

# The Triumph of Uncertainty

Science and Self in the Postmodern Age

ALFRED I. TAUBER

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*Dedicated to the memory of my grandfathers,  
Alfréd Manovill (1880–1944) and Gyula Tauber (1884–1915),  
who were destined to live their lives in times of tragic uncertainties.*



“It may be that, as Bergson maintained, a philosopher only ever develops one idea. In any case, there is no doubt that the philosopher is born of a single question, the question which arises at the intersection of thought and life at a given moment in the philosopher’s youth; the question which one must at all costs find a way to answer.”

– *Alain Badiou (2012, vi)*

“All the world over and at all times there have been practical men, absorbed in “irreducible and stubborn facts” [quote of William James]: all the world over and at all times there have been men of philosophic temperament who have been absorbed in the weaving of general principles. It is this union of passionate interest in the detailed facts with equal devotion to abstract generalization which forms the novelty in our present society. Previously it had appeared sporadically and as if by chance. This balance of mind has now become part of the tradition which infects cultivated thought. It is the salt which keeps life sweet.”

– *Alfred North Whitehead (1925, 3)*

“Properly speaking, there is no certainty; there are only people who are certain.”

– *Charles Renouvier (1912, 366)*

“Let’s think about what happens when one lets go of certainty.”

– *Tobias Rees (2018, 119)*



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# Foreword

**T**his is a unique book, and it is a book that is desperately needed for our times. If both positivism and relativistic constructionism have failed, what frames our view of reality? Tauber concludes that one's epistemological and ontological stances are, in the end, precepts that grow from the ways in which we deal with irreducible chance. Uncertainty is not to be avoided, but is an inevitable outcome of our limited understanding of the complexity of the systems (physical, social, and psychological) in which humans are embedded. Tauber's personal account shows how he followed contemporary science and philosophy back into the paradigms of Montaigne and Erasmus, who recognized the value of doubt and who saw the quest for certainty as leading to frustration and depression.

At first, I found it unsettling to be brought along Tauber's journey from college student, to medical practitioner, to scientist, to philosopher. Why can't he just go straight to his philosophical conclusions? But once one has followed this excursion, the reason becomes apparent. Tauber does not believe that the philosophy can be dissociated from the person. If he is to tell us his philosophy, he also has to tell us how he got to these conclusions. Fortunately, his tale is a recapitulation of modern philosophy's history, a story that draws from both analytical and continental schools of thought. He starts off with a positivistic scientific attitude, becomes immersed in the Science Wars that attended Thomas Kuhn's publications, becomes a scientist steeped in a culture where he realizes the storytelling aspects of his trade; learns from both Michael Polanyi and Willard Quine, and starts making his own synesthetic philosophy. As he tells us of

his journey, he offers insights into the debates that rocked philosophy after World War II. Tauber is an excellent teacher, and he is able to distill the important aspects of philosophical arguments without getting lost in trivialities.

Tauber has had the remarkable privilege of being a *scientific* practitioner, looking at philosophy as an outsider, and a professional *philosopher*, looking at science as an informed critic. He has thus been able to uniquely span the “Two Cultures.” He argues that science cannot be understood without the recognition that it is a creative act that draws from personal experiences, and that while scientific knowledge follows defined rules, one’s personal perspective and judgments guide interpretation. Whatever is “real” reflects an entanglement of knowledge and the personal, defining and redefining each other. This is a mature synthesis that should be applauded, respected, and discussed.

The philosophy of the *Triumph of Uncertainty* derives from Tauber’s active scientific career, which is then scrutinized by an informed philosophical critique. Here, we actually have an answer to Steven Weinberg’s question to Tauber: “What the hell has philosophy ever done for science?” By allowing science and philosophy to inform one another, Tauber has had a seminal role in transforming the science of immunology. That alone is an amazing accomplishment! The immunology he received was a “science of self/nonself determination,” where the immune system was seen as the defensive weaponry of the body against a hostile outside world. He re-made it into an ecological science wherein the defensive role was only a relatively small part of the immune system’s abilities to integrate the body and to negotiate its comings and goings with the outside world. This became a view of immunology where harmony was not pre-existing but was always being constructed. The body so maintained is an organism whose premise is uncertainty. It does not know what to expect. The genetic script can take it only so far. The immune system has to be adaptive and creative.

Immunology is the critical science of the twenty-first century, the science that is most concerned with the construction of one’s biological individuality. Tauber regards the immune system as a cognitive faculty that negotiates existence within a changing world. And like the immune system that he envisions, human reality is formed by the constant recognition of the new and our attempts to integrate it into the pre-existing equilibrium. The result is always creative, sometimes challenged by the incorporation of a single new entity that can shift the equilibrium/self into new paths. Harmony is always being sought and never reached as long as novelty is being apprehended. Both physics and biology show that “mutability and change reside at the base of contemporary

Western metaphysics.” And Tauber is saying to us, “Deal with it!” We live in a world where context determines function and identity, where parts become defined by their positions in wholes, and where complexity rules. Hume, Levinas, Wittgenstein, Quine, Whitehead, James, Nietzsche, and Polanyi each has a role to play in this synthesis. So do biologists Irun Cohen, Antonio Coutinho, and Lynn Margulis.

*Triumph of Uncertainty* is a rich tapestry, in which science plays several roles, but is not the totality. Two of its tasks involve critical paring away of falsehoods and its ability to serve as a model of communal activity. Its findings are provisional, but what it gives the human world is a model of consensual thinking, even among rivals. Moreover, through immunology (which both Donna Haraway and Bruno Latour claim is our first “postmodern science”), we get an embodied notion of how a cognitive system is able to establish identity through a dialectic of past and present experiences.

The question of identity becomes *Triumph*’s key theme and Tauber derives a crucial humanistic lesson from the science. The uncertainty (and potential) found in biology is correspondingly experienced in terms of personal identity as well. The self can no more be objectified through self-knowledge than is biological identity that exhibits constant adjustment to the challenges of interactions with the environment. Extending the dialectical structure of organisms responding and adjusting to “the other,” Tauber utilizes Levinas’ ethical notions of self-formation through the recognition of the other as a cornerstone of his philosophy. Indeed, the key role of caring comes from Tauber’s ideas about medical ethics, the mutualistic learning from the patient-physician relationship and the moral centrality of recognizing the other. Thus the biological epistemology so carefully charted correspondingly grounds his view of the universe—both natural and human. Here we find the bridge between the science and the humanities that originally propelled Tauber’s journey. The lessons learned have wide relevance for humanizing a world supposedly “disenchanted” by objectification run amok.

*Triumph of Uncertainty* can be seen as a modern “Guide for the Perplexed,” for most of us are indeed perplexed and confused. Beyond recognizing the constitutive nature of uncertainty, both natural and personal, Tauber suggests that an internal moral compass must guide us. In the end, we are responsible for finding meaning in a world characterized by irresolvable complexity. Thus, parallels are drawn from science’s epistemology with a vision of persons responding to others. In each domain, identity is dynamically established and dialectically enacted. In terms of biology, the individual is deconstructed in terms of

ecological relationships; in the social sphere, a moral sense of the self in response to the other orders and signifies the social universe we know and experience. Note, Tauber is not applying a scientific description to a human characterization, but rather he is describing a resonance between different ways of knowing, in which a shared metaphysics of uncertainty undergirds both the natural and psycho-social domains. This expansive philosophical dialogue offers insights about the reality science has bestowed and ways in which the objectified world might be humanized. It is a message well heeded.

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# Preface

“The principle of causality...is as much an altar to an unknown god as the one that Saint Paul found at Athens. All our scientific and philosophic ideals are altars to unknown gods.”

– William James ([1897] 1992, 567–8)

**T**he *Triumph of Uncertainty* offers a commentary on ways of knowing that have pitted objective and subjective orientations as opposed and exclusionary. I argue that such a division not only denies porous boundaries but represents discarded philosophical positions.<sup>1</sup> My discussion originates, in large part, in a dispute between central European and American scholars that roughly spanned the half century beginning in the 1920s. This account explains how I joined that dialogue towards its denouement when a flurry of vitriol announced its furious ending. I am referring to the Science Wars of the 1990s, when defenders of Truth and Objectivity made their stand against Thomas Kuhn and his cadre, who had reformed the positivist ideals of the so-called Standard View of science. The Kuhnians had countered the logical positivists (also known as “logical empiricists” or collectively as the Vienna Circle), who sought to establish a philosophy of science that would be rid of metaphysical claims and place true knowledge on a strict empirical basis.

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<sup>1</sup> The title, *The Triumph of Uncertainty*, plays on John Dewey’s *The Quest for Certainty* ([1929] 1984), his Gifford Lectures that dealt with the relationship of science to social needs and human values. My study is an extended commentary on Dewey’s problematic, i.e., the challenge of integrating different ways of knowing. I am not engaging a dialogue framed by Wittgenstein’s own concerns in *On Certainty* (1969) that are about epistemological skepticism and why radical doubt is philosophically inconsistent within a system of beliefs. For general overview of Wittgenstein’s *On Certainty*, see Moyal-Sharrock 2004 and Hamilton 2014. For a more technical explanation of why *certainty* is categorically different than *knowledge*, see Brice 2014.

All else was jettisoned and with that discharge, the “soft” interpretive elements that the American critics had identified as not only present but constitutive to the scientific endeavor generated heated argument. I grew up guided by a positivist standard, both in my early education and then as a laboratory investigator. That position, a standard in the basic research community, I extrapolated to deal with both personal social and existential dilemmas, namely, how to deal with uncertainty. The positivists claimed a degree of certitude I could find nowhere else. Eventually, I recognized their failed promises and sought a different way of understanding the scientific enterprise.

This tale begins in America, where I was born to Hungarian immigrant survivors of the Holocaust. They brought sensibilities and culture that would not find an easy home in America. But more importantly, their traumatic experience carried an aura of insecurity that pervaded our home and was transmitted to their children. The ways in which I dealt with my own perplexities centered on conflicted identifications in which science was contrasted in stark opposition to art and literary hermeneutics. This became a pressing matter during my university years. When confronted with making a career choice, I translated my emotional conflicts into intellectual terms that swept me into the historical debates about the unity of science; the legitimate jurisdiction of subjective elements in the objective pursuit of knowledge; the positivist ideals pitted against what the Hungarian émigré, Michael Polanyi called, “tacit” or “personal knowledge” (Polanyi 1962a; 1966); and finally the American pragmatist dislodgment and ultimate rejection of the philosophical formalisms of the Old World that had dominated philosophy of science during the inter-War period (Richardson 2002; 2007; Hardcastle and Richardson 2003; Misak 2013, 155 ff.; Mladenovic 2017, pp. 167-195).

For me, the fate of the Vienna Circle was not solely of intellectual interest. My story directly intersects with these Europeans through the Boston Colloquium for Philosophy of Science that I directed from 1993 to 2010. This interdisciplinary lecture series is a direct descendant of the discussions that had begun in Austria among these innovative thinkers. After World War II, those assembled in Boston met (under the leadership of Philip Frank) several times a year to discuss papers about science that would be delivered by scholars, principally those working at various local universities but also included visiting academics. In 1960, a small fund was transferred to Boston University, and under the guidance of Marx Wartovsky and Bob Cohen (my predecessor as Director of the Center for the Philosophy and History of Science), the “Vienna meetings” continued. Gerald Holton, as “secretary,” kept records of the earlier proceedings (Holton

1995a). I took pride in the minor role I played in this notable chapter of twentieth century philosophy of science.

How and why I assumed this role in my transition to the halls of philosophy after twenty years of basic biomedical research is explained in the opening chapters, so suffice it to note here that I found my scholarship oriented by those early Euro-American philosophical discussions. The positivist ideals that I thought governed my own investigations had, in fact, been effectively challenged by Polanyi's understanding of the scientific enterprise. His views about the interpretive aspects of scientific inquiry and their place in the universe of human ideas found residence in my own post-positivist understanding of the scientific endeavor. This story then is a comment on the fate of those central European ideas in America, where the search for *true* knowledge—certainty in the broadest sense—developed as an epistemological ideal was radically transformed. Accordingly, publication of this essay by the Central European University Press closes a circle comprised of both intellectual and personal elements; clearly, a most welcomed homecoming for a man who has so self-consciously sought to integrate diverse ways of thinking exemplified by the oppositions of “Two Cultures” (scientific/hermeneutical, American/European) and the identifications associated with each.

Avaloch Farm  
Boscawen, New Hampshire  
September 20, 2021



# Introduction

“Thinking too has a time for ploughing and a time for gathering the harvest.”

– Ludwig Wittgenstein (1980, 28e)

I have an unusual philosophical tale to tell, for I did not train as a philosopher, but rather as a scientist. However, I became a scientist for philosophical reasons and the questions provoking my interest seem to me to be *the* questions of our era. Specifically, I searched for *certainty* in a world that I increasingly recognized as anything but certain. I grew up with a sense of assurance that a prescribed way of thinking—rational and methodical—conferred the best strategy of achieving the best outcome, if followed faithfully, whatever the issue and whatever the circumstance (albeit acknowledging the contingencies of circumstance and the fallibility of judgment). Faith in an ordered universe—natural and social—underpinned this attitude. Drawing from a religious wellspring of divine providence, a variant of such belief informed science’s own aspirations. As Alfred North Whitehead observed a century ago, this basic metaphysical position justifies the assumption that because we believe the universe is ordered, we are justified to proceed with a reasoned-based approach to query nature and, by extrapolation, organize human affairs (Whitehead 1925). Adjoining empiricism with rationality, science would minimize, if not eliminate, uncertainty. More, having the potential of achieving clarity, Truth would be found, not by revelation, but by the tools of objectivity and neutrality obtained by the confident work of the autonomous ego.

This quest launched modern philosophy, when René Descartes pondered how to escape the skepticism about fundamental categories of being: How could he *know* anything for certain? The existence of God was a central concern, but even more fundamentally, who, indeed, was this self-conscious ego

that might ask such a question? And as he followed the logic of inquiry, Descartes decided that his only basis for building a world—a universe in which he could know the world, himself, and the divine—rested upon the certainty of his own self-conscious thought: “I think, therefore I am” thus became the countervailing motto to Montaigne’s skepticism, “there is no other certainty, but uncertainty” (Montaigne 1976, 392).<sup>1</sup> Based on the (putative) certainty of Descartes’s own self-consciousness, his assurance of himself as a thinking *thing*, he built an epistemology. This construct became the basis of modernity—a knowing agent, whose mind, independent of the material world, could confidently examine nature’s workings. The ensuing four centuries debated this schema and by the early twentieth century the “thinking thing” underlying modernity has been disassembled, deconstructed, and discarded. And with Cartesian conviction dismissed, the very foundations of modern philosophy cracked and crumbled. The ramifications have seeped into every crevice of our millennial culture.

When viewing the Cartesian project as the history of modernity, the primary “actor” of this drama is the scientist. Her original goals and prospects have been discounted, and in some cases abandoned, in recognition of science’s epistemological conceits. That is the story of deciphering the philosophical infrastructure of experimentation and interpretation, a chapter of intellectual history that forms the backbone of this narrative. But a deeper theme pertains to how science itself has revealed the limits of prediction while measuring the uncertainty at the core of reality. Indeed, uncertainty has attained a novel standing not only because of a massive cultural shift governing social principles, but also due to the probabilistic character of knowledge. From physics to systems biology, from economics to psychology, stochastic descriptions approximate, with varying degrees of certitude, the dynamics of complex systems. As a result, we live with renewed respect for the embedded limits of even the most methodical scientific conclusions. That modesty in turn has generated a deeper skepticism about critical analysis lacking the epistemic power of the laboratory.

Obviously, the continuum stretching between certainty and uncertainty is a cultural meter that has fluctuated throughout history. In our era, the needle is pushing towards the region of doubt. The ambiguities of the future are not the

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1 Similar wording is found in other essay by Montaigne, e.g., “How our mind hinders itself,” (Montaigne 1976, 463), and parallel comments scattered throughout his writings, e.g., in “Of Presumption” (*ibid.*, 481). For the intellectual and historical relation of Montaigne and Descartes, see Toulmin 1990, chapters 1 and 2.

issue, for unpredictable change is constitutive of human life. However, a novel kind of caution has appeared in recognizing a new paradox: With increasing scientific insight, the borders of knowledge appear more clearly. In other words, with scientific advances, uncertainty is better defined. And, despite the sophistication of our collective reliance on critical analysis, we have come to more modest expectations about our tools of thought—Reason and Objectivity—that grounded Enlightenment ideals and guided notions of progress. And with the reassessment of those values and methods, modernity has been challenged.

During my formative years, the values of science and its accompanying ideals were the prevalent cultural markers that guided my aspirations and framed my own sense of who I might become. Deliberate decisions had to be made as I planned my future. Coming of age in the 1960s proved challenging as the social winds of uncertainty were sweeping across the cultural landscape. Who could ignore the political turbulence of cities burning, political assassinations, disputed wars, and disruptive assaults on “establishment” authority and mores?<sup>2</sup> During this unrest, my assumed values and motivations were challenged. I had expected that my own good sense would orient me, and a new order would steady the rocking boat of my psyche. However, without a compass I was tossed about on churning seas. Confusion did not abate, and then the most obvious default position took hold, an assumption of sorts: The world was an ordered universe, so *I* must be the problem. Of course, I suffered adolescent perplexities, but that bewilderment was aggravated by the tempest of the times.

Little did I comprehend that my own disorientation was but a miniature mirror of vast historical forces at work. Only later did descriptions emerge that assigned conceptual categories to the shifts I witnessed. Following the Paris protests of 1968, the French postmodernists sang a refrain I would eventually understand: Reason imperiled, bequeathed relativism; social structures deconstructed, revealed society as a force field of vying power; the contingencies of language left a system of shifting signifiers; the ego defrocked, placed moral

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2 The common reading of the 1950s as a period of convalescence and social ennui is belied by the turbulence and innovation in the literary, musical, and visual arts following World War II. Although barely making a ripple in the common discourse, the artistic innovations of this period threw off the remaining strictures of structure and representation that foreshadowed the radical political re-evaluations of the 1960s. For a global overview of the mid-1940s to early 1960s artistic culture, see Menand 2021. The literature addressing this period in terms of social change, political upheavals, and cultural experimentation is immense, but well chronicled by Gitlin 1987. And for a startling review of the momentous political and social disruptions of 1968, specifically, see Kurlansky 2005.

agency in limbo.<sup>3</sup> At the time, I did not appreciate the implications of these descriptions of a world turned up-side down. Indeed, I doubt they had even penetrated my consciousness. Instead, I understood the vast cultural storm in which I was living in political terms. Those were apparent; philosophical discernment followed much later.

The year I graduated from high school (1965) Bob Dylan sang, “you don’t need a weatherman to know which way the wind blows” (“Subterranean Home-sick Blues”), or for that matter that a gale was raging. The second half of the ’60s confirmed his prediction. The disassembly of values and standards profoundly altered expectations. Indeed, most of my cohort walked unsteadily into the future as existential uncertainty enveloped us. I appreciated the relativism of “reality,” both as lived socially and politically; the values governing behaviors were hardly universal. If a country could go mad, as did Nazi Germany, what conferred rationality? In the middle of the Vietnam War, what were the “right” choices? With whom would I stand? These questions, and a host of others, formed around an irritant that would pester me wherever I went: *Who am I?* One didn’t need a philosophy course in ethics to understand that identity emerged at the point where one stood on the moral landscape. And that was determined by how one sees reality. Choices were required, and passivity was not an option.

I failed to perceive the deeper currents at work that were later defined in terms of the profound re-orientations that had emerged with postmodernism. After all, with the attack on modernity’s foundations, “all that is solid, has moved beneath our feet like a crust over a fluid.”<sup>4</sup> The intellectual framework only appeared later. So, as explained below, during college, I made a fledgling attempt at sorting out the perplexities as best I could. That effort took the form of defining my own identifications: Would I remain attached to the hermeneutical ways of thinking characterizing the arts, literature, and history, or, alternatively, would I seek the apparent steadiness of a career in science, based on an austere objectivity? Sorting out the apparent conflicted relationship of these ways of knowing ended in frustration. When I renewed that project twenty years later as an academic, I discovered how my original search for such a synthesis had a long, unresolved history. How I understood this apparent conflict

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3 The literature on this bevy of issues is seemingly endless. Useful introductions include Best and Kellner 1991; Jacoby 1999; Thorne 2009; Rodgers 2011. In terms of the larger context of the emergence of postmodernism, see DeKoven 2004.

4 Charles Darwin, describing the earthquake in Concepcion, Chile. February 20, 1835 (Darwin 2010, 124).

is the narrative backbone of this story, a tale that exposes the tension between Two Cultures (science and the arts/humanities) and the fault lines within modernity. I witnessed the surface of a crisis in the standing order, but my confusions originated in this much larger contest about the legitimacy of the subjective in a world seemingly dominated by the stark objectivity of the sciences.

I was hardly unusual in regarding scientific thinking as the ideal modality by which to deal with the indeterminate. This had become an enduring tenet of the Enlightenment in which the cognitive ideals of certainty, completeness, and necessity were instantiated through association with the scientific enterprise.<sup>5</sup> Later critical assessments left such promises as ideals, essentially unattainable. However, such revisionary understanding lay well beyond my horizon as I was about to choose a profession. I saw the question of certainty in the social terms of the times and as a personal psychological matter. To the extent that I placed my confusions in an intellectual context, I put science, the arts, and the interpretive disciplines in opposing corners and then allowed the combatants to battle for my soul. With whom would I identify? Eventually, after many ambivalent deliberations, I pursued a career in biomedicine as an academic physician. I did so, at least in the early stages of adapting to that choice, with an eye attuned to how science might be understood philosophically. It was a way of holding both ends of the stick—biology at one end and epistemology at the other.

### ON CERTAINTY

This essay is not a historical study of the birth of science and its development, a topic garnering a vast literature, but rather a reflection on one of its prominent underlying aspirations, namely, the search for *certainty*. Of course, science may be characterized in many ways, but as already mentioned, looking for certainty captures much of my own early motivations for entering the laboratory. Indeed, an irony underlies this tale, for my initial assumption that science would provide me with a way of achieving certainty proved innocent of complexities beyond my naïve experience. What emerged instead was a better understanding of how science defines and measures *uncertainty*.

My youthful ideas about achieving order and predictability originated (at least in my socio-educational stratum) with a narrow idea of science that had

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5 These epistemological ideals may be traced back to the ancients, but Kant encoded (some would say, enshrined) them in his *Critique of Pure Reason* (1787; see Kaufmann 1980, 186–87).

percolated throughout advanced Western cultures. The success of this form of applied Reason to conquer nature and enrich human industry seemed self-evident. Society's contract with the scientific establishment had reaped huge rewards: nuclear physics had terminated World War II; laboratory-based medicine enjoyed spectacular advances; space travel was no longer a fantasy; megagriculture had begun. Moreover, irrespective of achievements as assessed by the benefits of derivative technologies, a more fundamental ethos penetrated cultural norms. Science, in its positivist modality—its logic and empirical basis—had become the paragon of knowledge and its acquisition.

I had not anticipated revisions of these core ideals, for I did not appreciate the profound metaphysical shift that science itself brought to these assumptions. Complex systems (physical, biological, and social) are governed by nonlinear dynamics and thus chance leads to a spectrum of outcomes and even to irreducible indeterminacies. My appreciation of the larger philosophical consequences of this general scientific characterization of systems *qua* systems began with my own laboratory research. As explained below, my studies of the biochemistry of inflammation revealed a cascade of interactions that defied simple mechanics and designated outcomes. The wider the cast of immune actors, the more complex their roles appeared. Remedy was sought in delving to smaller and more restricted inspections. But in going more microscopic, the “big picture” receded ever further from clear definition. Within my own research community, the theoretical issues underlying this general matter did not command much interest, so I looked elsewhere for guidance.

Two tributaries of thought coalesced around the question of certainty. Both pertained to science, one regarding a new awareness about complexity and the embedded probabilities that characterize studies of biological systems. The second concerned the very nature of how reality is depicted by the scientific enterprise.

1) When I began to think about these matters in the late 1980s, the science of complexity enjoyed a resurgence of interest. At the time, many entry points might have been chosen to learn about chaos theory and self-organization (Gleick 1987; Bonner 1988; Yates et al 1987; Langton 1989; Welch and Clegg 1985; Welch 1985; Keleti and Ovadi 1988), but I chose to re-acquaint myself with new theories of evolutionary biology that highlighted the probabilistic character of biological phenomena. This diversion into an utterly new discipline proved to be the inflection point of my career. I had no conscious intention of leaving the laboratory, but I soon became absorbed in the philosophical implications of studying modalities of causation radically different than the

simple linear sequences invoked to model my own investigations. An awakening occurred when attending a symposium on neo-Darwinism organized by my Boston University colleague, Sahotra Sarkar.<sup>6</sup> There I was introduced to the underlying concepts of population dynamics and new views of evolutionary genetics, where probabilistic thinking was prominent. I soon became a sight-seer in this territory, and while I never contributed to the field, viewing biology from that vantage fundamentally challenged many of my own unacknowledged philosophical commitments. And here, at the apparent conceptual chasm between the biochemistry of immune reactions and the vast play of evolutionary forces, philosophy of science beckoned. As explained in later chapters, soon thereafter I embarked on an entirely new intellectual venture, one that led to a radically revised understanding of the scientific enterprise, one at odds with my underlying assumptions about the quest for certainty.

2) The second line of inquiry began with studies of the ways scientific knowledge is accrued. The entry into philosophy built upon my own experience as a practicing biochemist and cell biologist. I found that my experimental research defied a simplistic positivist philosophy. For positivists, “genuine” knowledge (knowledge of anything that is not true by definition) is exclusively derived from experience of natural phenomena and their properties and relations as derived from objective and neutral data. These findings in turn are assembled in models and theories putatively free of subjective contaminants. This philosophy holds that the observer must become a “subject-less subject” to produce a universal “view from nowhere” (Fox Keller 1994; Nagel 1996). Strict positivism never seemed quite right to me. My own laboratory experience showed that the so-called Standard View not only distorted the way science is conducted, but it set standards that were simply wrong. Fortuitously, a compelling literature challenging that depiction had established an alternate understanding. Led by Willard Quine, Thomas Kuhn, Stephen Toulmin, Michael Polanyi, Paul Feyerabend, and many others, positivist ideas were critiqued and then shed.

Thus, a second aspect of the certainty/uncertainty axis concerned the very nature of scientific discovery and the views of reality derived from its methods. A confluence of historical, sociological, and philosophical characterizations of science converged on a singular conclusion: The rationality underpinning scientific discovery and theory failed any prescribed methods. Instead, scientific investigation was a pragmatic process without formal order and drew from var-

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6 “Founders of Evolutionary Genetics, March 6, 1990.” Those lectures were later expanded and published (Sarkar 1992).

ious human cognitive and social resources. When the study of nature and the study of society were perceived as inexorably linked—not only interwoven in a trivial social sense but locked together at their deepest roots—a novel picture of science emerged.

In a rare display of arcane philosophy spilling into the public sphere, debate over the truth claims of science ignited a far-flung battle over the extent scientific facts are “constructed,” as opposed to “discovered.” Indeed, when radical constructivists extended their positions to the point of relativizing scientific findings, polite philosophical disagreement grew into wide-spread polemics of the so-called Science Wars of the 1990s. After all, Truth and Reality had been placed in jeopardy, at least as assessed by those holding a positivist view of the world. Fortunately, my arrival to the halls of philosophy coincided with this controversy. An auspicious setting for my initiation, these were the issues that had originally caught my adolescent attention and pestered me throughout my scientific career.

I aligned with the revisionists by which my assessment of the scientific enterprise shifted from the positivists’ Standard View (research governed by strict neutrality of the observer; logical progression set by Objectivity to arrive at some idealized Truth) to a very different understanding: Science is constructed through negotiation of its practitioners at various levels of discourse and pragmatic concerns, and rather than holding to a rigid fact/value distinction, a set of varying epistemic and non-epistemic values determine what is chosen as evidence and how it is interpreted.<sup>7</sup> Some would regard this “fluid” characterization of science as “postmodern,” but it hardly appeared as a new development. After all, the antecedents of this revision originated in the romantic reaction to the positivist conceits of the late nineteenth century. That story, a faintly disguised self-revelation of my own romantic affinities, proved to be the “hinge” of my own scholarship (further explained in chapter 10).<sup>8</sup>

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7 Epistemic values pertain to cognitive success, i.e., true knowledge or justified belief (e.g., parsimony, coherence, predictability); non-epistemic values, so-called “contextual values,” are derived from social, historical, linguistic, ideological, and philosophical determinants. Grossly, epistemic values are “internal” to scientific knowledge, while non-epistemic values are regarded as “external” or secondary.

8 Note, Romantic and Romanticism capitalized refers to the various movements in the arts, literature, philosophy of the first half of the nineteenth century, which also includes that period of science (biology, in particular) in which the irreducible character of organic processes supported notions of vitalism. Romanticism with a small “r” refers to the sensibilities akin to those of that period. As discussed in chapter 8, despite the taint of such views, I embraced certain aspects of romantic biology, albeit drastically refined to accommodate contemporary theory. My early publications reveal this orientation (e.g., Tauber 1993).

My intellectual inquiry began with a historical-philosophical examination of my own scientific experience that set the stage for a broader interpretation of post-Kuhnian science studies. As a practicing laboratory investigator, I had confidence in the truth claims I published. And precisely because I was an experienced researcher, I sided with those who argued for a more circumspect view of scientific method, theory construction, and interpretation. So, when I launched my own examination of immunology's theoretical development, I drew from both camps.

### SCHOLARSHIP AS SELF-KNOWLEDGE

This essay narrates the sources of my interpretations and thus situates my analysis both as a scientific practitioner and as a critic. I have been able to fulfill my early aspirations to link the science-humanities divide by exercising an interpretive evaluation of the research enterprise. Instead of science insulated from other forms of knowledge, I have come to appreciate how the disciplines of philosophy, history, and sociology offer a powerful means for understanding the scientific endeavor in its broadest intellectual and social contexts. On this basis I recognized that the Two Culture separation imposes a false division, when, in fact, a rich crosstalk is not only possible, but important both to understand science and to enrich the disciplines that are charged to study Western history and the institutions that constitute our culture. I would contribute to that dialogue and thus found the pathway to pursue my neglected interests.

My professional inflection occurred during my early forties, when I began a formal transition that took me from Boston University's School of Medicine, where I was a hematologist investigating basic mechanisms of inflammation, to the Department of Philosophy, where I was eventually tenured. While maintaining a small clinical practice, I initially held an 'interim' appointment as Director of the Center for Philosophy and History of Science, which to my surprise lasted 17 years (1993–2010). My studies first centered on immunology (my scientific expertise), which were then broadened from discerning issues about biological identity to considering epistemological models of the knowing agent. The scholarship proceeded in discernable steps: the theoretical development of immunology around the concepts of identity and individuality; physician character determined by moral responsibility; the disputed standing of the knowing agent conceived in positivist terms; the history of the self in philosophy. Underwriting each of these enquiries was the quest to define and to understand personal identity refracted from different conceptual points of view.

*The Triumph of Uncertainty* presents the genesis of the ideas that have guided my scholarship and how they took form. I have assumed this narrative style to show how temperament and subjective needs framed my pursuits. Indeed, if philosophy is a way of life, then the personal must claim its legitimate place. In a sense, my scholarship has been an exercise of self-knowledge and this essay summarizes those endeavors as a *romance* with all the markings of true passion. Part expository, part literary, this is a romance as Oscar Wilde characterized “uncertainty,” a pursuit with open borders and an undefined terminus.<sup>9</sup> He was referencing the erotic; I am referring to the erotic as well, as Socrates described philosophy: the ascension of Eros’s ladder.<sup>10</sup> The metaphor captures the origin of philosophy in the emotional substratum with the attainment of insight and enlightenment through the exploration of ideas—their origin and fate in deliberate discourse. Eros is a means for attaining human perfection that ends with philosophy. So raw passions are tempered by character and sublimated by directing the affections to the love of wisdom. Accordingly, *The Triumph of Uncertainty* is the story of a “philosopher’s desire” (Egginton 2007).

That desire focused on discerning the relationship of different kinds of knowing. As I faced the normal existential issues of adolescence, I gravitated towards the humanities for “answers.” However, dissatisfied with the vagaries of interpretation accompanying literature, art, and music, I turned to the laboratory for what I thought were more “solid” forms of knowledge. These intellectual contrasts reflected my own reactions to conflicted identifications.

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9 In *The Importance of Being Earnest*, Wilde wrote, “The very essence of romance is uncertainty.” He also opined there, “The truth is rarely pure and never simple,” again an apt reflection for this venture.

10 Plato’s *Symposium* begins at a dinner party, where each guest is asked to deliver an encomium (a speech) in praise of Eros (Love). As expected, the discussion begins with the sexual basis of the erotic, and then progresses up a metaphorical ladder, where at each stage Eros represents another aspect of human yearning for union: Eros promotes virtue; fosters learning and the exchange of ideas; expresses a primordial desire to find and then merge with one’s own (metaphorical) missing half. Dissatisfied with these explanations, Socrates relates how Diotima (a priestess) had taught him that Eros is a spirit that mediates desire, “the perpetual possession of what is good.” Obviously physical love is one manifestation, as are the other longings, but a higher object trumps all the others: For Socrates, the love of wisdom, literally, *philosophy*, is the highest rung of the erotic ascent. The pursuit of wisdom fulfills a primary desire, namely, to recognize true Reality. Everyday reality is only a refraction of the Ideal, i.e., the Forms (Beauty, Justice, Truth, etc.) represent the absolute and divine. “Platonic love” then is a spiritual trajectory towards divinity. Accordingly, Eros is a means for attaining human perfection that ends with philosophy, where raw passions are tempered by character and matured into directing the affections to the love of wisdom.

*Who* would I be? What kind of knowledge would I seek? What kind of intellectual compass would I employ? I sought an anchor to reality. I craved *certainty*. Science, I thought, was the paragon of truth. Could that ideal organize my own journey? Only later did my emotional valences change to allow a re-assessment that centered on acknowledging the limits of positivism and the evanescent character of certainty. Subjectivity made its just claims and objectivity found its rightful place in my personal universe, but not on the original terms assigned during my youth.

My later scholarship reflected a re-assessment of contemporary science that replaced discarded positivist aspirations with a more nuanced, socially inflected depiction. I came to understand how the interpretive plays a constitutive role in scientific thinking. How scientific discovery draws on personal (a critical distinction from the subjective) elements to achieve its creative insights is a story that has been well documented. I will review that history to explain how I trekked from the Enlightenment through the Romantic reaction, into modernity and finally, postmodernity. Science has played a central role in this trajectory. After all, beyond the mastery of nature and the wonder accompanying scientific discoveries, the findings of natural science have profoundly influenced how we understand ourselves as human creatures, moral agents, and existential seekers. This is the humanistic dimension in which meaning becomes the *métier* of experience. Seemingly set far from the laboratory, this nebulous locale of ideas, emotions, and values represents a stage upon which the influence of scientific mores are translated into the humane domain. After all, *knowledge* follows communal rules and standards; *experience* is multifold and private. The real is composed of both. And the ways in which this compounded reality has been parsed and valued is a key chapter in the history of Western thought. We do well to consider that history, organized here as a commentary on how objective knowledge frames our worldview and how the personal plays its own constitutive role in the scientific endeavor as well as framing the personal view of reality.

This commentary on science, a tale told in an autobiographical voice, explains the origins and development of a set of intellectual commitments. While I am not offering a psychological study or a confessional, elements of my emotional make-up, motivations, and character are self-evident. My self-revelation is deliberate. Autobiography captures such “extra-curricular” elements to serve as an expository device of philosophy, one that follows a well-trodden path—beginning with Augustine, extending to Rousseau and becoming a popular genre in our own era (Schuster 2003; Wright 2006; Mathien and Wright,

2006).<sup>11</sup> There may be various motivations, but for me autobiography is a tool to probe a philosophical puzzle, where

more than an act of personal revelation; it is a mode of philosophical exposition. The act of recording life events and expounding upon meaning of those events is a philosophical exercise: a process of revelation in which a particular image of oneself emerges *as a result of* one's ontological views of the self and *in response to* the rhetorical forces shaping self-representation. (Wright 2006, 3)

In other words, I am exploring and illustrating ideas about personal identity through the intimacy of a self-revelatory account as a means to knit together different ways of knowing and, in tandem, different ways of being.

This thematic interest draws upon the ancients. With “Man’s character is his fate” (fragment 119), Heraclitus made both a metaphysical and moral observation.<sup>12</sup> Accordingly, personality and intelligence determine habitual choices, patterns of behavior, and the way consequences receive their due. Indeed, one’s identity is in large measure the collected display of values and adherence to whatever comprises the normative for an individual. We call this *character*, which asserts that the underlying determinant of life’s choices (given the contingencies of life’s events) “is not in the stars but in ourselves.” In other words, moral agency transforms chance into fate. Why this claim still

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11 In English, such works by European (Jean-Paul Sartre, Simone de Beauvoir, Karl Popper), British (Bertrand Russell, R. G. Collingwood, A. J. Ayer), and American (Willard Quine, Mortimer Adler and Paul Feyerabend) philosophers are widely read. These self-examinations have, by and large, addressed two audiences – professionals and non-specialists. Often, those directed to colleagues serve as an opportunity to further justify the positions advocated in the more technical essays. Such reflections may also provide a congenial way to fillet opponents and settle grudges, personal and professional. And regarding the second audience, to the extent the author’s philosophy is further popularized by a more intimate account, so much the better. After all, autobiography offers special charms and insights.

12 Kahn 1979, 261. The more literal translation of the fragment, “Man’s character is his daimon,” refers to a divinity, which signifies one’s destiny. “The gods of Heraclitus, the immortals who live our deaths and are dead in our lives, can only be the elemental powers and constituents of the cosmos, from which our life comes and to which it returns” (ibid.). Thus, the character of man, the human soul, is comprised of one’s daimon, spirit, the “elemental equivalent of a given moral and intellectual character” (ibid.). This interpretation is supported by several fragments, e.g., “man is stamped as infantile by divinity, just as the child is by man” (Frankel 1974, fragment 79, 214). As to the ethical understanding of the fragment, Hölscher (1974, 237) suggests that the fragment is “not a precept of practical morality but an existential proposition: ‘For man, character is his destiny.’”

holds currency in our own postmodern era is the key theme leading to the terminus of this narrative.

In conclusion, I have endeavored to explain the sources of my own inquiry and the fate of an idea that has twisted and turned as it moved through the pathways of my mind. Composing such an autobiographical account inescapably imposes a template to outline an inner logic and purpose to my journey. Notwithstanding distorted memory and the strictures of order, I nevertheless remain confident that this philosophical tale began in typical fashion with misplaced questions and confused identifications. A nascent awareness of a philosophical problem, an inarticulate intuition—not even posed as a specific enquiry—was eventually transformed into a body of scholarship. That trajectory demonstrates how emotional components derived from experience and organized by personality are inextricable from the philosophical questions asked and the answers found. Such considerations bring analyticity to life and, moreover, showing philosophy-at-work provides a much-needed perspective on the authority of even our best tempered conclusions.



## Chapter

# 1

## Beginnings

I grew-up in a Jewish immigrant family residing in Washington, D.C. My parents had survived the Holocaust in Budapest, and after the war they escaped communist Hungary. Because my mother, Lilly, was born in Berlin, she received an early visa to the United States, arriving in May 1947. I was born six weeks later. My father, Laszlo (Laci), joined us in November and quickly developed his surgical practice. He was largely absent from our household, consumed by work and ambition. Lilly earned a master's degree in clinical psychology and treated a small number of mildly neurotic (or just unhappy) patients during my childhood. Without further detail, suffice it to note that our household was marked by uncertainties: financial insecurities, marital conflict, cultural clashes and most insidiously, transmitted traumatic memories.

Lilly and Laci desperately sought security in terms of the normal, and happily conformed to what they perceived as ordinary, i.e., that which would not draw attention to our family. They hoped to protect themselves and their children from a mad world, one in which they had barely survived. Indeed, in the grand scheme of history, I was never to be born. My conception sometime in October 1946, became a testament to hope revived, at least on my mother's part. I imagine that her choice to have a child represented a desperate attempt to return to a better world. My father freely admitted to me that he did not want children. I think he adopted a rational position, considering what he saw and knew. By the time the war in Europe ended on May 8, 1945, they had witnessed horrible death and deprivation. Fear enveloped them and uncertainty pervaded *everything*.

Both through direct and indirect transmission, the horror they suffered during the last days of World War II found their place in my malleable psyche. Of course, I didn't experience the danger and treachery directly, but their darkness followed me into my dreams. After all, my parents didn't attempt to hide the realities of their survival. By age five, I knew their stories: My Uncle Imre's death of typhus in the labor camp on the Eastern front; my mother's Gestapo interrogation near the end of the war and her miraculous release; the tank shells shattering the lower floors of the Red Cross Hospital, where my parents lived and worked; the lice, the hunger, the rancor; the murder in the streets; the *fear*. The image of the hospital's courtyard filled with cadavers piled in a tower of death was particularly vivid. And at least 140 members of our extended family were killed. I knew all too well the outlines of the family's trauma. Most survivors made every effort to shield their children from the memories of the Holocaust; mine did not. What I learned closely matched the historians' accounts (Braham 2013; 2002; 2018; Vági, Csősz, and Kádár 2013; Munkácsi 2018).

Neither Laci nor Lilly ever escaped Europe. Their values and expectations had been formed in another place during another era. I recall a discussion with my mother about where and when she would have liked to live her adult life. Unhesitant, she said, "fin de siècle Vienna." As an adult she still pined for the city that seemed so vibrant and liberating, a memory transmitted by her parents as a nostalgic fantasy. No wonder. That was the Golden Age of the Austro-Hungarian empire, when, following the full emancipation in the mid-nineteenth century, Jews had acquired unexpected success in the arts, professions, and markets. Indeed, the liberal policies of Emperor Franz Josef had finally allowed Jews a sense of citizenship heretofore denied them (Beller 1989). The heterogeneity of ethnicity, culture, language, and religion was driven by a tolerance for diversity absent in nation states that defined citizenship in far more restricted ways. Those still embracing a conservative understanding of the nation viewed every ethnic, linguistic, or religious minority as an obstacle that must be overcome, either with policies of assimilation or exclusion (Biale 1986, 90–1). The emancipated Jews recognized the on-going instability of their new-won status, but for them, the dark side of their participation seemed in retreat. That, of course, proved a devastating miscalculation.

The Wandering Jew marked Jewish experience, but a *home* had seemingly arrived. In 1735, two-thirds of the Jews of Hungary were immigrants, recently dislodged from the east and northeast. They were concentrated in the border areas, and for centuries had migrated from one locale to another. The Hungarian Jewish population grew from 540,000 to over 900,000 shortly before

World War I. By 1910 more than 200,000 Jews lived in Budapest, comprising 23% of the population (McCagg 1992; Patai 1996). Karl Lueger, the anti-Semitic mayor of Vienna, called the Hungarian capital, “Judapest,” and demographically he would have been correct: Budapest possessed the third largest Jewish population among the world’s cities, after New York and Warsaw.<sup>1</sup>

And they thrived. In Hungary by 1910, although only 5% of the population, the Jews comprised half of the country’s doctors, nearly half of the lawyers and journalists, and more than a third of the engineers. They were prominent in the arts, journalism, politics, and the financial markets. And when relieved of second-class legal status, Jews generally embraced nationalism with pride. My father often recited Hungarian accomplishments (in sports and academics especially), the unique cultural attributes of the Magyars (cuisine and folkways), and the historical highlights of a storied romantic past. The Jews’ nationalistic fervor of course faded with the eruption of anti-Semitism shortly after World War I and then accelerated in the 1930s. World War II brought the final calamity.

While most Hungarian affinities were erased by the Holocaust, Lilly and Laci nevertheless could not relinquish their cultural experiences that had, and would continue, to identify them as Hungarians. Cuisine, popular songs, movies, celebrities, political events, and myriad other memories of a lost culture remained ingrained and accompanied them to America. That their patrimony held utterly contradictory sentiments hardly vitiated their patriotic ardor, which probably served them as ballast when finding their balance in the rough seas of the immigrant experience. Beyond financial problems, their insecurities oriented a more superficial social awkwardness. The simplest exchange could turn into a disconcerting frustration. For instance, at times when asking directions or going into a store, my father would instruct me (with undisguised impatience) to translate his thick accent into a better understood vernacular. My mother bitterly recounted all kinds of advice, some solicited, some not (“You really should use deodorant!”). And each of them heard more than once the “dirty Jew” innuendo, and on rare occasion, the expletive. No wonder they kept vigilant guard and never felt at home.

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1 This urbanization was accompanied by a secularized lifestyle and a cultural assimilation, where the Yiddish of the Slavic and Prussian regions was replaced by Hungarian and German. The prosperity, cultural, and financial prominence of Budapest’s large Jewish community attested to its successful integration. Indeed, the 1911 edition of the *Encyclopedia Britannica* categorically states that Hungary had “absorbed” their Jews and “it has come to pass that there is no anti-Semitism in Budapest, although the Hebrew element is proportionately much larger (21% as compared to 9%) than it is in Vienna, the Mecca of the Jew-baiter” (Brilliant 1911, 736).

In sum, although Laci and Lilly lived in Washington, Budapest dragged behind them. After all, they arrived at ages 32 and 27, respectively—fully formed. Unfortunately, they could not prevent sharing their confusions and frustrations with me. Despite Laci’s avowals of American patriotism, his heart and much of his mind still resided in Budapest. And Lilly’s cultural roots were even more shallow, residing in no country for longer than two decades: Germany 1920–1934, then Hungary until 1946, followed by the United States in 1947 and finally Switzerland from 1967 until her death in 1987. She was fluent in four languages and conversational in another two, so when asked where she was from, she replied with a wry smile, “Cosmopolita.”

I shared their discomfort at being different. From the superficialities of how I used my knife and fork to the way I mispronounced certain words, their foreignness rested in my own speech and behavior. Reiterating my ambiguous national status, each September my elementary school teacher would send me to the speech pathologist. Soon I learned to say, “My parents are from Hungary,” and back I went to my classroom with a quickly scribbled note of release clutched in my hand. I remember those encounters with some discomfort but endured them as superficial affronts. I suspect my parents were less sanguine, if for no other reason than they were acutely self-conscious; as an adaptable child, I was not. Without going into further detail, I trust the point is apparent: My parents carried conflicted identifications and therefore unstable identities.<sup>2</sup> And if they were so uncertain about the most basic coordinates of their lives, so was I. Living in uncertainty was just the normal state of being.

Leaving the psychology aside and all the baggage they carried from their own difficult childhoods, my parents resided in a kaleidoscope of memories and queerly refracted visions of an America they always saw as exotic. They were first fascinated, then challenged, and eventually profoundly unsettled. When Laci and Lilly arrived in America shortly after World War II, their heady expectations quickly required corrections. Ignoring the severe insensitivities marking the era—towards African Americans, gays, women (generally) and children (in particular), not to speak of immigrants—most would look back at the ’50s as the staid Eisenhower period of stability and quiet rectitude. The country was getting back to business as usual, and my parents accordingly sought the American Dream along with everyone else. They did so in line with their neighbors, hoping to blur their European-Jewish distinctions as best they

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2 A sensitive (perhaps radical) exploration of this matter is Susan Faludi’s biography of her father, a member of my parents’ own cohort (Faludi 2016).

could. For example, I embarrassed them by wanting to exhibit the Chanukah lights in the front window of our house, so they removed them. After all, everyone would know that we were Jewish and worse, proud of it!

My parents delivered a clear message: We were now Americans—of the vanilla variety—with little to distinguish us from everyone else. To re-emphasize the point, my father would periodically utter a general admonishment followed a strong dictum, “Don’t shame me.” Strange how a child might shame him, yet that served as a favorite mantra, only second to, “Work, work, work; study, study, study!” We sent out Christmas cards and, while there was no religious conversion, my mother actively argued for joining the Unitarians. Laci resisted and prevailed. We were not members of a synagogue or country club, and my parents’ friends were almost exclusively European. An active correspondence with the old country and Israel tied them to a past that they would not forfeit. Indeed, it was important for them that they impart to me the repeated telling of nostalgic stories describing their childhood and young adulthood. In short, they actively pulled me into their world of memories.

While the tranquil land of Ozzie and Harriet beckoned, I perceived another reality. Perhaps childhood is characteristically confusing, but my parents’ persistent fears set a different magnitude of disorder that evolved into my own bewilderment and then insecurity. Indeed, much broke the façade of quiet normalcy. For instance, the prospect of imminent hurling of atomic bombs drove me and my classmates to huddle under our desks in mock air raid drills; the apprehension of tough boy gangs and a neighborhood bully kept me on vigilant watch; the awkwardness of being “other”—Jewish, immigrant, professional family—defined a certain aura of difference and subtly separated me from my friends. Nevertheless, the family fully enlisted in the ordinary script: America, an oasis of freedom and tranquility; middle class prosperity, where a little went a long way; work and study provided all one would need. I probably saw Ricky Nelson as a prototype child of a typical American family, and the disparities must have been acutely appreciated. I prefer to believe that I knew the difference between reality and fantasy, but at that young age I probably had no better insight than do adult audiences of popular television reality shows today. Indeed, the reality show syndrome was there from the dawn of mass media, with all of its insidious effects in attendance.<sup>3</sup> Now social historians appreciate

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3 The “culture industry” critique offered by Theodor Adorno and Max Horkheimer (Adorno; Horkheimer and Adorno 1993) seems to me particularly resonant because of my family’s background, viz., the mid-century central European fascist context in which it was written,

the subterranean churning of all those forces, which, in the 1960s, erupted in rejection of old authorities and stereotypic depictions characterizing “normal” life. As if *normal* ever represented a category other than *common*. In any case, despite my parents’ most ardent intentions, I don’t think normal represented a relevant category for life in our bungalow.

### AN AWAKENING

It is, of course, almost arbitrary, if not impossible to say when my mind turned from an accommodating receptacle to a critical lens. Through early adolescence, I seemed to have incubated in a cocoon awaiting wings to sprout for escape. At age 15, they appeared, as if by magic. I had the good fortune of being assigned to a ninth-grade English class taught by Bruce Lewis. That changed everything. He jolted me into a new echelon of self-awareness, and whatever the underlying forces might have been at work, Bruce’s tutelage profoundly impacted how I learned to think. Eccentric in speech and fashion and imperious in enforcing discipline, his wit and utter devotion to his students endeared him to all of us. One of his favorites, I basked in his attention. Writing assignments were subject to his hypercritical eye and our readings detailed a new literary world that astounded me. He taught us to read analytically and write with scrupulous attention to clarity. I best recall our discussions of *Great Expectations* and *Walden*.

The curriculum including Dickens seems easily explainable, but the choice of Henry David Thoreau strikes me as strange, inasmuch as his message, if understood, is an incitement for rebellion. The fact that it was a standard part of the curriculum suggests that the emphasis on social conformity marking the ’50s had, by 1962, evolved to another social reality in which expansive views of individuality were taking hold. Hardly anything then available could compete with the individualism espoused in *Walden*. Reading this anthem during the Kennedy era reflected the sowing of the seeds that would later blossom into the radical social and political conclusions drawn during the ’60s. The text certainly resonated powerfully with Bruce’s own personality, and I am certain that my repeated return to *Walden* (that included writing a book about Thoreau [Tauber 2001]) must be attributed to the powerful influence Bruce had on my development.

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and, more directly, because of the Freudian character of its analysis that framed much of my own thinking about social dynamics as discussed in later chapters.

Thoreau, with his single-minded independence, fulfilled the ideal image of individuality. He became the prophet of the 1960s and so my reading of *Walden* was right on schedule.<sup>4</sup> Although Thoreau was hardly breaking new ground, his anthem to the sanctity of his own autonomy resonated with our own fledgling rebellious expressions. It had a particularly rich American flavor that resonated powerfully with the pioneer ego ideal. In the Conclusion to *Walden*, Thoreau wrote perhaps the clearest credo for a life governed by a self-assertive virtue ethics (what Coleridge had called “individuation”), and which might be termed in the American context, the creed of individuality: “I learned this, at least, by my experiment; that if one advances confidently in the direction of his dreams, and endeavors to live the life which he has imagined, he will meet with a success unexpected in common hours” (Thoreau 1971, 323–24).

The key to *Walden* is that one’s life may be constructed from within—like a germ that must be cultivated to flourish. In this regard, human identity is fundamentally organic and thus dynamic. Thoreau delivered a message of American confidence in self-reliance and the success of one’s personal manifest destiny. And from a wider perspective, he appears as a modernist in asserting his personal identity as his alone. This attitude laid a profound impression in my psyche and its conception of agency would have deep influences in areas of scholarship far removed from the calm waters of Walden Pond.

Thoreau’s insular individuality vividly exhibited the tension between the autonomy of his personhood and the responsibilities demanded by the society in which he lived. Eventually, I would reject his egocentrism, but in my youth and long thereafter, *Walden’s* message enthralled me: Thoreau insisted that one’s deepest and most abiding core of personhood must be the assertion of individuality as a moral imperative. Beyond this general exhortation, he provided no prescription for others; each must find his or her own way. Underlying his counsel lay an implicit reckoning of personal identity. I did not fully realize the import of his message, but in reading *Walden*, a host of issues germinated, only to bear fruit much later: What is consciousness and how is it a reflection or expression of ourselves as persons? What is a self beyond consciousness, beyond self-consciousness? And what is the relationship of any such agent to

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4 The Thoreau model drew on Andrew Jackson’s populist principles, so well described by de Tocqueville’s survey of American society in 1831, just as Thoreau reached his own adolescence. It was the Frenchman who had coined the word, *individualism*, a particular American version of an earlier civic ideal already established in the American Enlightenment, reaching back to Locke and the tradition of liberal democracy born at the end of the seventeenth century (MacPherson 1962; Shain 1994).

nature, to the world beyond the circumscribed individual? Thoreau's life provides one example, and as a portrait of personal identity it held my imagination for much of my adulthood. Eventually, however, the Sage of Concord and I diverged. His libertarian politics were simply out of joint with my own communitarianism. As my ethical commitments clarified, I would reject the Thoreauvian credo, for what he offered me at age 15 would not suffice as a moral compass as I matured. Despite my lingering fascination with him, in the end I followed my own path, just as he had advocated.

But that judgement is part of a much later story. At the time, I sang an unoriginal song of adolescence, *Who am I?* and *Who might I be?* Beneath those seemingly impenetrable questions, undeclared and sullen, who cares? The full throes of teenage angst enveloped me. Left with various characters posing as "me" on the social stage upon which I played, different roles were assumed. None of them seemed to capture the elusive *I*. None seemed genuine. I identified with the likes of Zorro (Don Diego), a masked hero fighting evil in 1820s California, who lived as two characters.<sup>5</sup> I wore several masks and wasn't comfortable with any of them, and more to the point, I remained uncertain as to which one hid *me*. My "true" veiled identity only appeared at rare declaratory moments and even those were rife with doubts. My very first publication, "Masks," that appeared in the high school literary journal, *Eidos*, described my predicament. There, I offered pronouncements about the ailment of personas and noted the divergent ways in which devised personas operated. I saw many of my peers as failing to recognize the artificiality of the adopted guises they wore like costumes in a parade. I however, and my close friends, acknowledged the perils of conformity and while confused, we still felt "superior" to those not cognizant of their "hypocrisies." This appeal to authenticity found strong resonance in the writings of the French existentialists to whom we turned for inspiration and validation. Even today I shudder at such adolescent self-righteous discernments driven by insecurities and confusions.

Conjoined to this self-consciousness, an expanded social awareness also arrived. A memorable revelatory moment came when I read Paul Goodman's *Growing up Absurd* (1960) "an initiatory text of the sixties" (DeKoven 2004, 200). The excitement it generated drew from a consensus among the disen-

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5 The masked hero is a well-loved trope: Batman (Bruce Wayne), Superman (Clark Kent), the Scarlet Pimpernel (Sir Percy Blakeney) and countless others enact two characters and sometimes more. My favorite secret identity character, the Lone Ranger, never reveals himself without a mask, although during his various appearances on radio, television, and films, he was assigned several names, none of which were relevant.

chanted that our ill-formed trepidations were well justified. Goodman had provocatively described the erosion of cohesive values, and more generally the loss of a guiding social morality resulting from a corporate ethos gone amok. In a modern American version of Marxist alienation, we could identify with the blackness of a world he portrayed. No shades of grey. Goodman presented the void of still unsatiated materialism against the glorious brightness of a New Society grounded in justice and individual dignity. One had to choose from stark choices: conform to a de-humanizing system, a “brave new world” in Huxley’s version or, following Orwell’s 1984, recognize that “The choice for mankind lies between freedom and happiness and for the great bulk of mankind, happiness is better” (Orwell 1949, 262). Such insight required breaking from conformity, deliberately and self-critically: “Orthodoxy means not thinking—not needing to think. Orthodoxy is unconsciousness” (ibid. 53). The lesson appeared plain and compelling: Only ruthless scrutiny would save our very souls. If we required concrete examples of the social rot, Michael Harrington drove the nail home in *The Other America* (Harrington 1962). This book, more than any other, revealed the under-belly of an America I barely recognized. The poverty he described shocked me into a new dimension of social consciousness. Indeed, this exposed reality marked the tumultuous transition from the staid ’50s to the riotous ’60s that soon enveloped me.

But the larger point to which I am driving is that beneath the social matter of developing a sense of oneself was the search for direction in establishing the manifold of values in which identity would be lodged. In my case, philosophy became the most obvious place to search for those coordinates.

### THE ALLURE OF PHILOSOPHY

The seeds of philosophy were planted soon after my introduction to Thoreau. I made a habit of browsing the paperback bookrack of the local pharmacy. It stocked cheap books—popular mysteries, romance novels, some non-fiction. One day, a little volume of Nietzsche’s writings appeared. Completely inconsistent with their usual fare, it caught my eye. Who was Nietzsche? I bought the book and soon discovered a voice, alternating between stridency and poetry that was utterly novel for me. At sixteen, with only a paltry comprehension of Nietzsche’s radicalism, Zarathustra rested somewhere in my soul. Indeed, this seemingly incidental discovery proved pivotal, although I did not know it for another 30 years.

Nietzsche's ideas were radical, albeit a riff on Thoreau. Take charge of your life! Establish your own values! Follow your own path! Create your own reality! Emerson had plowed the field, and although both Thoreau and Nietzsche had carefully studied Emerson's *Nature* and "Self-Reliance," only Nietzsche would grow the full philosophical harvest (Stack 1994; Zavatta 2019). I had no perspective on Nietzsche's philosophy (most provocatively dethroning reason and celebrating the subjective) and lacked any understanding of the profound effect his writings had on launching the later postmodern critiques. Little did I appreciate that Nietzsche's replacement of reason with the "Will to Power" had radically revamped the modernist model of moral agency and the metaphysics of the Cartesian ego. And of course, I had no inkling of how important he would figure in my later studies.

Even without a taste of what was to come, a seminal idea started to take root in my young mind: Philosophy is subversive. And philosophers addressed the existential. Indeed, the French existentialists (again led by Nietzsche) had gained an important hearing in America shortly before I discovered Zarathustra (Cotkin 2002).<sup>6</sup> I consumed Sartre's *No Exit* and Camus's *The Stranger* that whetted my philosophical appetite and from there I began to read in an off-hand, nonsystematic way.

With no guidance, I studied Will Durant's overview (*The Story of Philosophy*) and then I stumbled upon Suzanne Langer (*Philosophy in a New Key*) and some of Emerson's essays. Langer was reasonably accessible, but Emerson's tortuous prose proved a formidable challenge. Yet a candle lit in my immature philosophical soul, and the glimmer grew stronger. Many years later, a trajectory of scholarship that began with Emerson led me to Thoreau, then to Nietzsche, and finally to Heidegger. As I followed that progression, I fell into step with the history of a major chapter in modern philosophy, one that eventually would be replaced by another tradition. In due course, those developments will be reviewed.

During the summer before my collegiate matriculation, I valiantly attempted to read Bertrand Russell's *A History of Western Philosophy* (1945). My father's oldest friend, Francis (Feri) Foldes, gifted this formidable book to me, and this act of kindness had repercussions that would not be realized for decades. Uncle Feri considered philosophy the highest form of knowledge, "the Queen of all

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6 For the Existentialists, the self is a moral agent who assumes responsibility for the choices taken by an individual. That freedom, whether real or illusionary, is the basis of self-identity. This theme is historically developed by Charles Taylor (1989).

disciplines” he called it. In a way I only understood later, he beckoned me to follow my own path. That advice and the endorsement of philosophy in particular infuriated my father. Only pragmatism and street-smarts mattered for him; intellectualizing wastes one’s time and energy. Indeed, it was an indulgence. Perhaps because he was so antagonistic, I took Russell’s tome and struggled with it. Alas, little came of the effort. The chapters on the pre-Socratics, Spinoza, and the British empiricists (John Locke and David Hume) attracted me. The more modern figures did not receive fair judgment—not that I knew of the biases Russell cherished and nurtured. On balance, his *History* offered a serious account and suggested what the study of philosophy might comprise. Yet frustration dominated my reading and in many respects the book discouraged me.

Although Russell’s *History* had intimidated me, during college I dipped into a narrow band of philosophical literatures. I chose works that addressed ways of thinking about science as an intellectual activity, a topic that preoccupied me after I decided to go medical school. Choosing biomedicine entailed a transformation that I will detail below but suffice it to note here that my desire to reconcile conflicting callings ignited these interests. The key texts held a common bond in their sweeping humanistic treatment of science. I must count the first chapters of Whitehead’s *Science and the Modern World* (1925) as the most notable. There he pronounced an anthem I took to heart: “If science is not to degenerate into a medley of ad hoc hypotheses, it must become philosophical and must enter upon a thorough criticism of its own foundations” (Whitehead 1925, 18). The call for a science informed by its own governing philosophy would remain abstract hand-waving for another 20 years, but in the meantime, I acquainted myself with related essays: James Conant’s *Modern Science and Modern Man* (1953), J. Bronowski’s *Science and Human Values* (1965), and Michael Polanyi’s *Tacit Dimension* (1966). These works signaled that the questions I was asking about how to place science in a larger intellectual framework had a distinguished history and consequently a legitimate matter for serious consideration. Indeed, these authors were committed to a synthesis I began to outline for myself.

My early deliberations of how science might be regarded from such a perspective were framed by what I now understand as a cognitive approach. Specifically, during college I sought explanations for how scientific thinking differed from interpretive or artistic disciplines; and more specifically, how did science develop from more primitive epistemologies? This issue, which eventually became the focus of my senior thesis (explained in the next chapter), began with Jean Piaget’s *The Language and Thought of the Child* and Lev Vygotsky’s

*Thought and Language* (about the social origins of language). These books were read during a semester seminar devoted to theories of child development, a course selected because of my untutored interest in linking thought to language. Noam Chomsky's generative grammar had attracted a lot of attention by the mid-60s, but I was drawn to other quarters: Benjamin Whorf's *Language, Thought and Reality*, Ernst Cassirer's *Philosophy of Symbolic Forms, Vol. 1, Language*, and Eric Lenneberg's *Biological Foundations of Language*.<sup>7</sup> These works, certainly an eclectic bunch, were held together by their respective efforts to comprehend the maturation of individual cognition through language acquisition. I did not pursue linguistics as such, but the power of looking at language from an evolutionary perspective made a deep impression on me. Later, I adopted this developmental approach to track science's cognitive origins. Remarkably, formal philosophy remained outside these collegiate explorations.

When I had ventured into traditional philosophical texts, I found myself in cul-de-sacs. For instance, P. F. Strawson's *Individuals* contributed nothing to my understanding about the "structure of thought" as the dust jacket promised, and Gilbert Ryle's *The Concept of Mind*, while accessible, adhered to a tradition in which I found no footing. Without guidance, the tradition resided as a distant territory and my transcript listed no courses in the Department of Philosophy. I remained preoccupied with pre-medical studies and so concerned about my grades that I chose not to 'indulge' in the treacherous territory of unsure footing. When I might have seriously engaged the subject in college, I faced the challenge of shifting mid-stream from my humanist pursuits to one defined by a life of bioscience. This inflection required a major transformation in my interests and identifications. Indeed, going to medical school determined every-

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7 Lenneberg studied the hierarchical schema for speech, whose experimental basis had great appeal for me (Lenneberg 1967). Because of the coordination of muscles movements and the various lag times for innervation, a pattern must be dictated from "above" to establish the coordination required for syntax to be translated into utterances: sentence → syntax → order of morpheme (word or word element) → order of phonemes (unit of sound, e.g., p, d, t) → order of muscle contractions (respiratory to upper pharynx). The cardinal question for me is where did thought fit into this sequence? I wondered how this physiological approach might be expanded to address this basic question, and during medical school, I thought about becoming a neurologist. Norman Geschwind in Boston offered an attractive opportunity. I had read some of his papers (1970; 1971; 1972), and although I interviewed with him, I returned to the more familiar biochemistry of my early research (explained below). In the end, test tubes better addressed my idea of science than the methods available to neurophysiology. Later, when I became Director at the Center for Philosophy and History of Science, I read Geschwind's collected papers (1974) in our book series. I mention all of this only to indicate my early interest in language and consciousness persisted during medical training and then was re-activated in my studies of philosophy of mind decades later.

thing for the next two decades. Yet, a tenuous string held me to the unmet promises of philosophy and knowing the scattered bits of its history would suffice for a long time.

### THE GREAT DIVIDE

During high school, Bruce Lewis continued to monitor an informal reading group I organized with a few of my classmates. We thus expanded the high school canon (Shakespeare, Dostoyevsky, Orwell, Huxley, Fitzgerald, Steinbeck, George Eliot, etc.) with the modernists: William Faulkner, Gertrude Stein, Katherine Ann Porter, James Joyce, Virginia Woolf, Bertolt Brecht, Ernest Hemingway, Joseph Conrad, Carson McCullers, and T.S. Eliot. The selections eventually comprised a course in twentieth-century literature and consistent with the literary fashion of the time, close analysis of the authorial voice, style, character development, and theme revealed a world carefully crafted in every literary respect. Each work startled me, and my critical acumen grew. Not surprisingly, I dreamed of a life in literature. I hoped to become a writer, and tried my hand at poetry, short stories, a play, and contemplated a novel. But soon I discerned that while classic themes might be easily recognized—love lost, love gained; heroic struggle, tragic defeat; mystery and resolution; bewilderment and insight—I had, in fact, experienced little of the world beyond the small circle of my immediate family and school life. Writing was put off. Hardly suffering from over-confidence, I recognized intellectual arrogance and would have none of it.

And although I preferred the humanities, science certainly resided within my circle of interests. I did well in high school biology, chemistry, and physics, and had even found my fledging efforts in the science fair rewarded with a prize and coverage in the *Washington Post*.<sup>8</sup> But that early success was inconsistent with my identifications with the literati. In any case, with my draft board hovering over me, I concocted a strategy that satisfied both alignments. At least intellectually, I would forge some ill-defined educational alliance: while pre-

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8 My first project in the eighth grade, an attempt to build a radar apparatus, failed. Then, with my friend Don Bialek, we learned how to do hemoglobin electrophoresis from a researcher at the NIH. A mouse from the colony we maintained was placed in an apparatus I designed to hold the rodent tight while we drew blood from its tail vein. Having built our own primitive electrophoresis unit, to our utter amazement, we saw lines of separation. We made no attempt to define what was separated, and any additional efforts expired with the death of the mouse colony soon after the first experiments.

paring for medical school, I would also pursue a humanistic program within those confines. Thus, my pre-medical studies would conform to a wider educational project and a revised life-plan.

At that time, either “Science as Philosophy” or “Bridging the Two Cultures” would have been suitable captions for my self-portrait. Although the turmoil over a career choice clearly outlined inner conflict, I self-consciously constructed my decision in terms of a broader intellectual endeavor. Or to be more forthright, what was fundamentally an emotional riot of conflicted identifications played out as an expression of an ill-defined, grossly amateurish, scholastic project. The incongruity is apparent: I had only a naïve view of science and a paltry understanding of philosophy. In fact, I was utterly incapable of devising a coherent program. Yet, despite my profound ignorance, I constructed an elaborate fortress of justification to deal with my turmoil.

Rationalization, as we all know, is a powerful means of justification. I thought science would offer a rigorous way of thinking. That appealed to me. Furthermore, at least the natural sciences seemed to present certitude. In no small measure, certainty loomed high among the values I required to deal with the social and personal turbulence that had engulfed me. I decided that the combination of a methodical logic and a promise of objective knowledge offset the humane gifts of the interpretive arts. And perhaps some ill-defined wariness guided me towards the stability of the concrete. So, with an elaborate array of ‘reasons’ I formulated the decision as choosing to pursue an objective picture of “the real” over the subjective.

Although I became a biology major, I performed better in physics and chemistry. I was drawn to the elegance and mathematics of the physical sciences and detested mastering a huge descriptive assembly of biological facts. Formulas and physical constants appealed to my sense of order. I suspect a certain kind of snobbism operated as well. Although unspoken in polite company, the hierarchy of knowledge placed the life sciences below physics. Moreover, if I no longer enjoyed the fellowship of the intellectuals, at least the “hard” sciences separated me from most of the other pre-medical students. Those I saw as a group of competitive racers scrambling to the finish line of medical school admissions. They were intensely grade-conscious; for them college was about professional success, not knowledge. I had no desire to identify with *them*.

More, the allures of objectivity were powerful. Why not extrapolate the scientific attitude to human affairs? Indeed, during the nineteenth century this became the positivist program broadly applied. The human sciences were introduced on this basis, and successfully penetrated all fields of knowledge. No

wonder science became a large component of my primary school education and beyond. Of course, powerful cultural forces were at work directing my choices. Sputnik appeared in the firmament when I was ten and the ensuing hysteria launched accelerated curricula in America. I found myself at the hub of these educational innovations and was duly enrolled in experimental courses of mathematics and science. The inculcation was hardly subtle. Beyond technical mastery, a moral ethos permeated the educational system. The institution of science assumed (but not necessarily fulfilled) the highest standard of comportment: honest exchange, modesty derived from an ever-vigilant awareness of fallibility, open discourse marked by best attempts at objectivity, and democratization of rewards based on merit. During my formative years, these values and accompanying ideals were the prevalent cultural markers that guided my aspirations and framed my own sense of who I might become. *Watch Mr. Wizard* was one of my favorite television shows, and I still have a copy of *The Boy Scientist* (Lewellen 1955).<sup>9</sup>

Yet a period of indecision intervened. After all, where is Ying, Yang resides as well. As already mentioned, dissension among the enlightened accelerated during the 1960s, when I was an impressionable undergraduate. Skepticism of science's application—the view of technology run amok—became a major line of attack during the Vietnam protests and fueled the intellectual debate. However, for me, the primary issue was not the political standing of science and its uses, but the deeper dilemma of seemingly having to choose between two divergent ways of thinking, namely, between objective methods of science and the interpretive disciplines of the humanities. Because I saw no resolution of what seemed disparate paths of learning, I reluctantly accepted the split. While attracted to the quest for knowledge as exemplified by scientific discovery, my existential questions lingered. Human presence in a deaf cosmos left self-consciousness to assert something, but what was that something? On what basis might a good life and the criteria of morality be established? These were the questions inciting my disquiet.

Underlying my perplexity rested the identity question. Indeed, the pull of seemingly disparate ways of thinking—science versus hermeneutics—fed a division of how I thought of myself. Would I probe nature as a scientist-physician, or would I pursue the arts, literature, or history? I thought if I could only

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9 The popular *Watch Mr. Wizard* aired Saturday mornings from 1951–1965 on NBC. Each week a boy or girl visited Don Herbert, who conducted a laboratory experiment to demonstrate basic physics or chemistry.

rid myself of one or the other identification as unwanted baggage, I might find an equipoise and proceed with establishing a career. Eventually, I made the choice of biomedicine, but the contenders for my soul toiling in the recesses of my psyche were not put to rest with that decision. While I would have preferred a less anguished education, certainly the heat of my turmoil drove my engine. Only in retrospect do I understand what Freud had observed about himself, as well:

After forty-one years of medical activity, my self-knowledge tells me that I have never really been a doctor in the proper sense. I became a doctor through being compelled to deviate from my original purpose; and the triumph of my life lies in having, after a long and roundabout journey, found my way back to my earliest path.... In my youth, I felt an overpowering need to understand something of the riddles of the world in which we live and perhaps even to contribute something to their solution. (Freud 1926, 223)

I shared that ambition, albeit without his drive and genius.

I hasten to add that aside from the personal conflicts and intellectual ambivalences, little did I know that my dilemmas reflected a cultural divide whose tensioned values and goals had no ready resolution. Personal authenticity loomed large, and I struggled to find my coordinates. The dominant issue, overriding all the others, was the apparent immiscibility of two different kinds of reasoning and knowledge. Pulled between the two poles of an early identity conflict (father = rational objectivity versus mother = sensitivity and aesthetic delight), I swung between (for the sake of simplicity) the scientific and the humanistic. I thus translated my inner conflict into scholastic terms by placing artistic sensitivity in opposition to the mechanical order offered by physics and chemistry. This polarization left me little room for identifying alternative approaches to what seemed an irreconcilable division.

The dichotomy proved false and distorting, but in the positivist age in which I grew up, the divergence of these broad orientations dominated characterizations of the academy and synthetic alternatives did not readily present themselves.<sup>10</sup> Today, the myopia of my perception of diverging pathways does not

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<sup>10</sup> Recently, Rens Bod (2013) has presented an ambitious history of the humanities in which he has shown that the development of linguistics, historiography, philology, musicology, art history, logic and philology share central epistemological principles with the history of science. The basic thesis argues that knowledge-making in diverse disciplines has followed similar patterns in which notions of progress, search for general laws, and application of empirical

exactly embarrass me, but it does give me pause to wonder at the power of such simplifying polarizations to direct my thinking. In one sense, I was responding to the re-alignment of the socio-political world that had swept through America. And at a deeper level, my own emotional life suffered the instabilities so characteristic of late adolescence. I required coordinates, a way of placing myself in the world. I opted for the road most likely to lead to *certainty*, or at least what I perceived as the more likely route to stability. Simply because science had been celebrated in those terms, I chose the objectifying stance. I eventually understood that I had created a distorting (even, false) dichotomy, but when a decision beckoned, I followed the dominant current. Little did I know that I was but a bit player in a much larger cultural upheaval, one with a long history that had erupted shortly before I began college.

