make up the network," and "meaning... is a function of the global state of the system and is linked to the overall performance in some domain, such as recognition or learning."

structuralism, and from models of the artwork as autonomous and autotelic. (And a word or two on its affinities with phenomenology.) I will suggest too what is to be gained from proposing this particular model as a genre-level account of lyric. For students of the long poem and the novel, who have excellent reasons for venturing those genres as contenders, let me reiterate my earlier comment on lyric as an extreme instance of literariness, a tendency present in all writing that is specifically read or in any way signaled or processed as literature.[31] And last, I will reflect on what I am about, here—namely, the business of modeling—so as to explain how that can be a nonnormative practice. But first, let me make the pitch.

Self-assembly is a term used by a number of discourses arising in different institutional sectors, some of which I have already named (e.g., evolutionary biology, information and systems theory: see the opening of this chapter). The common tasks that researchers in these areas set themselves are, first, to explain in nonmetaphysical language how certain wholes can be more than and different from the sum of their parts. They ask how certain aggregates generate orderly, directed, and to all appearances intentional behavior out of inanimate or what they call subsymbolic (or, nonsemantic) parts. How does this happen, they ask, in the absence of central or even dispersed control mechanisms? "Lifelike intention" manifests as boundary setting, pattern specifying, tonal stabilizing, reference cuing, and figure–ground selection, to name just a few of the ways that intention can manifest. It means coordinated, whole-system action arising directly from rules or arrangements operating at strictly local levels (matters to which I will return). I say "rules and arrangements" so as to exclude structures and to underscore both the priority of process in these accounts and also its ongoingness: these studies speak of regimes and routines, not parts.

A second research goal is to explain how the history of certain systems seems spontaneously to select for its own changing ratios of constancy to change, its own boundaries and identity, its own relevant context. It asks how entities bring forth environmental niches out of their buzzing blooming surround (or, same question with a different accent: how systems generate the know-how needed to run them). Similarly, physicist Karen Barad insists that relations precede/generate relata.[32] To

[31] Paul Jaussen's *Writing in Real Time: Emergent Poetics from Whitman to the Digital* (Cambridge: Cambridge University Press, 2017) makes a clear and powerful case for the relevance of self-organization theory to the long poem—specifically, the kind of poem that, in Pound's words, "contains history" in the sense of its literally emerging over a period of years, through protracted composition, revision, and/or publication. (See the *Paris Review* interview with Pound in Donald Hall, *Remembering Poets: Reminiscences and Opinions* (New York: Harper Colophon, 1979), 241.) Jaussen beautifully explains the fit between this kind of poem (this "transmissive interaction," to use Jerome McGann's phrase—see below, pp. 234–5) and key features of Horst Henriks-Jansen's "interactive emergence" (219 n. 32), such as iteration and recursion. With poems of this kind, one can see in a concrete way how the work specifies for itself a particular form of closure within a particular environment—an environment that it brings into being. Jaussen's chosen timeframe is the scale of literary and cultural history; mine is the temporality of the poem's running—where the environment specified unfolds during the time of reading. My discussion of the field properties of the relationship between text, version, and work (see pp. 289–94, written before I had read portions of *Writing in Real Time* in manuscript) would have been greatly enriched by Jaussen's analysis.

[32] Karen Barad, *Meeting the Universe Halfway: Quantum Physics and the Entanglement of Matter and Meaning* (Durham, NC: Duke University Press, 2007), 136–7: "Relations do not follow relata,

point my direction, here is a soundbite from Susan Oyama's *The Ontogeny of Information: Developmental Systems and Evolution*: "Form emerges in successive interactions . . . [;] it is a function of the reactivity of matter at many hierarchical levels, and of the responsiveness of those levels to each other." Let me note that this definition is the exact opposite of vitalism when that concept is taken to mean an essential and defining impulse toward autonomy.[33]

The excerpt from Susan Oyama dates back to 1985. Self-organization, actor-network theory, society of mind: these models have been kicking around a long time both in their home fields and as exports to others. The application to literature traces back to information and systems theory, the landmark event being I. A. Richards's

but the other way around. Matter is produced and productive, generated and generative. Matter is agentive, not a fixed essence or property of things. Mattering is differentiating, and which differences come to matter, matter in the iterative production of different differences. Changing patterns of difference are neither pure cause nor pure effect; indeed, they are that which effects, or rather enacts, a causal structure, differentiating cause and effect." Barad builds on the thought patterns articulated by David Bohm. In an interview with editors F. David Peat and Paul Buckley in *Glimpsing Reality: Ideas in Physics and the Link to Biology* (Toronto: University of Toronto Press, 1996), 50, Bohm offers these foundational comments on matter and motion: "There is an unknown reality which can only be described as eternal flux or flow. Out of this appear various forms which can be perceived. When these forms have a certain persistence and stability, we can recognize them and we call them objects. [These objects are not substances], they are subsistence. For instance, the vortex has a certain stability in water but it is not an independent substance. Ordinarily, we take the view that water is the substance, but if we try to analyse water into atoms, we get into trouble because of their quantum properties. So, I would say that the substance cannot be pinned down in any unambiguous way at all. It is unknown. But we can abstract forms in the movement of this substance . . . Forms do have subsistence and stability but they are not for that reason substances." Erich Jantsch, *The Self-Organizing Universe: Scientific and Human Implications of the Emerging Paradigm of Evolution* (Oxford: Pergamon Press, 1980), 41: "Well-defined spatial structures result from the interaction of processes in a specific dynamic regime. The circularity of many of these process chains calls for a dynamic formulation in terms of macroscopic notions referring to the system as a whole." Another pertinent set of statements, these from Varela, Thompson, and Rosch, *Embodied Mind*, 217: "Cognition emerges from the background of a world that extends beyond us but that cannot be found apart from our embodiment. Organism and environment enfold into each other and unfold from one another in the fundamental circularity that is life itself." And Bohm argues that "movement is in general *discontinuous* . . . an electron, for example, can go from one state to another, without passing through any states in between." *The Essential David Bohm*, ed. Lee Nichol (London: Routledge, 2003), 83. One should think in terms of a "multidimensional implicate order" with "a pattern of excitation [which] gives rise to approximately recurrent, stable and separable projections." Bohm, *Wholeness and the Implicate Order* (London: Routledge and Kegan Paul, 1980), 243.

[33] Susan Oyama, *The Ontogeny of Information: Developmental Systems and Evolution* (Durham, NC: Duke University Press, 2000), 26. See also Oyama, *Evolution's Eye: A Systems View of the Biology–Culture Divide* (Durham, NC: Duke University Press, 2000), where she describes "'[N]atural' biological persons [as] constructed . . . at every moment, products of, and participants in, their own and others' developmental processes. They are not self-determining in any simple sense, but they affect and 'select' influences on themselves by attending to and interpreting stimuli, by seeking environments and companions, by being differentially susceptible to various factors, by evoking reactions from others"; and, in another formulation biological persons are "partially nested developmental systems that can be studied at a variety of levels; in which ongoing processes can be analyzed by provisionally designating some factors 'causes' and others 'effects,' but in which causes and effects are not ultimately distinguishable; and in which organization need not be imposed on inert matter, but rather arises from matter in interaction" (pp. 180, 182–3). Robert Mitchell's *Experimental Life: Vitalism in Romantic Science and Literature* (Baltimore: Johns Hopkins University Press, 2013) came to my notice only after writing this chapter. Although Mitchell focuses throughout on "crossing points between Romantic art and science" (p. 12), he also takes seriously the resonance with "our own, current fascination with vitality" (p. 2), one expression of which is "the literature of embodied systems" (pp. 140–3).

1963 reissue of his 1926 *Science and Poetry*, to which he added the essay, "How Does a Poem Know When It Is Finished?" He also added an afterword titled "Reorientation," where he describes "how... *preternatural*, in the sense of beyond our previous notions of the natural, these doings are." (Just to give you a benchmark, the "doings" in 1963 were "neurological model designs and parallel calculators." Imagine how "preternatural" Richards would find today's science-scape.)[34] The line of thought winds through poststructuralist theory and surfaces again in present-day study of hyper- and cybertext and interactive media (i.e., digital humanities). It is my feeling that the conditions driving or linked to digital humanities give impetus to a broader application of the model of self-assembly. I am not alone in this: here is a manifesto-like statement from Timothy Morton's Guest Column in *PMLA* a few years ago: "true materialism would be non-substantialist; it would think matter as self-assembling sets of interrelations in which information is directly inscribed." And here is Daniel Tiffany: "criticism must complete the task inaugurated by physics," i.e., "a doctrine of materialism predicated on the dematerialization of bodies."[35]

The environmental and institutional conditions driving or associated with digital studies give impetus to a broader application of the model of self-assembly (maybe a deeper application too: as in, self-assembly as a model of modeling itself!). I list those conditions now and revisit one of them later: (1) the humanities-wide interest in reenchanting the object, finding ways to seize the reality of the appearance or the depth of the surface itself (we could try doing this in analytic, not just narrative and descriptive fashion); (2) general acknowledgment of the deep hybridity of the human vis-à-vis other species, technology, and the built world; borrowing from Sara Ahmed, our "queer phenomenology";[36] (3) the newly palpable reality of a variety of global or total conditions and behaviors (e.g., flows of labor, populations, goods, credit, information); along with that, new awareness of worldwide climate change and environmental crisis.

There is a difference between conditions that are analytically available (as these were, certainly ten, maybe even twenty years ago) and conditions that are lived as if unmediated. Every time we post our course materials online, buy a low-energy light bulb or a nonphosphate detergent; each time we debate the future of English departments (versus world literatures in English), we feel our "connexities," Richards's

[34] I. A. Richards, *Poetries and Sciences, A Reissue of Science and Poetry (1926, 1935) with Commentary* (New York: Norton, 1970), 93–9, 105–22, and *Parts and Wholes: The Hayden Colloquium on Scientific Methods and Concepts*, ed. Daniel Lerner (New York: Free Press, 1963).

[35] Timothy Morton, "Guest Column: Queer Ecology," *PMLA* 25 (2010), 277; Daniel Tiffany, *Toy Medium: Materialism and Modern Lyric* (Berkeley: University of California Press, 2000), 161. For a wonderful new addition to this literature, see Elizabeth Grosz, *The Incorporeal: Ontology, Ethics, and the Limits of Materialism* (New York: Columbia University Press, 2017): "I am interested here in an *extramaterialism*, in the inherence of ideality, conceptuality, meaning, or orientation that persists in relation to and within materiality as its immaterial or incorporeal conditions. This book explores a philosophical 'lineage' that addresses... the ways in which materiality (in all its forms) exceeds materialism and requires a different kind of philosophy, available but usually latent within the history of Western thought" (p. 5).

[36] Sara Ahmed, *Queer Phenomenology: Orientations, Objects, Others* (Durham, NC: Duke University Press, 2006).

nonce word for the new kinds of connections explored by the sciences and poetries of his day. And feeling these "connexities," we should also feel our want of concepts for the kinds of wholeness they compose.[37]

A fourth factor encouraging extension of the self-assembly model occurs at the level of politics: I mean the clear failure of robust autonomy claims for the individual, of determination claims for the economic, and of mediation claims for ideological structures and institutions. My reference is to web-based technologies that extend the individual and the collective deep into one another, squeezing out those mediations that, in the old days, both linked and distinguished those two spheres of activity and analysis. Two examples: instantaneously registered financial transactions; and social network politics. In other words, within the special conditions of the present, self-organization, which wrestles with the strange causalities arising in dynamically nested parts and wholes, is a model worth our attention.

Here is where my earlier reference to Mary Poovey comes in. Her 2001 article, "The Model System of Contemporary Literary Criticism," is an important contribution to the history of disciplinary formation and legitimation.[38] Poovey takes her title phrase, "model system," from biology, where it denotes "an object or process selected for intensive research as an exemplar of a widely observed feature of life (or disease)." She names lyric, romantic lyric, as the model system of our literary criticism, analogous to the role of the organism in biology. This means, first, that lyric "governs the ways that literary critics represent and treat their analytic object, even when this object is not a lyric poem." Second, it means that critical discourse itself contains lyric features, some of which Poovey lists (i.e., embedded quotation, developmental narratives, self-reflexivity). She then makes a fascinating because unremarked slide; she names the organism as the controlling metaphor of lyric, and therefore of our criticism. In other words, she closes the circle between biology and literary criticism, turning her analogy into an explanation. She is upfront about saying that her model of organism comes from Coleridge and the New Critics (who themselves drew on Coleridge, who drew on German idealist thought).[39]

I have many questions about Poovey's claims and applications, but the one to air here is methodological. Why, in her study of the organism's role in twentieth-century criticism, which she carries right up through poststructuralism, does she leave out twentieth-century biology? If the organism metaphor subtends our reading of lyric, and if lyric-organic features still, as she argues, structure our talk about literature and culture, shouldn't we bring that metaphor into dialogue with contemporary biology, if for no other reason than to encourage awareness of a discourse that, in some trickle-down or spill-over fashion, presumably already inflects our practice? Poovey cites Emily Martin's work as exemplary for its parsing of the cultural, political, and economic overdetermination of the metaphors governing

[37] Richards, *Poetries and Sciences*, 91.

