

# Intellectual Passions, Heuristic Virtues, and Shared Practices: Charles Peirce and Michael Polanyi on Experimental Inquiry

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**ABSTRACT** Key Words: Critique, responsibility, inquiry, science, doubt, heuristic virtues, intellectual passions, the comparative essay as a philosophical genre.

*The central preoccupation of Peirce and Polanyi was to undertake (in the words of the former) an inquiry into inquiry, one in which the defining features of our heuristic practices stood out in bold relief. But both thinkers were also concerned to bring into sharp focus the deep affinities between our theoretical pursuits and other shared practices. They were in effect sketching a portrait of the responsible inquirer and, by implication, that of the responsible agent more generally. This essay is, in structure, a series of études for how we might reconstruct that portrait, since there is no extended treatment in the writings of either author of these central figures (the agent and, in particular, the responsible inquirer). It is accordingly a preliminary study, though in some particulars a detailed one. Its ultimate aim is to join—and thereby to invite others to join—Peirce and Polanyi as inquirers into the very nature of inquiry itself.*

## Introduction

The thought of Charles Peirce and that of Michael Polanyi intersect at numerous points. These points of multiple intersections are sources of mutual illumination. This has hardly escaped the notice of scholars conversant with both thinkers. Indeed, Phil Mullins, Robert Innis, Andy Sanders, and David Agler have written exemplary comparisons of these two complex thinkers.<sup>1</sup> Even so, more (arguably much more) needs to be done in this regard. What these scholars have already so compellingly shown is that Peirce and Polanyi drew many of the same conclusions, were preoccupied with many of the same questions, and possessed strikingly similar sensibilities regarding fundamental matters. In brief, Peirce and Polanyi invite comparison as much as any two thinkers with whom I am familiar.

In general, comparative studies are a distinctive genre of philosophical discourse. It is far from surprising to encounter an essay on (say) Martin Heidegger and Ludwig Wittgenstein or one on Charles Peirce and Jacques Derrida or, finally, even a volume of essays on Emmanuel Levinas and Jacques Lacan. We have become accustomed to such juxtapositions. Though sometimes such ventures can be little more than (if indeed that) tedious exercises in hermeneutic cleverness serving no commendable purpose, they are often sources of illumination and insight. But perhaps too little attention has been paid to the pragmatics of such comparisons. Studies animated by a spirit of *rapprochement* are indeed among the most commonplace forms of philosophical discourse, though not all comparative studies are necessarily animated by this spirit. In any event, reflection on what we are doing when we are engaged in the work of *rapprochement* or simply comparison is surprisingly slight and sporadic. The obvious answer (bringing together disparate thinkers, traditions, or texts for the sake of calling attention to unsuspected affinities and differences) is neither mistaken nor adequate. This is, in truth, what we are doing or, at least, aspire to accomplish in such studies. Hence, the obvious answer is far from an inadequate one. Matters are, however, hardly so simple. The purposes being served by such comparisons call for our scrutiny. Pointing out similarities and dissimilarities

is one thing; doing so in such a manner as to advance inquiry or to aid whatever endeavor it is—the very inquiry or undertaking in which the authors being compared were passionately engaged—is quite another.

This is especially true if we take seriously Peirce's views regarding similarity. From a Peircean perspective, nothing could be easier than identifying similarities between even the most apparently disparate things. No two things are completely dissimilar in all respects. Yet, from a pragmatist perspective (at least regarding the fruitful comparison of different *thinkers*), matters are, as I have just noted, much more difficult.<sup>2</sup> Accordingly, the task of *showing* in detail, for some important purpose, how two thinkers are alike is not itself sufficient. In executing this task, one would have to contribute to the fuller realization of such a purpose—a truly philosophical (and not merely a hermeneutic) purpose.

In comparing what Peirce and Polanyi claim regarding inquiry, for example, one should aim at enhancing our understanding of this process itself. The comparison should be itself a step in the inquiry into the nature of inquiry. In general, both philosophical authors demand the *personal* participation of their readers in the elaboration of the meaning of their texts.<sup>3</sup> Beyond the role of the reader as an agent<sup>4</sup> assisting the text in realizing itself, that of the co-inquirer is, in the case of these authors, equally indispensable. Indeed, if we have not joined Peirce or Polanyi as co-inquirers—if we are not as seriously and passionately engaged in the process of investigation as they are (cf. Burchill)—we are failing precisely as readers, readers in the sense they explicitly call upon us to be. It would not be enough to show how two sticks are alike in this, that, and the other respect; it would be necessary to rub them together in such a way as to generate an illuminating flame and, then, ideally to use that flame to light the path of inquiry.

Even apart from this, however, to attend in detail to what both thinkers have to say, for example, about tradition is to have one's understanding of Polanyi enhanced by Peirce's insights and, in turn, one's understanding of Peirce deepened by Polanyi's points of emphasis. My appreciation and understanding of Peirce is inevitably enhanced by my study of Polanyi; but so too is my estimation and comprehension of Polanyi increased by my engagement with Peirce. One reason for this is that certain trajectories in Peirce's thought are traced out more fully in Polanyi's writings, while certain themes in Polanyi's thought are sounded not only more emphatically but also more delicately in Peirce's texts. Accordingly, a careful study of Polanyi can contribute to a nuanced understanding of Peirce and vice versa. But, in itself, mutual illumination is (to repeat) ultimately inadequate: fruitful suggestions for advancing inquiry, suggestions flowing from such comparisons, alone justify such a comparative study, at least if we are true to the spirit of these thinkers.

My aim in this paper is, consequently, to explore what is arguably at the center of each author's vision,<sup>5</sup> an attempt to offer a compelling portrait of the responsible inquirer and, inseparably connected to this, a *creditable*<sup>6</sup> account of experimental inquiry from the perspective of both the committed inquirer and the actual history of scientific investigation. More accurately, my goal is much more modest than this suggests, since it is merely to offer several closely related *études*, undertaken simply as preliminary studies for a more comprehensive, developed work. Inflected personally, these *études* are for a portrait of the responsible inquirer; understood processually (i.e., envisioned principally in terms of a process in which individuals participate), they are for an account of responsible inquiry. Whether or not I ever manage to turn to the task of executing this work is far less important than whether these *études* assist others in coming to terms with Peirce and Polanyi.