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methods correspond across disciplines, whether scientific or humanistic. However, such resemblances skirt my adolescent dilemma that was less about ways of finding truth than finding *me*. Namely, would I identify with those who employed the analytics of objectifying knowledge, or the sensitivities driven by imagination and intuition free of the neutral gaze?



## Chapter

## 2

# On Ways of Knowing

**I**n 1958, Sir Charles Snow (known best as C. P. Snow) delivered the Rede Lecture at Cambridge University. He entitled this famous talk, “The Two Cultures and the Scientific Revolution,” in which he described how scientists and the literary community were so divided they could hardly speak to each other (Snow 1959). Their shared goals, interests, and methods had radically separated and when coupled to the vast discrepancies in resources, the sciences flourished while the humanities began a slow decline.<sup>1</sup> Because he was a physical chemist and published novelist, he seemed well-positioned to make such a pronouncement. He also offered a prescriptive remedy by arguing for scientific literacy, a view that was then contested as a disguised form of subordinating the arts and humanities to the sciences and thus displacing the liberal intent of education.

What became known as the “Two Culture Controversy” began with a rebuttal lecture presented by the literary critic, F. R. Leavis, who pointedly wrote, not directly about the issues raised by Snow’s lecture, but about Snow’s standing as a spokesperson for science. Leavis’s essay, “Two Cultures? The Significance of C. P. Snow,” begins with what was called a “cruel” and “gratuitous” dismissal of Snow as a novelist, which was but the segue into dismissing Sir Charles as an intellectual: “...not only is he not a genius; he is intellectually as

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<sup>1</sup> Snow’s description has held over the ensuing decades. Recent reports show the persistence of declining student enrollments and shrinking professional positions for faculty in the humanities, despite wide-spread public consensus about the importance of the humanities in American life (American Academy of Arts and Sciences 2016; 2019).

undistinguished as it is possible to be” (Leavis 2013, 54). However, Leavis observed that Snow stands as “a portent,” “mastermind and a sage” for the public, and it is this authority that is the point of the attack, whose intent is to challenge the hegemony of science on culture-writ-large. Thus, as Leavis opined, the significance of Snow is not the man himself, but rather what he expresses, namely, the “cultural conditions” of the times. More specifically, the economic and social power of the sciences in modern society not only impacts academics (Whelen 2009) but has wide social and political ramifications as well (Reisch 2005; Ortolano 2011).

Science pitted against the humanities became a contentious issue that went far deeper than just the power politics within universities or a sociological clash between academic disciplines. Leavis pointed to the wider cultural influences of a struggle that would define legitimate ways of knowing and discredit others. A harbinger of the culture wars of the future, this debate captures the maturation of a division in the academy dating to the mid-nineteenth century. Until then, science was regarded as a branch of philosophy, but with specialization and academic segregation, science established itself as a distinct intellectual activity, one based on empirical investigation. Several social sciences (sociology, psychology, economics) developed in parallel as the empirical study of humans and their institutions expanded the spectrum of inquiry (Smith 1997, 65–75).

In 1840, William Whewell highlighted the distinctions wrought by professionalization of the empirical disciplines with a new name for the practitioners, “scientist” (Whewell 1840, cxiii).<sup>2</sup> The semantics are telling: The term designated an individual engaged in an endeavor separated from the rest of philosophy, i.e., one whose *profession* is to practice science. Prior to this new terminology, “natural philosopher” reflected a continuity of the sciences and other branches of philosophy. For instance, Charles Darwin referred to himself as a “natural philosopher,” which for him meant that the line separating science from broader philosophical questions could not be definitively drawn.<sup>3</sup> Whewell thus defined a profession that dissected nature to hopefully put it

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2 The divergence of the sciences from the literary and visual arts is captured by the etymology of scientist and artist. Each term first appeared in English about the same time. “Artist” was coined from the French, *artiste*, in 1823, and again, a specialization of those who practiced the creative arts required differentiation. And with each designation, the arts and sciences formally separated.

3 Note, “science” derives from *scientia*, knowledge of the world, and *sciens*, “knowing,” originally meant “to separate one thing from another, to distinguish.”

back together, but now for human enrichment. However, with this practical aspect “scientist,” carried a pejorative connotation of someone more interested in applying knowledge than in discovery for its own sake, a veiled indictment suggesting for-profit motivations and possible corruption of sanctified knowledge for knowledge’s sake. This compromised image of a searcher for truth clearly corrupted the earlier designation of “philosopher,” namely, one who sought “wisdom” as a noble pursuit for its own sake. Only towards the end of the nineteenth century did the word scientist assume more benign meanings.

Sanctimonious asides seem hardly fair. After all, material benefits were always at play in science’s quest for resources. Francis Bacon (1561–1626), in his early pitch for monarchical support of research, had promised bountiful benefits for the military and general economic prosperity. Human industry was part of the contract. And beyond a socio-economic investment, scientific philosophy provided humanism, born in the Renaissance, with a method of thought that would replace revelation with a new critical rationality. Empiricism and the logic applied to observation became a new way of resisting skepticism in a mysterious universe. Technical success aside, modernity is the Age of Science.<sup>4</sup> That revolution in thinking had profound effects impossible to measure. Indeed, science has been called “the engine of modernity” (Center for Science and Society, Columbia University 2017).

By the mid-nineteenth century, the seamless transition of gentlemen registering on both sides of the intellectual ledger (e.g., Isaac Newton studying both mystical texts and celestial mechanics) had unraveled. Within a generation of Napoleon’s Waterloo, the shared goals, interests, and methods of academicians had irreparably separated and by the beginning of the twentieth century, major rifts were formalized with the division of the human and natural sciences along the axis of explanation (*erklären*), exemplified by the natural sciences, and understanding (*verstehen*), interpretive methods, broadly construed (Bambach 1995). I wanted to better understand how that division emerged and whether bridges could be built to re-link these two fundamental ways of knowing. With this problem identified, my studies of science commenced.

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4 Modernity has various cultural and intellectual designations (Berman 1982) but generally refers to several epochs of thought: the seventeenth-century Age of Reason; the eighteenth-century Enlightenment; the long nineteenth century (1790–1914). Here, I partition “early modern” beginning with Galileo and Descartes (ca. 1630); Enlightenment originating with Spinoza (ca. 1670), but not in full flower until fifty years later; Romanticism, originating with Rousseau (ca. 1750), flourishes by 1790 and extends into the mid-nineteenth century. Post-modernism emerges in art and literature during the 1920s and finds its full throttle after World War II.

## THE UNITY OF REASON PROBLEM

At the end of the eighteenth century, Goethe explicitly addressed the “Unity of Reason” problem in seeking the common root of different kinds of intelligences, namely, those distinctive ways of thinking and judging applied to science and the arts (Fink 1991). Kant had formally presented the issue in different terms. For him, two kinds of Reason characterize human knowing, what he called “pure (or theoretical) reason” addresses the natural world while “practical reason” mediates the moral universe. The two differ in their respective cognitive functions, but the question as to whether they arise from a common root and divide or originate in different domains became philosophically interesting.<sup>5</sup> The challenge of how reason might be regarded as unified does not first appear with Kant’s schema, but grows from modernity’s conundrum of determining how humans can be both part of the natural world of cause and effect, and at the same time, exercise free will and thus assume moral responsibility. The autonomy of both theoretical and practical reason serves as the bedrock of Kant’s entire philosophy, a system that provides for freedom in both the apprehension of the natural world and the discernment of moral action in the social universe.

The nineteenth century was marked by responses to this fundamental division, where one tradition, identified with Hegel, followed the rationalist-speculative orientation that believed in the unity of reason (namely, a single source of theoretical and practical reason), while a second empiricist-psychological avenue of inquiry disputed such a unity and stressed the fundamental divide (Beiser 2014, 13–16; Neiman 1994). The idealist efforts failed and in parallel with the rise of science in the late nineteenth century, the empiricist (or naturalist) tradition prevailed as the scientific disciplines, following their own agendas, multiplied. Then those interested in the defining the role of philosophy in this partitioned relationship sought to understand the underlying logic of scientific pursuits and with such insight draw epistemological lessons from their colleagues’ efforts.

After World War II, sensitized to the dangers of unmonitored scientific applications, Snow continued the discussion, now firmly placed within the

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5 How Kant regarded “pure” and “practical” reason as unified has been deliberated in three basic formulations (Neuhausser 1993, 12): 1) They are compatible with each other, that is, insofar as the principles of one do not conflict with those of the other; 2) both can be derived as components of a unitary and complete system of philosophy, which has as its starting point a single first principle; 3) they possess an identical underlying “structure,” or constitute what is in essence a single activity of the subject.

social and political contexts of the academy. Ostensibly, the Two Culture Controversy centered on educational goals and ideals, but the root of the debate was about the influence of science and technology on culture-at-large. Dissension among the enlightened accelerated during the 1960s. Mastery of nature was not enough; science fell under the scrupulous eyes of critics who revealed the warts under the make-up.<sup>6</sup> Science, fairly or not, was indicted for diverse ills and attacked as the purveyor of destructive technologies. The objectivity of its positivist philosophy had been discredited by Nazi racial science and Lysenko's Soviet genetics to reveal how easily science might be employed for ideological agendas.<sup>7</sup> Techno-science had placed a hegemonic hold on Knowledge, but dire consequences of seemingly beneficial applications (e.g., insecticides and nuclear fall-out) grabbed headlines and cries mounted for greater citizen supervision (Carson 1962; Fradkin 1989). Arraigned for efforts to discredit the humanities and all they beheld, contemporary Big Science (the term for huge projects funded by government or corporate financing) was impeached for its close relations with the corporate body at the expense of the disenfranchised. And most venally, the laboratory was charged as a willing tool of the military-industrial complex.<sup>8</sup>

I had stumbled upon a problem with a long history. Advocacy for the unification of knowledge dates to the mid-eighteenth century (e.g., Diderot and the Encyclopédistes), but it was renewed with particular rigor among Viennese philosophers of science in the 1920s and '30s, who continued their efforts as emigres in the United States after World War II (see Preface). They were encouraged by James Conant, then President of Harvard University, who had commissioned his faculty to devise a new program, *General Education in a Free Society* (1945), which was an attempt to unify, or at least bridge, fields of knowledge that had been splintered between the sciences and the humanities.<sup>9</sup> But as the

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6 Reviewed in Tauber 2009a, chapter 5.

7 For German racial science see Ehrenreich 2007; Weiss-Wendt and Yeomans 2013. The German antecedents reach into American eugenics and racism (Kuhl 1994; Whitman 2017). The case of Soviet's embrace of Lysenko genetics is another well-examined example of how political determinants have influenced the practice of scientific research and its conclusions (Joravsky 2010; Graham 2016).

8 At various times, scientists themselves have assumed the mantle of moral advocacy (e.g., Liss 2005). A notable recent example was the debate concerning genetic engineering and its regulatory policy (Wright 1994).

9 For a personal recount of Harvard during the 1940s, see Holton 1995a. Of note, Thomas Kuhn's *The Structure of Scientific Revolutions* was published in a series dedicated to such unification. Edited by Otto Neurath, *Foundations of the Unity of Science, Toward an International Encyclopedia of Unified Science* published a series of monographs from 1938 through 1970 that

Snow affair had so clearly demonstrated, the two academic communities were so divided they could barely converse with each other. Snow had bet on the stronger horse by championing the sciences at the expense of the humanities (based on the material benefits of that choice). Indeed, science and its technological harvest proved triumphant in the following decades.

The contending positions reflected a rigorous debate about the role of science in society and, more generally, the dominance of one kind of knowledge over another. The controversy began with the clash of fundamental values between the entrenched Enlightenment and The Romantic Revolt (1780–1830) and had moved from an intellectual debate to an enactment of a world view. Indeed, the humanists' alarm extended well beyond resources and authority. For them, positivist aspirations (if not imperialistic dominance) had contorted the very foundations of knowledge. Positivists were dictating "the real" at the expense of other ways of knowing. Given my personal conflicts, I wanted to better understand this debate in which the objective and subjective were pitted against each other. Indeed, this apparent opposition seemed to reside at the core of my own dilemmas. So, I followed the philosophical path that led back to the likely origins of my own confusions, whose journey I later called, "scholarship as self-knowledge."

I began with the Age of Reason, whose Enlightenment was based on three principles emanating from the basic precept that knowledge is a virtue: all genuine questions can be answered; answers must be compatible with each other; and answers are derived through correct reason, as opposed to revelation or authority. "Correct" reason, of course, conformed to the mathematization of nature and the logic of objective analysis. Romanticism's rejection resided in dethroning these principles and replacing them with other precepts. Reason was a kind of confinement to be supplemented by creativity and imagination; personal authenticity and emotionalism celebrated the subjective at the expense of the analytic; the sanctity of the inexpressible and its transmission through art captured the deepest human realities; the protest against universality elevated individualism and self-assertion; and perhaps most central, the primacy of one's own subjectivity that displaced objectivity as the final arbiter of reality. Here, the conflict of the sciences contra subjectivity originated, because, according to the Romantics, physics cut "reality into some kind of

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sought the basic, unifying principles of the natural and social sciences. Contributors included a who's who of mid-twentieth century philosophy of science, including Niels Bohr, Rudolf Carnap, Bertrand Russell, John Dewey, and Charles Morris.

mathematically symmetrical pieces, whereas reality is a living whole” (Berlin 1999, 58). Ergo, science could not deal with what was truly important and, furthermore, distorted (even nullified) the authenticity of personal experience.

Later, when I surveyed this intellectual landscape, I appreciated that the massive cultural shifts associated with postmodernism had their roots in these Romantic ideas: 1) per Nietzsche’s proclamation, humans define themselves through self-chosen values and goals; 2) and because there is no pre-existing structure to which adaptation is required, perpetual self-creation expresses the dynamism of nature and the unpredictability of human activities; 3) knowledge and its telos, certainty, is sacrificed and replaced with the human reality depicted by art and myth; and 4) instead of the unification of knowledge, disunity characterizes the world and our understanding of it. Each of these grand ideas, vibrant in their ill-definition, would serve as waystations of my own intellectual journey, one that lay far in the future.<sup>10</sup>

### THE COLLEGIATE THESIS

Because I chafed at the ambiguities of hermeneutics in art criticism, historical analyses, and literary exegesis, I turned to the sciences as a more ready conduit to a realm of certitude. And accompanying the decision to go to medical school, a recalibration of goals commenced. Yet, conflict remained. While I wanted to prepare for a career in science, my interests in the humanities did not abate, because my first love, *poesis*, called and I would not abandon Her. Finding a balance proved a formidable challenge as I attempted to attend to both mistresses. I found a recourse of sorts in pondering the relationship between different ways of knowing—the objectivity characterizing science versus the interpretive faculties of the arts, history, and letters. Utterly innocent of the controversies that would up-turn theories of literature, art, and language, my assumptions of a stark contrast between the two domains of study proved naïve. After all, a revolution was underway that discarded positivist tenets in science studies (discussed in chapter 8). Whereas I thought of the scientific enterprise as the gath-

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10 Below I describe how romantic tenets pertinent to biology influenced my later critique of immunology and how my examination of positivism was framed by the Romantics of the mid-nineteenth century. Those studies then influenced, for a time, my own ego ideal based on naïve expectations of self-knowledge and freedom. At least part of that program was derived from how Thoreau understood autonomy, which then drove me to study Kant’s formulation. One of the ironies of this chapter of intellectual history is that Kant, despite his abhorrence for Romanticism, contributed to its genesis (Berlin 1999, 80–87.)

ering of the facts for the logical composition of theories, it became evident during the 1960s that interpretation and other subjective elements played crucial roles in scientific thinking. In short, the borders demarcating objectivity were increasingly blurred as interpretation assumed new authority.<sup>11</sup>

Cognitive considerations about analysis or creativity might have served my purposes as I sought common ground for the two academic domains. I was already well-aware of the mosaic of cognitive faculties with which humans operate, how differently people think, the range of reason that passes for “rational,” the play of the emotions, the workings of experience, the effects of unconscious bias and desire. Finding common ground on factoring such subjective aspects in the analysis of a text or an experiment could have addressed the science/humanities division that so preoccupied me. However, I did not take that route. In fact, I had no idea there even was such a road to follow. I had enrolled in an aesthetics of science seminar, but the instructor, a chemistry professor, lacked philosophical expertise and the course was a superficial, “look at this; look at that” kind of survey—“Science reveals Nature’s Beauty.”<sup>12</sup> So instead of adopting a cognitive approach to uncover the infra-structure of scientific interpretation, I used a developmental tactic that sought to track the emergence of scientific thinking from what I considered less sophisticated forms of thinking.

At the time, I thought of myth as a magical way of thinking that represented a station on the way to objective thought. This was the view of diverse scholars of the early twentieth century, who regarded myth as a primitive form of religion or a magical system of explanation. Accordingly, Sir James Frazer (*The Golden Bough*), Freud (*Totem and Taboo*), Ernst Cassirer (*Language and Myth*), and Emile Durkheim (*Elementary Forms of Religious Life*) developed a developmental view of myth in the hierarchy of knowledge. While I also searched for that root of science’s origin, I was looking for more, namely, a universal schematic of the mind. Studying the primitive, whether in anthropology or

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11 Radically altered philosophies of science (i.e., ideas of how scientists interpreted data and constructed their theoretical models) corresponded to parallel re-evaluations of the underlying principles of hermeneutics in the humanities. Derrida’s seismic deconstruction critiques had just reached America’s shores in 1968 as I proceeded with my own investigations ignorant of his arrival (Derrida 1974; 1978a; 2011; Culler 1982; Norris 1982; Caputa 1996; Dirk and Lawlor 2014; Cisney 2014).

12 Early on in my immersion in philosophy, I organized a colloquium on the same topic in the Boston Colloquium for the Philosophy of Science (1992), and at that symposium, David Kohn (1996) gave a brilliant paper on Darwin’s indebtedness to an aesthetic sensibility in the genesis of the *Origin of Species*, a conclusion affirmed and expanded by Robert Richards (2001, 514 ff.). The proceedings of that meeting were later published, whose title, *The Elusive Synthesis*, clearly expressed my own perspective on the aesthetic in science (Tauber 1996b).

psychology tapped into an evolutionary paradigm of human development.<sup>13</sup> Perhaps by examining the mythic domain would reveal an intermediate stage of human thought and the dynamics that govern it.

The logic for such a schema had credibility: Philosophy emerged from the early Ionic thinkers who were still imbued with a mythic consciousness. Plato himself invented myths to make his didactic points and the long antecedents leading to the eruption of scientific thinking in the Renaissance certainly drew from philosophical roots. In other words, the trajectory of myth à philosophy à science suggested that looking at myth might offer some insight into the deeper disciplinary connections I envisioned. From there, I could potentially better situate science and rational thought, more generally. With this vague idea, I devised a course of study in the form of a senior thesis about myth.

### ON MYTH

If better focused and maybe less ambitious, I would have narrowed the scope of my research. Indeed, if I knew more that would have been possible, but the wildly broad agenda I had set myself simply reveals my naïveté. I had taken a course in classics, read Homer and the tragedians, and possessed a superficial knowledge of the most famous Greek and Roman myths. However, myth as a topic of study was confined to the Department of Anthropology, and Mr. Carter didn't much care for such material. He was a kinship kind of guy, whereas I was more interested in anthropology as the study of the mind. I thought the primitive offered a way of examining the mental shorn of the more complex appendages of civilization that obscured the basic structures of the psyche. Nevertheless, I enrolled in several of his courses to study pre-literate kinship relationships, religious observance, and economic practices of the Aus-

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13 Interestingly, I did not explore the possibilities of studying the visual arts in this regard. When going to museums, I consistently visited the African and Oceanic artefacts, and I appreciated how they inspired Picasso, the Fauves, Gauguin, and the Dresden Brücke. These were among my favorite artists, but I failed to include them in considering myth. Twentieth century artists depicted primitivism ethnographically and thus differed from the primitivism of nineteenth century romanticism, which presented the idealized pastoral of mountain, field and stream, replete with cows and fair maidens. Then the use of "primitive" fanned in different directions as artists across diverse traditions sought to rediscover more primal ways of life. That effort was largely ideological, namely, to offer a counter-narrative to Western industrialization and the emergence of mass society. Then in the next turn, early twentieth-century artists used primitivism to focus on capturing a human primal state (e.g., Henri Rousseau) or abstracting reality (e.g., Picasso, Kandinsky). See Rubin 1989; Price 1989; Hiller 1991; Rhodes 1994; Flan 2003.

tralian aborigines, the Congolese, Polynesian, Eskimo and North American Indians. While absorbed by a glimpse into the primitive, I found little to apply to the more expansive project I vaguely envisioned, so I went my own way and ventured into the myth studies literature.

The wide swath of reading that followed—Homer Smith (*Man and his Gods*), Mircea Eliade (*Myth of the Eternal Return*), Joseph Campbell (*The Hero with a Thousand Faces*), James Frazer (*Golden Bough* [abridged]), Jessie Weston (*From Ritual to Romance*), and Robert Graves (*White Goddess*)—refracted the field across several disciplines but offered no obvious pathway for my inquiry, which, in a word, was to find a bridge that would link the disparate ways of knowing upon which my career choices were divided. Following the scholars, my basic premise held that myth represented a step in the developmental pathway to science. Just as archeology had shown the progression from hunting to pastoral and agricultural phases, so too did “mental anthropologists,” comparing various pre-literate cultures, presumably discern the sequential steps in the history of human thought.

Frazer was such a figure and his *Golden Bough* (a treatise on the putative evolution of magic to religion) most clearly presented such an argument. However, in my innocence, I did not fully appreciate how his armchair anthropology reflected the biases of his cultural period (Victorian), nor why his scholarly conjectures have been largely rejected (Fraser 1994, ix–xliii). What I knew was that modern literature had been influenced by Frazer’s seminal work, e.g., T.S. Eliot’s (*The Waste Land*) and William Butler Yeats, and that Freud’s *Totem and Taboo* built upon the platform Frazer provided (Vickery 1973). That genre dominated my extra-curricular readings, but eventually I sought a more analytical approach that found traction in Cassirer’s *Philosophy of Symbolic Forms* (1953–1957).

I don’t recall how *Symbolic Forms* crossed my path, but it captivated me when I discerned a fully developed philosophy consistent with my own presumptions about the evolution of the mind instantiated in discernable stages of thought. The first volume of *Symbolic Forms* is devoted to language, the second to myth, and the third to science. I found the attempt to show the evolution of thinking from the primitive to contemporary physics exhilarating. What appealed to me? Probably the underlying description of a mind with multiple faculties ordered by a hierarchical scheme. And to the extent that I was struggling to orient myself to an understanding of different kinds of cognition—science and poetry most prominently—Cassirer provided a solution: myth finds its own resting place in the hierarchy of the mind. That theme, in terms of sym-

bolization, fit in nicely with my high school reading of Suzanne Langer's *Philosophy in a New Key*. She had portrayed symbols functioning with a universality amenable to philosophical analysis that conformed to myth as a kind of language. Cassirer also held this position. Note, while Cassirer and Langer regarded myth as a window into the mind, neither considered mythical thinking as integral to the modern psyche, at least not explicitly. They were philosophers and given my later philosophical interests their introductions might have been more carefully mined.

In hindsight, I am bewildered why I didn't just focus on Cassirer's work, whose erudition and insight deserved my scrutiny if I was truly pledged to a developmental approach. Another obvious focus would have been an examination of philosophy's emergence in ancient Greece. Two points of view would have to be adjudicated: Did philosophy originate as an autonomous exercise of critical thinking out of a religious and mythical culture, or was philosophy in its earliest inception a form of myth that matured into a secularized form of discourse? Scholarship suggests that rather than an acute inflection in thinking as a direct reaction to myth, early philosophy borrowed heavily from the mythic culture as it formed its own agenda.<sup>14</sup> Plato extensively used myth as allegory to dramatize philosophical arguments and to make didactic points (Stewart 1960; Brisson 1998; Partenie 2004; Tofghian 2016). And Plato is only the best studied example of how ancient Greek thinkers appropriated myths. Interpretations range from the use of myth as a strategy to manipulate popular belief and authority (Morgan 2000) to the adaptation (not rejection) of myth to a new form of rational thought (Hatab 1990; Brisson 2004).<sup>15</sup> Simply stated, the rela-

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14 Accordingly, the earliest attempt to characterize nature by Thales (water was the primary substance and supported the earth) represented a turning point in Western thought. Thales' novelty is attributed to a description of nature as ordered and that order was intrinsic to natural cause, not divine. The challenge then for the beginnings of philosophy was to rationally posit the basis of this order. A long tradition argued this novelty thesis from Aristotle and Cicero to Hegel and a host of nineteenth century German and British classicists, which is most clearly seen in Anaximander's fragments appearing 40 years after Thales (Sassi 2018). The "continuity" thesis (philosophy evolved from religion) presented by Cornford argues that the key notion of differentiation developed by Anaximander may be traced to several Egyptian and Mesopotamian mythic sources (Cornford 1952; Vlastos 1993). I am clearly no expert, but it seems to me that Cornford failed to appreciate how Anaximander placed a natural order upon mythic explanations and thus differentiated a religious consciousness with a secularized one. Whether continuous or a disruption in thought, it seems well-established that Eastern and Egyptian myths impacted the Greeks. For representative commentary about this orientalist influence see Vernant 1982; Burkert 1992; Penglase 1994; West 1997.

15 For overviews of the transition of mythological thinking to philosophy, see various essays by Jean-Pierre Vernant, especially in "The Formation of Positivist Thought" (2006, 371–97)

tionship of myth and later systematic analysis followed convoluted pathways that I could have profitably explored. I did not. Whether this choice arose from sheer ignorance of the question or possibly because I became discouraged with the developmental approach, I cannot say. If the latter, I would have been in good company.

Not all theorists of mythology understood myth as a primitive philosophy of science or a way station to scientific reasoning. For instance, Bronislaw Malinowski (the most prominent of the generation of anthropologists following Frazer) argued that myth served the functional utility of ordering social hierarchies, organizing economies, and setting standards and enforcing morality (Malinowski 1954). C. S. Lewis presented myth as concretizing the reality to which the myth refers, by which he meant that myth conveys spiritual truths (including modern Christianity).<sup>16</sup> By mid-twentieth century, myth had been turned inwards, and Lewis's general point of view was supported by Rudolf Bultmann, who characterized myth as the reflection of the psyche that effectively uses the language of the world to translate inner subjectivity into the public domain (Bultmann 1984). In this sense, myth is an expression of psychological dynamics, famously explored by psychoanalysts like Freud and Carl Jung, but also by anthropologists (e.g., Claude Levi-Strauss), albeit from a very different point of view. On their view, myth is a portal into the mind, since we live, knowingly or not, through (and by) our own myths.<sup>17</sup> This aspect of myth ultimately captured my full attention.

By the late 1960s, Freudianism began its ebb in the intellectual firmament, and Levi-Strauss's structural approach to myth and kinship filled the pages of the *New York Review of Books*, where I first read about his influential theory. He posited that myth mediates the ways culture intersects with nature, both in

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and "The Origins of Philosophy" (2006, 399–408); Hyland 1984, 102–07; Edmunds 2014. For views concerning the lingering presence of myth in modern philosophy, see Daniel 2014 and Schilbrack 2002.

16 "What flows into you from the myth is not truth but reality (truth is always *about* something, but reality is that *about which* truth is), and, therefore, every myth becomes the father of innumerable truths on the abstract level... It is not, like truth, abstract; nor is it, like direct experience, bound to the particular" (Lewis 1970, 58).

17 The most popular advocates for the continued relevance of myths in the contemporary setting include Mircea Eliade (*Myth and Reality; The Myth of the Eternal Return*), Joseph Campbell (*The Power of Myth; Myths to Live By*), and Mary Midgley (*The Myths We Live By*). For review of scholarly theories of myth, see Scarborough 1994; Meletinsky 1998; Doty 2000. Michael Witzel (2012) makes the case that the world's mythologies have a continuous genealogy traced back to human origins in Africa. This is an extraordinary study of human history and the persistence of a few central existential responses.

terms of social organization and on a personal existential basis. But more, in Levi-Strauss's analysis, myth reflects the dynamics of thinking itself. In this sense, anthropology as the study of the mind jumped over the English Channel, continuing in the tradition of *The Golden Bough*. Levi-Strauss's *The Savage Mind* (1966) and *Structural Anthropology* (1963), despite their fashionable appeal, left me with an uncomfortable feeling that his divalent ordering schema was too neat and, yes, structural. I suspected that he offered a formalized portrait of his own mind at the expense of his subject's.

I veered into psychoanalytic literature, not yet convinced that its methods and conclusions had been debunked. I carried an early indoctrination. Not infrequently when my leash apparently needed shortening, my mother, the clinical psychologist, would drop-off succinct diagnoses, like "defense mechanism!" or "projection!" At the time, psychoanalysis seemed "true," at least in our household. So, if dissatisfied with Cassirer and Levi-Strauss, I still had not exhausted the vague notion that myth (e.g., Oedipal) provided a conduit into the recesses of the mental. I had read Freud and Jung in high school and knew the basics of their respective psychologies. Each had commanded my interest, and I vacillated between their competing constructions. I was intrigued by Jung's conception of the collective unconscious, whose universal myth of the Hero and the Mother embedded in the psyche struck me as implausible yet poetically "true." And while I found that Erich Neumann's *Origins and History of Consciousness* offered a grand overview of myth and its enactment in individual psychology, I found no map for that terrain (Neumann 1954). I suppose Jungian psychology, while seductive, didn't appear "right." The collective unconscious seemed a useful scaffold for highly speculative views of humankind and history, but not useful in ways that would address my primary concerns.

In contrast, Freud's *Totem and Taboo* (1912), *Civilization and its Discontents* (1930), and *Moses and Monotheism* (1939) provided me with what I considered a more likely structure for myth's operation. Freud's own myth making, coupled to imaginative commentaries—Norman O. Brown's *Life against Death* (1959) and Herbert Marcuse's *Eros and Civilization* (1955)—presented my adopted approach to myth-as-probe of the inner sanctum. These works both fascinated and repelled me. Fascinated, because something deeply resonant with the times and my inner turmoil rested between the lines; repelled, because the Freudian myths purportedly guiding the psyche seemed either over-intellectualized or just plain fanciful. In any case, I centered my attention on Brown and Marcuse, both of whom had advocated a liberation of the libido (Marcuse 1955; Brown 1959). They advocated a better balance between Apollo and Dio-

nysus (à la Nietzsche), where a mythic consciousness (ill-defined and largely opposed to the reason of science) would find its rightful place in the human psyche. No doubt, my sympathies for their advocacy of Eros only confirmed my good standing in the white male youth culture of 1968. The hormones were in full storm and temperament could not be denied.

I concluded that Freud offered the most comprehensive approach, but my reaction to his theory was ambivalent: On the one hand, I appreciated the use of myth to illustrate psychic dynamics, but, on the other hand, I was uneasy with his dogmatic, mechanical portrayal of the psyche, especially in consideration of the many competing models of psychoanalytic dynamics. Indeed, the entire psychoanalytic enterprise seemed suspect to me when a unified theory appeared so elusive. Clinical efficacy would have legitimated the analytic approach, but I knew psychoanalytic truth claims were highly controversial. On my view, the mythic depiction of the psyche offered powerful metaphors—useful for modeling the psyche, but not necessarily the voice of the lower depths. Yet, a key discovery had been made, namely, the psychic reality of the unconscious, whose character knows no logic, time, nor shared language with the ego. Because of intrinsic inaccessibility, Freud invoked myth to capture its workings.

In short, Freud's project came close to my thematic concerns, but I could not legitimate his project, at least not as a science. Even Freud admitted that psychoanalysis is only "the starting point of a new and deeper science of the mind..." (Freud 1925, 47). And, concomitantly, as attested by his detractors, the mythologies invoked by psychoanalysis accompanied by its mechanistic explanations and rationales had controversial support in the context of clinical pathology. I concluded that he was a good mythmaker but hardly qualified as a scientist in good standing. I would pick up the Freudian Knot again 40 years later in philosophical studies of his theory with a different set of questions and a re-designed scaffolding upon which to place his thought. My conclusions were essentially the same that I made in college: I discerned in his applications of myth a misapplied objectification of the subjective. In the attempt to construct a science of mental states, Freud failed both the criteria of good science and the task of preserving the subjective on its own terms.<sup>18</sup> Much would follow in later elaborations, but at this juncture in the late 1960s,

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18 Freud patently failed to fulfill the criteria that would establish psychoanalysis as a "science of the mind," his own putative ambition, and later crippling critiques had settled the *scientific* merits of clinical psychoanalysis for me (Grünbaum, 1984; Eysenck 1985; Cioffi 1998; Webster 1995; Macmillan 1997; Crews 2017).

I satisfied myself that I had at least identified a literature to address many of my interests in a vast library for future exploration.

### THE UNFINISHED THESIS, A *PROLEGOMENON*

My thesis reviewed diverse readings and concluded that while the role of myth in the twentieth century had been subordinated to rational discourse (namely, science) mythologies in various formats (psychoanalytic in particular) nevertheless reached into the recesses of the mind in ways inaccessible to scientific analysis. Myth held its own currency as a way of depicting persons and the world in which they live with narratives designed to create coherence and meaning. Although serving a necessary function, because positivist thinking had rendered such “magical thinking” illegitimate, I concluded that myth had lost a prominent place in Western culture. I shudder at my myopia, for I had ignored the persistence of mythic thinking in popular culture, art, and political propaganda. I had too readily dismissed the mythic probably because I was not prepared to allow its *realities*. Obviously, I had just skimmed the surface of a seething cauldron and there the matter rested for many years.

I liken my senior thesis to a roll of camera film that had yet to be developed. No “editor” appeared to help me “print” those photographs. The finished paper, typed with carbon copies(!), seems jejune and fragmentary to me now. Given the expanse of the question as I framed it, and my superficial exposition of the issues with which I grappled, it is a wonder that anything intelligible emerged from my labors. At best, I wrote a survey of the various roles myths fulfill as illustrated in the works of Levi-Strauss and Freud. Its lingering appeal in my memory lies solely in its frantic gesture towards a diverse literature I would continue to plumb, and whose insights I would further develop. In short, I suffered from an incalculable ignorance coupled to intense intellectual energies directed at excavating highly complex ideas. These eventually were better formulated and guided my later investigations. The essay pointed to something, but this ‘something’ took decades to coalesce into a reasoned body of thought that followed several related themes. In the meantime, my ostensible goals awaited fulfillment.

I easily could have explored the rich historical example of how the Aryan myth was reawakened and made operative in Nazi ideology. And that story would have found resonance in the deeper Freudian lessons that I had accepted: unconscious forces may escape Reason’s ability to contain them. And in this unleashed scenario, the mythic appears with full authority, as a truth. Only

much later when I revisited these issues did I find that Theodor Adorno and Max Horkheimer had explicitly described this dynamic exactly in these terms, a discovery delayed until the turn of the millennium.

Shortly after I graduated from college, an English translation of their *Dialectic of Enlightenment* appeared (Horkheimer and Adorno, 1993). They placed myth in opposition to Enlightenment's Reason as a projection of the psychic forces at work within the individual. Disequilibrium accounted for the crisis of modernity, specifically the distortion of despotic Reason that denied the rightful place of libidinal elements. Because the mythic cannot be totally suppressed, constructive ways of expression must be allowed. (Given the alarm at how the Nazis tapped into the mythic reservoir, no wonder Horkheimer and Adorno were repelled by the disruptive forces unleashed.) So, while the *Dialectic* emphasized the destabilizing character of the mythic (as had been developed by Nietzsche's celebration of the unleashed rapturous, the a-rational Dionysian), they were even more contemptuous and damning of what they identified as the Enlightenment's totalitarian pursuit of the rational.<sup>19</sup> In service to the control of nature and humans not only led to romantic disenchantment, but also to the political despotisms marking the twentieth century. The loss of a self-reflexive perspective and the relentless pursuit of order inevitably ended with both social and psychological imbalances. Horkheimer and Adorno thus sought to redirect Reason's destructive tendencies to attain a better balance in the collective psyche.

By placing myth within a broadly construed historical context, these philosophers addressed my own agenda of better understanding (and balancing) different ways of knowing. By using the same Freudian schema that I had tentatively introduced in my first studies of myth, their work would have undoubtedly helped to organize my thinking about a medley of issues that re-appeared from their dormancy decades later (Tauber 2013a, 51–71). And beyond that direct influence on adjudicating the role of mythic thinking, I came to appreciate the larger context in which their work was situated, specifically, their deep suspicions of “instrumental reason” and the instantiation of the Kantian ver-

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19 My early reading of Nietzsche had introduced the Apollonian (order)/Dionysian (release) conflict, which undoubtedly directed my own understanding of mythic thinking as an expression of unconscious forces. Indeed, the idea that philosophy was born as a rational response to the mythic organized my later study of the pre-Socratics. In a reversal of the usual interpretations of the Oedipus myth, Jean-Jacques Goux (1993) has cogently argued that the turn from the oracle to find explanation and rational understanding may well be the original case of Greek tragedy—not the march of indifferent fate, but rather the consequences of hubris, namely, a misplaced reliance on human reason.

sion of the ego's rationality. Their attack had wide ramifications for they were contributing to the dismantling of modern agency. A counter position that would rescue Reason was argued by Cassirer at about the same time.

Twenty years after Cassirer had published his studies of myth as a stage of the development of symbolic forms, he turned from his epistemological concerns to political ones (Cassirer 1944; 1946). As a result of Nazism, Cassirer, like Adorno and Horkheimer, regarded mythic thinking as opposed to the rational (instantiated by science) and similarly, he saw totalitarian regimes using mythic constructions to propel their own agendas. However, instead of a better balance between Myth and Reason argued in the *Dialectic*, Cassirer targeted myth as dangerous (Baeten 1996, 42). Consequently, he promoted Reason to allow what he called, "consciousness" to complete its full maturity (ibid. 83–5). That agenda, in which "human culture taken as a whole may be described as the process of man's progressive self-liberation" (Cassirer 1944, 228) could not be advanced if the mythic way of thinking was not expunged (Cassirer 1946, chapter 18). Thus, myth not only served as a precursor of scientific thinking, but because of its epistemological limitations, imperiled cultural advancement. This position developed from ideas Cassirer described earlier in *The Philosophy of Symbolic Forms* (1955) in which he maintained that mythic thinking did not differentiate symbols as *symbols* (i.e., symbols were endowed with magical power), whereas critical thinking makes a "sharp distinction between real and possible, between actual and ideal things" (Cassirer 1944, 57).

For me, Cassirer in defending Reason, offered a counterbalance to the *Dialectic's* critique of Enlightenment ideals and effectively represented the other side of a dispute that will be further displayed in *The Triumph of Uncertainty*. On this account, Cassirer was the last prominent modernist, while on the other side, Adorno joined Heidegger (whom he scorned) in dethroning the Enlightenment Ego, for better and for worse. That controversy swirling around the subject is a dominant theme here, and thus I regard the *Dialectic* not only as a ready reference point for my interests in myth, but the critical introduction to the medley of issues circulating around the modern subject that organized much of my thinking on this topic.

With the benefit of hindsight, the myth project launched me on ways of thinking about science beyond the dominant positivist orientation I had uncritically accepted. I began to appreciate science within a larger, more humane construct. In subtle ways, the laboratory did provide the existential coordinates, self-definition, and moral direction I sought. I found heroes—Pasteur, Darwin, and Einstein—and placed them into the Temple of Science, one that

had great appeal in offering the Real and the True as all myths do. And while a major reevaluation commenced much later, I would continue to believe in the god, *Fact*, with his handmaidens, *Objectivity and Neutrality*, dutifully in attendance. They steadfastly remained in place until the lessons of uncertainty transformed my own tale in ways I could not have predicted. I was an innocent (as most aspiring heroes are) and anticipated when I decided to become a biomedical scientist that I had joined a valiant company. Like the Knights of the Round Table, I too would do battle against the ignorant and the foul. I vowed to enlist in the greatest of human undertakings, to harness Nature not only for knowledge, but for the Good. By bringing Her to my bidding for the betterment of humankind, I would become a champion in the crowning achievement of the Enlightenment. Hopefully anointed, Sir Fred, my own Camelot story would be told as only a mythmaker could recount it.

All too evident, this sophomoric attempt at a grand synthesis was appropriately commented on by my advisor as “the work of a lifetime.” He expressed an uncanny foresight, for in every essential way, his assessment was spot on. That story will emerge as we proceed, but I note here that four decades later I wrote a book, *Science and the Quest for Meaning* (2009a), about the issues I faced in making the transition from my initial interests in literature to science, or more specifically, how the two discourses spoke to each other (see chapter 12). Indeed, that goal never wandered off my sights.

I now see, of the myriad shortcomings, the basic failure of my thesis rested upon a misplaced foundation: The draw of myth was not in understanding its intermediate placement in the edifice of knowledge or in dissecting its subjective meaning by objective analysis, but rather its ability to capture the cries and songs of the soul. This represented a poetic function, expressions of subjective experience—fear, awe, wonder—prompted by the mysteries of nature’s cycles, the life and death throes of human experience. A second neglected aspect concerned the role of myth in establishing identifications within the social world, or what later would grab headlines as “identity politics.” More specifically, myth offered ego-ideals (heroes) and thereby helped delineate social identities and corresponding values. I failed to recognize these legitimate ways of knowing, for the way I had formulated my problem of choosing a career assumed a view of science that precluded a synthesis. By opposing two ways of knowing, I established a seemingly irreparable opposition.

So, when worldly events overtook my deliberations, I left in abeyance the conundrum of finding a bridge between science and literature, fully recognizing that the poetic-mythic world reposed inadequately attended. The subject-

tive lacuna that might have been filled by art, music, literature, or religious belief hardly sufficed for me. In 1968, I could offer no ‘solution’ or even a ‘conclusion’ to my thesis beyond the probes I had made in several directions. Thus, I left unresolved what seemed conflicted ways of understanding. And because I had to make a career choice, I relied on the simple formulation that set the two worlds of knowledge at odds with each other. Knitting them back together became my life’s labor. As I placed the myth paper in the drawer, I took out the application for medical school. Twenty years later, I renewed my early inquiry with a new perspective.

I did not realize how epistemology drove metaphysics and that the entwinement of objective and subjective faculties belied partitioned positivist dictates. This appreciation derived from my basic research experience coupled to my writings in philosophy of science. With a Janus-like view of the humanities and experimental investigations, my original assumptions about supposedly irreconcilable approaches to knowledge eventually found “peaceful coexistence.” And as to personal identity, on the one hand, a professional commitment addressed the wide span of career and social perplexities, and on the other hand, choosing medicine placed the intellectual query on hold, leaving the ill-formed existential matters in limbo. In due course, I acquired different ways to confront these matters and when I re-explored them through philosophy, I found the same questions waiting as I had left them. Indeed, they appeared essentially unchanged from their deep repose after awakening from their hibernation after attaining professional success in medicine. Now, it seems evident that I had bet on a strong stallion (biomedicine), one that had enormous appeal, but a dark mare (philosophy) would eventually gain ground and finish in the lead.

#### COMMENT

The Two Culture confrontation formatting these early inquiries continued to direct my later scholarship. Granted, narratives impose an order, and one must be wary of oversimplification. However, it seems to me that my excursion through philosophy’s thickets in search of an intellectual clearing have been driven by a singular motivation. According to this plot, I renewed my enquiry about balancing competing modes of knowing, one centered on certainty and objectivity against the appeals of celebrating the hermeneutical and artistic that draw directly from the personal. To parse diametrically is a common ploy in schematizing intellectual complexity, e.g., myth oscillating with Enlighten-

ment (Horkheimer and Adorno 1993); the psychoanalytic ego competing with id drives (Freud 1923); the raw/cooked structuralist interpretations of myth (Levi-Strauss 1969). I found the same tactic helpful in understanding the sources of my confusions and the rationale for their clarification. Those collegiate attempts at reconciliation failed to establish an integrated position and given my choices (largely emotionally defined) the scales tilted toward science as the instantiation of objectivity.

Although choosing from opposing possibilities—poetry or analytics, humanities or science, philosophy or medicine—helped to navigate the messiness of a life, such dichotomies minimize and thus misrepresent complexity. In any case, as explained, I struggled to come to terms with these issues and eventually a concrete problem formed: how might I integrate my humanistic leanings with a career in science? What kind of work would I engage? What was most meaningful, creative, and worthy of my effort? Posed in terms of opposing ways of thinking allowed me to pack a lot of other stuff into my mental luggage. I could, in a manner of speaking, handle that topic. And more saliently, posing my personal issues within a well-articulated Two Culture debate allowed me to defer peering at the underbelly of my personal conflicts. Because I was ill-equipped to deal with the deeper reaches of the identity enigma, either analytically or emotionally, I followed a strategy that would recur many times: I intellectualized.

That ploy proved inadequate. I failed fully to comprehend that my insecurities—about the world, others, and myself—were not only the result of my ignorance and lack of experience, but also reflected the nature of knowledge itself, whose irresolvable uncertainty both inaugurates the epistemological quest but also accompanies it at every stage of development. And where I originally sought unification of knowledge and diverse ways of thinking placed on a continuum, when I revisited this set of problems, I concluded that such a project had been misconceived. Indeed, disunity characterizes life in our era. Moreover, the division represented a distillation of the deeper identity problem with which I wrestled.

I discovered that the career issue was far more complicated than any dichotomy might fashion. Eventually a reconstructed line of history permitted some insight about why posing the subjective-objective distinction as a rigid bivalency distorted the question at the heart of my own personal uncertainties. One could assign validity to each domain within their respective purviews. Each world of knowledge and experience drew upon different epistemologies. However, beyond that level of discrimination, I was to find layers of overlap

that made rigid binary distinctions problematic. That I saw the matter as partitioned was, of course, part of my quandary. The opposition that had trapped me into either/or options proved to distort a far more complicated relationship of ways of knowing and the identities that followed.

My later scholarship was set in motion by the Two Culture controversy that, more than an intellectual argument and political debate, represented a version of the realignments that were reaching into every corner of Western culture. A New Order had arrived, bringing in its wake radical reassessments of identity. Even though I had not been formally introduced to postmodernity, I did realize that the ballast required to center a coherent, meaningful life had shifted from my childhood expectations and, perhaps in seeking adjustment, lost. After all, seeking stability had been a preoccupation during my youth. How to find balance in a topsy-turvy world—both the outer social and the inner emotional—was hardly a unique effort. And while I have not delved into the insecurities of our immigrant struggles and my parents' emotional instabilities brought with them from the Holocaust, the uncertainties embedded in these experiences underlie my own story. And maybe *because* I lived with unstable personal coordinates and boundaries, I became more attuned to similar dynamics in society at large. So, if parallels appear between my inner commotions and the crisis of culture-wide turmoil, I readily admit that subjective appraisals of my most intimate life have obviously influenced my larger worldview and undergirded my *who am I?* queries.

My dabbling in psychoanalytic theory (ostensibly about myth but in fact an exploration into my personal tumult) eventually emerged in two books devoted to Freud. He served as the foil of my excursion into the personal identity problem and, more particularly, the conundrum of self-knowledge. *Freud, the Reluctant Philosopher* (Tauber 2010) dealt with moral agency and *Requiem for the Ego* (Tauber 2013a) examined how the inner voice of self-consciousness was treated by Freud and his most prominent philosophical critics: Adorno, Heidegger, Wittgenstein, Lacan and his French postmodernist followers. The double entendre of “requiem” refers most immediately to the demise of the Cartesian ego, a conception of identity that had offered a triumph of certainty over skepticism and the authority of one's own self-knowledge. And more personally, “requiem” alludes to the dismissal of my own *who-am-I?* quandary that I had originally posed for myself in my youth. Hardly a unique inquiry as one matures, but the fundamental ambiguities obscuring this matter accompanied me well into adulthood. So, hidden beneath the layers of *Requiem's* philosophical discussions about the language of mental states lay undisclosed origins of

my own odyssey to decipher that enigmatic *me*.<sup>20</sup> And then another question arises: Why did it take so long to put those questions to rest, or even quieted? The obvious answer: Some inquiries require a lifetime to address, and even then, only partially.

Sorting out that problematic took me 45 years! The origins of a “mistaken” formulation—one coincident with the schematization characterizing so much of modernity’s program—in many ways established the later course of my intellectual life. Thus, the questions *Requiem* addresses had ample time to ripen. Indeed, it is well-matured, like savory cheese or good wine. I admit satisfaction that I finally rested some of the key intellectual problems I had set out to answer as I embarked for the distant shores of adulthood: balancing different epistemologies, sorting out personal values and ideals, and more specifically, mastering a philosophical literature pertinent to issues swirling around personal identity, both as a knower and as a moral agent. That story will be summarized in later chapters, so suffice it to note here that the polarities of science-literature (and, more generally, objective-subjective ways of thinking) schematized a highly complex intellectual conflict embedded in a history that resisted a simple chronology. And those issues were hardly restricted to academia. The disruptive division between the humanists and the scientists reflected broader cultural adjustments, and my own need to find some coherence echoed these larger changes. I suppose that I might have profited from internalizing Einstein’s wisdom: “No problem can be solved from the same level of consciousness that created it.”<sup>21</sup> He must have been referring to certain kinds of questions, not all, but clearly, I required a broadened and deeper understanding of the problem I had presented myself . . . and that took a long time to develop.

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20 Most directly, in *Requiem*’s chapter 2, I picked up the Freudian scenario as conceived by Horkheimer and Adorno and thus completed the unfinished business of the collegiate thesis.

21 This quote, like many of Einstein’s bon mots have various renderings, attributes, and generally lack a primary reference (EMRG 2009).

## Chapter

# 3

## Transitions

**M**edical school began in September 1969, between the August Woodstock love-in and the violent December Altamont Rolling Stones concert, where a Hell's Angels "security" guard killed a crazed spectator, while Mick Jagger sang "Sympathy for the Devil." I watched my world erupt. Hardly a participant, I self-consciously regarded myself a spectator who had been immersed in the Sea of Medicine. For relief I read surveys of Wittgenstein's thought and then trekked into his *Tractatus* (1981), only to find myself immediately lost. In part, I recognized that I was too preoccupied, and so I again veered away from philosophy. The tension between the rational and the poetic, between science and myth, lingered for a while and then the conflict subsided below the tide of a life in medicine. No time to synthesize, just excel! Ironically, considering the intimacy of illness and death, I, for the most part, pushed existential questions aside. Once I accepted the assignment of becoming a doctor, the professional course lay clearly before me.

Biochemistry, anatomy, genetics, microbiology, physiology, and all the rest of the basic clinical sciences were a continuation of collegiate didactics and have generally been lost to my working memory. However, the first anatomic dissection—the smell of the corpse and a new intimacy with the human body—is vividly recalled and not with pleasure. That was the moment of initiation. Once there, reality assumes a different timber. Death is real. Disease is real. The abstractions distil into the tangible. With the mystery suddenly clarified, one is never the same.

During the first two years of medical school, I swung between excitement and despondent depression. No ideas, not even concepts; instead, rote-mem-

ory and self-discipline to regurgitate the facts. Fortunately, I found firm footing in the clinical rotations during my third year of studies. Boredom and ambivalence were replaced with a prescribed path that would end with a professional identity. That course would at least provide the framework for all the rest. Indeed, who I would be assumed from. Each field (medicine, surgery, pediatrics, and obstetrics/gynecology) seemed to attract distinctive characters and my fellow students mimicked our mentors: the surgeons exuded confidence and bravado; the pediatricians were generally a joyful lot; the psychiatrists presented a mournful visage; the internists seemed the most thoughtful, and for whatever reasons, I gravitated towards them after discharging the other options I had seriously considered (psychiatry, pediatrics, and surgery).

Perhaps I wanted to share the scientific vapors they breathed, and I certainly marveled at the fund of knowledge required for expertise. I knew quite early that I would specialize and attempt to master a sub-specialty from its laboratory foundations to the therapeutics of patient care. But clearly, the science proved most appealing. After so many years of drudgery, finally arriving to the hospital and seeing the application of what I had studied proved exhilarating. Delivering babies, finding a tubercle bacillus when others missed the diagnosis, palpating an undiscovered breast mass, or resuscitating patients accentuated the daily excitement of simply being a member of the health team. While I excelled in this induction period, my clinical career soon proved subordinate to my life in the laboratory.

Immunology intrigued me more than any of the other basic sciences. Aside from the intrinsic appeal of the questions posed by immunity, I had a deeply personal investment in the subject. My mother suffered severe asthma, and from an early age I had been assigned to care for her during the all too frequent episodes of labored breathing. From the beginning of medical school, I harbored a strong interest in understanding the disease. It seems obvious that lodged in my psyche resided an obligation to address her affliction. Clinical medicine would not suffice. In my rich fantasy life, I sought a cure for asthma. So, my interest in basic research probably originates, at least emotionally, in the matrix of fearful memories that Lilly would someday stop breathing. My sense of responsibility to care for her, helpless as I was, remains a prominent childhood memory. Her struggles planted the seed that became my later career.

My earliest aspiration to become a doctor thus began with the wish to find better treatments for asthma. I must account this aspect of the quest for certainty—specifically, a triumphant therapy—as one of the key emotional components that drove my existential and intellectual battle against uncertainty.

What I repeatedly witnessed is well-described in an English textbook of medicine published at the time of my birth, just after World War II:

Often preliminary indications some hours beforehand, constituting the “asthmatic aura” include restlessness, irritability, mental exaltation, less frequently depression.... Such warnings are not constant... A feeling of suffocation [induces] great restlessness, anxiety and alarm. [As] the sense of suffocation increases, the patient sits up in bed or gets up to throw open a window and fixes his arms to bring into action all possible muscles of respiration. Respiration, although laboured and difficult, is often slow, inspiration being short while expiration is greatly prolonged. Both are accompanied by loud wheezing sounds, audible at a distance from the chest. The patient appears pale, but the lips are dusky and the expression is anxious and distressed. The jugular veins are distended and prominent. The accessory muscles of respiration are seen to be in violent action, notably the sternomastoids, scalenes and pectorals. The skin is moist and there may be marked sweating. The chest is much distended, and at each violent attempt at inspiration very little further enlargement occurs, while there is often sucking-in of the supra-clavicular and lower costal regions. (Price 1946, 1168)

Of the dozen or so of the listed therapeutic options (e.g., “smoking a cigarette or cigar” or “the application of a mustard leaf over the sternum and placing the feet in hot water and mustard”) none have survived. Corticosteroids and new broncho-dilators replaced such concoctions in the early 1950s. My mother, however, still suffered asthma attacks throughout her life, despite my best efforts.

When I finally joined the ranks of the hospital and witnessed my first patients, I was, of course, intimidated by the complexity of the diagnostic and therapeutic aspects of care. Once I learned how to navigate the clinic and became more comfortable as a doctor-in-training, a painful insight dawned: I found medicine enveloped in uncertainty. I learned, reluctantly I must add, that clinical medicine and the research upon which we acted, were beset by lacunae in knowledge and too often, error. My naïveté about the august standing of science in the clinical setting might have been somewhat checked if I had read Renée Fox’s sociological study of the research unit at the Peter Bent Brigham Hospital, where I later worked:

All physicians are confronted with problems of uncertainty. Some of these result from their own incomplete or imperfect mastery of available medical

knowledge and skills; others derive from limitations in current medical knowledge; and still others grow out of difficulties in distinguishing between general ignorance or ineptitude and the limitations of medical science. (Fox 1959, 28)

And even when research dispels some of the uncertainty, “these gains in knowledge frequently uncover new problems of uncertainty to be explored” (*ibid.* 29).<sup>1</sup>

Despite the “disregard for uncertainty,” the issues swirling around ignorance and ambiguity are worthy of serious study and acknowledgement (Katz 1984; Han 2021). Beyond the individual limitations of the physician, the science of medicine too often fails to provide definitive explanations, a state of bewilderment that interferes with patient expectations and trust. The source of uncertainty may be informational (probability, complexity, ambiguity) or conceptual indeterminacy (intractability, randomness, or chaotic behavior of the phenomena in question), which leads to irreducible doubt about diagnosis, treatment, and prognosis. Such limitations have direct impacts on how risk is assessed and, more broadly, how one deals with the opacities and complexities of decision-making in a context rife with such informational deficits. Strategies have been formalized to deal what heretofore has been taboo. Training in medicine traditionally focused on rectifying ignorance by gathering information, employing expert consultations, and searching the literature for guidance. Such an approach naturally follows from the scientific tradition in which discerning causal pathways leads to explanation and intervention. However, when accepting irreducible limitations, uncertainty must be ordered and accommodated. And here, psychological adjustments must be made in which humility and “epistemic maturity” develop (Han 2021, 113–31).

Students gradually evolved what they referred to as a more “affirmative attitude” toward medical uncertainty. They became more able to accept uncertainty as inherent in medicine, to sort out their own limitations from those of the field, meet uncertainty with candor, and to take a “positive, philosophy-of-doubting” approach. In clinical situations, they were more prone to feel and display sufficient “certitude” to make decisions and reassure patients. (Fox 1980, 7; quoted by Han 2021, 118–19)

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1 This study was conducted at the beginning of modern clinical research (1951–52), shortly after the controlled double-blind protocols were introduced. It is a fascinating glimpse into the medical culture of that time, whose impact on my own education I recognized very clearly because it was the world in which my own mentors had been trained.

Yes, but to what degree?

When confronted with the perplexities of causes and the practical aspects of care arising from inescapable puzzlement, I longed for an alternate epistemic universe. And while I knew that ambiguity is constitutive to research, the question then became to what extent I could tolerate a different kind of uncertainty. Unlike the clinic, I thought laboratory research was “manageable” because a directed question might be posed and answered by an investigation whose variables were controlled and methods devised specifically for that problem. A reckoning beckoned when confronted with what I called the “theatrics” at the bedside, where a performance of reassurance (benign) and assertion of professional dominance (decidedly less benevolent) repelled my idealism. So, soon after my first clinical rotations in medical school, my original motivations for a career as a physician left me wanting more. The question then became, what kind of *more* would satisfy?

#### TURNING TO RESEARCH

Regarding the intellectual reasons to pursue basic research, I thought the laboratory offered me the best way of capturing certainty. The drive for knowing something *as it is*, pictured science as a unique way of knowing, and from my perspective, an epistemological goldmine. Given my earlier collegiate attempts to decipher the appeals of science versus the humanities, the allure of facts had made powerful claims. The positivist conceit, naïve and ill formed, still resonated strongly with the times. Fifty years ago, objectivity and facts were given, their sacrosanct status unchallenged, and critical attention was limited to scrutinizing methods and analyzing data. And the success of modern medicine was evident to all. Indeed, I was hoping to join the elite corps of physicians pushing back the fog of ignorance. In short, I wanted to become a researcher and that required learning how to think, scientifically as it were. Later, I critically examined positivism (historically and philosophically) and came to a very different appraisal of my original understanding. However, that story would follow a long detour, one that included a successful career as a laboratory researcher.

I already knew by my third year of medical school that basic research would dominate my physicianship, and I also knew that I would direct those efforts to deciphering the pathology of asthma. Consequently, immunology had focused my interest, and I spent considerable efforts to read beyond the curriculum (Humphrey and White 1970). I was thus primed in 1972, during the first six months of my final year of medical school at Tufts University, to join a investi-

gative laboratory. I had been advised that K. Frank Austen at Harvard Medical School led one of the world's premier asthma research centers that focused on elucidating the mechanisms of inflammation that lay at the origins of allergy's pathology. My interview went well, probably because I was so enthusiastic and brimming with excitement, Frank recognized one utterly consumed with a "mission." I had found my "sweet spot," a research arena with vast possibilities coupled to a focus on a very personal goal—addressing my mother's recurrent affliction. Having been quickly accepted into this new world, I was first assigned the chores of making buffer solutions and preparing animals for dissection, and then on my own, developing a chemical assay for histamine, a well-known mediator of the allergic response. Every day was an adventure.

Soon, I was examining the effects of a new class of inflammatory mediators. Those experiments remain vivid in my memory and, despite the simple experimental design, the excitement of devising the study and obtaining results that could be interpreted thrilled me beyond any later research with which I would be engaged. Indeed, there in Frank's basement laboratory, I became a committed "clinical investigator," and so I would identify myself for the next twenty years.

I enjoyed early success and presented my findings to a plenary session of the national allergy meeting in Washington, D.C. The results were soon published (Tauber et al. 1973). My contribution became a small part of a much larger story that eventually led to a new class of drugs for the treatment of asthma.<sup>2</sup> I brimmed with pleasure. The excitement and success of my initial research experience set the course for my medical career.

However, that early foray extended well beyond helping to place me in the world of academic medicine. I learned a kind of rigor that would hold no compromise. Frank's laboratory meetings would last 5–6 hours and as each of us presented the data from the previous week or two, he would scrutinize and then ruthlessly criticize either the experimental design or the interpretation offered. He would then direct the next steps in the project, all the while scowl-

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2 My research demonstrated the effects of various prostaglandins on histamine release from mast cells, which was part of the larger explanation of what caused the broncho-constriction of asthma. I had proposed that the major mediator of this allergic response was a member of the prostaglandin family. While my suggestion was not followed-up in Boston, Bergström and Samuelsson at the Karolinska soon thereafter made the critical correlations and identifications that would reward them with the 1982 Nobel Prize in Physiology or Medicine. Later a new class of drugs were successfully devised to block the effects of the prostaglandin derivatives, the leukotrienes. The prostaglandin/leukotriene story as recounted by Frank Austen is particularly interesting in the context of my own minor participation (Austen 1989; Austen et al 2009).

ing with the impatience for which he was so renown. He has become a close friend, but at the time he intimidated me and my only solace as I endured those inquisitions was to hold fast his repeated admonition, "If you survive this lab, you will do well."

Following the completion of my residency training in internal medicine, specialization in hematology, and post-doctoral research on the biochemistry of inflammation, I opted for a career in academic medicine. In 1982, about to celebrate my thirty-fifth birthday, I was "full of beans." I left Harvard for Boston University (BU) to establish my own laboratory at Boston City Hospital and to assume leadership of its Hematology and Oncology Division. Over the next nine years, the laboratory grew into a large research enterprise with junior faculty, post-doctoral fellows, and graduate students supported by several NIH grants. By 1987, I had been promoted to full professorships in Medicine and Pathology, and my career was, by all standards, a resounding success. Indeed, I had fulfilled my initial professional goals. But with those achievements, I harbored reservations. While I discerned the character of scientific investigation and learned first-hand what entails the establishment of factual data and their interpretation, I also recognized that the original quest for certainty was left unfulfilled. What constituted a fact and how it was interpreted turned-out to be far more complex (and problematical) than I had thought before entering the laboratory.

The original questions underlying my intellectual interests in science remained languishing in hibernation. They re-emerged gradually in a transition that began with a sabbatical during my seventh year at BU. The stated rationale was to update my general knowledge of biology, but the source of that renewal came from an interest to examine the origins of my science. I had become an authority on the role of the human neutrophil (a phagocyte, an "eating" cell) in inflammation, but how my research fit into its larger history of science remained unexamined. Eventually, I would address the role of the phagocyte in the history of immunology, which provided me the opportunity to enter the halls of the humanities again. I slowly loosened the strings holding me in the medical school and on the Ides of March 1991, I resigned from my administrative positions at the hospital and began the formal transition to the Department of Philosophy at BU. My motives for the switch were clear, at least to me.

The concepts offered to explain inflammation and the clinical syndromes built on that science held a story awaiting further elucidation. Fulfilling the curiosity of how a few pieces of the immunity puzzle might fit together did not fulfill my larger intellectual goals. My direct research might have been enough

if I had been truly committed to discovering the “secrets of nature,” but I was not so inclined. Imagining the mechanisms of enzymatic action, securing the isolation of a protein, tracking the steps in a metabolic pathway, discovering chemical species mediating immune phenomena ... each of these investigative targets intrigued me, but they remained within their own restricted realm. I sought a larger conceptual stage. Wittgenstein captured the core issue for me:

I may find scientific questions interesting, but they never really grip me. Only *conceptual* and *aesthetic* questions do that. At bottom I am indifferent to the solution of scientific problems; but not the other sort. (Wittgenstein 1980, 79e; quote from 1949 notebook)

That recognition admitted a subversive thought: I could redirect 20 years of laboratory work towards other goals framed by the humanities. When this hitherto unacknowledged desire finally erupted, I faced a radical self-assessment that launched me on a poorly marked trail with many forks and twists.

The antecedents could have been faintly discerned in the earliest stirrings of my collegiate mind. I intuited that science might be understood with a deeper philosophy than I possessed. The basic orientation had been stated by Alfred North Whitehead’s *Science and the Modern World* (1925). As already mentioned, the opening chapters had profoundly impacted my thinking and oriented my future approach to characterizing science, which prompted me to taste the sweetness of a concoction that combined scientific research with my philosophical “temperament.” While I would become a biomedical scientist, other paths beckoned and eventually would be followed.

### A DAWNING

If I had to cite a moment when my transition crystalized, it would be during an exchange I had in the early 1990s, shortly before departing Boston City Hospital (now the Boston Medical Center) for the College of Arts and Sciences across town. During an Executive Committee meeting of senior physicians, I alluded to biomedicine as one of the great triumphs of the Enlightenment, but its promises could not be met if ... I don’t remember why I invoked this rhetorical flourish, but no doubt I was arguing a point of principle, which, in that setting, inevitably concerned the allocation of money and resources. In any case, I vividly recall the reaction. Side-stepping the issue at hand, the chief medical officer asked me with arched eyebrows, “What is *the* Enlightenment?” This was not

about Kant's original definitional essay, *What is Enlightenment?*<sup>3</sup> No, his seemingly simple query stemmed from utter ignorance. I ascertained he literally didn't know what I was referring to or why. Considering that the Enlightenment had launched the ideas underlying our liberal democratic politics, market economies, notions of progress and scientific inquiry, not to mention the fundamental embrace of rationality, my interlocutor's historical myopia truly astounded me.

And beyond our indebtedness to the ideas originating in the Enlightenment, apparently the culture-wide reassessment of those ideals similarly escaped my associate's notice. The political and social repercussions of the 1960s were still at hand. We lived amidst a cultural critique that seemed to encompass everything the Enlightenment represented. The philosophers, social reformers, and political theorists of the eighteenth century had been indicted for spawning ideas that had evolved into a vast array of political and social problems plaguing the twentieth century: totalitarian movements, the anomie and nihilism of mass society, the secularism charged with the loss of moral foundations, the universalism decried by multiculturalists, and the control of nature through science and technology lamented by environmentalists. How could one be ignorant of the current assaults on the intellectual foundations of Western societies? The cultural edifice built on the Enlightenment's endorsement of Reason had come under attack as the various critiques collected under the banner of postmodernism reassessed Truth and Objectivity. And with the value structure and parameters of knowledge acquisition buckling, the vapors of change had emerged from the cracks in the foundations of the West and only those utterly insensible to that ether could ignore that the 'established' order was being challenged at its very footings (Rasmussen 2018).

Dumbstruck, I just stared at him, but no one else in that august group seemed to have given his question a second thought. We quickly moved to the next item on the agenda. And as I sat there pondering our encrypted exchange, I could only think of the folk wisdom, "Ants on a raft careening down a river don't know they are about to crash over waterfalls; indeed, they think they are in control." I, for one, would at least assess the craft, measure the currents, and

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3 Kant's prize-winning essay, "What Is Enlightenment?" (Kant 1996a) has been generally considered a seminal statement of the Enlightenment rational ideal. However, James Schmidt (2018) has uncovered the status of Kant's essay at the time of its publication and argues that despite the enormous influence of Kant's presentation, the issue was hardly settled and if anything, his "answer" provoked controversy.

climb the mast for a better look around. That required extensive study and years of reflection.

Although my associate could not be counted among the erudite, I must admit that I could not have asserted intellectual sophistication beyond a general awareness of the many meanings associated with eighteenth-century thought and their revision. Moreover, I could hardly declare any specific knowledge about the development of the Enlightenment's new normative authority of reason — one that seemed so natural to “us” enlightened. I would eventually learn that what I had taken for granted, the sanctity of Reason as I naïvely understood its workings, was a contested issue in the eighteenth century and it hinged on the quest for certainty.<sup>4</sup> The questions swirling around this matter were hardly prominent in my thinking at the time, but eventually they emerged as a key theme of my later scholarship. Re-assessing and recalibrating Reason's station, its claims and limits, undergirded my re-education in ways I could not have anticipated given my own limited historical knowledge.

Perhaps I vividly remember this moment of incredulity because of events that soon followed. I am referring to the Science Wars of the 1990s, when Reason's standing would again become a topic of heated dispute, one pitched between “Old Guard” modernist defenders of science and their postmodern critics. As explained in later chapters, I joined this debate, one that forged my own philosophy of science and the interpretations that followed. And as I reflect, a more general point deserves emphasis. While I smugly thought my understanding far superior to my interlocutor's, I did not, indeed, could not appreciate the scope of my own ignorance. What I did envision, slowly and with growing awe, was the promise of continuing my education, one that closely followed Reason's fate from modernity's origins into our own era.

I had assigned myself this ambitious program in terms of the intellectual history that commenced, and in many ways focused on Kant. I had been led to him by Cassirer, whom I had read in college (Cassirer 1951). Kant not only organized the Enlightenment's pre-occupation with the role and basis of Rea-

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4 Reason, in its Enlightenment iteration, “emerged out of a process of contestations over the legitimate sources of certainty. This transformation [was] a result of protracted debates concerning the proper means of procuring true and certain knowledge. It was through the disputes about the proper criteria of truth and the legitimate sources of intellectual authority that a significant number of eighteenth-century thinkers came to embrace a new shared conception of reason, one that was defined by its limits as much as by its ambitions. The historical process of determining new criteria of truth and certainty is closely bound up with the heroic narratives that were formulated by Enlightenment thinkers and that remain at the heart of the founding myths of modernity” (Matytsin 2016, 10).

son, but he also served as the foundation of later nineteenth century philosophical developments that framed my scholarship in several respects. Studying Kant included his predecessors (most importantly Hume in terms of the skepticism Kant addressed) and successors, whose treatment of selfhood and subjectivism aligned most closely with my earliest interests. While I was most intrigued with Johann Gottlieb Fichte (Neuhouser 1990), my reading inevitably led to Hegel. I was especially attentive to how he influenced Schopenhauer, and then Kierkegaard and Nietzsche, who in turn led me to Adorno and Horkheimer and the French postmodernists (Tauber 2013a; Boucher 2018). As explained in later chapters, this huge swath of intellectual history was oriented by the question of identity. While I seriously studied Wittgenstein and the rise and fall of twentieth-century positivism, I spent scant attention to the trajectory of Kant's influence on Anglo-American analytical philosophy (Hanna 2001; Rockmore 2005), nor the pathways leading to logical positivism (Coffa 1991). And while I carefully examined the development of nineteenth-century bioscience, I did not attend to Kant's influence in this regard (Friedman 2006). Perhaps surprisingly (given my initial focus on science), Kant served most importantly as the lynchpin in organizing my thinking about ethics. As explained below, while I favored different formulations, he had set the terms of my own excursions in moral philosophy that, in turn, led me to ways of thinking about personal identity.<sup>5</sup> But that was only one aspect of my studies of Kant and the repercussions of his thought. In sum, suffice to note here that my philosophical education revolved around Kant, both in studies of those who preceded him (principally Descartes, Spinoza, Locke and Hume) and those who followed him in the nineteenth century.

Although Kant's influence is difficult to overestimate, the Enlightenment cannot be schematized solely in his image. Far from a homogeneous set of ideas or governing precepts, the eighteenth-century intellectual universe appears in its full diversity when regarded with a wider historical lens. Instead of some shared intellectual style of thinking or an underlying notion of freedom as espoused by Peter Gay, social and political practices both preceded and conditioned the ascendancy of the key thinkers beyond the Kantian circle—the Scottish (especially Hume and Adam Smith), the *philosophes*, Rousseau, and so on (Gay 1966; 1969; Lloyd 2018). This Century of Reason took form within distinctive cultures

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5 I was particularly interested in how his interpretation of cognition dealt with consciousness and the problem of selfhood under the guise of the ego. That story became a central element of my assessment of 'the self' and, more specifically, autonomy (Schneewind 1998). I would eventually reject his moral philosophy for a relational understanding as discussed below.

(i.e., English, French, and German), but beyond those differences, opinion varies in demarcating the Enlightenment temporally, with beginnings bleeding into the early modern period and extending well into the nineteenth century. With such definitional disputes, accompanying conceptual criteria also diverge. And with the development of Romanticism, picking at one issue or another—universality, rationalism, secularism, objectivity—led to a cacophony of “anti-Enlightenment” critiques, whether delivered in the nineteenth century or the twentieth. In short, with the loss of coherence and definitional parameters, “the Enlightenment” seems better defined as a “long” eighteenth century. So, when Dr. Oblivious queried me about “the Enlightenment,” he would have been perceptive in recognizing the complexity of such a historical construct.

In short, I discovered no formulas or definitions that captured some universal consensus. And of course, I failed to find any certainty in such discussions. Opinion would reign supreme, and I found myself making peace with tentative propositions coupled to a wide latitude of judgment.<sup>6</sup> While attempting to reconcile these multiple perspectives, I set forth with the enthusiasm typically associated with awakened youth. And as I recount this seemingly innocuous aside with my colleague, cast amid collegial chatter, I am struck with how his question had unknowingly touched the nucleus of the inquiry that would comprise my scholarship for the next 30 years. To the extent that postmodernism oriented my thinking about ways of knowing (and objectivity in particular), and the degree to which my sensibilities were indebted to the romantic reaction, understanding the Enlightenment and the rejoinders to it would become crucial elements in my renewed intellectual development. However, sitting at that executive table, I could only intuit that another territory awaited my explorations. That transition soon followed.