[38] Mary Poovey, "The Model System of Contemporary Literary Criticism," *Critical Inquiry* 27 (2001), 408–38.

[39] Ibid. 408, 435.

scientific research. Martin's work is indeed exemplary, because it reminds us that the influence flows in both directions, with the sciences rubbing off on varieties of cultural work and culture doing the same to scientific work.[40]

Poovey names evolutionary biologist Richard Lewontin as one of the few who has thought about his discipline in terms of organizing metaphors.[41] This seems odd, because as early as 1985, Lewontin himself, with coauthor Richard Levins, rejected the model of the organism familiar to those who study nineteenth-century poetry: namely, the one deriving from Coleridge's posit of organic form. Levins and Lewontin urged historians to abandon the very metaphor that Poovey revives, and which she sees as normative for criticism up through the present. They call that model the "alienated view of the entity and environment." On my updated summary of that view, the organism is a metabolic input–output model, the identity, integrity, or closure of which is genetically determined in the short run, or for individual organisms. In the long run, identity/integrity is subject to evolutionary change by the interlocked processes of random variation, adaptation, and natural selection. On that view—the traditional, and in Levins and Lewontin's judgment, "alienated" one—"organisms adapt to a changing world which poses problems that the organisms solve through evolution.... The environment changes by some autonomous process, while the organism changes in response to the environment, from which it is alienated."[42]

In place of this, Levins and Lewontin describe a dynamic systems relation between entity and environment, sometimes called an anti-environmentalist view of nature. I quote: "just as there is no organism without an environment, so there is no environment without an organism."[43] One has to sit with that claim for a second: the first part is easy—that is, how entities require, and even include, their environments; metabolism counts as inclusion for instance. But, the other bit, saying that environments do not exist without entities, when "environment" includes rocks and stones, or the order of inanimate organic things, as it does for Levins and Lewontin and most ecotheorists—well, that claim entails a radical ontological reciprocity that startles all our intuitions, way more than the old brain teaser about trees falling in forests with no one around to hear.

Because Levins and Lewontin's term for this dynamic systems relation, i.e., "constructionism,"[44] matches up with humanities-speak, it muffles the conceptual force of their claim. Other research sectors sharing their view speak of enactive cognition, co-evolution, autopoiesis, and structural coupling. I choose self-organization as the umbrella term, the one heading broad enough to cover all those paradigms, all of them attempts to describe phenomena where there are no preestablished borders. Instead, borders are generated, such that the overall operation

[40] Emily Martin, *Flexible Bodies: The Role of Immunity in American Culture from the Days of Polio to the Age of AIDS* (Boston: Beacon, 1994), and *The Woman in the Body: A Cultural Analysis of Reproduction* (Boston: Beacon Press, 1987).

[41] Poovey, "Model System," 437.

[42] Richard Levins and Richard Lewontin, *The Dialectical Biologist* (Cambridge, MA: Harvard University Press, 1985), 3–4.

[43] Ibid. 99. [44] Ibid. 105.

of the system determines the division between outside and inside at any particular time. Nature, on this anti-environmentalist view, is "a mesh, a nontotalizable, open-ended concatenation of interrelations that blur and confound boundaries at practically any level: between species, between the living and the nonliving, between organism and environment."[45] In our line of work, one form that boundaries can take is that of text-context perceptions: ask yourself how you decide what counts as context for a given work, a given critical exercise, a given cultural/institutional moment? Then ask if it is you doing the deciding or rather the state of the system as a whole—the system being the scholarly publishing industry, the academy, your particular subfield, etc.

This line of thinking can be extended by reference to work in morphological biology. In the summer of 2007, I taught at the School for Criticism and Theory at Cornell University. At a reception, Eric Siggia, a physicist, came over and asked what I was doing in my seminar. I said, "postclassical science and literary form," and he said: "Read D'Arcy Wentworth Thompson." Because Thompson's major work, *On Growth and Form*,[46] wasn't available, I got the next best thing, an edited volume of essays on Thompson.[47] The math- and diagram-heavy cast of these essays put me off. That would have been the end of it except that about a year later, I came upon not just a reference to Thompson but an entire chapter devoted to the tradition in which he worked: names, dates, debates, titles. The book I was reading is *Form and Transformation: Generative and Relational Principles in Biology*, by Gerry Webster and Brian Goodwin, evolutionary biologists. This was strange, but even stranger, I had begun reading Moretti, and who should pop up but Thompson, this obscure (so I thought) Scottish mathematician, zoologist, and classicist (1860–1948). Moretti only offers a few cryptic comments but they are definitely in the zone.[48]

Webster and Goodwin work within the larger context of complexity studies, a body of research and set of models that give traction to paradigms like Thompson's, which could otherwise be regarded as historical curiosities.[49] I save my nutshell

[45] Morton, "Queer Ecology," 275–6.

[46] D'Arcy Wentworth Thompson, *On Growth and Form* (Cambridge: Cambridge University Press, 1917, 1942).

[47] *Essays on Growth and Form Presented to D'Arcy Wentworth Thompson*, ed. W. E. Clark and P. B. Medawar (Oxford: Clarendon Press, 1945).

[48] Moretti, *Graphs, Maps, Trees*, 56.

[49] Times have changed. Thompson's work, like that of many other students of morphogenesis from the late nineteenth and early twentieth centuries (e.g., William Bateson, Hans Driesch, C. H. Waddington, A. Weismann), has become a not uncommon resource among humanists working on form and transformation. Donna Haraway devotes one of her central chapters in *Crystals, Fabrics, and Fields: Metaphors That Shape Embryos* (Berkeley, CA: North Atlantic Books, 1976), 101–46, to Joseph Needham, noting his homage and that of many others to D'Arcy Thompson. *Crystals, Fabrics, and Fields* started out as Haraway's 1972 dissertation; it was published in 1976 and reprinted in 2004. "The second audience to enjoy and benefit from the reprinting of *Crystals, Fabrics, and Fields* is the new generation of developmental biologists... [thanks to] a revolution that reunites developmental biology with three disciplines that it abandoned in its metamorphosis from embryology. *Evolutionary* developmental biology sees changes in development as essential for evolutionary change... *Ecological* developmental biology brings the concept of epigenesis beyond the borders of the embryo [into] factors in the environment... [and] *medical* developmental biology is looking at the ways in which genes

account of complexity for later, but show my direction now by saying that complexity science confounds the received nominalist/realist or constructivist/essentialist binary. Whereas the standardly Darwinist position identifies species not as one thing with a history, but as many things, linked only by that history, Levins and Lewontin shift the species grounding from kin to kind, but with kind understood as a logical (rational) relational order among transformations (an order that is "not directly observable though it is real"), with "the organism enter[ing] directly and actively by being an influence on its own further ontogeny."[50] In Webster and Goodwin, complexity thinking moves strongly toward a certain kind of realism (see above): a realism of structural possibilities and parameters that "'select' and stabilise one empirical form from the set of forms which are possible for that type of field."[51]

The authors have no quarrel with Darwin's constructivist view of species as genealogy, shaped by the threefold pressures of genetic mutation, natural selection, and random genetic drift—accidental isolation of some portion of a population, i.e., a gene pool. On this kind of explanation (which can only take the form of a narrative), inheritance, usefulness, and function are the organizing principles, with the mechanisms I just named (mutation, etc.) as the way those principles operate in real time on real bodies. What Webster and Goodwin reject is Darwin's view of taxa—kinds or classes—as similarly an artifact of history, and thus the kind of thing susceptible only to narrative explanation, as distinct from any sort of rational or unifying method. They want to construct classes as natural kinds. And I want to explain why this is not as retrograde (that is, essentialist and ahistorical) as it sounds.

Pre-Darwinian science conceived its object of knowledge as the various biological kinds, which it studied through a method of comparative morphology tracing itself back to Linnaeus, but, also, to Goethe's *Theory of Metamorphosis*, composed 1790 in order to address boundary and transition problems in the Linnaean concept of type. The Linnaean model is at once Aristotelian and empiricist; you begin with observed, concrete particulars and by a process of comparison, you abstract those features that are common and discard the rest. For typology (the name of this practice), the abstracted common feature comes to characterize a class—is indeed the essence of that class. Opposed to this is population thinking, a concept developed by Ernst Mayr. (Moretti is also interested in the concept, and that is where he gets it.) "The assumptions of population thinking," I quote, "are diametrically opposed [to] those of the typologist.... All organisms and organic phenomena are

and environment can interact in the production (and disruption) or embryonic form... The morphogenetic fields that were so important [in the late nineteenth and early twentieth century] have reemerged as important modules that mediate the production of phenotype from genotype" (Scott F. Gilbert, in Preface, pp. xiii, xiv).

[50] Levins and Lewontin, *The Dialectical Biologist*, 105; kin versus kind: Webster, "Relations of Natural Forms," 215; "not observable though real": Goodwin, "Field Theory of Reproduction and Evolution," 23; Webster and Goodwin, *Form and Transformation*, 73 ("species taxa are conceptualised in [the Theory of Descent] as spatiotemporally restricted entities").

[51] Webster and Goodwin, *Form and Transformation*, 99.

composed of unique features and can be described collectively only in statistical terms." On this "radical empiricism," "individuals... form populations of which we can determine only the arithmetic mean and the statistics of variation. Averages are merely statistical abstractions; only the individuals of which the population is composed have reality." Nothing could be further from typology, for which "the type (*eidos*) is real and the variation an illusion."[52] Webster and Goodwin spot the central flaw in population thinking (and I imagine that Moretti is also subject to this critique): namely, that it begs the question of how, or on what principles, or by what criteria individuals are picked out as potential members of a population in the first place. In search of a way forward, Goodwin and Webster go back, to Goethe and Thompson. In Goethe's morphology (he coined the term for biology), and Thompson's revision and expansion, Webster and Goodwin see the prototype for their own mathematical model of "the *form* of a series." Goethe, however, could only reckon with continuous transformation arising from generative principles; Webster and Goodwin have the tools to conceptualize discontinuous series.[53] An important distinction.

With the arrival of Darwin, everything changed; "*taxa*" are denied the status of "natural kinds. Consequently, they are not susceptible to scientific explanation." For classical Darwinian theory, species are defined by descent from a common ancestor. Post-Watson-Crick, species are also conceived through genetic, or as biologists say, material continuity. Formal resemblances within or across species are labeled contingent, misleading, and inaccurate as explanatory features. A formal resemblance is, for example, the fact that "tetrapod limbs [four-leggedness] evolved from fish fins by a process involving changes in the generative mechanisms that gave rise to a remarkable diversity of groups undergoing similar types of transformation, with pentadactyly [having five digits, fingers or toes] probably emerging independently in different lineages."[54]

Webster and Goodwin's contribution is to trace another tradition within the history of biology, 1790 through the present: i.e., Goethe, William Bateson, Hans Driesch, D'Arcy Thompson, C. H. Waddington, and in some aspects, Ernst Mayr. Recent exponents of this tradition are Steven Jay Gould and Stuart Kauffman, major figures, as we know, in evolutionary biology. All these theorists zero in on the same gap within the sequence of historical levels of evolutionary study. In that neglected timeframe, they find an object—a certain kind of object, specific to that domain—and they posit a certain kind of causality explaining that object and its features. In other words, centrist Darwinism is great on the *longue durée* of species evolution, and twentieth- and twenty-first-century molecular biology is great on genetic determination. In between, however, at a middling temporality, is the time of the "life cycle": "the organism of which we speak as the fundamental entity in biology is the life cycle." About this, classical theory has little to say.[55] Another way

[52] Ernst Mayr, *Animal Species and Evolution* (Cambridge, MA: Harvard University Press, 1963), 5, quoted in Webster and Goodwin, *Form and Transformation*, 27–8; "radical empiricism" is their term.
[53] Webster and Goodwin, *Form and Transformation*, 104, 106; see also 116.
[54] Ibid. 7, 152. [55] Ibid. 193.

to put this is that classical theory cannot conceptualize the ways in which development and evolution (ontogeny and phylogeny) are intertwined.

