

Ethics in the Innovation Process: Some Unaddressed Issues for Pragmatists

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Abstract

There are now dozens of proposals for integrating ethics into the early planning and assessment of technological innovation. This paper tracks some of Larry Hickman's contributions to these trends. While Hickman's suggestions could be incorporated into virtually many of the new proposals for integrating ethics into technological research, development and dissemination, barriers remain. In this paper, I will explore some reasons why the field remains fragmented, emphasizing weaknesses in the pragmatist approach. First, I acknowledge the significance of obvious explanations: the technical community's unfamiliarity with ethical inquiry and the lack of both administrative and financial commitment to ethics-oriented research. There is, in short, an epistemic gap between the message that innovators are prepared to hear and the sophisticated response that Hickman's pragmatism offers. This gap may be a practical limitation to philosophical pragmatism in many of its manifestations.

Keywords

technology assessment – Larry Hickman – John Dewey – technological innovation

A gradual but steadily growing awareness of the need to incorporate a reflective process for the development and utilization of new technology is the background context for this essay. In one sense, recognition that technical innovations can have negative consequences for certain groups dates back at least to the closing decades of the 18th century. Resistance to the enclosure of common lands in the British Isles merged with anger against the consolidation of textile manufacturing into the factory system. Household artisans foresaw

an economic transition that was contrary to their interests and responded with efforts to sabotage the new industrial technology.¹ By the early 20th century, the idea that governance of technological innovations should become part of a general political philosophy began to surface. Much of this work continued to focus on transformations in the labor process. However, the philosophical basis for evaluating new technology became fractionated over the course of the 20th century.

Early 20th century visions of socio-technical transformation track closely with the pragmatism that will be the main focus of this essay. Advocates of the Christian Social Gospel saw the problem as a spiritual crisis that would be cured by a religious awakening with a naturalistic ontology. Others, including Thorsten Veblen and later C. Wright Mills interpreted exploitative class relationships as a function of the institutions that structure an individual's cognitive environment.² At same time, scientific assessment coupled with regulatory action formed the basis for ex ante assessment of food and drugs at Harvey Wiley's FDA. Civil society groups such as the Consumer's Union conducted independent proactive analysis of innovations.³ The early 20th century European trajectory for this line of thought includes figures such as György Lukács, Walter Benjamin, Theodor Adorno and Herbert Marcuse. It might be usefully oversimplified as seeking to understand their surprise at the proletariat's failure to overthrow capitalism. They explored quasi-Freudian mechanisms of displacement, transference and sublimation, often emphasizing the cultural and aesthetic dimensions of society. Martin Heidegger's decidedly non-Marxist take on the question of technology will be discussed later.

A more detailed excursion into the history of philosophy's engagement with anticipatory methods of technology assessment would be out of place in the present context. It must suffice to say that for most philosophers, this early 20th century engagement with the social dimensions of technical change had petered out by the 1970s. Hans Jonas's *The Imperative of Responsibility: In Search of an Ethics for the Technological Age* brought the discipline up short when he

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- 1 Sale, Kirkpatrick. The achievements of 'General Ludd': a brief history of the Luddites. *The Ecologist*, vol. 29, no. 5, Aug.-Sept. 1999. pp. 310+. Gale Academic OneFile, link.gale.com/apps/doc/A55576275/AONE?u=msu_main&sid=googleScholar&xid=5384073d. Accessed 11 Jan. 2022.
 - 2 McKenna, Erin and Scott Pratt. *American Philosophy: From Wounded Knee to the Present*. London and New York: Bloomsbury, 2015.
 - 3 Sapolsky, Havey (ed). *Consuming Fears: The Politics of Product Risks*. New York: Basic Books, 1986.

argued that it was now time to use technology in the governance of technology. Jonas argued that this required a transition from an ethic of responsibility within interpersonal relationships of individualism to one that recognized the social dimension of technological innovations and their potential for catastrophic and unintended consequences.⁴ Although Larry Hickman's work stands to remind contemporary readers that Dewey was poised to address these problems a half century earlier, by the 1990s, hesitancy over technological innovation was being viewed as a widespread social phenomenon retarding the uptake of nuclear power, genetic engineering and of new chemical techniques in a variety of fields.⁵ The response to this social phenomenon has introduced a series of similar intellectual rubrics: anticipatory governance,⁶ responsible innovation⁷ and broader impacts.⁸

I will use Hickman's philosophy of technology to show how pragmatist philosophy generally, and Dewey's thought in particular, can contribute to the constructive, anticipatory evaluation of the risks and unintended consequences of technological innovations. In contrast, the epistemology and value theory implicit with recent exercises in the evaluation of technical innovations is not pragmatic. Hickman has not succeeded in getting Dewey's thought into the mainstream. Rather than arguing for this, I will recount a recent case in which I participated. In short, although there is a growing recognition of the need to undertake ethically-grounded evaluative studies of new tools and techniques, as well as of the innovation process itself, pragmatist philosophy has not played a formative role in most efforts to do this. The paper then concludes with some speculative thoughts on the reason for this, as well as some suggestions for moving forward.

4 Jonas, Hans. *The Imperative of Responsibility: The Search for an Ethics in the Technological Age*. Chicago: University of Chicago Press, 1985.

5 Curran, Dean. Risk, risk society, risk behavior and social problems. *The Blackwell Encyclopedia of Sociology*, Oxford, UK: Blackwell, 2016. Accessed Jan. 11, 2012 at <https://doi.org/10.1002/9781405165518.wbeosr069.pub2>.

6 Guston, David H. Understanding 'anticipatory governance'. *Social Studies of Science*, 44(2014), 218–242.

7 Fisher, Eric, and Arie Rip. Responsible Innovation: Multi-Level Dynamics and Soft Intervention Practices. In *Responsible Innovation: Managing the Responsible Emergence of Science and Innovation in Society*, R. Owen, J. Bessant and M. Heintz, eds. Chichester, UK: John Wiley & Sons, 2013, pp. 165–183; Stilgoe, Jack, Richard Owen, and Phil Macnaghten. Developing a framework for responsible innovation. *Research Policy* 42 (2013): 1568–1580.