Upon leaving the clinic and laboratory I slowly exchanged my physician-scientist persona for the humanist professor of philosophy. The shift was designed to deliberately address my early ambition to find some integration of science and the humanities. It appeared that my own collegiate dilemma arising from a skewed view of bifurcated knowledge had internalized the “Two Cultures” as the problem of legitimating certain ways of knowing and discrediting others. Seemingly, I had to choose, but the spurious demand for making a choice between one versus the other proved untenable and unnecessary.

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6 A similar jumble of perspectives and interpretations marks the characterization of Romanticism, which is discussed in chapter 11.

Peaceful coexistence was also an option. However, such complementarity became apparent only later.

The explicit tension at play in culture-at-large was enacted within my own family. Deep divisions between father and son had neither been resolved nor, in some ways, recognized. Instead, I had effectively intellectualized a primordial contest of identification and understood a simple clash that found expression in my scholarship: Align myself with my father, the surgeon, a man seemingly governed by analytic logic and objective (in fact rigid) standards of right and wrong, or my mother, whose affection for the arts, intuitive wisdom, and fluctuating opinions, exemplified and, in many ways, enacted a jarring contrast of sensibilities. During childhood, this family drama played on several stages, upon which I had bit parts identifying with one and then the other.

The division played out in conflicted idealizations of ways of knowing. Growing up in the Sputnik era only strengthened the growing positivist ethos underlying the new educational emphasis on mathematics and science that exploded in the effort to beat the Russians to the moon. The educational message was hardly subtle: Positivism provided the standard of knowledge to generate “truth.” All other kinds of thinking were subordinated to the scientists driving their horses towards the finish line. With Daddy handing me the reins, I had become a jockey in that race, for better and for worse.

#### FACING THE UNAVOIDABLE, ETHICS

In the following chapters, I will describe the early scholarship that arose from a reassessment of the philosophy that had guided my scientific pursuits and then how my scholarship expanded to deal with related matters. But first, in the context of reviewing my medical career, I must pause to consider my physicianship beyond the laboratory. That proved to be the most immediate enactment of differing faculties of knowledge and of intelligence, namely, the scientific mind coupled to an empathy governed by different ways of knowing. As a biomedical investigator, I joined the chase with gusto; professional achievement was the goal, recognition the prize, and all of that was conducted with a focused commitment to the scientific ideal of objectivity and, in my case, dispassion. I had been told by my Chief Resident in Seattle, “Fred, you will be a Professor before any of us, but please don’t take care of patients.” He clearly saw blind ambition, but I could not appreciate his words of warning. After all, I had been told at Harvard, “Never allow patient care to interfere with your career.” That is, in retrospect, astounding advice, but at the time, I saw it as justified. After all, new ther-

apies or diagnostics served many more patients than any single physician could care for individually. That assessment was later modified, for once I crossed back to the realm of humanist practices and pursued philosophy, I consciously appreciated what I must have known all along: As a clinician, I could, in fact must, commit to both imperatives—scientific and moral.<sup>7</sup> The patient was not solely a scientific object, but a person suffering an illness. In my zeal for academic excellence, I had displaced the fundamental ethic of the clinic with the dominance of an attitude that subordinated the ethics of care for a positivist ideal. Again, an integration was required.

I suppose once I had been freed from the biomedical culture, another sensibility could take hold and assert its just claims. Obviously, good science and good doctoring are not mutually exclusive, but I had failed to find the proper balance. With my initial, tentative appointment to the Department of Philosophy at Boston University in 1991, I recognized that a critical part of my transition was to examine the ethics of the doctor-patient relationship. It had been the weak component of my own doctoring. In that examination, I achieved a better understanding of the larger context in which I played my clinical role. In short, while the philosophy of science would dominate my scholarship, attention to medical ethics comprised an important segment of my humanistic studies. My excursion would cover both the mind of science and the heart of care. A kind of recuperation guided my scholarship.

My effort soon focused on devising a philosophy of medicine and a reformed physician identity that would closely adhere to the realities and demands of the ordinary patient. Perhaps, because I had functioned for so long in a world of practical work and expectations, the ‘ordinary’ held great appeal for me. After all, the ethics of everyday life is the “place” in which medical ethics operates. The routine interaction between doctor and patient, not the dramatic life and death decision-making that dominates the thinking of bioethicists, defines the routine administration of care. The case studies filling ethics textbooks do not

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7 I have not carefully distinguished the use of the words, “ethics” and “morality” in this essay, because the terms are generally used interchangeably. Nevertheless, a rough distinction refers “ethics” to decisions based upon individual character and more subjective understandings of right and wrong, whereas “morals” emphasizes communal or societal norms. “[N]otions of what constitutes right or wrong, ideas of a substantial and knowable good, particular edicts or prescriptions, [take] the form of traditions [that are] often inscribed. . . . [We] will term this morality. This leaves the term ethics to describe that which exceeds or cannot be reduced to any particular conception of the good, any code, prescription or tradition” (Neill 2011, 11).

capture the moral dynamics of everyday treatment. Extraordinary decisions are not routine. An ethics of the ordinary is required.

I found my first bearings by reading Richard Rorty, Stanley Cavell, and Stanley Rosen who argued for a philosophy that attempts to capture “the elusiveness of the ordinary.” I was drawn to them, because they sought to replace a deconstructive skepticism with a constructive understanding of pre-theoretical, everyday life.<sup>8</sup> The key is to see that the ordinary may be explored in novel ways and that philosophy’s task is to recover human experience. They obviously differed as to how this goal might be achieved, but each shared the movement against philosophical formalisms. Instead of constructing a theoretical structure upon which to hang the messiness of the world, they wanted to grasp the everyday on its own terms. This approach to the prosaic attempts to recover philosophy’s original intent with an orientation that combines “theory” and “practice.”<sup>9</sup> I found no place better to meld armchair conjectures with real-life praxis than at the bedside.

In the medical setting, the ‘ordinary’ is lodged in the social character of clinical practice, where ethics is enacted to govern the behaviors and everyday exchanges of health care providers. And I asked, what is the bedrock of such governance? What is the initial act from which an ethics flow? There I would begin to devise a moral philosophy for medicine.

The routine care of the patient requires sensitivity to her needs. Highlighting moral awareness promotes behaviors that confer humane practices. My philosophy of the ordinary was to make medical ethics constitutive to the commonplace (Tauber 1995c). I promoted that understanding by an attempt to reform clinical education with a curricular requirement to teach ethics at the

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8 This ‘human-oriented’ tradition stretches from the ancients (e.g., Hadot 1995) to contemporary efforts to re-conceive contemporary philosophy from the search for universal truths to individual “ways of living” and thus capturing the ordinary (e.g., Groys 2012; Rosen 2002; Cavell 1988). These avenues of inquiry distinguish themselves from the currents of comment concerning philosophy’s transformation or even the “end of philosophy” (e.g., Baynes, Bohman, and McCarthy, 1987; Thomas-Fogiel 2011).

9 Whereas the pre-Socratics devoted themselves to theoretical speculation about nature, ignoring or belittling day-to-day concerns, Socrates tied together the theoretical and the practical as the two dimensions of philosophical reflection. In other words, for philosophy to attend to its full agenda, the theoretical and the practical must be joined, for in their sundering, the point of theory is lost. For Socrates, philosophy begins in the everyday, but the ‘Erotic ascent’ allows the enlightened to witness the perfect Ideas and return to the ordinary with an insight that helps direct human behavior (see Introduction, footnote 10). Accordingly, philosophy both transcends and remains deeply rooted in ordinary life, beginning and ending at the same spot, so to speak.

hospital bedside and in the clinic (Tauber 2002a; 2006a). While I thought my position was self-evidently correct, I discovered many disagreed. While I had erected a viaduct from philosophy to the patient, resistance to such a program revealed how far I had wandered off the beaten path. My proposal was rejected by the hospital's *ethics* committee: too much to ask of over-taxed doctors; no reward for the effort; and most saliently, they were swayed by a lawyer's warning, who effectively squashed moral sensitivity in the name of corporate concerns. On their view, I had become an eccentric.

This real-world outcome had been forecast a decade earlier on the occasion of my inaugural address marking my transition to the Department of Philosophy. I had reflected on the moral foundations of clinical medicine and directed my comments to what I considered the foundational issue, namely, how ethics grounded all of medicine—from the laboratory to the clinic to the bedside. I built my case on Emmanuel Levinas's relational philosophy that was just beginning to have an impact on American academia. I invoked his basic notion that the primary human response to another person constitutes the fundamental moral basis of ethics. Simply, *response* entails *responsibility*. I had adapted that seemingly simple idea of the unmediated primacy of the doctor-patient relationship as the basic formula for medical care. I maintained that no supporting argument or basis for my orientation was required, for the care of the patient was a given, the substrate, if you will, of the entire clinical enterprise. In 'philosophese,' I presented medical ethics as clinical medicine's ontology—its fundamental, basic reality. Moreover, on my view, medicine readily assumes the paradigmatic case for a Levinasian moral philosophy.

Accordingly, medicine, in its primary calling, became an ethical encounter in response to the need of the patient. That seems an unremarkable claim, but the caveat was less appealing to my audience: The science and technology employed by doctors are subordinate to this moral calling and, correspondingly, in service to the ethical mandate. In other words, the responsibility of the physician for her patient constituted the bedrock of clinical medicine and thus "medical ethics" as a specialty discipline was a symptom of a moral crisis. Every patient posed ethical questions and I argued that health care providers must be sensitive to them. In other words, I shifted the predicaments of current American health care from the usual economic and political discussions about financing and allocation of resources to the ethics that underlay those discussions. I called for far-reaching reform: rational rationing; accessibility for all; deliberate and scrupulous attention to ethical considerations, and above all, reform of physician training to re-emphasize the humane care of patients as opposed to

serving the techno-corporate minions so dominant in health care (Tauber 2002b). I wanted to dispel the pervasive ether of commodification penetrating every corner of the clinic. How? I called upon physicians to reconfirm their moral commitments as their highest priority. Simply, physicians must become patient advocates.

The presentation was received with polite comment, although my philosophical mentor, Burton Dreben, announced to all in the audience that I had traded being a physician for a metaphysician, a sorry state for a philosopher (and, although only implied, probably for a doctor as well!). As a devotee of Wittgenstein, metaphysics for Dreben was ‘nonsense.’<sup>10</sup> I sympathized with his objections, yet I held my position—medicine was at its base, ethical, and I would describe its philosophical structure accordingly. John Silber, a Kantian scholar and President of Boston University, politely listened, and then left with no comment. Levinas found no easy home in that hall.<sup>11</sup>

My lecture represented a “preamble” of sorts by pulling together several loose threads of thought that finally emerged a few years later in my *Confessions of a Medicine Man* (Tauber 1999a). I began composing that book at the same time I had adopted Levinas’s relational schema as a guide for an ethical medicine. Having collected several clinical vignettes dating from my childhood, I added poignant episodes from medical school and beyond. Each was emotionally charged to highlight the vulnerability of the ill. I noted that none of these stories fell within the academic saga, nor did they capture my professional acumen, but rather they outlined an ethical portrait of professional perfor-

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10 The term, “nonsense,” when used by analytical philosophers does not imply stupid or uninformed, but rather serves to highlight a misdirection for philosophical discourse. Wittgenstein had made the term famous by assigning it to ethics, aesthetics, and subjective states that he argued cannot be analytically discussed and, by falling beyond the limits of language, they become discourses without meaning.

11 My lecture echoed Jewish ethical themes, and I later wrote a paper describing Levinas as a rabbi, not a philosopher (Tauber 1998). I had been ‘introduced’ to Levinas by my friend Moshe Idel, the great historian of Jewish mysticism. We were browsing at the Harvard Book Store in Cambridge in 1991, when I chanced upon *Totality and Infinity* (Levinas 1969). When asked about the work, Moshe asserted with great confidence that Levinas would soon capture the American academic scene. I was doubtful, but Levinasian ethics soon dominated my readings, much to my benefit. The secular ethicists by and large ignored his Talmudic writings and, from my perspective, missed the wellspring of his thought. In Levinas’s philosophical writings (he was a student of Heidegger), time is the critical framework of *being* and in my analysis, I drew a direct link to the theological position that implicitly underlies the ethical construction Levinas composed. Making the Jewish connection through Talmudic sources was a particularly satisfying exercise.

mance—sometimes flattering, too frequently, not. Although I had provided an honest glimpse into my clinical career, I found myself unable to assimilate or expand these short tales into a larger work. I put them in a drawer and hoped that someday they would take form as part of a book that would reflect my course from ambitious scientist-administrator to a more compassionate physician-philosopher. Still in the confusions of that change, I could not find my theme, much less a synthesis. And then, in 1997, I picked up the incomplete manuscript and wrote an ode to the role of the physician as a responsible, relational figure, compassionate and empathetic. It emerged as a confessional of sorts, or perhaps a rebirth.<sup>12</sup>

*My Confessions* makes a forthright declaration: My own professional hubris clouded the entrusted confidence of my patients. This compromised moral posture obscured my priorities as a physician and the remedy demanded renewed activism—invigorated efforts to protect “clients” within the context of a corporate market organized around profit. Without such promotion of patient interests, clinical medicine could not retain its core mission. Furthermore, I suggested a revised view of patient autonomy. Rather than abandoning the patient to her “free choice,” physicians must offer pro-active guidance, ever mindful of paternalism. *Patient Autonomy and the Ethics of Responsibility*, the sequel to *Confessions*, made this advocacy position explicit and buttressed my thesis with philosophical supports (Tauber 2005a).

Whereas *Confessions* was personalized and often lyrical, I wrote *Patient Autonomy* as an academic treatise. I took point blank aim at the key precept of contemporary American medical ethics, the priority of patient autonomy. That tenet derived from the world of judicial rights-based principles, and I disputed that extrapolation from the judicial-political domain to the clinic. The argument rested on three legs:

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12 The subtitle of my *Confessions: An Essay in Popular Philosophy*, proved to fulfill its mandate. It has been the most widely read of my work, having been awarded prizes and translated into Korean and Spanish. That popularity attests to the abandonment of academic pretense as noted by an anonymous reviewer, who commended my heterodoxy: “Pick up a contemporary philosophy journal and you will see a uniform type of philosophical writing. As a rule, English-speaking philosophers write essays. Such an essay is as recognizable to philosophers as a scientific article is to doctors. Even so, the notion that philosophy should ideally be written in the form of the scholarly essay is a little odd, given the history of philosophy. Plato wrote dialogues. Butler wrote sermons. Sartre wrote novels and plays. Wittgenstein wrote aphorisms. Yet the prospect of an American philosopher earning tenure today by virtue of aphorisms or plays is about as likely as earning tenure for haikus or dessert recipes. Yet, why would philosophical ideas be best expressed in the form of the essay, much less the detached, humorless, argumentative essay that most philosophy journals publish?” (Anonymous)

1. Patient autonomy was a conceit, even a deception for the most obvious of reasons. Patients had neither the knowledge, nor the cognitive neutrality to make rational decisions when under the stress of illness. "Citizen" did not follow some simple translation into "patient," because the unmet requirement for restricted knowledge and the dependence on professional experience and judgment precluded true autonomous choice. Patients routinely, and happily, delegate their autonomy to the physician, albeit with an informed understanding. Thus, the extrapolation of the judicial model of citizen autonomy simply did not apply.
2. Given the unfortunate shift of the doctor-patient relationship that had occurred as a result of the ascendancy of American corporate health care, the physician now had divided loyalties. As an employee, certain obligations accrue, and as a care giver, the patient demands a different set of responsibilities. The two duties did not necessarily coincide or even overlap. In this ambiguous moral setting, the protection of the patient traditionally relegated to the doctor-advocate is jeopardized, because putative patient autonomy displaces that obligation.
3. Respecting individual dignity is a fundamental precept of an ethics of care, and the practical task of heightened moral vigilance must become part of ordinary practice. I maintained that the physician's primary responsibility could only be the patient and thus moral cognizance must be paramount. This required a deliberate ethical appraisal of each case. Otherwise, the central ethical issues would remain hidden from scrutiny.

In sum, medical ethics, based on patient autonomy, for better and for worse, is only the initial answer to the challenge of preserving patient dignity. On this view, the sacrosanct status of patient autonomy required redress.

I began by characterizing "autonomy" as a derivative construct of a particular understanding of selfhood. With different conceptions of the self, different notions of the patient identity develop. The individualism of the social worlds, the judicial and political definitions of citizen autonomy, and the informed consent of the patient in the clinic simply did not coincide. And more to the point, the identity of the physician required a relational understanding that, at least in the context of moral considerations, left atomistic conceptions curtailed. I reviewed the historical process leading to the present hegemony of autonomy, and offered, instead, a feminist relational view of ethics, a so-called "ethics of care," where the primacy of responsibility found its rightful place

(Gilligan 1982; Held 2007). In discarding the judicial model that employed legal precedent of case law to formulate medical ethics, I would substitute active dialogue and negotiation of patient wishes with the guidance of professional judgment.

Because I knew medicine requires its own philosophy (namely, one built within its own concerns), I followed *Confessions* and *Patient Autonomy* with a series of papers that expounded “moral-epistemology” as a guiding philosophy of medicine (further discussed in chapter 12). I proposed how both domains of medicine—moral and scientific—might achieve better parity (Tauber 2005b; 2006b; 2008a). For me, a self-conscious awareness of the moral dimension of care, coupled to scientific competence, served as the twin criteria of the Physician for the New Millennium. Quite obviously, I was again engrossed in building a bridge between science and the humanism that I had abandoned long before.

These writings brought together my clinical experience with a heightened awareness of how barren the scientific attitude had become when disjointed from a self-aware commitment to the patient. Dealing with *disease* (a pathological condition) and *illness* (the patient’s suffering) demand different kinds of intelligence and sensibilities. Thus, in sorting out a philosophy for medicine, my scholarship served to bridge the conflicting demands of my professional life—the empathy of care with the analytics of investigation. Understanding the apparent dichotomy and finding its resolution in the moral agency of being a physician effectively resolved the long-standing tensions of my youthful identifications: On my view, ethics was primary, while the “business” of medicine (diagnosis and therapeutics) was in service to the fundamental calling of assuming responsibility for another. And with that recognition of an ethical imperative, I reflected on my youthful quandaries in a new light. Upon awakening each morning, I never pondered if Dr. Alfred Tauber would have the prospect of doing something(s) worthwhile, meaningful, significant. Caring for another posed no existential doubt as to the value of my chosen role as a physician, whose commitment to science taught and then demanded adherence to a strict ethical code: honesty, open dialogue, recognition of fallibility. Consequently, medicine became my moral calling, and science taught (and enforced) efforts to think honestly with deliberate rationality, while factoring in the variables of diverse emotions and bias.

On this integrated view, clinical medicine combines different ways of knowing. Although I entered the profession as a way of addressing an epistemological problem, it became a way of living, a moral calling clearly articulated. Obvi-

ously, I had become a doctor quite different from the model I had embraced as a young man. In multiple ways, I had been liberated and although the word has been abused, I felt *authenticated*. While I terminated the active phase of my medical career in 2003, when I meet a stranger and the question of profession is asked, I usually say “physician.” My white coat still fits me best, although what I mean and what she understands are, undoubtedly, quite different.



## Chapter

# 4

## Rewriting Immunology

**W**hile my writings in medicine's moral philosophy represent an important aspect of my quest for linking "two ways of knowing," the following chapters focus on the deeper epistemological challenge of exploring science's philosophy understood not as a technical enterprise, but rather as an interpretive venture. That transition emerged from the unrequited desire that had lain in hibernation since college. While I had successfully conducted laboratory research, I had yet to address what I called science's intellectual footings. Redirecting my interests began from an awakened awareness of an agenda yet unmet.

Part of my disquiet resulted from a change in professional assignments. Not surprisingly, and typical of academic ascendance, my professional activities moved from the laboratory bench to the office, where I wrote grant applications and research papers, leaving the day-to-day experiments to students, technicians, and collaborators. As a result, the intimacy and excitement of doing the "wet-work" myself shifted to others, and with that shift, the concentration and innovation required for success waned. Furthermore, the energies that launched my research career were siphoned off by other administrative responsibilities. Dissatisfaction set in as I grew weary of writing grants and addressing the ordinary frustrations faced in administering a large laboratory. Thus, my original focus on science was first blunted and then diverted. My mind wandered and peeking out of the clouds of frustration a vision emerged. As already mentioned, during my sabbatical, instead of renewing and expanding my inves-

tigative expertise, I paused to draw the Big Picture of my science that had so dominated my life's work.

I sought a new perspective on science at three levels: First, I wanted an update of biology related to my laboratory studies, more specifically, genetics and molecular biology. Whether I thought this would be a painless way of interjecting new methods into my research I cannot say, but I do know it was the easiest justification for a rejuvenating reprise from the laboratory. Then, in the early stages of my review, I soon focused on reacquainting myself with evolutionary biology, both in terms of learning about contemporary advances as well as exploring the Darwinian historical roots. That interest derived from a curiosity about the origins of immunology, and, more particularly, the genesis of modern concepts of inflammation. Finally, as the historical studies developed, philosophical considerations entered the analysis. Note, I thought the scientific agenda was primary, with the humanistic questions subordinate to the more immediate cluster of issues relating to my work as a bench scientist. So, the sequence of my transition began with a contextualization of my active research within a larger biology from which historical questions emerged and then a philosophical exposition developed.

When I began the process that would eventually lead to closing my laboratory (1995), I had no markers for the road ahead, nor, for that matter, a specific goal. What I did appreciate at the time appeared only in vague outline. Because my philosophical interests still lay dormant, I initially sought scientists, not historians, to help guide my early scholarship. On that basis, I sought out Lynn Margulis (1938–2011), who was just leaving Boston University for the University of Massachusetts, and Dick Lewontin (1929–2021) at Harvard, two of the most influential evolutionists of the time. They encouraged me to pursue my interests and eventually became, with my contemporaries, Scott Gilbert (1949–), a developmental biologist at Swarthmore, and Sahotra Sarkar (1962–), a young philosopher of science at Boston University, an informal brain trust and collegial friends. The members of this quartet were linked by a general opposition to viewing organic processes as analogous to simple machines. Instead, they embraced approaches that sought to understand the dynamics of complex interactions, an attitude that reached from evolutionary mechanics to organic development. Sarkar and I allied in criticism of the reductive explanations promoted by molecular biologists, while I followed Gilbert's expansive understanding of development conceived through an integration of multiple levels of analysis from gene to environment. Our various exchanges prompted me to advance my intuitions about how biological systems could only be understood by discerning

the dynamics of complex interactions and integrating of multifold levels of analysis. In short, the focus of reductive biochemical research that held me in good stead in the laboratory would be discharged with a broadened vision of *life*.

Building upon these rich intellectual companionships, I proceeded with an ill-formed historical exploration of my own research field. That became my immediate target, but a much wider vista soon beckoned, one that I hesitantly approached, apparently ignorant of my deeper motivations. The stirrings for a philosophical study of science began with the recognition that my narrow laboratory investigations rested within a much larger biology, whose origins only appeared in vague outline to me. I surmised at the time that to better appreciate both the evolution of my own research and its conceptual context I would need to understand its larger historical framework. So instead of departing for a molecular biology laboratory to learn new methods, I went to Widener Library at Harvard and explored the origins of my discipline.

Libraries hold a romantic fascination for me. I have difficulty pinpointing their appeal, but I clearly remember the first time I visited the Library of Congress for a student assignment in high school. Dr. Marion von Doenoff, my United States history teacher, gave each of her students a scholarly paper that we were instructed to critically examine. Our assignment was to check each reference to determine if the historian had used resources accurately and had interpreted the findings appropriately. I chose a paper on Mark Twain's *Huckleberry Finn* that placed the novel in its social context—not that of the antebellum South, but rather the reconstruction period in which the book had been written. I went to the Library of Congress on many successive Saturdays, and while finding no errors, I did learn what constituted an important part of a historian's work, and, more generally, the immense resources available for serious study. The reading room, magnificent in every scale, delighted me and the contentment found there is always rekindled when entering a similar hallowed hall. Widener Library held me in the same cordial embrace. And so, I began my odyssey.

Like most scientists, my knowledge of the history of my research field was limited to perhaps the preceding five years of joining the guild. The concepts offered to explain inflammation and the clinical syndromes built on that science held a story that remained confined to published results in scientific journals. Interpretive commentary as to how a model was developed or discussions of the technical or theoretical limits investigators faced rested well beyond the typical horizons of discussion. Instead of a critical review, I relied on my men-

tors to know the earlier results well enough to judge the relevance and experimental standing of our own findings and to put them into the larger narrative to which we were contributing. The work required for formal doctoral dissertations usually included a more thorough historical review, but in the hospital setting, where research was taught primarily as an apprenticeship (as opposed to a scholarly exercise), I forfeited that introduction. Instead, I read research overviews that provided a larger perspective on recent findings, usually intended to support the authority of the author's investigative contributions and their interpretation. Understanding how a few pieces of the puzzle might fit together was really all I gleaned from my direct research.

As already explained, I sought a bigger stage upon which to work. The philosophical issues pestering me remained unaddressed. Restiveness set in. I had unfinished business, and my professional identity seemed too restrictive to respond to another calling in a serious way. And so I picked up the lost trail and began my excursion into the humanities by exploring the historical roots of my scientific expertise.

The biochemistry of inflammation defined my laboratory research and within that large domain, the phagocyte ("eating-cell") became my model system. The neutrophil, a member of this cellular family, circulates in the blood and wanders through the tissues seeking targets to literally ingest. It represents the first line of defense against pathogens, but phagocytes are also active in other inflammatory roles such as wound repair and scavenging weak or dying cells. These diverse roles were first described at the end of the nineteenth century by Ilya Metchnikoff (1845–1916), an embryologist who worked in the wake of Darwin's *Origin of Species* (1859). In my adolescence, I had read Paul de Kruif's *Microbe Hunters* (1926), where Metchnikoff is portrayed as a "mad Russian," a fiery figure whose polemics with other early immunologists and microbiologists was part of the common yore of the discovery and early victories over infectious diseases. *Microbe Hunters* presented the heroic struggle against invading microbes as the triumph of idealistic scientists and the brilliance of their ingenuity. That I remembered him so vividly from de Kruif's description testified to both Metchnikoff's charisma and to the dramatic portrayal.

At the same time, and in collaboration with de Kruif, Sinclair Lewis published the loosely historical novel, *Arrowsmith* (1925). I had also read this book as a youngster and recalled a vividly imaginative picture of the fight against infectious diseases. Martin Arrowsmith, a high-minded investigator (based on Félix d'Herelle and Jacques Loeb, each of whom I would later study), discovers

phage (a virus that attacks bacteria) and faces an outbreak of bubonic plague. Arrowsmith's trials, tribulations, and ultimate assertion of an authentic commitment to science became one of the great testimonials to a vision that broadly appealed to popular fantasies about biomedical research. Metchnikoff easily fit that gallant mold, but after a decade in the laboratory I knew science did not work as depicted by de Kruif and Lewis. Metchnikoff's story was undoubtedly more complicated, and interesting.

## THE ORIGINS OF IMMUNOLOGY

A new formulation of the relationship between host and contagious disease was formally stated in 1883 by Metchnikoff integrating three disparate and thus far unrelated research findings: 1) bacteria as etiologic agents of infection; 2) the nature and role of inflammation, and 3) the place of evolutionary principles as applied to physiology. The germ theory of disease was established by Louis Pasteur and Robert Koch by the mid-1870's, but there was no theory akin to our modern notion of immunological defense. Pasteur as late as 1880, while developing vaccines, believed that immunity was conferred by exhaustion of essential nutrients, analogous to the test tube model systems of bacterial growth. Koch was not even interested in the host response, confining himself to the establishment of bacterial etiology. Inflammation was generally viewed as a deleterious process, whose various components were regarded as reactive, not defensive. The white cells, already identified as amoeboid phagocytes, with purposeful movement and containing bacteria, were dismissed as transport vehicles for the pathogens, with no protective function hypothesized. In short, how bacteria might cause disease, and more fundamentally, the relation of host and pathogen from a physiological (organism) or evolutionary (species) perspective was left mute.

At this early stage of immunology, Metchnikoff proposed that phagocytes derived from the mesoderm of developing embryos were analogous to those seen in primitive organisms, where these cells served a nutritive function (feeding compatriot cells with other functional duties). In higher animals possessing a digestive cavity, he proposed that phagocytes assumed new functions as they relinquished their original digestive purpose. He extended the metaphor of "eat or be eaten" to a dedicated function of these cells: wandering through the body they recognized intruders and devoured them. He viewed the process as a general restorative mechanism, which he called "physiological inflammation."

According to Metchnikoff, the phagocytes in protecting the host, recognized the *Other* in every form—from senescent, malignant, damaged, or other-

wise diseased cells, to foreign invaders. The latter became his focus only as he was drawn into vociferous debate with “pathologists” (microbiologists) and early immunochemists, who were by then fully engaged in establishing the physics and chemistry of life processes (Tauber 1991a). The issue focused on what they saw as Metchnikoff’s portrayal of the phagocyte as an autonomous agent exhibiting independent volition. Basic phagocyte functions—their movement (chemotaxis), eating (phagocytosis), and killing—seemed to be governed by their own decision-making analogous to humans engaged in combat. The warfare metaphor was already widely used as a Darwinian trope, but when directly applied as a scientific explanation, Metchnikoff’s critics served him with an indictment of vitalism.<sup>1</sup>

Metchnikoff’s orientation put him in collision with those studying chemical mechanisms to explain immunity. They were preoccupied with exorcising mysterious, unaccounted forces that would compromise their aspirations for establishing a physics of life. Metchnikoff became a focal point of dispute because he described the phagocyte as exhibiting autonomous behavior. The cells seemingly ‘knew’ where to go (chemotaxis) and once at the site of damage or invasion they undertook the ‘responsibility’ of protecting the host organism by eating everything in their target range. The chemists would have none of it and in criticizing the absence of defined mechanisms they sought a pre-arranged chemical basis for host defense. They soon identified antibody or complement as chemical anti-bacterial substances and by 1908, when Metchnikoff shared the Nobel Prize with Paul Ehrlich (the leading immuno-

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1 Vitalism asserted that life processes possess properties irreducible to physico-chemical analysis. Accordingly, “living organisms are fundamentally different from non-living entities because they contain some non-physical element or are governed by different principles than are inanimate things” (Bechtel and Richardson 1998, 639). Vitalism was defeated by three key findings: 1) chemical analyses of metabolism; 2) the conservation of heat in biological processes, and 3) Pasteur’s demonstration that life did not spontaneously arise from some non-descript vital force. Although vitalism had seemingly been put to rest by the end of the nineteenth century, it remained a minor discordant theme into the early twentieth century, primarily in developmental biology. Georges Canguilhem was the last major expositor of vitalism, whose key essays are collected in Canguilhem 2008. For historical perspectives, see Mayr 1982; Bedau and Cleland 2010. Metchnikoff resisted the vitalism charge, but his vision of life seemed to echo what Henri Bergson called, *élan vital*, a life force supervening over biophysics. Bergson, in his *Creative Evolution* (1907), explored the question of self-organization and spontaneous morphogenesis as unexplainable in terms of mechanical processes. The seemingly volitional autonomous behavior of the phagocyte was a case in point. The publication date of Bergson’s influential work is noteworthy since Metchnikoff published his own parallel musings about human life and health at the same time (Metchnikoff 1907). Thus, each contributed to, or perhaps drew from, the Parisian *Zeitgeist* of the period.

chemist of the era), the course of twentieth-century immunology was set on defining the chemical basis of immunity.

In fact, Metchnikoff was forced to follow the chemists' lead. In his magisterial account, *Immunity in Infectious Diseases* (1905), he cited the first studies of the biochemical basis of bacterial killing by phagocytes. He noted that following active ingestion, a drop in pH within the digestive vacuoles correlates with bacterial destruction that he thought were enacted by intracellular enzymatic "cytases" (Metchnikoff 1905, 175–206).<sup>2</sup> And by the time he died a decade later, characterization of "endolysins"—lumped together as unspecified enzymes and bacteriolysins of uncertain origin (i.e., endogenous serum or phagocyte-derived)—were subordinated to the characterizations of soluble serum factors (Zinsser 1914, 296–310). And there matters stood as the focus on acquired immunity—the specificity of the antibody reaction—dominated the first decades of the twentieth century and effectively displaced interest in so-called "natural" immune mechanisms (Mazumdar 1995; Silverstein 2009).

However, the most important difference between Metchnikoff and his critics lay not in the mechanism of immunity, but rather in the basic conception of the organism. The animal was generally accepted as "given," that is it had an identity determined at birth. This became a product of a genetic endowment in the early twentieth century, but even at the time of Metchnikoff's early work, immunology had been organized around a conception of the insular organism, whose parameters of pre-established identity determined whether a substance would be "tolerated" or "attacked." This warfare scenario pitted the self (typically an infected patient) against invaders—pathogens of all kinds. Infectious disease afflicts an individual, a threatened *self*, and immunity is thus understood as the protective mechanism of that agent. The strength of the "host defense" orientation resides in a long and prominent clinical history in which microbes must be combatted, neutralized or killed. This dynamic struggle defines a biology of competition in the war of survival. The historical development of immunology evolved from this initial orientation and eventually the self (patient)/nonself (pathogen) dichotomy became the theoretical scaffolding of the discipline.

According to the dominant current theory, immune functions are still organized around this central idea, namely, the immune system (normally) ignores the host and attacks the "other." So-called autoimmune diseases were predicted at the dawn of immune theorizing, but not formally identified as resulting from misdirected immune reactions against host tissues until the mid-twentieth cen-

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2 For a summary of Metchnikoff's biological theory see Tauber 2003.

tury. Sir Macfarlane Burnet then developed the full implications of such aberrancies (Burnet and Fenner 1949). He posited that immune reactivity was based on protecting the “immune self,” which represented the animal’s identity defined as a “negative” space: That which was ignored constituted the *self*, a sanctuary free of immune reactivity, the *other* was the universe of susceptible immune targets. Note, Burnet configured immunity fully analogous with human identity: There is *me* and there is *you*, immunity discriminates this dichotomy.<sup>3</sup>

Given the commitments of immunology to clinical pathology, models of immune function built upon this basic premise of self/nonself discrimination were easily accepted. My analysis described the evolution of this idea from the birth of immunology into our own era. What began as a historical account soon became a critical analysis that eventually deconstructed Burnet’s self/nonself organizing principle. The commonsensical construction of “self” versus “non-self” (the ‘other’) depended on defining the immune self, which in turn organized immunity in terms of on/off activity—quiescent against host while assimilating the beneficial and rejecting the deleterious. The model, simple in design and evocative of identity as generally understood, proved too simple.

In the next chapter I describe how my critique took form, so suffice to note here that the immune self as originally conceived ignored how an organism’s identity changes over time as immune reactivity is altered by experience and setting. Moreover, autoimmunity is a natural activity of the immune system as it surveys the integrity of host constituents; designating self and nonself in such scenarios obscures clear differentiation of the self from other (Tauber 2015). Finally, with the frame of reference enlarged to consider the organism’s interactions with its environment, the self/nonself formula is most challenged. The normal exchange with the environment (external and internal) allows for assimilative (eating, breathing) or tolerant responses that are crucial for the animal’s economy. In other words, immunity must discriminate “good” non-self from the “bad,” and this too may fluctuate with the history of the organism and the ecological circumstances at the time of encounter. There is no sharp opposition of *me* (self) and *you* (other). Instead, there is an active interchange that may result in rejection or tolerance, and that dynamic is determined by previous immune “knowledge” and the environmental conditions the organ-

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3 Burnet’s theory was eventually accepted as the clonal selection theory (Podolsky and Tauber, 1997). For a discussion of the origins and development of Burnet’s hypothesis, see Tauber 1994a, 81 ff.; Tauber and Podolsky 1994; Crist and Tauber 1999.

ism encounters at a given point in time.<sup>4</sup> This view suggests that immunity goes beyond a simple on/off mechanism to regulate organismal identity.

While selfhood proved to be a powerful idiom, I recognized that the on/off scenario functioned, at best, as a metaphor. And when metaphors become confused with the phenomenon itself, contortion of theory results. I struck at the very foundations of the discipline: Selfhood could not serve as the basic conceptual schema of immunology. Yes, the immune system mounted a defense against pathogens, but this was not its fundamental characteristic. The basic problematic underlying all immune phenomena concerned how the immune system established the very identity in question. In other words, I argued for subordinating the integrity of the organism (the 'responsibility' of host defense) to the deeper challenge of defining that which must be identified, i.e., the *what* to be defended. So, *integrity* became secondary to *identity*.

That argument took form by placing Metchnikoff's theory of immunity into the contemporary context. My study began as a collaboration with Leon Chernyak in 1987. Leon, a Russian émigré in retreat from driving a taxi, was working in my laboratory. Having begun the history of immunology project, I had just identified Metchnikoff as my protagonist. And with that focus, I soon bumped up against an impenetrable language barrier. I turned to Leon for assistance. He became a perfect collaborator. He had the language skills I lacked, and, with both a medical degree as well as a doctorate in philosophy from Moscow, he possessed the intellectual talents to mobilize faculties that were being wasted in ferrying people through Boston traffic or doing biochemical assays. With his medical and philosophical background coupled to a prodigious intelligence, I hoped we might form a synergistic team.

Leon quickly accommodated himself to a new career opportunity and began translating Metchnikoff's key scientific texts for me. This effort required a thorough examination of the early works, and we concentrated upon those to track the progression of Metchnikoff's thought from the earliest stirrings of his revolutionary hypothesis of immunity. We originally framed our investigation historically; it soon became a philosophical study that established the bridge upon which I walked from the laboratory to the humanities.

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4 For example, 1) by the 1940s, animal studies had shown that stress alters the immune response that in turn determines the outcome of exposure to pathogens (Dubos 1966); 2) the exposure to environmental pollutants exacerbates asthma (Neffen 1999); 3) the COVID-19 pandemic showed how co-morbidities affect morbidity and mortality by altering the immune response (Ejaz 2020).

## METCHNIKOFF, THEN AND NOW

Metchnikoff's theory eventually became a template for my larger consideration of identity as the central theoretical problem of immunology. He had pushed against prevailing ideas: Instead of the organism regarded as stable and insular—and thus possessing a defined identity—he offered an altogether different conception. Animals continue to re-confirm (and in a sense, reestablish) their identity in response to challenges throughout their lifespan (injury, infection, malignancy, etc.). For Metchnikoff, organismal identity is a dynamic process with no endpoint, as opposed to some static state. And that activity, endogenous and ongoing, resulted from what he thought was the basic “disharmony” of life.

According to Metchnikoff's “phagocytosis theory,” organisms exist in a state of *dis*-equilibrium, and life processes are directed at achieving harmony, which in his schema, is an unachievable ideal state (Tauber and Chernyak 1991; Tauber 2003a). Inflammation assumes the role of mediating the restoration of a more harmonious state and thus it is “charged” with regenerating tissue loss, repairing injury, and rejecting infectious organisms. Note, ideality serves as a force pulling the organism's development (even in adulthood) to a more harmonious condition. This formulation is quite different from the prevailing theory proposed by Claude Bernard a generation earlier, namely, that the regulation of homeostasis (an already optimized physiology) set the parameters of physiological functions. In other words, for Bernard, harmony was the steady-state condition, whereas for Metchnikoff, disharmony was the normal condition and consequently the organism must constantly strive to achieve some optimal coherence and function among its competing components.<sup>5</sup> This general process he called “inflammation.”

Inflammation is a complex physiological response that includes not only immune responses but also associated functions such as dilation of blood vessels, fever, swelling, and repair of damaged tissues. Metchnikoff aggregated these various properties as part of a single physiology by deducing that these diverse phenomena represented aspects of a general reaction to damage, whether invasion by a foreign species, internal injury, or transforma-

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5 The idea of “normal” struggle, now turned inward and causing disharmony, reflected a prominent Nietzschean theme so prevalent at the time (Tauber 1994b). Other scientific sources, most prominently Wilhelm Roux and Rudolf Virchow, are reviewed in Tauber and Chernyak 1991, 118–23; Heams 2012; Bahar 2018, 51–64.

tions.<sup>6</sup> And this physiology, when broadly conceived, orders and thereby corrects a new insult or disorder of any sort (burns, trauma, malignancy, dead cells, etc.). Metchnikoff was an effective popularizer of his theory and in a celebrated series of lectures, he dramatically reported early observations that included the response to thorns placed into the transparent bodies of star fish larvae, where phagocytes subsequently congregated around the intrusive body and then devoured it. He saw a similar process in the tadpole, where phagocytes literally ate the tail to transform the juvenile into the adult body form (Metchnikoff 1893; 1905).

As Metchnikoff was developing these ideas, the discovery of infectious diseases hit the headlines, and by 1882, he had thrust his notions of harmony/disharmony schema into the debates about the nature of immunity. For him, immunity mounted against pathogens was part of the general inflammatory process that addressed the effects of disharmony (in the case of infection) to attain a more harmonious balance (the result of destroying pathogens). The claim that phagocytes were the first line of defense against infection was novel in itself, but when he extrapolated this phenomenon as inflammatory in the most general sense, he reconfigured immunity from a passive process or to an active one.<sup>7</sup> Indeed, he had identified a general restorative process: Host defense, *immunity*, then joined the same basic mechanisms used in wound repair and regeneration (e.g., clearing dead or effete cells, providing surveillance against tumors). Each of these diverse endangerments fall under the umbrella of “harmonization” and thus fulfill Metchnikoff’s criteria of addressing a disharmonious state requiring stabilization and revitalization to restore disrupted physiologies and depose deleterious elements.

We now appreciate that the ongoing surveillance of host tissues represents the “steady state” condition of the immune system. For instance, the blood erythrocyte (red cell) lives 120 days. As it ages, so-called neo-antigens (new molecular markers) appear on the external membrane that is recognized by splenic phagocytes which then remove the red cell from the circulation. A similar fate occurs throughout the body as the immune system identifies the

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6 For a review of how inflammation was understood before Metchnikoff, see Tauber and Chernyak 1991, 108–20.

7 Immunity was generally regarded either as the result of 1) exhausted nutrients analogous to a test tube model of bacterial growth (where nutrients must be replaced for continued growth), or 2) the result of preexisting anti-microbial defenses already formed and ready for mobilization. That immunity requires a recognition event and active mobilization of immune cells and production of anti-pathogenic factors (e.g., antibodies) only emerged after Metchnikoff proposed the phagocyte theory as an active model of host defense (Tauber and Chernyak 1991, 135 ff.).

viable from damaged or senile cells. This idea of ordering, the so-called “house-keeping” functions, originates with Metchnikoff’s conception of immunity as the “harmonizing” function of the body. In short, *concinny* captures the basic idea that parts must accommodate themselves to the whole or to each other (Tauber 2015).

Recognizing the novelty of Metchnikoff’s theory and the wide implications of his thought launched my historical scholarship. His intuitions proved correct, but it took a century of research to verify what at the time seemed a wild guess to many of his contemporaries. I knew the subsequent story very well and appreciated his foresight firsthand.<sup>8</sup> By the early 1980s, his original description of phagocyte functions had been confirmed (Klebanoff and Clark 1979). However, my interests quickly broadened to consider Metchnikoff’s seminal contributions in characterizing biological processes on a larger theoretical stage. I discerned that the tempestuous Russian represented the last gasps of “romantic” biology and while most of the guiding tenets of the early nineteenth century had been discarded by his own time, a persistent theme reappeared in the twentieth century with renewed vigor. The particulars of that story and its philosophical underpinnings are explained below, but in brief, Metchnikoff held a “biological point of view” (Silverstein 2009). As opposed to those committed to identifying the underlying chemistry of complex biological phenomena by reductive strategies (the disassembly of complex processes into their various components), he was a holist committed to looking at the organism-as-a-whole in an attempt to capture the dynamics of development and inflammation. As mentioned, he swam against an ascending tide of immunochemistry that dissected the immune response in terms of the chemical specificity of immune recognition mechanics (Mazumdar 1995).

Contrasting the phagocyte theory with this dominant “thought collective” (Fleck 1979) highlights Metchnikoff’s misalignment with his competitors.<sup>9</sup>

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8 My early research was directed at elucidating the mechanisms by which the human neutrophil generated highly reactive oxygen-derived toxins to kill bacteria and inflict collateral damage on resident tissues. That research included defining the enzyme that produced the various destructive substances employed in the inflammatory reaction (superoxide, hydrogen peroxide, hydroxyl radical) and the pathways that activated their production (Tauber 1981; 1982; Tauber, Karnad, and Ginis 1990; Curnutte and Tauber 2023). Later, I developed with my collaborator, Kevin Hartshorn, a human neutrophil-influenza virus model that has proven relevant in understanding the pathophysiology of COVID-19 (Hartshorn 2020).

9 The translators struggled with “school of thought,” “style of thought,” and “community of thought” to capture Fleck’s basic idea that communal enlistment into a comprehensive theoretical orientation guides individual research projects and interpretations.

By fin de siècle, reductive chemistry took firm hold in physiology and afforded new confidence in achieving higher degrees of certainty. This optimism was fueled by the great successes of physics in discerning the laws of nature. And while immunologists recognized that biology was not amenable to such reduction, their philosophical commitments (recognized or not) lay well below the surface of a controversy about methodologies. In their search for chemical mechanisms, the positivists of Metchnikoff's day were preoccupied with exorcising mysterious, unaccounted forces that would compromise their aspirations for establishing a physics of life. Metchnikoff became a focal point of dispute, because the phagocyte theory had been charged with invoking vitalism.

I pushed that indictment aside, for "vitalism" had become a catch-all for explanations that resisted reductive criteria. Only later did a science emerge that accounted for the non-linearity of complex systems that defied a simple mechanical model. On my view, Metchnikoff lacked the scientific language in which to situate his own intuitions about the developmental processes he observed. Consequently, the phagocyte theory was strikingly out of joint with the tightly linked philosophical warrants dominating the life sciences at the end of the nineteenth century. These included 1) nature conceived as a machine (materialism), 2) machines may be broken into their parts and then put back together (reductionism), 3) because machines are amenable to objective observation, human bias must be eliminated (positivism), and 4) the entire enterprise rested on an assumed analogy drawn from machines operating with lines of linear causation (metaphysical position). The immunochemists enthusiastically joined this program, but Metchnikoff rejected it. As described below, the development of immunology rested between these two orientations.

### ON DISCIPLINARY HETERODOXY

I was drawn to Metchnikoff, who illustrated how a vivid imagination could reorder well known facts into a novel formulation. He exemplified the romantic genius—a revolutionary leading a rear-guard defense against a mechanical vision of nature. I also empathized with Metchnikoff's outsider status, so out of place in a scientific culture that championed austere mechanistic models at the expense of his dynamic, even vital, vision (Tauber 2013b). Metchnikoff valiantly resisted the transformation of biology, but he could not slow its steady advance. The dominance of chemistry pushed his cell-based theory aside for another half century (Silverstein 2009; Tauber 1994a, 32ff.).

Although the phagocyte theory had not been proven during his own era, Metchnikoff's attempt to integrate the complex array of activities falling under the banner of immunity proved ultimately correct. Only with the theoretical contributions of Macfarlane Burnet after World War II would a comprehensive account of the biology of immunity complement the immunochemical framework. In that revision, the basic construct offered 50 years earlier proved prescient, when immunologists considered the problems of autoimmunity and transplantation, the explicit question of self and nonself emerged (Silverstein 2009). The formal self/other distinction had lain dormant for five decades, but when the explicit problem of host identity arose in these clinical conditions (as opposed to the character of the foreign and the response to it) the self/nonself discrimination attained experimental prominence. And perhaps that is the take-home message: The problems encountered in the laboratory demanded a rhetoric that could capture the dynamics of the immune encounter under different circumstances, where the calculus of immunity shifts from an other-directed response (i.e., pathogens) to the control of inner-directed immune destructiveness (Anderson and Mackay 2015; Tauber 2015). Under that autoimmune scenario, the host is threatened, and definition of *self* in contradistinction to the *other* becomes the variable of concern. And that problematic generated the fecund idea, and problem, of the self (discussed below).

The Burnetian model of self/nonself discrimination became the key conceptual apparatus of contemporary immunology by the mid-1960s. The search for its antecedents led to Metchnikoff, as Burnet himself acknowledged. My historiography then focused on notions of agency that had lay waiting during the earliest days of immunology's birth (Crist and Tauber 1999). As mentioned, the clearest support for the legitimacy of that genealogy came during Metchnikoff's own career in the charges made against him, namely, the putative volitional character of the phagocyte, whose incipient teleology projected human agency (Tauber and Chernyak 1991, 158–59).

To recapitulate, the idea of immune selfhood began with the dynamic portrayal of the phagocyte in its role in establishing the organism's identity. That perspective arose naturally enough from Metchnikoff's professional training as an embryologist. Following the central motifs of his profession, he asked, how does an organism develop into itself? And in that process, what confers its identity? For him, the phagocyte played a formative role as arbiter and enforcer of order. And when pathogens appeared on the investigators' horizon, phagocytes were regarded as providing a more specialized defensive

function while retaining their original tasks. The result in both the developmental and protective settings was the same—establishing *identity* and then maintaining the organism's *integrity*. That reconstruction crossed the lines demarcating several academic disciplines.

The original design of my history project was a reconstruction of immunology's experimental program. However, with Chernyak at my side, it also became a philosophical study to define the metaphysics underlying Metchnikoff's science that included embedded ideas of identity (Chernyak and Tauber 1990). "Metaphysics" is used here in reference to how a scientific object of study is configured by deeply set philosophical assumptions. These, in turn, mediate the interpretation of data. Accordingly, our study initiated an excavation of the intellectual sources of Metchnikoff's experimental program, and as a result it became a broader philosophical exercise. Of course, the basic description of the science required tracking the multiple sources and evolution of the phagocytosis theory, as well as accounting the experimental results and the controversies arising from differing interpretations. That chronicle would have been a worthy contribution, but our agenda expanded: We explicated Metchnikoff's grand vision of biology—the idea of struggle, of disharmony (derived from his original reading of Darwinism)—as an encompassing metaphysics that underlay his theory of immunity.<sup>10</sup> And in that novel analysis, we attempted to show how identity, its formation and maintenance, became immunology's central problem.

This seems to have been a natural course to follow. My conception of biology made the organism the orienting site of study. So, while my research in free radical chemistry, enzymology, and cellular activation mechanisms firmly committed me to a reductionist research program, my broader concerns were how to integrate these molecular functions back into a holistic construct. This

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10 Later, I led a project to translate Metchnikoff's evolutionary biology papers (Gourko, Williamson and Tauber 2000). Helena Gourko, a Russian immigrant, was my administrative assistant at the Center for Philosophy and History of Science; Donald Williamson was a marine biologist researching shrimp larvae, who discovered embryonic fusion *between* species that led to the revolutionary thesis about the origin of some species from non-common descent. Certain larval forms of sea-stars exhibit bilateral symmetry, while the adult form has radial symmetry. He argued that the two forms are the manifestations of two sequential phyla squeezed together as a result of one species fusing with another. He proposed heterosperm fertilization that he claimed to witness in the laboratory. Lynn Margulis was so taken by his radical theories of evolution, she suggested that I go to the Isle of Man to review his work. I came back with an endorsement, and we co-authored an introduction to his book describing a novel evolutionary mechanism (Margulis and Tauber 1992), which we re-endorsed a decade later in a second version (Margulis and Tauber 2003).

“clinical” orientation—where the patient in her entirety organizes the physician’s understanding and concern—contrasts with either a narrow molecular genetic approach or an ecological perspective. The organism occupies the conceptual space between these two grand styles of thinking. In the twentieth century, this orientation was relatively neglected as molecularists, on the one hand, and ecologists, on the other hand, each pursued their own agenda to the exclusion of the other (Tauber 1991b). Finding myself at the intersection of these different thought styles, namely, the perspective of the organism, the issue of identity organized my revisionist thesis: Instead of assuming a fixed identity (a given, as it were) to serve as the foundation of orthodox immune theory, I argued that *identity* was the science’s central problem. That position then set the course of my subsequent science studies. Indeed, Metchnikoff had served me well in ways I could hardly have anticipated.

I further note that my initial collegiate quandary about choosing between science and the interpretative disciplines found their first expression in my study of Metchnikoff’s thought. When I embarked on writing a chronicle of immunology’s history, I initially expected to provide an ‘objective’ account, one guided by similar standards governing my experience as a laboratory investigator. However, when I wrote about immunology’s origins, a philosophical interpretation infused the historiography. Perceptive critics understood that the work smacked of Whiggish revisionism. They did not indict *Metchnikoff* for the heterodoxy of its historiography that reflected strong philosophical overtones, nor accused us of poor or biased scientific interpretation. But *Metchnikoff and the Origins of Immunology* comprised a unique blend of tracking the scientific advances coupled to a philosophical analysis. The outsider status allowed me to look at the field with fresh eyes. On this view, interpretive license was noted and allowed to pass (Söderqvist and Stillwell, 1992). However, others were less generous and regarded the history distorted because in our attempt to address a philosophical issue, we were accused of projecting a contemporary interpretation on an older controversy.

Harmke Kamminga, a British historian of medicine, wrote the most interesting review of our Metchnikoff studies in terms I would call, “the challenges of ‘disciplinary heterodoxy.’” She appreciated that the dual historical and philosophical approach created a tension. Taking note of the two prevailing orientations in biology—reductionist and holistic (“hierarchical and dialogical”)—she observed that Chernyak and I sought to find a unification of diverging points of view under the auspices of organismic integrity, one we conceived as an active construct that was both established and maintained by immune pro-

cesses (Kamminga 1994). She highlighted how we built our case on the notion of disharmony that undergirded Metchnikoff's conception of the organism, one that was in stark contrast to the prevailing understanding in which the organization of the organism-as-a-whole is formally prior to the mechanical operations of its parts. Thus, to have a special faculty (phagocytes) responsible for harmonizing disparate elements was a novel conception that developed from the basic premise of the organism's disharmony requiring harmonization.<sup>11</sup> Upon this platform, Metchnikoff was then "forced" to address the scientific question of how harmonization might be achieved. As Kamminga wrote, "from there, the step to thinking about immunity was a small one. Through the phagocytes, Metchnikoff turned the notion of organismic integrity 'from metaphor into theory'" (Kamminga 1994, 141).

Closely following the trajectory of our analysis, she discerned the root of our interpretation, namely, the birth of the self concept grew from the work of a harmonizing faculty (the phagocytes), whose active process of inflammation established and then maintained organismal identity. The active element was instrumental in the dynamic biology Metchnikoff promoted. Prior to the phagocyte theory, immunity was regarded as a passive process (e.g., the exhaustion of essential nutrients starved the pathogens). Thus, for Metchnikoff, identity was an ongoing response to an unsettled question spanning the entire the lifespan of the organism, from early development to death.

In stark contrast, the immunochemists took identity as given. During the early discoveries of infectious diseases, their mechanistic biology had focused on the immune reaction to the foreign by assuming the animal as a stable construct. They had not envisioned the organism responding actively to insult. Metchnikoff saw phagocytic scavenging, repair, and defensive functions as purposeful in terms of defining (and sustaining) organismal identity. But note, the formal distinction of self and nonself eclipsed the interests of both parties: The immunochemists took the organism as given and Metchnikoff ignored the issue of identifying the other. On our view, Metchnikoff had provided the immunochemists with a theory of the organism, but admittedly, the explicit issues of self/nonself discrimination were not raised in his theory. So, beyond an argument about the prevailing thought style (reductive versus descriptive biology), a more basic clash of metaphysics contended the character of organismal identity. Admittedly, the public debate failed to capture these underlying

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11 This idea has been renewed by Leo Buss (1987) and critiqued (Gilbert, Sarkar, and Tauber 1992; Chernyak and Tauber 1992).

issues. And, consequently, Metchnikoff and his detractors slid past each other in their arguments concerning the dominant modality of host defense. That, in sum, was our interpretation and Kamminga then outlined what she thought were the historiographic flaws of our reading.

Kamminga echoed Metchnikoff's earliest critics, who claimed that he was "not at all concerned about the internal problematics of the humoralist theory," by which she meant discerning the mechanisms of immune specificity that identify the deleterious or pathogenic (later called "nonself") (Mazumdar 1995). She opined that because we were "heirs to both traditions in immunology," which formally combined in the mid-twentieth century in self/nonself discrimination model of immunity, we felt

the need to confront the problem of self and of nonself recognition. At the philosophical level, Tauber and Chernyak find a novel concept of self in Metchnikoff's writings, because they see integrity and self as being mutually defined. (Kamminga 1994, 143)

Then she cited a philosophical paper Chernyak and I wrote to explain our own conception of the immune self (Chernyak and Tauber 1991). On our view, as already discussed, *identity* precedes (presupposes) the preservation of *integrity* (protection, repair). Accordingly, immunity was first about establishing identity and secondarily about protecting or repairing it. And in my own essay published at the same time, I was more explicit in using modern terminology: For Metchnikoff,

the phagocyte was the vehicle of defense, but more broadly it also served as the mechanism by which the Self was preserved ... the phagocyte not only served as defender, but more fundamentally, as the arbiter of what was Self and the key architect to promote self-hood ... the phagocyte became the first measure of Self, a primary vehicle of homeostasis. (Tauber 1991b, 13)

Beyond the obvious shift to a contemporary vernacular, I was castigated for arriving at this conceptualization with a series of inferences:

What Tauber does in this essay is the following: he starts with Metchnikoff's emphasis on the tension between harmony and disharmony and the need for some harmonising force in the organism; the concern with organismic harmony is then translated into a concern with organismic integrity. The

role of the phagocyte in establishing and maintaining organismic integrity is then interpreted as an inner-directed mechanism. Finally, this inner-directedness is translated as self-directedness. In the process, we get a new notion of self. The philosopher may be happy with these moves; the historian is not... (Kamminga 1994, 143, referring to Tauber 1991b)

I would modify the last statement: *Some* historians are not happy with an effort to trace an idea—the idea of the self in immunology—to antecedent concepts.

I maintain that our interpretation showed how scientific evidence served as the currency of shifting concepts of the organism utilized and then developed ideas of identity. However, the metaphysical commitments of competing theories of biology underlying these laboratory developments were not readily understood at that time and scientists, given their disciplinary interests and training, were not prone to such speculations. The philosophical dissection of these ideas necessarily requires a historical perspective to describe the evolution of immunology's theoretical infrastructure.<sup>12</sup> Those notions of identity were exploited to illuminate the conceptual infrastructure of their thought.

Kamminga's complaint is justified. Yes, disciplinary boundaries were breached, but I make no apology. Indeed, I highlight her review because it exemplifies how the history of ideas draws from various academic disciplines – in my case, immunology, history of science, and philosophy. The methods, standards, and goals differ, but there is much overlap and I easily crossed putative borders. *Metchnikoff and the Origins of Immunology* is a hybrid text mixing scientific findings and their interpretations, and then explicating the underlying philosophical commitments that drove the controversies of the period. This was an inter-disciplinary work that was published as the initial volume in Oxford University Press's series in history of biology. My next book, *The Immune Self* (1994a) differed in disciplinary emphasis. It deployed immunology's scientific development as a scaffolding for showing the philosophical concepts that directed the evolution of the field. This qualified the book as the first in a series of philosophy of biology published by Cambridge University Press. Because the two monographs had different disciplinary weightings, they

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12 Our *Metchnikoff* could have been more fairly criticized for over-crediting the novelty of Metchnikoff's insights about inflammation as contrasted with earlier contributions by Cohnheim, Virchow and others, but that was not the case here. For other interpretations of this history see Rather 1970; 1972; Stossel 1999; Gordon 2016 and for a more general overview of Russian evolutionists (a place Metchnikoff fits most appropriately), see Todes 1989.

were assigned to different genres. However, I did not regard them as divergent in their inter-disciplinary character. Each book embraces the latitude of integrating different intellectual perspectives to portray the development of the science and to explain its underlying philosophical commitments. From my point of view, failing to observe distinctions between history of science and philosophy expanded the scope of my studies and enriched the exposition of my subject matter, which I would categorize as the practice of history of ideas.

The “history of ideas” is a discipline which looks at large-scale concepts as they appear and transform over the course of history. An historian of ideas will tend to organize the historical narrative around one major idea and will then follow the development or metamorphosis of that idea as it manifests itself in different contexts and times, rather as a musicologist might trace a theme and all of its variations throughout the length of a symphony. (Gordon 2008)<sup>13</sup>

That seems a fitting description of my scholarship.

I regard my own historiography as layered with various kinds of interpretation. In tracing the genesis of Metchnikoff’s theory or the development of the notion of immune selfhood in the twentieth century, I endeavored to show how laboratory data were organized by deeper theory or metaphor. These in turn may reflect extra-curricular intellectual or cultural influences. Such analysis must begin with an orienting conceptual perspective. However, by recognizing the limits of an intellectual or ideological points of view, and by revealing the identifiable cultural and metaphysical tethers, the critic can claim some recog-

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13 Peter Gordon further opines that the intellectual historian is more concerned with cultural context, whereas the philosopher concentrates “almost exclusively upon the internal coherence of philosophical arguments in themselves. One often says that the task for intellectual historians is that of ‘understanding’ rather than philosophical evaluation. That is, intellectual historians want chiefly to ‘understand’—rather than, say, to ‘defend’ or ‘refute’—a given intellectual problem or perspective....Philosophers, too, of course, will frequently appeal to historical-contextual matters when they are trying to figure out just why someone thought as they did. So the difference between philosophy and intellectual history is merely one of degree rather than kind” (Gordon 2008). Much of philosophy deals with its historical trajectory and interpretations based on the successive ebb and flow of interpretations around central ideas. For instance, Charles Taylor’s, *Sources of the Self* (1989), a work that played a key role in my own understanding of the self concept, may be easily assigned to the category of intellectual history, as opposed to membership in the philosophical canon. Where it lands is “the result of arbitrary associations and professional affiliation” (Gordon 2008). For an argument defending a clear distinction between the two disciplines, see Williams 1978, 9-10.

nition of interpretive limits. This circumspection does not gainsay that no matter the degree of self-awareness, one is left with interpretation.

As I circled around the various conceptions of personal identity, my understanding of the self in the philosophical tradition grew, and I extrapolated those lessons to a critique of current immunology. In other words, the philosophy informed my scientific interpretation, and my knowledge of science legitimated my criticisms. And more generally, several of my key ambitions were fully engaged in the immunology project, first and foremost by opening the question of identity, so central to my professional transition. I had found a respectable intellectual home. I could wrestle the self issue with the freedom of philosophical scrutiny, acquaint myself with the relevant literature, place my own ideas within that context, and do all of this under the auspices of the history of an idea central to contemporary biology. I was doing science as I had long-hoped, namely as a philosopher bridging the humanist-science divide.



## Chapter

# 5

## The Immune Self

Several novel ideas emerged from my Metchnikoff studies. The first concerned the prevailing definition of the science: Immunology, according to textbooks, is the science of self/nonself discrimination. This shorthand definition refers to the basic clinical orientation of the discipline: the immune system discerns the “other” (whether foreign or degenerate host) and then destroys the pathogen or rectifies the pathology. This dichotomy depends on a putative construct of identity, the *immune self*, by which immunity is the function that recognizes and acts on a duality of self and foreign. But I argue that this conceptual architecture employs selfhood as a metaphor, because the *immune self* has no standing as an *entity*. Selfhood is a powerful idiom, but it cannot claim scientific status as an *object*, a “thing” with defined borders and characteristics. Simply, notwithstanding the pragmatic, heuristic utility of the selfhood idiom, the immune self lacks a satisfactory epistemological definition (Tauber 2000; 2004).

That conclusion rested on three principal ideas that were closely connected: 1) no such objectified entity of selfhood exists, nor could immunity be defined in simple divisionary terms of self and other, 2) the biology of individuality requires a conception that accounts for the intercourse between organisms and their environment, where margins between self and other often shift and remain porous, and 3) the immune system is fundamentally an information processing faculty, where the cognitive construction is based on a knowing agent, classically conceived as the Cartesian ego. Each of these matters intersects with the others and all three are held together by the general notion that

the science is embedded in a complex cultural matrix in which investigators borrow ideas about identity and apply supporting language of selfhood to the cells and molecules that they study.

Several lines of criticism converge on the conceptual weakness of the “immune self” and, correspondingly, the governing concept of self/nonself discrimination in immune theory. Enshrining an atomistic notion of identity distorts the full expression of immunity that includes tolerant reactions in balance with rejecting mechanisms. Thus, the insular self resting at the base of the defensive construction restricts conceptualizing immunity’s larger ecological role. The Metchnikoff study laid the foundation for this orientation. Indeed, wherever I looked, his construct appeared relevant to reconceiving notions of immune identity. Consider how Beethoven or Coltrane took a musical theme and then played variations on that melody; analogously, I did the same with Metchnikoff’s idea of identity. With no irony intended, I think my historical-philosophical studies might be appropriately titled, “A Riff on a Theme by Metchnikoff.” Perhaps a bit overstated, but not much. Simply, Metchnikoff’s idea of identity established the orientation for my own history of immunology’s theoretical structure and its evolution. Consequently, his conception of the organism, more than just of historical interest, eventually served as the framework for all my subsequent immunology scholarship.

With this perspective, my project developed in two directions: First, I became aware that evolutionary biology had been neglected in understanding human disease, and soon after we initiated the Metchnikoff project, these wider implications for medicine were charted and extended (Tauber and Chernyak 1989; Tauber 1994c). The second and more prominent aspect grew from recognizing the competition of differing research approaches between Metchnikoff’s holism versus the reductionism of the immunochemists. That topic will be discussed in the next chapter, which describes how these two orientations directed later visions of immunity. Those developments in turn were dependent on Metchnikoff’s introduction of agency as the organizing construct of immunology.

*The Immune Self, Theory or Metaphor?* (Tauber 1994a) closely followed *Metchnikoff and the Origins of Immunology*. I explored the varying meanings of “the self” as employed by immunologists, and, more generally, the book became a study of the use of metaphor in scientific rhetoric. I showed the ways in which various notions of selfhood appeared in immunology’s theory, language, and practice, how this concept had been borrowed from commonplace notions of personal identity and more sophisticated philosophical and psychological con-

ceptions. Immunologists had imported various forms of the self idea from epistemological human cognitive models. This was not a deliberate borrowing, but an example of the easy transfer of folk ideas into the orbit of scientific language. Metaphors are, in a sense, the earliest attempt to model data, to organize the evidence for scientists who are groping for an appropriate vocabulary to describe heretofore uncharacterized phenomena. My critique centered on showing how the “immune self” rested comfortably within immune theory because of its plasticity of meanings drawn from several understandings of agency, and these various meanings served diverse applications.

The idea of agency serves an organizational function that effectively coordinates investigations and integrates findings by placing them in a universally shared paradigm of a knowing subject. This construction is hardly surprising, for the same model applies to studies in neuroscience, where the search for a homunculus that accounts for integrating experience has similarly been invoked when no such entity exists. Philosophers have warned not to confuse the sense or feeling of selfhood, an undeniable state of self-consciousness, an “experience that has the character of there being such a thing,” with a thing (Strawson 1999, 486). Simply, because it feels like there is a something does not mean that there is an entity. Given the predicate structure of our language, we seem to require a subject joined to action, a Wizard of Oz serving as a cognitive switchboard directing in-coming and out-going traffic (see Appendix). If there is a “self,” such a construct arises from functional behaviors characterizing identity. But this is a circular configuration: If identity is the organizing principle of the immune system, then the placement of selfhood in immune theory is inescapable. (Self as such might be substituted by individual, but the basic identity formulation remains.) If, however, the immune system is construed as the nervous system, namely, an information processing faculty, then immunity becomes an effector system regulated by beneficial/dangerous reactions encoded or learned through the organism’s experience (Tauber 2017). Identity (and individuality) then is subtracted as a governing precept. Let us unpack this claim.

### THE COGNITIVE PARADIGM

Immunology’s metaphoric extrapolation of human agency is based on the immune system’s perceptive functions, which serve the ready extrapolation of immunity to human agency. This cognitive orientation shifts the focus of immunology from its effector roles (i.e., the diverse immune phenomena observed, such as killing bacteria, controlling tumor growth, allergic reactions, or auto-

immune disease), to its primary characteristic, namely, how it behaves as an information processing faculty. That is a major reorientation with both theoretical and practical consequences. Common rhetoric portrays immunity as a process of seeing and acting as immunologists describe how macrophages “see” antigen, antibodies “recognize” epitopes, T cells possess “memory,” and adaptive immunity comprises a “learning” process. Like taste and smell, immune receptors sense the molecular world and then launch subsequent responses—active or passive as evolution and individual history determine. Following that first perception, signals travel up a hierarchical staircase just as the nervous system processes its various modes of perception. Then immune defensive or tolerant responses are evoked, a secondary result of primary perceptive functions.

Notions of selfhood—human or immune—draw from abilities to know the world. Just as nerves transmit information about the environment (internal and external), so do lymphocytes. To engage its targets, the immune system must first perceive them and then ‘decide’ whether to react. This is a cognitive process where the immune and nervous systems function analogously. Both ‘see’ the world and then respond to those sensory inputs. Both Niels Jerne and Burnet suggested such parallels as early as the 1960s (Jerne 1960; Burnet 1962, 94–95). They saw the immune system functioning similarly to the mind, and they each invoked language as a common medium, where humans use words and immunity employs lymphocytes that carry their own distinctive ‘meanings.’ Others followed these leads, specifically in semiotic terms (Celada et al. 1988). By the 1980s, explicit experimental findings showed that the immune and nervous systems shared mediators, receptors, a common phylogenetic history, and embryonic origins (Felten, Ader, and Cohen 1991). These parallels eventually coalesced into the “cognitive metaphor” that represents immune function using models similar to those proposed for understanding neural cognition.

Of the various formulations of selfhood *Immune Self* surveyed, the phenomenological account came closest to capturing the underlying basis of identity conceived immunologically (Tauber 1994a, chapter 6). Phenomenology literally means the description of appearances; the word “appearances,” like “phenomena,” attempts to describe what actually happens in human consciousness in connection with the “objective” world. The phenomenological psychologists began with the premise that the mind did not see the object “as is,” but through a complex integration of related perceptions. A total experience was thus constructed from imperfect and piecemeal data. A correcting mind formed the conscious image, for perception was based on an “interactive relationship be-

tween subject and object: the object was, in effect, partially ‘created’ by the act of seeing it” (Ryan 1991, 11).<sup>1</sup> Franz Brentano went further: The object did not exist except with reference to the act of seeing, and conversely perception existed only in reference to its object. He called this relationship, “intentional,” and it served as the origin of twentieth-century phenomenology as expounded by Edmund Husserl and his followers (Husserl [1913] 2014).<sup>2</sup>

On the phenomenological account, the self “exists” as a functioning, convenient, practical entity composed as an abstract construct in which ever-changing sense impressions cohere and take on meaning. That meaning, established in the very act of attention, is thus structured by the mind’s intention, and is experienced in consciousness as the fleeting bundle of perceptions, whether interior or exterior, that David Hume had described two centuries before (see Appendix). Selection and ordering of perceptions are prerequisites for experience. Most inputs are ignored so thinking requires choice based on practical or aesthetic importance. Experience is thus arrested upon certain objects, whose conceptualization in turns demands isolating and distinguishing some perceptual aspects, excluding others, and ordering reality not by hard and fast divisions, but by active, selective processing. Experience, then, enters as bare or raw data that is then integrated and organized according to the intentions of the experiencing individual, who manipulates sensory data to serve personal needs. In human terms, that cohesive “self” becomes an inviolate “me,” a self-defining, unique individual.

The phenomenologists defaulted in postulating how mind functioned. The nature of the experienced self is also left an open question, remaining as a description of an interactive process of that self with the world. But the key element of these phenomenological accounts is the view of the mind in forceful and energetic engagement with the environment, where the self—the abstracted agency of the mind—selects and constructs its world from the

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1 The key texts are Franz Brentano’s *Psychology from an Empiricist Point of View* ([1874] 1973), Ernst Mach’s *Analysis of Sensations* ([1886] 1914), and William James’s *Principles of Psychology* (1890, 1983).

2 This orientation of active perception found its modern exposition with Kant’s cognitive model of the mind, but with the new-found optimism of a scientific approach, a strong empirical element entered the philosophical discussion. The phenomenological critique recalls an earlier philosophical issue that in many ways deals with the same problem but formulates it differently: “In the end, after an honest effort, we will probably find ourselves agreeing with the philosopher [Kant] who asserts that no idea is fully congruent with experience, although he admits that idea and experience can and must be analogous” (Goethe [1818] 1988, 33). There are obviously complex Romantic antecedents to this view as exemplified by Goethe’s epistemological project (Tauber 1993).

bewildering complexity of the surrounding plenum and thereby differentiates itself. It does so by active engagement and by focusing on the act of perception, on the act of recognition, on the act of reaction, the subject is defined in action. In this sense, there is no self-residing as some preexisting and specified ontological entity. The immune self analogously emerges from immune activity.

Note, from a third-party perspective (which may be “seen” introspectively), there is a self in its selecting and doing. However, selfness is not definable from the subject’s own vantage, nor can it be defined as an *object*.

In sum, the organization of the world phenomenologically cannot define the self, but the composite array of behavior points to that nebulous construction. Indeed, how does the subject define itself? Its boundaries are only described in its bumping into “reality,” in its meeting with the other. The immune self thus becomes defined, as does the human subject’s identity, through mental experience, or in immunology’s terms, in its immune encounters.

Following this cognitive formulation, I understood the primary function of the immune apparatus serving as an information processor, where inputs are sorted and only as a secondary function are effector mechanisms activated. The analogies to the nervous system are self-evident: each has perceptive properties, each of them possesses capabilities to discern both internal and external universes, each administers information so that their respective perceptions are linked to effector systems (i.e., muscles or lymphocytes). In short, both systems are information generating processors. And as expected, these cognitive systems developed from the same phylogenetic and developmental roots and still share some messengers and their receptors (Rabin 1999; Ader 2011; Tauber 2017b, chapter 4). And most importantly in regard to my own studies, neither the nervous system nor its “cousin,” the immune system, possessed an anthropomorphic “ego” that sorted and organized perceptive inputs (Metzinger 2004; 2010; Gazziniga 2011). Both systems, conceived as networks, exhibit “distributed” dynamics. And with that shift, a central *persona*, metaphorical or otherwise, fell by the wayside.