In taking up this task, we cannot avoid beginning *in medias res*, especially when our imperative desire is to begin at the beginning. Indeed, this desire only arises because our projects and, indeed, we ourselves are

located *in medias res*. Practically, beginning *in medias res* means beginning with our ineluctable engagement in a wide range of shared practices. We are first and foremost practitioners, implicated participants in an interwoven set of human practices (Colapietro 2006). This is not so much a consequence of thought as the result of life and the exigencies of action imposed by the business of living (cf. Whitehead 187). As infants, we are held and nurtured. In being held, fed, and otherwise nurtured, we have our first touch and taste of ethics, of how we are to comport ourselves toward others, toward nothing less than the world itself in all its promise and allure-*ment*, its imperative demands and subtle seductions as well as its abrupt reversals and unanticipated rebukes. Human agents are to a remarkable degree recognizable participants in an overlapping set of shared practices, the most important of these being arguably the linguistic practices constitutive of an identifiable language.

The very acquisition of a language, however, requires that we have already been initiated into trick learning, sign learning, and latent learning (see, e.g., *PK* 75). That is, our very ability to attain the capacity for linguistic articulation is a function of our inarticulate intelligence (see, e.g., *PK* 71ff.). Accordingly, human agency in its most rudimentary forms is the irrepressible exercise of instinctual ingenuity, an ingenuity observable in our capacity to learn how to perform tricks, use signs, and reconfigure the context of our engagements (*PK* 74). The reconfiguration of context and, therein, that of the form of action are at the heart of pragmatism.<sup>7</sup> Far from being a doctrine preoccupied with the most efficient realization of antecedently established ends—far from being an uncritical celebration of purely instrumental reason (cf. Horkheimer)—pragmatism is, above all, devoted to the projection of barely imaginable ends (e.g., a world in which experimental intelligence rather than brute force or the exclusive interests of an insular group shapes the course of events). Pragmatism is attentive to how both in the interstices of institutions and outside of control by institutions some genre of activity (e.g., the rearing of children or the pursuit of truth, the administration of justice or the rituals of worship) becomes reconfigured.<sup>8</sup>

What is utterly remarkable here is that, at a quite rudimentary level, the instinctual exercise of our inarticulate intelligence already encompasses what Polanyi calls “latent learning,” that is, an ability to reorganize the very form of our own engagements with the world. While human action is always situated, the salient situations are never absolutely or inalterably given: they are inherently open to modification. They are modified by the very exercise of our agency. The human animal is, Peirce stresses, “so continually getting himself into novel situations that he needs, and is supplied with, a subsidiary faculty of *reasoning*” (*CP* 497). The dramatic result of being thrown back upon our *rational* agency in unprecedented circumstances is that what counts as (say) religious sacrifice or legal justice or commendable conduct is transformed, often quite radically. Both in reference to established modes of activity and the noteworthy modifications of those modes, however, improvisation and ingenuity are integral to intelligence, at least as this word is understood by Peirce no less than Polanyi. The most fully conditioned response tends not to be an utterly mechanical reaction, just as the most stunningly improvisational response is not an anarchical one.

Creativity, at least in the form of improvisation and innovation, is a hallmark of our agency (cf. Joas). But another feature is equally noteworthy. Our agency tends to evolve in the direction of reflexivity.<sup>9</sup> In the normal development of human beings, at least, we cannot but act, if only in the form of inhibition or restraint,<sup>10</sup> upon our tendencies to act; we cannot help but have emotional responses to our immediate feelings regarding our direct involvement in experiential affairs; and we inevitably form more or less integrated habits having a fateful bearing upon the acquisition and alteration of future habits. This implies that we cannot help but think about thinking, cannot help but inquire into the very process of inquiring, though this hardly entails that we undertake these tasks in a conscientious, careful, or effective manner. “Few persons care,” Peirce observes, “to study logic, because everybody conceives himself to be proficient enough

in the art of reasoning already" (*CP* 5.358). We tend to think about thinking in a haphazard, sporadic, and fleeting manner, to inquiry into inquiry itself in a similar way. Logic in Peirce's sense is, however, a normative theory of objective inquiry (the only form of inquiry deserving this name). At the very least, then, this means that logic is a painstaking, sustained, and self-critical undertaking. In these (and other) respects, it stands in marked contrast to the *logica utens* with which we tend to be unduly contented. In Peirce's sense, Polanyi was also a logician, for Polanyi was devoted to offering a normative account of those heuristic practices instituted for the sake of facilitating genuine discoveries or disclosures. Like Peirce, he was preoccupied, *as an inquirer*, to understand more deeply and fully the task to which he devoted his life.

## First *Étude*: An Inquiry into Inquiry Itself

The obvious is often easy to overlook. Peirce and Polanyi were trained scientists and, beyond this, committed inquirers whose animating concern was, over and above specific, substantive investigations, to offer a tenable theory of human inquiry in its broadest outline and (in no small measure) its most salient details. Peirce identified this as his quest of quests, his "Inquiry into the conditions of the Success of Inquiry (beyond the collection and observation of facts)" (5.568, note). In turn, Polanyi identified the task undertaken in *Personal Knowledge* to be "an enquiry into the nature and justification of scientific knowledge" (in brief, an enquiry into enquiry<sup>11</sup>). But he was quick to point out: "[M]y reconsideration of scientific knowledge leads to a wide range of questions outside science" (vii). In other words, they were practitioners reflecting upon their practice, in light of their participation and the relevant history of human practices, *for the sake of the refinement of that practice*. They were acutely mindful of what other practitioners had to say in this regard and often sharply critical of the pronouncements of these others. They possessed wide-ranging historical knowledge and a deep-cutting critical sensibility.

