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Experience and nature in pragmatism and enactive theory

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Abstract
Enactive theory seems to be reaching a critical juncture in its evolution, as it expands beyond cognitive science to include a project that Shaun Gallagher has called "new naturalism": a "phenomenologized" reconstruction of nature, directed by a distinctive view of experience that is itself a product of "naturalized phenomenology." This article aims to contribute to conversations about how to move forward with this project by highlighting important parallels between the trajectory of enactive theory and the early history of pragmatism. Pragmatism was first developed by Peirce, James, and Dewey out of a distinctive view of experience that strongly resembles that of enactive theory. Then, during the first third of the twentieth century, pragmatism evolved into a philosophy of nature and played a leading role in a reconstructive project much like the "new naturalism" proposed by Gallagher and others. Around midcentury, however, this project was largely abandoned as philosophers turned to problems of more limited scope. This history raises crucial questions for proponents of enactive "new naturalism": Why did the pragmatist version of this project fail to achieve its aims? And how will it be different this time?

Keywords Enactive theory · Pragmatism · Naturalism · Phenomenology · Philosophy of nature

1 Introduction

Consider the following story:

> Once upon a time, before the turn of the century, a new approach to cognition was set forth by a group of scholars actively involved in both philosophy

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and experimental science. At the core of this approach was a distinctive view of experience. It argued that prevailing theories of cognition were trapped by the Cartesian assumption of a fundamental divide between the subject and the world. It saw this dualism as the cause of a widespread tendency to misunderstand or minimize the role of experience in cognition, leading to futile attempts to establish certain foundations for knowledge. It argued that no such divide could be found in experience and that no such foundations were possible, nor were they needed, and it proposed a new approach based on a nondualist view of experience. Then, after the turn of the century, as its view of experience continued to evolve and make new demands, it argued that the basic theoretical presuppositions of science should be reconstructed so as to accommodate experience within a radically different understanding of nature.

As readers have probably guessed, this story has been specially constructed so that it can be applied to the histories of both pragmatism and enactive theory. The point of this exercise is to highlight an important parallel: in each case, a commitment to a non-dualistic view of experience leads to an ambitious project of philosophical reconstruction—a "new naturalism"—for which a naturalistic but non-reductive understanding of experience is pursued via the "experientializing" of nature. In what follows, I will tell this story two more times, first recounting the history of enactive theory from 1991 to the present, and then the history of pragmatism from its beginnings to the middle of the last century. By presenting these stories side by side, I hope to do more than just indicate key parallels. Taken together, they constitute an argument in support of enactive new naturalism as well as an attempt to clarify the obstacles that threaten to hinder its progress. The story of pragmatism is being presented here not just as an important precedent, but also as a cautionary tale.

The essay is divided into two parts, corresponding to the two histories. The aim of the first part is to show that recent developments in enactive theory—the turn toward philosophy of nature as well as calls for the radical reconstruction of science (see, e.g., Gallagher, 2017, 2018, 2022a)—can and should be seen as emerging naturally out of the core commitments and ideas of enactive theory as it was first conceived. That is, given the commitment of enactive theory to naturalism and to a non-dualistic view of experience, and given its principal ideas about the importance of experience to cognition and the need for circulation between experience and science, confrontation with deep and far-reaching questions about nature and science is inevitable. As argued recently by Evan Thompson, Adam Frank and Marcelo Gleiser, we cannot have an adequate science of mind without addressing the fundamentally "experience-blind" concept of nature presupposed by modern science (Frank et al., 2024).

The aim of the history of pragmatism recounted in the second part is twofold. First, it aims to bolster the argument of the first part by showing that a similar development has occurred before, and for similar reasons. Pragmatism emerged out of similar commitments, and it also attempted to reconstruct the scientific view of nature so as to make room for experience. In other words, I want to show that history is repeating itself, at least in certain respects. Indeed, if the stories told here are accurate, we should expect history to repeat itself: that is, we should expect a similar development to occur whenever similar commitments and ideas about experience take hold.

However, I do not think that that history is *just* repeating itself and, as I have just indicated, one of the main purposes of this essay is to help enactive theorists avoid failures of the past. Thus, the second aim of the pragmatist history is to call attention to the fact that a project very similar to enactive new naturalism was undertaken by pragmatists at the beginning of the last century, and it did not end well: it failed to have its intended impact on science and was largely abandoned by Anglo-American philosophy around midcentury. Moreover, by calling attention to this fact, I want to press the following questions: Insofar as the earlier version of new naturalism failed, *why* did it fail? For those of us who want the latest version of new naturalism to succeed, what should we learn from this failure? How might we ensure that history does *not* repeat itself?

Admittedly, these are complicated questions about which I am still searching for answers. In the conclusion, I will highlight several important respects in which enactive proponents of new naturalism are better positioned than their pragmatist predecessors. I will also indicate what I believe to be the most serious obstacles to new naturalism, especially those stemming from the institutional environment of professional science and philosophy. I do not offer any clear solutions, but I hope at least to show that careful consideration of the history of pragmatism has much to offer present discussions of the future of enactive theory.

It should be acknowledged at the outset that enactive theory has developed from the beginning in explicit relationship to precedents in pragmatism (Varela et al., 1991, p. 234). Connections between enactive theory and pragmatism are well known and have been given more thorough treatment elsewhere (e.g., Gallagher, 2022b). What I have not seen, however, is any consideration of the bigger picture to be presented here. Also, although my sympathy for enactive new naturalism should be clear, my purpose is not to defend its ideas about experience and nature. Indeed, if my argument has a take-home message, it is this: to carry out the reformist aims of new naturalism, new ways of thinking about experience and nature are not enough; the institutional environments of philosophy and science must be changed so that these ideas can be widely received and put into practice.

2 Experience and nature in enactive theory

The following account focuses on two works widely regarded as the most important statements of enactive theory: *The Embodied Mind: Cognitive Science and Human Experience* by Francisco Varela, Evan Thompson, and Eleanor Rosch (1991), and Thompson's *Mind in Life: Biology*, *Phenomenology*, *and the Sciences of Mind* (2007). My purpose is to show how the development of enactive theory as an experience-based theory of cognition leads to questions about nature. This orientation is largely implicit in the first work, but becomes explicit in the second. Then, in a third section, I briefly discuss the recent emergence of "enactive philosophy of nature" and its posture of "new naturalism."