The formulation of a “mobile brain” became an explicit modality for organizing theoretical discussion among a small group of immunologists in the early 1990s (Fridman 1991). Just as I had completed *Metchnikoff*, Irun Cohen, among the first to explicitly declare this new “cognitive paradigm” (Cohen 1992), organized the first conference dedicated to exploring this theoretical shift.<sup>3</sup> Held at

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3 I had met Irun in Boston in 1978 when he was a visiting scientist in Robert Schwartz’s laboratory at Tufts, and we stayed in touch over the intervening years. Then following the Rehovot

the Weizmann Institute of Science in Rehovot, Israel (in April 1994), the “Symposium on Immunology as a Cognitive Science” attracted a diverse group of immunologists (both experimentalists and theorists), cognitive scientists, psychologists, historians, and philosophers of science. Listening to their presentations, I quickly realized that little agreement existed about the application of “cognition” to immune theory. I profited enormously from the meeting with a well-directed update in cognitive psychology (Benny Shanon), self-organizational dynamics (Henri Atlan), computer simulations (Alan Perelson and John Stewart), and network theorizing (Cohen and Antonio Coutinho). But perhaps most importantly, I realized that few, if any, were willing to dispense with immune selfhood as an organizing principle, and from that point, my own contributions took form.

I left Rehovot with a clear path forward. The cognitive orientation offers an organismic orientation to immunology that attracted me. Cognition is mediated by systems that can be described partly in physical terms, but the molecules and cells making up the immune system obtain their global functionality only when the organism is considered in its totality (Tauber 2017b, 158–60). The animal confers the cognitive properties upon the immune system, not vice versa. Cognition then must be understood as a category of behavior, one that becomes a property of the organism, not a function of its constitutive systems (Tauber 2011a; Vaz 2011). Accordingly, immune “learning,” “memory,” “recognition,” and so on are functions of the entire body; the cells and molecules comprising the immune system are not themselves cognitive except as used metaphorically in their physical descriptions. From this position, cognition becomes a category of the functions of organisms and to confuse these different kinds of description is to commit the “mereological fallacy.”<sup>4</sup> Simply, “The mind is not in the head: The mind is in behavior” (Maturana 1985). And perhaps more to the point, the experiencing agent must be defined in terms of its functions, so process and relations replace entity, and with that shift, identity emerges in behavior. Ergo: there is no self as such.

The cognitive metaphor most directly grows from how we characterize intentional mental behavior, in which implicit teleological explanations con-

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meeting, we became close colleagues and friends. We eventually collaborated on his autoimmune research.

4 “If someone commits the mereological fallacy, then he ascribes psychological predicates to parts of an animal that apply only to the (behaving) animal as a whole. This incoherence is not strictly speaking a fallacy, i.e., an invalid argument, since it is not an argument but an illicit predication” (Smit and Hacker 2014, 1077).

form to our ideas about the purpose of complex biological phenomena. As explained by Robert Wilson,

The cognitive metaphor is operative whenever psychological terms are used to describe actions or behaviors of non-psychological agents [viz. nervous and immune systems/functions] or to explain actions or behaviors not caused by psychological states. When entomologists ... explain individual [ant] workers as sacrificing their reproductive interests in favor of those of the queen ... or when microbiologists conceptualize organisms as recognizing the presence of a pathogen, or a virus as choosing hosts with diminished immune systems, they invoke the cognitive metaphor ... and it is manifest in talk of cell migration, neural memories, molecular signaling, preferential developmental pathways, the goal of maximizing gene replication, and of biochemical systems as seeking equilibria. The cognitive metaphor is ubiquitous in the life sciences. (Wilson 2005, 75)

Thus, the cognitive metaphor instantiates agency—independent actors, both self-contained and self-directed, enacting autonomous behaviors. The immune self closely follows this construction and explains in large measure its metaphorical power that crosses the various sectors of immunology to serve as an effective idiom integrating the various segments of the scientific discipline (e.g., infectious diseases, transplantation, allergy, auto-immunity, and immune defects). Agency thus functions as a regulative idea undergirding the organization of basic principles governing immunology's theory (Crist and Tauber 1999; Tauber 2004).

Two theories of identity drew my attention. The dominant theory of immunity was constructed on the basis of defending the organism, whose identity is established by an embryological learning process: What is present at birth constitutes the "self" and everything else is "other," whether benign or not. Reaction then is determined by the danger or dysfunction of this category of nonself, and immunology becomes the science of self/nonself discrimination. An alternative formulation developed by Francisco Varela (a colleague of Coutinho's) in parallel to Chernyak and I, held that immunity only secondarily protects organismic integrity. Instead of the host defense schema, immunity is more fun-

damentally regarded as constituting that identity.<sup>5</sup> From his point of view, identity is created by self-referential, self-determined processes. In other words, embedded in Varela's theory was an implicit self formed independent of the environment, whose origins remained unaccounted and whose essential identity ironically was conceived as closed to the world.<sup>6</sup> While Chernyak and I appreciated the basic intent of Varela's formulation to present the organism as a self-constituting process, we differed from him inasmuch as we maintained that such self-definition is not self-generated (autopoietic) and thus independent of nonself, but rather emerges in dialectical interactions with the Other (Chernyak and Tauber 1991). This difference proved crucial in my own development of these ideas.

The basic concepts that organized my writings took hold in grappling with the theoretical issues raised in discussions with Varela, Coutinho, and Cohen about the cognitive character of the immune system. For me, the challenge of defining the universe of immune perception became paramount. And here, characterizing immunity required defining the epistemological universe in which immune perception functioned. My own cognitive "turn" generated two theoretical revisions. The first focused on explaining how the self served as a metaphor for a knowing agent, an obvious anthropocentric construction, and the second embraced perception as an adaptive faculty of the organism living in its environment. As already mentioned, I had already adopted an expansive ecological orientation, one derived from Metchnikoff's own dynamic conception of biology in which *relationship* replaces organismic insularity as a governing precept. Such ecological relationships are fundamentally, "dialectical:" interactions affect both the host and the encountered other.<sup>7</sup> And on this view, an atomistic self is replaced with an adaptive relational construct.

Adopting a dialectical perspective highlights that the organism's engagement with its other results in changes in both:  $A + B = A^{\wedge}$  and  $B^*$  or a new entity, AB. When so viewed, the prevailing understanding of immunity con-

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- 5 Varela employed the term "selfless self," to describe immune selfhood as an emergent property of "recursive causality," whose "virtual" character possesses no localized entity or firm identity (Varela 1991).
  - 6 On Varela's view, the immune system is a self-contained system whose cognitive functions operate with pre-existing recognition functions. That which falls within its cognitive domain is recognized and acted upon and that which falls beyond such recognition is "noise." His formulation is critiqued in Chernyak and Tauber 1991.
  - 7 This so-called "dialectical" view (a decidedly Marxist orientation) grew from a series of influential papers by Dick Lewontin and Richard Levins in the context of evolutionary biology (Levins and Lewontin 1985; Lewontin and Levins 2000).

ceived as a self guarded against others is replaced with an open dialogue between the organism and its environment, where *balanced* relationships, both internal and external, require immunity's mediation. On this interactive view, all immune encounters, both rejecting and assimilative, must be accounted, not only the responses of an injured or threatened host, but also those that enable benign interactions with the foreign. In contrast to some pre-established result of A's encounter with B, when A meets B, many factors determine the outcome, and except in the few cases of a predetermined response (e.g., one established by previous history of dangerous antigen exposure or by artificial immunization), the immune response falls along a spectrum of reactivity, where assimilation and tolerance are as important as protection and rejection. This general view emphasizes the vibrancy of systems that require complex models of causality as opposed to simple machines. Moreover, this dynamic orientation belies the autonomous individual embedded in the original Burnetian notion of selfhood.

Upon returning to Boston, I widened the scope of the unfinished *Immune Self* manuscript. After Rehovot, I understood that "selfhood" still framed discussions of the immune system's organization, but through a configuration far more complex than I originally thought. Dislodging the immune self led to the elaboration of the themes mentioned above. Moreover, although the project had begun as a narrow historical account of the "self" concept in immunology, my critique became a study of scientific thinking—an explication of how a metaphor was constructed, and why. Once I perceived the scope of the larger project, I extended my history to a more expansive philosophical interpretation to show how the cognitive metaphor works in modeling immunity conceived in the ecological context (Tauber 1997a; 2011a; 2013c). That progression will be described in the next chapter.

#### COMMENT

The notion of human selfhood serves as an integrating conception, an inclusiveness of being (perceiving, knowing, feeling, remembering). It entails the whole of our inner presence and mediates that core identity with respect to both the body and the environment. The self in its world is ever-changing and thus contingent, but the prevailing theme of its historical development is its persistence and representation as a holistic construction, forever appearing a manifestation of one faculty or another, but nevertheless remaining somehow coherent and intact. There is no such *thing* as a self. If anything, the self exists

as process. It is the *doing* of its agency, and from this perspective, the cognitive paradigm assumes its standing in immunology.<sup>8</sup>

The immune scenario so closely resonates with the human mind that the phenomenological description of mind-consciousness-self is easily transported into the scientific vernacular. And moreover, the imbroglios accompanying that transport bring with it the controversies swirling around the cognitivist paradigm that reach deeply into the conceptual issues at the foundations of philosophy of mind. These issues echo prominent concerns in immunology. For example, how does an antigen become an activator and evoke an immune response? What confers its otherness? How does the system recognize its foreign character? What determines the immune response resulting from that perception? When the immunologist poses that last question, she is essentially asking, what does an antigen *mean*?

In the cognitive paradigm, the antigen is understood in terms of its meaning. And its meaning is conferred by membership in a universe designated “nonself.” In the simplest case, the antigen becomes a representation of the foreign, whose significance (as nonself) is carried as an intrinsic property and when recognized, the immune system reacts. The model assumes that the system knows the “language” of that representation and thus comprehends the meaning as specified by the language in which the antigen fits. If the system only knows “English” then words (sic. antigens) derived from “French” will either not be recognized or misunderstood. For instance, in French “office” means “task;” “report” means “postponement;” “chair” means “flesh;” “coin” means “corner;” “agenda” means “diary.” If not recognized, a silence ensues, i.e., immune tolerance results, even if derived from a pathogen; if the antigen is misconstrued, a misdirected response will be initiated (e.g., in autoimmunity). And beyond “translation,” meaning is determined by the context of the immune encounter.

Foreign antigens are recognized as other not by their intrinsic alien character, but because they are presented in a context that signifies the other as dan-

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8 The words “agent” and “agency” embed an ambiguity: How does one separate that which is in action from the action itself? The problem rests on the difficulty of classifying specific events under the category of “action,” or as Donald Davidson explained, how do we determine a person’s actions or deeds as his own in contrast to mere happenings in his life? “I drugged the sentry, I contracted malaria, I danced, I swooned, Jones was kicked by me, Smith was outlived by me: this is a series of examples designed to show that a person named a subject in sentences in the active ... or as object in sentences in the passive, may or may not be the agent of the event recorded” (Davidson 1980, 44). Again, it is the “thing” (or subject) that is in question, and the relationship to its acting as opposed to being acted upon.

gerous. The underlying supposition of this orientation is that immunity does not distinguish a static, stable self from “the other,” but rather both the foreign and the host interact dynamically, where the larger physiological context of their meeting determines the immune response. Cohen used an analogy of Escher’s ambiguous representation etchings, where diverse figures emerge depending on what the viewer perceives as the background context. The trope is the alternate way one views what is figure and what is its context, so that what first appeared as ground may assume new form as a figure. When visual cognition perceives their interplay, representation (i.e., the figure) is shown to be constructed from an ambiguous universe, where background and image are freely exchanged. Meaning is thus actively sought and not given. I recognized this to be an important postmodern aesthetic principle that Cohen tapped to depict the immune system as defining self and nonself in a contextual dynamic (Cohen 1994).<sup>9</sup> Immune identity, on this view, only can be defined in particular contexts, and from such histories, identity functions emerge.

The contextual formulation of immunity has three primary historical sources: 1) Irun Cohen’s evocation of context in cognitive processes; 2) Charles Janeway, Jr. highlighted the collective character of immune responses in his metaphor of a “sociology of lymphocytes” whose “pattern recognition” were required to capture the dynamics of immunity, namely, coordinating both immune cells and other host constituents (Janeway 1989); and 3) the so-called “danger theory” that specifically addressed the participation of an array of inflammatory signals and sequential events amongst non-immune cells that initiate the immune reaction. This last hypothesis, authored by Polly Matzinger soon after the publication of *The Immune Self*, proved highly controversial (Matzinger 1994). Her thesis developed from observations that most antigens do not evoke a robust immune reaction, indeed, most are ignored (tolerated). Accordingly, it is the larger context in which the antigen is presented that determines the overall immune response. The immune system “doesn’t really discriminate self from nonself, but some self from some nonself” (Matzinger 1994, 994).

While antigens of pathogens that carry a defined “meaning” are an important case example of a particular form of immunity (Janeway 1992), generally,

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9 Cohen had no conscious ambitions to link his theory to postmodern critiques from other fields. When we discussed the matter in 1994, he appeared unaware of postmodern criticism (e.g., the views of Derrida and Foucault), and generally unconscious of any resonance his de-centered depiction of immune selfhood might have with similar arguments from literary or social criticism. I placed Cohen in the cognitive paradigm story a few years later (Tauber 1997a).

an antigen is neither self nor nonself except as it attains its meaning within a broader construct. Analogous to human language, while we begin with a representational foundation, each word has a spectrum of definitions and specification is then conferred by the way in which the word is used. When I say, “Let’s go to the bank,” do I mean to go to a building and get some money, or to the lake shore and go swimming? Multiple contextual elements confer specificity to words, and interpretations are delimited by those supporting structures. For me, the attraction of the contextual formulation is its resistance to the oversimplified on/off signaling inherent in the self/nonself characterization of immunity. The gradations of immune responsiveness, the dynamics of ecological intercourse, the variations of antigen presentation, and a host of other considerations makes the contextual model a superior depiction of immunity than an abridged representational construction, where  $x$  has a specific definition and whose meaning confers the basis of a reaction (Shanon 1993). In some instances, specific meanings are imprinted (e.g., invoked reactions induced by pathogenic bacteria or viruses), but my key point is that the spectrum of immunity stretches from non-recognition to tolerance (recognition without reaction) to rejection. It is this continuum of responsiveness that characterizes immune cognition across the wide expanse of interactions in which immunity is enacted. Thus, exclusive attention to the defensive scenario distorts the immune system’s role in myriad other functions. This general orientation set the stage for my later studies of immunology’s conceptual infrastructure. And as I set my sights to this next phase, ramifications of immune selfhood appeared in disciplines that were watching immunology with keen interest.

## CULTURE WARS

*Metchnikoff* offered the first attempt to examine immune theory with philosophical tools, a project that began at immunology’s origins and extended into our own era (Tauber 2005c; 2017b).<sup>10</sup> These studies joined a second tributary of sociological interpretations that are important complements to my own analysis inasmuch my critique draws from parallel interpretations that

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10 My analysis falls into two phases: during the 1989–2007 period I focused on the standing of the immune self by showing its metaphoric uses and how those meanings framed immune theory. Since 2008, I have been preoccupied with the wider ecological context for understanding immunity and autoimmunity. My articles in the *Stanford Encyclopedia of Philosophy* mark that evolution (Tauber 2002c; 2017a; Swiatczak and Tauber 2020) with a major revision every three years marking that transition.

have shown how scientific models—howsoever driven by empirical data—rest embedded in an intricate linguistic, historical, and cultural matrix. Those influences are inescapable and inevitably frame the ways in which laboratory findings are conceptualized. So, when immunologists think with ideas about identity or individuality and apply the language of personhood (a meta-discourse) to the cells and molecules that they study, their constructions may conflate “theory” with “metaphor,” sometimes usefully, sometimes not. The guiding lesson is how metaphysical commitments orient the interpretation of “hard” evidence. That message, in many ways, addressed my early attempts at finding a bridge between science and the humanities. Indeed, building these linkages fulfilled my interpretive studies in ways I could not have imagined at the outset of my career inflection from bench scientist to philosopher. I had labored many years to finally reach an intellectual perch from where I could survey a broad landscape. To say the least, this was immensely satisfying as I place these philosophical discussions within a historical context that reaches back to the Romantic period and stretches into our own era. However, first I offer a comment of the larger cultural context in which the immune self plays its allotted roles.

As discussed, the cognitive orientation regards immunity as a function of “perception” and “knowing,” which in turn embeds a knower who perceives and acts. Accordingly, the immunity scheme extrapolates human cognition as modeled by a hypothesized ego, whose characteristic information processing and intention find ready expression in immunology’s evocative language. Such commitments to agency expressed in the biology of an active self are reluctantly shed irrespective of the (implicit) philosophical assumptions carried by the metaphor. In Western culture, to be a self, an autonomous individual, is generally acknowledged as the foundation of personal identity, whether considered psychologically, politically, or morally. Irrespective of the self’s diverse meanings and uses, by and large, the term was imported into immunology with autonomous connotations, a direct application of common judicial/political and psychological understandings. These derived from the civic ideal already established in the American Enlightenment, one that was deeply indebted to Locke and the tradition of liberal democracy born at the end of the seventeenth century (MacPherson 1962; Shain 1994). That understanding has a history with an arc that begins during the early modern period and ends in postmodernity. This crosstalk between the laboratory and the culture supporting it has prompted extensive comment.

My studies of this correspondence began shortly after completing *The Immune Self*. Scott Gilbert and I began discussions about ways in which our respective disciplines might reflect postmodern themes and tropes about identity (Gilbert and Tauber 1995). As detailed in chapter 8, I had watched the science studies controversies erupt, and in my assessments, I took account of my own interpretations about the immune self. Scott and I published our respective musings, which I found particularly useful in terms of solidifying my thoughts on how to situate myself in the Science Wars debate (Tauber 1995a). I recall my astonishment at finding strong resonances between my conception of immune selfhood and postmodern tenets.

Any explanation of the immune system must ultimately deal with its emergent properties, self-organization, hierarchical structure, and integrating mechanisms. These concerns reflect the rejection of simpler mechanical models that would attempt to reduce complex functions to clockwork-like mechanics. Biochemical and structural analyses of molecular components do not reveal the properties and dynamic controls of a complex system that exhibit emergent properties (those not predicted from properties and interactions of the defined elements).

So, while I differentiated those immunologists who refer to the immune self as an entity (modernists) from those who are keenly aware of the dynamic (and contested) character of immune identity (postmodernists), that separation did not reflect differences of how the science was conducted. Rather, differing orientations prescribed divergent meanings for shared terminology that reflected contrasting conceptual commitments. In other words, when the self metaphor stands for an entity, a modernist formulation has been invoked. And when viewing immunity as a dynamic process, the metaphor echoes postmodern depictions of the subject. This latter orientation emphasizes how the immune molecular and cellular profile is altered in response to new challenges and therefore constantly changes its composition and character, as discussed above. In this sense, a certain indeterminacy characterizes immune identity, and a focused center, a postulated organizing principle, remains elusive and undefined. Such a view closely mirrors broader postmodern notions of identity, a theme explored in later chapters.

In referring to the underlying conception of the metaphor, not the science described in its own technical language, I made an important distinction: there are no criteria of scientific methodology and epistemology that clearly distinguish “postmodernist” from “modernist” science. What I do perceive is the application of different meanings of personal identity metaphors applied *to* the science.

In this sense, my larger argument of the metaphorical character of immune selfhood was illustrated. And more generally, immunology exhibited a vivid example of how terms of contemporary vernaculars find their way into supposedly neutral empirical scientific descriptions and models. The metaphors themselves carry meanings and those meanings impose ways of thinking about the data.

As explained, the immune self was born during a period in immunology's history when a simple on/off scenario seemed to characterize immune reactions to the foreign. That formulation proved insufficient to account for more complex phenomena of autoimmunity and transplantation (Starzl and Demetris 1995; Silverstein 2009). In highlighting the dynamic quality of immunity in these scenarios requires discharging earlier conceptions of immune identity where simple boundaries and their protection accounted for immunity. With the appreciation of immune tolerance and the dynamics of immunity considered in a wider ecological context, the regulation of the immune system became a new focus of interest. Complex systems are characterized by non-linear causality that by their very nature exhibit probabilistic outcomes. In this sense, indeterminacy displaces notions of a bounded self, which, in turn, resonates with post-structuralist ideas about identity. In this regard, the example of modeling immunity parallels culture critiques that depict selves as de-centered and constituted by social context and obscure political forces. Reconceiving immunity in these terms carried different notions of immune identity, where earlier conceptions of the insular self were replaced with dynamic ecological models that resonated with social depictions characteristic of recent culture criticism.

My critique of immune selfhood found allies within the immunology community (Podolsky and Tauber 1997, 361–66) and strong endorsement by anthropologists and culture critics, who were also finding previously unrecognized meanings in immunology's use of the self (Haraway 1989a; Martin 1990; 1994; Napier 2003; reviewed in Tauber 2016). They observed that the wide acceptance of humans conceived as selves finds support in the way immunity builds upon implicit Western understandings of personal identity. Commentators like Donna Haraway and Emily Martin assigned cultural values to the insular immune conception by noting that the evident social differences between races, men and women, workers and managers, or citizens and foreigners had surreptitiously been imported into immune theory. While some would regard such distinctions characteristic of modern notions of identity, they highlighted that there is nothing "natural" about such differences. Instead, they regarded the self/nonsself basis of immune discrimination a projection of

prejudice, namely, a way of making contested social boundaries a “natural” characteristic of social collectives.

And in a reversed exchange, these culture critics saw the idea of immunity as a means of exclusion transferred back to the science’s supporting culture. By valorizing the powerful American cultural trope of atomistic individuality, immunology instantiates an insular social model of persons. So just as Social Darwinians promoted “the survival of the fittest” to capture the social essence of American rugged individualism a century ago, today “immune reaction” putatively functions to externalize or segregate, and thereby promotes nefarious political meanings. As David Napier opined, the basic schema of an “I” who must be defended against “them” is more than just metaphorical: this scientific conceptualization has been internalized into the collective social psyche as a natural characteristic of nature. Napier sees these dominant immunological precepts as little different from simple demonology made respectable by its appeal to science. The so-called “Age of Immunology” may thus be regarded as the expression of a pervasive scientific paradigm about self and nonself that confirms and contributes to “our culture at war with itself” (Napier 2003, 7). The battle metaphors of “attack,” “defense,” and “invaders” are so prevalent in immunology’s lexicon that such military terminology dramatically illustrates this construction of conflict, both in terms of the self/nonself dichotomy, as well as the privileged standing of individuality over the commune.

This interpretation and others akin to it regard immune models based on host defense as instantiating an ideological orientation of social barriers, as opposed to constructions based on cooperation and collective action. More provocatively, this cultural bias has putatively seeped into immune theory by supporting notions of identity drawing from cultural values of an individuality celebrating personalized self-fulfillment at the expense of communal values. Beyond distrusting such political and moral alignments, I had already argued, from a scientific point of view, that the common conception of immune selfhood that embedded an autonomous ego imposed a distorting metaphorical construction upon immune theory. Consequently, I was sympathetic to this anthropological analysis that had expanded my own appreciation of how the borders between the laboratory and its supporting culture were porous and ideas were easily exchanged between the two domains (Tauber 2009a, 136–39). The so-called, “Two Cultures” were, in fact, not as divided as I originally thought.

Clearly, the example of immunity revealed the free correspondence and contextualization of the science set within its culture. The potency of immunology has resulted in the imposition of its own definitions on a broad social

scale (Sontag 1988). In this sense, immunology has been both imperialistic and triumphant. And here a subtle transition moves the self from its epistemological domain to the political. On one reading, immunology, marshaling the power of scientific legitimacy, bestows authority to differentiating, and by implication, to affirming, difference in society. Thus, the power of the science makes the self/nonself dichotomy an icon that verifies and legitimates an inequitable social structure. In this portrayal, science has achieved an imperialistic prominence, perhaps matched in intensity “only in the biopolitics of sex and reproduction” and thereby offering a scientific rationale for declaring the “natural” state of different kinds (Haraway 1989a, 366). There is *us*, and then there is the *other*, and the relationship is one of conflict. Note, beyond the metaphorical employment of immune theory, these critics maintain that science is part of a larger political ideology.

True, but their own analysis missed a crucial dimension of immunity. Haraway, Martin and Napier had not appreciated the broader ecological conception of immunity and thus did not include conceiving identity in a communal sense. From that perspective, instead of separation and defense, cooperation and free exchange marks a relational construct. Others might emphasize such a point of view and perhaps, given the political and social developments of the past 30 years, these dissociative extrapolations should be revised in any case?

That set of problems is not on my agenda and suffice it to conclude that irrespective of where one falls on the political spectrum, it seems clear that immunology has been enlisted in cultural criticism. And no wonder. To the extent that we are aware of ourselves as biological individuals, immunity (as opposed to genetic endowment) defines the ongoing basis of human identity. Immunology’s seductiveness is so powerful because the science is in such free communication with its supporting culture. The critical exercise is to decipher the underlying metaphorical structure of the discourse. It is an open dialogue, and we should be wary of the free correspondence between two very different kinds of language. On my view, the important distinction to maintain is that the critiques summarized above are sociological (some might say, political), not scientific, and the use of the science outside of the laboratory immediately translates, if not distorts, the original conceptual formulations.

And a larger lesson may also be garnered: the sociological depiction of immunology reveals how inter-contextualized and integrated the science is with its supporting culture, and in reverse, the science borrows from that culture as well as shown by the power of the metaphors that have been invoked to model the experimental evidence. The science thus lives beyond its narrow

purview, irrepressibly externalized from its parochial interests. This is a key message of contemporary sociology of science. I did not follow that lead, but instead continued to examine questions revolving around agency, a project that proved far more ambitious than I originally envisioned. In fact, a huge territory remained for exploration, for I had hardly begun the philosophical examination of the self that expanded well beyond the laboratory to address matters pertinent to personal identity and subjectivity, more generally. I approached these topics philosophically and I found abundant commentary both in the professional literature and in the culture at large. Indeed, I joined a flood of interest in the *I*.

The question of identity emerged as a wide-spread cultural preoccupation after World War II and by the time Maturity and I met during the 1970s, my cohort found itself immersed in what Tom Wolfe called “the me decade” (Wolfe 1982). I was swept up in those cultural currents and in response I sought intellectual signposts by which to orient myself. While my professional preoccupations had driven the identity question into a well-defined tract of career development, with the abandonment of the laboratory, I had to consider different identifications and a host of different values and motivations. *Who am I?* re-emerged with a vengeance. However, before we proceed, a potential confusion should be clarified regarding my references to self and identity. Selfhood, at least as I originally conceived the issue, concerns *what am I?* and namely, how to conceptualize what Descartes called, “the thinking thing.” Such an entity is configured by the indexical identity of a *me* or *I* that confers spatial, temporal, and relational structure to my being in the world. In this formulation, a Cartesian-inspired ego resides in the world and negotiates its desires as an individual. Upon this rather simple construction, Descartes built a philosophy on the certainty of his own self-consciousness—“I think therefore I am.” That claim is the origin of the modernist self (Taylor 1989; Seigel 2005; Siedentop 2014). The Appendix offers a short review of this construct to illustrate the philosophical under-pinnings of the atomistic self that is requisite for understanding the nineteenth-century transformation that followed. This story extends immunology’s own utilizations of, and contributions to, the cultural formulations of personal identity.



## Chapter

# 6

## Systems Philosophically Considered

**T**he foundations of my own revisionist ideas about immunity originated both in my laboratory investigations and through philosophical affinity with Metchnikoff's vision of biological functions. He forged his theory in response to a philosophy of science that dates to the early modern period. In the seventeenth century, Descartes had attempted to formalize reductive analysis as a scientific methodology, but not until the last quarter of the nineteenth century did reductionism achieve orthodoxy in the life sciences. Its declaration dates to a specific manifesto written by Hermann Helmholtz and fellow German physiologists, who, in 1847, declared that physiology, in principle, may be reduced to the same mechanical forces deciphered in physics and chemistry (Galaty 1974). It was an attack on vitalism (which assuredly deserved a quick burial), but reductionism was not restricted to only a strategic methodology for biology, but also included conceptual commitments that proved debilitating to its program. Once broken apart, a biological system's array of separated elements could not be put back together without a model of their pre-disturbed state (Sarkar 1998).

Metchnikoff did not have the means to decipher the immune system in terms of its overall structure, but nevertheless, he rebelled against the immunochemists' program as inadequate to explain the complexity of immunity. So, in the controversy surrounding his phagocyte theory, I aligned myself with his "biological" approach that was, at heart, an attempt to define processes directed at

establishing functional regularity and stabilized organization based on a holistic understanding of the organism. In this rich theoretical mulch, I sowed my own interests in the complexity and self-organization of the immune system.

While the chemists argued that immunity, like all physiological processes was amenable to reductive analyses within a mechanical model of interacting parts, Metchnikoff saw inflammation as a dynamic process whose complexity could not be reducible to firmly prescribed chemical interactions. I knew (with the benefit of hindsight) that the mechanistic clockwork ideal had failed in biology. Complex systems do not obey simple progressions, and instead of defined sequence of events with determinant outcomes, they often exhibit “indeterminant causation” (Gillies 2019, 194ff.) Because interacting pathways exhibit stochastic exchanges that depend on the context and history of the processes in play, prediction becomes a probabilistic description derived by calculation. Then the question becomes, what constitutes a scientific explanation if likelihood is the parameter of measurement? What is the standard of confidence? How is consensus obtained? These are basic epistemological concerns, and indeed, these considerations organized my re-conceptualization of immunology’s theoretical development, first in evaluating the reception of Metchnikoff’s theory and then assessing its later fate. Thus, I regarded the controversy generated by the phagocytic theory as far more than an argument over the specifics of immunity. The debate reflected vying philosophies of science that were latent a century ago, but fully enunciated a century later when I entered the discussion.

As explained in the following chapters, my early studies of immunology opened onto a medley of themes first discerned in Metchnikoff’s commitment to what would be called in philosophical circles, “emergent properties”—the idea, originally proposed by Aristotle (*Metaphysics*) that the whole is greater than its parts.<sup>1</sup> That issue was simply skirted by the hegemony of the chemical approach and the enthusiasm of its practitioners. The immunochemical program was based on the assumption that mechanical causation might be discerned in immune functions. Metchnikoff’s theory was based on a different

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1 Ontological (metaphysical) reductionism holds that reality is the sum of its parts; methodological reductionism seeks to provide explanation in terms of an object or a phenomenon’s parts. In the modern context, holism is understood in terms of emergent properties, i.e., those properties which cannot be explained from the sum of parts. For instance, swarming phenomena among fishes, birds, insects; the coordinated pumping of the heart; mental states emerging from neural systems; the stock market; the World Wide Web, etc. (Bedau and Humphreys 2008; Humphreys 2019).

conception of cause, one in which development and immunity followed non-mechanical dynamics. Simple machines assume predictive order; dynamic systems forego such certitude. And, of course, the methodologies built upon these respective foundations differed as well. Metchnikoff was a descriptive biologist who sought patterns of development and the dynamics of the inflammatory response; the immunochemists were reductionists committed to breaking wholes into their parts and defining the molecular events of the immune reaction. These contrasting philosophies of biology then became a subject of great interest for me, where my interpretations found a home in a larger field of thought.

My philosophical attitude had had a long time to incubate and develop. During the summer of 1968, when I was about to apply to medical school, I had read a paper by Michael Polanyi, entitled “Life’s Irreducible Structure” (Polanyi 1968). The argument, in brief, is that parts cannot be put back into their original wholes without some kind of top-down organization (an invoked teleology).<sup>2</sup> He used the example of letters of the alphabet that are arrayed to compose words, followed by sentences, paragraphs, and eventually articles or books. The word structure is the first order of organization, and the choices of letter selection is determined by the grammar and meaning required to compose a sentence, and the sentence is similarly directed by a higher order of organization, for each sentence follows a sequence determined by the larger context of the paragraph. The ideas lying latent in the parts become fully articulated (“alive”) once all the parts are assembled into their proper order.

Polanyi applied this hierarchical ordering to biological systems to discuss both 1) the failure of reductive analysis to re-construct original functions disrupted by breaking the whole into parts, and 2) the philosophical point that biology demanded top-down principles to complement the dominant reductive strategies characterizing contemporary research. In critically reexamining the roots of my own research commitments twenty years later, Polanyi’s paper became my pole star. As I shifted my interests from the laboratory to philosophy of science, I assessed the potential of reductive strategies, of which the molecular revolution in genetics had become the most prominent frontier in biomedical research.

The history of biology is marked by shifting methodological paradigms and in the early 1990s, an aggressive move to make molecular biology the

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2 I responded to Polanyi’s implicit teleological argument many years later (Tauber 1998b).

dominant research approach commenced in earnest. With political efforts invoked to fund the Human Genome Project (HGP), I watched as resources were sapped from other areas of life science investigations. Although predicting cures for cancer and the establishment of personalized medicine, those promises have deep conceptual flaws resulting from a simplistic understanding of gene action. Biological processes, including cancer induction, are as much determined by ecological and developmental plasticity as programmatic gene induction (Gilbert 2018). I examined this matter with my Boston University colleague, Sahotra Sarkar, with whom I argued against the Rosetta Stone claims of the HGP proponents (Sarkar and Tauber 1991; Tauber and Sarkar 1992; 1993; see also Lewontin 2000; 2001; Gilbert 2018). And as I formulated my own critique of immunology, this anti-reductionist mindset organized my critical historiography.

I feel vindicated. The reality of organic processes has trumped philosophical assumptions, and a dynamic conception of biology has taken hold. That was the story I eventually described in terms of immunology's own development. It proved to be the key to understanding Metchnikoff's alternative vision of biology and the one that I was to refract in my own way from the vantage of the emerging twenty-first-century New Biology (Woese 2004), a catch-all phrase about "systems biology."

Systems biology seeks to supplement reductionist analysis of complex biological phenomena with an integrative strategy that combines the various elements of a system into a coherent, dynamic whole. This systematic strategy requires high-output, comprehensive data from simultaneous measurements of multiple features. For example, to obtain a complete understanding of gene regulatory networks, various simulations and analyses must be performed that assess binding constants, rates of transcription and translation, kinetics of chemical reactions, degradation, diffusion, speed of active transport, and so on. And with integrative techniques, the components of a biological system at different levels of organization are reconfigured by sophisticated computer modeling to show complex interactions and their subsequent progressions.<sup>3</sup>

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3 In immunology, early stirrings of a systems approach had appeared in the 1950s under the mantle of cybernetics. At that time, both ecologists and immunologists were intrigued with the promise of this new science for their respective disciplines, but the hopes were largely frustrated, inasmuch as direct application of Shannon-Weaver formalisms failed (Tauber 1994a, 161–65). The modern systems approach that developed 40 years later draws from a mosaic of six theoretical programs: 1) systems philosophy, 2) cybernetics, 3) information theory, 4) operations research, 5) game theory, and 6) computer simulation of complex systems. Which of these will dominate modeling remains unclear, inasmuch as different systems may require

While the systems initiative has been called a “New Biology” (Woese 2004) and progress has been made, whether such modern tools can finally fulfill its reconstructive mandate remains to be determined. However, at the very least, the limits of an older reductionism have been acknowledged and a commitment to an integrative biology seems finally secured.

#### ON CAUSE

I saw immunology not only adapting these new research strategies, but like other biological subdisciplines, it underwent a fundamental shift in the underlying philosophy guiding its program, one that acknowledged the irreducible indeterminism embedded in immune functions. I had sought certainty and found that complex systems follow causal pathways that give a range of responses and generate emergent phenomena that are unpredicted by study of their constituent parts. Considering my original expectations of finding certitude in experimental science, this general conclusion could only appear ironic.

And, I must add, in thinking about these issues, I was jolted out of a well-established mind set. The linear maps depicting the biochemical pathways learned in medical school required a different kind of dynamic modeling. My own research would need a more comprehensive conceptual context if I were to push beyond the narrow confines in which I understood its significance. And as I reexamined evolutionary biology, I came to appreciate the radical contingencies of selection and population dynamics, random mutation, accidents of cross-genetic exchange, and random drift described in multi-focal and probabilistic terms. At some point, several conceptual tributaries converged on a dawning realization: the omnipotence of mutability and change reside at the base of complex systems, whether organic or physical. That stochastic conception challenges the basic epistemological expectations at the foundations of predictive science and thus has substantial, if not immense philosophical ramifications.

As I delved into immunology’s history, I was not fully aware of how my own philosophical allegiances guided my interpretations of that history. Only upon later reflection did I realize the subtle workings of contested metaphysics. Unpacking that story reveals both the workings of science and how my own temperament drove me in one direction as opposed to another. For me, the

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different strategies. Early efforts at immune modeling are reviewed in Tauber 2008b. As of this writing, the most comprehensive single review of current research in this area is Tomar 2020.

basic issue concerns how cause is understood as an epistemological matter and then how to explicate the metaphysical implications of that position.

For the sake of simplicity, consider the two basic modalities of high and low outcome predictabilities. In the first case, a defined causal sequence is apparent; in the second case, going from one state to another follows lines of probabilities, for the underlying causes and immediate sequences are either stochastic in nature or unknown, altogether. For instance, hitting a billiard ball accurately will result in a series of predicted strikes; in chaotic systems a butterfly's fluttering wings in Brazil may initiate a storm in Toledo. Following the cue ball is simple; charting the causal links of the weather is not. Thus, uncertainty 1) may reflect ignorance of the antecedents leading to phenomena, or 2) is an inherent characteristic of complexity. In other words, uncertainty may be regarded as an epistemological and/or metaphysical issue.

Molecular pathways in physiology display degrees of uncertainty governed by statistical descriptions that have replaced the aspirations of defining linear causality. From anabolism to catabolism, from development to senescence, organic sequences follow probabilistic or even chaotic deterministic principles. And the same indeterminacy characterizes genetics. The earlier notion of gene à protein à function has been long-discredited (Gilbert and Epel 2009; Tauber 2011b). The gene cannot be identified as a singular unit, but rather inheritance is better understood as a functional designation in which many layers of influence determine activation and deactivation sequences. Furthermore,

isogenic cells submitted to the same environment always display random fluctuations in gene expression. This random variability occurs between cells of the same population, a given gene being expressed in one cell at a given moment but unexpressed in another cell ... or between different alleles of a gene inside a single cell. ... [Accordingly, gene expression] can only be rendered by a probabilistic model. For this reason, genes can no longer be considered as being simply either active (on) or inactive (off) in a given cellular type or in a given cellular state. Instead, they must be attributed a probability of being active, even if this probability can in some cases be close to 1 or 0. (Gandrillon et al. 2012, 1)<sup>4</sup>

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4 "Stochastic gene expression" (SGE) arises from "noise" (inherent variation) in gene networks, random modification of chromatin structure, and random environmental factors (Gandrillon et al. 2012, 1) The entire issue of this journal is devoted to the role of chance in biological systems.

Add the epigenetics that play upon gene expression, and instead of the linear sequentially defined causal pathways initially postulated, molecular biology is now characterized dynamically, where outcomes typical of complex systems, again, can only be characterized in probabilistic terms. Accordingly, molecular biology requires an account of numerous interactions with variable outcomes determined at multiple levels of organization. In short, the inviolable standing of a logic where A must lead to B now appears as a highly simplified approximation of complexity.

In the late twentieth century, complexity theory has suggested how overdetermined causation and probabilistic descriptions might better serve depictions of physiological and genetic processes. As Jean-Jacques Kupiec notes (2009), axioms of causation that govern physiological processes are assumed to follow the mechanics of lock and key association that then determine the on/off switches of biochemical reactions. Much like a clockwork mechanism, gene activation, metabolism, immune responses, synaptic junctions, and so on all putatively function by such regulated cascades, where feedback loops, both positive and negative, integrate to form regulatory pathways. Accordingly, circular causality characterizes networks.

However, molecules do not fit together according to some prescribed program: Context determines function in regard to both interactive opportunities and the environment-induced flexible tertiary structure that determines specific functions. Proteins not only are subject to Brownian motion and the laws of diffusion that generate variation in behavior, but they also exhibit wide variation in the specificity of their interactions (multiple functions determined by developmental context, anatomic locale, and cross-specificities). In the immune system, this is clearly illustrated by both antibody and lymphocyte cross-reactivities that give rise to a spectrum of immune responses.

The variable character of protein interactions invalidates simple mechanical models and a more accurate portrayal of biological causation must account for the probabilistic events of shifting protein relations, which in turn determine organization and functional status of organisms. Given the uncertainty of tracking causal series observed at the molecular level, the causality operative at higher organizational levels requires different multi-dimensional, synthetic ways of thinking about a biological system in its entirety. Note *synthesis* is the focal point of this kind of analysis in at least two ways. First, such an exploration considers different levels of organization governed by different causal streams that require integration. And second, the *context* in which molecular interactions are studied must be comprehensively factored, a strategy that rep-

resents a synthetic view of a different sort. The issues are well understood; their solution, less so.<sup>5</sup> The epistemological issues raised by modern systems biology were already at hand in the nineteenth century, and to understand the full scope of current challenges we pause to consider that history and the characterization of causation in such complexity.

### THE PROBABILISTIC REVOLUTION

Certainty carries much baggage: fixed, stable, infallible truth (exemplified by mathematics). This idealized standard, of course, has a narrow province, and in the seventeenth century a major reconsideration was initiated from two sources. The first concerned the role of the knowing subject in gleaning scientific evidence and interpretation. Although the scholastics had demanded incontestable, objective (and reasoned) infallibility, with the appreciation and acceptance of constitutive human bias (subjectivity), the incursion of less stringent cognitive demands began to take hold. Positivism emerged as a counter movement to minimize the inherent cognitive constraints and the observer-dependent assignment of qualities that render perception, and subsequent interpretation, imperfect. This became, in our own era, the source of postmodern critiques about the neutrality and objectivity of science (chapters 8 and 9). Here, I consider how certitude was further compromised by a second tributary drawn from within the very nature of evidence itself. That epistemological turn has had a more profound effect than the latest ruminations of culture critics and their kindred faculties.

A post-positivist philosophy of science must account for the introduction of epistemological uncertainty that arises within science itself. Part of the case against Metchnikoff was built on the descriptive bias assumed embedded in his theory of the phagocyte's autonomous volition. As discussed in later chapters, positivism developed in the efforts to certify scientific findings, to maximize, if not establish, certainty. Proponents sought to purge the subjective and any attempt to employ science as an instrument for unifying reason of a different kind or employing the vagaries of "judgment" would have moved against a strong positivist tide firmly committed to its own concerns. However, hidden in the recesses of that program lies a fascinating irony: in their search for certainty, the deep motive for expunging subjective bias, inviolate uncertainty remains.

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5 I discuss my own skepticism about the current state of systems biology and the immediate future of such integrative efforts in Tauber 2017b, 210–18.

Coupled to the subjective factors at play in deriving and interpreting data, a new appreciation of epistemological limits embedded in physics came to the fore during the nineteenth century. Probabilistic descriptions displaced geometric certainty governing evidentiary expectations. These might be exact, but only within certain margins of likelihood. The picture of the world then shifted, for the metaphysics of a predetermined mechanical universe could not be sustained. Complexity demanded another kind of understanding, where myriad particles and the forces that govern them could only be described in terms of collective effects.

The ability to deal with statistical analysis provides powerful methods in such fields as thermodynamics and evolutionary theory. More than a tool, James Clerk Maxwell (1831–1879) and Charles Darwin, inaugurated a new way of thinking:

In 1859, a double intellectual revolution [commenced]. This year, chance burst in as an explanation of phenomena, in physics [kinetic theory of gases] on the one hand, and in biology [*On the Origin of Species*] on the other hand. It was indeed a real breaking-off from the old order. . . . It is more than a coincidence that Maxwell's hypothesis and the publication of Darwin's book happened the same year. It marks a maturation of the scientific mind, now confident enough in the explored field of causal determinations, to set out to conquer other territories. "Scientifically speaking, what Darwin actually tried to show was that chance had an objective reality, or at least and more precisely, that chance had in its theory the same status of reality as other theoretical entities" . . . This theory is not ontological or metaphysical, [but rather] it is profoundly epistemological. It shows that chance can act as an explanatory concept, similarly to other explanatory concepts of a theory, and not as the term used to qualify what is beyond explanatory concepts (the unknown or the unthinkable). (Morizot 2012, 59, quoting Lestienne 1993, 31; 14)

Note, the "probabilistic revolution" is construed as signaling a new awareness about irreducible uncertainty (i.e., approximation instead of certain outcomes) based upon the constitutive place of chance in complex natural processes. Following Lestienne, Morizot argues for another interpretation that turns chance into an explanatory concept, a "theoretical operator" where "methodical doubt" is used to

push back the limits of knowledge about the uncertain. . . . In Darwin's work, chance is an integral part of a scientific explanation. It becomes the

essential explanatory element, and is no longer considered an accident of the substance, the epiphenomenon of a regular and necessary law, or the parasite noise that comes to hamper the perfect mechanics of universal laws. (Morizot 2012, 60)

Upon this epistemological platform, a revolution took place.

The simple mechanical models characterizing both physical and biological phenomena have proven inadequate to predict outcomes in complex systems that exhibit varying degrees of predictability, including indeterminate causation. Complex behavior occurs in any system in which multiple interacting constituents follow dynamic mechanics. Such descriptions have become foundational in biology and the social sciences.<sup>6</sup>

Contemporary physics (statistical mechanics), biology (evolutionary theory), psychology, and economics, indeed, all complex systems follow stochastic principles.<sup>7</sup> The equations may be highly precise in describing the phenomena, like Schrödinger's wave function description of a quantum-mechanical system, but a particular endpoint follows a distribution of probabilities. And while statistical mechanics accurately define thermodynamic systems, biological systems enjoy no such accuracy. Physics envy has a powerful allure. With the rise of biochemistry and the hopes for a physical description of physiological processes in the late-nineteenth century, biologists had hoped to follow their physical science colleagues upon the successful reduction of life processes to physics and chemistry (Galaty 1974). Such expectations were based on the operations of a causation cascade that either followed serial (linear) sequences and thus were fully predictable or, as in the case of thermodynamics, collective properties might be discovered with corresponding methods derived to provide accurate outcomes. Alas, so far, such complex systems, whether biologic, economic, or social, have not been shown to follow ordering principles discerned by their examined properties and relationships. Indeed, more often than originally expected, indetermination reigns, and consequently, "uncertainty" assumes a new-found prominence.

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6 For a conceptual overview, see Auyang 1998; for an accessible history of complexity theory, see Waldrop 1992; for a review of current conceptual challenges see Chambers 2015; for introduction to systems analysis in biology, see Alon 2007.

7 The quantification of uncertainty has become a prominent subject in applied mathematics, e.g., Smith 2013; Sullivan 2015; Kochenderfer 2015.

The indeterminacies inherent in complex biological, economic, and social systems led to revised notions of likelihood (and expected control) in these fields. The mathematics required to deal with the probabilities of such systems and their aggregate data had wide applications, which percolated into all aspects of knowledge applications (e.g., education, social policy, business). The origins of these new mathematics date to the seventeenth century when European governments sought to characterize populations for demographic, economic, and military purposes (Hacking 1975; Kruger, Gigerenzer, and Morgan 1987). In the nineteenth century, statistical mathematics were applied to the human sciences, whose success was far more epistemologically limited than that accomplished in statistical thermodynamics (Porter 1986; Hacking 1990; 2006; Kruger, Daston, and Heidelberger 1987).<sup>8</sup> And by the twentieth century, probability theory has become a field of its own and so co-extensive to scientific method to claim itself, “the logic of science” (Gilles 2000; Jaynes 2003).

In terms of intellectual history, this “probabilistic revolution” emerged from new ways of approaching skepticism (Van Leeuwen 1970; Shapiro 1983; Popkins 2003). Originating during the early modern period, at the height of mechanical philosophy of science, a major epistemological reconsideration shifted basic premises about standards of analysis. And with that altered criteria of what would be accepted as proof, the *métier* of truth claims fundamentally changed (Pasnau, 2017). With more modest criteria of certitude, probabilistic thinking became a new tool that served to readjust epistemological criteria. This loosened understanding of cause acknowledged that natural phenomena could not be subject to scholastic demands and thus “justified allowance” eventually replaced “certain reason.” Moreover, different domains of knowledge demanded judgment based on the evidence suitable to each subject. Varying degrees of certainty led to different levels of assent and expectation, and correspondingly, epistemology became the examination of what warrants firm belief. Thus, “good enough,” as opposed to the unconditional, appeared in diverse disciplines (Hacking 1975; 2006; Kruger, Gigerenzer, and Morgan 1987; Kruger, Daston, and Heidelberger 1987; Pasnau 2017, 31–36; 187–88).<sup>9</sup>

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8 For a review of interpretations of probability see Gilles 2000.

9 Pasnau and Toulmin offer strikingly different interpretations of this epistemological shift. Toulmin regarded the Cartesian revolt against uncertainty as the basis of an almost willful assertion of certitude: “It might not be obvious what one was supposed to be certain about, but *uncertainty* had become *unacceptable*” (Toulmin 1990, 55). On this reading, science represented a new dogmatism concerning the character of knowledge that dominated other forms of knowing. As summarized below, Pasnau presents a more nuanced understanding of seventeenth century scientific quest for certainty. While the axiomatic ideal of Cartesian

Certainty was eventually shepherded off stage, and probabilities assumed center billing.

Once natural philosophers had accommodated themselves to the inherent limits of prediction, others followed in law, economics, and medicine. The transitions were gradual and variable standards of evidence vied for dominance. However, already by the end of the seventeenth century, John Locke (in *An Essay Concerning Human Understanding*, 1689) endorsed this new “proportionality” notion of the normative to reflect more moderate epistemic expectations.<sup>10</sup> With the acceptance of proportioned belief and reasonable doubt, the ideal of certainty orienting modern science radically modified Aristotelian criteria of what constitutes true knowledge. Instead of the necessary and eternal, certainty became conditional, dependent on the information obtained, and held to be true given the evidence at hand. These epistemological claims rested upon a new metaphysical foundation devised by Descartes’s efforts to formalize nature through mathematics and thereby discerning the divine cosmic machine. He sought the certainty so prominently displayed in his *Meditations* by acquiring a new set of postulates that would allow him to characterize the natural world through mechanical precepts. For the next two centuries, this attempt revolutionized the very basis of reality.

The scholastics thought of “causal explanation almost exclusively in terms of grasping the *essence* of things,” while the early modern figures, whom we now think of as scientists, relinquished that goal for a post-Aristotelian epistemic ideal. Modernity begins with discarding this Aristotelian doctrine of essences and replacing that metaphysics with a mechanical, material conception.<sup>11</sup>

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mechanics was exemplified in Newtonian Laws, for the most part, such certitude remained an ideal of limited scope. In other words, a newly acquired aura of circumspection prevailed.

10 “It is enough for us that we employ ourselves in looking for probably hypotheses and collecting data’ [Bayle, P. 1695. *Dictionnaire “Pyrrho”*] ... This goal is not certainty in the sense that Aristotelians hoped for, but evidence good enough to make belief reasonable. And with that shift in emphasis comes a corresponding shift from a conception of evidentness as compelling or forcing assent, toward a conception of evidentness as justifying or warranting assent” (Pasnau 2017, 37; 204–11).

11 *Essence* in the scholastic understanding is to ground explanation in the inner qualities of a thing, which in turn are constitutive to the thing’s essence. Gianfrancesco Pico della Mirandola (1469–1533, the nephew of the more famous Giovanni Pico) presented an early attack on the scholastic attempt at discerning essences. He began with listing the failed attempts to define the human and then proceeded to argue about natural phenomena: “Aristotelians are doomed to fail in their attempts to grasp the essences of things, because their approach requires working from the outside in, relying on the senses to grasp the accidents, and inferring from those accidents to a thing’s essence. This is certainly fair enough as a sketch of the scholastic method ... Given this sort of causal story, the scholastics might well suppose it possible in principle to

Instead of bodies governed by their inner essence, discernment of mechanical forces that dictate causal pathways was sought. The necessary connections between causes and effects were thereby radically altered and precipitated the crucial metaphysical turn of the seventeenth century: “the old causes got at the essence of things. The new causes were efficient causes, explaining how things were made to work” (Hacking 2006, 37).<sup>12</sup> A material physics would suffice and thus a new scientific ideal emerged, one whose predictive power was based on precision and mathematics.

Moreover, different domains of knowledge demanded judgment based on the evidence suitable to each subject. This adjustment had wide-ranging influence. By 1675, John Wilkins (a founder of the Royal Society), would distinguish mathematical, physical, and moral certainty and declare that each has its own truth criteria. He thus asserted a new-found confidence in “conditional infallibility, that which supposes our faculties to be true, and that we do not neglect the exerting of them” (Wilkins 1675, 9; cited by Pasnau 2017, 36.) The scientific enterprise thus embarked on a track re-set by new epistemological expectations. And perhaps ironically, the mathematics revealed the limits of prediction and the complexity of causal relations. In other words, science devised new ways of measuring uncertainty.

## CHANCE

Nothing makes sense without comprehending how one state leads to another. And the corollary—uncertainty reigns when cause is ambiguous or unknown—seems evident. After all, “causation is the most fundamental connection to the universe” and thus reaches to the very base of our governing meta-

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go from sensory experience all the way to the thing’s essence. But Pico casts doubt on every aspect of the story,” because of the fallibility of sensory perception and the inability then to drive to the core of a causal cascade to grasp ‘essence’ (Pasnau 2011, 634–35).

- 12 This post-scholastic reorientation has several origins, but in terms of this discussion, Galileo offers a particularly clear rejection of essences. Instead of invoking Aristotelian medley of forces that offered explanations of *why*, he asked *how*? He advocated descriptions of the properties of natural phenomena, e.g., location, motion, shape, size, etc., and thus abandoned the search for Aristotelian (unexplainable) causes. By describing the properties of bodies and the rules that govern them, a course closely followed by Newton a generation later, the New Science re-set the epistemic agenda (Galileo Galilei, 1957, 258; cited by Pasnau 2017, 15). Pasnau summarizes (2017, 155–59) contending interpretations of whether Galileo’s breakthrough resulted from a fundamental shift in metaphysics (Hacking 2006) or through an epistemic recalibration. Pasnau sides with epistemic reordering as exemplified by Newton (Pasnau 2017, 159–67).

physics (Mumford and Anjum 2013, 1). Notions of causation certainly qualify as fundamental to how the world is perceived and understood, and, most intimately, how we conceive our own agency to act within it. Later chapters will consider the scope of uncertainty reaching into the recesses of psychology, but here I am concerned with the character of chance in the natural sciences. Unlike “certain” knowledge, degrees of certainty preclude firm parameters and is measured in terms of “confidence levels.” The epistemological acceptance of probabilities governing the descriptions of complex systems conflicts with notions of idealized certainty, where one event follows an anticipated course of antecedents and consequences. So, just as the Copernican conception of the solar system upturned the basic metaphysics of medieval Europe, so too did a physics of chance revolutionize metaphysics. Today, uncertainty is generally accepted as constitutive of scientific explanation, not only in general reference to the fallibility of results and conclusions, but also regarding the predictability of phenomena and the degrees of confidence in describing cause and effect sequences. Truth is thus presented according to likely outcomes in which probabilities are fixed within statistical descriptions. What draws the boundaries for acceptable confidence then becomes a collective, interpretive decision.

When the criteria of evidence are subject to the interpretive faculties, negotiated acceptance must be conferred. All parties point to objective evidence, but objectivity is an idealized standard with a history of varying parameters and applications (Megill 1994; Daston and Galison 2011; Daston and Lunbeck 2011). And consequently, the history of science is the history of controversy arising from *interpretations* of what fulfills that ideal in consideration of ineliminable bias, philosophical commitments, social interests, and economic consequences. In short, the accrual of scientific knowledge is far more than the objective assessment of data (Shapin and Schaffer 1985; Shapin 1994). And when such elements are included in scientific assessment, positivism loses its grip on the enterprise (discussed in chapter 8). I am not suggesting that the fate of positivism and the rise of probabilistic mathematics are directly related, but they both point to a common recognition: descriptions of nature must deal with factors that compromise the status of some final Truth and the powers of prediction. Positivism developed in response to the subjective elements at play; statistical analyses was invented as a way of describing phenomena whose causal structure remained opaque. In both cases, irreducible uncertainty hovered over evidence and its interpretation. However, a deeper uncertainty lurks in the philosophical underbrush of this issue, one that drives to epistemology’s core problematic.

The issue at hand is how to understand chance in reference to predicting an outcome for a *single* case. So, probability provides a *description* of possible outcomes of a set comprising the phenomenon in question. And “if chance only means the unpredictability of a phenomenon and that predictability has to do with the limits of knowledge and not with the phenomenon itself, then chance is a subjective phenomenon linked to the limits of knowledge of the very one who speaks of chance” (Morizot 2012, 55). So, whether one assumes a subjective or objective views of probability is to ask, “whether the probabilities represent real facts about the world or the system in question or merely represent facts about our minds or our beliefs” (Velasco 2012, 6). Thus, two kinds of probability must be distinguished:

For statistical physics, the motion of a particle is subjected to Newton’s laws but it is described as a random walk. Probability in this case is subjective and not objective. It is used to handle the complexity of large populations of particles. However, in quantum physics Newton’s laws are no longer valid.<sup>[13]</sup> Chance is objective because indeterminism is inherent to the behavior of particles. So, inevitably, the question of the status of probability in biology arises: is it a subjective probability (epistemic), due to our lack of our knowledge (either experimental or theoretical) of the phenom-

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13 Heisenberg’s Uncertainty Principle asserts that with the measurement of a particle, place and momentum cannot both be measured accurately (Heisenberg 1958a; 1958b; Davies and Brown 1986). Observers cannot determine in any absolute sense the place and character of a quantum particle at the same instant: “If I know where an electron is I have no idea what it is doing and, conversely, if I know what it is doing I do not know where it is” (Polkinghorne 1985, 3). This measurement effect occurs because with every measurement, energy exchange occurs. In the Newtonian world that exchange is trivial and ignored, but with quantum measurement, energy must be exchanged between the apparatus and the quantum object. And because a quantum object is indivisible, it cannot be split or divided and, consequently, one cannot determine if that quantum comes from the apparatus or the object. So, “during measurement, object and apparatus are irreducibly linked. As a measurement is being made and registered the quantum object and measuring apparatus form an indissoluble whole. The observer and the observed are one. . . . The physicist John Wheeler used the metaphor of a plate glass window. For centuries science viewed the universe objectively, as if we were separated from it by a pane of plate glass. Quantum theory smashed that glass forever. We have reached in to touch the cosmos. Instead of being the objective observers of the universe we have become participators” (Peat 2002, 14–15). In short, Reality with a capital R, cannot be exactly observed. The Schrödinger wave equations that characterize quantum states are precisely deterministic, but because of the uncertainty induced by measurement, *cause* becomes a property of the physical system coupled to its observation. Thus, mathematical predictions cannot be directly observed and confirmed, for measurement itself creates the reality of the quantum event.

ena at stake, or is it an objective (ontological) probability that depends on the intrinsic nature of living processes? (Gandrillon et al, 2012, 2)

This question hinges on representations to distinguish between models and reality: “A model represents the world as being a certain way. We use models to make predictions and to explain phenomena. A model is something we use. Reality is the way the world really is” (ibid., 5). This distinction is the key philosophical issue about statistical representations of complex phenomena. Perhaps, not surprising, there is no consensus.

Given the centrality of probability in modern science, remarkably, we lack agreement on the conceptual status of statistical depictions, which Krzysztof Burdzy considers, not without justification,

one of the greatest intellectual failures of the twentieth century, [namely, the] several unsuccessful attempts to construct a scientific theory of probability. Probability and statistics are based on very well-developed mathematical theories. Amazingly, these solid mathematical foundations are not linked to applications via a scientific theory but via two mutually contradictory and radical philosophies. One of these philosophical theories (“frequency” [objective]) is an awkward attempt to provide scientific foundations for probability. The other theory (“subjective”) is one of the most confused theories in all of science and philosophy. A little scrutiny shows that in practice, the two ideologies are almost entirely ignored, even by their own supporters. (Burdzy 2009, vii)

The issue goes to the heart of representation, in other words, are statistics tools to depict the world or are they in fact “real,” as constitutive of nature? If the former, then

even at a conceptual level, determinism and stochasticity are notions that apply only to mathematical descriptions, that is, to models of the real world, and not to the real world itself. It is thus not clear if asking whether some data obtained from a real-world experiment are intrinsically deterministic or stochastic is a meaningful question. One should probably rather ask which type of model, deterministic or stochastic, is the more relevant to describe the data. (Bertin 2012, 16)

And with this tantalizing enigma, we turn to the heart of the matter.

Slowly, the implications of how modern physics and biology had revealed the opacities of causation dawned upon me. The satisfaction of pocketing a billiard ball or fixing a lawnmower reside precisely in the exceptional simplicity of the mechanics that govern those actions and the elegance of Newtonian physics that explains them.<sup>14</sup> However, those mechanics represent only a small slice of reality. Chance must also be accounted, for the certainty associated with linear causality that governs simple machines do not apply to complex systems (biological or social). These exhibit probabilistic outcomes. Indeed, with the rise of “systems thinking,” the traditional notions of certainty have been replaced with quantified likelihoods throughout the tower of knowledge.

In biology, from ecology to evolutionary theory to molecular biology, multi-dimensional system analyses, dialectical interactions, and over-determination has supplemented the simple clockwork conceptions taught me in my youth. Reductive approaches still dominate, but the temper of the discipline is shifting to more global assessments. And that move has included a more complex understanding of causality. And following our theme, this trend reflects a new calibration of the certainty/uncertainty calculus across the entire spectrum of inquiry—from the natural sciences to social policy to self-knowledge.<sup>15</sup> Just as the Copernican conception of the solar system upturned the basic metaphysics of medieval Europe, so too has a metaphysics of chance and indeterminacy revolutionized our fundamental view of reality, a reality characterized by the loss of foundations.

While I have emphasized the scientific sources of uncertainty, philosophy also had to take note. A new term, *epistemology*, was coined in the mid-nineteenth century in acknowledgement of a novel set of philosophical issues arising from a revised assessment of scientific knowledge.<sup>16</sup> With the rise of empirical science, knowledge produced by such investigations outstripped the

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14 The metaphysical shift of that revolution in thought is classically presented by Koyré 1968.

15 In the past few years, a plethora of books and articles about *uncertainty*, ranging from epistemological treatises to social commentary of various sorts, have appeared. Concerning the “certainty of uncertainty” see Wallerstein 2004; Marion 2015; Nowotny 2016; Pasnau 2017; Schaefer 2018. Uncertainty has become thematic in representing scientific knowledge, e.g., Briggs 2016; Dougherty 2016; Chen and Song 2017.

16 Although epistemology originates with ancient philosophy, the Scottish philosopher, James Frederick Ferrier (1808–1864), specified that “This section of the science is properly termed the Epistemology... It answers the general question, ‘What is Knowing and the Known?’ or more shortly, ‘What is Knowledge?’” (Ferrier 1856, 48). Later, Ferrier divided philosophy into epistemology, ontology, ethics, and anthropology (Oxford English Dictionary, “Epistemology”).

ontologies established by philosophers. More than a methodological divide, science presented a new uncertainty about knowledge itself. While positivist tenets apparently held sway, the fallibility of truth claims remained tightly moored to interpretations. Scientific knowledge was thus recognized as possessing a history, not just the story of its theoretical evolution, but also in recognizing its shifting conceptual basis, i.e., advances proceeded contingently on undulating conceptual foundations.<sup>17</sup> This insight itself would have cautioned my expectations of finding certainty, but a more profound instability lay beneath issues of justification: given that ontology is a way of organizing or understanding the world by set principles or foundations, the natural sciences revealed the uncertainty of such constructs. “The recognition that all knowledge about the world is methodologically mediated and grounded in conceptual presuppositions that are potentially undermined by new discoveries” leaves epistemology’s foundations insecure (Rees 2018, 57).<sup>18</sup> The 1990s Sciences Wars are but the latest iteration of this constructivist thesis.

We will review that debate below, but I pause here to note that I have detailed these matters, because their consideration served as an important step in my philosophy of science studies. Analyzing the early controversies at the birth of immunology introduced me to the undeclared conceptual underpinnings of scientific theory. The rapid advances in early twentieth century biochemistry and genetics outstripped Metchnikoff’s descriptive biology. Reductionism soon prevailed in defining research programs with obvious successes. I am no Luddite lamenting a discarded orientation of an earlier era, but only wish to emphasize that Metchnikoff intuited that the dynamic processes he described resisted the simple mechanistic explanations sought by the immunochemists. From our own vantage, the key principles guiding him have appeared under different circumstances, which in turn have prompted novel research approaches. Today, immunologists are amassing myriad data to discern the organization and regulation of the immune system. After all, elucidation of molecular mechanisms alone does not yield the insights required to discern the overall structure and functions of immunity.

My critique of immunology began with resisting the simplified self/nonsel self-schematization of immunity that fails to characterize the spectrum of immune responses. Indeed, the on/off switch of immune regulation cannot account for

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17 For the “experimental system” (i.e., epistemic) basis of scientific inquiry as opposed to accounts emphasizing the theoretical, see Rheinberger 2010.

18 Rees is indebted to Georges Conguilhem’s commentary on the relationship between history of science and epistemology (Conguilhem 1988).

the continuum of immune responses from quiescent acceptance of the foreign to a full-blown activation and rejection of the offending intruder. Linear causation adequately accounts for the sequence governing simple machines, but the immune system, like other complex systems, exhibits non-linear causation cascades that exhibit redundancy, over-determination, and probabilistic outcomes. To ascertain the regulation and organization of immune activities, the multiple pathways that govern the dynamics of this complex system must be accounted. With this mindset firmly in place, I returned to the question of immune identity and realized that the dominant clinical-based theory of immunology, founded on an autonomous model of selfhood, restricted assessing the full breadth of immunity and thus distorted its characterization.



## Chapter

# 7

## Pursuing the Enigmatic Self

**M**y philosophical interests steered me away from the major experimental concerns preoccupying the immunology community during the 1980s and 1990s. These included the ground-breaking studies of novel genetic mechanisms governing the immune response, new models of immune tolerance and autoimmunity, definition of the various mediators of the immune reaction and its regulation, and the isolation of the key molecular components of immune activation. Each of these areas deserved scrutiny, but I fastened on the identity question and saw it as the best target of philosophical study, although other candidates beckoned (e.g., information theory, model theory, and biological causation). However, one topic caught my interest as particularly important: the elucidation of the genetic mechanisms of antibody generation.<sup>1</sup> Scott Podolsky, a brilliant Harvard medical student, and I wrote *Generation of Diversity*, the definitive account of that crucial chapter of immunology's history (Podolsky and Tauber, 1997). The book fit into my general am-

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<sup>1</sup> Antibodies are the proteins (immunoglobulins) found throughout the body that have the unique property of attaching to other molecules through a highly sensitive and specific identification system. Antibodies have "sticky" ends that couple to matching molecular structures whether circulating in bodily fluids (e.g., blood or mucus) or to protruding substances attached to the outer surfaces of cells or microbes. Thus, antibodies are the tools of immune recognition and with their attachment to a target, a cascade of reactions initiates the immune reaction (neutralization of the offending substance or the death of the intruder). To discern how animals produce a universe of antibodies, each with a unique sticky end, from a pool of a small number of genes held the key to immune specificity. That question had emerged at the very origins of immunology and attempts to solve it represented a prominent theme of twentieth century investigations.

bition to write a history of immunology's development, and this text contributed to that goal by describing the key triumph of twentieth century immunology. And it also highlighted my larger theme. While Scott put the experimental story together (affronting the key players and a threatened legal suit to stop publication by two of them!), I argued that the molecular solution offered no insight into a larger problem—the organization and regulation of the immune system. To address that domain of questions would require analysis of the system as a whole and a loosening the bounds imposed by reductionist science. In short, with the antibody story solved, I argued that deeper problems awaited. Those were articulated a decade later, when I turned from the self-centered, defensive thought style of the insular immune self to an expansive ecological revision of immune theory. That required revamping immunology's central tenets.

Given the resistance to the challenges mounted against the dominant models of immune identity based on the atomistic self, I began to appreciate the strong hold of a metaphysics of agency that had so influenced immune theory. Two issues then assumed importance: 1) while philosophy had discharged the Cartesian ego, (see chapter 8, 13, and Appendix), (see chapters 8, 13, and Appendix), immunology still held to some version of a putative *entity* that could define a core identity to organize immune functions through self/nonself discrimination. As explained, I thought such a dichotomy failed to account for the complexity of immunity. Instead, I saw a powerful metaphor at work, one stretched beyond its scientific utility. And 2) if immune theory had adopted a discredited invention, did such an adoption signify a larger problem with the scientific theory itself? If so, then the misapplication of a metaphor pointed to the need for correction. In other words, if the self lacked standing, the scientific model in which it operated would incorporate its weaknesses and collapse. And from the ashes of the autonomous self, the ecological conception of immune identity took hold.

### THE ECOLOGICAL TURN

Metchnikoff's immunological observations began at about the same time one of his competitors, Ernst Haeckel, coined the term *ecology*. Haeckel, like Metchnikoff, was caught up in the Darwinian fever of the 1860s and sought a term to refer to the study of the multifaceted struggle for existence that Darwin's theory proposed. In 1866, Haeckel casually mentioned ecology as the study of "the interrelationships of living beings among themselves..." and in 1870 he elaborated this definition:

By ecology we mean the body of knowledge concerning the economy of nature—the investigation of the total relations of the animal both to its inorganic and organic environment; including, above all, its friendly and inimical relations with those animals and plants with which it comes directly or indirectly into contact—in a word, ecology is the study of all those complex interrelations referred to by Darwin as the conditions of the struggle for existence.<sup>2</sup>

This general ecological view resonated with my own training as a physician. I understood that the patient in her entirety requires a holistic approach. Whereas I practiced science as a card-carrying member of the reductionist team, clinical medicine had suffused my thinking with an alternate perspective: Patients must be conceptualized as integrated organisms, both in terms of their internal functions but also considered within their environment. Everything is connected to everything else; medication for the heart may have effects on the kidneys, antibiotics may affect nutrition, aspirin for arthritis might cause bleeding. Scientific medicine was based on the triumphs of the reductive program, but the care of the patient was framed by the organism-as-a-whole. So, as I was leaving the biochemistry laboratory, where reductive methods ceaselessly drove towards more basic mechanics (and these too were appealing), the possibility of conceiving complexity from another perspective appealed to my search for alternate philosophies of science.

This point of view reached well beyond methodological considerations. Accordingly, from the ecological vantage, immunity, by adjudicating what is assimilated and what is rejected, is the process that defines the organism's self-identification, namely, what it is and what it is not within the larger context of its environment. And those decisions occur in diverse settings posed by internal and external challenges. In such dynamic scenarios, adaptability and versatility determine overall success. Note, static parameters of immunity cannot accommodate opportunities or adjust to new trials. So, identity becomes a process of adjustments determined by the variables of the animal's history and ecological encounters. Under such conditions, what is core identity?<sup>3</sup>

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2 Quoted by McIntosh 1985, 7–8.

3 Heavily indebted to *The Dialectical Biologist* by Richard Levins and Richard Lewontin (1985), I proceeded to explore the false security that the genome offered to establish organismal identity (discussed below). But even when restricted to the genetics, the genome has been revealed as highly plastic and epigenetic effects render the sequence code only as a starting point for development. See various papers in Gissis and Jablonka 2011.

This acknowledgment of adjustment and modification underlies Metchnikoff's second seminal influence, namely, shifting the conception of the organism from possessing a stable, fixed identity to one characterized by adaptive change. With this basic reformulation, he discarded the Aristotelian understanding of *essence*. However, ancient metaphysics were slow to retreat. Nineteenth century biologists remained obsessed with understanding the "boundaries" between the organism and its environment. Yet, in a post-Darwinian construct, where everything is in evolutionary flux, how are those limits drawn? Simply stated, Metchnikoff posited evolutionary dynamics all the way down. And by breaking the then prevalent idea of a given basis of identity, he offered a radically different conception (Tauber 2017a).

As already discussed, the immune self is a powerful heuristic and a useful idiom to model diverse phenomena. And because of its evocative power, immune selfhood became crucial to the way notions of agency were incorporated into the science. This metaphor, in turn, supported the clinical scenario in which the self/other orientation grounded the warfare modalities of host defense. Fair enough. So, where does that conclusion leave immune theory that must encompass a larger array of immune phenomena?

Reacting and adjusting to external stimuli and conditions, vital processes are characterized by continuous exchange, both of nutrition and of information. To remain restricted within an analysis that already assumes only a defensive posture, limits understanding how animals live in intercourse with others. So, once the hegemony of the host defense scenario is supplemented with assimilative functions, tolerance assumes its proper role in the complex calculus of immune reactivity (Tauber 2008b; 2008c; 2017b). Note, when assimilation is placed in parity with rejection, immunity becomes a spectrum of responses ranging from active defense to immune silence.

Ecology is not restricted to the external environment but also includes the host's internal microbiome, the resident symbionts living in the gut, skin, and mucous membrane surfaces, where cooperative relationships between host and microbes govern normal physiology. As this ecology changes over the lifespan of the organism, an ever-evolving identity develops. Recently, an unexpected inversion of our body mythology has become evident: an individual's immune system itself is in part created by the resident microbiome, the consortium of microbes that live in commensal association with the resident animal constituents. For example, in vertebrates, the gut-associated lymphoid tissue becomes specified and organized by bacterial symbionts, and if the symbiotic microbes

are not residing within the gut, the immune system does not function properly, and its repertoire is significantly reduced. Recognizing the mechanisms that account for the establishment and maintenance of symbionts, where the animal houses ten times as many bacteria as the native cells of its own genetic identity—and cannot survive without these residents—requires a reassessment of organismic individuality and, ultimately, biological identity (Gilbert, Sapp, and Tauber 2012; Rees, Bosch, and Douglas 2018). So, when one refers to the greater ecology of the immune system, the larger context that includes both internal and external universes sensed and acted upon, the borders shift from an exclusive protective mode to a gateway of exchange between the host and its environment. I embarked on a comprehensive exploration of how this ecological perspective impacts immunology.