For both Peirce and Polanyi, the emphasis falls on learning and discovery, not knowing. Self-corrective processes and practices replace self-warranting cognitions or truths (Sellars; Delaney), so much so that everything is, in principle, open to revision and reappraisal. Universal doubt of a Cartesian cast is rejected, but the potentially universal scope of specific forms of genuine doubt, in the sense that *any* truth at some point might be rendered dubious by the course of inquiry itself (not in the sense that *every* truth can be rendered dubious, especially all at once, by methodological fiat<sup>12</sup>), is integral to Peirce's fallibilism (see Agler).

Insofar as either Peirce or Polanyi turns his attention to questions of justification,<sup>13</sup> the focus of concern tends to be, "How can a deliberate agent, entangled in some problematic situation, most intelligently proceed?" Their objective is not the refutation of skepticism; it is rather an account of inquiry, an account wherein the appropriate and indeed necessary idealizations of the shared practices of experimental inquiry are not allowed to eclipse the irreducibly personal dimensions of these communal endeavors. Moreover, both were devoted to crafting an account in which the immense value of formalization was given its due, but not allowed to eradicate the possibility of *acknowledging* even more basic values (such as an inherently unformalizable sense of beauty or an irreducibly personal sense of obligation). Finally, both were committed to an exacting ideal of ongoing critique, but equally sensitive to the ineliminable distinction between acritical and critical judgments.

There is a sense in which our practices are ungrounded or groundless. They themselves provide the grounds for how *to go on* (cf. Wittgenstein, I, #179). To imagine that there is something more fundamental than these practices *and* the world in which they have evolved (but a world accessible to us only in and through our participation in these practices) is to fall prey to an illusion. The insistence upon the necessity to ground our historical practices upon an ahistoric foundation—to jump outside of history as a

means of validating our endeavors—has been a defining fixation of traditional thought. Both Peirce and Polanyi have rendered themselves immune to the siren songs of an immutable order upon which our historically and evolved undertakings allegedly need to rest. They however do so without jettisoning entirely the temporally or historically invariant. Yet both of them appreciate that the transcendence of time is and can only be a partial, provisional, and precarious achievement in the very flux of time itself, that a critical distance from the densely sedimented histories in which we are ineluctably and indeed fatefully implicated is a singular achievement of historical actors. Our locus in the present is far less a prison than a point of departure from which precincts of the past can be reached and possibilities for the future can be projected.

The inquiry into the forms, functions, and conditions enabling as well as stultifying inquiry cannot be responsibly undertaken without envisioning a vast field of human practices in which our predominantly heuristic practices can be located. In just this sense as well as other senses, Peirce and Polanyi undertook this inquiry responsibly. For our purpose, however, several points are especially worthy of emphasis. First, *theory is* for both theorists *a form of practice*. Second, there is in the hands of these philosophers nothing in the least reductivistic about this characterization. Indeed, it is one thing to assert that theory is for the sake of practice, quite another to claim that theory itself is a form of practice having a status, authority, and integrity of its own. Third, there is a complex relationship between predominantly heuristic practices such as the experimental sciences (e.g., physics, chemistry, astronomy, and biology) and ones organized about goals other than the discovery of truth (e.g., the goal of insuring justice or that of satisfying the myriad desires of human organisms). Heuristic practices have been the beneficiaries of support provided by other forms of human endeavor (e.g., royal patronage, government funding, and the cultural prestige accorded these practices by ordinary laypersons) but also the victims of the intolerance, misunderstanding, and much else tracing their origin to these other endeavors. Given the vulnerability of inquiry to disfigurement or worse (corruption at its very heart), there is an abiding need for heuristic practices to protect themselves from the corrupting influences of other culturally sanctioned forms of human endeavor. In a later *étude*, I will return to this point, so for the moment I will content myself with noting that the integrity of a practice, especially such a practice as physics or chemistry, is ubiquitously vulnerable to internal corruption and external influence of a deleterious character. In brief, practices are by their very nature corruptible. Their maintenance as noble and ennobling endeavors is dependent upon the abiding commitment of conscientious practitioners to preserve the integrity of these practices. The very act of undertaking an inquiry into inquiry, in the manner exemplified by Peirce and Polanyi, can be seen as a dramatic instance of a deliberate effort on the part of these responsible practitioners to protect the integrity of the practices to which they devoted their lives.

This effort is a bid for self-understanding, albeit one inextricably linked to a commitment to self-accountability (cf. Larmore). Both Peirce and Polanyi, however, were acutely aware of the degree to which the human animal is susceptible to grossest deceptions, perhaps especially self-deceit and self-obfuscation. What they write about self-understanding is indeed informed by a finely attuned sensitivity to our persistently operative tendency to misunderstand our selves and various aspects of the experiential world. That self-misunderstanding especially is more often than not rooted in our ideals, without which our idealizations would be impossible. What exposes our practices most to corruption, disfigurement, and implosion are not so much our venal failings but our most honorable impulses, our most exalted commitments. What James Baldwin wrote about artists is true more generally of humans. We are looking for not only occasions for action but also opportunities for the cultivation of our talents. When the world affords such occasions and opportunities, we encounter “the most dangerous point”: “For … not only in the wilderness of the soul, but also in the real world which accompanies its seductions not by offering you opportunities to be wicked but by offering

opportunities to be good, to be active and effective, to be admired and central and apparently loved" (294).

In a curious way, this brings us to our second *étude*. The historically credited portrait of the responsible inquirer has been one in which methodic doubt has played the central role. But, from the perspective of Peirce and Polanyi, this discredits too much of what responsible investigators cannot and ought not to eschew, most of all, the acritical inferences upon which finite agents must inevitably rely and the conscientious acknowledgement of the constitutive ideals of our heuristic practices. That is, both theorists have their doubts about the role accorded to doubt by the founding figures of the modern epoch: they are deeply skeptical about the salutary effects of a methodic skepticism, especially when the champions of the method of doubt betray the spirit of dogmatism in their very insistence on doubt.