2.1 Experience and nature in *The Embodied Mind*

Before entering into a discussion of *The Embodied Mind* (hereafter, TEM), let us set the stage with a quick sketch of the context in which TEM was written.

The key feature of the "cognitivist" mainstream against which enactive theory emerged is the separation of cognition from experience. Although the causes of this separation can be traced back much further, the ascendance of behaviorism and then computational theory in the twentieth century led to the confinement of experience to a minor role in cognition or even to its total exclusion. Once this marginal or epiphenomenal status was established, experience could be seen as providing at most a weak constraint on cognitive theory (TEM, pp. 37–57, esp. pp. 48–57). Importantly, however, proponents of cognitivism have generally retained intentionality as an essential feature of cognition qua representational process (pp. 50, 52). The success of cognitivism arguably depends, therefore, on the possibility of separating experience from intentionality.

In anticipation of later discussion, it should be noted that the separation of experience from cognition and intentionality was *not* a prominent feature of the intellectual landscape in which pragmatism developed. Rather, it belongs to a major shift of thought that occurred over the course of the twentieth century. As recounted by the philosopher Crane (2019), whereas consciousness was widely understood at the beginning of the century as a "central and defining feature of the mind" and as closely related to intentionality, by the end of the century, these were "typically treated as distinct, separable phenomena" (p. 78). Moreover, this separation involved thinking about consciousness a certain way, which Crane calls the "phenomenal residue" concept of consciousness as "primarily a sensory phenomenon, with the sensory element itself conceived of as something inexpressible, indefinable, inefficacious and separable from the rest of mental life" (p. 94).

Against this background, TEM presents a complex argument that combines a penetrating critique of the cognitivist paradigm with the presentation of an alternative approach based on a radically different view of experience. On this view, cognitivism is doubly mistaken: it fails as a cognitive theory and assumes a false concept of experience, something like the "phenomenal residue" concept described by Crane. Moreover, these flaws are seen as related: to overcome the limitations of cognitivism, cognitive science needs to embrace a much fuller understanding of experience, such as that offered by phenomenology. In the next few pages, I present a stripped-down version of this argument to show how far-reaching questions about nature have been inherent to the enactive project from its beginning.

As argued in TEM, cognitivism requires that the relevant structures of cognition—domains, problems, objects, and features—are somehow "pregiven" or prespecified (pp. 147–148). However, when we consider the way in which these structures depend on the situation and task at hand, not to mention the enormous depth of determinable structure that is potentially relevant, the burden of prespecified structure is simply too great. Together with this criticism, TEM proposes that structures of cognition can be specified through and in the midst of cognitive activity. This is the core thesis from which enactive theory gets its name: the mind enacts the structures to which it responds, effectively "laying down a path in walking."

At the risk of making too much of a single word, I want to highlight a key implication of the term *enaction*. In ordinary usage, to *enact* a law is essentially to bring a new form of social order into existence. Likewise, as applied to cognition, it means to "bring forth" a new form of order, one that relates the organism to its environment in a particular way. Accordingly, by choosing this term for their approach, Varela, Thompson, and Rosch are suggesting that to understand cognition we have to understand how new structures come into being.[1]

In this basic form, the enactive thesis should be understood as more of a heuristic than a description of how cognition works (cf. Vörös, Froese, & Riegler, 2016, p. 192). Even so, to function as a heuristic, it must make a nontrivial claim about what it means for cognition to be enactive in the sense just described. I suggest that the hallmark of enaction, at least as originally presented, is a circular process of mutual specification. Indeed, circularity is the main theme of TEM, as clearly indicated by the authors themselves (pp. 12–14, pp. 237–239) and by the variety of examples they discuss throughout the book: the need for continuous circulation between experience and cognitive science, the continual self-creation or *autopoiesis* of organisms in relation to their environments, the dependent co-origination of self and world, and the circularity of perception and action. Accordingly, whatever else it may turn out to be, the "bringing forth" of structure involves a circular process of mutual specification.

Notice, however, that some of the circularities just mentioned are inherently experiential (self-world; perception-action), while others are amenable to "third-person" scientific description (organism-environment). This mixture is essential to enactive theory, but it also poses a fundamental question: How are we supposed to understand the connection between the kinds of circularity uncovered by phenomenology and the kinds of circularity that can be described by science? In other words, how should we understand the connection between enaction and experience?

Some connection between enaction and experience is obviously intended by Varela, Thompson, and Rosch; no one who reads TEM should doubt this. But the precise nature of this connection is left open to interpretation. Moreover, what makes the enactive thesis heuristic is not just the need for further specification, but also expectation that the work of specifying this connection will change our understanding of both experience and the biological processes on which experience depends. When the circularity of experience as described by Merleau-Ponty is connected with the circularity of life as described by autopoietic theory, it is expected that both will be destabilized and set into motion; the goal of enactive theory is not merely to figure out how to map one onto the other. This open-ended orientation makes enactive theory itself into a path made in walking, a path that leads eventually to questions about the place of experience in nature. It is also a liability, however, as the very same open-endedness leaves room for interpretations that avoid these questions by minimizing the connection between enaction and experience.[2]

This ambiguity is present from the beginning, as some arguments in TEM imply that enaction can be realized by systems that are clearly devoid of experience, while

[1] For extensive clarification and elaboration of this point, see Di Paolo (2023).

[2] For example, the "radical enactivism" of Hutto and Myin (2013, 2017) reduces cognition to a relation of covariance, and has been criticized by Thompson (2018) and Noë (2021) for its neglect of experience.

other arguments seem to make experience essential to enaction. For example, at one point, the enactive thesis is formulated as the claim that structures of cognition are "self-organized" and illustrated with a simple cellular automata model (pp. 151–157). The authors acknowledge that this model is "a far cry" from experience; nevertheless, they offer it as a "*minimal* example of how an autonomous system brings forth significance from a background" (p. 156). At the same time, insofar as consciousness exemplifies the enactive nature of cognition, phenomenology is clearly needed to articulate what it means for cognition to be enactive in a more general sense. Specifically, in TEM, the enactive thesis is articulated by the phenomenological argument that the structure of conscious cognition—the intentional positioning of a subject vis-à-vis a world—is brought forth by consciousness from its own background of embodiment (pp. 149, 173). This argument, that consciousness is involved in the structuring of its own cognitive activity, entails both a phenomenological claim about the nondual nature of conscious experience and a potentially far-reaching claim about the role of experience in cognition.