Webster and Goodwin deploy such phrases as "the forms of an entity," "living things are specific forms of being," "a living organism does not possess its 'typical' form throughout its life" (nice echoes, these, with Wittgenstein's "form of life" and with Williams's "structures of feeling").[56] They use this language to highlight their claim that the evolutionary unit is the whole organism, not genes and their products. Indeed, some will characterize the whole organism as an even larger form, via the notion of "co-evolution" (the joint evolution of a system together with its environment).[57] Not a thing or a structure but a routine, a history, a field of possibility and constraint. They want to be clear that "genes are involved at every stage," but, also, that "the unity of structure that underlies [five-digit] limbs as a category of biological form," the form of a class, not a species, does not come "from the invariant action of genes" nor is it explained by historical, functionalist accounts.[58] They are looking for a way to describe interactions between the generative principles of individual development on the one hand, and the principles and effects of evolution on the other. They want to take homology seriously.[59]

They want, in short, to study the middle zone and its protagonist, which is neither the gene nor the species but "the whole organism in its life cycle," a field extended in time and space. "If organisms are fundamental biological entities, as we argue, there must be a systematic way of describing them as dynamically stable wholes that undergo particular types of transformation."[60] To arrive at this, Gould, Kauffman, Webster and Goodwin, and many others submit the whole organism and its life-cycle to a "deliberate process of reduction and abstraction." (I echo Moretti there.)[61] What they get is a model—the so-called "morphogenetic field"—that reconstructs the organism/life-cycle/environment ensemble in such a way as to highlight patterns, regularities, possibilities, and constraints. Unlike species and

[56] Ibid. 3, 4, 7; Ludwig Wittgenstein, *Philosophical Investigations*, trans. G. E. M. Anscombe, 3rd edn. (Oxford: Blackwell, 1958), *passim*; Raymond Williams, *Marxism and Literature* (Oxford University Press, 1977), 128–35.

[57] Jantsch, *The Self-Organizing Universe*, 41.

[58] Webster and Goodwin, *Form and Transformation*, 129.

[59] Homology designates features in different organisms that are similar because inherited from a common ancestor that also had that feature. An example is the four limbs of tetrapods. Analogous features are those that have separate evolutionary origins but are similar because they have both undergone natural selection that shaped them to play a key role in flight. Analogies are the result of convergent evolution. From https://evolution.berkeley.edu/evolibrary/article/evo_09. Also see http://www.christianhubert.com/writings/analogy_homology for an excellent overview and discussion of the history and current usage of these terms.

[60] Webster and Goodwin, *Form and Transformation*, 193. And from p. 129: "The issue is how to make sense of the developmental and evolutionary data in terms of generative principles—how limbs are made—and whether an understanding of gene activities is sufficient to achieve this goal. My conclusion is that gene action needs to be understood within the context of theory of morphogenetic fields embodying organizational principles that themselves impose important constraints on the set of forms that can be generated. Genes are involved at every stage in the production of limbs in the developing organism; but the unity of structure that underlies tetrapod limbs as a category of biological form and defines them as homologous structures comes from the relational principles embodied in morphogenetic fields, not from the invariant action of genes."

[61] Moretti, *Graphs, Maps, Trees*, 1, 126.

individuals, morphogenetic fields are susceptible to rule-governed kinds of explanation, so that diversity can be understood in terms of transformation, not descent. In brief, theorists of this persuasion develop models of biological form "based on whole organisms as dynamically transforming systems that can be technically defined as fields."[62]

At this point, I return to the topic of complexity (signaled above), needed now, as I said, to grasp the field theory of form and/or genre that I forecast. Webster and Goodwin say right off the bat that the shift from structures to structure-generating fields could not have happened without the arrival of the complexity sciences. As I have indicated, this paradigm has developed across the physical, biological, and social sciences; the common term for the object of study in these diverse domains is self-assembly, which the different institutional sectors use in their different research programs.

Here is one example of self-assembly, or entity/environment cocreation. Today's neuroscience standardly models brain physiology not by reference to its functionally dedicated anatomical structures (e.g., visual cortex, frontal lobe) but (and, cutting across those structures) as a system of widely distributed neuron groups—more precisely, clusters of neurons capable of grouping.[63] Under conditions provided by both internal and external stimuli, and crucially, by the history of the system (which is also the history of the body and thus of the person), these physically uncoordinated clusters will fire together. The determining role of the system's history is explained by a mechanism called Hebb's Law: "neurons that fire together wire together."[64] They do so because of reinforcement effects occurring with repetition. More interesting, because brain connections are so dense and levels of operation so nested (a description with special application to textual systems and to lyric poetry more than the rest), these feedback effects do not just reinforce the original state and working of the network, they introduce changes into it. These changes are not merely content or input changes (as in, laying down new memories), but wiring changes—in our parlance, formal changes. The system's activity patterns have the recursive effect I previously alluded to; they reconfigure the system's boundaries, in the sense that some neuron clusters will join in the system

[62] Webster and Goodwin, *Form and Transformation*, 129.

[63] Chief among my sources for this general (so-called) Theory of Neuronal Group Selection (TNGS) are Gerald Edelman, *Bright Air, Brilliant Fire: On the Matter of Mind* (New York: Basic Books, 1992); Minsky's *Society of Mind*, 1986; Oyama's *Evolution's Eye*, 2000, and *Ontogeny of Information*, 1985; Terrence Deacon, *The Symbolic Species*, 1997; Antonio Damasio, *Descartes' Error*, 1994, and *The Feeling of What Happens*, 1997; Cantwell Smith, *On the Origin of Objects*, 1996; Varela, Thompson, and Rosch, *Embodied Mind*, 1991; Horst Henriks-Jansen, *Catching Ourselves in the Act: Situated Activity, Interactive Emergence, Evolution, and Human Thought* (Cambridge, MA: MIT Press, 1996); and Andy Clark, *Being There: Putting Brain, Body, and World Together* (Cambridge, MA: MIT Press, 1998). See Damasio, *Descartes' Error*, 226–7: "The self is a repeatedly reconstructed biological state"; Varela, Thompson, and Rosch, *Embodied Mind*, 107: "mind not as a unified, homogeneous entity, nor even as a collection of entities, but rather as a disunified, heterogeneous collection of networks and processes"; p. 121: "Ego-self, then, is the historical pattern among moment-to-moment emergent formations."

[64] An epigrammatic and not-quite-accurate summary of the argument of Donald O. Hebb, *The Organization of Behavior* (New York: Wiley, 1949).

whereas others will drop out. In other words, the system effectively selects for its own boundary relations and thus its own identity at any given moment, and it does so as an effect of its own history, its operation in time with all the variables introduced by time. The history of the system literally brings that system's components into being and continually modifies them. In other words, the system learns. Colloquially, *we* learn. (As in, this is what learning is.)

What you hear in all this (Levins and Lewontin, Morton, Webster and Goodwin) is a strong rejection of the qualitative uniqueness of the organic, and that marks a sharp difference between Poovey's model and the thinking developed by Levins and Lewontin et al. The life sciences both draw on and mesh with the physical and so-called exact sciences, as well as with science and technology studies and with cultural studies, positing a continuum between their objects of study. In other words, contemporary biology actively dismantles the kinds of organic–mechanic distinctions on which Coleridge's hallmark metaphors rested. Or, as historians of Romantic period science are now discovering, what we think of as Coleridge's organicism may be the anachronistic projection of early twentieth-century criticism, informed by that moment's normal science.[65]

The passage from local rules to global organization is the heart of self-assembly and it is predicated on a certain kind of part, on the existence of many parallel levels that are very densely linked, and on the recursive process I described above. First, parts: the correct words in this idiom are regime, process-structure, activity pattern, or organizational rhythm—terms that were invented to rule out fixed spatiotemporal units. These process-structures originate with the application of simple local rules and come to define different levels or informational codes, where information is defined as a difference that makes a difference and is therefore always linked to performance. The transition from structures to codes occurs via cascading feedback effects. The operation of the whole over time brings into being the structures explaining that operation. It also explains how orderly behavior arises from aggregates with no central or dispersed control mechanisms. As I have emphasized, recursion is one word for this phenomenon;[66] another, Douglas Hofstadter's, is "strange loops"; our term back-formation is also a good synonym

[65] Michel Chaouli, *The Laboratory of Poetry: Chemistry and Poetics in the Work of Friedrich Schlegel* (Baltimore: Johns Hopkins University Press, 2002); Denise Gigante, *Life: Organic Form and Romanticism* (New Haven, CT: Yale University Press, 2009); Amanda Jo Goldstein, *Sweet Science: Romantic Materialism and the New Logics of Life* (Chicago: University of Chicago Press, 2017); Noah Heringman, *Sciences of Antiquity: Romantic Antiquarianism, Natural History, and Knowledge Work* (Oxford: Oxford University Press, 2013); Kevis Goodman, *Georgic Modernity and British Romanticism: Poetry and the Mediation of History* (Cambridge: Cambridge University Press, 2008).

[66] See Robert Rosen, Howard Hunt Pattee, and Raymond L. Somorjai, "A Symposium in Theoretical Biology," *Glimpsing Reality*, ed. Buckley and Peat. Pattee: "in *living* systems . . . we have the process of internal self-description" (p. 117). "Self-describing means that the actual constructing mechanism must be made out of parts which are described and which can read their own description" (p. 119). Recursion names the phenomenon whereby a system, as simply part of its operation, produces a version or specification of itself that also specifies the world in which it operates as a system; the specification of the world in turn confers on the system the closure it needs to operate as a system. To understand this, one must construe "specifies" as a productive act, not just a registration, observation, or representational recapitulation. A recursive system is one that makes a blueprint of its workings as just part of those workings, and that reads the blueprint and modifies itself as a result.

as is Althusser's notion of absent cause, derived from Spinoza: i.e., a cause which is immanent only in its effects; or, as Althusser also says, "the effectivity of the whole in the part." (Compare Spinoza's double-aspect monism: one Substance, available under two infinite attributes, thought and extension.)[67]

A clear broad description of part–whole relationships in dynamic systems is given in Gleick, quoting Doyne Farmer and Norman Packard: "the collective behavior of the whole is qualitatively different from that of the sum of the individual parts. This is precisely the definition of nonlinear."[68] And here is a description of autopoietic (or self-organizing) systems by Humberto Maturana and Francisco Varela, Chilean neurobiologists, who started this ball rolling in 1972. A warning: their prose is not pretty. "An autopoietic machine [living system] is a machine organized (defined as a unity) as a network of processes of production ([including] transformation and destruction) of components which: (1) through their interactions and transformations continuously regenerate and realize the processes (relations) that produced them; and (2) constitute the machine as a concrete unity in the space in which they (the components) exist by specifying the topological domain of its realization as such a network."[69] Or, "an autopoietic machine is a homeostatic [or rather, a relations-static] system . . . ; [it] has its own organization (its own defining network of relations) as the fundamental variable which it maintains constant. For a machine to be autopoietic, its defining relations of production must be continuously regenerated by the components which they produce."

What we have, then, is not a structural *mise en abîme* or infinite regression but a progressive, self-transformative logic.

[67] Douglas Hofstadter, *I Am a Strange Loop* (New York: Basic Books, 2007); *Fluid Concepts and Creative Analogies: Computer Models of the Fundamental Mechanisms of Thought* (New York: Basic Books, 1995); Henriks-Jansen, *Catching Ourselves in the Act.* Althusser introduces the concept of structural causality in *Reading Capital*, co-authored with Étienne Balibar, trans. Ben Brewster (New York: Verso, 2009), 342–3. For the Spinoza reference, see Chapter 9.

[68] Quoted in James Gleick, *Chaos: Making a New Science* (New York: Viking Books, 1987), 339, from Doyne Farmer and Norman Packard, "Evolution, Games, and Learning: Models for Adaptation in Machines and Nature," Introduction to conference proceedings, Center for Nonlinear Studies, Los Alamos National Laboratory, 1985; Esther Thelen and Linda B. Smith, in *A Dynamic Systems Approach to the Development of Cognition and Action* (Cambridge, MA: MIT Press, 1994), 49, name self-organization "a science for systems with a history, systems that change over time, where . . . the end-state is not coded anywhere, and where behavior at the macrolevel can, in principle, be reconciled with behavior at the microlevel." p. xix: "Although behavior and development appear structured, there are no structures. Although behavior and development appear rule-driven, there are no rules. There is complexity. There is a multiple, parallel, and continuously dynamic interplay of perception and action, and a system that, by its thermodynamic nature, seeks certain stable solutions. These solutions emerge from relations, not from design. When the elements of such complex systems cooperate, they give rise to behavior of a unitary character, and thus to the illusion of structure. But the order is always executory, rather than rule-driven, allowing for the enormous sensitivity and flexibility of behavior to organize and regroup around task and context." Or p. 54: "When sufficient energy is pumped into these ['open'] systems, new, ordered structures may spontaneously appear that were not formerly apparent. What started out as an aggregation of molecules or individual parts with no particular or privileged relations may suddenly produce patterns in space and regularities in time. . . . These emergent organizations are totally different from the elements that constitute the system, and the patterns cannot be predicted solely from the characteristics of individual elements."