8 Watts, Sean M., Melissa D. George, and Douglas J. Levey. Achieving broader impacts in the national science foundation, division of environmental biology. *BioScience* 65 (2015): 397–407.

America vs. Europe in the Philosophy of Technology, with a Focus on Larry Hickman

In 2001, the Dutch philosopher Hans Achterhuis described what he called “the empirical turn” in philosophy of technology over the last quarter of the 20th century. Achterhuis and his Dutch colleagues discussed the work of several American philosophers who had written on the social, psychological and political impact of using specific tools and techniques. The Dutch applauded this approach, especially in comparison to work that followed the lead of Martin Heidegger, on the one hand, or Marcuse, Adorno and Horkheimer, on the other. The new, empirical theorists developed categories and described mechanisms that account for the role that tools and techniques play in altering patterns of perception or social interaction.⁹ As such, the empirical turn enabled the fulfillment of Jonas’s program, facilitating the explosion of evaluative approaches that flourish in the 21st century. But the empirical turn also sets the stage for two questions that I will address in this paper. First, Hickman was not included among the American philosophers Achterhuis and his colleagues associate with the empirical turn. Why not? Second, whether advanced under the banner of constructive technology assessment or responsible innovation, the inclusion of philosophers into these anticipatory efforts is widely accepted in Europe, but not in the United States. Why not?

I submit that these questions are more closely related than one might think. For example, Hickman emphasizes a distinction between technology, on the one hand, and tools and techniques, on the other. The distinction is important for anticipatory projects because the precautionary strategy recommended by Jonas refers to the unintended causal consequences of things like atomic bombs and genetic engineering, rather than some metaphysical essence or pervasive cultural form. Hickman draws on Dewey in characterizing technology as the theory, science or episteme for planned engagement with the material environment.¹⁰ Hickman’s 1990 book on Dewey makes the claim that the word ‘technology’ should be understood in terms of this theorizing approach, rather than with things like atomic bombs or genetic engineering. He doubled down on this terminology when it came to discussing Jonas-like anticipatory and precautionary activities in his 2001 book, *Philosophical Tools for Technological Culture*. There, Hickman again defends the idea that philosophical pragmatism

9 Achterhuis, Hans, Ed. *American Philosophy of Technology: The Empirical Turn*. Robert P. Crease, Tr. Bloomington: Indiana University Press, 2001.

10 Hickman, Larry. *John Dewey’s Pragmatic Technology*. Bloomington: University of Indiana Press, 1990.

is particularly adept at the reflective and anticipatory thinking needed for governance of innovations and the social changes they provoke. The theory, *logos*, or ology of *techné* is technology.¹¹

I have been impressed enough by this distinction that attentive readers of my own work will find the phrase “tools and techniques” used frequently in places where less careful authors would write ‘technology.’ However, it is important to note that Hickman’s practice runs contrary to the pragmatist notion that the meaning of a word resides in its use. The tendency to associate this view with Wittgenstein notwithstanding, it was 1911 when Dewey wrote, “There is a time and a place to see ghosts and a time and a place to see scouts of the enemy; and the great thing is to observe the conveniences about the proper time and place. To think of things rightly or wrongly is to think of them according to or contrary to social demands,”¹². In common parlance, people speak of atomic energy or genetic engineering as technologies. They are referring to a cluster of tools and techniques, and sometimes also to the people, organizations and social institutions that are associated with these clusters. Hickman is right to direct our attention to tools and techniques, but the tension between philosophical and common usage will return at in later sections of the paper.

More importantly, Hickman’s emphasis on tools and techniques should have impressed Achterhuis and the other contributors to *American Philosophy of Technology*. They argued Heidegger and other Europeans had wooly theories about the “essence” of technology, generally associating industrialization with a variety of social and spiritual ills. In separate chapters they present Albert Borgmann, Hubert Dreyfus, Andrew Feenburg, Donna Harraway, Don Ihde and Langdon Winner as models of the empirical turn. However, none of these American philosophers were particularly American in the sense in which pragmatism is sometimes said to be the distinctively American tradition in philosophy, though Ihde would later affiliate with Richard Rorty’s version of Dewey, (see Thompson, 2020). In fact, with the possible exception of Langdon Winner, all of them were adapting the literature of phenomenology or critical theory in their analyses of central heating systems, nuclear power plants, cyborgs, scientific instruments, computers or the French Mini-tel telephone system. Hickman was more accurate in saying that what distinguished these

11 Hickman, Larry. *Philosophical Tools for Technological Culture: Putting Pragmatism to Work*. Bloomington: University of Indiana Press, 2001.

12 Dewey, John. The Problem of Truth, In *The Essential Dewey: Volume 1: Ethics, Logic, Psychology*, edited by Larry A. Hickman and Thomas M. Alexander. Bloomington: University of Indiana Press, 1988.

authors was less an empirical turn, than a turn from technology to tools and techniques.¹³

At the same time, there are important respects in which Hickman's early work in philosophy of technology resisted the empirical turn. Hickman continued to emphasize the philosophical analysis of technology as such, albeit not in a way that has much truck with essences. His book *John Dewey's Pragmatic Technology* does not pursue an inquiry into tools and techniques, but follows Dewey into a *logos* or understanding of *techne*. The book suggested a more sophisticated way to interpret Dewey's instrumentalism, and simultaneously proposed an inversion of epistemology and technology. Hickman's version of Dewey downplays the role of knowing in knowhow and suggests that an active and manipulative engagement with nature serves as the starting point for knowledge production, as conceived in the scientific tradition.¹⁴ I will not discuss how Hickman's approach may have influenced readings of Dewey, but surely this engaged picture of the human condition is central to any philosophy worthy of the name pragmatism. Thus, even if Hickman's American philosophy of technology differs from the Dutch interpretation of what is quintessentially American, it does follow the pattern identified by Achterhuis in breaking from the European tradition.