One could argue, therefore, that the phenomenological argument for nonduality is a mainstay of enactive theory (ca. 1991), as it grounds the enactive thesis in experience while providing crucial support for the overarching goal of re-integrating experience and cognition. Yet the non-duality of experience is by no means self-evident; it needs to be argued.[3] It can be argued by pointing out that experience contains no clear and distinct division between subjective and objective aspects or parts.[4] Or it can be argued that all features of experience are specified by continuous cycles of perceptually guided activity, such that "the properties of the object and the intentions of the subject…are not only intermingled; they also constitute a new whole" (Merleau-Ponty, cited in TEM, p. 174; cf. Dewey, 1896).

This is not the place to argue for the nonduality of experience. I merely want to emphasize the clarification and support that this view provides for the enactive thesis. It strengthens the connection to circular causality, and it clarifies that enaction does not bring forth structure from a totally unstructured background. As argued in TEM, the background that embodiment provides for experience is richly structured by a history of sensorimotor interaction (pp. 3–4, 9, 173). What is brought forth is the specifically intentional structure of experience. The present object and subjective aim of experience, that which makes experience a cognitive activity undertaken by a subject vis-à-vis a world—these are not given to experience but something that experience actively constitutes.

What implications does this view of experience have for our understanding of nature?

[3] It should be clarified that although enactive theory rests on claims about experience, not just any perspective on experience will do. To qualify as a phenomenological constraint on cognitive science, whatever we say about experience should be the result of disciplined and rigorous investigation (e.g., see p. 23).

[4] This is not to deny that experience *seems* to contain subjective and objective parts, and it does not mean that any such distinction is without warrant—it may be practically indispensable. The claim is that the division of experience into subjective and objective parts is not simply *given* to experience, not in the way that could provide a foundation or fixed ground for knowledge. The early pragmatists made the same point (see below).

First, the more active role given to experience in cognition not only calls out for a naturalistic understanding of consciousness but considerably raises the bar for this understanding, at least in comparison to the "phenomenal residue" concept briefly discussed above. For the latter view, experience is presumed to be a natural phenomenon, but its explanation as such can be postponed indefinitely. In contrast, for the enactive view, the causal embeddedness of experience in the natural world is presupposed—but not explained.

Second, although the enactive thesis does not conflate cognition with consciousness, it implies that whatever is cognitive must share something of the enactive character of consciousness as disclosed by phenomenological investigation. This *could* mean that whatever is cognitive must be at least minimally experiential, or experiential in some respects, although that possibility is not raised in TEM. Whatever the case may be, the implied demarcation criterion—cognition must be enactive in the sense exemplified by consciousness—carries special demands for our understanding of cognition as a natural process.

Third, it could be argued that the broader argument in TEM for "circulation" between experience and science (pp. 3–15, p. 238) already points to the need for reconstructed concepts of nature and scientific explanation. Circa 1991, however, the stance of enactive theory with respect to philosophy of nature is more circumspect. Indeed, such an ambitious project of reconstruction might seem to be precluded by the disavowal of any intention to "build some grand, unified theory, either scientific or philosophical, of the mind-body relation" (p. xvii). On the other hand, in light of the project set forth in TEM, this disavowal is perhaps best understood in methodological terms: insofar as reconstruction is needed, it should arise *a posteriori* from the circulation between experience and science. What is being disavowed is the kind of systematic philosophy that starts a priori from first principles.

And, in fact, soon after the publication of TEM, it became apparent that a more explicitly reconstructive stance was required. In the 1990s, Varela and others created a phenomenology and cognition research group in Paris, and the activities of this group led to the publication of an edited volume that directly confronts the challenge posed by the "naturalization of phenomenology" (Petitot et al., 1999). In the introduction of this volume, the editors discuss five different strategies of naturalization and raise the possibility that an "enlargement of the concept of nature" is needed (pp. 68–71).[5]

2.2 Experience and nature in *Mind in Life*

The story now jumps forward to Evan Thompson's *Mind in Life* (2007; hereafter MIL). In this work, the central question of the relationship between experience and enaction is brought more fully into the open, but also made more complicated by the evolution of enactive theory since TEM.

Early in the book, Thompson highlights the cognitive unconscious as a "large problem-space in our attempt to understand human cognition," pointing out that

[5] According to Dan Zahavi, a follow-up volume to be called "Phenomenologizing Natural Science" was planned but never completed (2013, p. 39).

"most of what we are as psychological and biological beings is in some sense unconscious" (p. 12). Although Thompson does not make this point explicitly, I suggest that what makes this nonconscious realm of cognition so problematic for enactive theory is the requirement that it must be enactive in whatever sense is sufficient for cognition. Nonconscious cognition cannot consist of fixed operations on pregiven structures without undermining the entire enactive project. This problem space puts added pressure on enactive theory to clarify the conditions of enaction and its relation to experience, and, as I have just pointed out, this task has major implications for our thinking about nature.

In the decade following TEM, one of the most important developments in cognitive science was the ascent of dynamical systems perspectives (e.g., Port and van Gelder, 1995), which were readily embraced by enactive theory as scientific allies. For meeting the challenge of unconscious cognition, however, the alliance of enactive theory with dynamical systems theory is a mixed blessing. Although the dynamical systems approach supports the extension of enaction to nonconscious cognitive processes, it begs the question of experience, while at the same time raising new questions of how cognition is to be distinguished from various kinds of structural coupling found throughout nature. Also, the embrace of a dynamical systems approach has sometimes resulted in a minimalist version of enactive theory, with overly restrictive criteria for the naturalization of phenomenology.[6] The import of dynamical systems theory for enactive theory depends on how we understand the ambitions of the latter: is it primarily an attempt to purge cognitive theory of representational baggage or is it something more—an attempt to integrate experience and science?

By the time that MIL was published in 2007, these questions had already gone through several iterations, as indicated by Thompson's incorporation of a dynamical systems perspective into a focus on embodied skill— "embodied dynamicism"—that is partnered with phenomenology. In turn, this marriage of embodied dynamicism and phenomenology results in two further key developments of enactive thought that are presented and carried forward in the second and third parts of MIL.

The first of these is what has since been called the "Jonasian turn" in enactive theory. In the late 1990s, Varela and Thompson were simultaneously influenced by Hans Jonas's view of life as intrinsically teleological (1966). In brief, the result was a revision of autopoietic theory that understands the self-constitution of life as driven by norms or values that are enacted by the organism in the face of its own precariousness. This view, set forth in seminal articles by Andreas Weber and Varela (2002) and Di Paolo (2005), and expanded on by Thompson in MIL (see pp. 126–165), goes significantly beyond the perspective of TEM.