With the emphasis on elucidating vertebrate defense, immunology delayed attention to the demands of addressing immunity as “benign” maintenance. From this vantage, critical immune functions are understood as directed at 1) stabilizing an internal holobiont, in which tolerance of resident organisms must allow for mutualistic relationships, and 2) directing assimilative traffic with the external environment required for sustenance. Recognizing these twin preservation functions, together with the collected immune responses to pathogens, generates an immune profile that is characteristically evolving. Immunity matures during childhood and continues to change during the entire life span of the organism as a result of ordinary repulsive and incorporative immune processing (Grignolio et al, 2014; Brodin et al, 2015). The organism “learns from experience,” where the coordination of complex physiological activities of many cells, across tissues and several levels of organization, cannot be strictly pre-programmed, nor restricted to structures exclusively confined to the immune system (Grossman 1993). Consequently, the immune profile cannot be fixed, and the notion of a core identity is challenged by an altogether different conception.

My general attitude had been formed in the Metchnikoff study. As already discussed, he was prescient in rejecting the mechanical biology accompanying a static notion of organismal identity. By the late twentieth century, a dynamic picture emerged: the organism is engaged in myriad dialectical relationships with its world. In an ever-changing set of relationships, at many different levels of engagement, it lives both in response to its environment, and in turn alters its environment, both passively and actively. On this view, the organism undergoes redefinition of its ongoing development throughout life, just as Metchnikoff envisioned.

Accordingly, instead of an individualized notion of the self as a given entity neatly defined, that is, entailed by its own “selfness” and guarded by an immune

system, organismic identity emerges in dynamical encounters both within the body of the animal and beyond in a world fraught with various friend and foe relationships. This point of view shifts biological identity from one based on some pre-defined (and sustained) insularity to one characterized by the mutually affecting presence of the other. In the former case, immune activity is directed against the other, a so-called “one-way” paradigm; in the latter formulation, a “two-way” exchange occurs, where immune tolerance (non-reactivity) confers a benign designation to the foreign and thereby adjusts the meaning of the “other.” And with that nonessentialist understanding, immunology redirects itself from the one-way defensive modality to a two-way” dialectical immune “dialogue” (Starzl and Demetris 1995; Tauber 1998c).

The spectrum of immunity includes two kinds of immune activity, where the primal setting of species juxtaposed with each other must depict both the struggle and the mutual dependence of their interactions, whether enacted with the external environment or within the internal milieu. In such dialogue, the evolving nature of immunity is apparent because with the exposure to infections, vaccinations, the microbiome, and other environmental factors, immune memory adjusts the set point of discrimination. Accordingly, the immune self, even as classically conceived, enjoys no stable configuration. Discerning how the immune system develops and functions within its global ecology leads to models of immunity that transcend the self/nonself, subject-object dichotomies that have previously characterized the science. Immunology is only at the beginning of this transition, but new ways of thinking have begun to realign research strategies.

Drawing from my own skepticism about the promise of molecular biology to answer questions directed at understanding immune organization and regulation, I regard immune discrimination as a collective property of the immune system’s various components (Tauber 2017c). Such an approach parallels the character of neurological functions, and, accordingly, my critique focuses on how the immune system should be regarded as a system as a whole. On that view, system-wide analyses must be developed to better discern causation mechanisms quite different from on/off mechanics based on simple self/non-self discrimination models currently in vogue.<sup>4</sup> This position then led to the second prevailing idea of my scholarship, namely, to replace an autonomous

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4 The mechanisms of control pertain to how the system’s elements are connected, and in this regard only recently have methods been developed to discern such activity (Bransburg-Zabary et al. 2013).

conception of the organism with one defined in terms of its contextual placement in the environment.

As I promoted this ecological orientation that set the animal in its full interactive setting, a broader array of immune functions were considered. Because the organism must assimilate beneficial substances, such incorporation (e.g., nutrients) requires immune tolerance and sometimes, mediation. In other words, *balance* becomes the regulative principle for immunity, which means that the entire organism must be regarded as an integrated ensemble, whose frame of reference is the system as a whole. Beyond the direct interactions of antibodies and lymphocytes, there are over 30 cytokines (soluble mediators that stimulate and dampen the immune response);<sup>5</sup> approximately 20 cell types distributed in ten organs and the numerous products generated from these diverse sources.<sup>6</sup> Moreover, different cytokines (e.g., IL-1) may have different effects in different physiological systems and “a molecular pathway may have different effects in different cellular contexts, so that the same pathway can be involved in different functions in different species or in different parts of an individual” (Gilbert and Sarkar 2000). The immune response then constitutes a complex integration of molecular heterogeneity, cellular distribution, and finally, the economy of cytokine regulation resulting from cellular stimulation. Obviously, the complexity of coordinating such a vast array of components is a daunting challenge to modelers, and not surprisingly, only modest progress has been achieved over the past 20 years since serious efforts began (Tauber 2017b, chapter 6).

And even more than the complexity of integrating so many actors and charting the causative pathways of such an intricately dynamic system, I worry

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- 5 These molecular factors have diverse functions: Some effect natural immunity (e.g., tumor necrosis factor- $\alpha$ , interleukin [IL]- 1, IL- 10, IL- 12, type I interferons, and chemokines) and others play a role in regulating adaptive immunity (e.g., IL- 2, IL- 4, IL- 5, transforming growth factor- $\beta$ , IL- 10, and interferon- $\gamma$ ). Cytokines also have effects on supporting tissues (e.g., bone marrow, spleen, endothelium, and all target tissues), which should also be included in the system inasmuch as each target, in one capacity or another, provides varying kinds of interactions with immune cells and their products. The characterization of each element is determined by the particular experimental protocol chosen, which in turn has occasionally introduced an artifact related to the contingency of the factor’s discovery in one context only to be revealed later as having other, perhaps more important, roles in another experimental setting. The immune response then constitutes a complex integration of molecular heterogeneity, cellular distribution, and, finally, the economy of cytokine regulation resulting from cellular stimulation.
- 6 For example, B and T lymphocytes, dendritic cells, NK, Tc, Th, Th1, Th2, mast cells, plasma cells, progenitors of all kinds, thymus stroma, various leukocytes, and fibroblasts.

that the “wrong” data is being used. With the underlying commitment to the self/nonsel self paradigm and its associated on/off basis of regulation, the subtle surveillance activities of the immune system at rest are missed. As already mentioned, the immune system has diverse roles in the body’s ceaseless economy of internal cellular turnover, repair, scrutiny for malignancy and damaged tissues. These diverse supervisory processes maintain the organism’s normal body economies. Such reconnaissance does not elicit an augmented immune reaction characteristic of inflammatory responses. Add to this internal surveying, the oral tolerance required for ingestion of nutrients and the establishment and maintenance of the microbiome has only recently become a focus of research interest. The ongoing low-grade activities of the so-called resting state of immune “silence” does not signify immune deafness and as a critical aspect of immunity, these so-called “tolerant” mechanisms demand attention.

“Autoimmune” surveillance functions and the tolerance exhibited in assimilation and commensal relationships remain below the radar of active immune responses and thus are more difficult to study (Tauber 2015). Although immunity’s quiet business is continuously at work, because the information fails to elicit the established methods of measurement of the more vigorous immune reactions, we have relatively little knowledge of such activity. Techniques differ in evaluating an acute, augmented immune response versus assessing the characteristics of a low-grade, steady state. The origins of immunology as a clinical science explains why various full-blown activations have been studied in detail, almost to the exclusion of normal resting immunity: the scenario of the infected or allergic patient directed interest and resources to addressing these acute diseases. But such attention, when not balanced against other immune states, offers a distorted picture of the immune spectrum.

If the organization and regulation of the immune system is to be defined, then the resting state must be thoroughly investigated, because by definition, activation of the system emphasizes certain domains to the exclusion of others. If the system in its totality is to be considered, then the entire immune spectrum must be investigated. So instead of focusing on dramatic effector events, immunity’s ongoing low-level surveillance and tolerant encounters also must be characterized. In fact, these are the most basic functions. On this basis, a fully integrated ecological approach would encompass a comprehensive examination of both internal and external environments to capture those dynamics. Considering my own medical orientation, this ecological shift in thinking strikes me as ironic, inasmuch as I had recast immunology from its clinical home to join the environmental sciences.

Shifting from a focus on immune activation to studying the steady state condition of the immune system in resting conditions would require a major disciplinary adjustment, both methodologically and conceptually. Beyond the technical requirements of developing more sensitive methods for assessing the immune system in its normal housekeeping activities, a reconceptualization of what immunity does as part of the body's ordinary economy of exchange and surveillance is required. Displacing research priorities from studying full-throttle activation to the quiescent low-level activities governed by tolerance shifts the focus from effector functions to the preceding immune event of perception. The target must be sensed, and that information processed to initiate an appropriate response. Note, perception is first, and then reaction follows. On this understanding, the immune system is an information processing system that senses both danger (in the form of pathogens, allergens, toxins, etc.) and, just as importantly, tolerating the benign (i.e., ignoring innocuous substances and allowing absorption of nutrients for the organism's benefit). This bi-directional or ecological orientation dispenses with the notion of immune identity originally conceived in terms of insular individuality. However, the notion of an "individual" defining agency has a powerful grip on Western sensibilities, and despite the difficulties of defining such a subject, the *idea* of autonomous entities seems entrenched in common thought. For scientists this may not be a practical concern, but philosophers are still vexed by the general problem of the relationships of parts and wholes.

#### ON INDIVIDUALITY

If the autonomous self is inadequate to model the full spectrum of immunity, what construction might be substituted? On my view, a better formulation would account for the organism's ongoing dialectical processes with the world, both external and internal. In this schema, exchange processes define both the host and the other in relation to each other. Accordingly, identity shifts from emphasis on individuality to a relational construct. Indeed, in biology, organisms only exist in relation to others. Such an orientation conflicts with immunology's dominant thought style.

In the context of host defense, the clinical origin of immunity, the basic model is based on 1) protecting, 2) an autonomous, 3) individual (the patient). These features—protection, autonomy, and individuality—have served as the conceptual foundation of immunology since the end of the nineteenth century. In this scenario, distinct borders confer guarded individuality, and immunity is

the response to the violation of those boundaries. Accordingly, the individual is “self-contained.” However, from the ecological point of view that characterizes organisms in collective relationships, where does the individual begin and end? Indeed, what constitutes autonomy? Is autonomy even a significant characteristic in biological terms? These are central questions in philosophy of biology (Gilbert, Sapp, and Tauber, 2012; Tauber 2017b, 90–97; Gilbert and Tauber 2016).

The biological “individual” has served as a crucial basis for studies of genetics, immunology, evolution, development, anatomy, and physiology. Each of these subdisciplines has a specific conception of the individual organism that has historically provided the conceptual apparatus for integrating newly acquired data. By and large, an individual is regarded as possessing anatomic borders, harmonious balance characterized by communication between its parts, division of labor for the benefit of the whole, and a system of hierarchical dominance and control. Such an individual reproduces as a unit to replicate itself. However, symbiosis challenges this well-entrenched definition of the organism, because not only does the internal consortium of organisms sacrifice physiological autonomy as previous understood, but the collective also blurs anatomic borders to further obscure clear definition; development becomes intertwined among several phylogenetically defined entities, and the unit of evolutionary selection thus becomes a multiplex genome.

The idea of the individual operates at several levels of organization to capture a kind of class that distinguishes one gene, organism, species, and so forth, from another. However, scientific definitions of what constitutes an individual may be disputed. For instance, a gene is a seemingly easily specified class but is not readily defined. The use of the term “gene” is related to a complex process of inheritance whose origin and functional borders are not clearly delineated as to what marks the originating unit, or the minimum molecular requirement to produce a protein (Sarkar 1998; Beurton, Falk and Rheinberger, 2000). If one adheres to genetic reductionism, the identity problem is simply answered by a genetic signature where the genes “program” development.<sup>7</sup> But given the stochastic behavior of gene expression and the epigenetic factors in development (due to variable gene expression determined by external factors like temperature, nutrition, envi-

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7 Richard Dawkins in *The Selfish Gene* (1976) promoted the idea that organisms are essentially carrier of genes and then all of biology becomes the description of how the organism services (perpetuates) its genome. The position has been vigorously opposed, primarily within the debate about sociobiology, where genetic proponents have argued a genetic determinism that reduces complex human behaviors to some genetic substrate (Lewontin, Rose, and Kamin, 1985; Segerstrale 2000).

ronmental stress), such a solution is hardly complete (Gilbert and Epel 2015). And another startling example: the notion of species, the core focus of evolutionary theory, has no settled definition. When my doctoral student, Gal Kober looked, she found 23 definitions. They overlapped, but at each end of the spectrum, major differences emerged (Kober 2010; Clarke and Okasha, 2013).

Obviously, we use “individuality,” but such employment often relies on an intuitive grasp of that which we wish to characterize or count by criteria that may be quite arbitrary (Martin and Lynch 2009; Goodnight 2013). Once a definition is operative, then all those fulfilling the criteria may be counted. Such ambiguity may, in fact, be useful in accommodating larger theoretical concerns and hidden biases and, in the end, pragmatic rules are applied that follow collective judgments or a pre-subscribed model. So, attempts to define biology’s key concepts, from species to gene, characteristically exhibit the ontological ambiguity of individuals that then require intuitive separation, usually determined by consensus, and established by practice. The net result defies the semantics: instead of extending social notions (particularly Western ideas) of human individuality into biology, we now appreciate that complexes of organisms challenge any singular definition of organismal identity as independent agents (Löwy 1991; Gilbert, Sapp, and Tauber, 2012). Without firm parameters, one might easily concur that

a biological individual is just any object that some part of biology recognizes as worth describing. It might be an organism, a part of an organism, or a larger thing like a colony or ecological system. There are no fundamental or most-real individuals in biology. (Godfrey-Smith 2013, 19)

Underlying this discussion is a metaphysical assumption that nature may be successfully carved at its joints, a contemporary version of the ancient question about natural kinds:

[Nature] is a vast plenum in which our attention draws capricious lines in innumerable directions. We count and name whatever lies upon the special lines we trace, whilst the other things and the untraced lines arc neither named nor counted. There are in reality infinitely more things “unadapted” to each other in this world than there are things “adapted;” infinitely more things with irregular relations than with regular relations between them. But we look for the regular kind of thing exclusively, and ingeniously discover and preserve it in our memory. It accumulates with other regular

kinds, until the collection of them fills our encyclopedias. Yet all the while between and around them lies an infinite anonymous chaos of objects that no one ever thought of together, of relations that never yet attracted our attention. (James 1987a, 394)

And then James' conclusion seems binding to me: "there is no really inherent order, but it is we who project order into the world by selecting objects and tracing relations so as to gratify our intellectual interests. We carve out order by leaving the disorderly parts out; and the world is conceived thus..." (James 1987b, 634).

How the world is parsed and what is deemed important for study is determined and widely understood, by cultural values. As Max Weber observed, "we cannot discover what is meaningful to us by means of 'presuppositionless' investigation of empirical data. Rather, perception of its meaning to us is the presupposition of its becoming an object of investigation" (Weber 1949, 76). Any semblance of order is achieved by the winnowing power of value-based selection, for "in every case only a part of concrete reality is interesting and significant to us, because only it is related to the cultural values with which we approach reality" (ibid., 78). Following this line of reasoning, what constitutes a legitimate criterion to differentiate one individual from another is, ultimately, a convention (further discussed in the next chapter). This invocation forthrightly incorporates a constructivist understanding that I absorbed from the science studies literature.<sup>8</sup>

The ambiguities of individuality swirling around "species," "organism," and "individual" are interlocked, each suffering from vague and multiple criteria and thus obstructing the development of precise and inclusive definitions (Wilson 2005; Clarke and Okasha, 2013). In the immune scenario a similar problem arises. As already discussed, when immunity is considered in terms of ecological relationships, individuality becomes highly problematical. Again, like the immune self, the individual is obviously a useful, if not an indispensable semantic element, but its ontological status sways to and fro with different meanings generated in local contexts. Indeed, individual is employed with the same latitude immunologists use self in devising organismal identity. Framed

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8 Although discussed in chapter 8, no attempt is made here to address the various issues I examined in this vast field of scholarship. The best introductions to contemporary science studies are the several editions of *The Handbook of Science and Technology Studies*, which reflect the evolution of this academic discipline from the mid-1990s (Jasanoff, Markle, Petersen and Pinch, 1995; 2001; Hackett, Amsterdamska, Lynch, and Wajcman, 2008; Felt, Fouche, Miller, and Smith-Doerr, 2016).

within these discussions, agency and the immune self assume meanings that depend on the context in which identity is considered.

Contemporary immunology must now accommodate itself to this reconfiguration of organismal identity as determined by the fluidity of borders. Fully placing the organism in its environment has changed the definition of immune individuality and the processes responsible for such differentiation. Moreover, the concept of the organism as a holobiont, characterized by multiple species living together in complex immune-tolerated commensal relationships, has further deconstructed older versions of individuality as conceived immunologically despite the efforts of others to retain the older means of differentiation (Pradeu 2013).

Sluggish acceptance of different conceptions of organism may be explained by sociologists, who have noted that individuality, as does selfhood, draws from a deep cultural reservoir of social commitments not easily discerned or relinquished (see next chapter). Indeed, for Westerners, that identification “goes all the way down.” Viewed in this light, the co-dependence of immunology and the culture in which its ideology is framed illumines the power of this science in forming and then supporting dominant modes of identity.

#### COMMENT

My critique of immunology’s theory has been informed by the philosophical replacement of the autonomous ego by the subject conceived in terms of relationship. I applied this construction to the ecological model of immunity. That formulation, not surprisingly, draws from social meanings of selfhood, which in the broadest sense, is the ethical universe in which subjects live with others. As “self,” “agents,” and “persons” designate subjects acting in social environments, identities are determined by decisions that follow the dictates of values, mores, and obligations. In terms of this later understanding, the idea of the self became a way of representing the self-reflective agent of ethical choice, action, and identification, a set of designations that conferred very different meanings to the original Cartesian “thinking thing.” In short, the “self” became a moral and political category, not epistemological.

If, in fact, the self is a crucial way of identifying moral agents and representing their actions in the context of others, I thought using “self” as an epistemological construct in immunology, given its philosophical deconstruction, committed a “category error.” On this view, the importation of “the self” into immunology had an unsteady standing even as an idiom and became a seman-

tic trap that restricted the further development of immunology's theory (Tauber 1999b). As discussed in chapter 5, two features about the immune self stood out: 1) several definitions of immune identity reflect different meanings and uses of selfhood, and 2) the self/nonself designation served as a placeholder for describing the discriminations of immune reactions, an on/off system. However, on the eco-immunology perspective I propounded, instead of rigid self/nonself discrimination, immunity operates with flexible borders that reflect contextual determinants that then respond with a spectrum of responses. An entity, as such, did not exist beyond functional designations, a conclusion later extended by others (e.g., Pradeu 2012).

Clearly, the self served as a useful rhetorical device to coordinate various aspects of immune function, however, that construction carried liabilities, namely, a restricted idea of identity. A circumscribed, insulated notion ignored the dialectical character of biological functions and impoverished the full scope of immunity. When these dynamics are considered, a different way of thinking about biological identity emerges (Tauber 2000; 2017b). Although a useful tool, immunity based on a singular self would require a reconstructed theory, because such a model had collapsed under the weight of conflicting laboratory and clinical findings. Irrespective of those considerations, it was a weak scheme to begin with. This conclusion was not an armchair contemplation, but was rather derived from a critical review of the scientific evidence that could not be integrated with the conception of selfhood based on an autonomous model of identity.

And by discarding the atomistic immune self, new vistas beckoned for immunology's theoretical development. Far from what some immunologists claimed as the "end" of the science (Jerne 1967), I sought to replace the prevailing model of immunity with an expanded theoretical base in order to focus upon horizons only faintly outlined in the current literature. Forty years earlier, Jerne had argued that the conceptual foundations of immunology had been established and experimental evidence confirmed his theory of the immune response, at least as he had conceived it. Yes, the science had matured, but the "end" was nowhere in sight. While a segment of immune phenomena had been clarified, much was left to discern, apparently far more than he realized. It is risky to make such predictions. For instance, Paul Cannon, the former president of the American Association of Immunologists and distinguished member of the National Academy of Sciences advised a young doctor in the early 1940s, "No young man with aspirations for becoming a scientist should stake his future in immunology; all of the important questions have

been answered" (Rowley 1991). Since then, 19 Noble laureates have been recognized for their contributions to that "completed" science. And that science extends far beyond the laboratory. On my view, placing immune identity in the ecological framework opens new vistas for immunology's development. The science speaks for itself, but its correspondence to a philosophical infrastructure deserves comment.

### THE SELF RECONCEIVED

The modern philosophical problem of personal identity begins with Descartes's famous assertion, "I think, therefore I am." By proclaiming the incontrovertible solidity of his own ego as the foundation of knowledge, a so-called "thinking thing," he pursued a reasoned, logical deduction from the certainty of his own self-awareness. However, the structure he proposed inadvertently makes the *I* an *other*. To communicate with oneself already entails a partition. The very nature of such a monologue is, in fact, a dialogue where one speaking with "oneself" leaves the subject-object predicate structure in place. Descartes himself presents the ego's representation of itself as divided by its own self-consciousness in which a gap appears between the

"I" of the "I think" and the "I" of the "I am," which follows as a logical conclusion from the "I think." That is to say, either these two "I's" are not the same thing or the second is already assumed in the positing of the first. "I think" already entails the subject "I" and, thus, the conclusion, "I am" is strictly superfluous. Descartes has not really proved or substantiated anything beyond what he had already presupposed. (Chiesa 2007, 15)

So, the *I* which is said to think is already marked off from the *I* that affirms the thinking. Simply, the ego has been split and subjectivity swings between the self-consciousness of *I think* and the being of *I am*. So, when I am not consciously thinking, when *I* is not (re)-presented in thought, the subject extends in the world, unmediated by the self-consciousness of its own thought.<sup>9</sup> And with the ego representing herself to herself, or as she imagines herself, the

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9 Here, despite the very different discourse, we recognize Heidegger's solution where *Dasein* (Heidegger's nomination for the subject described in chapter 13) is integrated in the world, where action of an actor is replaced with a seamless assimilation of the subject in the circle of her being (Tauber 2013a, 90ff.).

“modernist fallacy” has been committed in which such imagining must be based on symbolizing or representing herself to *herself* (Neill 2011, 17).

This portrayal vividly depicts the fault lines of self-consciousness. When the ego peers at itself, the *I* becomes an object. And if *I* am an object, who then knows *me*? When *I* becomes the object of one’s own subjectivity (which in any case cannot be identified), the self-conscious first-person addresses her inner state as in a third-person relationship. In this scenario, a putative object of scrutiny has been created from a reflexive construction. As an object, consciousness somehow resides separate, albeit close to one’s true self, but always distinct. Consciousness is the stream of thoughts (James coined the term, “steam of consciousness”) that, when contemplated as an object, must then be displaced by another core sense of selfness that unforgivingly retreats.<sup>10</sup> The self then cannot be purely experienced but is represented by the “sum total of all that he CAN call his” (James 1983, 279). These, of course, include emotional, spiritual, and subjective elements of identity beyond bodily sensations, but the embodiment reactions (according to James) serve as the foundation of consciousness, and more fundamentally, selfhood. Since consciousness is world-directed, it is defined in terms of its objects, including the recognition of its own body as its “self.” And, of course, consciousness is only known in retrospect: “[I]t is not one of the things experienced at the moment; this knowing is not immediately known. It is only known in subsequent reflection” (ibid., 290). Consciousness, then, is recognized in the attempt to objectify the phenomenon of self-reflection or awareness. However, such second-order cognizance is irretrievably distinct from its ontological source, its “selfness.” This observation serves to cap the Cartesian model and its subsequent development in the modernist context (see Appendix).

Nietzsche attacked the modernist ego (of the self, more generally) as an artefact of self-consciousness (Koelb 1990). With the subject having lost its boundaries and its footings, he asserted that the ego is but a fictive construction and thereby he dispensed with the self altogether.

I don’t concede that the “I” is what thinks. Instead, I take the *I itself to be a construction of thinking*, of the same rank as “matter,” “thing,” “substance,”

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<sup>10</sup> “But it must be remembered that all writers who have described the Cogito have dealt with it as a reflexive operation . . . a consciousness which takes consciousness as an object... But the fact remains that we are in the presence of two consciousnesses, one of which is conscious of the other... Thus the consciousness which says I *think* is precisely not the consciousness which thinks” (Sartre 1957, 44–45).

“individual,” “purpose,” “number”: in other words to be only a *regulative fiction* with the help of which a kind of constancy and thus ‘knowability’ is inserted into, *invented into*, a world of becoming. Up to now belief in grammar, in the linguistic subject, object, in verbs has subjugated the metaphysicians: I teach the renunciation of this belief. It is only thinking that posits the I: but up to now philosophers have believed, like the “common people,” that in “I think” there lay something or other of unmediated certainty and that this “I” was the given cause of thinking, in analogy with which we “understood” all other causal relations. However habituated and indispensable this fiction may now be, that in no way disproves its having been invented: something can be a condition of life and nevertheless be False. (Nietzsche 2003, 20–21)<sup>11</sup>

Once this position takes hold, the entire modern edifice based on the rational, self-knowing ego collapses and the certainty of the very sense of self yields to skepticism. For Nietzsche, the I of the subject-object structure of conscious thinking divides the unity of psychic life into a conscious-unconscious artifice, whose structure conforms to a theoretical model, but fails to offer an adequate understanding for personal identity. Instead, he maintained that the core of psychic life does not conform to the imposed structure of conscious predicate thinking. Accordingly, it is unconscious psychic life that constitutes human *being*, and the effects drawn from that domain are demonstrably present and directly available in various modalities of emotion and feeling. Freud developed that theme and then later postmodernists followed the inner logic lying-in-wait (Tauber 2013a). Indeed, to accept the mystery of the unconscious foundations of the ego and the constitutive fallibility of knowledge, more generally, is to radically disrupt “the order of things” (Foucault 1970).

Because there is no object to see, or to know, the entire notion of some core self—a homunculus—residing at the seat of one’s soul appears as an artifact of the inner-directed human cognitive faculty and the grammar of Western languages.<sup>12</sup> The solution argued during the twentieth century, most prominently

11 Note, “regulative” is used here as an organizing principle that has no basis in fact, i.e., useful as a functional description—an “as if...” linguistic device.

12 Self-consciousness thus presents a set of problems about the explanatory gap between the physical basis of mental states and the awareness we have of the world and the inner sense of thinking that comprises self-consciousness. This disjunction has been called “the hard problem” (Chalmers 1995), and closely following, if consciousness is the “hard problem,” then finding meaning in a material world is the “really hard problem” (Flanagan 2007).

by Heidegger and Wittgenstein, requires dispensing with that subject-object (*res cogitans/res extensa*) structure altogether (discussed in chapter 13). On this account, the Cartesian notion of identity was widely challenged, and today many would say that the autonomous, individuated ego has not only been defrocked but finally dismissed.

Persons, agents, and subjects act in the world, but the self is an abstraction, a product of faulty grammar or misaligned metaphysics, an epiphenomenon of the mind, and despite our best analytical efforts, it is “necessarily incomplete, because the project resists description and conceptualization as it is in itself. It is lived but not known: it is a ‘mystery in broad daylight’” (Jopling 2000, 13).<sup>13</sup> Given that conclusion, the self hardly offers a firm foundation for theorizing immunity and on that basis, I reevaluated the basic assumptions underlying the science of identity.

Early immunologists conceived immunity predominantly in terms of the organism’s insularity and thereby falsely simplified the complexity of these functions. By building on an atomistic notion of identity, the very conception of the Cartesian ego later rejected by philosophy distorted the process biology characterizing organic functions (Nicholson and Dupré 2018). As already detailed, the revised model emphasizes that intercourse with the environment (both internal and external) requires balanced adjudication of rejecting and assimilating processes. This point of view takes account of how organisms live in a universe of interactions in which dialectical exchanges challenge any singular definition of identity. That design of interchange has prominent philosophical antecedents and psychological considerations in the “relational” interpretation of identity from which I drew my revisionary ecological account.

That conception of identity originated with Georg Wilhelm Friedrich Hegel, who composed identity in terms of dialectical relationships. He portrayed a strictly evolving, dynamic notion of the subject, where the ego emerges only in relation to another. In the famous Master/Slave allegory (*Phenomenology of Spirit*, 1807), he mythologized a primordial scene in which two strangers meet. They recognize each other as the Other. In that conscious recognition, they distinguish themselves as individuals in their mutual encounter. The confrontational scenario—one referred to as dialogical or dialectical—creates the self-consciousness of personal identity. In other words, one is not conscious of oneself until the Other appears. In that recognition, identity is established in

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13 Jopling is referring to Jean-Paul Sartre, who in *Being and Nothingness*, describes consciousness as a “mystery in broad daylight” (Sartre 1978, 610).

the contrast with oneself. So, in the Hegelian construction, instead of some core identity, persons are identified in relation to some Other as confronted by other persons, the natural world, the divine, and so forth.

This formulation aligns with lessons learnt from social philosophy and developmental psychology. Although individuality and autonomy govern much of Western political identity, such ideals are balanced against contravening communitarian conceptions of persons, according to which humans are part of a collective that confers individual identity. Perhaps the clearest example of this relational understanding is found with young children, who adopt various behavioral features first observed and then copied from their parents, siblings, and mentors. They internalize cues of comportment, values, and goals that establish the basic framework of their own developing identity. This is hardly a radical insight, for any parent knows that young children fashion themselves to varying degree upon adult behaviors: “I must be like Mommy or Daddy. At least, I want to be.” Indeed, much of “up-bringing” is instruction and adoption of learned practices and discourses. The nature-nurture line is continually disputed, but much of the contemporary views of personal identity are understood as essentially mimicked behavior, whose structure persists in the cognitive and behavioral characteristics of adult identity.<sup>14</sup>

This social theory of identity formation holds that human identity is the product of both a core personality and the social environment in which persons develop. Accordingly, not only is social identity established by observing others in terms of presentation-of-self (a social adaptation), but one’s own self-image (the psychological understanding of one’s self) is derived as a reflection of how others regard me. Accordingly, others serve as mirrors on two levels: one must comprehend how I am perceived by others, a crucial way to gauge one’s interactions and social identity. And at a second level, such understanding also informs one’s own self-image in the sense of the infant viewing a mirror: how others see *me*, I refract myself. This conception is a close parallel to Hegel’s original description of the origins of self-consciousness and self-identification. Note, the existence of the other comes first; I follow.<sup>15</sup>

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14 Wolfgang Prinz calls this developmental theory, where agency, intentionality, and cognition derive from various kinds of social interaction and communication, the “open mind” (Prinz 2012).

15 And more than this social formation of identity, the so-called “mirror effect” goes to the core of self-awareness, i.e., I only understand myself as others perceive me. In other words, I internalize that reflected image to provide a basis for modeling consciousness: “Our beliefs about minds ... are in fact not just beliefs about how our minds work, but also powerful tools for making them work as we believe. It is through our belief that our minds work in a particular

## COMMENT

My thinking about relational conception of identity propelled my scholarship in two directions by 1) serving to organize my writings about the doctor-patient relationship and the philosophy of medicine that followed (chapter 3), and 2) shifting my notions of immune identity from atomistic descriptions to a model based on dynamic interactions. This is the source of ecological ideas pertaining to organismal identity and individuality discussed above. For me, both projects—scientific and philosophical—joined in a common view. I am referring to the resonance between the evolution of the Cartesian ego to the relational Hegelian construct and immunology's own movement from a self/other dichotomy to an ecological attunement as a basis of immune identity. In immunology's conceptual shift, a simulated ego has been discharged for a more fluid conception of organismal identity, a transformation that mirrors an analogous movement in philosophical ideas about selfhood. Once the Cartesian certainty of the ego had been destabilized and the search for such an entity abandoned, another way of configuring personal identity took its place. This Hegelian relational construction opened the way for a sociological definition of persons and with that shift from atomistic formulations, the conception of insular selfhood fell by the wayside. The roots of the postmodern critique reside in this romantic turn, a topic discussed in later chapters.

Although many would associate the romantics with heroic individualism, the deeper effect of Hegel's philosophy brought forth a logical extension of how the social constitutes identity. However, during the twentieth century, new complications developed that would further undermine the subject's standing. On this postmodern view, we cannot fully know the social forces molding identities (Foucault) nor the effects of unconscious desire (Freud). I would hardly suggest that immunology's ecological turn reflects these changes, but I do believe that the adoption of a dialectical understanding of identity, in contrast to autonomous individuality, fit the larger social currents of our times. This reconsideration of selfhood led me to a broad study of agency, one that began with a scientific metaphor and continued to the post-

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way that we actually make them work that way... [T]he stories people tell about others and themselves should be regarded as neither fact nor fiction about their souls but as tools for making and shaping them accordingly" (Prinz 2012, xv). In short, "it is through the mirrors of others that we come to see and understand ourselves as agents like others" (ibid. 63). I discuss the psychological aspects of the mirror effect in Tauber 2013a, chapter 5. For a contemporary cognitive interpretation see Savanah 2013.

modern philosophies of Nietzsche, Heidegger, Wittgenstein, Freud, and Foucault. Thus, my renewed philosophical journey, innocently begun as an examination of the historical roots of immunology, expanded to a far broader inquiry about personal identity in which the vistas of my research reached well beyond my early expectations.

The various modalities in which the self was formulated and then discarded led me to understand the immunology of selfhood as a misconceived construct when I considered biological identity and individuality. Those concepts, of course serve a vital role and find multiple expressions in both the theory and practice of the life sciences. As I developed my critique of immune selfhood, the epistemological principles gleaned from the *what am I?* philosophical debates were readily applied. Already summarized, those studies offered new ways of thinking about immune theory that have broad significance for the cognitive sciences and philosophy of biology more generally.

The second area that commanded my interest—the *who am I?* inquiry—derived from my interest in medical ethics and the quest for a moral philosophy that would support the clinical scenario. As discussed in chapter 3, that project arose during my transition from the laboratory when I reconsidered my physican identity. However, that project would have a wider impact on my thinking than I realized at the time. “The who and what of the identity question are not just two ways of asking the same question, they entail quite different views of the self and thus organize sub-sets of the identity conundrum” (Izenberg 2014, 9, in reference to Ricoeur 1992, 116). While closely related, commentators have taken pains to differentiate the two (Seigel 2005, 6). Sorting out those differences frames the intellectual scaffolding for the remainder of my story.

In this regard, Charles Taylor’s *Sources of the Self* (1989) organized my general thinking about personal identity. I read this seminal work shortly after its publication, just as I was beginning to seriously think about selfhood in the immune context. Taylor moves the self from a *what* to a *who*, and more specifically, to ask, *who am I?* is to identify “where I stand”—to be oriented in a moral space defined by commitments and identifications. (Taylor 1989, 27–31; also see MacIntyre 2007 for similar orientation). Identity confers responsibility, whose constancy in relationships and character traits determines expectations and reciprocity. One’s self-knowing identifications largely determine choices that have both immediate and future effects. In the most general sense, to know who I am—and *know* is used with a tinge of irony—is to be aware that just by posing the *who am I?* question provides an ethical founda-

tion upon which to act. In short, the self-awareness of the *who am I?* inquiry is the initial step in moral cognizance. So, from this perspective, personal identity is the matter of defining and then redefining moral agency. After all, “to be moral is to find one’s fit with the world” (Zwicky 2017, 261).

This general formulation proved so compelling that it seemed to me that the self was, in fact, not a *what*, but rather a *who*, the subject of moral philosophy (Tauber 1999b). This proved an important inflection in my thinking about identity, especially in consideration of the multiple meanings and uses of self and selfhood across many disciplines.<sup>16</sup> And even to arrive at my chosen ethical base of understanding, I had to select from diverse approaches to the philosophical self where the discriminations between the epistemological, metaphysical, and ethical was not always maintained. Debates often slid past each other, where what was tangential in one paper became the center of another. In addition, basic categories of related topics were not often delineated as well as one might have expected. In the philosophical lexicon, the self (as well as person, agent, and individual) are treated under the heading of “personal identity” and again, confusion often reigned. And wide reading was required, because various scholarly subdivisions contribute aspects to the discussion—epistemology, political philosophy, ethics, metaphysics, and philosophy of mind. In any case, once secure in the placement of “identity” (namely, in terms of the relational construct), I found the *terra firma* that organized my thinking about biological identity, as well.

Guided by philosophy’s treatment of selfhood, I built the scaffolding for my critique of immunology. My approach reflected recent developments in science studies by showing how the “extra-curricular” metaphorical construction of agency provided proto-models for complex phenomena. Unpacking the science’s conceptual infra-structure revealed a logic unaccounted by the Standard Model. In short, as I completed this phase of my reconstruction of immunolo-

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16 When it came to the problem of the self, I soon discovered a daunting fact that could not be avoided—vast disagreements on what commentators were debating dominated the literature. At least 50 different selves vie for consideration. A partial list includes the cognitive self, the conceptual self, the contextualized self, the core self, the dialogic self, the ecological self, the embodied self, the emergent self, the empirical self, the existential self, the extended self, the fictional self, the full-grown self, the interpersonal self, the material self, the narrative self, the private self, the psychological self (with a slew of formulations ranging from self psychology to object relations), etc.; and the phenomenological self include several subcategories: 1) a subject of experience (conscious feeler and thinker), 2) a thing, 3) a mental thing, 4) a unified singularity, 5) a persisting thing over time continuing across hiatus in experience, 6) an agent 5) a personality, etc. (Strawson 1999).

gy's guiding theory, I recognized that the modes of thinking that held me in good standing as a laboratory investigator had swayed as my own understanding of science had been challenged by these studies. Indeed, where had I landed in the controversies arising from the debunking of positivist conceits administered by Kuhn, Feyerabend, Polanyi and their fellow travelers? I had to reconsider previously unexamined assumptions about scientific progress and the character of Knowledge, Truth, and Reality. To this sector of my education I now turn.



## Chapter

# 8

## Rethinking Science

**A**s a laboratory investigator, I still held the ill-defined ambition of integrating different kinds of knowing (scientific and hermeneutical), the same goal I had pursued during college. In line with that unmet ambition, I had hoped that beyond the exercise of thinking as a scientist and discovering novel facts, the practice (the actual doing) of biomedical research would also present me with a philosophy of science, perhaps even a metaphysics underpinning scientific insight. While still lodged in laboratory research, I dipped into A. J. Ayer's *Language, Truth, and Logic* which I found opaque, indeed, unintelligible. The same frustration occurred with Carl Hempel's *Aspects of Scientific Explanation* and Rudolf Carnap's *An Introduction to the Philosophy of Science*. I lacked the background, focus, and sustained attention required to comprehend these works. Consequently, my thwarted intent of developing a deepened understanding of the scientific enterprise left me with only the myopic gaze required to design and conduct experiments. Simply doing science absorbed me, although nagging questions occasionally surfaced to remind me of my original aspiration to engage broader intellectual questions.

Unfortunately, I had no one with whom to discuss my unrest. My colleagues, engrossed in laboratory life, seemingly never entertained such thoughts. Maybe they did, but it was not a fashionable topic. And if they had, then the tools available within our limited philosophical expertise could not have approached the deeper issues. For scientists—my mentors and then my peers—the problem of verifying data and examining the foundations of our practice remained confined to the immediate problems of unifying results by

writing papers and grant applications. While vaguely aware of the tectonic shifts occurring in philosophy of science during the 1970s and 1980s, I functioned in an academically insulated world. “Normal science” ensnared me. When I did emerge from the laboratory, I sought a deeper understanding and while writing the critique of immunology, I decided to educate myself about the characterizations of science that seemed to prevail in the various discussions I heard at the Boston Colloquium for the Philosophy of Science.

### STRANGER IN A STRANGE LAND

Few have had the opportunity to switch disciplines within academia. I found the venue at Boston University’s Center for Philosophy and History of Science. The chance to direct the Center was sheer serendipity. I had become interested in the center’s celebrated colloquium, a renowned lecture series that covers all aspects of science studies: history, philosophy and sociology of the natural sciences, mathematics, and the social sciences.<sup>1</sup> I first attended its sessions as I began the history of immunology project. I had asked its founding director, Robert (Bob) Cohen, if I might organize a conference around themes resonate with that work. Those proceedings were published, coincident with my first monograph (Tauber 1991d; Tauber and Chernyak 1991). The next year I assumed an informal Associate Director position, and in 1993 Bob retired. The ensuing search for his successor ended in a classic academic deadlock, and I slipped in as the interim director, a position I held for the next seventeen years.<sup>2</sup>

The primary function and identity of the Center, aside from sponsoring post-doctoral research fellows, consists of its colloquium series. This program had been, and continues to be, a premier forum of science studies that attracts the most prominent scholars in its various sub-disciplines.<sup>3</sup> Over the course of

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- 1 Much of the intellectual content, and excellence, of the Colloquium has been captured in Boston Studies in the Philosophy of Science book series that began with Marx Wartovsky (1963). Robert Cohen continued the series, editing more than 150 volumes by the time I assumed Directorship of the Center in 1993. Not all of these books resulted directly from the Colloquium, but a good number did. For a sampling see Cohen and Wartovsky, 1985.
  - 2 While I resigned my hospital positions in 1991 and closed my laboratory in 1995, I continued to practice clinical hematology until 2003. I was tenured in Philosophy in 1998 and retired from Boston University in 2011.
  - 3 For example, among philosophers: Quine, Donald Davidson, Hilary Putnam, David Wiggins, Stanley Cavell, Patrick Suppes, Cora Diamond, David Pears, Arthur Fine, Alasdair MacIntyre, Isabelle Stegners, Abner Shimony, Robert Brandom, Ruth Millikan, Don Howard, Stephen Toulmin, Herbert Dreyfus, Jaakko Hintikka, Alex Rosenberg, Philip Kitcher, Warren Goldfarb, Robert Pippin, John Norton and many others; historians: Janet Browne, Roberts Richards, I. B.

my tenure, I hosted more than 800 speakers, and because I was largely responsible for composing the program each year, I chose the symposia topics and invited individual lecturers. This became a unique education, an opportunity that soon expanded to include having my own views discussed and critiqued by presenting a paper almost every year.

With the directorship, I joined the Department of Philosophy and was tenured five years later. My courses were similarly designed to educate myself and that reflected, as expected, eclectic interests. In fact, I had no specialty. These offerings ranged from the expected philosophies of science, medicine, and biology, but branched out to include American political thought, German idealism, metaphysics, environmentalism, psychoanalysis, philosophies of nature, history, religion, literature, and so on. Of the 32 courses I taught in the College of Arts and Sciences, philosophy of medicine was only offered three times; medical ethics, twice; philosophy of science and history of science, once each, and even if the course name was repeated, each semester was unique in readings and theme. Despite this significant commitment to teaching, by and large, my scholarship dominated the other academic roles I had assumed.<sup>4</sup>

The prospects to learn by teaching and to find guidance for certain technical matters were compelling. However, the most important benefit was to organize the assembled voices of the Colloquium. Hosting those whom I had read with great benefit was a privilege, but few of the presentations provided a direct contribution to my endeavors. Consequently, I often felt that I had enrolled in a tour of intellectual sightseeing. In fact, I stubbornly followed my own interests and made little effort to engage a larger forum. That aloofness provided the independence to pursue my own way. I did so, with a self-confidence originating from I know not where. That I never intended to be a professional philosopher seemed obvious to me. Indeed, I openly declared that I lacked such aspirations. I just wanted a compatible academic home in which to do my work, as I defined it. I am omitting a wide swath of professional development but suffice

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Cohen, Scott Gilbert, Stephen Shapin, Jurgen Renn, and John Stachel; sociologists: Bruno Latour, Michael Lynch, Andrew Pickering, Sheila Jasanoff, and Noretta Koertge); and some scientists with broader humanistic interests, e.g. Stephen Jay Gould, Steven Weinberg, Ernst Mayr, Richard Lewontin, Matthew Meselson, Stephen Grossberg, Lynn Margulis, Marvin Minsky, Roger Penrose, Brian Green, and Steven Pinker.

4 I also offered a philosophy of medicine reading course to fourth year medical students, and once a basic immunology course in the Department of Biology. In addition, I supervised several master's students and two doctoral students, Dinos Meikos and Gal Kober, who wrote dissertations in philosophy of biology under my direction. Also, two doctoral post-doctoral fellows, Eileen Crist and Andrea Grignolio initiated studies of immunology under my guidance.

to note that I secured an understanding of philosophy that allowed me to think about questions bedeviling me since my youth.

I hesitate to describe myself as lonely, however, I found scholarship isolating. I saw others engage socially in ways I did not. They attended conferences, enjoyed regular lunches and dinners together, vigorously corresponded with colleagues, dutifully sat on committees, and participated in university politics. My style and my temperament led me elsewhere. I have come to realize that I represent a type, much like R.C. Collingwood, a well-known and respected Oxford philosopher. He “had a reputation of being a lone wolf. . . . one of those English non-conformists who are fated to create a party of one member” (Toulmin 1974, x). I could identify with Collingwood, who had academic interests in two disciplines, ancient history and philosophy. When I read his acerbic comments about his life among his colleagues, I could only chuckle in amused recognition:

When I took part in these weekly arguments the problems always had to be other people’s problems and the methods of handling them other people’s methods; and that if I tried to raise the problems which I found especially interesting, or to conduct a discussion according to what I thought the right methods, I was met by greater or lesser degree of incomprehension, or by the well-known symptoms of an outraged philosophical conscience. For these experiments very soon taught me what it was important for me to learn: that I must do my own work by myself, and not expect my colleagues in the philosophical profession to give me any help. (Collingwood 1978, 54)

I did not entirely share Collingwood’s experience, for I enjoyed two influential relationships that in many respects oriented my philosophical education. By highlighting them, I am putting aside the numerous stimulating discussions I had with Boston colleagues (Cohen, Sarkar, John Stachel, Abner Shimony, Dan Dahlstrom, and Victor Kestenbaum) and Colloquium speakers, not because they were not useful in developing my own ideas, but few were interested in the issues that focused my own attention.

My most sustained engagement was with Burton Dreben (1927–1999), who joined the Department at the same time I did. Having served Quine (1908–2000) for decades as interlocutor and earnest editor, Dreben was an acknowledged expert of the analytic tradition. Because I was most interested in Wittgenstein, Burt assumed a natural mentorship. I regularly attended his seminars (several devoted to Wittgenstein, as well as others dealing with Frege, Russell,

Austin, Carnap, and Quine) and happily sought his tutelage. These seminars stand out as the highlight of my 17 years in the Department of Philosophy.

Dreben had been described as “a Socratic gadfly” because of his iconoclastic views of philosophy that I found appealing, and for whatever reasons he saw me as worthy of his mentorship (Kurzman 1984). He confirmed my own skepticism about philosophy and by exploring the limits of thought in the analytic tradition he appealed to my sense of philosophical rigor and doubts that “results” as I understood such endpoints were even possible in philosophy. Based on an empirical survey, not some winsome observation, I concurred that I would have to settle for the process of philosophizing, for philosophers seemingly cannot agree whether truth is absolute or relative, whether knowledge is possible or skepticism is correct, whether universals exist or only particulars, whether we have free will or not, whether God exists or not, whether the morally right thing to do is maximize the good or to act in a way that respects non-consequential constraints on action, whether meaning is a matter of representational content or inferential role in discourse, whether to know something you must be aware you know it or not, and so on.<sup>5</sup> In short, they agree on nothing of philosophical moment. Every field of inquiry disputes, but at least in the fields that serve as our paradigms of knowledge, such as the natural sciences and mathematics, one finds nothing like the preposterous proliferation of incompatible positions that is the hallmark of over two thousand years of philosophy (Leiter 2018, 197–78).

Indeed, I found myself engaged in an activity radically different from biomedicine. “Activity” is a rather pale way of describing the utterly strange discourse I hoped to master. After all,

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5 Surveys were taken in 2009 and repeated in 2020 (Bourget and Chalmers 2009; 2014; 2020). How bias might be ascertained is not clear, but those identifying themselves by discipline showed a majority in philosophy of mind, metaphysics, and epistemology among the 32 subjects represented. The results show some consensus (>70% is my cut-off) on a priori knowledge, non-skeptical realism, atheism, and scientific realism (Bourget and Chalmers 2009; 2014). While the 2020 survey showed some changes in alignment with various philosophical positions, I found the most interesting findings concerned which philosophers the respondents “identified with.” The top four were Aristotle, Hume, Kant, and Wittgenstein, followed by my other favorites scattered among the 56 remaining candidates: James (#17), Dewey (#19), and Putnam (#20) were bunched together, while Nietzsche (#24) and Kierkegaard (#36) were surprisingly low in the popularity contest, and then Rorty (#43) had a relatively poor showing. Heidegger at #26 was lower than I expected, but no higher than he deserved (Table 7, Bourget and Chalmers 2020). Again, epistemology, metaphysics, normative ethics, and philosophy of mind were the leading areas of specialization, while philosophy of science ranked #9 and philosophy of biology #22 of the 33 subjects listed (Figure 4, Bourget and Chalmers 2020).

philosophy is the strangest of subjects: it aims at rigor and yet is unable to establish any results; it attempts to deal with the most profound questions and yet constantly finds itself preoccupied with the trivialities of language; and it claims to be of great relevance to rational enquiry and the conduct of life and yet is almost completely ignored. But perhaps what is strangest of all is the passion and intensity with which it is pursued by those who have fallen in its grip. (Pyke 2011, 98; cited by Leiter 2018)

Although receptive to Dreben's general point of view, I sought someone who would balance his slash and burn attitude with a more constructive approach. That individual was Hilary Putnam (1926–2016), with whom I developed a deep friendship.

Hilary was a towering figure at Harvard, possessing an extraordinary, eclectic intelligence coupled to a vast philosophical scholarship. He exhibited the essential character of philosophy's ceaseless movement and assumed that no resting place of inquiry would be found. When accused of too often switching positions, he countered that because intellectual commitments are open to constant self-criticism, philosophy, by its very character, cannot provide final answers. He embraced that caveat about analysis, not as a weakness of philosophy, but embedding its strength. Later we both taught at Tel Aviv University and once when we discussed our respective seminars, he told me how he would frequently amend, and often significantly change, a position he had argued the week before! The futility of finding an end point struck me as obvious, and he seemed so comfortable with his own fluctuating positions that I was reassured that my own vacillations were not necessarily the sign of confusion, but rather constitutive to the process of doing philosophy.

I had first-hand experience of his style. Close to my retirement, I published *Science and the Quest for Meaning* (Baylor 2009a) that Hilary had read and then critiqued. While generally enthusiastic (he was a most generous man), he criticized me for presenting a position that he had held a decade earlier and not the more recent one he currently preferred (Tauber 2009a, 203–5).<sup>6</sup> I rebutted that

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6 The matter concerned realist/anti-realist arguments, a discussion that I placed in a lengthy endnote. My "modest" constructivist position was based on an anti-realist stance Hilary disputed. That he found my argument tucked away in small print I find noteworthy. He later published his complaint in Putnam 2012; the specific criticism, 103–08. More generally, I found his notion of "inner realism" particularly conducive to my own views. He had abruptly rejected metaphysical realism in 1976 and while opposing the radical constructivist notion that the world is ontologically dependent on human concepts and values, Putnam argued that the mind imposes a functional conceptual framework upon the world (a position akin to Kant's):

I was not using *him*, but rather his delineation of a *problem*, one he had discarded but I chose to keep. He seemed somewhat mollified but not quite satisfied. Of course, most do not share Hilary's flexibility. For instance, I vividly remember how Alasdair MacIntyre stormed off, outraged, when I quoted Levinas, "the best thing about philosophy is that it fails" (Levinas 1986, 22). MacIntyre thought philosophy "advanced" (e.g., Grundman 2018). I do not; it evolves and never achieves closure in the sense of "solving" a problem. I came to this position by witnessing the debates about scientific knowledge and its interpretation and easily applied that lesson to philosophical arguments. The ways science has been characterized over the past century exemplifies this point, as discussed below.

### CHARACTERIZING SCIENCE

During the twentieth century, general characterizations of science fell into three groupings. The first cluster placed science within a general philosophical context, which meant interpreting the methods, products, and intellectual structure of science as part of a comprehensive epistemology. Critiques by Husserl, Whitehead, Heidegger, and John Dewey sought to demonstrate how science framed the modern world in every aspect of human experience and how that presentation distorted (or imperialistically trumped) other forms of knowing. These diverse characterizations collectively sought to reclaim an agent-centered understanding of the scientific venture. This was a form of subjectivism conceived within a humanistic framework that may be understood, in the context of the previous discussion, as a reactivated romantic sensibility.

The second set, largely dominated by the logical positivists of the Vienna Circle (but including earlier critics, like Pierre Duhem and Henri Poincaré), developed when philosophical idealism finally sputtered to its end during World War I. Whereas their nineteenth-century forebearers assumed empirical conditions of knowing that were applied from the physical and life sciences to the social sciences as well, these Viennese anti-metaphysicians extended a rigorous scientific method to traditional philosophical problems writ large (Reichenbach 1951; Hylton 1990; Giere and Richardson 1996; Tait 1997; Rock-

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"The mind and the world jointly make up the mind and the world" (Putnam 1981, xi). However, that too Hilary would significantly revise (Putnam 1994). To what extent he assumed a new position is the subject of his own comment (e.g., Putnam 2015, pp. 94-7) and extensive discussion by others (reviewed by Rochefort 2021).

more 2006).<sup>7</sup> They thus regarded science analytically and attempted to formalize a philosophy of science based on principles of verification and falsification, the nature of observation, theory construction, and the basis of truth claims without consideration of the knowing/interpreting subject. They promoted the scientific enterprise by building on foundations established by August Comte, William Whewell, and John Stuart Mill, and concluded that subjectivity contaminated the pursuit of “positive” or “true” knowledge. Indeed, the distinction of scientific “facts” and corrupting subjective “values” represents *the* crucial positivist distinction. Shortly before positivism was dismantled in the 1950s and ’60s, Horkheimer, opined, I think fairly,

Today there is almost general agreement that society has lost nothing by the decline of philosophical thinking, for a much more powerful instrument of knowledge has taken its place, namely, modern scientific thought. It is often said that all the problems that philosophy has tried to solve are either meaningless or can be solved by modern experimental methods. In fact, one of the dominant trends in modern philosophy is to hand over to science the work left undone by traditional speculation. Such a trend toward the hypostatization of science characterizes all the schools today called positivist. (Horkheimer 2004, 40)

Those who resisted positivism’s advance (including Horkheimer) or doubted its promises were characterized as suffering from “a failure of nerve” (Husserl 1970, 9). That hubris proved vulnerable (Zammito 2004).

Nineteenth-century positivism was based on four major tenets: 1) nature might be observed without distortion of human cognition that depends on a notion of objectivity that requires a radical separation of observer from observed, so that no subjective values are allowed to play in the gathering and analyzing of data; 2) from data, facts emerge and those facts may be assembled into models and theories that are then tested; 3) reality is integrated, and sci-

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7 Auguste Comte (1798–1857) authored positivism in the 1830s, a philosophical and political movement that enjoyed wide-spread influence in the latter half of the nineteenth century (Bourdeau 2021). As much a philosophy of social development as philosophy of science, he maintained “that each of our leading conceptions—each branch of our knowledge—passes successively through three different theoretical conditions: the Theological, or fictitious; the Metaphysical, or abstract; and the Scientific, or positive” (Comte 1853). According to Horkheimer and Adorno, Comte’s formal positivist philosophy followed the Enlightenment trajectory: “To the Enlightenment, that which does not reduce to numbers... modern positivism writes it off as literature” (Horkheimer and Adorno 1993, 7).

entific methods can be applied to study all phenomena—physical, organic, psychological, and social by the same objective means; 4) progress characterizes scientific pursuits, and faith in that progression promises evermore comprehensive laws of nature. Accordingly, from facts, determined by objective methods, scientists derive hypotheses that are closely examined by experimentation that then are placed in some ordered construct. Such models are then formalized in predictive theories more successful than previous ones. At least, so it was thought.

Several assumptions in this sequential development deserve attention. The first is that the inductive scheme by which individual empirical observations are generalized “presupposes metaphysics,” namely “an antecedent rationalism,” the first principle that dwells in the deep reaches of science’s philosophical structure (Whitehead 1925, 62). Accordingly, 1) the world is material and ordered; 2) this order may be discerned by detached empirical observation, neutral rational description, and objective analysis; and 3) laws will emerge from this inquiry that will remain inviolable. Why nature corresponds to human mathematical and objective descriptions remains enigmatic, but the empirical product of that method has been highly successful and thus approximates a depiction of the real as truth, and so on. The method “works,” but as David Hume noted with suitable skepticism, why it works is not logically self-apparent.

A second profound metaphysical assumption builds on the lingering Aristotelian notion of natural kinds, where the “thing-hood” of nature’s objects science examines seem self-evident. These entities are assumed to exist as contained within a *simple location* of placement that in turn depends on a certain understanding of the space-time continuum (Whitehead 1925, 69–70). However, quantum mechanics radically upturned a universe of discrete objects existing in fixed coordinates of space and time.<sup>8</sup> This is important for our discussion, because with a simpler philosophy of physics, the real is effectively localized and captured as objective entities. Such “things,” waiting in nature for human discovery, rested upon what Whitehead called the “Fallacy of Mislabeled Concreteness” (*ibid.*, 52). In other words, the abstract descriptions of nature arising from modern science have paradoxically been conceived as concrete realities, when in fact they are constructions of human invention. They are *real*, but their reality depends on how they have been partitioned from the array in which they exist. Humans apply the partitioning borders of “things” through measurement or definition, which in turn are constructed with human

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<sup>8</sup> See chapter 6, footnote 13

tools (machines) and, ultimately, human cognition (*ibid.*, 72). Simply, as Kant had noted earlier, human “understanding” is the lawgiver to Nature, as dictated (and limited) by human “reason.”<sup>9</sup>

Whitehead’s observations draw from a long line of argument about “natural kinds.” Are things that we dissect from the panoply of experience to become individual elements that may be counted, or are they differentiated and acknowledged as items by intrinsic, natural characteristics? Much of contemporary post-positivist comment builds on the understanding that natural categories are imposed, and while used because of their functional utility, their authenticity is always in question.<sup>10</sup> As already noted in the preceding chapter, James argued that the furniture of the world is delineated by human interest and need, in other words, “things” do not arise naturally, but are accounted by making and categorizing choices:

We carve out groups of stars in the heavens, and call them constellations, and the stars patiently suffer us to do so—though if they knew what we were doing, some of them might feel much surprised at the partners we had given them.... What shall we call a thing anyhow? It seems quite arbitrary, for we carve out everything, just as we carve out constellations, to suit our human purposes.... The permanently real things for you are your individual persons. To an anatomist, again, those persons are but organisms, and the real things are the organs. Not the organs, so much as their constituent cells, say the histologists; not the cells, but their molecules, say in turn the chemists. We break the flux of sensible reality into things, then, at our will. We create the subjects of our true as well as of our false propositions. We create the predicates also. Many of the predicates of things express only the relations of the things to us and to our feelings. Such predicates of course are human additions. (James 1987b, 597–98)

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9 “In the seventeenth and eighteenth centuries, the principle of causation had been put into ever more successful use by practicing scientists, at the same time doubt had been cast upon it by philosophers.... Kant, however, argues that a genuine necessary connection between events is required for their objective succession in time, and that the concept of causality in which this connection is expressed is imposed on experience by our own thought as an indispensable condition of its possibility. The human understanding, therefore, is the true lawgiver of nature, and the successes of modern science are due to its conduct of its inquiries in accordance with a plan whose ground lies *a priori* in the structure of human thought (B xii–xviii)” (Guyer and Wood 1998, 21).

10 Originally posited by Plato in *Phaedrus* 265d–266a. For contemporary accounts see Campbell, O’Rourke, and Slater, 2011.

Thus things become facts when suitably identified (in the positivist opinion, independent of human value). This positivist view leads to the third critical assumption, one that I would describe as the positivists' ethos: facts are conceived as independent of value and thereby protected from subjectivity. With this approach, positivists invoked critical distinctions between scientific facts and contaminating non-epistemic values. In short, facts and values resided in split domains. However, this fact/value division proved to be muddled.

The effort to regard facts independent of values did not include the value of objectivity that became the positivists' cardinal precept. During the nineteenth century, objectivity shifted in meaning as standards were revised to accommodate new methodologies. Data from machines radically replaced the personal report with one written in a neutral voice and a universal perspective. In other words, a report might have been written by anyone given the setting and circumstances of the investigation. And because true knowledge possessed no individualized perspective, a community of observers would warrant the discovery. Agreement on the significance of a finding testified to the veracity of the facts under discussion and then the significance and meaning of the facts might be discussed. In the end, a hypothesis, or even a theory would emerge. Universal accessibility independent of personal bias became the key criteria (Tauber 2009a, 52–54). The singular subjective observation was thus co-witnessed and translated into a shared public finding through the data derived from a machine.

Standardized equipment and techniques universalized scientific practice so that the first-person report could be replaced by the abstract "scientist," an authority who would leave the human only as a machine among machines. This positivist ideal carried profound implications. Constructed in opposition to the romantic view of the world that privileged the individual's perspective and subjective experience, positivism denied any cognitive value to personal judgments. Individual experience, positivists maintained, cannot be extrapolated into a scientific description. "Noble," "good," "evil" or "beautiful" are human projected qualities of men or events, and while such adjectives may be applied to nature, in doing so a human sentiment is assigned to the phenomenon. In reaction against the Romantics, positivists sought instead to radically objectify nature, banishing all human prejudice from scientific judgment. The total separation of observer from the object of observation—an epistemological ideal—reinforced the positivist disavowal of value as part of the process of observation. One might interpret, but such evaluative judgments had no scientific or objective standing.

Accordingly, these precepts portray the scientist as vanishing, absorbed by her machines. But if one steps back from the persona of the scientist as a social entity and attempt to portray her subsumed beneath the epistemological demands of what Thomas Nagel (1986) calls the “view from nowhere,” a “paradox of scientific subjectivity” emerges (Fox Keller 1994). This posture refers to the ostensible goal of a completely detached observer, one independent of subjective foibles and prejudices, whose conclusions come from “somewhere else.” But pray tell, how is the scientist removed from the interpretation she offers, a process that synthesizes and judges the facts to construct a model or theory? For positivist science, this element was largely ignored. Seemingly, the facts fell into place logically and, putatively, independent of human interpretation. I entered the field after this austere view had been effectively challenged. However, unrepentant Standard View stalwarts defended the positivist standing of facts and the claims of Objectivity and Truth. To this third characterization of science, I now turn.

#### CATCHING THE TRAMP STEAMER

While there were stirrings that the gap between science and the humanities was smaller than I thought, I knew science as only a technical exercise based upon a methodology devoid of the subjective. Both Kuhn’s first edition of *The Structure of Scientific Revolutions* (1962)<sup>11</sup> and Polanyi’s *Personal Knowledge* (1958) had been published before I attended college. Although influential and now canonical, they escaped my serious attention, but not my memory of their first trivial encounter in 1965. I distinctly recall a seemingly casual glance at these books belonging to a college classmate, Rick Adler. He had enrolled in a history of science course that included the seminal texts—Kuhn’s *Structure* (1962) and Charles Gillispie’s *The Edge of Objectivity* (1960). I remember picking them off his desk and casually glancing at several pages. We had a short exchange about the course, but Rick’s hesitant interest quelled my own.

We were, unbeknownst to us, amid a revolution that would reject the dominant positivist philosophy of science. Kuhn, Feyerabend (1975), Polanyi, Toulmin (1953)<sup>12</sup> and others promoted non-formalistic accounts of how science was

11 The canonical text was issued in 1970 and two later editions (1996 and 2012) included general commentaries.

12 Note the date, 1953, of Toulmin’s text that closely follows Quine’s seminal papers that were instrumental in dislodging key tenets of the logical positivist school (Issacson 2004; Tauber 2009a, 92-100). Toulmin’s introductory text emphasized how the contextualization of scien-

performed. The fundamental shift follows two key tenets: first, science does not develop according to some overriding logic or method. Instead, scientific knowledge is a pragmatic product that incorporates creative and interpretive functions. Second, once that constructive door opens, the knowing agent introduces an interplay of epistemic and non-epistemic values that influence knowledge acquisition and its application. These positions built on what Arthur Eddington called, “selective subjectivism,” in which to account for the ways in which the scientist selects the object of study within chosen epistemological constraints (Eddington 1933).<sup>13</sup> But the next generation coupled specific subjective factors (e.g., aesthetic, psychological, political, gender influences) to pragmatic opportunism to erect their sociologically-sensitive constructivism (Zammito 2004). By the time I graduated, these mid-century critics had set the groundwork for a revolution in the ways the scientific enterprise was understood by overturning the descriptions of science based on the ordered, restrictive methods of rational advancement built on positivist precepts. That revision allowed me to again approach my collegiate integrative project, but now on terms that allowed for the bridge-building I originally sought. I find the timing ironic. I didn’t even know Kuhn and company were having a party. I hadn’t been invited. I awoke two decades later to empty bottles and scattered debris. The celebrants were just saying adieu by the time I again engaged my abandoned collegiate interests.

One of the main modernist-postmodernist battles had been fought over the standing of science, when the major conceptual breakthroughs had been made in philosophical (Quine), cognitive (Polanyi), methodological (Feyerabend), and historical (Kuhn) sectors. It seemed as if I had been sitting on the dock mending nets while the boat had taken off for rich fishing grounds. I was left to catch the tramp steamer and proceeded with my own historical/philosophical research with a wary eye and an ear turned to the cacophony.

The seismic reevaluation of science as an objective and neutral pursuit was launched by Kuhn’s *The Structure of Scientific Revolutions*, a work that ignited controversy about the legitimacy of positivist precepts. Prior to 1960, what passed for philosophy and history of science is now called the Standard View. In large measure a hagiography of “scientific method,” “scientific rationality,” “scientific objectivity,” and “scientific progress,” the Standard View portrayed

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tific problems largely informed the “answers” provided and thus offered an early declaration of the non-epistemic variables of scientific construction.

13 Eddington’s argument was extended in his *The Philosophy of Physical Science* (2012, 16–21).

science as logical in its ordered definition of the real. Despite the positivists' best efforts, when each of these categories was placed under a critical lens, they failed their own cognitive standards. The "idolatry" of science fell to a more circumspect respect. Kuhn led that reappraisal. He argued that the view of the autonomous, rational growth of scientific thinking, that is, of science as logically progressing and possessing universal and unwavering objective criteria to describe nature conflates science's declared ideal aspirations with the heterogeneous nature of its enterprises. In refutation, Kuhn maintained that scientific change occurred non-incrementally in sudden leaps, or what *Structure* described as "paradigm" shifts. Kuhn's original notion of paradigm has suffered misapplications, overuse, and conflicting interpretations (Masterman 1970). Yet, he introduced an abiding revisionist view of scientific advance that challenged logical progression and championed a pragmatically derived picture of the world (Hoyningen-Huene 1993).

### QUINE

Despite the undoubted influence of its argument, the ultimate influence of *Structure* rests on its promotion of deeper philosophical arguments and other shifting elements in the study of science. By 1960, the positivist program was already unwinding from within, and Kuhn drew upon a profound philosophical reassessment led by Willard Quine (Friedman 1999; Zammito 2004; Hylton 2007). How Quine's insights have been extended to the foreground of science studies cannot be overemphasized, for he, more than any other figure, unhinged descriptions of scientific practice and its pragmatic logic from formal accounts.

Quine's critique must be understood within the context of the logical positivist movement that arose, in large measure, as a revolt against the idealism that dominated philosophy at the turn of the century (Hylton 1990; Giere and Richardson, 1996; Tait 1997). For these positivists, language became the forum in which to examine science's philosophy. They maintained that scientific method is the only source of knowledge, and that a statement is meaningful only if it is "scientific," in other words, empirically verifiable (thus their alternate label, "logical empiricists").<sup>14</sup> Statements alluding to some transcendental reality were regarded as meaningless, since they could not be verified. With such criteria,

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14 The Vienna Circle were composed of an inner cadre led by Moritz Schlick and then a larger, more diffuse group of philosophers whose respective positions took form in response. For collected papers see Sarkar 1996; for critical comments, see Ayer 1952; 1959; Friedman 1999; Richardson and Uebel 2007; for popular overviews, see Sigmund 2017 and Edmonds 2020.

metaphysics could be ignored. Moreover, the knowledge criteria of science defined *knowledge*, more generally, and thus discourses that failed the standards of empirical investigations were dismissed from analytics altogether.

The Vienna Circle analysis of language pursued both “negative” and “positive” plans. The first sought to dispense with “non-science” (a major focus of concern) by establishing a linguistic conception of analytic truth that would provide an account of the non-empirical character of logico-mathematical knowledge. Without appeal to metaphysical principles or abstract entities (like concepts or ideas), these positivists attempted to establish the *a priori* status of logic and mathematics compatible with radical empiricism by showing the truth of such propositions through logical analysis. Having putatively secured logic and mathematics and having pushed metaphysics aside, they were then freed to pursue the second aspect of their agenda, namely, assess epistemology in the same linguistic manner. Their philosophy thus became the analysis and clarification of meaning with the use of logic and scientific method. Accordingly, language was viewed as a system for solving problems; from another vantage, philosophical problems were characterized as confusions bestowed by language itself, or as Wittgenstein famously noted, “philosophical problems arise when language goes on holiday” (Wittgenstein 1968, 19e). Accordingly, the aim of linguistic analysis was to solve philosophical problems, namely, “to shew the fly the way out of the fly-bottle” (*ibid.*, 103e). These efforts, however, failed. (Note, Wittgenstein would not formally associate with the group given his general suspicions of these efforts.) With this new opening, a spectrum of options ranging over varieties of naturalism, pragmatism, constructivism, and relativism have made their respective claims.

Logical positivism’s failure had many sources, but for our present purposes the issue may be reduced to a single fault: For the Vienna Circle, the key to cognitive significance rested on mutually exclusive criteria, that is, based on logic or on fact. Thus, meaningful statements either were analytic-independent of empirical considerations and reliant on language alone (as Quine wrote, “grounded in meanings independently of matters of fact,” [1980a, 20]). The alternate, synthetic statements, were assertions which were verified or falsified by empirical procedures, in other words, “grounded in fact” (*ibid.*). Mathematical and logical statements were regarded as analytical (tautologies) and true-by-definition. Such propositions are helpful in organizing cognitively meaningful statements but are not verifiable by examining the world. In contrast, synthetic truths are empirical. Indeed, the demarcations – theory/observation, discovery/verification, fact/value – rested on this more fundamental division between synthetic and analytic statements.

The analytic/synthetic division so understood originates with Kant, who argued in the *Critique of Pure Reason* that sensory experience requires mental (cognitive) synthesis, while analytic statements are tautological and rest within their own internal logic and definition. For instance, the truth of the statement, “All unwedded men are bachelors,” depends solely on the definition of “bachelor” and thus is an analytic statement. “I dropped the ball” is a synthetic statement. Its truth content is assessed by determining whether I in fact dropped a physical sphere that bounces, and if not, whether my statement refers to having failed an assignment or responsibility or some other referent. In short, synthetic judgments require some interpretative, empirical operation and thus are distinguished from analytical statements. Or at least so it seemed.

The so-called analytic-synthetic distinction collapsed under Quine’s critique. He showed that synthetic statements could not be completely separated from analytic elements that supported them. To say that “Caesar crossed the Rubicon” cannot suffice as a synthetic statement because the very meaning and significance of that sentence requires a vast network of supporting facts, definitions, and interpretations, which, in turn, create a *web of beliefs*. Quine argued that theories in their *entirety* hold empirical significance. On this view, the line demarcating the synthetic from the analytic vanishes. If the distinction itself has no firm footing, then the so-called “two dogmas of empiricism” fail and the putative *logical* basis of scientific theory constructed by the Vienna Circle comes crashing down. Quine’s critique had broad ramifications, for, if correct, then belief systems (and science is the most easily conceived as such a system) cohere through various kinds of epistemological and linguistic linkages that extend throughout the network of ideas. In other words, scientific theory is a grid with interlocking synthetic and analytic components. Change one, and the entire structure must accommodate as a fully integrated whole.

With the analytical logic of the positivists dismantled, Quine effectively argued that theories are tested as ensembles, not singly, because 1) any scientific statement can be held true if adequate revisions are made elsewhere in the system; and, conversely, 2) no statement is immune to change, since truth claims are made within the context of the whole, and not even analytical statements are free of such adjustment. As Quine wrote, “our statements about the external world face the tribunal of sense experience not individually but only as a corporate body” (Quine [1951] 1980a, 41). Two points deserve emphasis. First, language, and by extension, belief systems including scientific theory, achieve stability by balancing all respective elements within a holistic construction. (This basic holistic notion set the stage for Kuhn’s idea of the para-

digm.) The web of beliefs acts as a kind of buffering system for accommodating new elements and bestowing meaning on them by their coordination within the entire system (Quine and Ullian, 1978).

The second element describes the relativity of the process because each system has its own coordinates, its own inner logic, its own weight relative to other systems. This simply means that language fits loosely to the world, and the way words or statements link to the world is arbitrary (invented) and thus indeterminate (open to interpretation or re-definition), except as integrated within some “coordinate system” (Quine 1969a). When this view is applied to science, theory becomes a ‘language’ in which facts are coordinated within an interlocking network of other facts that must accommodate new findings (data) as meaningful within the system-as-a-whole. Quine’s “under-determination thesis” maintains that for any set of facts, linkage lines will be adjusted until the most congruent, predictive, and pragmatically supportive structure is found. In other words, the other facts of that system will adopt the new fact as consistent with the already established ‘meaning’ of the system.