[69] Humberto Maturana and Francisco Varela, *Autopoiesis and Cognition: The Realization of the Living* (Dordrecht: Reidel, 1980), 78–9.

And, "autopoietic machines are unities because and only because... their operations specify their own boundaries in the process of self-production."[70]

For an example of this part–whole, or maybe pattern–entity, relationship, think about a whirlpool—not in any technical way, just on a coarse-grained experiential scale, where we can see part–whole, content–form, and entity–environment relationships. And keep it in mind as an analogy for both text–context and version–poem relationships. A whirlpool is nothing but water behaving in a certain way. The water particles of which it is made continuously change their location within the pattern and they also move out of the pattern, just as new water bits enter the dance. The pattern, however, i.e., the relationships between ever-changing particles and pressures, maintains itself, and it is this pattern, rhythm, or energy flow that attracts new particles, until at a certain point in time and space, an edge is defined, marking ("specifying," in autopoietic language) the whirlpool's environment. "Point" and "edge" are the wrong words, but they are all I have. They are wrong because the boundary between whirlpool and its surround is fuzzy, not just perceptually (like bumps: where do they begin and end?) but operationally, even ontically, if you will excuse the register switch. I think of the outside water, or the whirlpool's environment, as an essential part of the whirlpool, essential precisely in

[70] Ibid. 81. L. V. Beloussov, in "Dynamical Levels in Developing Systems," *Dynamic Structures in Biology*, ed. Goodwin and Sibatani, 19, defines self-organization "as a process by which structure A transforms itself into a spatially more complicated structure B without requiring internal or external blueprint homeomorphic to B"; Jantsch, *The Self-Organizing* Universe, 21: "what we [call] structure is nothing solid, composed of the same components, but rather a dynamic regime which puts ever new [units, parts, and contents] through the same [organizational rhythm]." The following features are central to theories of self-organization: (1) focus on causality as a stochastic or probabilistic passage from local rules to global organization; (2) distributed and operational closure rather than spatially bounded, discrete, stable model of structure; that is, structure conceived as an effect of dynamic regimes, not a cause [as applied to lyric, closure of this sort would include the act, resources, patterns, and relations instated through reading routines and histories]; (3) intention as arising from nonintentional parts and processes; linked to this, the figuring of chance and necessity as a continuum, analogous to the transformation of noise into information, accident into design (in genetic variation) absent an overarching or original plan and also any possibility of telos. In self-organizing systems, symmetry breaking, perturbations, and disequilibrium are sources of order; thus, order arises through production and dissipation of disorder; (4) self-organizing systems can evolve to an entirely new regime, unpredictable from the prior state of the system; example: beyond a critical temperature gradient, fluctuations become reinforced rather than suppressed (or, as students of literature might say, they get represented, recursively reconfigured, or motivated). When that occurs, the system's identity (its dynamic regime) abruptly switches from conduction to convection. Or, a new macroscopic order emerges which may also be grasped as a fluctuation of the old, stabilized by energy exchange with the environment. For an analogy, consider the way that sensuous and semantic excesses arising in literary language use can move the system as a whole in discontinuous leaps from one referential plane to another, planes that are not nested in each other or part of a single phenomenon; (5) tolerance for noncoherence among different levels of description, so that the test of a description is not whether it can translate into the terms describing some other level of operation or structure, e.g., complementarity in physics; (6) self-organizing systems are recursive; (7) self-organizing systems show strong relativity as distinct from perspectival or subjective relativism; (8) for self-organizing, enactive, emergent property (etc.) systems, the primacy of atomistic, microscopic analysis is replaced by an emphasis on macroscopic or global effects. The interaction of parts on one scale can lead to complex global behavior that in general cannot be deduced from knowledge of individual components; again, different kinds of description for different levels of activity; (9) where cognition is involved, the task-oriented model is replaced by a model of different levels interacting to produce patterns without predetermined constraints.

its difference. Without that difference, which the whirlpool makes, no whirlpool. An example of the recursion you heard in Maturana's and Varela's prose: living systems produce the components and relations that produce them. Language adapted from the research ensemble that I have referenced might help with the analogy between the whirlpool's relation to its watery surround, and the relation of the literary work to its contexts. Both can be seen as dynamic regimes in continuous flux; paradoxically, their constancy is maintained by their dissipative energy, this entropic tendency bringing forth ever new opportunities for increased order. Below, I extend this modeling of the literary work to the problem of its relation to its own versions and texts, considering the work as a temporarily stabilized process-structure in the coherent evolution of the same system, a system synonymous with the work.[71] In the Steinian idiom of self-organization: whirlpools are "autopoietic machines . . . [whose] operations specify their own boundaries in the process of self-production. . . . An organization may remain constant by . . . maintaining constant relations between components in continuous flow or change."[72] I take this to mean that due to a history of small, strictly local actions (a microhistory of water, acted upon by what is nearest), the whirlpool suddenly emerges as a determinate form and in the same stroke brings into being its enabling context. Channeling Stevens now ("Anecdote of the Jar"), we could say that the whirlpool makes the water surround the water, the stream surround the whirlpool—makes the context surround the text, and the work surround its versions. At the same time, the whirlpool also operates causally and in a holistic and coordinated fashion—as an agent, so to speak—on its own ongoing processes so as to reinforce some fluctuations but not others: to convert some to information and to leave others inert (i.e., mere facts). In other words, we have a model of organized, evolving, productive, selective activity absent symbolization, absent any centering of causality in a source, action, or location (such as inside or outside), and absent any teleological or normative endpoint. The self-organizing whirlpool thus offers a picture of an immanent, nondualistic history of becoming.

Although recursion looks a lot like *mise en abîme*, there is one crucial difference. With the latter (picture the Morton's salt girl[73]), the only changes introduced into the self-replicating original are those of scale. Though *mise en abîme* seems to spiral up or down, or in or out, it goes nowhere. With recursion, however, the repeats introduce changes into the generative machinery itself; it would be as if the Morton salt girl's umbrella were closed in one frame (or on one scale) and open in another. This happens because recursive systems are open to the environment; that is exactly what defines them, their drawing and redrawing of the bounding line. The logic is

[71] Additional works consulted include Miguel A. Aon and S. Cortassa, *Dynamic Biological Organization: Fundamentals as Applied to Cellular Systems* (Berlin: Springer, 1997), 323 and *passim*. See above, p. 538 n. 105.

[72] Maturana and Varela, *Autopoiesis*, 81; see also p. xv: "perception should not be viewed as a grasping of an external reality, but rather as the specification of one."

[73] The Morton's salt label shows a girl holding both an umbrella and a box of salt (to illustrate the selling point, written on the label: "When it rains, it pours," i.e., the salt doesn't clump with humidity). The salt box she's holding is of course a miniature of the box on which the label is affixed; you thus imagine infinitely repeating and tinier and tinier images of the same.

evolutionary not circular. Changing, not homeostatic, and changing, not becoming in that internally driven and directed Hegelian (or, vitalist) sense.[74]

The notion of genre or type that emerges from complexity theory is very different from constructs we looked at earlier, i.e., typology and population thinking. It is also different from a related concept, empirical intensionalism, where one isolates some intrinsic feature common to all members of a set, and then abstracts it

[74] For examples of recursion in the domain of social practice, consider, first, the phenomenon described by Homi Bhabha in the chapter titled "By Bread Alone" in *The Location of Culture* (New York: Routledge, 1994). Bhabha plots the movement of information (we might say, the conversion of noise into information) that came to trigger (or, signify, embody, engender: the undecidability of the cause–effect relation is important) the Revolt of 1857 in India. A local disturbance in a particular village (a perturbation in the system) caused news of that disruption to travel from that village to the next. What I term "news" is not, on Bhabha's account, a representation of what happened but rather a feature of the happening itself. That is, the disruption triggered a boundary breach between one domain and the next, reconfiguring in a literal sense what had been distinct social entities. The breach took the form of a signal: the passing of a chapati. At its origin, the transfer was, presumably, symbolically constructed, i.e., a code signaling change in the system and promoting a reorientation of its parts and reorganization of its processes. But as the chapati circulated, its referential dimension faded; the action proceeded minus any narrative and any theorizing; neither did it assume a proactive, determinative function.

Here is the passage from Sir John Kaye's 1864 account, quoted by Bhabha, "By Bread Alone," 287: "From village to village, brought by one messenger and sent onward by another, passed a mysterious token in the shape of those flat cakes... called chapatis. All that was known about it was that a messenger appeared, gave the cake to the headman of one village, and requested him to despatch [*sic*] it onward to the next; and that in this way it travelled from place to place; no one refusing, no one doubting, few even questioning in blind obedience to a necessity felt rather than understood." In other words, while intentionality at various moments *attached* to the action of passing the chapati, the origin, content, and aim of that intentional aspect remained a blank. The chapati could not be said to have *symbolized* insurrection, for not until its passage linked various places and groups did there emerge a constituency or collective subject—a location, to use Bhabha's word—capable of intending, construing, or enacting insurrection. One might say that the representational identity of the chapati arose as a kind of feedback effect of its circulation. In other words, passing the chapati was an effect of uncoordinated local processes that, at a certain threshold level and due to the relative autonomy and thus interaction of the levels in which it circulated, brought into being its own cause: a revolutionary consciousness or intention. This is not a before-and-after perspectival analysis, but a view of the phenomenon as itself irreducibly relative and time-bound, or processual. It is also a view of the phenomenon as an indissoluble blend of theory and praxis. Quoting Bhabha now, "By Bread Alone," 286: the incident shows "the emergence of a form of social temporality that is iterative and indeterminate." Like my anecdote of a whirlpool, Bhabha's reading is an "attempt to stain the clear waters of causality."

A more recent study of a recursive instance within social history is Chris Kelty, "Geeks, Social Imaginaries, and Recursive Publics," *Cultural Anthropology* 20.2 (May 2005), 199–200. Kelty observes that "publics require more than simply speech or writing, they require a more nuanced sense of the very act of being addressed. To be part of a particular public is to choose to pay attention to those who choose to address those who choose to pay attention... and so on. Or as Michael Warner puts it, 'The circularity is essential to the phenomenon. A public might be real and efficacious, but its reality lies in just this reflexivity by which an addressable object is conjured into being in order to enable the very discourse that gives it existence.' " From Warner, "Publics and Counterpublics" in *Public Culture* 14.1 (Winter 2002), 51. Kelty mobilizes the technological specificity (the special recursiveness) of software and networking operations to model the ways in which "geeks imagine their social existence through... technical practices as much as through discursive argument. It ['the conceptual tool of a social imaginary'] is particularly appropriate... because the practice of writing software is precariously situated between verbal argument and material practice; indeed, software creation itself represents a certain immanent critique of the very distinction between speech and practice..." (p. 186).

Below, I discuss an application of recursion to the problem of textual singularity (the problem of the work with respect to the text and "the version").

so as to characterize a class. Looking back to Goethe and forward to nonlinear mathematics (with a long visit to Cassirer, their role model, in between), Webster and Goodwin propose the construction of a class (we might say, a genre) as "the form of a series."[75] They are clear about their objectives and how they differ from Mayr's (and, we can see, from Moretti's as well). "To represent a diversity as a system" (Moretti's genres) "is not the same thing as explaining it," nor is "formal determination of possibilities" the same as "theoretical explanation of actualities." Webster and Goodwin are ambitious, and they can be, due to a feature of their notion of serial form different from Goethe's and Cassirer's. I refer to the fact that Webster and Goodwin do not restrict "the form of a series" to series whose members come into being successively. In what are called "meristic series"—which describes most morphological variation—temporal order is irrelevant and variation discontinuous. Diversity of this kind cannot be unified by procedures at the level of experienced features and properties. Discontinuously variable forms (genres, and, for reasons that will later emerge, I would say also, literary works, as distinct from their texts and versions) must be conceived as wholes: systems of relations rather than variable aggregates of independent elements (population thinking) or, of course, as intensionist, or based on representative individuals. Through the device of "equivalence classes," these wholes, or discontinuous series, may be compared.[76] "Equivalence classes" means that except for one invariant, all transformations are equivalent. With a doughnut, if your constraint is "connectedness," anything you do to it short of eliminating the hole counts as topological equivalence. Basically, equivalence classes give a way to compare sets of transformations, not individuals. Thompson uses language from Henri Bergson to define his aim: to track the "logical affiliation between forms."[77] He moves away from the Darwinist preoccupation with kin and contingency, recovering the pre-Darwinian interest in kind and necessity, but, and this is new, a kind of necessity shared not just with other organic systems but with physical ones as well. Although no rules for such transformation can be conceptually generated, the forms can be compared, and the intelligible relations between them seen and studied. This is what the Thompson through Kauffman tradition attempts: a systematic method of comparing forms.