This break is especially evident in contrast with Heidegger, who is interesting because there are important respects in which Heidegger does *not* fall into the pattern of which he is accused. Explaining what I mean will require me to take some liberties in summarizing Heidegger, whose views were both multi-faceted and changing over the course of his lifetime. In a nutshell, Heidegger starts with tools and techniques that we find ready to hand in the world of daily life. We reach for a hammer or a can opener; we drive our automobiles; we adjust the burner as we scramble eggs. We use these tools and techniques without ever bringing them into the focal gaze of our attention. They recede into the world, but in doing so, the world becomes affable and carefree. Quotidian tasks constitute our lives, freeing our thinking for other things.¹⁵ We may become distracted from ever taking up whatever it is that calls us to think, but we can't blame our hammers or skills in egg scrambling for that. This emphasis on the way in which specific tools and techniques structure a person's engagement with the world influenced Dreyfus, Ihde, Feenberg, and

13 Durbin, Paul. In search of discourse synthesis: Philosophy and "Quotidian" Technologies: Hickman and Light, *Techné* 10(2006): 240–252.

14 Hickman, *Op.cit.* Note 10.

15 Heidegger, Martin. *Being and Time*. J. Macquarrie and E. Robinson, Tr. New York: Harper and Row, 1962.

Borgmann, and it is important to notice that Heidegger's discussion in *Being and Time* was every bit as empirical as anything any of them ever wrote.

However, as I read Heidegger, technology-as-such has yet to emerge in the ready-to-handedness of ordinary tools and techniques. Technology is a historical event that transforms the human condition. This is the sense in which Achterhuis *et. al.* are right to emphasize a metaphysical dimension in Heidegger's work on technology. Scientific disciplines, what we today call STEM, create the possibility for directing our gaze directly on tools and techniques, making their principles and the work they do the focus of attention. However, as humanity's attention is redirected, there is the risk that this way of orienting ourselves to the world will become pervasive. Under the spell of possibility created by industry, anything and everything comes to be seen as standing in reserve, as available and waiting for utilization in the collective rush to improve the efficiencies of tools and techniques. It is at this point that Heidegger makes a surprisingly Kantian move, suggesting that when humanity or human nature has itself become a resource, the ultimate peril is very near.

Jennifer Welchman has argued that we must read much philosophy from the time of both Dewey and Heidegger as struggling with the discipline's demotion in prestige. Philosophers are no longer accepted as sovereigns of the sciences. While the phenomenologists were searching for a new ground beneath the STEM fields from which to reassert philosophy's dominance, the analytic school was seeking a closer alliance with mathematics, now reimagined as a set of techniques that science and engineering cannot do without. Dewey charts the third path: philosophy is the liaison officer, retaining philosophy's independence, but without whose assistance the work of the sciences comes to naught.¹⁶ Nevertheless, anyone tempted by Heidegger's vision of technology will be inclined to read Dewey's endorsement of instrumental epistemology as the work of a lunatic under the spell of a *logos* that views anything and everything merely as a means to an end. Dewey even denies that there *are* ends, (or he seems to).

In order to succeed in portraying Dewey as offering an alternative philosophy of technology, Hickman had to show that Dewey has not fallen into the trap that Heidegger has laid for these pesky Americans, hell bent on clear-cutting the Black Forest and turning the beaten footpath into an Autobahn. Hickman does this by drawing our attention to the distinction between straight-line rationality and the Deweyan conception of inquiry. Hickman borrows the analysis of straight-line rationality from Langdon Winner. Here, the ends or goals of intentional agents are taken as given. Paradigmatically rational action

16 Welchman, Jennifer. *Dewey's Ethical Thought*. Ithaca, NY: Cornell University Press, 1995.

undertakes the task of reaching these goals as rapidly and as inexpensively as possible. This *is* the rationality too frequently adopted in the STEM fields, but Hickman shows us that this is not what a philosophically defensible technology would pursue.

Dewey would say that we pursue ends-in-view, rather than a fixed goal, and that ends-in-view derive from the problematic situation. In my own reconstruction, adapted from David Kolb, the problematic situation arises from some disturbance. It is followed by divergence, a weakly structured search for direction; we might call it brainstorming. It is only when divergence settles on a more structured model that inquiry is assimilated as a problematic situation. For paradigmatically scientific inquiry, the model adopts the standpoint of *reference*: It views the world is all that is the case, but it does so in a manner that yields opportunities to converge upon an end-in-view. Convergence is the selection and planning of a response to the problematic situation. There is still more to inquiry, however, as actually doing something will inevitably involve accommodating contingencies not fully anticipated by an end-in-view. Only after an inquiry has passed through all these phases is the original disturbance confronted, and if the accommodation is unsuccessful, the whole process begins again.¹⁷ Hickman offers a more fulsome and nuanced treatment of this cycle, showing just how far it is from an attitude that views anything and everything as a resource.