## Second *Étude*: Doubts about Skepticism

As Peirce and Polanyi conceive the topics of belief, doubt, and inquiry, the most pressing concern is not to refute skepticism, once and for all. It is to affirm, time and again, what alone would unblock the road of inquiry and thereby open new paths for experimental investigation. It is one thing to advise one's co-inquirers not to block the road of inquiry (as though this is merely a mistake into which they might fall), quite another to point out the specific ways in which historical developments have actually obstructed the heuristic road—and then to show how such obstructions can be removed. Peirce and Polanyi certainly were animated by the desire to warn their contemporaries and successors to avoid putting obstacles in the path of inquiry; however, they were even more desirous to remove the historical impediments frustrating the ongoing work of experimental investigators. One of the ironies here, arguably the most crucial irony, is that the road of inquiry has been as often as not blocked in the name of science itself. All too frequently, the self-appointed champions of science (one might think here of Mach, Pearson, or Snow) have unwittingly contributed to a self-stultifying understanding of their own endeavor. Polanyi goes so far as to underscore "the immense power of self-deception" on display in so many formal attempts at self-understanding on the part of scientists (PK 169).

When one has lost one's keys, one tries to find them—not to debate the possibility of whether this endeavor is, in principle, rational or justifiable. There of course might be circumstances in which the very possibility of ever finding one's keys is a matter to be taken up with the utmost seriousness; but such circumstances would be specific, not global. If every time a person who lost a set of keys took up seriously the skeptical challenge, rather than looking in a careful and (possibly) systematic manner, we would hardly be justified in judging such a person to be duly *critical*; rather we would properly suspect some psychological problem (cf. Wittgenstein's *On Certainty*). That is, their concern is to justify not knowledge presumed to be in their possession, but the procedures by which what is not yet known can most effectively be discovered.

The radical skeptic and mainstream epistemologists who allow skepticism to be the pivot around which their entire enterprise turns are too credulous regarding the coherence and legitimacy of such doubt. The dogmatic skeptic is, indeed, the hidden figure in the official portrait of the responsible inquirer painted by those who at the outset defined the modern epoch (most influentially by Descartes). To be *post-critical* does not mean being blind to the need for critique or even for the role of doubt in the course of inquiry; rather it means being delicately sensitive to the forms and loci of effective doubt (see Agler in this issue). But it also means acknowledging the conditions and commitments required for effective doubt to take root. Even so, Peirce goes so far as to assert that "skepticism about the reality of things,—provided that it is genuine and sincere, and not a sham,—is a healthful and growing stage of mental development" (CP 8.43).

Many and many a philosopher seems to think that taking a piece of paper and writing down ‘I doubt that’ is doubting it, or that it is a thing he can do in a minute as soon as he decides what he wants to doubt. Descartes convinced himself that the safest way was to ‘begin’ by doubting everything, and accordingly he tells us he straightway did so, except only his *je pense*, which he borrowed from Augustine. Well I guess not; for genuine doubt does not talk of *beginning* with doubting. The pragmatist knows that doubt is an art which has to be acquired with difficulty; and his genuine doubts will go much further than those of any Cartesian (CP 6.498).

Practically, this means that the art of doubting is derived from and applicable to experience: “genuine doubt cannot be created by a mere effort of the will, but must be compassed through experience” (CP 5.498; cf. Friedman).

The art of inquiry is, in no small measure, the art of doubting. No experimentally trained inquirer, such as Peirce and Polanyi were, has any doubt about this. But the role of doubt is, in the context of inquiry, not originary (more precisely, it is not absolutely or unqualifiedly originary). Intelligible doubt only arises against a vast, vague background of largely tacit, intricately interwoven beliefs (or habits). It concerns not so much a propositional attitude as an agential orientation toward the experiential world, an orientation that is in truth a disorientation. Doubt marks those occasions when an agent is truly at a loss regarding what to say or do, how to go on or even in extreme cases how to get back to the point from which that agent set out.

Human agency is, at the very least, a more or less integrated set of somatically rooted habits making possible (at the very least) the competent execution of an indefinite range of human activities.<sup>14</sup> Such habits are, in certain contexts (i.e., for certain purposes), identifiable with skills or abilities to perform certain tasks, especially when the performance of these tasks is (or can be seen as) integral to participation in some other practice. The capacity to draw inferences in accord with the rules of inference, or to construct sentences in conformity to the rules of grammar, or to conduct a juridical inquiry in accord with the strict procedures of the promulgated laws in a given culture, or even to act within the recognizable bounds defined by the tacit rules of acceptable behavior seems to suggest that habits and skills are best conceived in terms of rules. In turn, rules in the relevant sense are taken to be formalizable. Pragmatism is—or entered upon the scene—as the explicit formulation of a heuristic maxim, a rule articulated by an inquirer for the sake of guiding the activity of himself and others passionately yet responsibly engaged in the task of inquiry. Rules, codes, and formalizations however play a subordinate role in the pragmatist account of our heuristic practices and, thus, also in the self-portrait of the responsible inquirer, at least as sketched by Peirce and Polanyi. To stress that the role of rules in particular is subordinate is not to imply that rules are dispensable or even unimportant. Far from it. But both Polanyi and even Peirce, who spent so much time explicating the formal rules of valid inference, were acutely sensitive to the limits of codification and formalization. In a crucial respect, both were anti-formalists. Both were, in effect, attuned to the full force of pronouncing any instance of human conduct “Bad form.” That is, they were deeply appreciative of form, formality, strict protocols, and the conscientious adherence to established procedures and traditional maxims. But this deep appreciation was tempered and informed by an even deeper appreciation of the irreducibly vague and tacit dimensions of human experience and conduct. Habits are not so much implicit rules as rules are codified habits. That is, inherently vague habits, skills, and abilities are primary, while formally explicable rules, procedures, and codes are derivative and thus secondary. Such codifications stand to habits, skills, and abilities in a manner somewhat analogous to the way maps stand to the terrain mapped. They can help us find our way about, but they can never replace experiential acquaintance with actual conditions (the tacit familiarity underlying not only formal definition but also even pragmatic clarification). To alter the metaphor, formal rules are the shadows cast by those concrete realities known as habits and

dispositions.<sup>15</sup> We can trace the contours of these shadows and, in doing so, we can obtain a sense of the shape of the realities to which they bear witness. But the realities themselves are the discoverable tendencies and dispositions of things, ranging from inanimate beings at the lowest level to responsible agents at the highest.