How does this square with both classical Darwinian theory and with the genocentric emphasis of the past half-century? First, consider some logical implications of the Darwinian narrative. Evolution by natural selection stresses random shuffling of the genetic pack, accidents of history, competitive interactions between individuals for scarce resources, and (driving the car, so to speak), the power of natural selection to prune out the unadapted. Everything is cast as a struggle, and the significant unit of struggle is the individual. Even species are seen as individuals in the sense that they too are the product of historical accident and the necessities

[75] Webster, "Causes, Kinds and Forms," 285. See also n. 54 above.
[76] Webster and Goodwin, *Form and Transformation*, 34.
[77] Thompson, *Growth and Form*, 201; quoting Henri Bergson, *Creative Evolution* (1911), 26.

of survival. And in Richard Dawkins, of course, the gene is the individual par excellence.[78]

We would have no trouble recognizing the ideological shape and hero of this story were we to read it in our own language, the language of liberal individualism, capitalism, nationalism, etc. As for Dawkins's selfish gene and other genetic determinisms, the conceptual split between genotype and phenotype, cause and effect, code and expression shares obvious features with such binaries as essence/existence, form/content, spirit/flesh etc. Again, we have read stories like this. And critiqued them, ad nauseam. There is no question but that accident, history, and survival are key players in the evolutionary story, and that genes set parameters for transmission. But none of these factors gets at the middle level: between, on the one hand, genetic coding for molecular structure, and on the other, the *longue durée* of evolutionary time. Beginning with the relationship between the cell nucleus (genetic stuff) and the cytoplasm, causality moves in both directions and so on all the way up the line to organism–environment interactions.[79]

Jerome McGann has called poetry the most densely coded of the genres.[80] I take this to mean that every action potential of the poem (correction, of the texts that we call poems, and especially of those offered and/or received as lyric) can become a feature, and every feature an element in a pattern and every pattern an organizing principle. I say this is especially true of lyric (see above) because poems so designated tend to be those which suspend the closures imposed by narrative, dramatic, and doctrinal structuring, which means that any and every structuring possibility remains alive. No feature becomes extrasystemic until its polysystemic possibilities have been exhausted (which is, never). The formation of these patterns (acoustic patterns, iconic, figurative, syntactic, stanzaic, metrical, and so forth) occurs through the application of simple local rules. Here is one: feminine rhyme. Where does the rule for it come from, the rule saying that lines ending on unstressed syllables are an informational code and thus each instance of it a feature? Not from the fact of two lines or even ten closing with a dying fall but from the global performance of the poem as a whole, which circles back (or doesn't) to target such endings as events, elements in a system. Your knowledge that feminine rhyme is likely to be a comic effect in the modern poetries is part of that global performance in the sense that attention patterns are contexts of reading. You hear the circularity—the hermeneutic

[78] Richard Dawkins, *The Selfish Gene* (Oxford: Oxford University Press, 1976), and *The Extended Phenotype* (Oxford: Oxford University Press, 1982).

[79] As an instance of this middle-level, epigenetic order of causality, Webster and Goodwin describe the way in which sex determination in certain kinds of alligators occurs during gestation and is controlled by water temperature. Another of their examples is the whorls produced in certain algae (Acetabularia) during embryonic development, that serve no function in the adult. Although the whorls are active during growth, the algae can grow perfectly well and even reproduce without them. The Darwinist perspective assigns such features to "hereditary inertia," in effect, merely identifying a problem; it cannot give a description at the level of generative process (*Form and Transformation,* 215). The alligators and algae are used to illustrate the failure of both genetic determinism and evolutionary theory to explain biological form where neither accident nor survival value applies (ibid. 79–80).

[80] Jerome McGann, *The Textual Condition* (Princeton, NJ: Princeton University Press, 1991), 13: a text is "a laced network of linguistic and bibliographical codes."

circularity, to be exact. How to determine the poem's parts until you have identified the whole, but how to do that until you have figured out the parts? My point is that rather than seeing this as a metaphysical mystery testifying to the uniqueness of poetry, or as a reader-response projection, or as an obstacle to both formal and historical explanation, we can see it as a property that poetry shares with very disparate phenomena and we can then draw on the growing understanding of those phenomena to illuminate the poetry phenomenon. That alone should justify not just modeling lyric but modeling it in this way.

Because it is so important in applications closer to home, let me rephrase what I said about boundaries being always up for grabs in systems like these. The system's external boundaries undergo a continuous selection process, which means that the system as such or as a discrete functional ensemble is never given in advance and never stable. That is because the system is not a thing at all, but a dynamics for bringing forth thing-like ensembles from elaborately meshed environments. What is inside or out at a given moment is enacted (that is the language) by the state of the system as a whole at that moment. Enacting a domain in our idiom (i.e., literary criticism) means referencing a context, hearing an intertext, choosing one particular copy or version of a work over another, or choosing one textual variant over another. It means instituting patterns of activity that repeat across different scales and are embedded in one another. For an analogy to this kind of boundary formation, recall evolutionary biologists' insistence on organisms and environments as the co-evolutionary unit (see above), a unit whose bounding line never stays put.

Another crucial feature of self-organizing systems is their nonlinearity, which means (among other things) that very small changes at one level can yield large outcomes at another. Which small changes will register (and, how small they may be) cannot be formalized or predicted; as before, those "decisions" depend on the history of the system. Here, an analogy might be to natural selection, and a phenomenon called preadaptation. Random variations produce opportunities and disadvantages that get activated or not depending on factors that only become factors, and on a field of them that only crystallizes as a field after the fact—i.e., after the organism as a whole, a developing field, has "motivated" the condition (as we might say). Consider in this context Eliot's long-ago posit of "The Tradition," which, with the introduction of the new, "the really new," undergoes a retroactive change, yielding reorganization of the whole.[81] We all know how tiny variations can produce huge outcomes in evolutionary development; and certainly many of us are even more familiar with how this happens in poems (poems in context; contexts in poems; and poems treated as autonomous). We also know how hard it is explaining this to students in analytic or linear terms.

What do self-organizing systems do, you might ask? What is their raison d'être? They make changes in themselves and they do it strictly as a result of their own situated operation. That is the one thing they share, the defining thing. Everything

[81] T. S. Eliot, "Tradition and the Individual Talent," *The Sacred Wood: Essays on Poetry and Criticism* (London: Methuen & Co. Ltd., 1920).

else that they do—in literature terms, lay bare the workings of ideology, affirm the status quo, release new affective and intellectual potentials, enhance perception, renew the language, create discursive communities; in nonaesthetic terms, switch from conduction to convection, create vortices out of turbulence, cause deflationary spirals—all these actions follow from that one rule of self-modification. You might say that the countless purposes served by systems of this kind (countless even for one particular system) are byproducts of their internal purposiveness, the caveat being that internal is always a historically governed negotiation. If you could get Kant and Bourdieu (Kant's aesthetic, Bourdieu's *habitus*—socially ingrained dispositions) to do a duet, that is the tune they would sing.

Let me return to that dense coding specific to poetry, because it suggests another point of comparison between lyric and self-organizing systems. The connections within lyric levels can also jump levels, exhibiting that nonlinear behavior I mentioned earlier, where small differences yield mighty results. So, for example, a collateral intertextual resonance—say, a muted Miltonic phrasing in a poem that seems not to heed it or need it—can leap to semantic prominence under certain global conditions, which are always also historical conditions. I like the way this tipping-point effect chimes with Jakobson's famous description of the poetic function as a "projection of the principle of equivalence from the axis of selection onto the axis of combination."[82] I take this to mean (among other things) that a contingent similarity relationship (A is like B; love is, in some respect, like a rose) jumps to a semantic level (A goes with B; love and roses are part of the same entity, or one is a part or attribute of the other). In other words, a level-jump from metaphor (the level of arbitrary signification, or linguistic construction, or naming) to metonymy, the onto-level of reference or mimesis. In this way, intention arises from nonintentional processes, necessity emerges from contingency, much as information arises from noise under certain conditions, or the way that design emerges from accident.

For a literary gloss, you might remember Shelley's puzzling claim early on in the "Defence of Poetry"[83] that poetry organizes language (he means, the *lingua franca*) once it has grown "disorganized" through overuse. Shelley's word choice seems odd, because we think of overuse leading to hyperorganization or rigidity, not disorganization. Strange, too, because we think of poetry (especially the modern poetries in which I include the Romantic, with their defamiliarizing projects) as scrambling, undoing, releasing, not organizing. Shelley's verb makes sense, however (as does his use of "order" throughout the essay), if it models the kind of

[82] Roman Jakobson, "Linguistics and Poetics," *Style in Language*, ed. Thomas Sebeok (Cambridge, MA: MIT Press, 1960), 358. (And see above, p. 248.)

[83] Percy Bysshe Shelley, *A Defence of Poetry* (Indianapolis: Bobbs-Merrill Co., 1901), 17–18: "Their language is vitally metaphorical; that is, it marks the before unapprehended relations of things and perpetuates their apprehension, until the words which represent them, become, through time, signs for portions or classes of thoughts instead of pictures of integral thoughts; and then if no new poets should arise to create afresh the associations which have been thus disorganized, language will be dead to all the nobler purposes of human intercourse."

process that I have been describing, one that requires randomness in order to provoke the level jumping that creates new meaning, that turns sound into sense.

Obviously there are important differences between knowledge-based systems, like poems, and physical-causal ones, like vortices. Although both project an agency effect (recuperating and then recreating it with a difference in an open-ended way), our inclusion in the poetic effect is a distinctive feature. To get at that, I go to a fairly recent work by cognitive philosopher Andy Clark—building on my acquaintance with his equally original earlier study, *Being There: Putting Brain, Body, and World Together* (1997). In *Supersizing the Mind: Embodiment, Action, and Cognitive Extension* (2008), Clark develops the model of thinking that he—and David Chalmers, in a landmark 1997 article—names "Extended," as opposed to the conventional, or so-called "Brainbound" model. In Brainbound, all thinking happens in the biological brain, which has entry channels at the perceptual interface (i.e., where world impacts body), and exit channels at the action interface, where body impacts world. By contrast, Extended "depend[s] directly and noninstrumentally upon the ongoing work of the body and/or extraorganismic environment." Clark says "noninstrumentally" to distinguish his model (like Graham Harman's: i.e., radical incorporation) from tool-use or environmentally supported cognition. "Extended minds," he writes (and we all have them), are "natural born cyborgs." They do engage in standardly described representing and computing; all Clark says is that some of our thinking some of the time may "supervene" upon activities and encodings that "promiscuously criss-cross the boundaries of brain, body, and world." When we think in this way, we are "testing the possibilities for incorporating new resources deep into [our] embodied acting and problem-solving routines."[84]

Thinking, on this view, is not a discrete event performed by a subject on an object, mental or otherwise, but a process of ecological self-assembly, in which embodied agents "exploit opportunities provided by dynamic loops, active sensing, and iterated bouts of environmental exploitation and intervention." Seeing the mind in this way means seeing minds and bodies as "open to deep and transformative restructuring, in which new equipment can become... incorporated into the thinking and acting systems that we identify with our minds and bodies."[85] The meaningful timespan here is that of the lifetime (going back to our earlier discussion, the ontogenetic scale), not the scale of evolutionary change. Readers will notice, by the way, that this picture of the mind is the exact opposite of sociobiology's.

Clark opens with a charming and powerful story. He shows us science historian Charles Weiner gleefully telling Nobel physicist Richard Feynman that he had just

[84] Andy Clark, *Supersizing the Mind: Embodiment, Action, and Cognitive Extension* (Oxford: Oxford University Press, 2008), pp. xxviii, 42. Clark holds the chair in Logic and Metaphysics at the University of Edinburgh. See Clark, *Being There: Putting Brain, Body, and World Together* (Cambridge, MA: MIT Press, 1997); Malcolm Ashmore, *The Reflexive Thesis: Wrighting Sociology of Scientific Knowledge*, (Chicago: University of Chicago Press, 1989); Andrew Pickering, *The Mangle of Practice: Time, Agency, and Science* (Chicago: University of Chicago Press, 1995).