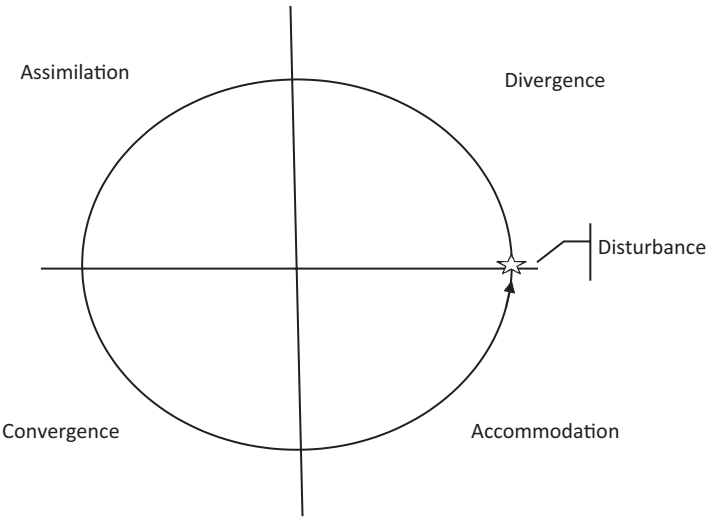


FIGURE 1 The Learning Cycle and the Four Phases of Inquiry

17 Thompson, Paul B. *From Field to Fork: Food Ethics for Everyone*. New York: 2015, Oxford U. Press, at pp. 15-21.

Nevertheless, I would say that Heidegger got one thing right. It is not something that Dewey (or Hickman) gets wrong, but they might be faulted for under emphasis. If we represent the phases of inquiry by Figure 1, we find the STEM fields dominating the left hand side of the diagram.

Assimilation comes to be conceptualized through processes of modeling and hypothetico-deductive explanation, while convergence is practiced as engineering or administration. As practice becomes dominated by the STEM vision of these modes, the aspects of both divergence and accommodation that would open individuals to alternative responses are occluded. Institutionalization of this STEM-dominated vision numbs the entire culture, and its capacities for imagination and response to contingency are diminished. Ironically, such diminishment creates distance between the disturbance and the institutionalized capacities for rational action, so much so that at the societal level, the ability to even detect disturbances is obscured. Heidegger is right to associate broad social dysfunctionality with the particular institutionalization of technique that characterizes industrialized societies, but his diagnosis of the problem in *The Question Concerning Technology* (1977) looks rather like a wistful return to the days when Kant argued that only philosophers could adjudicate the contest of the faculties.

It is *Philosophical Tools for Technological Culture* that argues how pragmatism serves as a response to the institutionalization of straight-line rationality in the STEM disciplines. Hickman's portrayal of the Deweyan liaison officer is no monarch, but it is still a significant promotion from Hume's under laborer, consigned to taking out the trash accumulated by centuries of religion and poetic excess. Pragmatic technology must encompass the whole cycle of enquiry. This includes the cultivation of a critical faculty that can query the way that history has left us personal preferences and social habits that we might hope our children will not also inherit. This critical faculty will understand that both individually and socially, the human condition is to be envied by a nature that has been adapted to our habits as surely as our habits are an adaptation to what nature has made available to us.¹⁸ We will see, in other words, that the human condition is that of an organism responding to an environment saturated with tools and techniques. Indeed, the pervasiveness of inherited tools and techniques can be a source of hope for us, rather than a source of doom. As practices of our ancestors, we know that these tools and techniques were adaptations that allowed them to get by, to avoid extinction. As such, we have reason to presume a measure of wisdom within them. Yet as

¹⁸ Hickman, *Op. cit.* Note 11.

tools and techniques, we also know that they are human creations that can be changed, that the response could have been different. As Hickman writes, it is when systems break that we need technology in his specific sense as an ology dedicated to anticipatory evaluation and amelioration of problematic situations.¹⁹

Anticipatory Evaluation: the Bioeconomy as a Case Study

The scholarly literature on technology assessment is both massive and chaotic. As such, it is helpful to refine the scope with a case study. Even as I write in January of 2022, the U.S. National Science Foundation (NSF) is conducting an online workshop to explore how social and behavioral science can be better incorporated into research on the bioeconomy. It is clear that the seventy-odd participants have very different understandings of the project, and I am, I believe, the only philosopher who has been invited to participate. The activity provides a diagnostic (if not exhaustive) indicator of anticipatory assessments, why technological innovation is taken to be problematic and how social scientists might address these problems. The workshop is being conducted under Chatham House rules, so my characterizations are unattributed.

The bioeconomy (or bioeconomies) is a term of fairly recent coinage. I began to hear the term in the early 1990s in connection with the commercialization of agricultural biotechnology. Biotechnology is itself a vague and sometimes contentious term that began to be used in connection with genetic engineering, or recombinant DNA mediated tools for modification of plant, animal and microbial genomes. Tools for manipulating genomes emerged within a decade after James Watson, Francis Crick, Maurice Wilkins and Rosalind Franklin presented the double helix model for DNA in 1962. By the 1980s, products such as human insulin from a gene-altered bacterium were being marketed. The thought that these tools would revolutionize drug development, medical diagnostics and eventually therapeutics linked the tools of genetic modification to social benefit, while history of the pharmaceutical industry suggested that these innovations could be quite profitable.²⁰ By 2020, the bioeconomy is most broadly understood within the United States as a sector of the general economy comprised by firms exploiting biotechnologies, which are now frequently expanded to include more traditional forms of biomedical and agricultural

¹⁹ *Ibid.* p. 12.

²⁰ Teitelman, Robert. *Gene Dreams: Wall Street, Academia and the Rise of Biotechnology*. New York: Basic Books, 1989.

technologies. Thus, for example, firms that are using artificial intelligence (AI) to develop more efficient forms of weed control are part of the bioeconomy.

Given this framing, what is problematic about the bioeconomy? The most widely shared problem definition seems to revolve around translational research (e.g. moving from knowledge of basic mechanisms to applications with direct benefits to third parties) and commercialization. This, in turn, breaks down into a long list of specific activities, among which are:

1. coordinating research and development (R&D) across industry and academia, as well as among different research groups and firms;
2. business development and financing;
3. assuring regulatory compliance, including anticipation of potential product liabilities;
4. anticipating marketing challenges, especially as associated with public risk perception or concerns;
5. achieving diversity goals associated with racial and gender equity.