Quine’s deconstruction laid the groundwork for positivism’s dismemberment as a governing theory of scientific practice and development. Following his insight, 1) a logical scheme for scientific evolution could not be formulated; 2) an analytic decipherment of scientific theory could not account for its coherence or utility; and 3) as Kuhn amplified in his own presentation of the “paradigm,” only a seismic adjustment will alter the system’s basic character (further detailed in Zammito 2004; Tauber 2009a, 92-99). Quine placed science under a scrutiny that inaugurated a revolution in characterizing its truth claims and objective methods. Instead of some idealized notion of truth or the singular truth quotient of any singular fact, all the elements of knowledge—facts, hypotheses, theories, the diverse values supporting each, the linguistic structures and metaphors, the larger social and cultural determinants, and so forth—contributed to what he called “a web of beliefs.” Like a web, any alteration of one part signified an adjustment that would either accommodate or reject that component. Once incorporated, all the other supporting elements must adjust to the integration of the new part (Quine [1951] 1980a, 42-3).

In repudiating the “imagined boundary between the analytic and the synthetic,” Quine espoused a “more thorough pragmatism” (Quine [1951] 1980a, 46). The pragmatic, local descriptive alternative he offered maintained that the reality sought by scientists was a metaphysical aspiration, discerned by substituting their linguistic analysis for a traditional metaphysics (Quine 1969b). He argued that we must be satisfied with the picture offered by our investigations

but claim no more (1969a). Truth can only be defined within a particular framework. Neither language nor scientific conceptual schemes mirror nature, and thus assessing the success of any scheme is based on pragmatic criteria. These are adequate for the task at hand, albeit “truth” assumes a modest stance. The process is piecemeal, yet progressive (Quine [1951] 1980b, 78-9; Tauber 2009a, 96-98, 201, n. 10).

Accordingly, the belief system is not dependent on what is *really* there, but rather on the success with which it works. And it “works” through observation and the hypothetical-deductive method, which then offers a “conceptual scheme” of the real. And conceptual schemes, like frames of reference in relativity theory, serve to provide a perspective. Reality is then only our best theory. So, for Quine, truth can be no more than a product of this pragmatic approach, an approach whose limits we better understand but whose success is beyond any final logical analysis. Yet pragmatic results do arrive and are adjudicated by public identification and abstraction. We are not, as he said, in “cosmic exile,” but approach the real with confidence, albeit conforming to a good measure of skepticism (Quine 1960, 275).

Quine is the key transitional figure between the positivists and the post-positivists who followed them, and in that role, we see an unresolved tension: On the one hand, Quine’s commitment to natural epistemology places him firmly within the realist camp.<sup>15</sup> On the other hand, his epistemology leads to a radical re-assessment of science’s putative ability to capture reality in some final fashion:

As an empiricist I continue to think of the conceptual scheme of science as a tool, ultimately, for predicting future experience in the light of past experience. Physical objects are conceptually imported into the situation as convenient intermediaries – not by definition in terms of experience, but simply as irreducible posits comparable, epistemologically, to the gods of Homer. Let me interject that for my part I do, *qua* lay physicist, believe in

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15 In his landmark essay, “Epistemology Naturalized.” Quine makes epistemology a branch of psychology in this famous passage: “Philosophers have rightly despaired of translating everything into observational and logico-mathematical terms. They have despaired of this even when they have not recognized, as the reason for this irreducibility, that the statements largely do not have their private bundles of empirical consequences. And some philosophers have seen in this irreducibility the bankruptcy of epistemology...But I think that at this point it may be more useful to say rather that epistemology still goes on, though in a new setting and a clarified status. Epistemology, or something like it, simply falls into place as a chapter of psychology and hence of natural science” (Quine 1969a, 82).

physical objects and not in Homer's gods; and I consider it a scientific error to believe otherwise. But in point of epistemological footing the physical objects and the gods differ only in degree and not in kind. Both sorts of entities enter our conception only as cultural posits. The myth of physical objects is epistemologically superior to most in that it has proved more efficacious than other myths as a device for working a manageable structure into the flux of experience. (Quine [1951] 1980a, 44)

These conclusions, *in toto*, were devastating to any normative account of science. If foundations were disassembled, what remained other than convention, consistency, and consensus?

Quine's ontological relativism, affording only pragmatic criteria for knowing the world, provided later social constructivists a route to pursue a more radical endpoint. Quine distanced himself from them, much as Kuhn professed hostility for the Kuhnians, who carried his work to an extreme relativism that he similarly had not envisioned. Forgetting that Quine embraced scientific reality as defined by a naturalized epistemology, more specifically, physical science, the irony is self-apparent. After all, his own naturalizing epistemology is strongly supportive of science writ-large, as his later work clearly states (Quine 1995). In many respects, he held a traditional view of the *objective* as the best approximation of approaching the *real*. I note this attitude because Quine wears two personae. The first is conferred by the power of his critique of positivism. That endeavor drew from the same tradition of logical analysis that spawned the Vienna Circle, and Quine, trained as a logician, was very much a member of that tradition. Second, he firmly committed to the authority of scientific knowledge, hence his naturalism. The latter position proved to have little impact on later philosophical developments as compared to his dismissal of the logical positivists' program. That re-appraisal set the course for post-positivist philosophies of science for the next half-century. Ironically, like Kuhn, he could not forecast how his critique would be used by later commentators, who appropriated his ideas in a radical re-formulation.

### THE TURN OF THE SCREW

Kuhn's *Structure* drew from two powerful pragmatist arguments that developed non-formal notions of science's logic: 1) Quine maintained that revision of a web of beliefs may be made in any number of ways and that the criteria that guide the choice between different logically and epistemologically possi-

ble revisions are *pragmatic* (Quine [1953] 1980a; 1980b), and 2) Nelson Goodman (1953) argued that justificatory practices have no foundational basis and are, instead, governed by evaluative values that are variously interpreted within the context of successful practice. In other words, the scientific values that guide research (e.g., accuracy, simplicity, coherence, etc.) are themselves derived from fruitful investigative performance and unifying interpretation. Thus, *usefulness* determines their justification where practices and the rules governing them are pragmatically formulated in tandem and their dialectical harmonization serve to justify each.

That Quine, Goodman, and Kuhn were working together at Harvard in the early 1950s is a fascinating confluence of influences, whose impact on later American philosophy can hardly be over-emphasized (Misak 2013; Mladenovic 2017, 155ff.). Yet, I must note, that of the many contributors to the pragmatic inflection of American philosophy, Kuhn stands out as the pivotal figure, for his defrocking the positivist program reached well beyond philosophers' deliberations with immediate and direct impact in sociology, economics, political science and the humanities.<sup>16</sup> Beyond the notoriety (and more importantly, confusions) of ill-defined concepts of "paradigm" and "incommensurability," Kuhn undermined the status of what constitutes certain knowledge. Instead of formalistic accounts of logical progression, he emphasized the fluidity of discovery and interpretation. And that orientation impacted all of academia by setting the stage for re-appraisals of the status of *facts* that later critics argued were not so much discovered as constructed. Furthermore, facts do not just coalesce into models and theories but fall into place given a larger scaffolding of what Ludwig Fleck had described as the "thought collective" (Fleck 1979). Fleck's seminal work inspired Kuhn and an entire generation of social constructivists, by first showing how facts are the product of complex social negotiations of evidentiary findings, where the fact emerges within a collective of contributors who negotiate whether 1) data constitutes a *fact*, and then 2) how the fact is placed within a model or theory. Interpretation thus provides both the datum's status and its meaning. Data assembly does not occur in a vacuum. Analysis is not controlled by neutral logic. Human interest is always at play.

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16 On the 50th anniversary of *Structure of Scientific Revolutions's* publication, *The Guardian* noted the pervasive presence of "paradigm shift" in contemporary discussions of organizational change and intellectual progress. "A Google search for it returns more than 10 million hits... and it currently turns up inside no fewer than 18,300 of the books marketed by Amazon. It is also one of the most cited academic books of all time. So, if ever a big idea went viral, this is it" (Naughton 2012).

In the contested arena of modeling evidence, so-called “non-epistemic” factors play a crucial role. These are derived from sources outside the laboratory (social context, historical forces, economic impact, etc.) that impinge on the business of what is researched and how those results are applied. So, the scientist, while consciously aware of fulfilling epistemic standards, does not easily escape less obvious influences originating beyond the laboratory.<sup>17</sup> This process, immensely complicated and still not clearly understood, denies the positivist hopes for a “view from nowhere,” where some universal, essentially uncontested neutral research simply pictures the world as it is.

If the rationality underpinning scientific discovery and theory fails any prescribed method, the revisionists argued that scientific investigation was a pragmatic process drawing from various human cognitive and social resources to construct knowledge. When the study of nature and the study of society were perceived as inexorably linked—not only interwoven in a trivial social sense but locked together at their deepest roots—a novel picture of science emerged, one that was hotly contested. As might be expected, when Truth and Reality are at stake, many took note, because this post-positivist orientation radically alters our very confidence in the objective distillation of reality. Instead of capturing the real, the constructivist argues that what *is* depends on *how* “the what” is seen and why it is being viewed. Her wedge drives at human fallibilities: the irrationality of much of how we think, the hidden prejudice of emotion, the bias conferred by experience, and the recognition of ignorance where we assume knowledge. In this reappraisal, objectivity assumes new contours. Indeed, without a logic of rational development based on objective appraisal, final truth forever retreats, leaving only facts that cohere in the theoretical, technological, and methodological arrangements of the time.

When radical “Kuhnians” extended their constructivist positions to the point of relativizing scientific findings, polite disagreement grew into wide-spread polemics. In a rare display of arcane philosophy spilling into the public sphere, debate over the truth claims of science ignited a far-flung battle over the extent

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17 While Newtonian physics has been interpreted as emerging from the distinctive political climate of seventeenth-century British political culture (Jacob 1976; Toulmin 1990), examples drawn from the life sciences are more convincing. For example, studies of the social behavior of apes reveal differences of interpretations that follow gender divisions. Donna Haraway observed that male primatologists generally see aggressive dominance patterns as prominent, while women scientists observe cooperative relationships as framing social ape behavior (Haraway 1989b). Teasing apart the cultural threads pertaining to how racial science supported Nazi ideology is a particularly notorious example of objectivity compromised.

to which scientific facts are constructed, as opposed to discovered. The discussion on both sides was dominated by rhetorical hyperbole, indeed, the vitriol reached hysteric proportions. For example: “There is no goddess, Truth, of whom academics and researchers can regard themselves as priests or devotees” (Heal 1987–1988, 108). The defense responded with impassioned and sometimes strident rebuttal, for instance, “It is downright indecent for one who denigrates the importance or denies the possibility of honest inquiry to make his living as an academic” (Haack 1996, 60). Accordingly, one would justifiably banish such “cultural garbage” propounded by academic “slobs” and their collective “gangs” (Bunge 1996, 110; 96; 97). Taking the sole proprietorship on honesty could not foster discussion, much less a resolution (Ross 1996). I watched in amazement and then drew my own conclusions (Tauber 2009, 133ff.).<sup>18</sup>

Among the more outrageous claims, a significant core validity remains (Ross 1996; Labinger and Collins 2001). For me, the Science Wars catalyzed a reassessment of the legitimate claims of different ways of knowing, now with a more circumspect view of objectivity and the subjectivity that played its own role in the creation of knowledge. How science draws on domains of imagination beyond logic and radical objectivity to achieve its insights draws from a hermeneutical perspective and with that hybrid, I saw a bridge between what I had previously thought were two diametrically opposed ways of thinking. Instead of dichotomy, with a deepened understanding of the larger historical and philosophical context in which knowledge evolves, division turned into a continuum, where the objective and subjective elements of creativity find synthesis. A resolution to my youthful quandary began to coalesce around this realization and the scholarship that followed my early immunology writings excavated that idea.

### SCIENCE AND THE QUEST FOR REALITY

I consolidated my thinking about these matters in an unexpected format. In the mid-1990s, shortly after publishing *The Immune Self*, I was asked to edit an anthology describing science as an intellectual and social enterprise. The opportunity to compile *Science and the Quest for Reality* came as a surprise (Tau-

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18 The debate reached a climax with Alan Sokal’s hoax, in which he argued that gravity was a fiction, one that society had agreed upon but only because of the ideological blinders supporting this concept. His paper was published in a reputable journal (*Social Text*) and later revealed in *Lingua Franca* as a parody (Editors 2000; Sokal 2008; Sokol and Bricmont, 1998).

ber 1997b).<sup>19</sup> I did not solicit the project but was invited by the editors of the series, whom I did not know. I suppose they thought me suitable because I led the Center of Philosophy and History of Science, however, they probably did not realize that I did so as an interim appointment. I was no expert, and, in fact, I was no more than an enthusiastic novice in the field. The Center had an excellent library and I spent much of a year reading there. In that sanctuary next to my office, I educated myself in the multiple disciplines comprising science studies, and as I sampled that literature, I discovered a rich articulation of my own ill-formed views. Indeed, the project concretized my ideas about science and forced me, in making editorial decisions, to define my own opinions.

*Quest for Reality* presented a wide swath of topics: the status of scientific realism (constructed), the nature of scientific change (heavily indebted to Kuhn), the boundaries of science (the laboratory walls are porous), and, closest to my over-riding interests, “science and values.” I undertook this venture at the height of the Science Wars, and as mentioned, I found myself in “the center of the road.” There, I firmly held to the standards of objectivity that had ruled my own laboratory while acknowledging (through my historical studies of immunology) the constructivist elements (i.e., the self metaphor) and deeper philosophical commitments (reductionist versus holistic thinking). The book became a declaration of sorts about my own views of science and the reality it presents. My summary (presented in a long Introduction) described general themes about the debunked “Standard View” of science and an Epilogue enunciated lingering romantic themes I would soon develop in my later scholarship.

*Quest for Reality* effectively captured my own sympathies for the post-Kuhnian historians and the post-positivist philosophers of science and thereby became a key reference for much of my later work. Indeed, in many respects, that collection of papers legitimated a major reappraisal of my own laboratory research and the scholarship about immunity that followed. However, the anthology could not cover my full interests and one of these concerned how to interpret science in its historical evolution as a system of ideas.

The birth of modern science and the developments encapsulated in the “scientific revolution” have had seemingly endless commentary, and while interpretations differ, my guiding questions centered on the place of *understanding*

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19 The book joined a series entitled “Main Trends in the Modern World” that included texts devoted to propaganda, the metropolis, the middle class, social movements among other topics.

in the enterprise.<sup>20</sup> For me, *understanding* bridges the immediate scientific concern, the need for explanation, and the humanistic, referring to the larger sense of meaning and contribution to a coherent view of the world and oneself within it. Beyond the guiding principles of prediction, control, and manipulation of nature, with an eye directed towards the pragmatic, understanding spans the cognitive criteria of an objective-based appraisal of science's product with a subjective appreciation of scientific findings that fall into a larger personal orbit. This humanistic aspect seemingly had lost its place in the history of science, one that was on prominent display in the sixteenth century and again during the Romantic period (Richards 2001). That issue would become an important focus of my evolving scholarship.

The humanist orientation represented one of the two massive intellectual tributaries that had joined to create modern science. Francis Bacon emphasized the material benefits of empirical investigation. In contrast, the humanists like Erasmus and Montaigne, regarded the scientific refinement of "pure" ideas as a means of attaining intellectual coherence that afforded a better understanding of God's material creation and His divine laws. For them,

to increase comfort, or to reduce pain, was secondary to the central spiritual goal of Science. Rejecting both in method and spirit Bacon's vision of humanly fruitful science, Descartes and Newton set out to build mathematical structures, and looked to Science for theological, not technological, dividends. (Toulmin 1990, 105)

The repercussions of this attitude reflected radically differing attitudes about the philosophical import of scientific knowledge. The humanists accepted the latitudes of objectivity. Dispensing with "intellectual exactitude, with its idolization of geometrical proof and certainty" for a "practical modesty, let them live free of anxiety, despite uncertainty, ambiguity, and pluralism" (Toulmin 1990, 105). In other words, focused on the primacy of humane concerns, the practical challenges and concrete problems of everyday life, they rejected "the rationalist move of *decontextualizing* the problems of science" (ibid., 80).

In contrast, Descartes and his followers developed a novel strategy by pursuing a philosophy based upon universal abstractions (and the geometric method) to establish irrefutable knowledge that adhered to standards of logical

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<sup>20</sup> For difference between prediction and understanding as the primary aim of science, see Toulmin 1960.

proof. This is the origins of the “scientific method” in which twentieth-century positivists followed the same decontextualized objects of study, which were subject to examination by rationally validated methods that were in turn underwritten by demonstrable, logical arguments.<sup>21</sup> With this observation, Toulmin hit on the focal point of my own philosophical concerns. In contrasting these two points of view, he highlighted the dual origins of modernity: the humanist sixteenth century, grounded in classical literature, the prosaic world of law, politics, religion, and medicine coupled to a scientific universalism rooted in seventeenth century natural philosophy.

I was to treat these two perspectives, seemingly in perpetual conflict, ten years later in *Science and the Quest for Meaning* (2009), in terms of the romantic reaction against the positivism of its own period (summarized below in chapter 12). But whether examined as did Toulmin in the early modern period or in later times, a constant theme is reiterated, namely the status of certainty and how uncertainty serves to organize the philosophical infrastructure of science.

In early modernity, the humanists were skeptical of religious dogma and the certainty in which it was carried. They argued for temperance and toleration, they held practical doubt about the value of “theory” for human experience, and most saliently for our discussion, the limitations of reaching unquestioned Truth or unqualified certainty in theology, natural philosophy, metaphysics, medicine, or ethics (Toulmin 1990, 24–28). This skepticism was challenged by the scientific revolution, and more particularly by the philosophy elaborated by Descartes: opinion/argument yielded to proof and thus formal logic trumped rhetoric, general principles were sought to offer some uniformity to the messiness of the particular, so abstraction displaced the case-by-case adjudication of concrete diversity, and, correspondingly, timelessness, in the form of the permanent displaced the transitory as the object of study. In short, the ambiguities of uncertainty were philosophically countered by a philosophy designed to attain certainty or unambiguous knowledge.<sup>22</sup>

As discussed in later chapters, this search for certainty was effectively thwarted not only because of the constitutive complex character of nature but

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21 Objective stringency becomes a corollary requirement for such a system (Daston and Galison 2011; Daston and Lunbeck 2011).

22 “No formalism can interpret itself; No system can validate itself; No theory can exemplify itself; No formal language can predetermine its own meanings; No science can forecast just what technology will prove of human value” (Toulmin 1990, 31–35). Toulmin interprets the Quest for Certainty as a reaction to the social and political uncertainties generated by the catastrophe of the Thirty Years War, 1618–1638.

for good philosophical reasons as well (Toulmin 1990, 105). I will not further delve into this nest of issues here and this cursory review must serve as a preamble for describing how Descartes's efforts directed at rebutting skepticism evolved into the positivism of the nineteenth and twentieth centuries that further developed his quest for certainty. For now, suffice to note that the fate of this pursuit ties together not only science's own pragmatic aims, but has also effectively parsed the differing ways of knowing that so befuddled me. Sorting out that dilemma eventually opened the door to contemporary science studies whose refractions of scientific method and theory construction profoundly impacted my understanding of the scientific endeavor. *Science and the Quest for Reality* became a waystation on that road.

I continued to examine the central theme of post-Kuhnian science studies which asserts that despite the appeals of neutrality and objectivity of the individual knower, subtle, subjective elements remain at play in analysis. Simply, interpretation is integral to the scientific enterprise and thus personal factors cannot be purged. And here, at the juncture of objectivity and the panoply of subjective factors influencing interpretation I found the synthesis that I sought since I first appreciated the tension in science pitted against hermeneutics. Accepting this general standpoint, I examined philosophical issues pertinent to the knowing agent that arose during the Romantic period. It was then that the oppositions evident at the objective-subjective interface were most prominently debated. In the romantics' response, I discovered resonances in contemporary science studies that offered an enriched understanding of positivism's replacement with constructivist models.

A resolution beckoned. The alternatives that had remained in waiting eventually declared their rightful position in the hierarchy of my thought. My "re-education" led to far-ranging repercussions. A revised view of the subjective-objective division emerged once I achieved success as a biomedical researcher and reconsidered my original imbroglio from a far different vantage point. I found that the rigid contrasts bandied about were less dichotomous than originally presented, for the oppositions that had guided my professional life were exaggerated and untenable. With these new understandings, I built the bridges that would connect the oppositions that had so belabored my conflicted identifications. Before turning to that matter, I offer a brief outline of my philosophical reconsiderations about science, a commentary drawn from both personal experience and critical re-evaluations, whose pragmatic orientation provides a hard-won equipoise.

## REFLECTIONS

With my writings on immunology, a new self-consciousness slowly developed. Doing “normal science” (Kuhn’s term for the work of ordinary investigations), I had no reason to question the standards organizing the methods employed and the strategies adopted. No meta-views of the performance or theory were required. Sounding the deeper intellectual currents was utterly irrelevant. After all, the myopic view of the bench scientist requires no such perspective. And with good reason. Scientists work within a research tradition that has been proven highly successful in yielding degrees of certainty unobtainable with other ways of thinking. Why fix what isn’t broken? Indeed, to become “theoretical” would interfere with the daily business of laboratory experimentation. Science as practiced is an epistemic affair, and I, like all the successful investigators I knew, became absorbed by the doing.

This commonplace attitude, unadorned by theory and pragmatic in practice, suffices for research scientists as a legitimate description of how they work. The ordinary attitude is that empirical data adjudicates hypotheses and while interpretation may be disputed, the investigative process depends on the gathering of factual material. I first learned this basic tenet as a child from Sergeant Joe Friday of the 1950s television show, *Dragnet*. He would interrupt a rambling witness and direct him, “Just the facts sir, just the facts.” He then would draw the proper conclusions and apprehend the criminal (Dragnet 2022). As discussed, such a simplistic schema misrepresents the complexity of how facts are constituted and the latitude of interpretation that may arise. Interpretation may be prejudiced by “extra-curricular” influences (e.g., Eddington’s promotion of Einstein’s relativity theory; tobacco-sponsored research disputing toxic effects of smoking; Gregory Mendel’s manipulation of genetic data; Pasteur’s tribunal that rejected spontaneous generation) and the rhetorical battles of disputed conclusions (Strevens 2020, 41 ff.).

However, these circumspect considerations are not the mettle of the apprenticeship in which I enrolled, nor, for that matter, is post-Kuhnian philosophy of science integral to the education of students in the natural sciences. Being critical and objective are, of course, cardinal precepts, but the discrepancy between the investigative ideal and the realities of scientific discourse and competition belie the positivist Standard View.

For me, the gulf between the laboratory and post-positivist commentary on science was highlighted in an encounter during the early 1990s, shortly after I had joined the Department of Philosophy. In conversation with Steven Wein-

berg, the Nobel laureate (physics 1979), he asked (in a somewhat inebriated state), “What the hell has philosophy ever done for science?” I responded, “Not much. But it’s not about science, it’s about philosophy.” I probably was a bit intoxicated myself, so the discussion didn’t assume any intellectual traction, but basically my off-hand response summarized my view at the time, one developed before I wrote my critical studies of immunology. That judgment was based on what I would now call “textbook philosophy of science,” which deals with verification theories; falsification; nature of laws and theories; types of scientific reasoning (hypotheses, deduction, induction, probabilistic); search for truth (indirect tests, auxiliary hypotheses, coping with empirical findings); realism/antirealism; constructivism and the various discussions spawned by Kuhn’s revolt against the Standard View. No doubt, philosophy of science so regarded had become a central focus of contemporary epistemology, and to the extent that it served as the context of my own work, highly pertinent. However, I could see little impact of that body of work on the practice of science.<sup>23</sup>

I would answer Weinberg differently now. Although authors are not necessarily the best judge of their work, I regard my writings on immunology as contributing to both philosophy *and* science. Regarding the science of immunology, I have offered a revision of research goals and a reformulation of immunology’s basic theory. This seems to me to be doing science with a very practical impact. If my reoriented perspective takes hold, the science will change dramatically. I take no personal credit for this shift, if it occurs, because I am joining a cadre of scientists who hold similar views and are doing the experimentation that is pushing this program forward. Whether it succeeds is another matter, altogether. In the meantime, I have satisfaction in still participating in the scientific discourse.

And regarding philosophy, I have identified basic issues that deserve further attention and opened the science to philosophical scrutiny. Descriptions of extensive metaphorical thinking are relevant to philosophy of science more generally, and my ideas about cognition, information, and definitions of individuals are pertinent to other areas of biology and psychology. Philosophy of ecology, a fledgling discipline would profit as well. But I recognize that this immunology scholarship is in its infancy and has had limited appeal for the larger philosophy community. Even philosophers of biology have remained

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23 A recent study has attempted to quantify the impact of philosophy of science on the natural and social sciences. The method of using a citation model is approximate, at best, but nevertheless, evidence is presented that philosophers are not ignored, albeit their impact seems minor (Khelifaoui et al, 2021).

outside my small interactive circle. From this perspective, the impact of my writings probably has a more immediate influence on immunologists. The reason is simple: few philosophers have expertise in immunology and thus find my writings impenetrable. The scientists at least know what I am arguing about.

Academic silos stand tall and well-defended. For instance, philosophers of physics assume sophisticated knowledge of relativity theory or quantum mechanics, and when they engage their uninformed colleagues, they could be speaking Chinese and the difference in comprehension for the non-specialist would be negligible. Such segregation was reenforced as I acquainted myself with the philosophy of biology literature. The practitioners of this subdivision were predominantly concerned with evolutionary biology and closely related areas. Of those philosophers working in this specialty, the best ones were intimately knowledgeable of the science, had spent time in laboratories devoted to the subject, and wrote papers that were explicitly concerned with examining data, the models in which they were placed, and the scientific conclusions drawn. The topics were technical and firmly set in the practical problems of group selection, species, taxonomy, evolutionary mechanisms, adaptation, altruism, and to a limited extent the nature of genes, definition of function, and criteria of individuals as pertinent to evolutionary dynamics. Oftentimes, I thought their papers, published in philosophy of science journals, could have easily appeared in scientific publications instead.<sup>24</sup> Scholars addressing general questions such as the nature of biological laws, causation, complexity, reductionism, and biological models reflected different sets of interests.

In short, philosophy of science is a highly specialized field, so given the character of the discipline, I accepted working within a small circle of scholars.<sup>25</sup> That of course had consequences. For example, at a faculty meeting in which we discussed the prospect of adding a philosopher of biology to the staff,

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24 My impressions have been confirmed: other areas of biology (development, ecology, microbiology, cognitive science, genetics, neuroscience, sociobiology, etc.) comprise less than half of the subject matter of published work in philosophy of biology, and much of that commentary was considered in light of issues in evolutionary biology. This distribution had little correspondence to the actual research conducted in biology (Pradeu 2017).

25 Segregation is not isolation and I have had the opportunity to work with several research immunologists, who were interested in immune theory, most noteworthy, Frank Austen, Irun Cohen, Melvin Cohn, Antonio Coutinho, Robert Schwartz, and Nelson Vaz,; and; theorists: John Stewart, Francesco Varela, Zvi Grossman; historians: Andrea Grignolio, Peter Keating, Ilana Löwy, Ann-Marie Moulin; Arthur Silverstein, and Thomas Söderqvist; philosophers: Alex Rosenberg, Thomas Pradeu, Henri Atlan, and Kenneth Schaffner; and direct collaborations with Leon Chernyak, Eileen Crist, Scott Gilbert, Scott Podolsky, Sahotra Sarkar, and Bartłomiej Swiatczak.

a senior colleague, Jaakko Hintikka, stated we lacked such expertise because I did not qualify. His view of the field centered on what he saw as the province of evolutionary biology, and having no expertise himself, his impressions were his sole basis for judgment. I stormed out of the room in frustration and disgust.

On reflection, Hintikka's opinion cannot be easily dismissed. He sensed that my concerns were not entirely oriented to elucidating the infrastructure of immune theory; he probably also intuited that my philosophical interests were broader than might be contained in philosophy of science. Indeed, he was correct. I had a second demanding agenda, one centered on identity, albeit disguised—at least during the early stages of my philosophical excursions. In later chapters I will explain how the agency of knowing and identity, more generally, posed in different formats shifted my science studies from their original focus and with that inflection, my philosophical enterprise took on new complexity. As described below, that redirection had several sources, but the tributary originating in the depiction of reality offered by contemporary science seems to me of special significance.

## Chapter

# 9

## Outline of a Post-positivist Philosophy of Science

If Western civilization has a fundamental governing ethos, the idea of progress—whether couched in terms of material advance, improved health and wellbeing, religious redemption, or the catchall, “the pursuit of happiness”—claims primacy. To achieve these lofty, virtually metaphysical ideals has many footings, but key among them for the past 400 years are the instruments of rational thought. While science has enjoyed the greatest success of the rational ideal, political systems and social programs have sought to mimic the scientific standard. Radical postmodernists held a far more circumspect view, not only about extrapolating laboratory rationality to the social, but, more critically, human reason itself. For them, Reason, in its modernist incarnation, no longer holds its position as the arbiter of Western mentality, where knowledge, objectivity, truth, and rationality are housed in some standard version.

The modernist/postmodernist stand-off may be schematized by a duality of “rationalists” pitted against “anti-rationalists.” The key to the antirationalist program is certainly not irrationality or even a-rationality, but rather a resistance to a domineering “logo-centrism” that defines reality in terms of positivist understandings. On this general view, “modernity’s mistake” is seeking scientific explanation and order in subjective domains where it has no jurisdiction. Whatever order is imposed will in some way limit or even distort the knowledge derived from the logic operating in (imposed on) such a system. These divisions originate with the Romantic revolt against the Enlightenment that puts Kant in

the crosshairs of anti-rationalists (e.g., Kierkegaard, Schopenhauer and Nietzsche). By fin de siècle, the rationalists marshalled their forces in various alignments of positivism, pragmatism, phenomenology, and early analytical philosophy. And then with the swing of the pendulum, Heidegger gave new life to the anti-rationalist orientation, which in turn was countered by Adorno and the Frankfurt School. The contest was then renewed in the 1960s and 1970s with various German rationalist thinkers on one side (e.g., Hans-Georg Gadamer's hermeneutics, Niklas Luhmann's systems theory, and the neo-idealism of Michael Theunissen and Dieter Henrich), who sharply contrasted with the French anti-rationalists of the same period, exemplified by Lacan's psychoanalytic theory, Foucault cultural historiography, and Jacques Derrida's deconstruction of language. They were joined by a bevy of fellow travelers grouped together as postmodernists (e.g., Alain Badiou, George Bataille, Gaston Bachelard, Jean Baudrillard, Gilles Deleuze, Jean Lyotard, and Michel Serres). Their diverse attacks on the subject focused my own interest, and more broadly, much in the spirit of Heidegger's project, their concerted effort attempted to dismantle structuralist thought, a thoroughly rationalist venture.<sup>1</sup>

In this attempt to displace Enlightenment ideals of knowing and judgment, no final arbiter or standard remains foundational. The context of a decision, the options available, the relativist position of any initial assumption renders rational deliberation not only fallible but dependent on hidden considerations that Foucault dubbed "Power" and Freud called "unconscious." Wary of misapplied argument, sensitivity to the complexity of inquiry has placed wide margins on what passes for rational deliberation. In other words, rationality does not equate with logic, and with that mindset, skepticism assumes a new-found prominence.

### ON REASON

To discuss reason in this context requires discerning at least three levels of application, which in too many instances have been wrongly fused. The rules of deductive reasoning and inductive consolidation in the laboratory represent different modes of thinking from either the individual thought processes of ordinary life behaviors or the process of social evaluation. To lump the inevitable vagaries in everyday human intercourse with the public scrutiny accompanying scientific conclusions is to project commonplace bias on to the far

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<sup>1</sup> This short description is based on Martin Schwab's summary account (1989).

more vigorous logic developed for investigating nature. Nevertheless, as discussed in the previous chapter, the Science Wars putatively revealed the vagaries bestowed by the social construction of knowledge and scientific pursuits won no exceptions.

The projection of Reason's social and individual foibles on the scientific enterprise strikes me as assuming a skepticism more applicable to individual deliberations than collective ones. The communal critical enterprise does not equate to the psychology discerned in individuals. Parallel processes may operate, but the correctives operating in collective thought differ from the resources available to the individual. The two comprise different ways of thinking. However, as discussed below, a chastened positivism strikes me as credible, and the point is to provide a measured reflection on the ostensible ideals of scientific thought given the constructivist critiques. Simply, the Kuhnians cannot be so easily dismissed, not only for internal epistemological reasons, but because their position fits into larger cultural and political trends that claim their own legitimacy.

As attested by a significant portion of the American public, the ripples from post-positivist descriptions of scientific thinking reached far and wide. That some critics went too far does not cancel the general reevaluation. Psychologists have shown that reason's application depends on contextual factors, and these may have subtle and not so subtle effects. If one looks for some basis for the postmodern view of reason, then one need only look to a rich psychological literature that has clearly demonstrated the bias intelligent people exhibit. Studies exposing the dynamics of unconscious irrationality and impaired self-awareness have shown how over-commitment to certain ideas may blind neutral judgment and logic may be kidnapped by hidden concerns. Seemingly trivial immediate prior experience prejudices logic and irrational choices are routinely made. What is rational depends on a cast of contextual elements, a general finding supported by extensive empirical psychology that has examined this issue, and as these change choices based on certain options must correspondingly change as well.<sup>2</sup> Depending on the context, certain options

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2 Several theories vie for explaining the reasoning process. For instance, heuristics/bias theory (Kahneman and Tversky 2000); mental models theories—humans reason by constructing small-scale models of reality or map-like representations in semantic form (Johnson-Laird 2006); mental logic theory—reason reflects an innate logical capacity inspired by Jerry Fodor and Noam Chomsky (reviewed and modulated by Hanna 2006). Various permutations have spawned a large literature (e.g., Manketelov and Chung 2004; Millgram 2001; Stenning and van Lambalgen 2008).

become more, or less, important as selections are made with particular intentions in mind. Because logic may be fractured or even ignored, “rational” becomes something less than a tight syllogism. How a problem is presented becomes critical in forming undeclared assumptions and manifesting hidden desires or needs that may trump the logic of simple deduction. Another way of making the point, logic may not be entirely relevant to final decisions. Not surprisingly, illogical choice often dominates, as certain idiosyncratic heuristics may determine conclusions and hidden biases can easily distort interpretations and estimation of outcomes.<sup>3</sup>

Recognizing that human rationality does not function as some singular idealized cognitive faculty, reason becomes instrumental, a tool to achieve a goal, and goals may not either be explicit or even conscious. While humans obviously have varying degrees of intelligence, how that intelligence is exercised reflects processes extending outside formal logic to combine with wish, ideology, fantasy, and prejudice. It is only a small step then to conclude that a crucial variable in the calculus of rationality is not the rules of reason per se (i.e., logic), but rather the context created by myriad extra-rational factors within which reason must function. Personal history, bias, needs, and values—acknowledged or implicit—influences, if not determines, judgments. Thus, the conception of reason as functioning in some idealized rational realm is a conceit. Simply, deliberate logic follows established rules; human rationality does not.<sup>4</sup> To riff on a well-known adage, what is reasoned (and true) in New York may not be reasonable (or true) in Kabul. And here, at the junction between logic and the application of rationality, the wedge of interpretation operates. And with that admission, positivism—true, certain knowledge—must revise its presumptions. The consequences of that modification in the Tower of Knowledge have been seismic.

The uncertainty of Reason’s standing has generated radical reevaluations of the social and political power structure formed and swathed in the rational discourses of the Establishment. The postmodern mantra, voiced in rebellion to

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3 This view has supportive experimental appraisals. When subjects are presented with standardized problems involving logical deductions, their choices are dictated by the context of the problem and the kinds of options open to them for making rational elections (Wason test). For a review see Hanna 2006. Classic studies collected in Kahneman and Tversky 2000; Gilovich, Griffin, and Kahneman 2002.

4 “When studying reasons, we study normative aspects of the world. When discussing rationality, we discuss our perceptions of, and responses to, reasons. Our ability to reason is central to our rationality in all of its manifestations, that is regarding reasons for belief, action, emotion, or anything else” (Raz 1999, 75).

the social order, claims that heretofore only certain kinds of knowledge for certain ends have held validity, and thus “logo-centrism” of dominant elites must be displaced from its hegemonic control. Accordingly, “reason” is an instrument of social power that must now be shared by others who possess different forms of knowledge derived from different kinds of logic, and different values. Indeed, “reason” becomes a political element, a kind of currency that may be exchanged among various denominations.<sup>5</sup>

If one leans toward the postmodern alignment, a novel insecurity (perhaps bewilderment) results when awakening from the Dream of Reason, where lines of causation become indeterminate and the solidity of “facts” waver. Postmodern criticism parades the indeterminacy theme as one of its central dogmas. Such revisionist views about causality have supported an invidious attack on the standing of facts and the theories based upon them. Whether fair or not, extrapolations from quantum mechanics to the uncertainties of Weimar politics have been displayed along a continuum stretching from figurative analogy to claims of strong correlation (Forman 1971). In this regard, a better understanding of how irrationality can take hold of the best intentions points to the conceits of an idealized power of consciousness and contributes to the recognition that the image of human thinking is better visualized as a river raft buffeted by submerged rocks and rapids than as an edifice built upon steel girders. The demands of functioning in currents that have fewer restraints and only pragmatic solutions means those practical realities have replaced unreachable ideals. If, in fact, utopian aspirations have been compromised, Western self-consciousness has been fundamentally changed to something else. Those sympathetic to this latest critique of modernity are left to determine this something else within revamped ideals of Western notions of human agency.<sup>6</sup>

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5 Meeting this social critique, Anglo-American analytic philosophers have discovered the difficult task of defining meaning, or even speaking logically once we become self-conscious of the various linguistic and psychological traps common discourse suffers. And their Franco-Germanic colleagues have complemented that result with their own deep skepticism that spawned language’s radical deconstruction altogether. This vast literature may be parsed in several ways, but basically *meaning*, *reference*, and *ordinary language* comprise the major categories. For introductions see, Lycan 2000; Martinich and Sosa 2012; McGinn 2015. The early key analytical texts may be found in various anthologies, e.g., Caton 1963; Weitz 1966. For more up-to-date readings see Moore 1993; Nuccetelli and Seay 2008. For representative reviews of this analytic tradition and an overview of contemporary thought see Soames 2003; 2010; Stroll 2000.

6 The literature on this bevy of issues is seemingly endless. Useful introductions include Best and Kellner 1991; Sarup 1993; Ferry and Renaut 1990; Jacoby 1999. Thorne 2009; Rodgers 2011.

The general lesson from this wary view of reason pertains to how values, acknowledged or implicit, govern thought. And from that position only a small step then concludes that the variable in the calculus of reason's function is not the rules of reason per se (i.e., logic), but rather the constellation of values in which reason ultimately functions. Kuhn made an important contribution to this general orientation, for his critique of science's Rational Model of development opened the door to a more expansive understanding of how science evolves and the myriad factors at work beyond Reason as conceived in its idealized formulation. He upturned science's Standard Model, and this had far-reaching consequences, nothing less than a revised understanding of rationality. However, a caveat must be made: to overstate the significance of a more limited regard for Enlightened Reason must be balanced with the just standing of science's critical self-evaluation. Kuhn, during the late stages of his career, attempted to rescue a more traditional view of science's objectivity by distancing himself from the radical constructivists, however, he had no control over the latitudes of the pragmatism he espoused (Kuhn 2000; Mladenovic 2017)

Despite extravagant extensions, a pragmatic orientation has taken hold. Pragmatists substitute practical standards of discourse and experimentation, in which some ideal of Truth and Objectivity have been displaced by more circumspect expectations. They opt, instead, for a demotion of such standards and accept working approximations that establish criteria for a discourse that accommodates the limits of such standards without relinquishing the power of the scientific enterprise. In studies of scientific practice, notions of *the Scientific Method* have been replaced with a conception of investigation undertaken through ever-shifting communal understanding of what constitutes bona fide evidence and its interpretation. We now consider the rationale for such a modest view with a summary of the writings of Richard Rorty (1931–2007).

### RORTY

As already discussed, during the Science Wars, angry debate ensued when the discussion moved from describing the inter-contextualization of science and its supporting culture, an innocent sociological discourse, to far more radical assertions that led to radical attacks on science's governing precepts. The most extreme postmodernist critique left science reduced to politics where an insidious relativism would reign. While the argument seemed to center on the status of scientific truth, a deeper subtext commanded attention: If the walls of the

laboratory were breached, Relativism would replace entrenched notions of Truth, and Truth remained a Holy Cow as conventionally understood. The question thus loomed: with whom would I align?

On the one hand, I was confident of the scientific knowledge I produced as a biochemist—unabashedly factual in the “old” sense. The success of science is precisely in the ability to model phenomena, both their mechanisms and the consequences arising from them. Achieving prediction and control is enough for the practicing scientist. The issue is always the degree of confidence and the latitude for revision and retrenchment. For the philosopher, the argument is not over the specific claims about the reality depicted, but rather on how we know and whether the mode of knowing determines what *is* in any final sense. Assuming that latter perspective, I am an “antirealist.” I would hardly argue against the reality of the world, its *is-ness*, but I recognize a realism that is bracketed by the limited ways of knowing that world and the strictures imposed by the cognitive structures of the mind.

The faculties of cognition are highly developed under the direction of a pragmatic telos oriented to establish predictability of, and mastery over nature. Descriptions of reality obtained by such means are highly reliable, but hardly infallible. Skepticism rules while results are used as tentative components of an ever-evolving conception of the Real. But the constructive elements of so-called extra-curricular factors and the larger metaphysics in which we operate, cannot be escaped. Fallibility is the watchword, so the cardinal issue for me is the tentative status of what we construe as true. And at this epistemological juncture, I found my own deflationary views in alignment with Rorty’s, the *bête noir* of contemporary Anglo-American philosophy.

Although Rorty had no significant following in my department, my friend Hilary Putnam (who often debated Rorty) respected him, and so did I. Much in the Wittgensteinian tradition, Rorty adopted a thoroughly pragmatic orientation, seeing scientific change as arising through unexplained paradoxes, unexpected findings, new vocabularies, and evocative metaphors resting on weak foundations. Science then became a process of “tinkering,” lacking assumed rules of rationality and thereby forfeiting the idea that progress follows some internal logic. However, progress does result, as assessed retrospectively, and the issue is not that scientists make no headway, but rather that the methods employed cannot be standardized. Nature and human cognitive faculties are simply too complex for such formalization. That lesson seemed reasonable enough, but Rorty’s major appeal for me was how he extended a Wittgenstein-inspired skepticism well beyond his views of science. I sought

guidance to employ the lessons I had learned from science studies to a more general philosophical orientation. Rorty provided those markers.

He saw himself opposing the tradition of “philosophy as a tribunal of pure reason” (Rorty 1979, 4) and instead he would regard philosophy as breaking free of its traditional search for foundations to serve a “therapeutic rather than constructive, edifying rather than systematic” function (ibid., 5). Rorty’s pragmatism thus holds “that what is rational for us now to believe may not be *true*.... It is to say that there is always room for improved belief, since new evidence, or new hypotheses, or a whole new vocabulary, may come along” (Rorty 1991a, 23). Intersubjective (community) agreement sufficed and thus replaced idealized notions of Truth and the Real. That view seems fair, more, it captures the acceptance of fallibility at the heart of the scientific enterprise.

Repelling the charges of relativism as any truth is equivalent to another or that “true” is an equivocal term, Rorty accepted consensual standards of practice. Accordingly, he held no theory of truth at all: “Not having *any* epistemology, *a fortiori*, he [the pragmatist] does not have a relativistic one,” (Rorty 1991a, 24) and much less a correspondence theory of truth (ibid., 22). And as for objectivity, Rorty was satisfied with what turns into a moral virtue. Pragmatists

think that the habits of relying on persuasion rather than force, of respect for the opinions of colleagues, of curiosity and eagerness for new data and ideas, are the *only* virtues which scientists have. They [pragmatists] do not think there is an intellectual virtue called “rationality” over and above these moral virtues. On this view there is no reason to praise scientists for being more “objective” or “logical” or “methodical” or “devoted to truth” than other people. But there is plenty of reason to praise the institutions they have developed and within they work, and to use their models for the rest of culture.... My rejection of traditional notions of rationality can be summed up by saying that the only sense in which science is exemplary is that it is a model of human solidarity. (Rorty 1991b, 39)

Objectivity then becomes a product of social cohesion and consensus (i.e., “solidarity”). Accordingly, science is an example of “communal reason” at work. Sociologically informed critics, citing the fluidity of discourses between scientific communities and the ever-present opportunism of practicing scientists to enlarge their critical purchase on their investigations, regard reason as an active dialogue between actors (Pickering 1993; Shapin 1994). These players revise their thinking in response to the opportunities of debate and the incorpo-

ration of different kinds of knowledge. On this stage, the character of modern interdisciplinary science has challenged the older monolithic, formalistic accounts of scientific practice.

Rorty made a case that seemed eminently reasonable to me: truth-seeking becomes the search for understanding the world unencumbered with formal criteria of what constitutes knowledge. Instead of positing some timeless norms, he admonishes us to simply pursue an understanding of nature freed of a Platonic idea of Truth or Reality, and through communal effort, define the world as best we can. By adopting such an attitude, Rorty hardly dispels scientific knowledge, but he wants that knowledge freed of extraneous, and unnecessary metaphysical baggage.

The concepts we assign to truth statements comprise the constructivist domain, for the standing of truth (final, contingent, deflationist, whatever) constitutes the ongoing practice, or problem, of science. From this pragmatic viewpoint, the entire enterprise is dependent on an evidentiary notion of truth. The realist, in stating the truth conditions of a theory cannot affirm whether those conditions are satisfied because even the best confirmed theories may still be false. Truth then becomes “some sort of (idealized) rational acceptability,” or essentially an epistemic notion based on our state of knowledge and thus not achievable in any finalized sense (Putnam 1981, 49). This deflationary position holds that truth has no essential feature, and indeed, there is no single robust property or underlying nature to characterize it. So, instead of searching for such an attribute called “truth,” the deflationist would argue that truth should be regarded as fulfilling an epistemological function as a guide for seeking correct or reliable statements in the effort to optimize certainty (Horwich 2005; Armour-Garb and Beall 2005). That is enough, for in terms of success, while aspiring to an idealized finality of Truth, scientific practice, pragmatic and dynamic, has proven itself capable of establishing standards adequate for its own pursuits.

The accomplishments of science are extraordinary by any measure, and that testament cannot deny reason’s authority. The issue is not that humans are irrational or cognitively limited in myriad ways, but rather self-appraisals and constant scrutiny are part of our rational apparatus. Because Truth and Objectivity cannot reside in some idealized insularity but must rather take on their meaning in the messiness of everyday life, does not mean that truth and objectivity become figments or even illusions. Rather, a new self-conscious awareness has set in to replace an older complacency, where modernist conceits are now seen as having exceeded unreasonable expectations, and we now must acknowledge the uncertainties with which humans have always lived.

I found Rorty's deflationary views refreshing. Indeed, he provided a larger framework for my understanding of science, not as a means of achieving certainty, but as a way of approaching uncertainty. As proven in myriad ways, scientific methods are highly effective instrumental tools for exploring the world. Satisfied with pragmatic results, he relinquished Kant's attempt to "mirror" nature (Rorty, 1979). Instead, Rorty recommended a thoroughly pragmatic approach to science, so

that we worry only about the choice between two hypotheses, rather than about whether there is something which "makes" either true. To take this stance would rid us of questions about the objectivity of value, the rationality of science, and the causes of the viability of our language games. All such theoretical questions would be replaced with practical questions about whether we ought to keep our present values, theories, and practices or try to replace them with others. Given such a replacement, there would be nothing to be responsible to except ourselves. (Rorty 1991b, 41)

Following this general line, Rorty joined other antirealists, who have challenged those who believe that the quest for reality ever more closely approximates "the real," i.e., that we are effectively approaching such ideals with the tools of reason—objectivity and neutrality. And despite the limits of our cognitive faculties, scientists effectively describe, manipulate, and ultimately apply their findings for human purposes. That is enough, for critical judgment is tempered by human experience bumping into nature and accommodating itself to those realities:

I think it's important for pragmatists to say that the fact there aren't any absolutes of the kind Plato and Kant and orthodox theism have dreamt doesn't mean that every view is as good as every other. It doesn't mean that everything is now arbitrary, or a manner of the will to power, or something like that. That, I think has to be said over and over again. (Rorty 2002, 375)

Simply, some descriptions are better than others, however, accepting well-established theories of science does not require accepting the metaphysical realist view that those theories correspond to some final picture of reality. Enough to regard truth as the best application of our collective intelligence.

Whereas in the positivist era the fact possessed an idealized status, constructivist critics have exhibited hidden assumptions and biased judg-

ment.<sup>7</sup> On this view, although science has triumphed in placing its mark in both material and social contexts, it guides with more circumspect confidence, subject to new kinds of judicious evaluation. So, while science still claims its exultant epistemological status, its product, *true* knowledge, has become an approach to the asymptotic, or idealized limit. Instead of some finality, the pragmatist can be satisfied with practical results and the successes based upon them. On this view, beliefs have as firm a basis as can be established with pragmatic assessments. Of course, a “true” result may occur for the “wrong” reasons, but to say (as does Rorty) that truth only serves to order the scientific enterprise does not make true arbitrary. The attempt to reduce all knowledge acquisition to “just” interpretation and thus subject to relativism is simply wrong.

Rorty gave the truth screw another turn, one that attempted to strip philosophy of science (and much else) of any essentialist concepts. His critique was aimed at disarming metaphysics tout court and in that revamping of modern philosophy, he was not shy to throw Truth into the metaphysical discards. That effort reveals the radical logic underlying the upturning of a positivist point of view and the clearest target of the “defenders of science” who appeared during the Science Wars.

Rorty began a seminal paper, “The Contingency of Language” (1989), with a bold assertion, one that might serve as the introduction to a treatise on contemporary constructivism: “About two hundred years ago, the idea that truth was made rather than found began to take hold of the imagination of Europe” (Rorty 1989a, 3). That language is a contingent product of human thought and social interactions hardly constitutes a novel or even radical claim. However, Rorty would extend the contingency thesis into language itself to encompass *all* products of the human mind. On his view, science and the reality it reports is based on various contingencies that are human-determined and constructed. So, for Rorty, to describe the world, one of the most difficult “essences” to exculpate from this older metaphysics is Truth. And if Truth is contingent, the foundational bedrock of the Real is shattered and uncertainty ascends.

Rorty argued that the reality of the spatiotemporal world should not be confused with the claim that truth, i.e., the description of that world, is also

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7 For a discussion of “fact” and the constellation of values surrounding objectivity, see Tauber 2009a, chapter 2. For the historical origins and evolution of “fact” see Daston 1994. A shift in thinking quantitatively occurred before the Renaissance, largely originating in commercial dealings. Those developments then were instrumental in the development of modern objectification (Crosby 1997). The story continues along this thematic line in Poovey 1998.

“out there.” In other words, he differentiated truth claims from scientific descriptions and their interpretations. Rorty was quite specific that his target was not science but rather positivist philosophy, which in turn was part of his larger effort to present a pragmatic view of the world. From Rorty’s perspective, humans should accept that the commonsensical world is the result of causes that do not include mental states, like “truth,” a concept he regards as imposed on the reality reported. And from this position, truth acquires a new standing:

To say that we should drop the idea of truth as out there waiting to be discovered is not to say that we have discovered that, out there, there is no truth. It is to say that our purposes would be served best by ceasing to see truth as a deep matter ... as a term which repays “analysis.” “The nature of truth” is an unprofitable topic, resembling in this respect “the nature of man” and “the nature of God,” and differing from the “nature of the positron ...” (Rorty 1989a, 8)

Rorty thus assumed a radical anti-metaphysical, empiricist conclusion. For him, truth is a product of the human mind, it does not exist outside, independent, or free of the mind (*ibid.*, 5). Truth then becomes a pragmatic standard, a guiding or regulative principle of the scientific enterprise without metaphysical standing.

In sum, for Rorty, truth-seeking becomes the search for understanding the world unencumbered with formal criteria of what constitutes knowledge. Instead of positing some timeless norms, he admonishes us to simply pursue an understanding of nature freed of a Platonic idea of Truth or Reality, and through communal effort, define the world as best we can. By adopting such an attitude, he warrants knowledge freed of extraneous and unnecessary metaphysical baggage. He allows that positrons are “real” as asserted by communal consent. That standard suffices as he rejects any essences, even, or perhaps especially, the “real.”

To conclude, Rorty attempted to clear philosophy of science of what he considered obstructing and unhelpful metaphysical baggage. Without direction, especially without pursuing some ideal truth or reality, or some optimizing fitting of human reason to the world, language becomes a platform for the development of new metaphors as reason seeks to navigate the world. Scientific reason then becomes only one of several languages used for this general purpose, and science, like its compatriots in reason’s house, functions in basically the

same way. On this view, a correspondence theory of truth must be replaced with a pragmatic one, as novel strategies and language form on demand to make that world (Rorty 1989a, 21).<sup>8</sup> Indeed, truth is our (collective, consensual) own. A product of human industry, it is neither arbitrary, nor absolute, but comprises the evolutionary endpoint of human inquiry—contingent to its time and place and ever-changing as a result of answering communal requirements, pursuing collective ideals, and forging consensus, i.e., “solidarity” (Rorty 1991a; 1991b). And given our thematic concerns, we might now ask, How does *certainty* fare in such an epistemology?

### COMMENT

In ways I did not expect, choosing science provided the intellectual scaffolding for parsing knowledge and assessing truth claims. For me, science remains the pinnacle of Western thought, and I consider my early ambition to learn how to think in terms of establishing hard facts in the laboratory as a personal accomplishment. In that endeavor, I found degrees of certainty simply unavailable elsewhere. Having that experience puts postmodernism in perspective.

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8 The Quine-Rorty critique of science derives from their shared opposition to the Viennese positivists’ insistence that only language is accessible to philosophical analysis, but Vienna hardly had foreseen the consequences of this position. Quine and Rorty jointly argued that:

- 1) Language is not pictorially related to the external world and thus cannot provide an isomorphic depiction of the world (“correspondence” theories of truth are therefore forbidden). Thus language (propositions) cannot represent or correspond to some final or ultimate reality (Rorty 1967).
- 2) Word meanings are derived from the context of their use, and thus meanings must be considered in the universe of rules, context, habits, and conventions that bestow meaning.
- 3) Different language functions must be differentiated (e.g., naming, classifying, commanding, prescribing, describing, referring, expressing, etc.) and not conflated.

And, perhaps most importantly:

- 4) Language cannot go “behind” itself since we would have to use either its own symbols or other symbols in an endless regress to describe language. Language thus offers us no Archimedean point in which to either describe language itself or the reality that language describes. Consequently, humans are left with the dilemma of understanding language’s strictures as it serves as the vehicle of the mind’s exploration of the world. Reality may be viewed in alternative ways, not because the nature of facts depends on how we construe or understand them to be, but rather because there are no such facts except relative to some linguistic or conceptual framework within which we live.

In short, according to what Rorty called “the linguistic turn,” although much had been argued earlier by Neurath (Tauber 2009a, 96–98), language cannot be breached. Our judgments are embedded within the boat of our language and concepts. Our language only changes piecemeal, slowly, with no new design available. The architectonics of theory are similarly entrapped.

As to the contingency of scientific advances and the truth claims made solely on pragmatic criteria, defenders of a normative view argue that discursive reason has developed within a long philosophical tradition, in which scientific rationality owes far less to a confident reliance on data, methods, and warrants than to the self-doubting Socratic “dialectic of interrogation” to which facts and theories are regularly subjected (Fisch and Bebaji, 2011). Incapable (as a matter of logic) of objectively confirming her efforts, let alone of proving them, the scientist can, in principle, boast no more than to have prudently subjected her work to the most thorough tests available. That knowledge is incomplete and must be scrutinized through the lens of skepticism, the key precept of critical investigation of all kinds. This epistemology serves science as it did philosophy from its earliest awakening, namely, relentless examination of complacent assumptions and beliefs.

The perfectionism of endless reappraisal governed by critical skepticism provides the scientist with the basic value of inquiry, a value that binds science to its philosophical antecedents. And success is reassessed through ongoing rational review. But how does such rational self-questioning function and upon what might it be based given the normative strictures in which we think? The relativist attack and the insecure standing of the normative have made this discussion central to a host of diverse discourses. I will not delve into this jungle of controversy and instead simply endorse a Rortian perspective: knowledge must be judged by the best efforts of communal reason at work. In this revision of positivist hopes, an ideal Truth is only that, an ideal. Sociologically informed critics, citing the fluidity of exchange between scientific communities and the ever-present opportunism of practicing scientists to enlarge their critical purchase on their investigations, regard reason as an epistemological “catalyst” between actors. These players revise their thinking in response to the opportunities of debate and the incorporation of different kinds of knowledge. Upon this stage, modern interdisciplinary studies of science have changed the older monolithic, formalistic accounts of scientific practice (see various essays in Jasanoff et al 1995; 2001; Hackett et al, 2008; Felt et al 2016).

I lament that some critics have seized upon the “weakened” notion of truth and would relativize knowledge altogether.<sup>9</sup> A major distortion is made when

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9 SSK’s (sociology of scientific knowledge) “strong” program maintains that “there is no sense attached to the idea that some standards or beliefs are really rational as distinct from merely locally accepted as such” (Barnes and Bloor 1982, 27). This relativist position advocates a philosophical study of knowledge acquisition with the so-called “equivalence postulate,” where “all beliefs are on a par with one another with respect to the causes of their credibility. It is not that

laboratory practices are then regarded as paralleling the deconstruction of literary texts with the inversion of meanings and loss of authorial authority to become a rhetorical agonist field (Latour and Woolgar 1979). On this view, the inferential logic used to test hypotheses in the laboratory is no different in kind than subjective judgment. I utterly reject the argument that the informality and debates characterizing interpretations of scientific experimentation and model-building mimic the hermeneutical exercises found in literary or art criticism. Strictures on construction differ among disciplines. Claims made in the natural sciences may be adjudicated on the anvil of evidence of reproducible phenomena. And the success of that empiricism cannot be denied.

Where to draw the borders of justified doubts became the critical issue of contention during the Science Wars, where the high-cost stakes appeared in clear relief. Undoubtedly, Science dethroned would provide a rich reward for radical postmodernists, for the argument reached into the very depths of contending ideologies. I do not want to wander into those caverns here and suffice it to offer a summary judgment: Putting aside the more extravagant postmodernist claims, with the ebb of the epistemological conceits held by the positivists, a broad and sustained sociological critique of science has deconstructed the Rational Model of scientific advances and with it some purveyor of Truth. Those disciplines based on scientific methods, most importantly social theory and historical analysis that claim their legitimacy by mirroring scientific methods, have profitably undergone renewed scrutiny. Aside from failing the methodological standards of the natural sciences, social and historical narratives are increasingly indicted as inescapably contaminated by bias and distortion.<sup>10</sup> That general critique has encircled all academic disciplines, which to my mind is a healthy balance to unexamined assumptions and complacency.

Although I have not been persuaded by the hyperbolic rhetoric nor by what seems to me the extravagant claims, much worthwhile insight has emerged.

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all beliefs are equally true or equally false, but that regardless of truth and falsity the fact of their credibility is to be seen as equally problematic" (ibid., 23). This epistemological study of relativism (best captured by Barnes, Bloor, and Henry, 1996) led to some extreme conclusions, (e.g., Woolgar 1988a; 1988b). Note, Kuhn and Polanyi, who set the stage for these later constructivist positions, regaled against such extreme positions.

10 For instance, when Hayden White attempted to dethron factual truth for idiosyncratic narrative and pervasive ideology by declaring the relativism of historiography, he released a torrent of criticism of positivist historiographies (White 1973). Jacques Derrida initiated a similar revolt in literary criticism. The key texts of his *annus mirabilis*, 1967, are Derrida 1974; 1978; 2011. His influence extended not only through literary criticism (e.g., Cisny 2014; Dirk and Lawlor 2014), but also appeared in related fields, including studies of contemporary biology (e.g., Kay 2000).

Post-positivist thought introduces an epistemological humility that deserves wide endorsement. The ceaseless scrutiny and self-criticism demanded in the laboratory remain instilled in my own ways of knowing. Thus, I regard myself a “hyper-modernist” (in distinction to a “postmodernist”), namely, one committed to ceaseless re-examination of reasoning and reason. To overstate the consequences of a more limited regard for Enlightened Reason distorts the bona fides of rationality. Yes, science functions, as do all knowledge acquisition systems, with constructivist elements—pragmatic, opportunistic, eclectic, and interpretive. Yes, even in physics what is understood as important is framed by priorities set not only by the scientific community but also by the policies of government support. In the life sciences, clearly certain ideologies have contorted research (e.g., Nazi and Stalin genetics), and discarding these historical examples as extraordinary, we cannot deny how research agendas cannot escape the political winds swirling round the laboratory.<sup>11</sup> These elements cannot be ignored, but as a philosophical matter, I cannot construe my own biochemistry and cell biology research in line with SSK’s strong relativist position that, in the most extreme case, leaves the rationality governing science in shambles.

I reject this thesis. I am fully aligned with the experimental logic and the operative objectivity at work in “normal” science. Yet, I also fully acknowledge that in my studies of immunology’s development, I invoked a strong constructivist element by demonstrating how the self metaphor served a critical function in organizing mid-twentieth century immune theory. At that level of discourse, I showed that a cultural element had been introduced to describe functions that did not have a fully developed mechanistic basis. Such innovative use of language, drawn from a shared culture, serves as a proto-model for phenomena that could not be defined in more concrete terms. In the case of the immune self, the epistemological claims made on its behalf could not be upheld. A new relational construct appeared with the move towards an ecologically oriented immunology. And with that development, we witness different notions of identity emerging. We may easily extrapolate this case study to a wider consideration of reason at work. Exposing the anatomy of a metaphor does not then reveal a compromised logic, for underneath such descriptive language a critical

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11 Polanyi’s writings reiterate the need for scientific research to proceed under the sole direction of investigators, who, as a collective society of “truth-seekers,” he thought were the best judge of what constitutes the appropriate agenda of study (Nye 2011, chapters 5 and 6). That position came under forceful rejection in the 1960s as a result of the scrutiny of critics who argued that social and political interests must be acknowledged and either empowered or rejected in consideration of the larger social agenda in which the science is being applied (Tauber 2009a, chapter 5).

intelligence operates. Rather than exhibiting postmodern insecurities and skepticism, I regard the immune self story as illustrating the vibrancy of scientific reasoning. We do not employ some universal template, but rather resort to pragmatic, pluralistic approaches to grasp phenomena and conceptualize them with a diversity of cognitive tools. The lesson is plain. Metaphors are not *false*; they are useful when their functions are understood.

I am emphasizing this point because I believe the relativism of postmodern criticism applied to science has exhausted its most radical claims. What remains is a more modest lesson: Instead of some idealized rationality that had served the Enlightenment ethos, pluralism now reigns with diverse values informing deliberation. And here a crucial distinction must be made between what occurs in the laboratory in contrast to the use of science in society-at-large. The spectrum is wide, extending to the application of scientific findings for legislation (e.g., policy to minimize climate change) to the interpretation of evidence for individual life decisions (e.g., abortion). The line separating science and politics may be twisted to suit the exigencies of ideology (Tauber and Sarkar 1993; Tauber 1999c). When politically expedient, intrusive restrictions on scientific independence may be applied. We need not review Nazi race theory or Soviet genetics to cite examples, since the Bush and Trump administrations had no compunction in exercising their own distorted interpretations of scientific findings when beneficial to their own doctrinal commitments (Mooney 2005; Plumer and Davenport, 2019; Tollefson 2020). In dissecting those applications, we witness a derivative of a complex calculus of language, social interests, historical contingencies, and cultural parameters operating in the political domain. Yes, but the internal logic of scientific deliberation remains largely insulated from such influences as testified by the outcry of scientists distraught by the manipulation they witnessed.

Postmodernity no longer appears as a novel cultural phenomenon. A bevy of newly minted labels have been proposed for a new twenty-first century cultural movement driven by the internet, digitalization, and cyber-technologies. Assuming various labels (e.g., “post-postmodernism,” “metamodernism,” “digi-modernism,” “trans-postmodernism,” “post-millennialism”) radical cultural, social, political, and cognitive changes are forecast. However, some see a new humanism emerging, a shift beginning to counter the excesses of postmodernity by returning to modernity’s Enlightenment project.<sup>12</sup> Maybe. How can we

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12 A representative manifesto is Alan Kirby’s “The death of postmodernism and beyond” (Kirby 2006; 2009; for review, see van den Akker, Gibbons, and Vermeulen 2017. In her review of

distinguish between a new trajectory and the swing of the pendulum (following Horkheimer and Adorno 1993)? If the latter, how wide is the arc and what tempo does it follow? Much too early to predict. In any case, irrespective of such speculations, the uncertainties bestowed by the postmodern critiques are not easily dismissed. Indeed, they continue to churn, having melted solid assumptions of yesteryear.

While postmodernism commanded headlines for a generation, the dust has settled, and I think it time to re-assess the significant shift in cultural, artistic, and self-identifications following in its wake. These may be summarized as residing in an insecurity in which, as Marx said, “all that is solid melts into air” (Berman 1982, 15). And what is the source of this uncertainty? On my view, the postmodern ‘state of being’ is not based on accepting the epistemological claims made by radical critics of science, but rather resides in the disjunction created by the dominance of science as the modality of reality in opposition to other ways of knowing. Some kinds of irrationalism are necessarily combatted by objectified logic, but other forms of subjectivity have been challenged by the objectification of the world. How do *I* fit in? On what basis is ethical choice made? What is the moral structure of the universe after God’s funeral? These are questions firmly lodged in the personal dimension and to better understand the source of these vexing questions, I examined their historical origins. And doing so eclipsed the borders of dispassionate inquiry, for I discovered that my adolescent conundrums enacted a cultural story that began with the romantics and has continued into our own era under the guise of postmodernism. The remaining chapters of this narrative present the intellectual diary of how I traversed this territory.

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current American literature (ca. 2005), Mary Holland (2017, 11–17) places the origins of literary postmodernism in the aftermath of World War II. That work, as reflected in other art forms and coupled to critical theory and philosophy, is characterized by a pre-occupation with the limits of language and the ambiguities of representation, reference, and meaning. She believes that late capitalist culture is currently transitioning to a “post-postmodernism” characterized by a re-awakening of a literature with a decidedly humanist, interpersonal ethos. For summary of this shift see Holland’s “Conclusion: Metamodernism,” (ibid., 199ff.), where she argues that a major current of contemporary literature reflects “a re-orienting of postmodernism and its attending literary concepts of poststructuralism, turned toward the Enlightenment project of modernity ... operating in a modernist vein through postmodernist literary techniques turned towards modernist goals: metamodernism” (ibid., 201). For putative post-postmodernist developments in urban planning and culture criticism, see Gans 1993; Turner 1995; Akker, Gibbons and Vermeulen 2017.

## Chapter

# 10

## A New Agenda

“I began by observing that you cannot find out what a man means by simply studying his spoken or written statements, even though he has spoken or written with perfect command of the language and perfectly truthful intention. In order to find out his meaning you must also know what the question was...to which the thing he has said or written was meant as an answer.”

R. C. Collingwood (1978, 31)

**A**s previously discussed, my writings on immunology characterized the conceptual “infrastructure” of the science, which was organized by three contrasting positions: The first highlighted two competing understandings of immune function—defensive versus ecological. That appraisal showed how the clinical thought collective dominated the environmental context of immunity. The second opposition pitted Metchnikoff’s reductionist critics against his holistic vision, which in modern terms I posed as mechanical versus dynamic models. The latter position led to systems biology and the introduction of probabilistic thinking into biology. The third contrast, the one that organizes the following chapters pertains to Metchnikoff’s introduction of agency in his depiction of phagocyte behavior. The dissenters accused him (unfairly) of vitalism when he applied a descriptive interpretation of a complex phenomenon that could not yet be ascertained by chemical mechanisms. That controversy rested on a fundamental argument about what comprised evidence and with a new confidence in positivist tenets in the life sciences, Metchnikoff’s claims were dismissed as fanciful. That he was ultimately proven correct by later developments highlights both his scientific creativity and the limits of a mind-set restricted to the reductionist approach.

It took many years to fully develop these themes, but already, shortly after completing *Metchnikoff and the Origins of Immunology*, I announced my general program. In the first colloquium I organized at the Center for Philosophy and History of Science (“Organism and the Origin of Self”) my interests in complexity and resistance to reductionism were outlined (Tauber 1991b). At that time, I was absorbed by readings in non-linear dynamical systems. As discussed in chapter 6, I sought a broader philosophical framework in which to understand science based upon probabilistic principles, or, in the terms of this narrative, the limits of certainty. This was the impetus for swerving back to a historical study of reductionism that had been framed by a larger philosophy, positivism. At that junction, the second half of my story unfolds to include philosophical topics uncovered by these initial studies.

Deciphering Metchnikoff’s theory served as the fulcrum for addressing this wider set of issues. Putting aside the specifics of his new conception of inflammation, he had prescient insight into the inadequacy of the philosophy of science guiding biology during his period. Clearly, he found himself at odds with the immunochemists of his day, but that controversy reached far deeper than contested views of host defense. Where they saw chemistry as the key to discerning immune functions, Metchnikoff substituted what was then called a “cellular” approach. That was shorthand for a “biological” orientation that embraced a holistic conception of the organism (Silverstein 2009).

The dynamics Metchnikoff intuited caught my attention, for beyond his specific theory of immunity, I discovered a sensibility, that, lacking terminology more precise, I must call *romantic*. I am referring to his rejection of a mechanized image of nature, where organic life is conceptualized as a conglomerate of interacting elemental parts defined by physics and chemistry. (Note, he was not exercising poetic enchantment or disenchantment of nature, or some existential posturing that has become a caricature of romantic angst.) Metchnikoff substituted Nature-as-Machine with life in constant struggle— fundamentally dynamic, “disharmonious,” and chaotic. Such a depiction is ill-disposed to the mathematical idealization proposed by Descartes and the reductive methods he advocated. The Cartesian model relies on the mechanical linear causality ( $A \rightarrow B \rightarrow C$ ) that is readily schematized and when successful, highly predictable. However, on the romantic view, life processes do not conform to such a schema. Metchnikoff has been vindicated, albeit in terms utterly foreign to fin de siècle biologists. That almost a century would pass before complexity would receive its full due does not gainsay his intuitions. I am not suggesting Metchnikoff was a prophet of New Biology per se, but I do maintain that his science resisted the

reductive monopoly of his period that was eventually supplemented by modern dynamic modeling. In this regard, his romanticism proved fecund.

Romanticism had another appeal for me, namely, its critique of science's adherence to an austere positivism that precluded a synthesis between science and the personal. That conflict, reiterated in several formats in this narrative, reflected my divided loyalties to different ways of thinking. The romantic critique was not directed to questioning the technical mastery of specific phenomena, but rather the displacement of wonder and the aesthetic for an objectivity that eliminated the subjective, altogether.<sup>1</sup> As explained in the following chapters, I carefully examined this issue, first advocating a synthetic 'solution' and then rejecting it.

And then a third component of Metchnikoff's approach impacted my thinking. As mentioned, much of his program originated in a sensibility of wholes, inter-connections, dynamic mechanics, and emergent phenomena. These guiding precepts conflicted with the mechanical model framing my own scientific orientation. Indeed, once I grasped the scope of the phagocyte theory controversy and my own stance within it, the transition I had made from biomedicine to philosophy took on new meanings. Simply, I discovered a startling personal inconsistency. The philosophy undergirding my laboratory research conflicted with Metchnikoff's more expansive vision of biology. This provoked an awakening of sorts. His modes of thought challenged the

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1 Although interpretation is an inescapable aspect of scientific thinking, that caveat does not mean accepting the subjectivity of early nineteenth century scientists who projected their own emotional reactions onto their observations and conclusions. In other words, a line divides personal modes of thinking and experience that enter any creative enterprise against the subjectivity of Goethe, who interposed emotional valuations to his observations (illegitimate) and attributed aesthetic perception as integral to his scientific interpretations, a position well-accepted in our own era (Tauber 1996b). Goethe made no attempt to separate the faculties of knowing and regarded the search for "Unified Reason" as a problem of aesthetics. In his biological and physical science writings, Goethe combined historical review, aesthetic judgment, and subjective appraisals (Tauber 1993). For example, he posited a "primal leaf" as the basic template from which all plants derived their characteristic form. In some sense, he anticipated Darwin's basic idea of evolution of species originating from a common ancestor. Goethe, however, had no inkling of evolutionary processes and based his idea solely on aesthetic criteria. The perception of shared characteristics among diverse species was an insight derived not from some scientific judgment, but rather through an analysis driven by aesthetic intuition. He extended this idea to the morphology of animals as well and thereby affirmed the art-science synthesis so dear to his romantic soul. He was, in a word, the paragon of Romantic science (most active period, 1790–1810), and while his methods were rejected in the next generation, Goethe provides an illustrative case study of how objective observation and the subjective may merge, despite failing to offer resolution to the subject-object division. Indeed, science marched on with nary a nod to his discarded aestheticism.

prevailing thought style of the research community with which I affiliated. After all, a positivist ethos pervaded my laboratory, and my success depended on discoveries derived from effectively practicing reductive-based science that assumed simple machine-like models. In other words, my laboratory “mind” did not conform to my affinity with Metchnikoff’s philosophy of biology, which became strikingly apparent when I appreciated that the complexity of the immune system would not be adequately characterized with the prevailing mind set of my research community.

I began to acknowledge that qua scientist, I had become a stranger in a strange land. The irony, of course, was that while I seemingly resided as an alien in the halls of philosophy because of my highly questionable professional standing, in fact, I was quite at home there. I had begun to think well beyond the ordinary parameters of the laboratory investigator. My horizons had widened. My interests had found new pursuits. A new intellectual identity was being forged. I was finally poised to address the underlying issues that had placed me in the laboratory and were now pulling me in other directions.