[85] Clark, *Supersizing*, 29, 31.

discovered Feynman's original notes and sketches, which he called "a record of your day-to-day work." Feynman took umbrage at the phrasing, retorting sharply, "I actually did the work on paper." Weiner replied, "well, the work was done in your head, but the record of it is still here." Feynman: "No, it's not a record. It's working. You have to work on paper and this is the paper." Clark describes Feynman's "loop through pen and paper [as] part of the physical machinery responsible for the shape of the flow of thoughts and ideas that we take to be distinctively those of Richard Feynman."[86] The notations (and the notating) are as integral to his thought-process as are Feynman's short- or long-term memory, his grouping and comparing routines, computing skills, or anything else occurring inside his skull.

The test for genuinely Extended cognition is Clark's so-called Parity Principle. "If, as we confront some task, a part of the world functions as a process which, were it to be provided by goings-on in the head alone, we'd have no hesitation in designating it as part of the cognitive process, then that part of the world is (for that time) part of the cognitive process."[87] Example: when I was little, I added and subtracted by drawing the sides of a dice, using grouping and comparing techniques that now take place in my head. Small confession: what is really in my head is the image of the dice, not the grouping/comparing techniques. In other words, I still add and subtract like a cyborg.

Obviously, the argument is not that pencil and paper are cognitive, only that body-and-world-involving loops are part of an extended cognitive action that traditional bioprejudices have kept us from seeing. Clark prefers the term "routine" to "cognitive action," because it captures the developmental and analytic importance of habit and reinforcement. To think of thinking as coupling, recruiting, looping means seeing that process as a new systemic whole in its own right. I am reminded of how phenomenology first defined intersubjectivity: the intentions of subjects and the properties of objects as constituting an independent third thing, not a state of reciprocity (which is how most of us use the term now) and not an aggregate.[88] Cognition thus conceived is neither a recovery of information nor a projection; it is a process occurring in relation to particular tasks such that aspects of the environment—language, for instance—are called up into a net of knowing.[89] The hybrid ensemble of neural, bodily, and environmental elements brings into being for some period of time an emergent and autonomous network which enacts a world—"world" meaning a domain of significance for the organism.

Clark is quick to observe that language has always been a prime example of extended minds—a technological scaffolding allowing us to (1) simplify complex tasks, (2) achieve higher levels of computational expertise, (3) add new objects to the world (such as words and categories), (4) think about our own thoughts and selves, and (5) to some extent shape those thoughts and selves.[90] Katherine Hayles

[86] Ibid., p. xxv. [87] Ibid.

[88] Maurice Merleau-Ponty, *The Structure of Behavior* (Boston: Beacon Press, 1963), 13: "the properties of the object and the intentions of the subject... are not only intermingled; they also constitute a new whole."

[89] "Net of knowing" is Andrew Pickering's phrase, in *Mangle of Practice*.

[90] Clark, *Supersizing*, 44.

has observed that literature does not just enable cognition; it is a technology for transforming it (which is why she sees no need to defend the literariness of interactive cybertechnology).[91] Building on that thought, we might venture that the uses of language we want to call lyric are those that lend themselves to recruitment into our cognitive routines—routines primed by their own histories, which include our own histories, to enact those parts of the language environment we call poems in particular ways. Returning to Culler, perhaps this is why we continue to read lyric as dramatic monologue; it feels as if thinking is happening right now—the larger lyric "now"—as we read, but we are not sure quite where this thinking is happening, because it happens in or to or through an apparatus that both is and is not us, extending into the layered environments that make up our world.

Clark says that we "seem to be specifically designed to constantly search for opportunities to make the most of body and world... integrating new resources very deeply, creating whole new agent–world circuits in the process."[92] For many of us, the resource of poetry in general and lyric in particular has met the test for incorporation. The evidence? Back to Culler: "lyric is memorable language... [with] the power to embed bits of language in your mind, to invade and occupy it... The force of poetry is linked to its ability to get itself remembered, like those bits of song that stick in your mind." Many of the reasons for this are formal. Culler cites "rhythmical shaping and phonological patterning."[93] A better term for the kinds of reasons I have been exploring, is formational, pointing up a dynamic process rather than a result. I say "formational" to capture the dense coding unique to poetic language use; the incidence of parallel processing and bootstrapping; the frequency of level crossing and jumping; the fact that strictly local relations can precipitate global reorganization. Putting that into English: formal features are always getting taken up into semantics; the diegetic always deforming and displacing the mimetic; the working machinery of the poem altering with its own running, and the end altering the beginning. What I am saying, again, is that poetic organization of language approximates and joins in on brainwork. The two are isomorphic. And, as I suggest below, in one respect lyric closes even more firmly on cognition as such.

Before that, though let me add a bit more clarity to the important distinction I have already made, regarding earlier models of organism, adding to that some other potential lookalikes (e.g., structuralism and traditional formalism). The older models (the Coleridgean, the dialectical, even the deconstructivist) certainly tolerated flow, boundary-crossing, constitutive historicity, disequilibrium, recursion, and contingency, but the new models of form require such dynamics. "Holistic but nontotalistic" is how one student of complexity, Mark Taylor, describes the order of things that complexity comprises. Political theorist William Connolly builds on

[91] N. Katherine Hayles, *Chaos Bound: Orderly Disorder in Contemporary Literature and Science* (Ithaca, NY: Cornell University Press, 1990); "Introduction: Complex Dynamics in Literature," *Chaos and Order: Complex Dynamics in Literature and Science*, ed. Hayles (Chicago: University of Chicago Press, 1991); *How We Became Posthuman: Virtual Bodies in Cybernetics, Literature, and Informatics* (Chicago: University of Chicago Press, 1999).

[92] Clark, *Supersizing*, 42. [93] Culler, "Why Lyric?" 205.

William James's "radical empiricism" to develop what he, Connolly, terms a New Pluralism. In contrast to "organic holism" (the view that "the parts of a system [are] intrinsically tied to the larger whole that constitutes them"), Connolly posits "a world of connections punctuated by breaks and altered trajectories," wherein "the connections are typically loose, incomplete, and themselves susceptible to potential change. They do not add up to a complete whole and... never will. The connections are punctuated by 'litter' [or noise] circulating in, between, and around them."[94]

The key distinction is in the concept of the unit of study (organism, poem, entity) vis-à-vis its environment. For poems, environment can consist of referential contexts, intertexts, readers, cultural and literary systems, economic systems, other versions or texts of the same work, technological apparatuses. The list is endless. What is special about self-organizing systems is that the closure of the object of study is, as I said, operational and temporary, their environment enacted by the running of the system, with the system reflecting or being shaped by its own past runnings. Far from returning to a posit of an artwork isolated from the world (the well-wrought urn), self-organization points forward to the posthuman idea of meshing or "the interconnectedness of all living and nonliving things," the "mesh

[94] William E. Connolly, *A World of Becoming* (Durham, NC: Duke University Press, 2011), 33, 35; Mark Taylor, *The Moment of Complexity: Emerging Network Culture* (Chicago: University of Chicago Press, 2001), 140 (quoting Ludwig von Bertalanffy): "General systems theory... is a general science of wholeness which, until now, was considered a vague, semimetaphysical conception"; "To think what post-structuralism leaves unthought, that is, a nontotalizing structure that nonetheless acts as a whole... neither a universal grid organizing opposites nor a dialectical system synthesizing opposites but a seamy web in which what comes together is held apart and what is held apart comes together. This web is neither subjective nor objective but is the matrix in which all subjects and objects are formed, deformed, and reformed... which function holistically but not totalistically" (pp. 11–12); Levins and Lewontin, *Dialectical Biologist*, 136: "Unlike the idealistic holism that sees the whole as the embodiment of some ideal organizing principle, dialectical materialism views the whole as a contingent structure in reciprocal interaction with its own parts and with the greater whole of which it is a part. Whole and part do not completely determine each other." Bohm, *Wholeness and the Implicate Order*, 218: "throughout this book, the central underlying theme is the unbroken wholeness of the totality of existence as an undivided flowing movement without borders... the implicate order is particularly suitable for the understanding of such unbroken wholeness in flowing movement, for in the implicate order the totality of existence is enfolded within each region of space (and time). So, whatever part, element, or aspect we may abstract in thought, this still enfolds the whole and is therefore intrinsically related to the totality from which it has been abstracted."

What about poststructuralism? Deleuze alone offers no less than five paradigms of formal determinacy arising from irreversible process, fluctuation, messiness, nonequilibrium, and spontaneous level-jumping from local rules to global organization. There's the rhizome, the body without organs, the molar as opposed to molecular body, the fold, and deterritorialization. In the sciences, these metaphors would be termed "postclassical," departing as they do from seventeenth- through nineteenth-century science's commitment to universality, eternity, reversibility, and natural law determinism. All of them are attempts to think what I'd call the being of becoming, in contrast to being—singular or plural—as that which either grounds, moves through, or surfaces at the end of history. Deleuze's metaphors are models for how effective causalities arise out of aleatory processes, exactly the focus of today's biological, information, and physical sciences. They try to figure out how systems that are far more dynamic and shape-shifting than ours wind up producing effects that look just like intention. It may be that Poovey lumps poststructuralist theory with literary criticism so as to sidestep the force of poststructuralism's metaphors for part–whole, entity–environment, identity–history relations. I think she is right to do that, insofar as our criticism favored the deconstructive over the reconstructive element in Deleuze's metaphors. Where does this leave us?

consist[ing] of infinite connections and infinitesimal differences."[95] As for structuralism, on its own account, informational differences are binary, whereas for self-organization those differences are byproducts of the state and workings of the system as a whole. And binary is the last thing these differences are, since they show continuous movement between difference and identity without dialectical transformation and without a guiding hand. Looping and recursive is what they are, not binary.

I have introduced a lot of expensive equipment—lab equipment, one might say. What is the gain for lyric, and as philosophers often ask, how to pay for it? First let me explain the gain to me personally and maybe to others who teach poetry, especially Romantic poetry. The broadest, simplest definition of lyric, good for an introductory course and setting aside the older sense of lyric as song, might go as follows. A lyric poem is a representation of the experience of thinking and feeling (or, remembering, wishing, hating, etc.). Lyric both enacts thinking and feeling, and includes in the performance reflection on those processes, creating a spiral effect which seems to climb toward ever more encompassing and complex self-accounting. The general term for this effect is self-reflexivity, or the mind's return upon itself; the more specialized term is irony, Romantic irony.

Later in the semester, you will explain that the hallmark of lyric—its representation of inwardness—occurs with the splitting of narrative (the story that is told: mimesis, or *fabula*), from narration (the story of the telling: diegesis, or *syuzhet*). This split triggers a chain reaction, cleaving grammar from argument, form from content, and necessity from contingency. Collectively, these divisions reinforce the psychological and philosophical split within the subject, separating the reflecting mind from the object of its scrutiny. You tell your students that the aim of the poem is to reunite those domains, turning the dialogue of self and soul into a complex interior monologue.

Your students ask: why should the mere fact of representation instigate this cascading fission? One answer is language: with the positing of the "I"—objectification of a strictly processual inwardness—lyric allegorizes our fall into language, and within its own small compass, makes it happen all over again. Along similar lines, you might explain the workings of *le supplément* and of *différance*. Answers of that kind (grammatology) are probably the only precise ones, though they tend to fall flat in the classroom and even to your own ears. One wants to give a substantive explanation or at least one that is closer to the specificities of lyric.

When I yield to that impulse, I find myself stuck in one of two boxes. Cued by the Romantic lyric's structural troping of Christianity's fall-to-rise, and by that story's susceptibility to Hegelian and Marxist recoding (viz., self-enriching alienation), I answer the question teleologically. Why (quoting Coleridge) does the subject "becom[e] a subject by the act of constructing itself objectively to itself"? Or in a different key, why does God, "bright essence," emanate Christ, his "effluence"; or again, why, for Hegel, does *Geist* (roughly: spirit) divide into mind and

[95] Timothy Morton, *The Ecological Thought* (Cambridge, MA: Harvard University Press, 2010), 28, 30.

nature?[96] Answer: so that humanity may find and fulfill its project, to reunite spirit with matter adding the dividend of absolute self-consciousness. More narrowly, so that the reader of lyric may undergo this process of *Bildung*, of formation or education. The payoff of this process is the birth of thought about thought, which, while it forever blocks the eastern gate, the portal back to innocence or self-identity, at the same time establishes the subject's power to mediate all subsequent unities. It opens the westward passage. Masterful and melancholy, effective and ethical, the Enlightenment subject is born. That is one box.