### Third *Étude*: Habits, Skills, and Rules

In the interest of space, this *étude* will be hardly more than a doodle (to which I will add another doodle in the penultimate section). The main point to make here is, at once, simple to state yet difficult to comprehend in its deep-cutting and far-reaching implications. It is indeed one I have already made: habits and by implication virtues<sup>16</sup> are primary, rules and maxims derivative. “Rules of art can be useful, but they do not determine the practice of an art; they are maxims, which can serve as a guide to an art only if they can be integrated into the practical knowledge of the art. They cannot replace this knowledge” (PK 50). Rules and maxims are not to be disparaged; rather they are in many instances to be emphatically recalled and even deliberately cherished. Deliberative agents tend to know just how useful formal procedures and explicit rules, especially in proverbial form, can be. But they know even better how “practical knowledge” takes the form of an expansive range of unspecifiable skills exercised by improvisational agents caught up in novel circumstances. Theoretical inquirers as such possess such “practical” knowledge, since they know how to comport themselves in the context of inquiry. This is truly a species of *know how*, so that knowing *that* is inconceivable apart from knowing *how*.

“Established rules of inference offer,” as Polanyi notes, “public paths for drawing intelligent conclusions from existing knowledge” (PK 123). But the art of inquiry is more than anything else a game of guessing. For this maxims are certainly helpful. Such established rules are, for the growth of knowledge, necessary but not sufficient: responsible inquirers must be responsive thinkers, ones capable of responding in novel ways to novel situations.<sup>17</sup> It obviously means being able to frame imaginative hypotheses that go beyond the secure precincts of existing knowledge. “The process of logical inference is,” in Polanyi’s judgment, “the strictest form of human thought, and it can be subjected to severe criticism by going over it stepwise any number of times” (PK 264). The principal function of the diagrammatic symbolization of inferential processes is, of course, to facilitate the activity of inquirers in their efforts to go over an inference ‘stepwise any number of times.’ “But systematic forms of criticism can be applied only to articulate forms” (PK 264). Some steps in an investigation are, however, inherently uncontrollable and, accordingly, uncriticizable. “Tacit acts are judged by other standards [than articulate forms of human thought and especially formal processes of deductive inference]”; they “are to be regarded accordingly as *a-critical*” (ibid.).

At the most primordial level, then, we cannot but go on acritical inferences. At the most exalted level, however, we are thrust back upon self-set standards and self-imposed discipline. At the highest level, indeed, the logic of affirmation becomes the logic of self-affirmation. “An intelligence which dwells wholly within an articulate structure of its own creation accentuates by doing so a paradox that is inherent in the exercise of all intellectual passions” (PK 195). This paradox concerns the necessity of dwelling in some interpretive framework and, equally, the necessity of breaking out of such structures.

“There is [in science no less than art or religion] present a personal component, inarticulate and passionate, which declares our standards of values, drives us to fulfill them and judges our performance by these self-set standards” (PK 195). This makes intellectual passions and heuristic virtues, rather than logical rules or formal procedures, the heart of the matter.

The actual history of scientific discovery makes this incontrovertible. Such discovery “is overwhelmed by its own passionate activity” (*PK* 196).<sup>18</sup> But this entails for Peirce no less than Polanyi being overwhelmed by some salient feature of “the circumambient All” (*CP* 6.429) in which the human animal is implicated.<sup>19</sup> “Scientific discovery, which leads from one such framework [of interpretation] to another, bursts the bounds of disciplined thought in an intense if transient moment of heuristic vision.” As the result of breaking out of some hitherto unquestioned framework, “the mind is for the moment directly experiencing its content rather than controlling it by the use of any pre-established modes of interpretation.” It is thereby (as we noted above) “overwhelmed by its own passionate activity” (*PK* 196).

In the concluding chapter of *Personal Knowledge* (“The Rise of Man”), Polanyi asserts:

Comprehension is an unformalizable process striving toward an unspecifiable achievement, and is accordingly attributed to the agency of a centre seeking satisfaction in light of its own standards. For it cannot be defined without accrediting the intellectual satisfaction of the comprehending centre. The unspecifiability of a conscious act of comprehension implies the impossibility of accounting for it [this act] in terms of a fixed neurological mechanism, etc. (*PK* 398).

What Polanyi asserts here regarding comprehension might with equal justice be claimed regarding inquiry or science. They are unformalizable processes with unspecifiable achievements. To some extent, the procedures by which inquiry or science are effectively undertaken *can be* formalized and, moreover, the achievements of the practitioners *can be* specified. What cannot be accomplished however is the reduction of the art of inquiry to a set of rules, in particular, a finite set of explicit rules insuring an antecedently definable success. What we are doing, even when we are engaged in a historically recognizable and culturally sanctioned form of human activity, is not transparently, certainly not infallibly or completely, clear to the participants in any practice. Our conscientious engagement in any human practice demands, time and again, a Socratic confession—a contrite acknowledgment that we do not know fully, and thus we do not know adequately, what we are doing. Only out of such an acknowledgment can the impulse to reform us and reconfigure our activities effectively assert itself.

The virtues of the inquirer encompass conscientious adherence to the formal rules of valid inference. They are hardly exhausted by such rules. Indeed, the very nature of virtue is that it transcends complete formalization, codification, or even explication. The invincibly tacit knowledge of the virtuous person is, in the end no less than the beginning, a surer guide to the practical meaning (or pragmatic clarification) of the various virtues than any abstract definition or formal codification.

Scientific inquiry cannot be reduced to a set of rules. It is indeed nothing less than a form of life, a distinctive form of human life bearing a complex relationship to other human practices (none of which is reducible to a set of rules). “We owe our mental existence predominantly to works of art, morality, religious worship, scientific theory and other articulate systems which we accept as our dwelling place and as the soil of our mental development” (*PK* 286). While science is but one practice among others (more accurately, while our heuristic practices constitute an extended family of shared practices having its matrix in a far wider range of human undertakings), it possesses (as we have already noted) an integrity of its own; but it constitutes a world unto itself (in other words, a form of life in and through which distinctive ideals of intellectual excellence are formed and reformed).