In contrast to this framing, a few participants at the workshop emphasize what is characterized as a European perspective on the bioeconomy. On this view, the bioeconomy is a comprehensive attempt to resolve contradictions between economic development and environmental sustainability. The “American” position continues to see the bioeconomy as a sector within larger regional, domestic and global economies. It is defined in terms of firms applying biologically based tools and techniques. The “European” position sees the bioeconomy as a planned strategy for ameliorating problems in the economy writ large. A representative list of *these* problems include pollution, climate change, habitat loss, persistent poverty and an unsustainable consumption of natural resources. The implicit suggestion is that human activity must be reconciled with the stable rhythms and patterns of nature. A shift to more “biological” modes of thinking is the unstated prescription for achieving this. As fascinating as this contrast is in its own right, the balance of my discussion in this section will concentrate on the problems as defined in the “American” perspective.

In its initial phase, the risk assessments that were expected to anticipate unwanted outcomes were conceived as a purely technical exercise. Risk assessment is usefully characterized as involving four conceptually distinct activities, though in its early days, only three of these phases were recognized. First, there is hazard identification which is an inductive exercise of listing what can go wrong, based on an understanding of the relevant mechanisms. Although hazard identification is conceptually amenable to socio-economic hazards (such as unemployment or bankruptcy) and psycho-social hazards (stress, suicide, divorce), in practice risk assessments have been limited to biophysical mechanisms. The second component is exposure quantification, which develops the

conditional probability that hazards will actually materialize, given certain specified decisions. These two components of risk assessment are thought of as an exercise in factual inquiry, with little role for values. The third phase, risk management, has always been acknowledged to require value judgements. It is where decision makers decide what to do about a risk. One can apply precaution and avoid the risk, or one can accept it. One can see if benefits offset risks, or one can adopt insurance or compensation schemes for those who experience hazards. Although I have been a critic of this framework, I also believe that philosophers of technology have yet to understand its strengths.

First generation risk assessment was criticized for being insufficiently attentive to the opinions and concerns of the public. The controversy reached a turning point with the issuance of a National Research Council report *Understanding Risk* in 1996. The result has been the addition of a fourth activity, risk communication. The use of the word 'communication' was itself something of a compromise. Many technically inclined people assumed that the activity was one of educating the non-expert public on the facts as determined by hazard identification and exposure quantification. A slightly more expansive understanding recognized the possibility that affected parties may want to be involved in the value-laden process of risk management. Finally, many social scientists insisted that risk communication is a two-way process that allows the public to participate in all phases of a risk assessment.²¹ This third concept of risk communication conjoined with calls for "democratizing technology" to spark an era in which mediated public engagement was viewed as the crucial element in attempts to address the unintended and unwanted impacts of technological innovation.

There are elements of the bioeconomy discussion that do not fit this model of increased public involvement in the assessment and evaluation process. For example, some participants have stressed the need to identify externalities. Although externalities can be positive as well as negative, the workshop participants who use this term are thinking about costs or harms to third parties that are not priced in to the innovation process by regulation or by competitive aspects of the market structure. Air and water pollution are classic examples of negative externality, as are the loss of cultural amenities. Economists have developed powerful (but also limited) techniques for studying this problem. In fact, there is tension between economists who derive assessments of public benefits and costs from econometric data and the social psychologists who call for more direct public engagement assessment procedures (example,

21 Jasanoff, Sheila. Songlines of risk, *Environmental Values* 8 (1999): 135–152.

Shrader-Frechette, 1986; 2002).²² Compared to studies by economists and survey researchers, social research advanced under the banner of anticipatory governance or responsible innovation places significant emphasis on face-to-face interaction with non-scientists using focus groups, consensus conferences, science museums and experimental methods including auctions, deliberative discourse and scenario planning. The bioeconomy discussion also included educational initiatives as measures that could serve the twin purposes of informing public opinion and providing public feedback for technical decision making in applied biology.

The following conclusions can be drawn. First, there has been explosive growth since Jonas made his first call for precautionary assessment of innovative tools and techniques in 1979. Competing theoretical approaches vie against one another. Second, innovators and bureaucrats see the primary role of assessment in assisting in the promotion and public acceptance of tools and techniques. Although the practitioners of anticipatory assessment methods have resisted this framing, the thrust of their work seeks to ameliorate resistance to technology, perhaps by making adjustments to design, reducing risks or finding policy mechanisms that compensate losers. If there is a trajectory in this field over the last half century, it is toward greater public involvement in the assessment process. Finally, philosophers are rarely involved in these activities in the United States. Dewey's leadership notwithstanding, it is Europeans who have been willing to embrace the contribution of philosophers as "liaison officers" that could contribute a coordinating and translational role to the performance of an anticipatory assessment.

The Trouble with Pragmatism

This section of the essay will speculate on some reasons for pragmatist philosophy's relative absence from the anticipatory governance/responsible innovation literature. We should begin by acknowledging that this may not be a problem that really needs much explanation. It is not so much that *pragmatism* is absent as it is *philosophy itself* that is missing, at least in the United States. It is possible that this just reflects a rather broad antipathy to philosophical thought that has long characterized intellectual life in the United States. I

22 See, for example, Shrader-Frechette, Kristen. *Risk Assessment and Scientific Method: Methodological and Ethical Problems with Evaluating Societal Hazards*. New York: Springer, 1986; Shrader-Frechette, Kristen. *Environmental Justice: Creating Equity, Reclaiming Democracy*. New York: Oxford University Press, 2002.

will pick up on this possibility after considering some possible weaknesses in the pragmatist tradition. Further, perhaps this field has matured to the point that philosophers are unable to make intellectually unique contributions. Philosophical thinking has figured in the formative years of many scientific disciplines, only to recede after they reach maturity. Although the assessment methods I have described require activities that are beyond most philosophers' skill set, I do not accept the claim that this field has developed beyond the point that philosophers can make meaningful contributions. In fact, as indicated both above and elsewhere, it is pragmatist philosophers that are most able to make contributions.²³