Here is the other. Your best or most cynical students will see how self-serving your explanation is, how it glorifies this critical itch we all feel—the itch to "murder to dissect,"[97] and thus redeem and resurrect. They will demand a real explanation, not a just-so story, for the scission which launches modern lyric. Why that initial posit, that over-against? They will ask where that Christian–Hegelian perspective comes from: or, what motivates that Enlightenment and Romantic tarrying with the negative? Because they grasp the subject–object, mind–nature paradigm as part of the problem, you will set your new account in the domain of the body. You might suggest that the founding (and maybe not so fortunate) fall occurs in the domain of production (the laboring body), or the domain of desire (the Freudian or Deleuzian body), or the domain of power (the Foucauldian body), or the domain of race and gender (marked vs. unmarked bodies), or of empire, or more inclusively, of trauma. At a certain point, you will hear yourself saying in the domain of turtles, standing on other turtles.

The problem is this. On the one hand, one wants to stop offering explanation in the same terms as what we are trying to explain, or in terms of features essential to our experience of ourselves as believing, wishing, intending creatures. On the other hand, why must the closure of the artwork be modeled through a posit of exteriority or containment: as in politics, economy, sociality, materiality, and so forth, all variants of Jameson's synonym for history, i.e., "what hurts," spinoff from Lacan's "what resists symbolization absolutely"?[98] For many of us, the desideratum is an immanent form of explanation: not a translation of our analytic object but an unfolding—explication—of a pattern pleated into it, a pattern that repeats across other domains, scales, and states which we may call context or history, for instance, but not the outside or Other.

Let me state the obvious: anyone familiar with today's scholarship knows that we have developed ways of embodying this kind of understanding. In fact, that is probably why students and nonacademics find our explanations so maddening; that feedback loop between figure and ground, text and context, and our resistance

[96] Samuel Taylor Coleridge, *Biographia Literaria* (New York: Leavitt, Lord & Co., 1834), 157, chapter 12, thesis 6; John Milton, *Paradise Lost* (Aberdeen: John Boyle, 1784), 64, Book 3, l. 6; Hegel, *Phenomenology of Spirit*, trans. A. V. Miller (Oxford: Clarendon, 1977).

[97] William Wordsworth, "The Tables Turned," *Lyrical Ballads: Reprinted from the First Edition of 1798*, ed. Edward Dowden (London: David Nutt, 1891), 188.

[98] Fredric Jameson, *The Political Unconscious: Narrative as a Socially Symbolic Act* (Ithaca, NY: Cornell University Press, 1981), 102; Jacques Lacan, *The Seminar of Jacques Lacan: Book 1, Freud's Papers on Technique, 1953–1954*, ed. Jacques-Alain Miller, trans. John Forrester (New York: Norton, 1991), 66.

to privileging either domain. Or, consider both our intersectional and our remediation studies, which construct their object of inquiry not *in* the between of various domains but *as* the between. I would characterize these features, however, as procedural and stylistic, embedded in the critical practice; in my experience, this makes such understanding hard to convey in the classroom and hard to defend critically. What we could use are models that are large enough to help others learn from our practice and also, explicit enough to be studied in their own right.

Self-assembly or self-organization, the enactive sciences, complexity studies, and the like cast the continuous production of form (or selfhood, identity, entity), and the simultaneous production of context or domain of significance, as a special kind of positing. I put it this way first to bring out the echo with phenomenology and second to clarify its difference from representation. Neurophysiologists Varela, Evan Thompson, and Eleanor Rosch gladly acknowledge the kinship with phenomenology. "We reflect on a world that is not made, but found, and yet it is also our structure which enables us to reflect upon this world...we are in a world that...is not separate from us [and our reflection]." For enactive science, they write, this hermeneutic circle is not a problem: "cognition is not the representation of a pregiven world by a pregiven mind but is rather the enactment of a world and a mind on the basis of a history of the variety of actions that a being in the world performs."[99]

The meaningful feature of this kind of positing is that it happens without the over-against that for many of us defines representation. Its affinities are rather with Coleridge's formula for the Primary Imagination: "...repetition in the finite mind of the eternal act of creation in the infinite I AM." The key word there is "repetition," which suggests extension, addition, coupling, in Coleridge's phrase, "eddying," but not cutting, negating, cancelling.[100] It means starting from where you are, which means losing the metaphysical—or, maybe gaining it, by losing the "merely" physical. It means a logic of resemblance, not difference (and here I conjure Foucault's famous epistemes, the Renaissance and the Classical).[101] As I have said, self-organization offers a rigorously nondualistic and immanent history of becoming, and, what I did not say, is that it realizes one goal of dialectical thinking: i.e., to demonstrate the identity of identity and difference. Unlike dialectics, however, it does so without an initial act of curtailment whereby the entropic plenitude of existence crystallizes into determinate form. In losing that fiat, it also loses the (sad, empty, meaningless, etc.) remainder.

Self-organization offers a fresh perspective on the hoary concept of aesthetic autonomy, redefining both the *nomos* or law that the artwork or organism gives itself, and the self (organism, artwork) thus regulated. It lets us keep (or bring back) a model of poetic form while dissociating it from structure and intention. Or perhaps its model of intention amplifies the so-called achieved intention of 1950s

[99] Varela, Thompson, and Rosch, *Embodied Mind*, 3, 9.

[100] Coleridge, *Biographia Literaria*, 172 (ch. 13); for "eddying," see "Dejection: An Ode," and, in I. A. Richards, *Coleridge on Imagination* (New York: Harcourt, Brace, & Co., 1935), 152, 154.

[101] Michel Foucault, *The Order of Things: An Archaeology of the Human Sciences*, trans. Allen Sheridan (New York: Random House, 1970), p. xxii.

Neo-Aristotelians Richard McKeon, R. S. Crane, and Elder Olson, i.e., the Chicago School.[102] Self-assembly lets us drive context deep into the artwork's formation even as it shows how it is the form of the artwork that defines that context as its zone of significance.

My candidates for research and development: first, in the domain of textual studies, revolutionized by McGann's insistence, to which I will shortly return, on regarding each historical and physical instantiation of a literary work as constituting an original, as it were: i.e., a unique art object-event. More simply, McGann refuses the commonsense abstraction of work (say, "Kubla Khan") from both version (the 1816 edition) and copy (Coleridge's Crewe manuscript as remembered, then transcribed, by Byron, to whom Coleridge read it aloud).[103] My question—a formal question that I hope raises larger issues—is, how do we talk in a clear and rigorous way, rather than an intuitive way, about the work, by which I mean the entity that contains (or should we say, generates?) its different texts and versions. How might we theorize the status of the artwork in a way that respects the immanence of sociohistorical context to individuation, insisting on the uniqueness of textual and even physical and interactional instantiations but at the same time acknowledging the global phenomenon that organizes or arises from those forms? My second interest, which might be inferred from the previous discussion, is in substituting recursion for reflexivity as the privileged mechanism of lyric and by extension, of subjectivity. Reflexivity always arises from the primordial scission just noted, precursor to the *cogito*. Recursion, on the other hand, describes an iterative and embedding process from which, at a certain point, something that operates like self-awareness emerges, remaining, however, immanent to the processes that brought it forth. Recursion models a productivity requiring no initial cut, no negation (in the dialectical sense) and where the products, so to speak, cannot be figured as outputs, for they enlarge, or render more complex the system that engenders them rather than delimit it (see just above).

My question about the status of the literary work is related to my growing discomfort through the years, and evident throughout this chapter, with the never fully pondered or clarified decisions that we all make about what things, and what kinds of things, will count as context for the particular poem that we are reading or the problem we are solving, and also about how we decide where context ends for a given critical activity. I see nothing wrong with instrumental or pragmatic decisions; but why can we not have those and also deeper, more integral or immanent accounts of the thing? McGann's field-changing work flew in the face of long accepted editorial theory, the assumed goal of which was to establish the definitive text for each work examined. "Definitive" could mean the text closest to the author's original manuscript and/or print version, pruned of technical corruptions; it could mean the text representing the author's final expression of his intentions

[102] R. S. Crane, ed., *Critics and Criticism: Ancient and Modern* (Chicago: University of Chicago Press, 1952).

[103] Jerome McGann, *A Critique of Modern Textual Criticism* (Chicago: University of Chicago Press, 1983), 92–3.

(as in, the last edition corrected by the author); or it could mean a new composite version, as it were, built up by the editor's decisions about which of the author's changes were consistent with the author's or the artwork's (big difference) guiding intentions. McGann rejected all of these agendas by proposing that each version of a work, and each physical copy or text of that version, is defined by the "determinate sociohistorical conditions" under which "every text enters the world." Each text, thus, is as definitive, as genuine, as authoritative as the next. Each is what he terms a "transmissive interaction" that cannot be abstracted from its nexus of dynamic factual particulars.[104] For instance, Wordsworth's 1800 Preface to *Lyrical Ballads* and his 1802 version show both substantive differences (text added or deleted, lexical changes, punctuation) and physical differences (pagination, margins, typeface etc.), but they also differ in the sociohistorical environments they entered and activated. For McGann, the artwork not only materializes in a given context, it materializes that context—I would say, in a fashion that maps perfectly onto the entity–environment codetermination posited by Levins and Lewontin. Moreover, let us imagine that the Preface was printed in two formats in the same year, one a deluxe vellum and leather version, and the other a cheap pamphlet. In the view of contemporary editorial theory that has adopted McGann's position, these two editions of the essay constitute different essays, inasmuch as they instigate different interpretive "horizons"[105] and participate in different social formations. You can see here one huge payoff of McGann's contribution: it bridged the entrenched professional divide between students of the text or historians of the book—paleographers, editors, philologists—and, on the other side, critics (in the sense of *hermeneuts*). The job of the editor is neither to simplify nor to synthesize (as in traditional editorial theory) but rather to construct for each text the particular sociohistorical environment within which its material particulars signify in particular ways. The goal is to dissolve the work into its diverse material instantiations.

What then do we—and what does McGann, who continues to use such language—mean by "the work"? What do we reference when we ask our students to read Wordsworth's Immortality Ode? Is it possible to theorize the thing we name by a title as opposed to a thing, a particular thing, which we describe by a genealogy or locate by a set of sociohistorical coordinates? Of course, it may be that we use such terms as "the poem" or "the work" merely as a linguistic convenience, shorthand for the critically reconstructive work to come. But if we want to use the term in a meaningful way, what might we mean by it? Or, from another angle, does our gut sense that texts and versions, their uniqueness notwithstanding, are still part of a single work suggest something about the singularity and wholeness of our study texts and also about our cognitive habits?

[104] Jerome McGann, *The Textual Condition* (Princeton, NJ: Princeton University Press, 1991), 9, 11.

[105] Hans-Georg Gadamer, *Truth and Method*, trans. Joel Weinsheimer and Donald G. Marshall, 2nd edn. (London: Continuum, 1989), e.g., 269–74.

The work, unlike version and text, would seem to denote persistence and constancy over time, and thus, something that can be separated from particular users and uses. Or maybe the work is a supposition through which we posit the ultimate self-identity of very large but not infinite aggregates of texts and readings, but what is the point of so positing? Are versions and texts like Blakean states of the work, or is the work a state through which versions and texts pass, their giant form (in Blake's idiom, their Zoa?)[106] It is no accident that Blake provides language for this problem; here is an artist who hand-made every print and every edition of every work he composed, creating a distribution and consumption circuit wholly independent of the day's commercial press and generating a series of sui generis verbal/visual artifacts resistant to abstraction, homogenization, difference-splitting, and interchangeability. Must we say either that works engender texts and readings; or, from texts and readings we extrapolate the work that contains them? Neither seems to get it right. We need something else, something more like this: at a certain historical point, a flashpoint, texts give rise to the global properties that are the work, a self-organizing system. A "temporarily stabilized timespace structure in the coherent evolution of one and the same system," with "structure" grasped as "nothing solid, composed of the same components" nor a "differential relation within a system the boundaries of which are given from the outset, but rather a dynamic regime which puts ever new units, parts, and contents through the same organizational rhythm."[107]

Another angle on the matter comes into view when we ask what the phrase "interpretive horizon" means, the horizon established by the original "sociohistorical conditions" under which "every text enters the world." If each reading transaction yields a new poem, then what is the nature of the constraint—the horizon—imposed by the inertias of the history of that text? In what way do the various pasts of the version or text inhabit not just the present of reading but also the present of the work itself, if we can use that phrase? If works are "transmissive interactions," how does the particular interaction constituting that text summon up or include "the sociohistorical conditions" under which "the text enter[ed] the world"? Again, the answer will not line up with either internal or external determination; it will

[106] Among other things, this kind of thinking helps us respond to the kind of question put by Bill Brown, in "Introduction: Textual Materialism," *PMLA* 125 (2010), 24–8. Brown ponders the status of the literary work, which in light of McGann's arguments would seem a mere idealist abstraction from versions and texts. The problem: how to theorize the work in a way that respects the immanence of sociohistorical context to individuation (i.e., the uniqueness of textual and physical form) but at the same time acknowledges the global phenomenon arising from these "transmissive interactions" across space and time. To think of the work—not the Immortality Ode, 1807 version; and not the Ode, seventh printing of the 1815 edition, owned and annotated by John Doe; but just, "the Ode"—to think of that virtual reality as a self-organizing system of versions and texts chimes with an intuition many of us feel about the kind of unity, coherence, or self-identity possessed by a work which has no physical body, or rather, too many of them.