What has changed? Enaction is now clearly more than mutual specification, insofar as specification of structure is now understood to be directed by values that are enacted by the organism. The enaction of value therefore has a certain priority as a condition for cognitive behavior, and it constitutes a fundamental asymmetry in the relationship between organisms and their environment (Barandiaran et al., 2009). It also indicates a new demarcation criterion: only autonomous systems capable of enacting their own norms can be cognitive. Finally, it confirms that even if structure

[6] See n. 2 above.

is not brought forth from an unstructured background, neither is all structure derived from structure. Rather, enaction is driven by some kind of conatus that brings structure into being.

The ascription of a conatus or existential concern to all forms of life has been criticized as anthropomorphism (Villalobos & Ward, 2016; De Jesus, 2016; cf. Kee, 2021). Certainly, any claim about the experiential nature of (presumably) nonconscious processes needs to be clarified and defended. But to reject such claims simply because they seem anthropomorphic or insufficiently naturalistic is to beg the very questions being explored by enactive theory. Also, the term "Jonasian turn" implies that enactive theory has been hijacked and made to deviate from its original path. But the development that goes by this name has multiple motivations, and once these are acknowledged, it is arguably not a "turn," nor is it necessarily "Jonasian."

Consider the continuity thesis set forth by Thompson in MIL (pp. ix, 128–129, passim). This thesis is sharpened by a Jonasian view of life, but it does not depend only on this view. I have just pointed out that a critical problem space for enactive theory is the realm of nonconscious cognition. Although this realm is frequently discussed within the context of our own bodies, the crux of the problem that it presents is the same as that presented by the Jonasian view of life. Again, once committed to the position that all cognition is enactive but not all cognition is conscious, enactive theory must clarify how enaction is continuous across conscious and nonconscious processes. Whether we are talking about nonconscious aspects of the human body or nonconscious forms of life, the challenge is basically the same.

The "Jonasian turn" is not just about the continuity of life and mind, however. It is also a claim about teleology, normativity, and value as essential features of the cognitive behavior common to all living beings. And this complexification of the enactive thesis can be motivated in other ways. In the third part of MIL, Thompson draws upon Husserl's phenomenology to present an enriched view of the enactive nature of consciousness.[7] This view arguably constitutes yet another key development in the evolution of enactive theory. To the picture of consciousness as a self-constituting activity that was described in TEM primarily in terms of nonduality and the circularity of perception and action, Husserlian phenomenology adds (1) a distinctively flow-like temporal continuity that connects present experience with its receding past and its indeterminate future and (2) an affective tone that gives to conscious activity an intrinsic motivational impulse and aim (see also Varela & Depraz, 2005). Insofar as these two features—temporal continuity and intrinsic motivation—are understood as essential to consciousness as a circularly self-constituting activity, they raise the question of whether they are also essential conditions for enaction per se.

In other words, if enactive theory accepts this Husserlian analysis of the temporal and affective nature of consciousness, it is pressed by the problem of nonconscious cognition to decide whether and how to ascribe these features to nonconscious processes of the body and forms of life. For example, it raises the question of whether we

[7] I am referring especially to a pair of chapters, "Temporality and the Living Present" (pp. 312–359) and "Primordial Dynamism: Emotion and Valence" (pp. 360–381). I have the impression that this third part of MIL is not discussed as frequently as parts one and two, despite evidently strong connections, as I indicate here.

should understand some kind of "primordial affectivity" as an inherent feature of life qua self-constituting activity (e.g., see Colombetti, 2014). Moreover, even if we set aside nonconscious cognition and the continuity thesis, this enriched view of enaction has potentially far-reaching implications for our understanding of nature, as Thompson acknowledges (pp. 356–359). Earlier, I pointed out that every feature added by phenomenology to our understanding of consciousness raises the bar for a naturalistic understanding of its role in cognitive behavior. At minimum, if consciousness is "a temporal flow of intentional experiences related to each other motivationally" (p. 356), nature must be understood as allowing for this kind of process to emerge. Thompson concludes, therefore, that "in bringing the resources of phenomenology to bear on our understanding of nature, the very idea of nature is transformed" (p. 359).

2.3 Enactive philosophy of nature and "new naturalism"

The conclusion that enactive theory requires a reconstructed concept of nature has been reached by others, including Dan Zahavi and Shaun Gallagher, two prominent proponents of naturalized phenomenology (Zahavi, 2004, 2013; Gallagher, 2017; 2022a). Some have gone so far as to suggest that enactive theory is best thought of as a "philosophy of nature" (Di Paolo et al., 2017, p. 253; Gallagher, 2017, pp. 21–24; 2018; Meyer & Brancazio, 2022).

The reconstructive orientation toward nature that has emerged within enactive theory over the past two decades has been recently characterized by Gallagher as a "new naturalism" (2022a, pp. 22–24). Although this term is not widely used in the enactive literature, it aptly expresses the enactive commitment to engagement with science together with the conviction that science requires some basic shift of thinking (yet to be determined). Behind the stance of "new naturalism" is the conviction that the truth of scientific naturalism depends on the concept of nature that frames, guides, and interprets the work of scientific inquiry. Moreover, it argues that for naturalism to be true we have to find some way to incorporate the findings of phenomenology into our understanding of nature. According to Gallagher,

> There is a truth of naturalism predicated on *that* conception of nature. In this respect, naturalizing phenomenology is actually a kind of phenomenologizing naturalism. Rethinking nature in this way, also means we have to rethink science—not just science as it is practiced by the experimental scientist, but our theoretical concept of science, or science as we know it (p. 28; italics added).

It would be difficult to overstate the scope and complexity of the project proposed by Gallagher in this passage. Because of the way concepts of scientific explanation are entangled with concepts of nature, the requisite change must be articulated at a rather abstract level while being demonstrated by specific programs of research. In other words, it must be possible to show that a satisfactory kind of explanation, which scientists would recognize as such, can be achieved within a different conceptual

framework.[8] It is hard to imagine how such an ambitious project of reconstruction could proceed without close collaboration with and among scientists from multiple fields, including physics.

It is therefore not surprising that discussions of "enactive philosophy of nature" have so far been largely aspirational and schematic. Within the circles of enactive theory, arguments for the need to re-think nature go back at least 25 years (Petitot et al., 1999), while comprehensive proposals about *how* to re-think nature, and attempts to engage seriously with physicists on this matter, remain scarce. But they do exist.