Certainly one of the problems with pragmatism resides in the fact it is not well understood. I suggest that we should approach this as a layered problem starting with the fact that most English speakers associate the word with taking a pragmatic attitude toward problems and life in general. Here 'pragmatic' is a near synonym for 'expedient', especially in contrast to attitudes or approaches characterized as theoretical, abstract or idealistic. While a similar ambiguity plagues many isms (realism, materialism, idealism), pragmatism arguably suffers a more acute version of this problem within the community of scientists and social theorists, including other philosophers. For example, a recent paper in the *Journal of Rural Studies* uses the word 'pragmatic' to characterize political strategies deemed to have a higher chance of success.²⁴ I believe this usage encourages other researchers engaged in technology assessment to interpret pragmatism as a philosophical inclination to define problems in a manner that suggests short-term, if not immediate tactics for resolution. This leads, in turn, to a cascade of misunderstanding. Pragmatism is seen as shallow, as opportunistic, as relativistic, as failing to address fundamental philosophical problems and as in service to powerful interests. Pragmatist philosophers have made repeated replies to this phenomenon,²⁵ but we should not expect it to

23 Hickman, Larry. Pragmatic resources for biotechnology, in *Pragmatist Ethics for a Technological Culture*. J. Keulartz, M. Korthals, M. Schermer and T. Swierstra, Eds. Dordrecht, NL: Kluwer Academic Publishers, 2002, pp. 25–36; Lake, Danielle and Paul B. Thompson. Philosopher-as-liaison? Lessons from sustainable knowledge and American philosophy, *Dewey Studies* 2(2018): 10–41.

24 Ashwood, Loka. "No matter if you're a Democrat or a Republican or neither": Pragmatic politics in opposition to industrial animal production, *Journal of Rural Studies* 82(2021): 586–594.

25 Indeed clarifications begin in the early 20th century writings of William James, and will be familiar to many readers of *Contemporary Pragmatism*. For two more recent sources, see Eldridge, Michael. *Transforming Experience: John Dewey's Cultural Instrumentalism*.

go away. My personal strategy has been to avoid describing my approach as pragmatist unless I expect to develop what is meant by that in some detail. The unfortunate result is that much of my work in the philosophy of technology is not viewed as a contribution to pragmatist philosophy by other pragmatist philosophers.

A different problem arises when pragmatism is represented as achieving epistemic and sociopolitical advantages that are more familiar to social scientists under the guise of postmodernism, social construction or feminist philosophy. The problem is exhibited in microcosm by the exchanges over a short paper in *Administration and Society* by Hugh T. Miller. Hickman was one of several authors who contributed commentaries on Miller's paper. The original paper is relevant in the present context because Miller describes public administration as needing to address "disasters natural and social, demographic shifts, health statistics, colliding subcultures," while recognizing that governance is no longer the exclusive province of government. Echoing (but not citing) Jürgen Habermas's thoughts on new social movements,²⁶ Miller writes that civil society organizations are now deeply involved in setting the agenda for social action.²⁷ While Miller is not specifically focused on social problems associated with technological innovation, the problems that I have been discussing throughout this essay fall comfortably underneath the conceptual umbrella he has outlined.

Miller thinks that the "old pragmatism" of Peirce, James and Dewey is incapable of proactive engagement with these new realities because it is too closely wedded to a "mirror of nature" epistemology and the methods of the natural sciences. He argues that attention to work by Thomas Kuhn, Richard Rorty, Jacques Derrida and Michel Foucault provides a corrective to this error. Several of Miller's interlocutors, including Hickman, counter his position by arguing first that Dewey was, in fact, a critic of the epistemological doctrines that Miller discusses, and second that epistemologies licensing infinite opportunities for interpretive deconstruction cannot underpin the decisive action that public administration requires. Hickman is especially careful to note how fallibilism constrains the overreach of those who deploy scientific methods, while the pragmatist emphasis on epistemic warrant serves as the basis for action—presumably to include action by public administrators—informed by scientific

Nashville, TN: Vanderbilt University Press, 1998, or Fesmire, Steven. *John Dewey and Moral Imagination: Pragmatism in Ethics*. Bloomington: Indiana University Press, 2003.

26 Habermas, Jürgen. New social movements. *Telos: A Quarterly Journal of Radical Thought* 49 (1981): 33–37.

27 Miller, Hugh T. Why old pragmatism needs an upgrade. *Administration and Society* 36(2004): 243–249.

findings.²⁸ He has provided substantial elaboration of this point as it relates to Rorty and the European tradition in *Pragmatism as Post-Postmodernism*.²⁹

I have no disagreement with Hickman's response to Miller, but I would nonetheless like to note that Miller's expressed need for something "new" diagnoses a problem for pragmatists. After I told one of my graduate students to look at Dewey for a more extended philosophical account of insights she drew from feminist and indigenous perspectives on environmental science, she told me that people can't be expected to go back and read things that are almost 100 years old. Citation practices in the sciences favor the most recent sources, rather than the oldest ones. In fact, I think her point might have been more convincingly made on explicitly pragmatist grounds. The Darwinism in Peirce and Dewey, along with James's emphasis on habit, suggests that the both linguistic meaning and its conceptual underpinnings are subject to evolutionary development. Importantly, I think these early pragmatists understood something about Darwinian natural selection that is still not widely understood beyond the biological sciences. Evolutionary change in a population occurs when a subset of reproductive units—in Darwin's case they are individual organisms—is removed from the population. There may be other factors relevant to change, such as random mutation, but evolution describes how traits become dominant in population because individuals having those traits continue to reproduce, while other individuals having different alleles are selectively eliminated from the reproductive pool.³⁰

If we apply this principle of evolution to human discursive practice, we can speculate on why competing tropes appear to have a selective advantage over formulations offered by Peirce, James and Dewey. We must first have some rough picture of how discursive vocabularies are reproduced over time. I would stress three elements. They are, first, literally repeated in discursive settings. This, however, depends on the second element, which is memory. People remember to say certain things; they remember how certain argument forms

28 Hickman, Larry. On Hugh T. Miller on "Why old pragmatism needs an upgrade." *Administration and Society* 36(2004): 496–499; Webb, James L. (2004) Comment on Hugh T. Miller's "Why old pragmatism needs an upgrade," *Administration and Society* 36: 479–495; Shields, Patricia M. (2004) Classical pragmatism does not need an upgrade: Lessons for public administration. *Administration & Society* 37: 504–518.