## Fourth *Étude*: Science as a Form of Life

Science is, at once, itself a form of life and an integral part of a human life, including far more than experimental investigation in its historically demarcated forms. That is, science is simultaneously autonomous as well as derivative from, and dependent on, a historically evolved form of human existence in which certain intellectual passions (along with much else) are, to some extent, provided cultural support. Without the cultivation of these intellectual passions, the emergence and growth of experimental inquiry would be impossible. Put yet otherwise, science is a world unto itself and part of a world larger than itself. The integrity of science demands an acknowledgment of both the autonomous character of experimental inquiry and its deep rootedness in animal life. It is indeed rooted in the plasticity so characteristic of certain zoological species, hence also the capacity of such organisms to learn from experience (ultimately in the case of *Homo sapiens*, to learn from experience in a self-directed and self-critical manner). It grows in the soil of a millennial acquaintance with what eventually become identified as the focal concern of specific sciences: “The existence of animals was not discovered by zoologists, nor that of plants by botanists, etc.” (PK 139). But it flowers into an endeavor far removed from the instinctual gropings of even the most intelligent species (PK 123-24).

This makes the justification of science itself, at bottom, the justification of a form of life and, hence, one in which there is something inescapably circular about the manner of justification (PK 195). On the one hand, this justification cannot but appeal to the very criteria and ideals by which this form of life is defined. In this sense, it must be an *internal* justification and, as such, it cannot avoid appearing to be question begging. On the other hand, it cannot limit itself to such an appeal and, in this way, it cannot avoid seeming to be a violation of the integrity of this very form of life. To justify the life of the experimentalist ultimately by an appeal to something other than a devotion of truth would be a paradigm of such violation. How, then, is this dilemma to be resolved?

The most basic skills (the somatic, social skills and capacities by which experimental inquirers are able to accomplish the myriad tasks requisite for carrying forward any intellectual endeavor, including the one with which they so completely identify) are not so many bottom rungs on a dispensable ladder (a ladder they are in the position to kick away once they have ascended by its assistance). The formalist dream is that all the indispensable acts of the responsible inquirer might be reduced to a finite set of formalized rules. Peirce and Polanyi however see this not as a dream to be fulfilled, but a nightmare to be avoided. Idealizations, codifications, and formalizations play an indispensable (though variable) role in all forms of inquiry; but intellectual passions, a wide range of seemingly rudimentary skills, a more or less integrated set of heuristic virtues, and much else which cannot be completely formalized, codified, or even articulated play an even more *vital* role.

These habits are formed and skills acquired in the interpersonal contexts to which our shared practices trace their deepest roots. The personal is inseparable from the interpersonal, the effective from the exemplary and thus from the authoritative, while codes are distillations from processes of codification and formal procedures are idealizations of the efficacious forms of some practical expertise (say, the expertise of the inquirer, the manifestly skillful participant in some historically established or contemporaneously promising practice). The exemplar in effect functions as an authority, however provisionally.

Rejecting the method of authority does not entail denying the provisional authority of our actual traditions.<sup>19</sup> Indeed, in the case of both Peirce and Polanyi, there is a robust recognition of the indispensable part played by heuristic traditions in the ongoing work of experimental investigation. There is, in their writings, a corresponding suspicion of those forms of originality based upon an adolescent

devaluation of these intergenerational communities. In an especially important passage, Polanyi asserts:

Wherever connoisseurship is found operating in science or technology we may assume that it persists only because it has not been possible to replace it by a measurable grading [or gradient] ... The large amount of time spent by students of chemistry, biology, and medicine in their practical courses shows how greatly these sciences rely on the transmission of skills and connoisseurship from master to apprentice. It offers an impressive demonstration of the extent to which the art of knowing has remained unspecifiable at the very heart of science (PK 55).

In turn, rejecting the method of apriority does not require jettisoning a keen appreciation of the critical role played by human conversations (face-to-face and otherwise) in what itself might be envisioned to be a different form of dialogical exchange—the experimentalist’s conversation with Nature (CP 6.568; also 5.168). Werner Heisenberg goes so far as to assert: “science is rooted in conversations” (1971, vii). As long as conversation is taken in a copious sense, one encompassing enough to include the exchanges between inquisitive, ingenious animals, on the one hand, and some more or less determinate range of identifiable phenomena, on the other, Peirce would heartily agree with this.

In any event, the life of experimental inquiry is one with the life of evolving symbols (see, e.g., CP 5.594, 2.220, 2.222 and especially 3.301). There is no paradox, at least no contradiction, in tracing the most exalted forms of human articulation to their subterranean roots in inarticulate intelligence. The radical responsibility of conscientious inquirers indeed requires such inquirers tracing their autonomy to their gifts and inheritances.

### **An Irrepressible Doodle: Responsible Inquirers as Passionate—and Playful—Participants in Historically Evolving Practices**

Given my own interests and preoccupations, I cannot repress the urge to offer a doodle—so severely abridged as to be little more than a caricature—of the human face of any experimental inquirer. Peirce’s manuscripts are a repository for a large number of pictorial doodles, often ones of a humorous composition (Viola; Leja). They are, of course, also such a place for textual doodles, though to an even greater extent a series of sketches in various stages of completion.

One of my favorite pictorial doodles to be found in Peirce’s unpublished manuscripts is the portrait of a figure (in fact, only of a face) named *Epistémy*. It is the depiction of an irritable and perhaps irascible character. It stands in sharp contrast to the more welcoming visages typically adorning the pages of these unpublished writings. I am disposed to go so far as to suggest that, in a puppet show of stock characters, at least one imagined by Peirce, *Epistémy* would play the role of the villain while Inquiry would assume that of the hero.<sup>20</sup> In any event, here is *Epistémy*.