Gallagher has provided a glimpse of how enactive philosophy of nature might proceed in an article (2018) that proposes to replace the "classic" non-relational and reductionistic concept of nature with a thoroughly relational concept. Tom Froese, in collaboration with physicists, has launched a program of research that confronts the "problem of efficacy"— the causal efficacy of experience—from perspectives of thermodynamics and dynamical systems (e.g., Froese & Karelin, 2023). Meanwhile, Thompson has joined with the physicists Adam Frank and Marcelo Gleiser to write a manifesto of sorts, a call for philosophers and scientists to work together to integrate experience into a new scientific worldview (2024). Though few in number, the prominence of these examples indicates that the reconstructive strand of enactive theory is reaching a critical juncture, as it goes beyond the life sciences to engage with physics and transform itself into a full-blown philosophy of nature.

What will this project look like? What are its main goals, not only with respect to how we think about experience and nature, but also with respect to the way in which research is done? Who will take part, and how will it be carried forward within the present academic environment? And what we can we learn from past efforts?

3 Experience and nature in pragmatism until midcentury

What follows is a highly condensed account of the initial development of pragmatism, focusing on three phases. First, in the early years leading up to the articulation of pragmatism, Peirce, James, and Dewey developed a distinctive view of experience that strongly resembles the view developed a century later by enactive theory. Second, in its heyday during the first third of the twentieth century, pragmatism took a leading role in the development of a "new naturalism," a reconstructive project much like that proposed by Thompson and Gallagher. Third, from the 1930s until midcentury, pragmatism underwent a decline or "eclipse," which I will argue is best understood as the near total abandonment of this reconstructive project.

[8] This requires the abstraction of ideals of scientific explanation from the metaphysical commitments that have embodied these ideals in the past. For example, the principle of sufficient reason is arguably a regulatory ideal of scientific explanation that over time has become nearly inseparable from metaphysical commitments to exhaustive mathematization, determinism, ontological reductionism, the inviolability of physical laws, etc. If so, alternate forms of scientific explanation that reject the latter commitments must show that they conform to the former ideal as well or better than traditional forms. See Unger & Smolin, 2015 for a proposal along these lines.

3.1 The pragmatist view of experience

In a narrow sense, pragmatism can be defined as a distinct family of perspectives on meaning, truth, and inquiry originally developed by Charles Peirce, William James, and John Dewey around the turn of the last century. But when describing the wider movement from which these perspectives arose, many contemporary interpreters emphasize the priority of a distinctive view of experience (e.g., Ryder, 2014; Shusterman, 2010; Stuhr, 1997; Hart & Anderson, 1997; Frankenberry, 1987). Not only can this view of experience be found in the writings of Peirce, James, and Dewey that precede their respective formulations of pragmatism, it is arguably essential to understanding the development of this philosophy in its "classical" form (Ryder, 2014, p. 63). Some have gone so far as to call it the "single most important contribution of American thought" (Corrington, 1997, p. 274).

Needless to say, it is impossible to do justice to such an important topic here. Here I present a truncated account of the classical pragmatist view of experience, focusing on three features that show its affinity with enactive theory: nonduality, temporal continuity, and intrinsic teleology. Moreover, to indicate the priority of this view, I will indicate its appearance in several relatively early writings of Peirce, James, and Dewey.

The most emphatic statements of the nonduality of experience are found in James's writings. For example, against theories of consciousness that start from a distinction between subject and object, James insisted that experience "*has no such inner duplicity*" (1904/1977, p. 172). However, in Peirce's 1868 essay, "Questions Concerning Certain Faculties Claimed for Man," and its sequel, "Some Consequences of Four Incapacities," a similar position is reached by questioning the existence of "certain faculties" or powers of intuition that would allow us to distinguish purely subjective or objective elements of consciousness. Through a series of diverse arguments (e.g., our failure to notice the blind spot in our field of vision), Peirce seeks to demonstrate "the impossibility of distinguishing intellectual results from intuitional data" (1992, p. 15). Although the method of inquiry for which pragmatism is best known would not emerge until later, in these early essays Peirce's refutation of both idealist and empiricist versions of Cartesian foundationalism opens up a radically nondual way of thinking of experience that would become essential to the development of pragmatist thought.

As for temporal continuity, again one thinks of James, especially famous passages of *The Principles of Psychology* (1890/1983) that describe "sensible continuity" and the "specious present" as basic traits of consciousness. But again, it is striking how much of this view is anticipated by Peirce in a section of "Some Consequences" that describes consciousness as a stream of signs (1992, pp. 38–43). Drawing out the implications of his argument against intuitions, Peirce concludes that "the striking in of a new experience is never an instantaneous affair, but is an *event* occupying time, and coming to pass by a continuous process" (p. 39). Moreover, Peirce claims that the meaning of thought belongs only to its temporally continuous and extended nature; taken by itself, a feeling in the "immediate present" has no meaning (p. 41). This argument anticipates James's more famous account of how meaning is constituted by

the "transitive parts" (1890/1983, p. 236) of consciousness: feelings of relation and tendency that he describes as the "fringe" or "free water" of consciousness (p. 246).

The influence of James's *Principles* is clearly evident in Dewey's seminal essay, "The Reflex Arc Concept in Psychology" (1896), in which themes of nonduality and temporal continuity are carried forward by a penetrating critique of the "dualism" of stimulus and response. In addition to rejecting all "rigid distinctions between sensations, thoughts, and acts" (p. 358), Dewey makes a well-known argument for the continuous circularity of perception and action that anticipates one of the central themes of enactive theory (cf. TEM, p. 174). What is less well known, perhaps, is Dewey's suggestion that this circularity is driven by an intrinsic teleology: essentially, all experience seeks a more complete and harmonious "coordination" (pp. 358–359, 368, 370 and passim). Insofar as the intrinsic teleology of improved coordination is inherent to experience as a process of continual transaction and adaptation, it constitutes all more specific, situational aims or "ends-in-view."[9]

Although Dewey's later writings on experience (e.g., 1929/1958) would develop this feature more fully, teleology is a major theme of classical pragmatic thought since its beginnings (e.g., see Corrington, 1997). It is evident, for instance, in Peirce's claim that thought always seeks its own satisfaction, or at least relief from dissatisfaction (1992, pp. 114–115), a view that James and Dewey embraced but were at pains to distinguish from subjectivism (e.g., Dewey, 1910/1997).