29 Hickman, Larry. *Pragmatism as Post-Postmodernism*. New York: Fordham University Press, 2007.

30 I am adopting a conceptualization of evolution that may be contested by other pragmatists (see, for example, Moses, Russell G. Groundworks for a pedagogy of evolutionary love ethics: Archetypes of moral imagination in the pragmatisms of Peirce and Addams,

go, and in what circumstances they are applicable. Having them printed (a technology) aids the memory, but then people must remember to read. Finally, discursive tropes and other cognitive resources are reproduced through education, but here, too, I would emphasize that the interchange between the human organism's memory and environment plays a role. There may be many points covered in any individual's education, but a person's working environment plays a role in determining which are most likely to be reproduced over the course of that individual's lifetime. I think that pragmatist epistemology is less likely to be reproduced simply because of its complexity and subtlety. I say this in part because of the many times that I have failed to give an adequately pragmatist account of my own process, simply because when called to do so unexpectedly, I floundered. I would recognize well into the conversation (or more typically, a day or two later) that I had failed to mention some key point that would have cleared everything up. It may be that *all* of these more sophisticated philosophical approaches—post-structuralist, social constructionist and feminist—are subject to this weakness. A certain cohort gets a grip on them for a while, but then they devolve into cant—buzzwords repeated with little understanding. Over time they just prove to be too difficult to reproduce in a convincing matter. Then their functional elements have to be reinvented by the next cohort, who will have little interest in recovering the defunct vocabulary of the previous generation. The possibility leads me to echo a previous theme: pragmatists have pragmatic reasons not to wear their pragmatism on their sleeves.

To return specifically to the debate around Miller's paper, there is one other matter that bears discussion. Two of Miller's respondents (but not Hickman) argue that in contrast to Rorty's linguistic pragmatism, Dewey's emphasis on experience provides a richer source for the iterative meaning-formation, testing and revision that is critical to the pragmatist criterion for warranted assertion and administrative action.³¹ In a follow-up, Miller says that this is just the problem. Miller interprets Dewey's conception of experience as a grounding or reference point for meaning; he sees this as a residue of the foundationalism that Dewey rejected. Miller thinks that linguistic pragmatists such as Rorty and Putnam have shed this baggage.³² Although I do not think Miller is reading Dewey correctly in making this critique, I do think that the linguistic pragmatists are on to something. When scientists perform experiments to test

Educational Theory, 67 (2017): 713–725). Unfortunately, engagement with this fascinating theme is beyond the scope of the present paper.

31 Webb and Shields, both *Op. cit.* Note 28.

32 Miller, Hugh T. Residues of foundationalism in classic pragmatism. *Administration and Society* 36 (2005): 360–374.

theories, it is the interpreted *claim* about the result that is either compatible or incompatible with the theory, not the result itself. The view is motivated by the idea that important epistemic properties, such as necessity and possibility, and normative properties (such as warrant or justifiability) are modal: they quantify over vocabularies or “worlds”. It is only when a group of people have reached agreement on what any member is entitled to claim that Peirce’s scientific method for fixation of belief can operate smoothly. This is precisely what is lacking in many disputes over the risks of new technology.

I am not sure why Miller thinks that Rorty is in any better position to deal with this problem than Dewey (or Hickman), but perhaps he thinks that Dewey’s approach licenses a simple appeal to experience as the foundation for factual claims. In fact, I think that this is where Dewey’s association with Jane Addams helped him to a view that emphasizes the importance of inhabiting the same world as your discourse partners. One can begin to do this, as Addams did, by living with them—a very different understanding of experience than the one Miller seems to have—but it takes time. Here, the pragmatist orientation allows one to move between discursive communities where people talk about scouts of the enemy (Dewey), devil babies (Addams) or the wisdom of rocks (Naomi Scheman) and conversations about the bioeconomy where speakers’ entitlement to such propositions have been ruled out by a rigorous application of modal operators. This is, once again, what Dewey may have had in mind in speaking of philosophers as the liaison officers of industrial society.

However, there is one last problem, or maybe it is two. In saying that the pragmatist orientation *allows* one to move between discourse communities, I am saying that someone (such as myself) who is steeped in the pragmatist epistemology of warrants, fallibilism and situated contexts can feel entitled to say things in one discourse community that they might not say in another. The important point is that pragmatism enables one to accept the responsibility for having said them. Importantly, the *truth* of the claim is not relativized to the discourse community in which one is speaking at the moment, but the way that one discharges one’s responsibility for having said it certainly is. On the one side, you are just observing what Dewey called the “conveniences” of time and place: you are speaking the local dialect. On the other side one must engage in a translational exercise that emphasizes the functional role of speech acts, cashing them out in terms of their significance for bringing inquiry to bear upon the “at issue” elements of speaking. See Jane Addams on devil babies for an instance.³³ The problem, Kristie Dotson argues, is that there

33 Addams, Jane. A modern devil-baby. *American Journal of Sociology*, 20 (1914): 117–118.

are situations where this translational exercise is inherently disrespectful, and liable to be distorting in ways that are oppressive to the people being translated.³⁴ I think pragmatists need something to say in response to Dotson, and I do not think that just doubling down on the scientific method's ability to fix belief is adequate.³⁵

What is more, when I say that pragmatists are *allowed* to move between these discourse communities, I am also stating a highly contextualized subjunctive conditional, rather than stating what someone is actually allowed to do in real life. I am saying that one could specify conditions limited solely to truth-apt, epistemic criteria in which such translations would “go through”. But there is no pragmatist badge that one can pin on one's shirt that will actually *allow* you to do this when talking amongst members of a discourse community. Addams had such a badge, but it did not say pragmatist. On one side, it was an earned trust based on years of interpersonal commitment and solidarity with people in the Chicago neighborhoods she was writing about. On the other side it was her evident intelligence, but it is worth noting that her gender and her lack of an academic credential led many practitioners of Peirce's method of science to discount her significance.³⁶ In one sense, this just takes us back to my original point: mentioning pragmatism without qualification is, in most instances, an invitation to miscommunication and misunderstanding.