Why would Peirce portray a figure so named in such an unflattering light? Allow me to appeal to a poet, although to a letter rather than poem by him, to shed light on Peirce's doodle. In a letter to his brothers, dated December 21<sup>st</sup>, 1817, John Keats defines *negative capability* as a remarkable capability of the human animal (one observable in Shakespeare though not in Coleridge); it is present "when a man is capable of being in uncertainties, mysteries, doubts, without any irritable reaching after fact and reason." While Keats seems to be disposed to ascribe this capability primarily to artists, its range of applicability might be much wider than this.<sup>21</sup> There is nothing inherently objectionable about reaching after fact or reason in the face of uncertainty or doubt. There is, however, something potentially self-stultifying in the irritable (and, thus, by implication the premature and presumptuous) reaching after these. The art of inquiry, no less than the work of the artists, requires the capacity to remain in doubt—to explore a range of possibilities without dismissing too abruptly, as almost always tends to be the result of irritability, seemingly implausible or even in some respects fantastic possibilities. The work of experimental inquiry encompasses the play of the theoretical imagination. The portrait of the inquirer given to such play is hardly that of *Epistêmy*, as sketched by Peirce in MS 1528. The humility, patience, and hope animating such an inquirer would hardly allow for a countenance frozen into a portrait of irritability. Such seemingly insignificant and irrelevant dispositions as humility, patience, and hope are, in the judgment of Peirce no less than that of Polanyi, truly intellectual virtues, ones indispensable for carrying out experimental investigations in a responsible manner. So, as a quickly improvised doodle portraying the responsible inquirer, I am strongly disposed to sketch the face of a passionate yet playful person who possesses the capability of living in uncertainty and doubt for an indefinite time. It is also the portrait of the virtuous person, wherein virtue reclaims its original meaning of strength. Though not nearly as arresting or intriguing as Peirce's various forms of doodling, I hope this one is at least suggestive and not without its own fascination. Though this doodle might fittingly serve as a conclusion to this essay, a more traditional conclusion is almost certainly a more appropriate one.

## Conclusion

First of all, the inquiry into the nature of inquiry invites a consideration of an encompassing field of human practices in which the defining features of our heuristic practices alone stand out in bold relief. Second, the dogmatic character of modern skepticism no less than the unacknowledged doubts shaping various forms of scientific dogmatism are effectively exposed by Peirce and Polanyi. There are, to be sure, reasonable doubts regarding the corrosive forms of modern skepticism, just as there are such doubts regarding the alleged certainties to which modern thinkers have appealed in their attempt to dispel (or defang) the seemingly intractable forms of modern skepticism. These doubts about skepticism suggest that traditional forms of the skeptical stance betray an unperceived dogmatism, while the characteristic assurances of those so vociferously combating modern skepticism betray anxious inflections. These inflections themselves betray an obsessive preoccupation with merely theoretical "doubts." What is needed is, as much as anything, a post-critical philosophy, one marking a decisive break with not only Descartes but also Kant.

Of even more fundamental importance, the ineradicably personal character of experimental inquiry and the precariously experiential nature of even the most praiseworthy forms of personal agency are arrestingly illuminated by Peirce and Polanyi: their efforts to throw light on these aspects of our practices and our very agency truly throws these facets into bold relief, especially against the background of traditional theories.

Finally, the emergence of self-critical intelligence is, paradoxically, only explicable in terms of a post-critical philosophy. The modern ideals of critique need to be supplanted by what (albeit misleadingly) might be

called a postmodern acknowledgment of responsibility. Theoretical undecidability does not preclude practical decisiveness. As it turns out, theoretical decisions (specific decisions made by theoretical inquirers at some historical juncture in the actual unfolding of some actual inquiry) are, at bottom, a species of practical decision. Such at least is the counsel of Peirce and Polanyi. What conclusion to draw, method to deploy, topic to research, and a host of other considerations are matters confronting historical actors in the evolving circumstances in which such improvisational agents are ineluctably entangled. In a sense, then, they are historical judgments, since they require taking into account what has been done, what one is doing, and how to go on precisely as a participant in some practice.

The thought of Peirce intersects with that of Polanyi around such themes and topics. Because of this, they prove themselves to be mutually illuminating philosophers. Of far greater significance, they prove themselves (especially in their mutual illumination) to be indispensable resources for attaining a deeper understanding of the central questions to which their theoretical imaginations were, time and again, drawn. “To read Peirce is,” as John E. Smith long ago noted, “to philosophize, for to follow his arguments it is necessary for the reader himself to be wrestling with the very problems Peirce envisaged” (xxv; cf. Short): above all else, it is to philosophize about such topics as inquiry, doubt, practice, rationality, and indeed much else. The same must be said about reading Polanyi. We have squandered the opportunities provided by their texts if we have not followed out the trajectories of their thought beyond what they themselves were in a position to accomplish.<sup>22</sup> The possibility of doing so, however, presupposes a passionate identification with an interwoven set of shared practices, above all else, those of responsible utterance and truly experimental inquiry. It is only by so identifying ourselves with Charles Peirce and Michael Polanyi that we can hope to begin to fathom their meaning. Identifying ourselves with these thinkers in the appropriate manner does not preclude critical distance from their substantive claims and methodological decisions. Quite the contrary, it alone secures the humane bases for effective critique, in the service of adjudicating these claims and assessing these decisions—that is, in the service of traveling down the road of inquiry.

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## Endnotes

<sup>1</sup>I have benefitted greatly from not only David Agler's essay in this issue of *Tradition and Discovery* but also his response to an earlier draft of this paper. Thanks also go to Robert Innis and Phil Mullins for help in producing the final copy of these remarks.

<sup>2</sup>When I wrote that Innis, Mullins, and Agler have written exemplary essays, I intended to assert that they did so in just this pragmatic sense.

<sup>3</sup>On the first page of the Preface to *Personal Knowledge*, Polanyi stresses "the *personal participation* of the knower in all acts of understanding" (vii). He explicitly links this theme to the reading of a text (see, e.g., 92).

<sup>4</sup>As a sign, a text possesses an agency of its own. Even if the author is "dead" in the sense intended by Roland Barthes and (by implication) Michel Foucault, the author is almost always a ghost haunting the habitation of the text (cf. Glass).