The affinity of the pragmatist view of experience for that of enactive theory is perhaps even stronger than this cursory treatment indicates. Central to both perspectives is the denial that experience (or its analysis) can provide a foundation for certain knowledge, together with the positive claim that experience is much richer than previously thought. Both argue that the recovery of this richness is essential to understanding experience as a cognitive activity. Also, on the basis of this richness, both highlight the transformational possibilities of experience (e.g., see TEM, pp. 30, 218). For the early pragmatists, much of the richness of experience is "vague" (James, 1890/1983, p. 246), and it is the vague richness of experience—its potential determinability—that allows it to evolve continuously from moment to moment. What must be recovered, therefore, is not just the richness of experience but its *capacity for enrichment*: its capacity for growth, expansion, and refinement.[10] The early pragmatists saw this capacity as continuous with the evolutionary character of life and nature as a whole, and came to believe that this continuity was critical to understanding both experience and nature.

3.2 Pragmatism and "new naturalism"

In this section, I briefly describe the leading role of pragmatism in an ambitious reconstructive project that, tellingly enough, has also been called "new naturalism." For present purposes, it will suffice to sketch the broad outlines of this project. More

[9] For Dewey, stimulus and response are interrelated phases of experience that can be distinguished as such only in terms of this teleology: a stimulus is whatever aspect of experience has the effect of perturbing coordination, and a response is whatever has the effect of restoring it.

[10] For elaboration of this point, see my *Enjoyment as Enriched Experience* (2023).

than anything, I want to draw attention to the fact that in the early twentieth century the comprehensive re-thinking of nature was a major, even central, concern of pragmatism and American philosophy more generally.

At the beginning of the twentieth century, naturalism became the "dominant philosophical tendency in America" (Eldridge, 2004, p. 53). It is important to clarify, however, what it meant to embrace naturalism in this context. The "hallmark of the new naturalists,"[11] according to Michael Eldridge, was search for "a way to be naturalistic without being reductive" (2004, p. 55). I would add that this search was, above all, for a naturalistic but non-reductive understanding of experience. As described by John Ryder, American naturalism of this period was defined by a concern "to take seriously a continuity between human beings and nature with respect to the full range of human experience" (1994, p. 15). According to neo-pragmatist Richard Rorty, "Insofar as there was an emerging consensus in philosophy in 1900, it was that…nature and experience are two descriptions of the same thing" (1995, p. 2). This consensus made it possible for diverse perspectives to engage in a sustained conversation about two questions: "how to understand experience in light of its natural status, and what implications experience has for our understanding of nature" (Ryder, 1994, p. 15).

The central figure of this movement was John Dewey. His *Experience and Nature* (1929/1958; first published 1925) was widely read and discussed by other naturalists, and is perhaps the work that best exemplifies their central concern. But naturalism in the early twentieth century was much more than pragmatism. Other influential figures included George Santayana, a prominent critic of Dewey, and the Aristotelian F.J.E. Woodbridge, who together with Dewey made Columbia University into the center of American naturalism. [12]

Another key figure was the English philosopher Alfred North Whitehead. Although best known for his work on the logical foundations of mathematics, Whitehead was deeply influenced by James's writings on experience, and during his time at Harvard University in the 1920s and 1930s he turned to philosophy of nature and produced a series of works that played a major role in the development of new naturalism (e.g., 1920/1971; 1925/1967). His *Process and Reality* (1929/1978) is perhaps the most ambitious attempt to show how basic traits of experience—including nonduality, temporal continuity, and teleology—can be applied to our understanding of nature. It also exemplifies how new naturalism evolved in close conversation with contemporary science, especially the revolutionary developments of general relativity and quantum theory (see also, e.g., Mead 1932/1959). At the same time, it is emblematic of the kind of systematic speculative philosophy that would soon come to be seen as overblown and outdated.

To get an idea of how this movement looked to its participants, consider the following remarks of Arthur Murphy, written in 1932/1959 for the introduction to George Mead's posthumous *Philosophy of the Present*. Before this passage, Murphy has just situated Mead's work in relation to pragmatism, experimental science, and

[11] This use of "new naturalism" may be a bit anachronistic, as it seems this term was adopted later, in the 1940s, when the movement to which it applies was already in decline.

[12] American new naturalism was, in turn, part of a larger trans-Atlantic conversation that included figures such as Henri Bergson, Samuel Alexander, and Arthur Eddington.

philosophy of nature, which he believes "will no doubt be regarded as the characteristic contribution of the 1920s in Anglo-American philosophy" (xiv). He then explains the recent development of philosophy of nature as follows:

> The various theories of knowledge that were phases of the 'revolt against dualism' all sought to objectify those features of experience which a dualistic philosophy had regarded as merely subjective. This meant that what had previously been allocated to 'mind' must now find its place in 'nature' and that nature must be re-constructed accordingly. And finally, in the extension of relativity to the objective world, a criticism was required of the notions of 'perspective,' 'time-system,' 'sociality' and the like, in order to show how these notions, purified of their merely subjective connotations, could take their place in a system of categories as the pervasive characters of reality (xv).

Notice that the kind of philosophy of nature that Murphy describes in this passage does not start from first principles. Rather it proceeds by a kind of dialectic that circulates between "objectivized" accounts of experience and "subjectivized" accounts of nature. A similar dialectic is implied by Dewey's observation that he and Whitehead share a common understanding of the relation between experience and the rest of nature, namely:

> that experience is a manifestation of the energies of the organism; that these energies are in such intimate continuity with the rest of nature that the traits of experience provide clues for forming 'generalized descriptions' of nature…and that what is discovered about the rest of nature (constituting the conclusions of the natural sciences) provides the organs for analyzing and understanding what is otherwise obscure and ambiguous in experience directly had… (1941/1988, p. 125).

3.3 The eclipse of philosophy of nature

In the latter half of the twentieth century, a generic commitment to naturalism became so dominant in Anglo-American philosophy that in many circles it was regarded as axiomatic: something assumed rather than argued for. Meanwhile, pragmatism and the more particular brand of naturalism with which it was associated suffered something of an eclipse. There are multiples versions of this "eclipse narrative," each presenting a different take on what was eclipsed and why (e.g., Neville, 1992; Rorty, 1995; Bernstein, 1995; Capps, 2003; Good, 2003; Talisse, 2008). Rather than try to adjudicate this dispute, I will focus on aspects of this history about which there is substantial agreement. For whatever else happened, it is clear that academic philosophy largely abandoned the reconstructive project of new naturalism.