#### THE NEXT PHASE

Key moments in one’s career are often appreciated only in retrospect. One of these occurred with a seemingly ordinary lecture I delivered to medical residents shortly before I formally transitioned from laboratory investigator to philosopher of science. My address attempted to show how understanding the evolutionary history of some key proteins had clinical significance. I designed the title, “Would You Marry a Neanderthal?” to provoke interest, but my topic had nothing to do with evidence about our ancestors’ crossbreeding with these Sapien cousins. Instead, I placed humanity in the biosphere both historically and as an object of evolutionary process: Neanderthals on one side, the present on the other. The residents politely listened, but, as I learned later, the topic was considered eccentric to their practice-oriented concerns. Humanity’s place in the eons of prehistory was tangential to their interests (Tauber 1991c). That I was making an argument for understanding the history of disease and the insight such a perspective offered made little, if any impact. They sensed (correctly I must add) that I had wandered off the straight and narrow path with which they were comfortable. Recall, I had taken my sabbatical a few years before to acquaint myself with evolutionary biology. I suppose, to be generous, I was attempting to make my extra-curricular meanderings relevant at the bedside. But in fact, my mind was elsewhere and they knew it. Indeed, I had be-

come fully engrossed in finding my way through the fog of romanticism and exploring themes that had followed me into the medical school.

My collegiate introduction to romanticism was heavily influenced by the art historian, Morse Peckham. In *Man's Rage for Chaos*, he argued that human cognition seeks to order the environment to establish coherence and predictability (Peckham [1965] 1980). Necessarily, this perceptive process is incomplete, and art fulfills the psychological need to fill the gap between conventional patterns and the demands of reality. The Romantics played a decisive role in expanding our understanding of nature and they did so by emphasizing those elements not previously integrated. The "chaotic" is that excluded component art acknowledges and then captures. His scheme of incorporating what is there but previously resisting inclusion into our worldview (both of nature and inner psychological realities) vividly depicts the romantic sense of the creative. Undoubtedly, part of the appeal for me was Peckham's efforts to include naturalistic aspects in his argument, i.e., art is an adaptive behavior. Art and biology! At the time, his thesis was just what I sought. I suppose temperament again raises his shy head: my measure of science, general wariness of intellectual arrogance, and skepticism of epistemological certainty placed me well outside the positivist camp as I aligned with anti-mechanistic romantic thought.

Does my viewpoint make me an anachronistic remnant of an eclipsed era, or perhaps someone exercising an adled mind? I would rather avoid a label and simply admit that I empathized with Metchnikoff's dilemma of adhering to a romantic philosophy while working in a scientific community attempting to purge all remnants of that program. He had brilliant insight into the dynamic nature of biological processes, however, he could not prove any of it. Although Metchnikoff received a Nobel Prize, his science was despised by the German reductionists and the 1908 award reflected a tortuous political battle within the Nobel Committee. The issue was first and foremost the evidence supporting a principal role of the phagocyte in the context of immunochemical elucidation of the immune reaction. However, the underlying dispute also concerned the status of Metchnikoff's general theory of immunity that carried ideas that failed mechanistic explanation.<sup>2</sup> Fifty years later, the molecular elucidation of his descriptive observations was confirmed. Although I celebrated his foresight, my overriding interests were framed by his vision, by his broad conception of the

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2 I reviewed the Nobel archives to piece together the inner debates about conferring the Prize (Tauber 1992; 1994a, 32–43).

organic, not the particulars of phagocyte functions that he first deciphered. Is this an aesthetic orientation? I have been accused of such and I would not shirk this romantic assignment. However, I must note, that my commitments to facts are not in dispute; how to assess data, how to construct a model, how to compose a theory, *those* are the challenges. And my romanticism, at least as I see it, is based on a multi-layered and inclusive biology that would discern dynamic processes and allows for the uncertainty embedded therein. How and why I further explored the romantic roots of my thoughts are explained below.

Delving into nineteenth-century philosophies of science led me to an examination of competing epistemologies that centered on the knowing agent. And that topic, in turn, prompted a review of philosophy's treatment of one of romanticism's key issues, namely, the subjective-objective divide. From my studies of selfhood applied to immune theory, I recognized that the philosophical foundations of the Cartesian ego, the paragon of the mind-world split, had been discredited, so given the tenuous standing of the positivist ego, where did that leave the knowing subject? I would soon learn that the "Question of the Subject" had arisen from several sources, but it seemed the ways in which positivism had subtracted the epistemological agent was key. If science assumed a radical objective posture, where did that leave subjectivity? In short, objectivity had made subjectivity a problem.

Moreover, if biologists were fully committed to reducing complex life processes to chemistry and physics (a key positivist aspiration), and I had recognized the inadequacies of that approach, where did that leave positivist aspirations, more generally? Are the human sciences, writ large, amenable to radical objectification and if not, what then is their epistemological standing? What role does objectification have in ethics? And then more generally, what is the place of positive modalities of thought when applied to the subjective realm, where objectifying rules are imposed on emotion, intuition, and experience? Indeed, does one *think* subjectively? These were the beguiling questions that lay sequestered beneath the historiography I pursued. Once the immunology project had matured and I had found a tenured home in the Department of Philosophy, I could expand my inquiry to specifically address differing ways of knowing that had so beguiled me in college.

I held a tentative position: the entire question of the subject-object divide, perhaps ironically, reaffirmed the irreducibility of the subjective. The challenge was to understand why this intuition held me close, or put another way, why it was of consequence for me. On that basis, I renewed my examina-

tion with a review of the original romantic response to the conundrum of self-hood—the locus of self-consciousness.

With the completion of *Generation of Diversity* (Podolsky and Taber 1997), the third book of my immunology “trilogy”, I turned to philosophical issues that had been raised by the immunity project but postponed for a decade. I thought that a more thorough investigation of the immunochemist reaction against Metchnikoff’s romantic biology might be interesting, not only as a key precedent in the evolution of twentieth century philosophy of science, but specifically in elucidating the relationship of the “knower” (the scientist) and the “known,” her object of inquiry. I was ready to explore this subjective-objective divide that seemed to underlie my own quest for a better integrated worldview, and thus I turned to the philosophical canon for guidance.

Early modern epistemology sought to discern the nature of human perception and the ability to derive mental “pictures” of the world. Science, with its logic and universal methods offered a powerful model for understanding how those sensory findings are extended into facts and laws, a project Descartes thought would result in the axiomatization of nature. As mentioned, Kant posited that because of reason’s autonomy, the mind became the “lawgiver” to nature, i.e., it provided order on the plenum of experience. Reality was then the product of human perception of nature *and* imagination in constructing it. And at the same time, the mind patrolled and created its own human social and spiritual universe with a reason designated for that purpose. Kant thus directly confronted the human/nature divide with reason’s own division—“pure” reason applied to nature and “practical” reason to discern the moral universe. He then sought a way to reunify that which had been split, the so-called, “Unity of Reason” problem as discussed in chapter 2.

My collegiate dichotomous partition of ways of knowing relates to these separated faculties of reason. Studying Kant enabled me to see a way out of an irresolvable divide in his formulation of judgment. He posited this central faculty of the human mind as the function that ties together the various cognitive operations into a single unity of rational consciousness. I will not review the structure of this schema and simply note that Kant’s *Critique of Judgement* (1790), with its explication of aesthetics and biology as exemplars of “judgment,” provided me a philosophical scaffold for a deeper understanding of the problem that had pestered me for decades. More, because this *Third Critique* was the “starting point for romantic and post-romantic artistic practice,” I knew it presented a conduit into the romantic reaction to what they considered the

sterile rationality of the Enlightenment (Zoller 1990). Here, I would find the early source of hermeneutics and the various tributaries of the Unity of Reason problem that reached into the twentieth century.

### ROMANTICISM'S CALL

Romanticism held me firmly in its grip. From my collegiate studies of myth to my understanding of postmodernity, the romantic ethos has pervaded my thinking. By the late 1990s, having come to a plateau in my immunology scholarship, I stepped back to assess its broader implications, not only about science-writ-large, but more particularly about the knowing subject—the ostensible objective observer. The next step seemed to follow seamlessly. Eventually, I developed a philosophy of science in dialogue with the incipient romanticism that had formed so much of my intellectual sensibilities. From that direction, I tackled the science-humanities divide and, more particularly, developed interpretations of late nineteenth century biology relevant to our own times.

While aware of my intellectual proclivities in this regard, I did not consciously assemble my ideas until I stumbled upon Isaiah Berlin's exposition that so clearly captured the major themes of the Romantic movement (Berlin 1999). Aside from articulating my own intuitions and integrating fragmented knowledge, Berlin confirmed the legitimacy of my interest in clarifying the conflicted and tensioned characteristics of Romanticism in contrast to the Enlightenment. I would have profited from listening to his lectures delivered in Washington's National Gallery of Art and broadcast over the radio in June–July 1965. Alas, I was travelling cross-country and missed the insights of his historical vision until much later.

Assigning dates for intellectual movements is only approximate and inevitably varies with country, chronological overlap, and disciplinary interests. In terms of my own scholarship and internal sorting (note, not necessarily those of experts), I date the Early Modern period between Descartes's *Discourse on Method* (1637) and John Locke's *An Essay on Human Understanding* (1689). Politically, it begins with the Thirty Years War (1618–1648) and ends with England's Glorious Revolution (1688–1689). The "radical" Enlightenment is co-extensive with secularization and political liberalism (Israel 2001). The political and ethical writings of the Scottish and American Enlightenments exemplify these ideals. Philosophically, the Enlightenment commences with Spinoza's *Theologico-Political Treatise* (1670) and extends to Kant's *Critique of Judgement* (1790). Romanticism ripples through Germany to England

to America from Rousseau's *Emile* (1762) to Thoreau's *Walden* (1854) that marks its zenith.

My own interests centered on Kant's "Copernican Revolution." One of the ironies of this chapter of intellectual history is that Kant, despite his abhorrence for Romanticism, contributed to its genesis by triggering a reaction to his own philosophy (Berlin 1999, 80–87). I followed the Kantian aftermath in German Idealism (Hegel and Fichte)<sup>3</sup> and then tracked the inevitable reactions (principally, Schopenhauer, Kierkegaard and Nietzsche). Nietzsche brought me to the twentieth century, where I closed my philosophical circle begun in adolescence with a close examination of the contrasting schools of thought initiated by Heidegger and Wittgenstein (discussed in chapter 13). My late education follows this rough segmentation, and I sketch it here only to offer an overview of the broad territory I traversed, some of which will be detailed, but most of which will pass quickly beyond our hastened gaze. In any case, to the extent that my scholarship has a primary source, I would assign that wellspring to the Romantics, in particular, how they characterized the epistemological agent.

Who is the knowing subject? I understood that the foundations of the Cartesian ego, instantiating the mind-world split, had been discredited in the twentieth century. So, given the tenuous standing of the observing ego, where did that leave the subject-object divide? The elimination of the subject, the "subjectless-subject," became an ideal of objectivity (Fox Keller 1994). Ironically, that conception coincided with the same subjectless-subject who appeared as the logical result of the romantic aspiration to eliminate the separation of the Cartesian ego looking *at* nature to a stance in which she is integrated *within* nature. In other words, romanticism reached the same idealized endpoint of positivism's elimination of the subject. It was as if two armies, moving in the same circle, one clockwise and the other counterclockwise, met at their zenith.

The subject, romantically scrutinized, centered on the status of various kinds of knowledge, and more specifically, the legitimacy of subjective experience in the face of science's authority. If the human sciences, writ large, were subject to radical objectification, where did that leave ethics, aesthetics, and the spiritual that could not be reduced to scientific scrutiny? Self-conscious thinking becomes a different species when applied to the subjective realm, where objectifying rules are poorly imposed on emotion, intuition, and experience. What happens when objects of thought are one's own feelings, emotions, and desires? Does language even capture such mental states? What are the modes of contem-

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3 I found Frederick C. Beiser's works (1987; 2002; 2003) particularly useful.

plation that address the ineffable? And when existential questions loom, *Where Do We Come From? What Are We? Where Are We Going?* the reason of science soon collides with the impenetrable and thus becomes inapplicable.<sup>4</sup>

Because I began with the irreducibility of the subjective, I sought to understand why this intuition held such standing even in my self-identification as a scientist. Given the adoption of a scientific way of thinking as the standard of knowledge, the Romantics had asked, how does the rest of “me” relate to the objective world? In other words, where does subjectivity reside in the reality science describes? How does the picture of reality depicted by science include subjective judgment? And I would also ask, most generally, on what basis does the objective-subjective integration occur, if at all?

I returned to the origins of this query in my *Thoreau and the Moral Agency of Knowing* (Tauber 2001). Here at last, I directly addressed my unresolved collegiate conundrum and studied how scientific inquiry might be included in a humane pursuit of meaning; more specifically, how imagination mediates the personal/objective interface. That opened the door to a host of issues seemingly far removed from philosophy of biology, topics pertaining to the self-consciousness of the knowing agent and the nature of her reason.

Thus, in ways I would never have predicted, the question of the self that had dominated my studies of immunology launched a cascade of topics loosely arranged around the knowing subject: epistemology considered from the Romantic perspective, a conception of agency that revised the Cartesian model, the search for Reason’s unification that reached to the very sources of the modernist-postmodernist divide, an affirmation of subjectivity drawn from philosophical sources. I had not anticipated that the extended study of immune theory would lead me to these larger philosophical undertakings. But looking back, I can see that my historiography was driven by twin concerns: a self-evident epistemological exercise, and in a more latent form, an exploration in moral philosophy.

By “moral,” I refer to how values structure and orient what one sees and understands, whether engaged in scientific or historical discourses. Not only is knowledge itself valued, that is, employed for ends, but knowledge is constituted by an ordering, a prioritization of interest, that confers a particular character on observations, facts, and theory. If we admit that scientific investigations are constituted, at least in part, by a value-driven perspective and implicit

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4 In reference to Paul Gauguin’s masterpiece *D’où Venons Nous / Que Sommes Nous / Où Allons Nous?* (1897, Museum of Fine Arts, Boston).

value-inspired goals, then we must acknowledge such elements in any assessment. This blurring of the fact/value distinction became the dominant theme of my more general writings on science in culture, where I discussed the incipient extracurricular factors that may easily influence the interpretation of scientific data used for social ends (Tauber 2009a, chapter 5). That inquiry begins with the scientist herself and the blurring of the subject-object division. With this interest kindled, my study of romanticism, in which Thoreau served as an exemplary model, began to take form. As discussed in the next chapter, I saw both the strengths and weaknesses of an epistemology that consciously sought to draw the objective and personal elements of “seeing” together. And once I recognized that long-lost path stretching before me, I set off to see where it would take me.

### THE ROMANTIC RESISTANCE

In our post-positivist age, the romantic complaint remains unanswered. The “spectator gap” beyond its explicit epistemological significance also stands for a metaphysical dissociation of humans and nature. This, and what the romantics had identified as “disenchantment,” became the catch-all lament for Western complaints of alienation. Improved health, agriculture, and industry notwithstanding, this romantic cry represented the other side of the coin of discontent with modernity’s mass society and its trappings associated with science and its technological off-spring. The pastoral ideal personified by Thoreau captures those sentiments that gained momentum during the twentieth century. The same grievance about a rising scientism placing a wedge separating humans from nature, resurfaced in the philosophies of Heidegger and Husserl, the environmentalism emerging from American Transcendentalism (Tauber 2003b), various anti-science critics (Roszak 1972; Holton 1995b), nature religions (Albanese 2002; Dunlap 2004), neo-panteism,<sup>5</sup> Zen Buddhism,<sup>6</sup> among others. Each protested that science’s ether had pervaded (to the exclusion of competing ways of knowing) all aspects of human life to profoundly determine how we think and what we think of the world, of other persons, and of our-

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5 To appreciate contemporary Spinozism as the culmination of Western philosophy see Kronman 2016. A very different tack that regards science capable of revealing nature’s divinity see Kaufmann 2008.

6 Of the massive literature devoted to surveys placing classic Asian texts in a Western philosophical translation see Harvey 1990; Wright 1998; Kupperman 1999.

selves. I short, science was indicted for putatively redefining even those aspects of experience that might, at first glance, seem to escape its positivist vapors.

Each of these romantic protests begin with the Cartesian *res cogitans/res extensa* division, where the scientist becomes a witness of nature, not part of it. To peer at nature dispassionately is to maintain that metaphysical divide, which according to the dissenters is the origin of a traumatic cascade: objectivity instantiates isolation; alienation soon follows, and in the end, existential crisis results. Accordingly, any delimited picture of nature presented through the objective stare must be translated into human significance. Where does the divine fit into a disenchanting cosmos? What is meaningful in an objectified nature and how is it derived? What might counter such disenchantment? Without a revamping of metaphysics, the spiritual, emotional, and aesthetic dimensions of experience were left to find their own course. How to personalize objective knowledge then became the key challenge.<sup>7</sup>

The Romantics understood science's centrality, but they challenged the allures and costs of its standing. Moreover, they insisted that the reality science provides is truncated, incomplete and ironic, inasmuch as the objective picture is hardly the reality we know intimately.<sup>8</sup> Although recognizing the power of the "view from nowhere" (universally neutral and objective) they championed the sanctity of the individual's vantage that emphasized the aesthetic, spiritual, and imaginative components of experience. Or more simply, the subjective. And because the romantic temperament resisted the subordination of the personal at the expense of the objective, a Great Divide loomed. The issue was not

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7 As Walt Whitman mused:

When I heard the learn'd astronomer,  
When the proofs, the Figures, were ranged in  
Columns before me,  
When I was shown the charts and diagrams, to add,  
Divide, and measure them.  
When I sitting heard the astronomer where he  
Lectured with much applause in the lecture room.  
How soon unaccountable I became tired and sick.  
Till rising and gliding out I wander'd off by myself,  
In the mystical moist night-air, and from time to time,  
Look'd up in perfect silence at the stars.

(Whitman [1865] 1973a, *When I Heard the Learn'd Astronomer*, 271).

8 Heidegger dubbed scientific reality, a "world picture" (1977a; 1977b), which captured the image of a circumscribed depiction of limited scope. This disavowal focused his attack on Cartesian metaphysics and prompted him to offer his own. The fate of that effort awaits my later commentary (chapter 13).

knowledge, but rather the authenticity of subjectivity in the processing of experience. Analysis is one way of knowing, “subjectivity” encompasses much else.

In celebrating the subjective, the Romantics decried positivism not only as a philosophy of science, but more generally as a philosophy of knowing. For them, radical objectivity fails because the view from nowhere subordinates, if not eliminates, the human dimension from consideration. Science may offer facts and theories, but the second step of investing such knowledge with personal meaning remains an unattended matter unless deliberately addressed. In their philosophy, poetry, and art they celebrated the fluidity (and sanctity) of personal experience. Here, individualism was born, and a new self-awareness birthed. The lines connecting Blake to Baudelaire, Schopenhauer to Nietzsche, and Turner to Gauguin led to the bevy of figures that had profoundly influenced my own thinking about modernity and the postmodernism that grew from the romantic mulch.<sup>9</sup>

No less an authority than Isaiah Berlin opined that Romanticism was “the greatest single shift in the consciousness of the West,” by which he meant that it transformed the lives and the thought of the Western world more profoundly than any of the later shifts which have occurred in the course of the nineteenth and twentieth centuries (Berlin 1999, 2). The Romantic era was a pivotal moment in Western history because this “great break in European consciousness” (ibid., 8) moved “away from the notion that there are universal truths, universal canons of art, that all human activities were meant to terminate in getting things right, and the criteria of getting things right were public, were demonstrable” (ibid., 14). The individual became paramount and the “world picture” science presented was categorically rejected.

Romantics adopted a new “universal,” one dominated by the private, by the emotional, by the independent self, bequeathing the relativism that currently dominates our own postmodernity. In this post-Enlightenment period, the universe is plastic, there is no abiding structure of things or thought or morality. Objectivity has different meanings in different domains, no abiding method is universally applicable. The world and the modes by which it may be understood and governed become more pliable, require more tolerance, allow for plurality, and must be understood as amenable to acts of will and free choice. The Romantic world then might well encompass divergent and even contradictory characteristics: harmony and turbulence, unity and multiplicity.

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9 The relation of postmodernism to romanticism is a complex topic that has been most explored in the literary context (e.g., Altieri 1979; Larrissy 1999).

ity, integration and fragmentation. Then one might well ask, what is the normative? Which values govern? And then, how does one find bearings without foundational values? As I have reexamined the trajectory of my own scholarship, these fundamental uncertainties emerged as the underlying currents guided my inquiries. In this sense, the Romantics set my agenda, not as they originally posed their own challenges, but as similar anxieties reappeared in the context of our own time.

### AN APPRAISAL

The origins of the Romantic Revolt began as a secular attack on religion in the late seventeenth century that soon enrolled science as an alternative way of obtaining truth. Facts and theories based on them would replace the revelations that formed the basis of divine directives. Science had established standards of knowledge derived from objective accounts and the truth of interpretations (and by extension, inner experience) thus became suspect. While religion was the target, a major revision of personal identity occurred in parallel. The repercussions were seismic. The newly found authority of the individual translated into the public display of a new way of thinking about agency. And that extended to the status of the individual's cloistered thought. The private realm was subject solely to one's own judgment. That proved complicated: on the one hand, the sanctity of private thought reflected a new-found freedom, but on the other hand, the subjective resided in a province where truth claims answered to different criteria of veracity. After all, given the prejudice and bias afflicting human opinion versus the dramatic results of dispassionate scientific methods, how could subjective ways of knowing compete with the objective enterprise?

Posing such a dichotomy, as Kuhn and others have argued, not only distorts the "ways of science," but also omits the personal experience of doing science. The science/art dichotomy obscures the creative, personal components of the scientific endeavor. In other words, while the stark division commands the most attention, clearly personal, especially aesthetic factors are at play in science. I recognized this component early in my transition to the Department of Philosophy I organized a colloquium on the aesthetics of science (1992), which was later published (Tauber 1996b). This was the same bridge offered by Max Weber in his famous essay, "Science as a Vocation" (1946). He maintained that science's intellectual achievement offers personal satisfaction and provides the thrill of inspiration, imagination, and ideas. Accordingly, a scientist is not solely

a calculator or uninterested observer but engages in a vital, creative activity. To situate science in terms of its humane function rather than solely through its epistemological aspirations or technological applications, Weber referred to “the inward calling for science.” By addressing the broader meaning of the enterprise for its practitioners, he suggested that the defined scope of scientific disciplines seemed restrictive to this wider agenda. However, he recognized that scientific imagination drew upon the same creative sources of intuition that inspires art and thus his attempt to place value squarely in the personal experience. Weber’s insight complements those who regarded positivist science as forfeiting claims to becoming a universal philosophy. Perhaps Weber had a romantic streak, for he drew from the same stream of thought that envisioned the common root of art and science in a unified Reason.

I readily acknowledged Weber’s insight, but any remnant of the romantic program had been indicted and essentially purged by the late nineteenth century. However, I wondered if something might be salvaged. My hesitancy in discarding the romantic trial altogether rested upon a hunch that their mistakes are not so easily dismissed. Five philosophical issues commanded my attention:

1) By common consent, one of the cardinal sins the romantics committed was to allow subjectivity to infiltrate their scientific views. Take for example, Samuel Taylor Coleridge: he posed individuality as an undisguised metaphysical concept, wherein all life strives to perpetuate its own kind in its own particularity (Coleridge [1818] 2010). This proto-Nietzschean Will to Power (also articulated by Schopenhauer) clearly expressed the romantic sanctity of individuality as a cardinal characteristic of life itself and the innate vitality animating it. This metaphysical construction has a startling persistence within contemporary biology. Little extrapolation was required to see the modern parallels with the basic idea of individual autonomy that dominated romantic thought. As I would discover in my studies of immunology’s theory, notions of individuality organized our own contemporary understanding of immune phenomena. The extrapolation to wider ideas about identity (the immune system’s “responsibility” for establishing and protecting the individual) revealed a similar commitment to a metaphysics of identity conceived in its atomistic, autonomous guise. This construction drew from a particular conception of agency, and it was chosen over other ways of thinking about the subject.

2) In addition to the presence of “extra-curricular” elements in scientific thinking, a pressing epistemological matter raised by the romantics remains highly relevant today. I had uncritically accepted an undergraduate under-

standing of the scientific method closely akin to the way positivists had characterized the scientist—a detached observer of the world, objective lens in hand. She reports the findings, the facts as it were, and then steps back to interpret them. Little did I appreciate the unsteady status of a “fact,” nor the interpretive process that molds facts into models and theories. My naïve philosophy of science would eventually be corrected, but throughout my career as trainee and then as an independent researcher, I accepted this over-simplification. When I analyzed the fact/value distinction, I concluded that such a dichotomy fails positivist aspirations. Instead of a stark, unadorned objectivity, facts are interpreted and employed through the choice of values that themselves are subject to cultural change.<sup>10</sup> Moreover, standards as to what constitutes objectivity and neutrality have evolved within different disciplinary traditions. The romantics accepted the convergence of non-objective elements in the investigative process, a position that holds a secure place in current philosophy of science.

3) Another persistent idea is the romantic tenet of holism (nature conceived as integrated and whole) that we now appreciate is a required principle in characterizing dynamic biological systems (see chapter 6). Systems biology, a top-down approach, complements molecular reductionism: parts must be assembled by organizational principles derived from functions conceived within the entire construct of the organism. Even though most of contemporary biology still adheres to older mechanical models, other expansive strategies are developing in this respect. To exhibit a molecule’s function, many layers of analysis, interpretation, and finally, definition, are played in a medley of variables. Accordingly, a biology committed to methods that ignore the essential dynamic character of organic processes must, by necessity, lose the perspective required to characterize a complex system. Even Bernard, the Father of Physiology, understood that any physiological element “must always refer ... to the whole and [thus] draw our final conclusion only in relation to its effects on the whole” (Bernard 1957, 188–89).

4) And yet another consideration, derived from the characteristics, enlisted me in what I call, a “neo-romanticism.” Unlike the faith of the Enlightenment in discovering the governing principles of order and the rationality that would expose nature’s workings as a vast mechanism, the romantic sensibility

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10 As discussed, in the immunity scenario, the individualistic self-defense schema draws from a set of values underlying insular understandings of agency; an ecological orientation shifts those same facts into a paradigm where immunity becomes a mediating faculty, where protection is balanced against assimilative measures. See Grignolio et al. 2014; Tauber 2017b.

regarded opaqueness as constitutive to nature or what I have identified here as irreducible uncertainty. This ethos counters the positivism that is predicated on the clarity of “certain” knowledge. In a sense, this is but a sensibility, one that postures the entire investigative endeavor.

5) The final (and most intimate) array of issues inherited from the romantics that held my attention concerned the existential. Obviously, knowledge stretches over a spectrum of objectivity. Some kinds of knowledge are produced at the far end of the objective pole, and such knowledge demands (appropriately) minimal “contamination” with the subjective. But this is not the extant issue, for that battle has been long fought and decided. The point I would pursue is something else entirely: what is *personal knowledge*, and does it comport in the scientific endeavor? Obviously, to translate an objective picture of the world into terms that has human existential significance requires diverse values and assessments and these too have their legitimacy and just applications. The issue is not to entirely purge the subjective, but to recognize its rightful place in the tribunal of judgment, where knowledge is ultimately valued and deployed for human use and understanding. Stranded knowledge is both useless and irrelevant divorced from the reality of the personal domain. In short, knowledge is inexorably valued along the entire objective-subjective continuum.

Those who would discard romanticism’s yearnings maintained that “meaning” was never listed on science’s menu, at least not as a main course. Whatever meaning is derived from scientific findings must be taken *à la carte*, probably only as dessert. Accordingly, meaning comes from outside of science, and such interpretation arises as a matter of choice, a question of belief and personal need. Given that meaning resides beyond science, it seems that the romantic quest remains for those so inclined. Simply, let those who seek a better synthesis carry on as best they can, for the aspiration to find meaning is not easily dismissed. This need, a relic of an ancient metaphysics, resides deeply within Western psychology, and science is hardly immune from being co-opted for this larger purpose. Indeed, if scientific knowledge has become a paragon of truth and a source of wonder at nature’s order and function, how could those findings remain immune from being placed within a larger context?

Henri Atlan suggests that this metaphysical posture results from a profound desire for science to provide a comprehensive explanation of nature. He refers to this as a mystical aspiration:

The need for an explanation of reality is, fundamentally, antiscientific. The satisfactory explanation is a bonus, the esthetic pinnacle that accompanies

and sometimes completes ... the result truly sought; technical performance ... For the practitioners of contemporary science ... the need for explanation is merely a relic of metaphysical, indeed religious, wonder. (Atlan 1993, 193)<sup>11</sup>

Following this theme, Gaston Bachelard, rather than lamenting the contamination of such a metaphysical remnant, celebrates its role (Bachelard [1934] 1984). He saw in the pursuit of meaning the motive force of research, one that would animate scientific query in a twofold fashion: nature not only has a rationality that invites discovery (and thus enables humans to place themselves within nature from which objectivity separates them), but more intimately, that knowledge, translated into wonder, provides the emotional recognition to marvel, and thus regain, a lost enchantment. To find personal meaning represents the process by which objectivity and subjectivity (both acknowledged and justified) are brought into proximity, to overlap, and even to integrate. To speak of nature, we draw from both objective accounts as well as the relational aspects derived from the pervasive metaphysical picture science presents. The pursuit of the real, in the end, is a quest for meaning. In this latter task, we endeavor to place humans within the cosmos defined by a reality derived from scientific findings.

To shun the existential does not mean we escape its call. Theology may not beckon, but metaphysical wonder remains, and even more deeply, the task of understanding the existential placement of humans in the world cannot be ignored. In the reality composed by science, we may have exchanged one set of beliefs with another, but that does not signify the absence of a metaphysics that helps define our existential understanding. Rather than deny the metaphysics of this scientific age, perhaps we should delve more deeply to understand them? While we might resist alluding to metaphysics in this “post-metaphysical” era, we cannot escape the question of reality and our place in it. And defining that reality extends far beyond the purview of science and its various conjugates.

If philosophy cannot address the challenge, other venues will continue to offer their means of expression—art, religion, literature, music, political discourse, and so forth.<sup>12</sup> While each can proceed on its own, historically, philos-

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11 Atlan’s work has unfortunately been neglected in Anglo-American studies (see Tauber 1996c; 2011; 2012a). For a more explicit connection between wonder as a core element of science and religion, see Gilbert 2019.

12 I recognize that the “so-forth” should not be dismissed cavalierly, because the romantic view that puts a holistic, enchanted vision of science squarely into the political framework has served dangerous ideologies in the past. Clearly, Nazism had deep romantic roots and critics

ophy has been instrumental in defining the central themes. I cannot fathom philosophers abdicating that role. If my excursion into philosophy has a single theme, it is to recall that ancient mission. And in doing so, I came to realize that a line, in fact a well demarcated division separates science—a form of knowledge—from the various forms of personal meaning that might derive from such knowledge. In other words, once meaning enters the calculus of knowing, I found myself on a slippery slope much like Alice in Wonderland falling into another realm, where the logic of the regular is replaced by something else. Examining that issue required some major historical and philosophical excavating.

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have pointedly charged those who would imbue science with value as flirting with the distortion of science and its surreptitious use for ideological ends (Mosse 1964; Harrington 1996). “The enchanted version of science, looking for ‘value in a world of facts’ opens up the possibility that any ethical system can be validated by holistic [enchanted] reason ... ‘The whole is greater than the sum of its parts’ provides the extra something that can be shaped to fit any moral purpose [such as Nazism]” (Kendler 1999, 831; see also Köhler 1959).



## Chapter

# 11

## Personalizing Science

**T**he skirmish initiated by C. P. Snow's Two Cultures declaration represented only a short battle in a long-standing feud between romantics and positivists. As discussed in chapter 2, during the nineteenth century, science and the arts had diverged, and instead of finding some form of reconciliation between their opposing ways of knowing, the Romantics held fast to an irreconcilable schism. They willingly paid the cost of a defense that would place the subjective ego close to its original conundrum:

Romanticism, far from providing an alternative to scientific objectification, simply turns reality over to the sciences once and for all and rests content with creating its own reality in imagination. Romanticism's final story is that we can let science have reality, because we have another reality—a special reality that is in here, within the self. Given this view of things, however, the self is not just the center of the universe. It is the universe. (Guignon 2004, 65)

I will bypass the issues of solipsism and the dangers of such a distorted view of subjectivity, and just note that while romanticism pulled me to her bosom, where the subjective found legitimacy, that acceptance meant living with an enduring conflict and the price of that position was very high. In recognizing the romantic endorsement of this opposition leaves the quest for “coherence” in abeyance. Of course, one might argue that coherence is neither necessary nor possible. And that endpoint proved to be my own, but before arriving at

that conclusion I thoroughly examined the question as the following chapters will attest.

I had bought into the science/hermeneutical split in my youth and the sentiments described in earlier chapters followed me into adulthood. Why? I have no answer other than “temperament.” Perhaps because of my own emotional issues, I sought a way to reconcile my admiration of “hard,” objective thinking with the aesthetic. A simple, and simplistic, division existed within my own family: My father—the stalwart physician, methodical and reasoned—sharply contrasted with my mother—artistic and intuitive. The identification with one or the other divided my youthful psyche and that conflict found its expression in myriad ways, from the dilemma of a career choice to the selection of intellectual problems later pursued. Through my research of how the romantics concocted their program, I found ways to approach that early conflict, or at least a large portion of the problem I had posed for myself long before. Inasmuch as the romantics had cast their spell on my early imagination and framed much of my later intellectual life, I was returning home, where unfinished business beckoned. Much required revision in my original formulation of the issues, but I found that the basic critique of the positivist program had been confirmed, at least to my satisfaction, which I elaborated in twin works.

*My Science and the Quest for Reality* (Tauber 1997b) elaborated on positions challenging the dogma of my early education in science’s methods and guiding principles: stark objectivity generates facts, which, in turn, logically fall into their proper place. Although an obvious caricature, this orientation deeply influenced me as I set out to chronicle immunology’s conceptual development. The central theme of post-Kuhnian science studies upon which I relied asserts that despite the appeals of neutrality and objectivity of the individual knower, subtle, subjective elements remain at play in analysis. Simply, interpretation is integral to the scientific enterprise and thus personal factors cannot be purged. And here, at the juncture of objectivity and the panoply of subjective factors influencing interpretation I found the sites where different epistemologies met. There, I examined philosophical issues pertinent to the knowing agent that arose during the romantic period, when the oppositions evident at the objective-subjective interface were most prominently debated. The romantics’ response in several respects paralleled contemporary ways of thinking about the scientific enterprise and helped explain positivism’s displacement by constructivist models.

A resolution beckoned once I reconsidered the Great Divide from this historical vantage. The rigid contrasts bandied about were less dichotomous than

originally presented, and consequently the oppositions that had guided my professional life were exaggerated and untenable. As explained below, in finding new ways of thinking about the personal elements in scientific thinking, I built bridges that would connect the rival affiliations that had so belabored me. This re-education led to far-ranging repercussions.

#### POLANYI

When I met Kuhn, we enjoyed a rich discussion about his failed attempt “to rescue objectivity,” but the personal relationship did not flourish. And more to the point, aside from appreciating the enormous influence of his *Structure of Scientific Revolutions*, I found little traction there for grounding my own interests other than his general endorsement of pragmatism governing scientific practice, views that re-enforced my own alignments with Quine, Putnam, and Rorty (Mladenovic 2017, pp. 155 ff.). Polanyi, on the other hand, proved to be a seminal resource. His *Personal Knowledge* (1962a) strongly resonated with how I intuited scientists think, which I illustrated in a study of Thoreau and then extrapolated its thesis in *Science and the Quest for Meaning* (Tauber 2001; 2009a). These works expounded on how scientific knowledge may coordinate with the subjective, whether aesthetic or existential. Because *Personal Knowledge* proved invaluable in developing my own philosophical positions, a brief review is warranted. And of incidental note, in an unexpected coincidence, I recently discovered that my grandfather had befriended his fellow Hungarian Jew in Berlin.<sup>1</sup> Polanyi was almost family.

Polanyi begins *Personal Knowledge* with the bald assertion, “I start by rejecting the ideal of scientific detachment” and proceeds by analyzing the word

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<sup>1</sup> Michael Polanyi (1891–1976) was a distinguished physical chemist who began writing his critique of positivist science in *Science, Faith, and Society* ([1946] 1964). He emigrated from Hungary to Berlin in 1919 and was one of those my grandfather, Alfréd Manovill, hosted in his capacity as leader of the Berlin Hungarian Association. The lines of connection may have been multiple, but the most direct was Polanyi’s membership in the Kaiser Wilhelm Institute where my grandfather held an honorary position. (Max Planck wrote a letter to Alfréd lamenting the Manovill’s emigration back to Budapest in 1934. In 1930, Polanyi characterized Alfréd graciously: “unshakeable optimism [was] the defining feature of Manovill’s attitude toward life” (“Alfréd Manovill 50 Jahre,” Michael Polányi Papers, University of Chicago, Box 20, Folder 2; see also “Alfréd Manovill. Zu seinem Jubiläum,” quoted by Michael Miller in an unpublished paper, “Portrait of a Banker as a Young Man: Alfréd Manovill in the House of Mendelssohn”). Polanyi left Germany in March 1933 for Manchester, England, despite having converted to Catholicism in 1923. He understood that his acquired religious status would not protect him from Nazi persecution.

“knowing” to show that its connotations refer to many levels of understanding (Polanyi 1962a, vii). Impersonal, “objective” knowledge is only one kind of knowing, but even this category, according to Polanyi, is a conceit, and a limiting one at that. His argument attacked the positivists’ position essentially from within the strictures of their own logic (which was, incidentally, very different from the strategy that Kuhn employed). Much of Polanyi’s critique concerned the logical futility of establishing any fixed framework that could critically test the positivist program. In other words, the positivists offered no perspective from which their own axioms might be examined.

Polanyi explicitly discounted subjectivism and substituted “personal.” In this fashion, he still endorsed objectivity’s ostensible goals, but rejected an either/or choice with the subjective. He would broaden the cognitive category of “objectivity” to include those mental faculties that are invoked in discovery and cannot, in any formal fashion be finalized in a logical format. He called this realm of knowing the “tacit dimension,” and in that domain the full panoply of knowing—aesthetic sensibility, probabilistic judgment, intuition, metaphoric extension, and the like—comes into play. I first encountered this position in reading his *Tacit Dimension* in college, which complemented his important article on reductionism (see chapter 2; Polanyi 1966; Gill 2000).<sup>2</sup> This short book is a distillation of *Personal Knowledge* and makes a claim that echoed Richard Feynman’s bon mot, “a very great deal more truth can become known than can be proved” (Feynman 1965; 2015, 111).

Polanyi argued that we see the world through different cognitive lenses, each of which has a part to play in scientific discovery and interpretation. He was wary of becoming ensnared in the confines of restricted theory or disciplines of thought, and more importantly perhaps, limiting scientific method to only a narrow wedge of experience and modes of knowing. By discarding positivist precepts of radical objectivity, he could scrutinize the array of warrants that mediate the inclusion of information. The problem of integrating several layers of reality coupled to the endeavor of widening the scope of investigation would then become a challenge of devising inclusive cognitive criteria that would loosen the strictures encasing notions of science held by his contempo-

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2 Norwood Russell Hanson drew a similar cognitive model (1958). Hanson and Polanyi were hardly making novel claims since other scientists themselves had already noted how *implicit* (viz. tacit) values and ways of thinking were at play in their assessments and development of models. For instance, W. I. B. Beveridge referred to “taste” to capture the aesthetic components in his discussion of intuition and imagination in scientific thinking (1960, 106–08), a precept already declared by Goethe 150 years earlier (Tauber 1993).

raries. Polanyi did not revive subjectivism, but rather promoted the role of non-explicit ways of knowing in scientific discovery and theory formation. On this broad view, cognition moves from the tacit pole of knowing to self-conscious rational deliberation.<sup>3</sup>

On Polanyi's view, objectivity, although a critical component, is a late tool in cognitive assessments. Instead of denying the selective process of observation and the interpretative character of scientific investigation, he embraced them. Thus "personal knowledge" (the partially articulated conditions, frameworks, and subjective elements of tacit knowledge and pre-conscious thinking) became a catch-all for the necessary, creative elements that cannot be accounted for in the positivist rendition of science. Moreover, factual findings alone are insufficient for determining significance, and thus interpretation is required. Indeed, this insight has a long history, but it had fallen out of fashion as the positivist's program of verification had gained ascendancy.<sup>4</sup> From that perspective, only statements that followed direct observation or logical proof warranted the status of knowledge. So, the complexities of integrating perception, values, interpretive bias, and synthesizing creativity lay well beyond their concern. Polanyi understood that Knowledge comprised much more.

Considering what constitutes the calculus of scientific distillations that we call models or theories, Polanyi's reservations about positivist assertions hardly seems novel today. Because what passes for scientific rationality cannot be formalized by rules or algorithms, raw knowledge posing as a fact is essentially meaningless. What is the significance of a scientific fact or larger theory unless

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3 Experimental studies have shown that experimental subjects actively address persistent problems unconsciously ("deliberation without awareness") and they do so with normative standards. Those findings, although actively debated, show that the cognitive unconscious is a wellspring of deliberation and highly dynamic in both the breadth of its engagement and surprisingly analytic in its reflections (Sio and Ormerod, 2009; Bekker 2006; Bos, Dijksterhuis, and van Baaren, 2011; Dijksterhuis, Bos, Nordgren, and van Baaren, 2006; Lassiter et al 2009; Segal 2010; Strick, Dijksterhuis, and van Baaren, 2010; Shanks 2006).

4 Goethe observed 200 years ago that "everything factual is already theory" (Goethe 1998, no. 575, 77), a circumspect view about the status of the factual close to the position presented here as developed in our own era: "Thus we can never be too careful in our efforts to avoid drawing hasty conclusions from experiments or using them directly as proof to bear out some theory. For here at this pass, this transition from empirical evidence to judgment, cognition to application, all the inner enemies of man lie in wait: imagination, which sweeps him away on its wings before he knows his feet have left the ground; impatience; haste; self-satisfaction; rigidity; formalistic thought; prejudice; ease; frivolity; fickleness—this whole throng and its retinue. Here they lie in ambush and surprise not only the active observer but also the contemplative one who appears safe from all passion" (Goethe 1988, 14). This is not to say that Goethe was innocent of projecting subjective values onto his own observations (Tauber 1993).

we may apply it to human understanding? Understanding entails many layers of interpretation that draw from science's supporting culture, the values that govern its use, and, ultimately, the sense of meaning and significance ascribed to the scientific portrait of the world. And the necessary correlate then follows:

While the choices in question are open to arbitrary egocentric decisions, a craving for the universal sustains a constructive effort and narrows down this discretion to the point where the agent making the decision finds that he cannot do otherwise. *The freedom of the subjective person to do as he pleases is overruled by the freedom of the responsible person to act as he must.* (Polanyi 1962a, 309)

Note the emphasis: one must act *judiciously* and *responsibly*. These are ethical directives. Scientific findings transcend the individual investigator, because facts and their interpretation belong to the group and are adjudicated collectively. Thus, for Polanyi, science was a social activity to its core and the values that governed its discourse and activities were based on open, honest exchange. So, beyond the reflexive and interpretive cognitive latitude he described as science's epistemology, such deliberation was guided by values far beyond the reach of positivist aspirations. These he clearly spelled out in "The Republic of Science," where "republican values and methods of liberalism, not those of social democracy, rule in the city of science" (Nye 2011, 179; see Polanyi 1962b; 1974). In his political, economic and, most saliently, philosophical writings, Polanyi promoted the sacrosanct status of individual liberty inseparably linked to the demands of a complex and organized society. For Polanyi, the scientist instantiated such a citizen.

Accordingly, scientific thinking is an ethical activity. The responsibility of just judgment is built into the cognitive enterprise as constituted by the institution of a society of seekers, the scientific establishment. He thus opines that the investigative enterprise demands a profound moral "commitment" (Polanyi 1962a, 299–324):

The course of scientific discovery resembles the process of reaching a difficult judicial decision—and the analogy throws light on a crucial issue of the theory of knowledge. Discovery stands in the same contrast to a routine survey, as does a novel court decision to the routine administration of law. In both cases the innovator has a wide discretion of choice, because he has no fixed rules to rely on, and the range of his discretion determines the

measure of his personal responsibility. In both cases a passionate search for a solution that is regarded as potentially pre-existing, narrows down discretion to zero and issues at the same time in an innovation claiming universal acceptance. In both cases the original mind takes a decision on grounds which are insufficient to minds lacking similar powers of creative judgment. The active scientific investigator stakes bit by bit his whole professional life on a series of such decisions and this day-to-day gamble represents his most responsible activity. (Polanyi 1962a, 309–10)

This basic orientation would have a profound effect on my own thinking about science. Polanyi recognized, as did an entire generation following him, that scientific knowledge is ultimately human-centered, both as a cognitive process and as a social activity (Thorpe 2001; Jha 2002; Lowney 2017). He argued that the scientist is a unique knower, whose judgment and interpretative skills are constitutive to the scientific enterprise. These aspects could not be adequately accounted for by some prescribed logic of scientific discovery. The creativity of the scientific imagination rests on many faculties, some tacit, and thus buried (i.e., implicit and undeclared). In other words, the simple inductive model—data in, conclusions out—cannot capture the scientific process at the level of the individual scientist creating and interpreting her research.

By emphasizing what had heretofore been referred to as emotional characteristics, Polanyi presciently identified and promoted faculties of knowing that have become key components of contemporary cognitive psychology. Emotions color evaluations based on the context of their expression, the web of beliefs in which they are situated, and these, as Polanyi himself observed, typically remain silent, or tacit (Polanyi 1966). Indeed, Quine noted that justification for theory choice or determination of relevant information entails a selection rarely understood by any rigorous “rational” prescription. Quine summarized his position better than any commentator:

[T]otal science is like a field of force whose boundary conditions are experience. A conflict with experience at the periphery occasions readjustments in the interior of the field. Truth values have to be redistributed over some of our statements. Reevaluation of some statements entails reevaluation of others, because of their logical interconnections.... But the total field is so underdetermined by its boundary conditions, experience, that there is much latitude of choice as to what statements to reevaluate in the light of any single contrary experience. No particular experiences are linked with

any particular statements in the interior of the field, except indirectly through considerations of equilibrium affect the field as a whole....

If this view is right, it is misleading to speak of the empirical content of an individual statement—especially if it is a statement at all remote from the experiential periphery of the field. Any statement can be held true come what may, if we make drastic enough adjustments elsewhere in the system. (Quine [1953] 1980a, 42–43).

In other words, judgments—*both* subjective and objective—render information salient, enabling selection of some data and thereby weaning the influx of the rest so that interpretation and larger design play a constitutive role in ordering evidence (Quine and Ullian 1978; Putnam 1986; Hylton 2007, 177–97; Tauber 2009, 92–100).

To separate scientific rationality from other components of intelligence as some distinct and independent ability distorts the process of scientific thinking. Each of the various formats that come into play requires judgment, and judgment is the conglomerate of logic, interpretation, experience, and the larger context in which findings are assessed. The web of beliefs is diverse and comprises many far-flung elements that may hardly be acknowledged, or even perceived. Appreciating that the subjective plays its own role in the objectivity of scientific research suggests that the unified reason I sought already resides in the ongoing project of understanding how integration of various faculties of knowing comprise a more comprehensive theory of reason. Perhaps more to the point, that quest seems justified on the merits of understanding the scientific process in its full employment.

Polanyi's epistemology would have later repercussions as the next generation of social critics extended his constructivist philosophy (Nye 2011, 295 ff.). I had listened with interest to the diatribes between those defending an orthodoxy based on detached, neutral objectivity against those who demanded a more circumspect view of the larger truth claims originating in the laboratory. The outlines of the critique seemed clear, the implications, murky. But one thing was evident: Polanyi had struck a responsive chord in my philosophical soul and his influence would ripple through my ensuing studies.

Initially, I did not fully appreciate the significance of Polanyi's arguments. Having returned to his writings 25 years after first encountered in college, I recognized in retrospect that he had outlined much of my own philosophical program. It would be naïve to claim a precise reconstruction of my own thinking

about this constellation of issues during the decade of 1987–1997. However, I am certain that Polanyi's works legitimated my larger project of seeking a synthetic philosophy that would tie together *erklären* (explanation per the natural sciences) and *verstehen* (understanding, interpretation). Perhaps such a recollection might be attempted, but that effort would be fraught with misappropriations drawn from what I currently think about historiography and the philosophical topics considered at the time. However, I do recall that I was stretching the borders of what I first thought of a historical account (*Metchnikoff* and *The Immune Self*) to include interpretive elements, the philosophical ones most prominently. In those works, I did not conform to a particular school of thought or adhere to a singular line of scholarship. In any case, only with the publication of my *Thoreau* in 2001 did my own project explicitly echo Polanyi's. And it was at that point I finally understood the outline of conceptual linkages between the sciences and the humanities that I had sought as a collegiate senior (per chapter 2). I built that bridge, but as Colonel Nicholson realized in *The Bridge on the River Kwai*, it could not stand.<sup>5</sup>

#### THOREAU

As already discussed, the logical positivists presented the endpoint of the objectification program that would minimize the subjective components of knowledge acquisition and thereby directly confronted the privilege of the individual point of view. The romantic tenet asserting the legitimacy, and calling, of personal experience, was by that time utterly tangential to the core mission of scientific investigation. In short, the romantic agenda had been summarily discarded. However, the logical positivist agenda in turn suffered an ignoble demise. As already discussed, by the early 1950s the unravelling of the Vienna Circle's program had begun and was essentially completed by the mid-1970s (Zammito 2004; Tauber 2009a, chapter 3).<sup>6</sup> That story, at least for me, originated in the romantic resistance to positivism in the nineteenth century. And so I returned to examine that period in which my neo-romanticism

5 *The Bridge on the River Kwai* (1957) is a celebrated film about British POWs, who were forced to build a bridge in Burma for the Japanese Imperial army. Nicholson's obsession with the construction loses sight of the larger strategic significance of providing a railway, and at the climax of the movie, he finally recognizes his narcissistic error and detonates the structure.

6 The best approaches thus far have focused on case studies, where standards of evidence were contested and thus showed the latitudes of scientific thinking as revealed by dispute of interpretation (e.g., Schaffer and Shapin, 1985), the basis of objectivity (e.g., Megill 1994; Daston and Galison 2011), and validity of observation (Daston and Lunbeck 2011).

had originated, long slumbered, and was finally awakened. With objectivity given and positivism ascendant, I wanted to understand the modalities by which the late romantics clung to a role for subjectivity in the scientific endeavor. I set my *Henry David Thoreau and the Moral Agency of Knowing* (2001) in this transition period (1840s and 1850s), when conflicting epistemologies were clearly enunciated and the romantic preoccupation of how to place the observer in relation to nature became an explicit debate. I discovered some fecund ideas that when re-cast for our own era seemed highly relevant again.

Recall, the Romantics' writings on the disenchantment of nature and the unity of knowledge were particularly appealing to me since adolescence, when I first read Thoreau's *Walden*. And the dilemmas he raised continued to orient my fledgling efforts in college to reconcile the apparent opposing claims of objective and interpretive ways of engaging the world. More directly, I had recently taught *Walden* in a philosophy of nature course that my enrollment-obsessed chairman urged me to offer. This rereading of the text had a deep impact. At the time, I was living in an eighteenth-century farmhouse nestled by a large apple orchard, cutting hay, plucking apples, pears, and blueberries, and building a boathouse from pine saplings on our New Hampshire lakeshore. These doings were reminiscent of Thoreau's own "experiment" in living, and I identified with his efforts to better place himself within nature. His was both an aesthetic and spiritual endeavor. Indeed, of all the figures of that period with whom I was acquainted, he most clearly personified the science-humanist-artist model that resonated so powerfully with my own ego ideals. This reengagement proved to catalyze the next phase of my intellectual journey. So, with his *Journal* at my side, I eagerly picked up a neglected trail and walked its winding course.

After *Metchnikoff*, I felt comfortable with intellectual biography as an explicative genre. If I was, in fact, interested solely in science, Thoreau seemed at first glance a most unlikely prospect. The natural history he practiced had already been eclipsed by the early professionalization of biology, but the epistemological agenda he had set for himself struck a responsive chord with me. He self-consciously sought coherence between objective knowledge and the aesthetic and the spiritual, a triangle where each mode of experience found its rightful place. Once I understood the scope of his aspirations, Thoreau served as the foil for my evolving epistemological ideas. Simply stated, his vision of knowledge was not governed by the accrual of naked facts, but rather the value structure by which that information assumed significance. Specifically, personal meaning emerged through an integration of empirical findings and an aesthetic by which they

were organized. Thoreau developed a deliberate way of seeing, one designed to bring himself into alignment with nature in all experiential dimensions. And that venture represented one of the last gasps of the romantic strategy devised to re-enchant nature and to find existential meaning therein. And with him as my companion, I began to address my larger metaphysical agenda. So, having completed the first phase of my studies of immunology, I was ready to deal with the underlying drive that had landed me in the humanities faculty.

I had initially intended to write an essay on Thoreau's notions of time, based on some insights that occurred to me during my 1998 Philosophy of Nature course. However, once completed, I expanded the paper to include Thoreau's concept of history, and after those two chapters took form, I realized that his culture criticism followed the same patterns as his natural history. The manuscript finally became a long monograph detailing Thoreau's epistemology.

My book portrayed Emerson's protégé caught between the practice of natural history and the emergence of professional academic biology that would provide little space for his efforts. As Thoreau witnessed romanticism's ebb tide and the rise of a new positivist scientific standard, he rejected the role of "scientist" (Whewell 1840, cxiii) and instead became an early conservationist and an important naturalist writer. These are fair credits, but I saw him (as he saw himself) as a moral philosopher and an astute epistemologist. He is best known in the first guise, as a visionary of the ethical life, one who championed the wild as our own link to the world. In seeking the core of human being, Thoreau asserts that the wild is the essential element and that by domesticating it through civilization we lose contact with the deepest source of our vitality and spirituality. Justly, his essay, "Walking," became a national anthem to a new moral standing of nature. He begins with a cry to arms:

I wish to speak a word for Nature, for absolute freedom and wildness, as contrasted with a freedom and culture merely civil—to regard man as an inhabitant, or a part and parcel of Nature, rather than a member of society.

I wish to make an extreme statement. (Thoreau 1980a, 93)

On that declaration, Thoreau then declared, "in *Wildness* is the preservation of the World" (ibid., 112, emphasis added). This slogan captures Thoreau's moral stand, one that underlies what conservationists have appropriated for their own programmatic efforts. However, note that Thoreau wrote "wildness," not "wilderness." He chose his words carefully, for as important as the conserva-

tion of nature might have been for him, his concern (like most romantics) was primarily with his own vitality, which he saw as celebrating the wildness within himself.<sup>7</sup>

My philosophical portrayal showed how Thoreau's nature studies represented an epiphenomenon of a deeper enterprise—the discovery of the self and its perfection. In this romantic context we see Thoreau's relationship to nature as the expression of that effort. He might have sought self-definition in another context, but he chose his encounters with nature that became the means by which he explored his own identity and developed his personhood. This exercise he pursued as an observer of the natural world, and in his self-conscious studies of nature and his own place therein, he practiced what he preached.

His was a lonely vigil, for Thoreau dwelt well outside formal philosophical discourse. Yet he was well aware of the philosophical issues with which he dealt, and he made sophisticated comments on a variety of epistemological issues. He accepted his outsider standing (“there are nowadays professors of philosophy, but not philosophers” [Thoreau 1971, 14]) and proceed in his own unique way by inventing a new way of thinking about the world and himself in it. With an astute sense of detail and a poetic eye, Thoreau sought to create the world in which he lived, one imbued with beauty and spiritual significance. He thus endorsed distinctive romantic tenets in asserting the primacy of his own knowing. I contrasted his engagement with nature against the academic biology emerging at Harvard. My composition became a fugue of three themes: 1) the rejection of positivism by a romantic who sought to translate objective knowledge into terms of personal significance; 2) the moral character of such a venture, which meant assessing the values guiding his efforts; and 3) a portrait of personal identity based on this example. The last was the heart of the matter.

Thoreau is best known for building a small cabin on the shores of Walden Pond for what he called “an experiment” in living—often repeated as an effort to live a simple life. However, a more grandiose gesture of self-creation was also in play. He literally took a page out of Emerson's *Nature*, the American Transcendental manifesto:

Every spirit builds itself a house; and beyond its house a world; and beyond its world, a heaven. Know then, that the world exists for you. For you is the

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7 Nietzsche would convert that wildness into the Will to Power (Nietzsche 1967; Stack 1992; Zavatta 2019).

phenomenon perfect. What we are, that only can we see....Build, therefore, your own world. (Emerson 1983a, 48)

What an extraordinary exhortation!

Thoreau melded several tributaries from *Nature* that would guide his mature project. This pivotal essay had posed questions concerning 1) the relation of ideas that correspond to material nature, 2) the role of intuition as a valid mode of knowing, and 3) the character of an individual's ethical standpoint (Richardson 1986). Each of these issues, according to Emerson's perspective, was grounded in man's relation to nature, as opposed to God, state, or society. As did the Stoics long before him, he evoked parallel universes, where nature's laws were fundamentally the same as the laws of human nature, and thus man could base a good life, a life of virtue, on nature. Emerson more clearly articulated his position in the Phi Beta Kappa address at Harvard (delivered the day after Thoreau graduated but probably did not hear) by asserting that the business of the American Scholar was to study nature and thus attain self-knowledge by the correspondence discovered in that examination (Emerson [1837] 1983b).<sup>8</sup>

Thus, for Emerson, the appreciation of nature leads to the reconstruction of human divinity in its various forms and the making of a self-crafted world. The creative element is key: meaning is established between a contemplating individualized mind—the self—and the world (natural and divine) about him. Thoreau would erect his own romantic philosophy along these lines, picking out some elements and discarding the rest. In so doing, he assumed two philosophical positions. One is ethical—we are responsible for the lives we lead and must assert moral self-consciousness in the effort required to fulfill human potential. That program, clearly inspired by Emerson, I will discuss in detail below, but first I review how Thoreau engaged nature that defined in terms of the knowing agent, his moral venture.

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8 Emersonian Transcendentalism stressed how one might be spiritually enlightened by studying nature: Because humans are only dimly aware of their innate divine sources, the natural world remains “the present expositor of the divine mind” (Emerson [1836] 1983a, 42). Through correspondences we might “read” nature and thus decode her, for “every natural fact is a symbol of some spiritual fact” (ibid., 30), and conversely, “all spiritual facts are represented by natural symbols” (ibid., 22). This “radical correspondence between visible things and human thoughts” (ibid.) reflects the emblematic nature of the world, where “the whole of nature is a metaphor of the human mind” (ibid., 24). If one could discern that language, nature then holds “models for human art, metaphors for human growth, assurances of human stability,” and thus one who studies nature is afforded a “means of recovering his ‘power,’ his charismatic capacity for the mastery of life” (McIntosh 1974, 28).

Unlike Emerson, Thoreau immersed himself in careful observation and recordings of his natural surroundings. For example, he took soundings of Walden Pond, kept scrupulous recordings of weather, reported what he thought was a new species of fish, dated the first appearance of flowers, and observed birds and animal behavior with meticulous detail. These are only examples of his penchant to gather factual data. This natural history thus spanned many later professional scientific disciplines (ecology, ornithology, climatology, botany, and zoology). He then coupled that scientific activity to a sophisticated appraisal of his epistemology. Thoreau was acutely aware that what he saw was determined by *how* he saw. As he himself observed, what objects “one person will see . . . are just as different from those which another will see as the persons are different” (Thoreau 1962. 11:285; November 4, 1858). Nature’s reality is not at stake, but the ability to know that world is principally dependent on the character of observation and then derived comprehension and interpretation: “As for the reality no man sees it—but some see more and some less” (Thoreau, 1984, 355; December 2, 1846).<sup>9</sup> And he was particularly, even uniquely, self-aware both of his observations and himself observing.

Thoreau possessed a matchless view of the natural world by following a two-step process: first, he gathered facts with extraordinary detail. He was known to sit in a swamp for hours, recording what he saw in a small notebook, and then transcribing his findings into his journal. Once he had scrupulously recorded his observations, his literary labors began by gleaning the aesthetic and the spiritual import of what he saw. In short, for Thoreau, gathering facts was only the commencement of a self-conscious process of deliberately placing himself *in* the world by ordering such knowledge in a personally meaningful way. To do so, he developed a distinctive epistemology, one in direct opposition to the positivist’s “view from nowhere,” a universal perspective from which all observers saw the same phenomenon in the same way. Precisely at this point, where the personal was eliminated, Thoreau threw up his challenge to the assertions of the professional scientists.

An autonomous observer peers at the world from a privileged, singular vantage. Moreover, that vantage carries a value structure that prioritizes the observer’s report. Consequently, for Thoreau, seeing ultimately depends on the

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9 Interestingly, when Wittgenstein discussed the psychology of seeing, he made the same general point that interpretation precedes what is seen: “So we interpret it, and *see* it as we *interpret* it” (Wittgenstein 1968, 193e).

individual's ability to observe and to create, and the world as known is thus radically dependent on a particular point of view.

Thoreau unabashedly assumed a constructivist philosophy: reality is a product of mind and nature, as Kant first proposed, not formulated by a universal reason as originally posited, but composed with varying cognitive rules, historically and culturally developed and thus contingent to time, place and temperament. Although I found no evidence that Thoreau understood (or cared) about the philosophical underpinnings of his work (after all, he lived in what Stanley Cavell has called America's "pre-philosophical moment" [1981, xiii]), I saw his project exhibiting the constructivist position to which I was attuned. Indeed, my study described Thoreau's epistemology in those Kantian terms.

### THE MORAL COMPONENT

While objectivity for Thoreau had its respected place, he held that facts were ultimately signified within a context of interpretation. Thus, facts, beyond their role in depicting nature objectively, revealed both the beauty of nature and, perhaps more profoundly, the moral lessons that might be gleaned from such observation. He did not use "moral" to mean good or evil, but more generally, moral as value—the basis for ordering actions and choices of all kinds. As he wrote in his 1852 journal,

Nature has looked uncommonly bare & dry to me for a day or two. With our senses applied to the surrounding world we are reading our own physical & corresponding moral revolutions. Nature was so shallow all at once I did not know what had attracted me all my life. I was therefore encouraged when going through a field this evening, I was unexpectedly struck with the beauty of an apple tree—The perception of beauty is a moral test. (Thoreau 1997, 120)

This journal entry resounds with *Walden's* proclamation, "Our whole life is startling moral" (Thoreau 1971, 100). When Thoreau's project becomes a "moral test," he explicitly assigned himself the responsibility of achieving this integration. For him, to see becomes an achievement, and seeing, of course, required multi-dimensional kinds of knowing. And here the moral theme joined Thoreau's epistemology.

For Thoreau, awareness is the responsibility and capacity of the observer to see. In this regard, the character of the individual is radically determinative of

what is there. He placed lenses of enhanced sensibility before his eyes, both to focus his sight and filter it. The “ethics of seeing” requires an effort, a deliberate search for beauty, and the act of deliberate observation conferred the re-enchantment of nature he sought. Nothing would be taken for granted: all life was a marvel to behold. Finding nature’s splendor hardly describes the work of an ordinary scientist, or even of a “natural philosopher.” It was, instead, the expression of an artist working in a new medium. And the work of a moralist, for the very act of observing became a test of Thoreau’s values and his ability to live by them.

Reading Thoreau’s journal, I marveled at how he composed nature in a personalized format. He took what he required to present a picture of the world, of himself within it, as a work of self-creation and famously proclaiming, “this world is but the canvass to our imaginations” (Thoreau 1980b, 292). So, when this active imaginative component of knowing was applied to his empirical studies, instead of embracing objectivity’s “view from nowhere,” Thoreau proclaimed the primacy of precisely his own vision.

I think the man of science makes this mistake, and the mass of mankind along with him: that you should coolly give your chief attention to the phenomenon which excites you as something independent on you, and not as it is related to you. *The important fact is its effect on me.* He thinks that I have no business to see anything else but just what he defines the rainbow to be, but . . . it is the subject of the vision, the truth alone that concerns me. The philosopher for whom rainbows, etc., can be explained away never saw them. With regard to such objects, I find it is not they themselves (with which men of science deal) that concern me; the point of interest is somewhere between me and the objects. (Thoreau 1962. 10:164–65; Nov. 4, 1857; emphasis added)

Accordingly, Thoreau’s science became a *poesis*.

I know of no more encouraging fact than the unquestionable ability of man to elevate his life by a conscious endeavor. It is something to be able to paint a particular picture, or to carve a statue, and so to make a few objects beautiful; but it is far more glorious to carve and paint the very atmosphere and medium through which we look, which morally we can do. To affect the quality of the day, that is the highest of arts. (Thoreau 1971, 90)

Thus, Thoreau proceeded by deliberately placing his natural history in relation to different kinds of knowing (colored by moral and emotional sentiments). His reaction to the ascendancy of new forms of objectivity offered a case example of how science might be contextualized within larger humanistic meanings, i.e., a picture of reality integrated by human subjectivity. His effort did not pit scientific ways of knowing against competing epistemologies, but instead he pursued an integrative project in which other dimensions of experience might join within the reality offered by his observations. Note, objective facts remained the *métier* of scientific discovery, but beyond placing those facts into models or theory, the existential significance of those facts would claim their ultimate standing.

Thus, Thoreau responded to the challenges posed by the positivist ideal by attempting to humanize the scientific worldview. His singular accomplishment was to show how individual vision might be combined with discourses that employ dispassionate objectivity. Reasserting the authority of the individual observer, he was acutely self-conscious of both observing nature and observing himself observe it. His Janus-like vision offers us an essential clue for pursuing a strategy to integrate Reason by employing objective science for subjective ends. For him, questions of knowledge were framed by the moral structure of knowing, and in demonstrating that relationship he provided a critical portrait of human agency. I could find no better example of Polanyi's *Personal Knowledge* thesis. Indeed, *personal* became the mantra for my Thoreau study.

Thoreau has carried many identifications, each derived from the perspective of the student seeking his wisdom. I regarded him as an idiosyncratic philosopher, whose extension of Emersonian perfectionism made the self-conscious subject, whether considered epistemologically or morally, the central concern of his diverse writings (Tauber 2003b; 2012b; Cavell 2003). For the Concordians, individuality became an achievement, the due process of an acute self-consciousness guided by deliberate purpose. And, closer to orthodox philosophy of science, I composed *Thoreau* as a commentary to post-positivist philosophies of science that had been written a generation previously, when Polanyi, Kuhn, and others undermined the "rational model" of scientific—positivist-directed—advancement. They argued that beyond "the facts" subjective elements played a critical role in interpretation of scientific data and the development of theory. This thesis appears almost as a self-evident adage now, but I thought that the romantic origins of their constructivist theme should be acknowledged and explicated.

Thoreau was prescient in his own critique of an encroaching positivism that would deny the interpretive elements embedded in science. I used his extensive writings to reignite a philosophy of science that explicitly showed the interactions of various values in practice, some of which were “epistemic” (i.e., objective, itself a contested designation with different standards) and others “non-epistemic” that still must be accounted for in the synthesis of knowledge. And, given my persistent interest in the notion of selfhood, I further examined positivism as an aspect of the subject-object epistemology that so powerfully guides the common understanding of how humans encounter the world. And from there, new vistas opened before me.

## Chapter

# 12

## Moral Epistemology

**T**horeau practiced an epistemology along a continuum of knowledge that stretched from writing a chronicle of objective observations to recording his subjective reactions to those findings. So, while placing facts within nature's architecture, this project could not be construed solely as an attempt to capture "reality," for Thoreau's depiction emerged from his own imagination. His attacks on a sterile objectivity were both audacious and appealing. A generation later, phenomenological psychologists developed a fully articulated program that began with the premise that the mind did not see the object "as is," but by integrating related perceptions (see chapter 5). Thoreau qualifies as a proto-phenomenologist.

Phenomenologists maintain that experience is constructed from imperfect and piecemeal data that requires a correcting mind to form the conscious image. On this view, perception is based on an "interactive relationship between subject and object: the object was, in effect, partially 'created' by the act of seeing it" (Ryan 1991, 11). Moreover, the object does not exist except with reference to the act of seeing, and conversely perception exists only in reference to its object. Brentano called this relationship, "intentional," and it served as the origin of twentieth-century phenomenology as expounded by Husserl. The romantic origins of the phenomenological account are not often cited, but for me, this school of philosophical psychology only reenforced my opinion that Thoreau had articulated an important epistemological principle, one embedded in our contemporary understanding of cognition.

Although I was not primarily interested in the psychology of perception and self-consciousness, I did want to explore how values structure cognition. My interpretation subordinated Thoreau's methods of scientific inquiry to a broader agenda, the second step of perception in which knowledge is processed and integrated into the subjective awareness. Here, aesthetics and existential meanings take hold. Where to draw the line between the objective observation and its processing is not obvious. Humans make choices and thereby assign degrees of importance to one kind of observation over another. Information is weighed, certain details become important within the context in which they are seen, and the observer creates that context for determining the significant.<sup>1</sup> Of course, science may be demarcated within one kind of framework and art within another, but my interest focused on how "facts" are deployed within each domain.

Obviously, orthodox science proceeded without Thoreau, but he showed the value of making objective knowledge his own. The issue is not subjectivity in the confining, prejudicial, solipsistic sense, but rather moving perceptions from the objective parlance to meaningful experience. As Thoreau wrote in his *Journal* in May 1854,

There is no such thing as pure *objective* observation. Your observation, to be interesting, i.e. to be significant, must be *subjective*. The sum of what the writer of whatever class has to report is simply some human experience, whether he be poet or philosopher or man of science. (Thoreau, 1962, 6:236–37)

And this was to be a celebration of life in its fullest deployment. He sought to retain the youthful freshness of experience, for only in the personal would the full significance and beauty of knowledge remain fresh and most intimate: "I suspect that the child plucks its first flower with an insight into its beauty and significance which the subsequent botanist never retains" (Thoreau 1992, 329, February 5, 1852). This vision gripped me with tenacious hooks.

Thoreau, beyond offering an epistemological foil to regard science, also voiced a deeper expression of identity. His communing with nature, his historical pursuits of various kinds, his observations of society and men, were each

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1 Cognitive psychology has shown that humans see discrete objects and their relationships in different ways and while there is a high degree of accord, discernible differences between Western and Asian subjects has displaced the notions of uniform perception of some singular reality (Nisbett 2003).

organized around a self-image of what he wished to be, and this literary work became an expression of his self-consciously composed identity. For Thoreau, poesis, science, and social commentary became part of a grand moral project that reflected the character of his own seeing and knowing. This grand synthesis was self-willed through the deliberate choice of values that would order a unique vision, namely, his observations were a product of the value bestowed on the object of scrutiny. And the facts of the world, or more simply, the world, only become factual with the values assigned by human evaluation. Thus, the play of facts and values, interacting with varying valences assigned to each, serves as the *métier* of life experience, ordinary and otherwise. Note the movement in which a circle of relationships is created: an epistemological position is linked to a moral one, which in turn is associated with a sense of personal identity. The three domains are inextricable from each other and how one is developed influences the others.

For Thoreau, authenticity required a self-renewal achieved through the self-conscious process of actively engaging nature and recognizing the beauty and splendor of himself so engrossed. This became a mode of self-discovery (“let me forever go in search of myself— Never for a moment think that I have found myself”) that accomplished the dual purpose of 1) tapping into the reservoir of his vitality for the rejuvenation he sought, and 2) an act of virtue that made his life a “sacrament” (Thoreau 1990, 312, July 16, 1851). Accordingly, Thoreau assumed a moral stance about his own personhood, which depended on an underlying epistemological assumption about how he might know and engage the world, creatively. Given his commitments to individuality, he jealously guarded his own personal ability to direct his efforts. Thus, his assumed autonomy, the sanctity of his own personhood, underlay the entire endeavor.<sup>2</sup>

Thoreau’s romanticism deeply influenced my thinking. For me, his importance lies not solely in laying the foundations of our contemporary environmentalism, but more deeply in the ways he responded to the challenges of what Nietzsche would later call nihilism. Thoreau fell in line between Emerson and Nietzsche in asserting a self-willed moral universe in which they would conduct their lives. The self-consciousness they so keenly experienced embodied a romantic ethos that might now seem outdated, but its lingering presence un-

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2 As Thoreau opined, “how to observe is how to behave” (Thoreau 1962, 5:45), a precept later adopted by James, “each of us literally *chooses*, by his ways of attending to things, what sort of universe he shall appear himself to inhabit” (James 1983, 401). That cognitive lesson, derived from a phenomenological understanding, thus also enshrined an ethics by which to ground identity.

derlies our own preoccupation with identity. While the next two chapters deal with this topic in detail, its romantic roots exemplified by Thoreau highlights the Unity of Reason theme that has punctuated this narrative and now focuses our discussion.

The most immediate lesson learned from writing my *Thoreau* concerned the placement of scientific inquiry into the widened setting I had sought. I called the characterization of science in this broadened view, a “moral epistemology” to capture the interplay of a bevy of values (objective and subjective) that coordinate to generate personal experience. In my reconstruction of the late-romantic response to positivism, I saw how a personalized epistemology would account for the search for facts and still endeavor to incorporate the subjective elements of knowing that form the wider girth of meaning. And, of course, the rightful jurisdiction of each modality of thought must be respected. After all, “objectivity of whatever kind is not the test of reality. It is just one way of understanding reality” (Nagel 1986, 26). And conversely, the boundary must be preserved to guard against the corruption of objectivity by subjective-based bias and ideology, where facts are inappropriately used to serve political or social ends. The task is to hold a balanced view with an eye towards finding some reconciliation as opposed to the hegemony of one modality versus the other.

In terms of the post-positivist picture of science, the task is to acknowledge the role non-epistemic values play in the judgments inherent in scientific discourse and interpretation.<sup>3</sup> The point of the exercise is to be self-conscious of the disguised elements that play into any objective account of nature. These non-epistemic values compose the “force field” in which facts are constructed. However, I think we must go further in understanding the value structure of the non-epistemic as it impacts on the processing of scientific knowledge. This comprises a second step of integration, one that occurs at the level of the individual finding significance and meaning in the world science presents.