[107] Jantsch, *The Self-Organizing Universe*, 98, 6. 21, Page 6: "Emphasis is then on *becoming*—and even the being appears in dynamic systems as an aspect of becoming. The notion of system itself is no longer tied to a specific spatial or spatio-temporal structure nor to a changing configuration of particular components, nor to sets of internal or external relations. Rather, a system now appears as a set of coherent, evolving, interactive processes which temporarily manifest in globally stable structures that have nothing to do with the equilibrium and the solidity of technological structures."

have to involve something like a system of change, not that the work undergoes, but that the work is.

Referencing the work of Hans Zeller, McGann writes: "his proposal is that the editor must analyze textual variations not in atomic and seriatim fashion, but systematically, since each work—each text of a work—" (and now he quotes Zeller) "consists not of its elements but of the relationships between them." McGann adds, "Such relationships appear to the critic as purely textual formations, whereas in fact the textual relationships are only the signs of other historical and social relationships." The work of a textual history is to "illuminate the contours of the generic structural patterns and relationships which define the several constitutions of a particular work," to give a "schematic outline... reveal[ing] the systematic transformation which all literary works undergo in their production."[108] Could we say, then, that the literary work is a dynamic regime organizing versions and texts, just as an information flow might be said to organize facts? The work is larger than and different from its versions and texts, but it is at the same time nothing but those elements, or, rather, the systematic changes and relations among them. The work is not analytically reducible to its instantiations nor does it developmentally express them. Because the work is a history of processes of organizing time and space rather than an object within it, the work can tolerate changes in its parts, the kinds of changes readers (and revising authors) are always making. "Changeable too, but somehow 'Idem semper,'" to borrow one of Byron's signature slogans for himself and his poems.[109] Instead of thinking of the work as occupying or operating in a social field, one could conceive the social context, like the historical, as specified by the work, caught up in its organization of time and space. Within the work's force field, fact becomes information; surround becomes environment. The work conceived as a self-organizing system specifies the context in which it can operate as such, at the same time including that context in its network identity, as we have previously seen with literary and nonliterary systems alike. We, our readings, the social and historical realities presupposed and mobilized by our readings, and so forth, can be figured as the operations through which self-organizing systems (literary works, in this example) specify their boundaries. This is a way of thinking that allows us to keep or bring back the posit of poetic form but to dissociate it from structure and intention, either original or achieved, and also, to drive context deep into the artwork's self-constitution even as form defines that context. I attach a medley of phrases from McGann's study, *Don Juan in Context*, to show how closely self-organization approximates his descriptions of Byron's great poem: in *Don Juan*, "form is what emerges in the interplay of forces and things and persons, in events... Moreover, the form that emerges in the particular instant of accumulating realities does not, for Byron, emerge into or out of the mind. The perceiving mind... is only another element in the emergent form... Furthermore, the emergence of form must be surprising because it is always determined... by improbabilities: accidents, trivia, the unexpected, 'mere'

[108] McGann, *Critique of Textual Criticism*, 61–2.
[109] Byron, *Don Juan*, XVII, l. 83 (stanza 11, l. 3); "Idem semper": always the same.

possibilities." Byron described himself as a person "acted upon by what is nearest." So with *Don Juan*: "Form in [the poem] is what comes about. It is the means by which arrangements are actually made." It is "a network of patterns," a complex set of interacting forces and characters activated by the fortuitous method of the poem. "*Don Juan* has no 'form' only in... [an] essentialist philosophical perspective... the poem has its own coherence and unity, and it is both possible and necessary to speak of how the poem works out its designs."[110]

Maybe we have learned something about the kind of unity or coherence or self-identity possessed by a work, which has no physical body, only a history of material instantiations or events. And we surely learn something by coupling McGann's brilliant reading of form in *Don Juan* with self-organization theory. But *Don Juan* is a tractable poem for our purposes. It actively repudiates what it considered the idealist notions of form governing Coleridge's poetry, notions that Coleridge formulated in such phrases as "unity in multeity" (also "multeity in unity") and "the principle that all the parts of an organized whole must be assimilated to the more important and essential parts."[111] Do contemporary theories of self-organization, complexity, emergence etc. have any bearing on the kind of poem that Coleridge wrote, the kind that still, according to Poovey, serves as the model system for our critical writing, i.e., the Romantic lyric? (See Chapter 9, for a reading of "Frost at Midnight" that might answer that question.) Most important, the kind that enjoys pride of place in English department classrooms, where it remains our best exhibit for the teaching of close reading, to this day, the single defining skill of our discipline?

I spoke above of the apparatus overhead entailed by this model. Another, more general way to pay for this kind of costly equipment might be the research opportunities and description sharing we could do with disciplines not often part of our circle. As for pedagogy more generally, why not show students it is not just poetry that is conceptually hard or nonrational—what they call subjective: meaning, not lending itself to definitive formulation and lacking strict subject–object boundaries? What a breakthrough for them to learn that in many cases or on many levels, both the objects and the explanatory models of the sciences are as fluid, as inter- or multideterminative, and as comfortable with contingencies as are ours in the humanities. And, a bonus: we get to teach the biology and chemistry majors a form of critical thinking that might actually interest them.

For another gain, I return to Poovey's claim that lyric "governs the ways that critics treat their analytic object, even when this object is not a lyric poem." Today, she writes, "we teach our students to do to social identities what our teachers taught us to do to lyrics: break them down, reveal their slippery ironies and ambiguities, show what their wholeness conceals."[112] That is true, we still do that, but we also try to teach our students and ourselves how to put things together again in

[110] Jerome McGann, *Don Juan in Context* (Chicago: University of Chicago Press, 1976), 101, 115–16.

[111] Coleridge, "On Poesy or Art," *English Romantic Writers*, ed. David Perkins (San Diego: Harcourt Brace Jovanovich, 1967), 495; *Biographia Literaria*, 217 (ch. 18).

[112] Poovey, "Model System," 409.

ways that are (and cannot help but be) responsive to our own reality principle. All I mean by that bloated phrase is the generally acknowledged fact (indeed, the cliché) I referenced above: namely, that our era is characterized by varieties of wholeness that are different from those that obtained during my era of grad school and that colored our notions of parts and wholes, identity and difference, and thereby our practice of literary criticism.

The science thinking I have sketched lends support to what is probably the biggest recent innovation in humanities studies. I am speaking of thing-theory, part of a broader interest in reenchanting the object, transforming it from dead to vibrant matter, not by reference to sedimented production histories but through phenomenologies of use, exchange, regrouping, collecting, distressing, and incorporating. Self-organization theory carries that kind of narrativization deep into the structure and processes of the object, blowing apart the idealist–materialist binary in ways strongly endorsed by today's object-theorists.[113]

And then there is the holy grail of grasping lyric's grip on us (or, on some of us some of the time)—something to do with our shared mindfulness (literally?) with lyric. It means taking seriously that "resonance" I claimed at the beginning, between efforts to model lyric and student and colleague response.

Tiffany observes that you can learn things from making models that you cannot learn from either the blueprint or from empirical examples. He is especially interested in models of "phenomena that are, by their nature, inscrutable," like those in physics, math, weather systems, and poetry.[114] He explores modeling (toy-making, he calls it) as doing, not in the sense of applying knowledge (as in reverse-engineering), nor in the sense of conveying knowledge, like analogy, but of making it. In the same vein, Hofstadter speaks of models not as evidence-generating, legitimation devices but as discovery apparatuses, where intelligence is seen to arise from a special kind of analogy-making, one where the edges or identity of the two domains is not given in advance. Like metaphors, he says, but where you do not know the relation between the two domains in advance.[115] You can see (that is, Tiffany shows us) how Enlightenment empiricism, if pursued to the letter, can turn its founding episteme inside out.

As for formalism, we know its traditional meaning: a view of the work as autonomous with respect to its founding conditions as well as its conditions of reception, and

[113] Tiffany, *Toy Medium*, 6: "the history of philosophical materialism shows the equation of material and invisible phenomena," a "shared iconography."

The status, uses, validity, and "affordances" of models and/or metaphors in literary criticism badly needs theorizing, of a sort that would draw on current, recent, and classic work in history and philosophy of science, e.g., Michael Weisberg, *Simulation and Similarity: Using Models to Understand the World* (Oxford: Oxford University Press, 2013); Mary Hesse, *Models and Analogies in Science* (South Bend, IN: University of Notre Dame Press, 1970); Mary S. Morgan and Margaret Morrison, *Models as Mediators: Perspectives on Natural and Social Science* (Cambridge: Cambridge University Press, 1999); Lorenzo Magnani, Nancy J. Nersessian, and Paul Thegard, eds., *Model-Based Reasoning in Scientific Discovery* (Berlin: Springer Science & Business Media, 1999), as well as more humanistically-oriented work, such as Douglas Hofstadter's *Fluid Concepts and Creative Analogies*, and more empirically-based study such as Horst Henriks-Jansen, *Catching Ourselves in the Act*.

[114] Tiffany, *Toy Medium*, 3.

[115] Hofstadter, *Fluid Concepts and Creative Analogies*.

everything in between. What I have been describing, self-organization, could be termed a formalism in that, as I said at the start, its claims are operational, which means formal, albeit in a highly dynamic sense. The dynamism is all, however: on this view, the work is a system that comes into being at certain threshold states or under threshold conditions. And, it comes into a different kind of being—or, fails to materialize at all—under other conditions, conditions that do not belong to history or to the text or to the reader but to shifting configurations of all three, among others. A formalist criticism, thus conceived, would attend to generative principles not as immutable laws but as a logic working through, and changing, structures over time. My hope is that language of this kind will help to dissolve our deep sense that we somehow know what the terms "abstract" and "concrete" mean, and that they always mean the same thing. In place of that, consider both the epigraph to this chapter, from Stevens, the poet who, more than any other, challenges that seemingly changeless distinction, and this (not wholly or evenly Kantian) summary of Ernst Cassirer's observation: "Any comparison of the contents of perception with a view to abstraction presupposes a constructive act of identification in which these contents are thought *from the first* not as disconnected particularities but as an ordered manifold... The concept in its basic function—unification of a multiplicity—is a presupposition not a consequence of abstraction... [The concept] is the law of connection or relation between the elements which comprise a series and by means of which they acquire their cognitive identity. Such a series is not 'given' but constructed."[116]

I will close with two other uses of the term formalism that are apt for the topics entertained here. Among scientists, formalism means believing in the usefulness of devising logical models, i.e., forms or formulas. They are useful because they give us a way to translate phenomena arising from and reflecting highly contingent and particular relations into a form that can isolate what is necessary from an intentional point of view.[117] This translation process can show a great deal—obviously, not everything—of what is true about those contingently produced phenomena. It can, as Andrew Piper writes of the critical method he terms "topology," "reduc[e] complexity in the name of representing more complexity." In place of the "geometric continuity" of the book—"from the one-dimensional line to the two-dimensional page to the three-dimensional codex that is the sum of its two-dimensional parts"—"topology marks the entry into a textual universe of far greater formal and structural complexity."[118] But what is the force of the word "intentional" in the above definition of formalism? It would have to mean something like self-organizing in the sense of: as if it were an agent or action or person or process or system. Coupling that "as if" with a more familiar idiom, we might say, from the lyric point of view—following de Man, the "prosopopoeia" point of view.[119] That is the claim. No less, no more.

[116] Webster and Goodwin, *Form and Transformation*, 105–6.

[117] William Paulson, *The Noise of Culture: Literary Texts in a World of Information* (Ithaca: Cornell University Press, 1988).

[118] Andrew Piper, "Reading's Refrain," *ELH* 80 (2013), 388, 390.

[119] Paul de Man, "Hypogram and Inscription," *The Resistance to Theory* (Minneapolis: University of Minnesota Press, 1986), 44–50.

Finally, back to Moretti who quotes Novalis: "Theories are nets... and only he who casts will catch." We are advised not to evaluate these nets or theories as ends in themselves but for "how they concretely change the way we work." Alluding to this—to a way of working—and closing on a personal note, Moretti assures readers who remember his work "within the Marxian problematic of the 60s and 70s," that he is still plowing that field, still exploring the "great idea of that critical season," namely "form as the most profoundly social aspect of literature: *form as force*."[120] That is also my personal note.

[120] Moretti, *Graphs, Maps, Trees*, 91, 92.