Conclusion

Perhaps I can pull some of these desultory threads together by returning to Kolb's learning cycle, a model that he himself claims to have gotten right from Dewey. My participation in the bioeconomy workshop requires a layered application of the model. At one level, there are many disturbances that STEM specialists in either the assimilative or convergent quadrant feel they could address. Their work on climate change, depletion of fossil fuels and the polluting impacts of burning petroleum for energy has made them aware that this cannot continue. They have already been around the learning cycle a few times and stand ready with a number of clean energy technologies they want to try. I have done liaison work in some of those trips around the cycle, specifically in connection with biofuels. I pointed out that the disturbance is framed in a

34 Dotson, Kristie. Conceptualizing epistemic oppression. *Social Epistemology* 28 (2014): 115–138.

35 Thompson, Paul B. Pragmatism in a post-truth era, *Pragmatism Today* 12(2021): 88–99.

36 Siegfried, Charlene Haddock. Classical American philosophy's invisible women. *Canadian Review of American Studies* 22 (1992): 83–116.

number of different ways. In addition to the sustainability frame just outlined, some see biofuels in as the latest development in a century long history work on what was once called “chemurgy”. Others see biofuels as a national security strategy justified by turmoil in the Middle East. Still others see it in strictly political terms, initiated by George W. Bush’s security concerns, but now embedded in the Republican party’s strategy for holding the corn producing states of the Midwest. If you are for or against the Republicans, that is all you need to know.³⁷ In a sense, I have played my part in creating a new disturbance for these STEM scientists who hope to bring on the bioeconomy.

The sense that STEM scientists wanted social scientists to smooth out the trajectory for gene technologies was, in fact, a problem for some participants researching social dimensions of the bioeconomy. A pragmatist would advise a work-shop process organized around each phase in Kolb’s learning cycle, a process that Matt Brown has characterized as working Dewey’s logic of inquiry explicitly through the research process.³⁸ Although this particular workshop did not follow that pattern, it has, in fact, been widely adopted by professional facilitators and systems experts, though seldom with explicit reference to pragmatism or Dewey.³⁹ The break between academic philosophy and systems-based analytics can be traced to C. West Churchman’s departure from the philosophy department at the University of Pennsylvania. He wound up in the business school at the University of California, Berkeley, but that is another story altogether.

My contributions to the workshop often consisted in brief remarks intended to illuminate how differently matters can be viewed, depending on one’s back-ground and dominant interests. This was most successfully demonstrated when I reported on the work of Naomi Scheman, who describes herself as a Wittgensteinian, rather than as a pragmatist. Plant scientists at the University of Minnesota, where Scheman was on the faculty in philosophy and women’s studies, used genomics methods to identify and publish the sequence for wild rice. Wild rice is sacred to the Anishinabek or Ojibway, and they objected to this unilateral action on the part of the university. The scientists were

37 Thompson, Paul B. The agricultural ethics of biofuels: Climate ethics and mitigation arguments. *Poesis & Praxis: The International Journal of Technology Assessment and Ethics of Science*. Open Access DOI (2012): 10.1007/s10202-012-0105-6.

38 Brown, Mathew J. John Dewey’s logic of science. *HOPOS: The Journal of the International Society for the History of Philosophy of Science*, 2 (2012): 258–306.

39 See, for example, Bawden, Richard J. Systems thinking and practice in agriculture. *Journal of Dairy Science* 74 (1991): 2362–2373; Ulrich, Werner and Martin Reynolds. Critical systems heuristics. In *Systems Approaches to Managing Change: A Practical Guide*, M. Reynolds, Martin and S. Holwell, eds. London: Springer, 2010, pp. 243–292.

dumbfounded. They could not fathom the objection, and felt that by publishing the sequence, they were actually protecting the genome from those who would seek patents for segments of the sequence. With support from tribal elders, Scheman wrote articles explaining why this was seen as an infraction.⁴⁰ Her work demonstrates philosophical liaising at its finest, and other participants were fascinated by the story. However, I suggest that it is Scheman's work on building trust with communities beyond the walls of the University of Minnesota that allowed her to pull this off.⁴¹

The conclusion to all this is that philosophers *can* make continuing contributions to the ethic of responsibility envisioned by Hans Jonas. Dewey's pragmatist logic of inquiry provides a roadmap of the innovation process that highlights entry points for philosophical reflection. Furthermore, pragmatists may be more inclined to do this sort of work, in the first place. Beyond these modest contributions, I am not sure that pragmatism advances Jonas's program, and I have mentioned a number of ways in which it might retard it. The final thought is this: These weaknesses in the pragmatist philosophy need not be thought of as particularly disturbing. In fact, they only constitute a problematic situation to the extent that campaigning for pragmatism is one's end in view. But *given* the weaknesses I have noted, why would we want to do that?

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40 Scheman, Naomi. *Shifting Ground: Knowledge & Reality, Transgression & Trustworthiness*. New York: Oxford University Press, 2011.

41 This evaluation of Scheman's work derives support from the account she gives in Scheman, Naomi. We are always already engaged: Epistemological field work in the real world of the university, in *A Guide to Field Philosophy: Case Studies and Practical Strategies*, E. Brister and R. Frodeman, eds. New York: Routledge, 2020, pp. 178–192.

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