<sup>5</sup>In *A Pluralistic Universe*, William James suggests that "Any author is easy if you can catch the center of his vision."

<sup>6</sup>My use of this word in this context is intended to allude to the task of accrediting highlighted by Polanyi in *Personal Knowledge* and elsewhere.

<sup>7</sup>As Jonathan Culler notes in a very different context (!), "meaning is context bound, but context is boundless" (2002, 67). The prefixes *re-* and *trans-* are especially critical in the lexicon of pragmatists. Recontextualization is no less important than reconstruction, renewal, or reappraisal; indeed, the latter are always in effect, at least, instances of recontextualization.

<sup>8</sup>"From a humane standpoint our study of history," John Dewey noted, "is still too primitive. It is possible to study a multitude of histories, and yet permit history, the record of the transitions and transformations of activities, to escape us" (MW 14, 78-79).

<sup>9</sup>"Now the theory of Pragmaticism was," Peirce observed in 1905, "originally based ... upon a study of that experience of the phenomena of self-control which is common to all grown men and women; and it seems evident that to some extent, at least, it must always be so based. For it is to the conceptions of deliberate conduct that Pragmaticism would trace the intellectual purport of symbols; and deliberate conduct is self-controlled conduct. Now conduct may itself be controlled, criticism itself subjected to criticism; and ideally there is no obvious limit to the sequence" (CP 5.442).

<sup>10</sup>For Peirce, the ideal of self-control is largely realized through deliberate self-restraint and self-inhibition. This important facet of his overarching moral psychology has hardly received the attention it deserves.

<sup>11</sup>Enquiry versus inquiry: in *Descartes: The Project of Pure Enquiry*, Bernard Williams stresses that the pure enquiry in which Descartes was engaged differs from other forms of enquiry (or, to help render this distinction clear, simply from inquiries, as though enquiry and inquiry are fundamentally different activities). For Peirce and Polanyi, however, the inquiry into inquiry is, in most critical respects, continuous with the first-order inquiries constituting the subject-matter being explored. Whereas the project of pure enquiry is "to be done, if at all, once in a lifetime" (Williams 33-34), the task confronting the responsible inquirer, as envisioned by Peirce and Polanyi, is to be taken up, time and again, in the ongoing course of a historical practice susceptible to immanent crises (crises generated by its very successes).

<sup>12</sup>Despite her deep sympathy to Peirce's pragmatist approach to human inquiry, Susan Haack points

out a respect in which Peirce is not fair to Descartes regarding his predecessor's methodological construal of universal doubt.

<sup>13</sup>Both unquestionably *do* attend to questions of justification in various contexts, but what precisely they are doing when they become preoccupied by such questions is all too easily misunderstood. The main reason for this is that their engagement with such questions seems to be one more modernist (or critical) attempt to secure the foundations for knowledge, rather than a post-critical (thus, perhaps—to use a likely misleading term—postmodern) endeavor to offer a thoroughgoing fallibilist account of experimental inquiry in which a personal commitment to self-corrective procedures in effect replaces a completely impersonal appeal to self-certifying cognitions.

<sup>14</sup>This characterization of our agency fails to do justice to our struggle with our own incompetencies and, inseparably connected to this, the critical role such frequently disconcerting struggles rule in the effective mastery of some recognizable competency.

<sup>15</sup>From Peirce's perspective, there are likely no more straightforward examples of concrete *realities* than the embodied habits observable not only in certain species of animals but also in virtually every observable form encountered in the natural world.

<sup>16</sup>One of the many ways in which Peirce is an Aristotelian is that he takes habit to be the genus of virtue (i.e., a virtue is a species of habit).

<sup>17</sup>“The interpretative framework of the educated mind is,” Polanyi insists, “ever ready to meet somewhat novel experiences, and to deal with them in a somewhat novel manner. In this sense all life is endowed with originality and originality of a higher order is but a magnified form of a universal biological adaptivity” (*PK* 124).

<sup>18</sup>This carries implications for the relationship between science and art. “The arts appear then no longer as contrasted but as immediately continuous with science, only that in them the thinker participates more deeply in the object of his thought” than does the scientist (*PK* 194).

<sup>19</sup>Peirce defines religion, in reference to an individual, as “a sort of sentiment, or obscure perception, a deep recognition of a something in the circumambient All, if he [the individual] strives to express it, will clothe itself in forms more or less extravagant, more or less accidental, but ever acknowledging the first and last ... as well as a relation to the Absolute of the individual's self, as a relative being” (*CP* 6.429)

<sup>20</sup>“To learn by example is,” Polanyi notes, “to submit to authority. You follow your master because you trust his manner of doing things even when you cannot analyse and account in detail for its effectiveness. ... These hidden rules can be assimilated only by a person who surrenders himself to that extent uncritically to the imitation of another. A Society which wants to preserve a fund of personal knowledge must submit to tradition” (*PK* 53). If anything, Peirce is even more of a traditionalist in this regard than Polanyi.

<sup>21</sup>“Science and philosophy seem to have been changed in their cradles. For it is not knowing, but the love of learning, that characterizes the scientific man; while the ‘philosopher’ is a man with a system which he thinks embodies everything worth knowing. If a man burns to learn and sets himself to comparing his ideas with experimental results in order that he may correct those ideas, every scientific man will recognize him as a brother, no matter how small his knowledge may be” (*CP* 1.44).

<sup>22</sup>Indeed, John Dewey in *Art as Experience* characterizes philosophies in terms of this trait. At the conclusion of Chapter 2 (“The Live Creature and ‘Ethereal Things’”), part of the title of which is also derived from Keats (*LW* 10, 27, note #1), he suggests: “Ultimately there are but two philosophies. One of them accepts life and experience in all its uncertainty, mystery, doubt, and half-knowledge and turns that experience upon itself to deepen and intensify its own qualities—in imagination and art. This is the philosophy of Shakespeare and Keats” (*LW* 10, 41).

<sup>23</sup>We have the advantage of our time—the time since each one of these thinkers has died—but we have this advantage because of the insights with which they have equipped us for the ongoing task of critically appropriating our historical moment.