This development is easily overlooked, because, as I have just pointed out, by midcentury naturalism had come to prevail in Anglo-American philosophy. But the kind of naturalism that prevailed was not reconstructive, at least not in the sense described above. Although philosophers did not abandon the search for a naturalistic

understanding of mind, by midcentury this project no longer demanded "that what had previously been allocated to 'mind' must now find its place in 'nature' and that nature must be re-constructed accordingly."

How and why did this happen? A good part of the answer has to do with changes in the orientation, style, and scope of philosophy that accompanied its evolution as a professional academic discipline in the twentieth century. The change to which I am referring is not easily characterized, as it encompasses the emergence of both analytic and continental philosophy as distinct traditions. Also, as I will now indicate, it is a change that self-described pragmatists have both supported and opposed. For present purposes, I suggest that it is best described as a turn away from "comprehensive" projects (like new naturalism) in favor of a more "piecemeal" approach to philosophy.

Consider the picture presented by pragmatist Sidney Hook in the introduction to his 1956 anthology, *American Philosophers at Work*, and the critical response by pragmatist John E. Smith in his 1957 essay, "The Course of American Philosophy."[13] Hook claims that "American philosophers, with some notable exceptions, no longer practice philosophy in the grand *tradition*, essaying wholesale views about the nature of man, existence, and eternity" (Hook, 1956, p. 12, quoted in Smith, 1957, p. 286). Smith agrees, although he takes a different view of this development. He observes that the influence of pragmatism has declined since the 1930s (p. 289), but more specifically, he observes that it is the "constructive, metaphysical side" of pragmatism that has been most forcefully "driven into the background" (p. 290). According to Smith, American philosophy has increasingly abandoned the "comprehensive approach" of Dewey, Whitehead, and others of their time, and preferred to "confine its attention instead to specific problems to be treated one at a time" (p. 290). For his part, Hook suggests that this "piecemeal approach," of which he approves, is driven by a "fear of absolutism and dogmatism" (294). Smith, however, suggests that the preference for piecemeal philosophy is backed by the questionable assumption that "the piecemeal and the partial is self-supporting and that it is capable of compounding itself," such that "without any guidance it will inevitably form one seamless unity" (ibid.).

A curious feature of this debate is that both sides saw the other as failing to live up to pragmatist standards of open, fallibilist inquiry. The charge against "comprehensive" philosophy—philosophy that attempts to take up a systematic view, and in so doing makes speculative claims about how diverse aspects of experience are related—is that it leads to the kind of system building that is at best useless and at worse totalizing and foundationalist. In defense of systematic philosophy, Smith turns this charge on its head, arguing that only a systematic approach allows us to be properly reflexive and self-critical:

> We are involved in a whole whether we are aware of it or not, and for two reasons: first, the things we seek to know from the partial perspectives we must adopt in order to gain precise knowledge do not in fact have their being by parts and in perspectives, but come before us with their own wholeness and integrity; and secondly, we do not know enough not to have a systematic view, since apart

[13] Both Smith and Hook trained at Columbia University, Smith about 20 years later than Hook.

> from the attempt to bring our limited knowledge into some systematic form we must remain ignorant of the extent to which what we have gained must be modified by what has been left out of account. A systematic approach is thus no luxury or self-indulgence (p. 294).

Whatever the respective virtues of comprehensive and piecemeal philosophy, I think it can be agreed that American philosophy turned decisively from the former to the latter. Even those who dispute the "eclipse narrative" agree on this point. For example, although Robert Talisse argues that the influence of pragmatism on twentieth century thought was so extensive that one cannot speak of its eclipse, he acknowledges that "the kind of comprehensive philosophical system building in which Dewey engaged" did suffer a decline (2008, p. 265). The reasons that Tallise gives for this decline are worth quoting in full:

> Most of those active in professional philosophy had come to see that no set of philosophical premises full-bodied enough to support a system was non-controversial enough to justify the effort of grand system building. The most philosophers could pursue was a defensible account of some more or less specific phenomenon, with the hope that such an account should be shown to hang together with similar accounts of related phenomena. But note that this humbling of philosophical ambition is driven by the utterly pragmatic insight that, when no single approach can plausibly claim to be the only responsible way of proceeding, philosophy itself must advance dialectically and in piecemeal fashion, by way of meeting the arguments, challenges, and counterexamples raised by those who do not share one's fundamental philosophical orientation (ibid.).

This pragmatist justification for a piecemeal approach echoes the earlier position of Hook, whom Talisse defends against those who accused him of betraying pragmatism (pp. 257–263). Again, by presenting this dispute, my main purpose is to highlight the fact that all sides agree that a shift from comprehensive to piecemeal approaches occurred around midcentury. At the same time, I want to raise the larger question of the reasons for this shift and to draw attention to the connection between comprehensive or systematic philosophy and the project of new naturalism.

4 Conclusion

We now return to the question posed at the beginning: What lessons should enactive theory learn from the history of pragmatism? Again, the answer we give to this question depends on how we understand the reasons for the abandonment of new naturalism in the last century, and the connection between that project and the latest version of new naturalism now emerging from enactive theory. It also depends on our view of the present situation: of the need for reform and the obstacles that stand in its way.

To be clear, I do not think that history is simply repeating itself—enactive theory is not reinventing the wheel—but I do think that the similarities are strong enough to warrant careful reflection on the past. More specifically, I suggest that enactive

theorists calling for a radical reconstruction of science (Gallagher, 2022a; Frank et al., 2024) should regard early twentieth-century new naturalism as a failed attempt at more or less the same thing. But why did it fail? And how could or should it be different this time?

It might be the case that pragmatist-led new naturalism failed for intellectual reasons. Perhaps its arguments for the integration of experience and nature were misunderstood, or perhaps they were simply inadequate. Whatever the reason, insofar as the failure was intellectual, the task for enactive theory is fairly straightforward. As enactive theorists fill out their view of nature, they can benefit from critical engagement with antecedents such as *Experience and Nature* (Dewey, 1929/1958) and *Process and Reality* (Whitehead, 1929/1978). Also, it should be acknowledged that the new naturalism of last century was never completely abandoned: it continued in the works of Susanne Langer, Paul Weiss, Charles Hartshorne, Justus Buchler, Robert Corrington, Sandra Rosenthal, Robert Neville, and many others. More than any particular idea about how to integrate experience and nature, the strength of this tradition is its clear-eyed recognition that the search for a more adequate naturalistic understanding of experience is a large-scale project that should draw on the full range of human experience—not just science—and that it should have the courage and imagination to explore radically new (or at least different) ways of thinking about nature. On the other hand, insofar as this tradition of "speculative naturalism" (Gare, 2014) has remained on the margins of academia, it has struggled to remain actively engaged with science. Enactive theorists are well positioned to carry forward the best version of this tradition: a broad-based and boldly imaginative form of naturalism that is unencumbered by scientism and yet actively engaged with science.

Another possible reason for failure is that in the early twentieth century science had not developed to the point in which the need for radical reform was strong enough. As long as standard forms of explanation continued to progress, their limitations with respect to experience could be accepted and simply brushed aside. In this respect, the failure of new naturalism was not so much intellectual as "practical": it did not (and perhaps could not) make the case for an alternative form of scientific knowledge production that would outpace standard forms. Without a more enticing alternative, most scientists will maintain the theoretical status quo despite its flaws, at least as long as it satisfies demands for prediction, control, and technological innovation.[14]

A major obstacle to philosophical reconstruction, then, is the instrumentalist posture of professional science. Regardless of whether scientists are instrumentalists in practice (or whether they should be), instrumentalism is a widely accepted, even orthodox, stance to which scientists can safely retreat whenever their theoretical presuppositions are challenged. Moreover, adherence to instrumentalism obscures the way in which science can be steered by external interests, making it more resistant to criticism. In light of the extraordinary technological gains made by science in the last century, the kinds of economic interests that inevitably attach to these gains, and the dependence of scientific research on external sources of funding, can we really

[14] Consider the penetrating critiques of modern science made a century ago by E.A. Burtt (1925/2003) and A.N. Whitehead (1925/1967): both were widely read and yet failed to impact the long-term course of scientific research.

blame scientists for sticking to business as usual? I do not mean to defend the "businessification" of science, only to point out the enormity of the obstacle that it presents to reform of any kind, but especially the kind of reform sought by new naturalism.

What is at issue is not just the best means of doing science, but also the very purpose and aim of scientific inquiry. The best response to instrumentalism is to ask: *Instrumental for whom? And for what purpose?* Is the best science that which maximizes prediction and control of human behavior and the exploitation of resources in service of purely economic interests? Or is the best science that which enriches our understanding of life and enhances our capacity to make it better in a much fuller and inclusive sense?

With respect to this issue, enactive proponents of new naturalism are much better positioned than their pragmatist forebears. They have the added perspective gained from another century of continued adherence to the standard "Newtonian" model of physical explanation, and can draw on more powerful critiques of this model as well as more rigorous proposals for alternatives (e.g., Smolin, 2006; Silberstein et al., 2018). But just as importantly, they have the added urgency and leverage produced by recurrent political and economic crises, worsening mental health, and environmental catastrophe. More than 75 years into the so-called Information Age, it should be clear that these problems cannot be resolved by an endless accumulation of scientific data: we need the kind of self-understanding that enactive new naturalism is most concerned to provide (see Frank et al., 2024).

Still, even if enactive new naturalists have the benefit of added perspective, urgency, and clarity of purpose, they may not be able to advance without reversing the turn to piecemeal philosophy described in the last section. This is perhaps the most immediate challenge to new naturalism today; it may also be the most important reason for considering the history of pragmatism. I suggest that that the turn to piecemeal philosophy was the main reason for the failure of new naturalism in the last century and, furthermore, I suggest that the reasons for this turn were mainly institutional, not intellectual (cf. Good, 2003). In short, the evolution of professional philosophy as a discipline, in keeping with wider academic trends of disciplinary specialization and compartmentalization, led to an institutional environment in which large-scale projects like new naturalism cannot get a foothold.

If I am right, enactive proponents of new naturalism must come to terms with the comprehensive scope of their project and try to specify what it would mean for it to gain traction both within and beyond the academy. They may prefer to use terms other than "comprehensive" and "systematic" to describe their endeavor, but I do not think it will help to tiptoe around the questions that are signaled by these terms. How do we build the consensus required for sweeping intellectual reform? What kinds of institutional reforms are required, and how do we make these happen? Early pragmatists and other new naturalists of their time believed that a large-scale philosophical reconstruction of science could be carried out in non-foundationalist, non-dogmatic fashion through a dialectical method not unlike that endorsed by enactive theorists today. However, it should be remembered that the academic context in which pragmatist-led new naturalism emerged was very different: in 1925 the term *interdisciplinary* did not yet exist, probably because the highly compartmentalized

institutional environment to which it refers was still coming into existence.[15] What can it practically mean to carry out a comprehensive intellectual reform within the much more tightly "disciplined" institutional environment of present-day academia?

Robert Talisse's argument (2008) for a plurality of approaches that gradually builds up consensus by working on specific problems in piecemeal fashion tacitly presumes the kind of institutional context in which pluralism leads to sustained conversation rather than fragmentation into hyperspecialized cliques (see Haack, 2016). I do not mean to suggest that pluralism is an obstacle to new naturalism. On the contrary, in principle, it should be a strength. In fact, one of the singular virtues of enactive theory is its embrace from the beginning of a richly pluralistic approach that brings scientific research into conversation with multiple traditions and methods of philosophy, including theories and methods of Buddhism. The question, rather, is this: What kind of institutional context is needed to sustain this richly pluralistic approach as enactive theory expands its scope to include a reconstructed view of nature and arguments for the reform of science?

This final question of institutional context may seem far removed from the main goal of new naturalism, the inclusion of experience within a reconstructed scientific understanding of nature. But it is worth considering the possibility that what caused the eclipse of new naturalism in the last century was not a lack of good ideas about how to integrate experience and nature but rather the accommodation of philosophy and science to the professional demands of their institutional environment. It cannot be a coincidence that the kinds of philosophy and science that have come to dominate the modern academy are those that are most easily carried out within tightly controlled disciplinary niches. In theory, this environment does not require the separation of experience from nature, but it is easy to see how it contributes to its entrenchment in practice. As long as this is the environment in which ideas about experience and nature must prove their worth, new naturalism will need more than good ideas.

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[15] According to the Miriam-Webster online dictionary, the first recorded use of *interdisciplinary* is in 1926.

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