Following flexible, poorly defined rules of navigation, this conjoined moral epistemology highlights how knowledge is structured by, defined through, and embedded in diverse values, and more to the point, these values include those established by lived experience and ordered by personal meanings. Note, this

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3 “A reconstructed epistemological project has to retain an empirical-realist core that can negotiate the fixities and less stable constructs of the physical-social world, while refusing to endorse the objectivism of the positivist legacy or the subjectivism of radical relativism” (Code 1993, 21). Lorraine Code notably identifies herself as a feminist philosopher, but she extends the question of gender to the general epistemological challenge of accounting for the knowing subject (Code 1991; 1993; Nelson 1990; Alcoff and Potter 1993).

terminology, “moral epistemology,” is not the characteristic usage that addresses the epistemic status and relations of moral judgments and principles (i.e., justification of statements or beliefs, in epistemology, or validation of judgments of actions, in ethics). Instead, here “moral” stands for acknowledging the degree to which knowledge is value-laden. Note, moral epistemology captures the collapse of a dichotomous fact/value epistemology and substitutes an enveloping formulation (Putnam 1982; Tauber 2009a, 175–86). So, now I turn to the integrative challenge Thoreau represented as a moral issue, not epistemological.

### TWENTIETH CENTURY RESPONSES

During the early twentieth century, influential commentators (e.g., Heidegger, Husserl, Max Weber) generally agreed that Reason had been divided with dire consequences. The then current expectations of science to provide a comprehensive worldview and a basis by which knowledge might be unified under its auspices remained an unmet challenge. Husserl dramatically posed the task in *The Crisis of the European Sciences*:

Merely fact-minded sciences make merely fact-minded people.... Scientific, objective truth is exclusively a matter of establishing what the world, the physical as well as the spiritual world, is in *fact*. But can the world, and human existence in it, truthfully have a meaning if the sciences recognize as true only what is objectively established in this fashion? (Husserl 1970, 6–7)

Husserl’s criticism confronted positivism in terms quite divorced from any technological influence exerted on the wider social domain. As Goethe and Kant before him, Husserl called for a coherent reason, a common philosophical grounding for each sphere of experience. Without such a unification, he lamented the “crisis” of the deeply divided nature of two kinds of knowledge (Harvey 1989).

What began as Descartes’s Dream, became Husserl’s nightmare; a philosophy that sought to describe nature in formal terms (i.e., geometrically or mathematically) has left science as “a residual concept.” On this view, the agenda of technical mastery had isolated science from its original place in the larger philosophical realm. “Metaphysical” problems that should still be broadly linked to science under the rubric of rational inquiry were now separated over the criterion of *fact*. In a word, “positivism ... decapitates philosophy” by legitimizing

one form of knowledge at the expense of another (Husserl 1970, 9). Husserl was lamenting the loss of humane, personal elements in the scientific view and sought a philosophy that would integrate the subjective and objective ways of knowing. The hegemony of the natural sciences had arrived and he sounded the alarm. An originally unified philosophical foundation had been fractured (Hopp 2008). Diverging ways of thinking (with distinctive rationalities) coupled to a corresponding inability to address human interests as defined in a humanistic framework, left a “vital state of need ... [where] this science has nothing to say to us” (Husserl 1970, 6).

Husserl was reacting to the philosophers of the Vienna Circle. They, like Husserl, wanted a form of unified reason, but not on the basis of some parity between the natural sciences and hermeneutical disciplines but rather strictly structured (and adjudicated) by their analytical vision. For them, consilience of knowledge under the banner of science followed the authority of their definition of what constituted truth criteria. And that project was elaborated from deeply held philosophical commitments (see chapter 8).

As discussed, my *Thoreau* (2001) addressed the matter, but not in the terms of Husserl’s call to make reason whole. Indeed, few have pursued this goal, and, in fact, it has been largely abandoned. Many tributaries have fed into the dismissal of a unifying universal philosophy. To the Anglo-American ear, such speculation seems not only foreign, but strangely whimsical. For this skeptical group, scientific reason is assigned to govern one domain of knowledge, and other kinds of reason are left to matters of value and ethics. Indeed, lines have been drawn precisely on this basis, and those who discard the very possibility of some enveloping philosophy basically ignore Husserl’s project or dismiss it as misconceived. For those in that rejecting camp, “multifocal” reason characterizes human life, and to pursue integration smacks of eclipsed metaphysics. Indeed, the twentieth-century philosophies attempting the Husserlian enterprise—existentialism, Marxism, structuralism, Heideggerian phenomenology—have each proven incapable of the task assigned themselves. Instead, following Wittgenstein, analytic philosophers have sought to show that the very conception of such a venture is misconstrued.

Ironically, this general posture may well be the most enduring of the contributions made by the logical positivists, for while they failed to formalize science, they succeeded in discrediting projects such as Husserl’s...perhaps for the wrong reasons. Note, an underlying scientism served to support the Vienna Circle’s unrealized project to establish the foundations of a “unified science.” They failed and more recent scholarship has explained why the effort was mis-

conceived (Dupré 1993; Galison and Stump, 1996; Cartwright 1999). Contemporary science depicts discontinuities of the world in contrast to the unification of knowledge envisioned by the logical positivists and their forerunners.<sup>4</sup> I take epistemological divisions as given. An irreconcilable difference of competing conceptions of contemporary philosophy translates into divergent intellectual aspirations and different philosophical expectations. Furthermore, different ways of knowing must account for personal experience.

Discarding formalisms and foundations leaves pragmatic modalities directed at the human use of science. This became John Dewey's mission, whose constructivist philosophy endeavored to establish the integration that evaded Husserl. Dewey pursued a naturalistic epistemology, where instead of a passive assimilation of the world, the mind actively interacts with its environment to construct knowledge or as Putnam later opined, "The mind and the world jointly make up the mind and the world" (Putnam 1981, xi). In Dewey's *Studies in Logical Theory* (1903), cognition and knowledge acquisition are dissected as a genetic process in which a problem, confusion or maladaptation 1) promotes a cognitive response, which is then followed by an 2) analytic process in which the parameters of the challenge is gathered and in a 3) reflective phase, the various modalities of inquiry (ideas, suppositions, theories, etc.) are composed into hypothetical solutions to the original problem, 4) whose adequacy is then tested in terms of their pragmatic success. Underlying this epistemological approach resides Dewey's assessment of the motivations behind traditional metaphysics, whose central aim

had been the discovery of an immutable cognitive object that could serve as a foundation for knowledge. The pragmatic theory, by showing that knowledge is a product of an activity directed to the fulfillment of human purposes, and that a true (or warranted) belief is known to be such by the consequences of its employment rather than by any psychological or ontological foundations, rendered this longstanding aim of metaphysics, in Dewey's view, moot, and opened the door to renewed metaphysical discussion grounded firmly on an empirical basis. (Field 2001)

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4 The consilience they prophesized was most "optimistically" argued by Wilson 1998 but failed to find many believers (see Callebaut 1993; Olafson 2001). Note, consilience in the sense understood by Wilson overlaps with but is not the same as the "unity of science" program that dates, at least in the twentieth century, to the Vienna Circle and its descendants. For overview, see Kamminga and Somsen 2016.

I will not further detail Dewey's epistemology here and instead will only summarize what I term the moral underpinnings of what Dewey called, a "theory of inquiry" or "experimental logic." Doing so, I realize that in only highlighting his aspirations and over-riding rationale, I leave in abeyance a description and judgment of the philosophy. However, my concerns lie elsewhere than in his specific epistemology tenets (i.e., fallibilism, the lack of incorrigible foundation of knowledge, truth function assessed in terms of human use), which re-appeared in pragmatist philosophies of science that have been summarized in chapter 9.<sup>5</sup> Instead I turn to the value structure of his epistemology, the substratum of Dewey's thought and the theme central to my own endeavor.

In the twentieth century, what Emerson had declared as "peculiarities of the present Age . . . the age of the first person singular" (Emerson 1963, 70), shifted in Dewey's philosophy with the displacement of the self-absorption characteristic of romanticism to the chores of pragmatic education, politics, and communal solidarity. Dewey thus placed the Transcendentalist's integrative moral vision into a programmatic scaffold. Dewey recognized and then highlighted that all sciences

are a part of disciplined moral knowledge so far as they enable us to understand the conditions and agencies through which man lives . . . Moral science is not something with a separate province, for physical, biological and historic knowledge must be placed in a human context where it will illuminate and guide the activities of men. (Dewey 2002, 296)

The world so construed is fundamentally moral in the sense of human-valued, human-centered, human-derived, human-constructed, and human-intended.<sup>6</sup>

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5 For discussion of the relationship of the respective epistemologies of Dewey, Pierce and James, see Sleeper 2001, pp. 44 ff. That discussion is useful in placing Putnam, Rorty and other late twentieth-century pragmatists in philosophical perspective.

6 Protagoras of Abdera (c. 490–c. 420 BCE): "Of all things the measure is Man, of the things that are, that they are, and of the things that are not, that they are not" (DK 80B1). Plato accused Protagoras of unsustainable relativism in the *Theatetus*, where "If what each man believes to be true through sensation is true for him—and no man can judge of another's experience better than the man himself, and no man is in a better position to consider whether another's opinion is true or false than the man himself, but . . . each man is to have his own opinions for himself alone, and all of them are to be right and true—then *how*, my friend, was Protagoras so wise that he should consider himself worthy to teach others and for huge fees? And how are we so ignorant that we should go to school to him, if each of us is the measure of his own wisdom?" (161B). And again, in Plato's *Protagoras*, if opinions of Truth differ, how is adjudication achieved? Some have interpreted these passages as an early attack on relativist epistemological assertion and Nietzschean view

For Dewey, no firm demarcation between moral judgments and other kinds are possible, for “every and any act is within the scope of morals, being a candidate for possible judgment with respect to its better-or-worse quality” (Dewey 1922, 279). Thus, he widened the scope of “morals” to value judgments writ-large: “morals has to do with all activity into which alternative possibilities enter. For wherever they enter a difference between better and worse arises” (ibid., 278). Accordingly, values form the cognitive glue in which experience coheres. And a corresponding agenda is at play: the disenchantment of nature, one devoid of value has been replaced with a reordering that includes human interest and meaning. To segregate the personal from the world as some separate entity defrauds philosophy’s own quest, for a world without human value has lost human significance. Humans live firmly *in* the world. To fracture that fundamental unity not only distorts our understanding of ordinary experience but introduces alienation, the root of nihilism.

From this point of view, meaning assumes philosophical supremacy through a self-reflexive attitude. As Dewey asserted, “Meaning is wider in scope as well as more precious in value than is truth” (Dewey 1931). Not to demote “truth,” but according to Thoreau and Dewey, truth is in service to meaning. This adage might be easily misunderstood, and rightly rejected, if truth is not included as occupying a central place in the constellation of what constitutes meaning. Let us unpack these claims.

When science is configured within a moral epistemology, the technical mastery of nature is coupled to the humane project of finding meaning in that knowledge. Such an understanding then underscores how science cannot rest solely within epistemological demarcations. For those uncomfortable with the personal aspects (i.e., the aesthetic and spiritual), they still acknowledge that the current debates about the applications of scientific knowledge are tied into the value judgments applied to scientific facts. Interpretation cannot be divorced from the larger ideologies that go into constructing the meaning and use of those facts.<sup>7</sup>

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of morality. Note, I am invoking human-centered, not “man is the measure of all things” as originally formulated, but strictly in the moral sense Dewey intends. If “human measure” is understood metaphysically, a different set of issues arise: Yes, Protagoras correctly placed value in the human domain (within communal restrictions), and yes, the world is the world we know and value (again, qualified by communal consent); but no, we cannot claim some metaphysical primacy.

7 For instance, debates about the biological determinism of complex social behaviors such as alcoholism, homosexuality, or violence have found ideologues using scientific data for their own purposes, but whose rationales cannot be finally decided by such appeals to “scientific objectivity” (Tauber 2009a, 133–51).

On this view, truth not only has an epistemological standing, but it also possesses an ethical one. This claim does not reduce the standing of epistemological truth in any sense, but in this configuration, truth becomes a tool in the moral domain as well, where truth claims constitute a stage on the way towards some meaningful synthesis of scientific knowledge with subjective values. Truth thus functions in the service of meaning-seeking behaviors, which, of course, coincides with the integrative requirements of thought. Reality is thus experienced in an ongoing test of personal knowledge against the world that demands responses that invoke one kind of reason or another. This integrative effort requires a self-reflective attitude about science and how it becomes constitutive to our view of the world and of ourselves. Reflexivity then becomes the heart of the project, where comprehension of an integrated world emerges as epistemology's object of inquiry. Simply, human-defined significance serves to focus judgment's function, an arbitration of experience to create human reality. I explicated this nest of issues in an ambitious synthesis, *Science and the Quest for Meaning* (Tauber 2009a), a work that had been dimly imagined decades before.

### SCIENCE AND THE QUEST FOR MEANING

*Quest for Meaning* reviewed the potency of attacks against positivism launched by Polanyi, Kuhn, and Quine; the role of constructivist thinking in science; the Science Wars depicted in terms of foundational epistemological conflicts between "defenders" of science and their post-positivist critics; the turn to pragmatism to establish a philosophy of science focused on practice as opposed to some logical conceit; and depicting Thoreau as an exemplar of practicing a humanistic science. Putting aside the immeasurably vast direct effects of technology and the social policy generated by scientific understanding, I declared an anthem to a humanism too often neglected:

Beyond how we might understand science as an intellectual enterprise or as a cultural institution....we must consider how a translation occurs between the objective picture of the world and the meanings by which we signify that world. I am referring to an understanding of science's own rationality in relation to other kinds, and in that comparison describing where we might place the personal, subjective ways of knowing. Indeed, how might we deliberately conjoin human-derived, human chosen, human-centered values with those objective values that we so commonly

understand as irreparably separated from these [humanistic] origins. (Tauber 2009a, 38)

Rorty said it more succinctly, when commenting on scientism: “there is nothing wrong with science, there is only something wrong with the attempt to divinize it ...” (Rorty 1991a, 33–34). That seemed evidently correct to me.

I had travelled a far distance from the positivist ideals of my youth. From my innocent vantage, positivism had seemed the standard of knowledge and the best mediator of reality. As Karl Popper opined, in an authoritative positivist voice, “epistemology I take to be the theory of *scientific knowledge*” (Popper 1972, 108). He excluded everything outside what he considered science from philosophical consideration. For him, and all who followed the positivist program, science was the view from nowhere, and consequently its epistemology left no place for *me*. His was hardly an idiosyncratic view. He captured the mindset of the period. And here, with Popper’s steadfast subtraction of the epistemological agent, we finally come to the basis of my youthful conundrum and so much of the scholarship that followed.

I understood that the subject, more precisely, subjectivity could not be dismissed from objective ways of knowing. It was not a question of segregation, but rather understanding (and accepting) their unavoidable interplay. Instead of a gap, a continuum connects them, each modality of thinking must be accounted in balance against the other. And if not eliminated, where did the subjective figure in the calculus of my thinking, of my being? And how that agent might become a subject of philosophical inquiry remained an outstanding question. Thirty years after seeking an integrative worldview, I still sought a resting place.

*Quest for Meaning* deliberately echoed the title of my earlier characterization of science described in *Science and the Quest for Reality* (1997b). The second *Quest* presented a philosophical review of positivism’s dominance in the first half of the twentieth century and its demise after World War II and then presented moral epistemology as outlined above. The book formally addressed my collegiate puzzle of how to resolve the dichotomy between objective and interpretive ways of knowing through a Dewey-inspired humanist view. From the vantage of my own scholarship, I realized how the subject-object dichotomy of positivism that provides for the objectivity of science, betrays the irreducibility of perspective. And without a firm epistemological foundation of the knowing subject, both objectivity and subjectivity became “problems.” Despite what I called “the embarrassment of self-consciousness” (Tauber 2009a, 185)—refer-

ring to the lingering effects of Cartesian metaphysics derived from the persistent separation of mind and the world—I used Thoreau as an exemplar of the romantic venture to appreciate nature within a multi-dimensional matrix of facts ultimately signified by an aesthetic-spiritual-moral sensibility.

Although I attended to science as politics, *Quest for Meaning's* major theme remained focused on how the demise of positivism during the late twentieth-century changed the place of science within its larger supporting culture (political and ideological) that often put the interpretation of scientific findings into the battleground of policy and resource allocation. The notion of an insular “fact” belies how facts are comingled with the values and theories in which they are embedded. To disentangle the relative roles of these supports becomes a highly convoluted, and sometimes an irresolvable endeavor. Facts, chosen and developed, hardly stand stable. So, no formal, final method exists to define fact/value relationships. And because facts, and the truth claims based on them became subject to dispute about their objective standing, science itself has faced new scrutiny.

So-called value-free science adopts three basic claims concerning the construction and use of facts: objective science never presupposes non-epistemic values 1) in determining what the evidence is or how strong it is; 2) in providing and assessing the epistemic status of explanation; nor 3) in determining the problems scientists address. Each of those assertions, over a wide array of arguments, has been challenged by many commentators. When theory and fact conflict, sometimes one is given up, sometimes the other, and the choice as often as not is made “aesthetically,” by adopting what appears to be the simplest, the most parsimonious, elegant, or coherent—qualities which themselves are values. These are what Putnam calls action-guiding terms, the vocabulary of justification, also historically conditioned and subject to the same debates concerning the conception of rationality (Putnam 1982). The attempt to restrict coherence and simplicity to predictive theories is self-refuting, for the very logic required even to argue such a case depends on intellectual interests unrelated to prediction as such. In short, by dispelling the intellectual hubris of pristine objectivity we are left with a more dynamic, albeit less formal, understanding.

Inasmuch as science is unified neither in its methods, its standards, nor its interpretative strategies, its various epistemologies fail any final standardization. Theories and models evolve from loose creative strategies, and the pragmatic assembly of facts relies on varying degrees of certainty and interpretative facility. This position argues that a relaxation of the rigid fact/value dichotomy

recognizes that science continually evolves its value judgments in regard to its own practice. Standards of objectivity change in response to new demands and contexts. Such flexibility allows investigative findings to find their rightful place as scientific data and their use in theory development. Typically, philosophers of science regard that exercise as placing facts within broader conceptual theories or models. However, the fluidity of the value structure of science opens a broadened theoretical vista. I am less concerned with the more restricted epistemic functions of diverse values than understanding the wider non-epistemic universe in which other kinds of values structure knowledge within the context of what Polanyi called, “personal knowledge.” Polanyi’s concerns focused upon the limits of positivism; I wished to go further.

Highlighting how facts are applied through miscellaneous values and social interests, *Quest* summarized the science-society exchange. On the one hand, science as a cultural product must be studied in its social contexts, and on the other hand, we must understand how scientific findings contribute to the placement of humans in their natural, social, and existential domains. Whether posed in terms of assessing social policy, defining normative modes of thinking, acknowledging the cognitive role of emotional intelligence, composing the heuristics of rationality, articulating the moral dimensions of knowledge, and so on, all approaches converge on describing the objective-subjective spectrum as a continuum of various kinds of intelligence, broadly construed. *Quest for Meaning* thus presented a broadly conceived portrait of science as part of the larger Western dilemma of integrating self and other, objectivity and subjectivity, individual belief, and communal knowledge, with each dipole understood as balancing intermediate positions. Specifically, I sought to offset the preoccupation of placing contemporary science in its Baconian tradition of mastering nature with two other considerations: 1) the social use of scientific knowledge, not only for material gain, but also for political agendas, and 2) the older origins of scientific inquiry as an expression of metaphysical wonder. I framed that recalibration as requiring a synthesis of scientific objective findings with personal signification.

When seeking epistemological continuity between different ways of knowing, I imposed a unifying template that became the primary thesis of *Quest for Meaning*. Instead of the restrictive objectivism of positivist philosophies, I highlighted a view of science that placed subjective elements in scientific practice as constitutive to the ways science works. This was the agenda set by Polanyi and Kuhn. However, I had another agenda as well. I did not advocate Thoreau’s natural history as a valid form of science as evidentiary practice, but

I did maintain that “after science,” when one contemplates the reality depicted by the objective eye, a translation or adaptation of that knowledge completes science’s larger purpose. In other words, beyond technical mastery and exploitation of scientific gains, a humane component remains to absorb the evidence. *What do the facts mean?* Here is the fulcrum linking science and the humanities I originally sought. That effort was inspired by Husserl and most clearly by Dewey, who called for a unified philosophy:

The problem of restoring integration and cooperation between man’s beliefs about the world in which he lives and his beliefs about the values and purposes that should direct his conduct is the deepest problem of modern life. It is the problem of any philosophy that is not isolated from that life. (Dewey 1984, 284)

While some may discharge such a diagnosis as a misjudgment or even hopelessly naïve, I now understand how my original collegiate query fell into line with a humanism shared by both an American pragmatist (Dewey) and a European phenomenologist (Husserl). In this sense, the common root I originally had sought lay uncovered at last.

I found that Dewey’s philosophical goals addressed my own interests and his pragmatism, grounded in a skepticism of philosophy’s limits, were consistent with my own intuitions.<sup>8</sup> For my purposes, it was enough that he had at least underscored the need for pursuing an integrative approach to the fragmentation of modern life and the displacement of the “self-positing I” that had so dominated romantic thinking (Tauber 2001, 195ff.). He catalyzed the articulation of ill-formed ideas from my collegiate past, but the original intent of my early studies, namely, the various efforts to unify Reason—to discover how to bridge, subjective and objective ways of knowing, proved (as so often occurs in philosophy) a poorly formulated problem. The issue is not necessarily to integrate *erklären* (explanation per the natural sciences) and *verstehen* (understanding, interpretation), but rather to find their proper relation with each other. Both as a philosophical problem and as a haunting personal matter, I have revised my attitude.

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8 Again, my friendship with Hilary Putnam influenced my gravitation towards James, Dewey, and Rorty. Hilary and his wife, Ruth Anna Putnam, wrote extensively on Dewey (Putnam and Putnam 2017).

## RECONSIDERATIONS

As those before me, I sought an investigation of the natural world that employed pluralistic reason, where various cognitive faculties receive their just deserts. That project found traction amongst pragmatists and contemporary cognitive scientists, who have sought to capture human intention. But a demurral cannot be ignored, and a codicil must be added: I recognize the romantic ideological basis of this orientation. To portray a “disenchanted” universe as the inevitable product of scientific inquiry is misguided. This indictment, dropped at the doorstep of the laboratory, is better understood as part of the larger secularism that has taken hold in the post-industrial West. Clearly, my romantic identifications aligned me with those lamenting the human condition so defined. However, “disenchantment” and “coherence” are not necessarily *philosophical* problems, at least not as I framed my inquiries. Perhaps the search for meaning and the need for coherence is both idiosyncratic to my own romantic inclinations and lacking philosophical import? If the enigma organizing my scholarship is dismissed as lacking analytical import, then I have pursued a quixotic goal, because the motivation for finding integration and coherence lies well beyond analyticity. Accordingly, subjectivity lives in its own domain, independent of analytics and critical judgment. The whisper of this misgiving quietly rang like a nagging tinnitus, persistent but largely ignored for a long time as I doggedly traveled an old trail.

I had written my *Thoreau* with a two-fold agenda: first, as an exercise to meld two ways of knowing, and second, to outline a moral philosophy. Both topics addressed intimate issues with which I was dealing at the time. I lingered on the personal meaning problem and attempted to extend the lessons learned from Thoreau’s example to a characterization of science more broadly. And for another decade, I remained an unapologetic romantic. *Quest for Meaning* attempted a more ambitious synthesis than I had contemplated before, but eventually that agenda would be eclipsed upon bumping against the limits of philosophy presented by Wittgenstein. As explained in the next chapter, I endorsed his views. My presuppositions fell under new scrutiny. My expectations for philosophical solutions required revision. Perhaps there were no *solutions*? Perhaps I sought a philosophical synthesis where none existed? Perhaps my aspired metaphysics were out of joint with the life I lived? By rejecting Heidegger’s “solution” and accepting Wittgenstein’s circumspective view of such metaphysical adventures, I placed my own problematic in a far different orien-

tation than originally formulated. And coincident to assuming more modest philosophical goals, a resolution beckoned.

For me, philosophy is not prescriptive in any final sense. The process of inquiry itself, in offering tentative solutions and asking anew how problems might be framed, is the philosopher's work. To break intellectual and existential complacency constitutes the philosopher's mission. Her endeavor is about addressing questions, interesting questions, without necessarily achieving final answers. Accordingly, the historical tradition has appraised "success" in deepening the inquiry and in generating new interrogations, typically, by moving on.

Old ideas give way slowly; for they are more than abstract logical forms and categories. They are habits, predispositions, deeply engrained attitudes of aversion and preference. Moreover, the conviction persists—though history shows it to be a hallucination—that all the questions that the human mind has asked are questions that can be answered in terms of the alternatives that the questions themselves present. But in fact intellectual progress usually occurs through sheer abandonment of questions ... [as a result of ] their decreasing vitality and a change of urgent interest. We do not solve them: we get over them. Old questions are solved by disappearing, evaporating, while new questions corresponding to the changed attitude of endeavor and preference take their place. (Dewey 1910, 19)

I rested comfortably with this view. Indeed, the quest, as a quest, captured my own intent. On that basis, I composed *Quest for Meaning* as a tentative summation.

My views about bridging the humanist-science divide significantly changed since writing *Quest for Meaning* in 2007. I have often thought this book had been composed out of its proper time zone. It aligns most closely with works published in mid-twentieth century, when commentators like Conant, Bronowski, Polanyi, and Whitehead explored this same region. However, for me it represented a synthesis of ideas nurtured over twenty years and thus ripe for harvest. After all, the attempt to find some meeting ground between science and the humanities had perturbed me for a long time. *Quest* did not fully bridge the gulf separating different ways of knowing, but it did show the limits of a philosophy of science that failed to account for the personal elements in both the production of knowledge and its interpretation. Science may then be thought of in its "first-order" manifest (the ordinary doing of inquiry) and a "second-order" agenda in which its findings become part of a universe of per-

sonal meaning. My romanticism thus found its bearings in Thoreau's synthetic epistemology and Dewey's humanism. So, beyond the the continued (albeit, revised) credibility of romanticism's critique of positivist philosophy in terms of framing my understanding of biology, I reaffirmed the credibility of the romantic orientation for addressing my own aesthetic and existential concerns. In this sense, *Quest for Meaning* represented an exercise in scholarship as self-knowledge.<sup>9</sup>

For me, the objective and subjective remain in their own respective domains and thus the original attempt to find a synthesis of different ways of knowing had instead become the acknowledgement of peaceful "co-existence." And while I held naturalistic tendencies, no doubt indebted to my biomedical career, I had no patience for those who sought consilience. Addressing the "coherence problem" does not necessarily end in unified knowledge. Such integration is an Enlightenment project that would establish the basis of mind, of ethics, of self-consciousness upon a comprehensive science. I believe such efforts serve a misplaced aspiration. We might well seek a modest coherence, but to recognize the limits of different kinds of thought seems a more appropriate orientation. In other words, I reject scientism, even as an ideal. The universe is a dappled reality and different ways of thinking are required to create the ways of being in that world. Coherence is an unrequited desire of another age.

Where I previously sought integration, a romantic solution as it were, now I am satisfied to accept that each domain may have interchange to mutual benefit, but a coherent amalgamation under some totalizing philosophy, "unified Reason," now seems a misbegotten venture. Building bridges is important, but to bridge is not to combine. Various legitimate ways of thinking employ diverse forms of reason. Hermeneutics and science function with different logics and divergent goals. Once interpretive modes of thinking attain their just place in the hierarchy of thought and experience, objectivity assumes the rightful position for which it was designed. The matter then becomes recognizing the influence of one domain on the other, not as combatants or even rivals, but as partners in the business of living in a world that requires multiple ways of thinking.

Living in the various worlds in which we are domiciled (whether natural or social) requires different ways of knowing and different types of perception; different modes of reason; different states of consciousness. A "natural epistemol-

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9 I have also pursued this theme in other self-reflective essays of how I practiced "science as self-knowledge" (Tauber 2006c; 2014a). However, unlike this essay, those summaries were primarily concerned with the conceptual developments of my scholarship, not the underlying psychological elements directing my inquiries as described here.

ogy” governs one’s interactions and choices as determined by such processing to arrive at, what Kant called, *understanding*. A second kind of “reason” mediates a separate and distinctive way of refereeing how the world is judged. The values governing each domain differ because the demands on reason differ. Just as Kant had observed at the end of his *Second Critique*, humans live in two worlds—natural and social—and each requires distinct kinds of what he called, reason. It is as if different “selves” are living together in some kind of consortium.

Two things fill the mind with ever new and increasing admiration and reverence, the more often and more steadily one reflects on them: *the starry heavens above me and the moral law within me*. I do not need to search for them and merely conjecture them as though they were veiled in obscurity.... I see them before me and connect them immediately with the consciousness of my existence. (Kant [1788] 1996b, 269)

The mind integrates disparate forms of human self-consciousness as a fundamental condition of human being. To find the glue, well, that is another matter. In any case, I’ll rest with Kant—coherence might be sought, but different domains of thought reside in their own respective province and must find their balance and rightful jurisdiction.

New philosophical vistas opened after completing *Science and the Quest for Meaning*. I had enjoyed an exhilarating journey. My review of post-positivist philosophies of science again revived discarded romantic ideas about the personal interpretive elements of scientific method and theory construction. And those issues introduced questions about the knowing ego. I came to regard my own intellectual odyssey as a mirror of modernism’s historical trajectory. How I dealt with competing epistemologies highlighted aspects of the ego’s philosophical fate and thereby illuminated the general problem introduced with the Cartesian model.

Instead of an ego surveying the world, separate and inviolate (and thus capable of exercising radical objectivity), post-positivists acknowledge the imaginative scientific mind joining with its historical, social, and cultural faculties to create the mosaic of reality. And with that expansive view, the knowing agent emerges with new ambiguities. A key theme of romantic science concerned the status of the observing scientist. While Thoreau has become a celebrated advocate of modern-day environmentalism, I saw him fitting more

snugly into “ego-ology” than ecology, because of his preoccupation with an ever self-conscious “me.” And while he was acutely aware of himself as an observer, the characterization of his selfhood remained outside his epistemological interests. Thoreau had identified the conundrum of placing the *I* in the world, but he did not solve the Cartesian problem of dualism. Thus, my *Thoreau* and the lessons distilled from that work left an unresolved problem—the unrequited status of the self, whose self-consciousness underlay romantic identity.

If this narrative might be likened to a jazz quartet, then the percussive base must be assigned to the refrain of agency, the topic that ties together the immune metaphor (the conceptual foundation of immunology), the prevailing philosophical themes illustrating the uses of identity, the romantic conception of the knowing agent, and so on. And as the music played on, something sounded amiss, for the drums became muted and then ceased altogether as I began to more fully appreciate that the modernist self had been disassembled and then rejected. With this denouement, a larger meta-theme concerning uncertainty centered on the human subject and, more specifically, the contested place of subjectivity, that sense of the *who I am*, which again appeared to drive my interests.



## Requiem for the Ego

**W**hile several Romantic tenets held great appeal for me, in many respects the most compelling ideas were those that reconfigured personal identity. As previously discussed, the key innovation concerned the self's relation to its addressed object. That object could be the outside world or some inner self-consciousness. Relation became the key precept, for when one is in dialogue, the experiencing self is absorbing and responding. In the process of experience, which now became the watchword of romanticism, the very idea of a set identity, one fixed and unchanging (and thus incapable of evolution), becomes anathema. The cardinal rule is self-reflection, and in an endlessly recursive process, the self experiences itself, more particularly its world, the other, and its own experience. Relation replaces entity.

How did this transfiguration of the self occur? Without digressing too deeply into the history of philosophy, it is fair to say that philosophers at the dawn of Romanticism—and by extension, or perhaps in concert, the poets—were attempting to break the confining impasse in which the self had been placed by John Locke's construction of a detached, observing "eye" that would perceive the world, know it directly, and retain its objective autonomy (see Appendix). In many ways, "autonomy" was the key issue, serving both as the basis of an epistemological system and as the fundamental element of a moral and political philosophy. This idea of autonomy was recognized at the crest of Newton's epochal discoveries in the philosophy of Locke, who effectively translated the objectifying scientific ideal into the political and moral domains (MacPherson 1962). Locke's philosophy hinged upon arguing for the ability of

the individual to detach from the world, and from himself, and observe each objectively (Tauber 2001, 199). The romantics rebelled against this formulation of identity. Yes, they prized individuality, but they rejected the metaphysical rift that set them apart from nature and the ideal of the Whole.<sup>1</sup>

I think the crucial characteristic of the romantic dislocation (becoming a malignant trope as “alienation”) resides squarely in Hegel’s insight. In confrontation with the Other, self-awareness arises. *He* is not *me* and with that recognition, *I* becomes self-conscious. That mindfulness of *me* as distinctive and different then reconfigures the subject’s relation to the world. Before the Other appears, the world and *me* are one, but in the self-consciousness of recognition, a division occurs. In the barest sense, the self-recognition of *I* sunders the self’s integration with both nature and more intimately, one’s subjectivity. Here the source of romantic sensibility arises. *I* am out-of-joint with the world because of the disjunction induced by becoming individualized. The subject is no longer embedded within an integrated whole in which s/he lives. The *I*’s lost integration then initiates efforts to repair that fragmentation, a catch-all for the romantic philosophies of redress. In sum, as a result of the *I* being atomized by self-conscious recognition, the ensuing rupture triggers the search for a “resting spot,” where s/he no longer feel self-conscious, separated (even estranged) and thus disaffected and disjointed.

Science plays a role in this metaphysical drama through the formal restrictions imposed by objective knowledge, which fundamentally challenges (and uproots) subjectivity—the *me* as arbitrated solely by the sense of self. So, when I earlier opined that “objectivity makes subjectivity a problem,” I am referring to the undercurrents of this metaphysical division of Self and World. On this reading, Thoreau’s celebration of nature became a vocation for mending his metaphysical divide that suffered a self-consciousness he could only suspend in the mystical states he sought. His journals recount moments of rapturous communion with nature, instances of mystical revelries. He referred to these experiences only metaphorically and made no attempt to capture these experiences in his writings (Tauber 2014b).<sup>2</sup> Indeed, he left them unsaid; they exemplify the

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1 Romantic holism, as a philosophical construct, grew out of the seventeenth century debate over the metaphysical structure of nature, where Spinozan pantheism became the direct antecedent of the romantic notion of nature’s unity (McFarland 1969; Israel 2001). Thoreau closely followed that understanding.

2 Thoreau was well-aware of his idiosyncratic amalgamation of interests. When the secretary of the Association for the Advancement of Science questioned him about what branch of science interested him, Thoreau famously wrote in his journal, “I felt that it would be to make myself the laughing stock of the scientific community to describe or attempt to describe to them that

intransigence of the unsayable, and he thus left his pantheism in silence. To the extent that Thoreau's informal theology had an ethical component, it resided squarely in his call for a deliberate life, one that would find its meaning in search for a utopian realm in which harmonious integration with nature occurs beyond self-consciousness (Tauber 2001, chapter 7). So, by fully engaging and appreciating the wonder and mystery of the world he inhabited, Thoreau stitched together the rift between himself and the sublime Other. Note, on this reading, Thoreau's nature studies were subordinate to a spiritual quest in which his self-conscious intelligence dissolved in perfect harmony with Nature.

Although Thoreau's detailed study of nature accentuated the subject-object divide, his pantheism offered a metaphysical solution to a threatening alienation. He admonished that we should recognize that we are nature, or, as he put it, that we should acknowledge our own "wildness." In asserting that nature, the wild, is within us, our mission is to discover and become intimate with that primitive essence which connects us with the cosmos. The wild, because of its very character, cannot be "known," that is, tamed or rationalized, made a species of consciousness. All those modes of knowing that we pursue are sorry residues of a primary knowing. In the wild, Reason does not rule; it can, at best, only mediate. So, in some sense, Thoreau "solved" the Kantian imbroglio by asserting that no essential divide separated man and nature, only one's self-consciousness. We are at base wild and thus integral to nature. The "problem" of human agency arises only when we become self-conscious knowers, who must contemplate and objectify our experience so that the recognition of our primary experience may be reported—to others and, more fundamentally, to ourselves.

So, while Thoreau's philosophical milieu was idealism, he reached beyond Reason to a realm of unprocessed experience that required translation, which in itself was only a derivative problem of self-consciousness (Tauber 2001, 202). In that formulation, he reframed the defining question of his age that had been presented by Emerson, but not "solved." Self-consciousness remained, albeit both a problem in terms of disenchantment and alienation, as well as the means of negotiating that "space" between the knower and his object of attention.

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branch of science which specially interests me, inasmuch as they do not believe in a science which deals with the higher law. So I was obliged to speak to their condition and describe to them that poor part of me which alone they can understand. The fact is I am a *mystic*, a transcendentalist, and a natural philosopher to boot.... How absurd that, though I probably stand as near to nature as any of them, and am by constitution as good an observer as most, yet a true account of my relation to nature should excite their ridicule only" (Thoreau 1997, 469-70, March 5, 1853; emphasis added).

A “solution” was tendered, but it awaited a radical reformulation, a philosophy explicitly directed at the romantic imbroglio.

### HEIDEGGER AND THE RELINQUISHED SELF

The journey on the Philosophical Highway I had initiated with Thoreau took me far beyond Walden Pond in ways I could hardly imagine. It originated in my laboratory. During my pivotal year, 1987, Leon Chernyak (my *Metchnikoff* co-author) and I indulged in afternoon talks about the philosophical canon. I am forever grateful to the serendipity resulting from my efforts to “save” Leon from a life in a taxi. His commitments to Hegel and Heidegger directed his efforts to educate me in a tradition quite alien to my own scattered readings in Anglo-American philosophy. Several years later, Dreben captured an underlying tension (which at times became an impasse) when he made a keen observation about Leon. During a salon session I had organized, Leon had offered a monologue on the topic at hand, to which Bert cracked, “This is quite amazing: nineteenth century St. Petersburg revisited!” Only at that crystallized moment did I recognize the wide expanse separating Leon and me. In the several years of discussions, I never quite understood his Hegel and later, with even more encryption, his Heidegger. Indeed, from our engagement over Heidegger (Leon’s true philosophical pole star) I gleaned only a glimmer of comprehension, but that was enough to sustain my interest long after Leon and I parted ways.

Although I easily mark the beginning of my Heidegger encounters with Leon, the ripened phase of my own understanding is difficult to demarcate. I continued to study Heidegger and soon after my introduction to the Department of Philosophy, I attended a seminar devoted to Heidegger’s *Being and Time* (1962) offered by my colleague, Ěrazim Kohak. That exposure did not dispel Heidegger’s opacity. However, when I conducted my last seminar at Tel Aviv University in 2015, “Heidegger on Nietzsche” (or better labeled “Tauber on Heidegger on Nietzsche”), I felt comfortable in his world.

Having arrived at Heidegger’s doorstep by a most circuitous and unlikely route, what did I find there? What was it that had sustained my interest? The brilliance of his *Being and Time* consists in its rejection of modernity’s ego that instantiated the subject-object epistemology lying at the core of the scientific endeavor. The appeal, at least for me, was to follow the outcome of the romantic challenge and the consequences of Heidegger’s deconstruction. I had a brief infatuation that evolved into a rejection, but given the centrality of the identity question, I felt compelled to come to terms with his philosophy. And in the pro-

cess, I clarified my own understanding of romantic selfhood and the issues congregating around that topic.

Heidegger shared the same quandary faced by Thoreau, namely, Cartesian self-consciousness. But unlike Thoreau, Heidegger drove to the philosophical foundations of Western philosophy to provide an alternate understanding. He displaced the Cartesian structure of the ego residing distinct from the world by attacking philosophical views of the mind that omitted its most crucial feature, namely, the mind's receptivity to the world. For Heidegger, knowledge (and ultimately truth) is a product of an orientation to the world based on a set of intuitions and practices that would capture that "natural" alignment. He attempted this with an epistemological revolution, one that would dispense with the subject-object mode of knowing by replacing the knowing agent peering *at* the world with *Dasein* (a redesigned subject) firmly implanted within the world.

Heidegger's *Dasein* became a newly minted subject of experience. *Dasein* literally means, "being there"—the *there* being the world-at-large, and more specifically, the "there" places *Dasein* *in* the world, not detached from it. Heidegger's primary philosophical target was the seemingly irredeemable Cartesian chasm between Man and the World. That division would be corrected with *Dasein* firmly embedded in the immediacy of the present time and place (i.e., without predication). *Dasein* is "a way of thinking, which, instead of furnishing representations and concepts," the result of an ego looking *at* the world and deriving knowledge *of* the world, she is placed *in* the world (Heidegger 1993a, 138). Accordingly, *Dasein* abdicates an Archimedean point of reference (me-other) and thereby discards the predicate structure of knowing. In other words, by moving the subject into the world, the very notion of the ego—that which surveys the world as a separate eye—is dismissed. I dubbed that move, the ego's requiem (Tauber 2013a).<sup>3</sup>

By rejecting the autonomous notion of agency, Heidegger audaciously attacked the very foundations of modernity. With *Dasein*'s "receptivity" to the world a bold revision of Western metaphysics results, because the world is no longer seen as a collection of objects, a world-picture depicted by a representing subject (Heidegger 1977a; 1977b). This configuration also dispenses with the primary representation of the self, which in the Heideggerian schema is no longer an object, but rather conceived as a life unfolding in the world. Note, with that move, he putatively solved the "problem" of self-consciousness and thus

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3 With the *I* dissolved into the world, "the way in which man is man, that is himself ... by no means coincides with I-ness" (Heidegger 1977a, 145).

fulfilled Thoreau's romantic aspirations. No longer a mind at the center of consciousness, Dasein finds itself in *what* it does, and affirms identity as a product that develops in the course of living (Heidegger 1962, 155).

Heidegger thus addresses the imbroglio of self-consciousness: Dasein displaces the ego's attention to objects, of the world and of herself, with the subject's epistemological placement within the world and her existential turn to face Being. Accordingly, Dasein is embedded *in* Being, not itself. Only a falsifying self-consciousness, a self-consciousness that objectifies subjectivity, separates Man from his authentic nature. Indeed, Being cannot be approached in the Cartesian schema, because the self-consciousness constitutive to the self-knowing ego entraps its own selfness. So, instead of an entity, "a thinking thing," Dasein is conceived in a functional engagement with Being.

Because Dasein is no longer a "subject" posed in distinction to some "other," the predicate division of an ego surveying the world of beings is no longer operative. Instead, Dasein turns to that which *cannot* be objectified, Being. Truth then becomes the authenticating truth of Dasein facing the Nothing and allowing its "unveiling."<sup>4</sup> In that presentation to the void of nothingness, its "receptivity" to Being, Dasein fulfills the human imperative. Accordingly, Dasein exists as a "potentiality-of-Being," one that has abandoned itself to "possibilities because it is an entity which has been thrown" into the world and open to it (Heidegger 1962, 315). This constitutes a particular characteristic, for unlike other beings, "Being is an *issue* for it" (*ibid.*, 32). In short, Dasein is determined not by reference to a "what" but rather as that being which "always understands itself in terms of its existence—in terms of a possibility of itself: to be itself or not itself" (*ibid.*, 32–33). And on this existential turn, much fell as the modernist edifice crumbled into postmodernity.

With Dasein, the metaphysics of individualized selfhood would be replaced with one of integration. Arguing that the entirety of Western metaphysics rests upon the displacement of philosophy's escape from Being, Heidegger sought an understanding of subjectivity that would allow, indeed, accomplish, a radical shift in philosophy's entire agenda. In that move, the atomized ego would be

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4 In an astonishing reversal of the usual meanings, Heidegger asserts that Dasein's recognition of the ultimate mystery of Being (its essential hidden and unknowable character) represents the truth function. Dasein exercises its freedom in a perpetual "unveiling" of truth, i.e., the "true" is that which emerges in the light of the openness, a presentation or offering of Being. Yet the endeavor of "unveiling" perpetually faces a reciprocal "veiling," for the *what* of the unveiled is *nothing*: "Being in its very disclosure, withdraws into veiling" (Borch-Jacobsen, M. 1991, 105–106). In other words, truth for Heidegger is the unveiling of Being, whose very essence is that which recedes from knowing, and retreats from us (Heidegger 1993a; Dahlstrom 2001).

replaced with Dasein's receptivity to the Absolute. In short, Dasein represented Heidegger's response to the romantic alienation and the nihilism afflicting Western civilization.

Heidegger probed the limits of thought itself. His task was audacious and, in many respects, impossible. Indeed, he himself admitted that he could not concoct the language that would carry the ineffable. His failure hardly discredits the effort. After all, the God of Moses answered the inquisitive "Who are You?" query with the simple reply that has echoed through the ages, "I am that I am" (Exodus 3:14). What might Heidegger add? Indeed, can such a question be addressed by philosophy at all? Wittgenstein gave a resounding, "No!" Heidegger joined in the assault on metaphysics, but not with the burn and scourge strategy Wittgenstein employed (discussed below). Instead, Heidegger explained philosophy's failure in terms of the misplaced attention to "things" ("beings") as opposed to Being.

Heidegger wished to recapture a religious sensibility, one that would confront an exhausted spirituality. While his project twists and turns through a meandering maze, the underlying issue is quite simple: Can Being be *thought*? Can we perceive that which underlies the particularities of beings? Can we think in terms that radically dispense with our own subjectivity, namely a point of view? In this regard *Being and Time* failed to address these matters and thus remained unfinished. And the later writings, tinged with the mystical and sprinkled with poetic and numinous overtones, reflected how language failed Heidegger as well. I appreciated his attempt to address Nietzsche's challenge of facing nihilism, but this seemed more of a theological problem than philosophical (at least as I understood the disciplinary demarcations). As Heidegger himself admitted in the famous *Der Spiegel* interview (1966), we need a new divinity:

*Heidegger*: Philosophy will be unable to effect any immediate change in the current state of the world. This is true not only of philosophy but of all purely human reflection and endeavor. Only a god can save us. The only possibility available to us is that by thinking and poetizing we prepare a readiness for the appearance of a god, or for the absence of a god in [our] decline, insofar as in view of the absent god we are in a state of decline. ["god" as the concrete manifestation of Being as "the Holy."]

*Spiegel*: Is there a correlation between your thinking and the emergence of this god? Is there here in your view a causal connection? Do you feel that we can bring a god forth by our thinking?

*Heidegger*: We cannot bring him forth by our thinking. At best we can awaken a readiness to wait [for him]. (Heidegger 1976)

He could not be clearer: *thought* would not deliver us from the grip of nihilism, while receptivity to Being would.

Heidegger claimed that because of the dominance of the techno-scientific depiction of the Real, we were incapable of hearing the call of Being. His entire philosophy may be regarded as a gallant attempt to revitalize subjectivity in a turn away from the material and, in parallel, legitimate the truths of the soul. This is what he meant by “unveiling” Being. That was not the work of philosophy, but rather the proclamation for a new spirituality.<sup>5</sup>

### THE 1929 INFLECTION

Heidegger substituted a metaphysics of Being for a metaphysics of beings. Since I had aligned myself with Wittgenstein, who had effectively argued the “nonsense” of any metaphysics as a motley group of “grammatical errors,” philosophy, then, with relentless scrutiny, must “show the fly the way out of the fly-bottle” (Wittgenstein 1968, 103e.) Accordingly, Heidegger was either the biggest bug in the jar or, as he himself attested in his last testament (*Der Spiegel* interview), philosophy’s role in loosening nihilism’s grip on the soul was strictly supportive. This latter view of philosophy is less a dismissal than an acknowledgement of the limits of analytical thought. Here, I decided the Heidegger and Wittgenstein lines converge: each recognized the legitimate call of the existential, but philosophy could not carry us forward (Braver 2012).

Heidegger would repeatedly ascend his secular pulpit in his attempt to overcome the old metaphysics intertwined in a language that remained unyielding to his strenuous efforts. He failed. Articulating how the “nothing” out-stripped thought, at least for me, is a story better approached through art and music. I did not follow him any further in the direction he probed. In this regard, his most satisfying contribution to my own project was in illustrating, in a way so different yet complementary to Wittgenstein, the outer borders of philosophy. In that enterprise, he came to the limits of thought, and more specifically, the limits of language. Once that corner was turned, the personal identity issue came into a new focus: personal identity means exactly that—*personal* and thus radically subjective. What I think and feel is *me*, and the *me* has no analytic definition. And it is here that the philosopher must cross over to another kind of expression. I would turn elsewhere to go forward. As dis-

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5 See Caputo 1986 for discussion of Heidegger’s cosmological orientation.

cussed below, I returned to an earlier intuition, one first sensed well before any philosophical awareness pushed it aside.

Some observed that Heidegger inaugurated the “end of philosophy,” certainly as conceived before the publication of *Being and Time* in 1927. In the celebrated 1929 Davos debate between Heidegger and Cassirer, Dasein dramatically confronted the anthropo-centric modernist orthodoxy of the time. Their confrontation has been regarded as the dramatic turn of twentieth century philosophy, a tipping point when the Cartesian ego was toppled and a reconceived notion of subjectivity introduced.<sup>6</sup> Heidegger radically restated the thematic question “What is Man?” to “Where is Man?” His answer, Dasein resides in the world and leaves the self-reflexive ego unreconciled to its isolation. Thus for Heidegger, Dasein must eclipse Man. And with the demise of the ego, basic notions of subjectivity, personhood, and agency would be fundamentally reorganized.<sup>7</sup>

Heidegger’s agenda distinguishes the world of beings and that of Being. The former constitutes the subject of philosophy’s history, namely, the world depicted by the ontic sciences (physics, psychology, physiology, etc.) that are devoted to the elucidation and control of nature. The ontic orientation underwrites humankind’s modernist selection of scientific scrutiny that offers, at best, a narrow depiction and, at worst, a dehumanizing distortion. And note, with Heidegger’s effort to revamp Western metaphysics, science is no longer his concern, other than to subordinate it to a new conception of humanism (Heidegger 1993b). He argued that to even have a “world view” offered by science (the product of the representing ego) confounds Dasein’s fundamental character, namely the cardinal characteristic of the human ability—if not fundamental and essential characteristic—to face Being. In other words, to accept the objectification of scientific inquiry and to “see” reality is to remain locked into a survey of the furniture of the world while Being beckons.

With that conclusion, Heidegger turned philosophy from metaphysics that dealt with beings, to Being—the ineffable Beyond, that which human could not comprehend but might intuit. Although he discarded much of what had passed for legitimate philosophy since Plato, he had not escaped metaphysics, he only

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6 If there was a victor, Gordon (2010) awards Heidegger, inasmuch as the younger generation gravitated towards him with enthusiasm. Certainly, in terms of the next century, Heidegger’s influence far outweighs any of the neo-Kantians, the group with which Cassirer affiliated. See also Friedman 2000.

7 “Western history has now begun to enter into the completion of that period we call *modern*, and which is defined by the fact that man becomes the measure and the center of beings. Man is what lies of at the bottom of all beings; that is, in modern terms, at the bottom of all objectification and representability” (Heidegger 1982, 28).

substituted his own version. To contemplate Being and deny such considerations as non-metaphysical begs a smile or a snort! Indeed, in 1929 Heidegger had not fully established his rhetorical position and was satisfied to plainly assert that “the truth of metaphysics dwells in [a] groundless ground” of Being where philosophy has no hold (Heidegger 1993c). Later he would struggle to find his voice to address the unsayable and abandoned analytics, altogether (Heidegger 2012; 2013). By then, he was no longer *doing* philosophy. Indeed, he had moved well past philosophy; he had become a theologian, or what he preferred to call himself, a “thinker.” In abandoning traditional metaphysics, he had discarded philosophy-speak, for the language-at-hand was incapable of addressing the Great Mystery.

With the headline story of Dasein’s introduction, the modernist edifice crumbled into postmodernity (a story I detailed in my *Requiem for the Ego* [2013]). This chapter of intellectual, indeed, cultural history finally came into focus for me. I understood the contours of my earliest collegiate attempts at defining the relationship of scientific thinking and other kinds of subjective experience as an expression of situating myself in a world that afforded no singular point of view. Different perspectives offered distinctive pictures of reality. The self-consciousness that the subject-object structure of thinking proffered effectively provided degrees of objectivity, but objectivity was only one way of being in the world. My own recalibration resonated with Heidegger’s redefinition of humanism, wherein humankind moves from “man is the measure of all things” to a new form of harmonization with all that which seems to alienate. As opposed to the prison of self-consciousness grounded in the Cartesian ego, 1) humans would be part of the world, not separate looking at it, and 2) philosophy would be directed not to the world of things, beings, but rather Being. In the simplest summary, Heidegger would replace the self-consciousness of peering *at* the world with Dasein living *in* it. He thus combined a phenomenological revamping of identity with an existential reconfiguration. And that revised posture included a profound metaphysical move as well.

My own recalibration resonated with Heidegger’s redefinition of humanism and pricked my slumbering consideration of the All and the End. But his venture, as philosophy, seemed doomed to me. I had searched for an elusive synthesis exemplified by Thoreau’s venture, but eventually, I saw the terminus of Dasein’s logical progression—the end of an objectifying epistemology: science could not be included in Heidegger’s vision. He followed Nietzsche, who had shrilly “slammed the door on the house of scholars” (*Zarathustra*) and attacked

the pillars of Western civilization—Reason, Science, Socrates, Christianity—with a slash and burn strategy. While Nietzsche’s Dionysian and tragic dimension of human life held my attention during my youth, I eventually recognized that he and Heidegger led a tribe of their own. Perhaps because Nietzsche was my First Love, I suffered an idiosyncratic introduction to philosophy and naïvely thought that he would provide a philosophical foundation for my own venture. He did not, nor did Heidegger.

I held Reason in too high esteem to forego its promise. I distrusted Heidegger’s invocation of “poetry.” Approaching Being was not philosophy, it was a mysticism newly garbed. At that point, he hoped to shift philosophy to a nebulous form of “thinking” that too easily was subverted for nefarious ends. Moreover, the alternative to positivism’s hegemonic hold on human knowledge is not a Heideggerian “unveiling” of truth or a rejection of science, but rather finding new ways to rejuvenate a tired epistemology. And that project is tied to the larger requirement of refashioning our governing metaphysics, which I dare predict must arise from the smoking ashes of the twentieth century phoenix. The battle between a newly revised Enlightenment and a dangerous, exclusionary a-rationality (the same vacillation of enlightenment and myth described by Horkheimer and Adorno [1993]) represents the most troubling unpredictable struggle of our uncertain era.

My search to find coherence with two ways of knowing, knitting the world together, so to speak, ended with my Heideggerian gambit and a bald recognition: the logic of deconstructing the subject-object understanding of agency leads to a religious station, one that I associated with allures long ago rejected (e.g., mysticism, Buddhism, mind-expanding drugs, religious fervor). I had never ventured into those territories and so my imagination could not accommodate Dasein’s mode of experience. More, I found no *philosophical* traction in Heidegger’s writings. Once I penetrated the obfuscations of his language and exposition, I found his ideas lodged in a different enterprise from my own. I had more ground to plow.

Moreover, I am suspicious of Heidegger’s moral baggage and its influence on his philosophy.<sup>8</sup> Lurking in Dasein’s shadow is a Nazi espousing the *volk*,

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8 The recent publication of Heidegger’s *Black Notebooks* has again ignited debate about how his political sympathies reflect a hitherto hidden darkness in his philosophy and the pernicious influence such a melding might have (Farin and Malpas 2016). The controversy about Heidegger’s political status began immediately after the war, and then was re-kindled in the late 1980s when Paul de Man was exposed as a Nazi sympathizer during World War II (Wolin 1993). As a deconstructivist, de Man held an esteemed position at Yale, where he influenced a generation of

*Natur*, the collective fate of the *People*. Facing Being implicitly draws from the same wellspring of a grand collective that too often subordinates the individual to the group defined in ideological or religious terms. Indeed, where does Being end and beings begin? And more generally, a fundamental weakness looms: I did not find an ethics embedded in Heidegger's vision. A philosophy of Dasein may be adequate for living in a hut, but not for life among others (Sharr 2006). The similarities with Thoreau are self-apparent and for my part, their self-imposed isolation, rejected. In the end, my sense of responsibility carried by a moral self-consciousness fails affiliation with Dasein.

So, although Heidegger set a new agenda for many, I rejected Dasein. On balance, I think he should be credited with reminding us of the ineffable regions that philosophy cannot reach, but he did so by abdicating the self-awareness that undergirds moral agency. And if this self-conscious modernist position is rejected, an inescapable question arises: what is philosophy in light of the turn toward Being and away from Man? Dasein might capture a romantic ideal, but at an unaccountably excessive cost. The extracted price I counted too dear for one committed to the sanctity of one's sense of autonomy and self-responsibility. And while I am intrigued by Heidegger's provocation, in the end I could not follow him. The philosophy failed, as he himself admitted when he decided to shed "philosopher" and become a "thinker." With that conclusion, I moved my Heidegger library to the basement for storage and there it rests. However, the unresolved issue of identity, the problem at the base of my immunological studies and the issue underlying all that followed, remained for decipherment. I went back to Wittgenstein and as I first sensed many years before as a young adult, his approach would yield a more satisfying response to the question at hand about *me* (Tauber 2013a, chapter 7).

#### ON PERSPICUITY

Heidegger presented romanticism's terminus for me (at least in terms of defining the knowing subject, the self-conscious *me*), and as I put his 'solution' aside, I turned to Wittgenstein, who offered a radically different way of doing philos-

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critics. Jacques Derrida came to his defense and in the ensuing debate, Heidegger was drawn into the fray. Derrida, in defending deconstructivism also contested the principal assailant on Heidegger, Victor Farias, who contested de Man's embrace of deconstruction as a manifestation of the moral bankruptcy of his Nazism. On the relation of national Socialism on German philosophy see Sluga 1993; Fritsche 1999; Bambach 2003; Faye 2009. Note, Heidegger was hardly exceptional in this regard. Many philosophers had flocked to Hitler's banner (Sherratt 2013).

ophy. I had been drawn to him for many reasons. Obviously, his influence in Anglo-American philosophy was self-evident and I wanted to understand him for that reason alone. But I was attracted to him for the substance of his thought, far more than, for instance, the pull of James, Dewey, Quine, or Rorty. While I closely studied each of them, Wittgenstein, at least for me, towered over all the rest. I had intuited from my first encounters that he had developed an appealingly skeptical approach to philosophy, and in the process altered the course of thought. This was the message hammered home by Dreben, and the better I understood his interpretation, the better it addressed my own doubts about the limits of analyticity.

Wittgenstein became my antidote for Heidegger, and metaphysics more broadly. For Wittgenstein, philosophy's role was to reveal the faulty "grammar" of persistent philosophical problems. Accordingly, philosophy becomes an analysis of language. And what posed as grand metaphysical questions then must be seen to have no answers simply because they are not true questions; they are mistakes of grammar (what Bertrand Russell called "bad grammar" [Russell 2012, 183]) and thus "nonsense."<sup>9</sup> Thus all matters pertaining to ethics, aesthetics, and the spiritual fell beyond philosophical scrutiny. In short, Wittgenstein did not deal with such matters, albeit they are central to human life, because analysis has no jurisdiction in the domain of the subjective or the ineffable. And more to the point, offering analytical rationales and explanations misappropriates philosophy's legitimate agenda. He therefore admon-

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9 Following Wittgenstein, Dreben quipped, "the history of philosophy is the history of 'nonsense,'" a slogan that became the *nom de guerre* for the general deconstruction of classical philosophical problems to "problems of language." Science had sense; logic had sense; ethics and aesthetics had no (analytical) sense, i.e., they were *non-sense*, because they lacked truth criteria of the sort governing science. What I heard Dreben repeat on several occasions has been documented somewhat differently: "Philosophy is rubbish, but the history of rubbish is scholarship" and "Philosophy is garbage, but the history of philosophy is scholarship" (Leiter 2005). He may have said "garbage" or "rubbish" on other occasions, but those nouns misrepresent his invocation of Wittgenstein's notion of *nonsense* that has specific meaning and represents a serious philosophical position about the bulk of philosophical discourse, i.e., "nonsense" consists of matters beyond analytic discussion (e.g., ethics, aesthetics). The epigram of an anthology edited by Dreben's second wife, Juliet Floyd, has as its epigram, "Nonsense is nonsense, but the history of nonsense is scholarship" (Floyd and Shieh, 2001). "A bit of background on the 'history of nonsense' quote: 'Nonsense is nonsense—but the history of nonsense is scholarship' is actually a quote from Saul Lieberman, who uttered it when introducing Gershom Scholem at a famous lecture in the 1940s at the Jewish Theological Seminary in NYC. Lieberman was a great Talmudic scholar; Scholem was, of course, one of the greatest scholars of Jewish mysticism. ... Dreben's first wife's father was Shalom Spiegel, who was a distinguished scholar of medieval Hebrew.... so the quotation had great resonance for Dreben, in multiple ways" (Leiter 2005).

ished, “Whereof one cannot speak, thereof one must be silent” (Wittgenstein 1981, 189).<sup>10</sup>

While the primary lesson I gleaned from studying Wittgenstein’s philosophy concerned the limits of analytical thought, the more immediate impact focused on ways of thinking about mental states and introspection, more generally (Tauber 2013a, chapter 7). And those positions then led to a reevaluation of the entire personal identity imbroglio. In short, Wittgenstein’s philosophical orientation offered me a way of thinking about the enigmatic *I* that made “sense.”

The self, became, under Wittgenstein’s analysis, a metaphysical problem and therefore a result of faulty grammar. He begins his critique by scrutinizing the use of “I” as subject and the use of “I” as object (Wittgenstein 1960, 66; Shoemaker 2003).

Wittgenstein insists that in its use “as subject,” “I” is not used to refer to myself as a particular person. Rather in its use “as subject” “I” has no other function than to express the self-ascription of a subjective state (for instance tooth-ache, in: “I have a tooth-ache”), without any reference at all being made to a particular entity, distinguished from other entities in the world. In this respect, Wittgenstein provocatively maintained, saying “I have a tooth-ache” is no different than moaning. (Longuenesse 2017, 2)

For Wittgenstein, the ego’s “private” language is a contrivance of a scrutinizing faculty that is the public expression of an artifact. The mind turned in upon itself seemingly employs the same perceptual functions used to engage the external universe. So, when the moods, sentiments, emotions—the affects—obtain attention, consciousness does what it always does to fulfill its evolutionary function: Facing a ‘problem,’ it scrutinizes, analyzes, judges. Usually the target is the world, but in our culture, the mind itself, through *self*-consciousness, “materializes” inner states to become objects of inspection. In other words, in that inner-directed configuration, the mental is composed of representational objects observed by an ‘objective,’ detached ego. That “eye” peers within to discover *me*.

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10 The meaning of this proclamation has been subject to seemingly endless comment, for interpretation orients critiques of the *Tractatus* itself, and more broadly, the relationship of Wittgenstein’s early (*Notebooks* and *Tractatus*) and late *Philosophical Investigations* and *On Certainty*. I align myself with those who see continuity, i.e., the later pragmatic view of language is a further development of earlier views. For discussion of this orientation see Diamond 1996; Cray and Read, 2000; Janik 2004; for a dissenting view, see Hacker 1972; 2000.

There is a picture of the mind which has become so ingrained in our philosophical tradition that it is almost impossible to escape its influence even when its worst faults are recognized and repudiated. In one crude, but familiar version, it goes like this: the mind is a theatre in which the conscious self watches a passing show (the shadows on the wall). The show consists of 'appearances', sense data, qualia, what is given in experience. What appear on the stage are not the ordinary objects of the world that the outer eye registers and that the heart loves, but their purported representatives. Whatever we know about the world outside depends on what we can glean from the inner clues. (Davidson 1994, 61)

On this view, making *pictures* of any mental state, perhaps most vividly illustrated by memory images, is to utilize (extrapolate) modes of perception from the objective world to representing states of the mind.

Of course people have beliefs, wishes, doubts, and so forth, but to allow this is not to suggest that beliefs, wishes, and doubts are *entities* in or before the mind, or that being in such states requires there to be corresponding mental objects. (*ibid.*, 62)

However, such objectification of mental "pictures" cannot be achieved and remain only "metaphors of objects before the mind" (*ibid.*).

Wittgenstein (as Kant before him) uses "I" narrowly as a semantic expression of inner mental feelings or thoughts, and thereby avoids the self construed as an object, altogether. However, unlike Kant's transcendental construction (i.e., defining the necessary conditions for the mental), Wittgenstein came to this important distinction by essentially following Hume's almost cursory, off-hand remark about grammar: "all the nice and subtile questions concerning personal identity can never possibly be decided, and are to be regarded rather as grammatical than as philosophical difficulties" (Hume 1978, 262). That mind-bending comment was extended by Wittgenstein to the reduction of all philosophical problems to those of language misuse. So, for him, the role of philosophy is to clarify problems bestowed by metaphysical confusions through an examination of language itself.

Wittgenstein described the language of inner states as an exemplar of profound philosophical mistake reaching to the very core of Western metaphysics. James Edwards calls this extrapolation from outer, public language to inner, private states, "rationality-as-representation," the Cartesian commitment to

see all our thoughts as *representations*. And with representation comes the requirement of justification: What is the correspondence between the language and its object (Rorty 1979)? Locked into a mind-body dualism, rationality-as-representation is the true root of ‘private language’ that “forces us to construe all such complaints [pain] as *reports, descriptions, representations*; thus, it is that conception which fertilizes the ground for the seed of the object/name picture” (Edwards 1982, 188). And the same objectifying ‘logic’ is applied to feelings and memories. In sum, the metaphysics of early modernity, with its conception of rationality reaching into the *mind* and treating it as an *it, as an object*, is the target of Wittgenstein’s attack.<sup>11</sup>

The metaphysics that Wittgenstein sought to overturn follows many routes towards diverse targets, but in the context of addressing ‘the self,’ the key issue is the abandonment of *explanation* and the substitution of *description*. He proposed a different way of looking at the world, at ourselves within that world, and the inner life in which we recurrently take notice:

A main source of our failure to understand is that we do not command a clear view of the use of words. –Our grammar is lacking in this sort of perspicuity. A perspicuous presentation produces just this understanding which consists in ‘seeing connections.’ (Wittgenstein 1968, 49e)

And those ‘connections’ comprise a different way of discernment that begins with a startling surmise, namely *our* world is not *hidden* (as Western metaphysics assumes), but rather reality is presented directly.<sup>12</sup> We must not allow a false application of grammar interfere with that appreciation. “A philosophical problem has the form: ‘I don’t know my way about’” (Wittgenstein 1968, 49e), and for Wittgenstein the correct method of finding one’s path is not by “penetrating the phenomena” of language and meaning, but to better arrange “what we have always known” (*ibid.*, 42e, 47e). So instead of seeking some hidden homuncu-

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11 He made “a radical break with the idea that language always functions in one way, always serves the same purpose: to convey thoughts – which may be about houses, pains, good and evil, or anything else you please” (Wittgenstein 1968, 102e). An “in-use” alternative is offered instead, a form of pragmatism that spawned the “ordinary language” school of philosophy (Somames 2003; Misak 2016). See Baz (2012) for review of this position and a trenchant defense of its continued relevance.

12 “Philosophy simply puts everything before us, and neither explains nor deduces anything. — Since everything lies open to view there is nothing to explain. For what is hidden, for example, is of no interest to us” (Wittgenstein 1968, 50e). As discussed in chapter 9, this is the basic position Rorty assumed in his critique of positivist philosophy of science.

lus, *me*, the Wittgensteinian formulation presents inner psychic phenomena in a perspicuous arrangement that would offer “Clarity instead of Truth” (Edwards 1982, p. 132).

Thus, as already discussed regarding Rorty’s critique of positivist philosophies of science (chapter 9), instead of seeking a Hidden Reality (referring to subjective states, metaphysics tout court), philosophy should discern how language functions to present the world (Wittgenstein 1968, 128e; Rorty 1989a; 1991c; 1991d). In the case of objectification, science employs representations to achieve its ordering functions, but subjectivity possesses no representational language. Yet mental states do exist, and our ability to communicate them occurs within “forms of life” that operate by communal agreement and practice (Wittgenstein 1968, 88e–89e). So, while language that eschews representation (in a first-order way) suffers from a lack of reference, but experience and accepted custom achieves understanding, more or less.

Although philosophy is etymologically defined as the “love of wisdom,” I think Wittgenstein hit closer to the mark when he characterized philosophy as a “therapy,” by which he meant that in removing philosophical perplexity, a resumption of a “normal way of life, no longer tormented by earlier confusions and scruples” could be attained (Edwards 1982, 133).<sup>13</sup> Accordingly, the solution of a philosophical problem is to make it vanish, note, not by an answer, but by dismissing the question altogether:

For the clarity we are aiming at is indeed *complete* clarity. But this simply means that the philosophical problems should *completely* disappear.

The real discovery is the one that makes me capable of stopping to do philosophy when I want to.—The one that gives philosophy peace, so that it is no longer tormented by questions which bring *itself* in question. (Wittgenstein 1968, 52e)

Whereas Heidegger effaced the I, Wittgenstein went further by discarding any metaphysics in which to situate *me*. Instead, he regarded the identity issue as

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13 “The philosophers’ treatment of a question is like the treatment of an illness” (Wittgenstein 1968, 91e). For a critical view of how “therapy” is construed in Wittgenstein’s philosophy, see Hutto 2006. Selecting references on this topic is daunting inasmuch as a catalogue of published works on “philosophy as therapy, the method and nature of philosophy” lists 115 items as of 1990! (Frongia and McGuinness 1990, 399). Considering the intense interest Wittgenstein has enjoyed over the past 25 years, I cannot estimate what a comprehensive review of the topic would entail.

misconstruing subjectivity and thus the question of *the I* lay outside analytical discourse. This solution, applied to the problem of personal identity, sliced through the *philosophical* Gordian Knot of confusion surrounding this topic. With this perspicacious insight, I could again approach the identity question on its own terms.

### SUBJECTIVITY RESCUED

Let us briefly retrace our steps and reset our bearings. The worldview bestowed by science, and more, the dominance of its criteria of truth and determination of reality requires a translation into humane significance and meaning. Simply, our metaphysics poses the challenge of how to mend the world, to make the world—humans and nature—whole again. One approach was to seek a more encompassing *Weltanschauung*, a “return to reason,” a broad reason that allows for different kinds of discourse with different standards of knowledge to capture a spectrum of experience directed at different ends (Toulmin 2001).<sup>14</sup> Sensitive to this romantic quandary of alienated nature, stitching together the subject and her object became my prominent theme of study. Twentieth-century continental philosophers, most notably Weber, Husserl, and Gadamer, taking their lead from Goethe and Schiller, repeatedly addressed this latter metaphysical challenge (Weber 1946; Husserl 1970; Gadamer 1981; Bortoft 1996; Beiser 2005). They provided commentaries about a reality depicted objectively, that is, a world in which humans self-consciously reside separated from that world. From their descriptions, the challenges of defining meaning and significance of human existence took diverse courses, of which, as explained, the Thoreau-Dewey line of thinking seemed most promising to me.

The second general approach I followed requires reconfiguring the knowing agent from an outside observer to an integrated participant. So, the question looms: might a revised epistemology overcome the Cartesian subject-object divide? Always aware of separation, and appropriately so, since science would purge itself of subjective contamination, this “subject-less subject” faces the metaphysical challenge of finding herself in the world described without her (Fox Keller 1994). What are the philosophical possibilities and

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14 One expression of this sentiment may be found in environmentalism, which draws from both the earth and biological sciences, as well as from religious and moral sentiments (Albanese 2002; Dunlap 2004).

consequences of shifting the human “stare” *at* the world to human placement *within* it? Heidegger directly confronted this challenge, whose attempted resolution I rejected.

The issue hinged on the problem of self-consciousness from which romantic alienation originated. Just as the world is objectified, so too am *I* as a subject made into an object by introspective reflection. Self-consciousness carries the same gaze that had been directed towards the external world inwards to look at oneself, as if *me* is something to be observed—seen or heard. Such objectification instantiates the self as another entity in the world, namely, *the I* becomes a thing to myself. Wittgenstein showed that such a formulation utterly distorts the subjective, which must be understood on its own terms. He may well have been influenced by Kierkegaard, to whom we now turn (Creegan 1989).

Kierkegaard observed how the objective and subjective aspects of experience can easily be conflated. In his section, “The Task of Becoming Subjective” of the *Postscript*, he wrote,

[T]he subjective problem is not something about an objective issue, but is the subjectivity itself. For since the problem in question poses a decision, and since all decisiveness ... inheres in subjectivity, it is essential that every trace of an objective issue should be eliminated. If any such trace remains, it is at once a sign that the subject seeks to shirk something of the pain and crisis of the decision; that is, he seeks to make the problem to some degree objective. (Kierkegaard 1941, 115)

In other words, subjectivity does not adhere to the demands of objectivity. And more to Kierkegaard’s point, assuming an objective view of one’s own life and determining its ‘intent’ based on such criteria both distorts and misdirects the subjectivity that constitutes one’s core being.

Objectivity is an orientation towards reality based on abstracting away, in various degrees, from subjective experience, and from individual points of view. A subjective orientation, on the other hand, is based on an attunement to the inner experience of feeling, sensing, thinking and valuing that unfolds in our day-to-day living. (Balog 2016)

But what does “attunement to the inner experience” mean? In philosophical terms, or analysis in general, subjectivity doesn’t mean anything, at least analytically. There is no referent other than *me*. The wording approximates an as-

sertion that subjectivity has its own truth and standing. And more to the point, there is no basis for analysis, philosophic or otherwise. As Wittgenstein said of the *Tractatus*, the whole point of the book is to show what is important cannot be expressed.<sup>15</sup> This observation is generally thought to pertain to ethics, aesthetics, and metaphysics, but more generally he was referring to subjectivity writ large, namely all that which cannot be objectified or treated with the logic applied in scientific investigations. Attempting to capture subjectivity in objective terms, namely, in universal public talk, is a misplaced endeavor, radically mis-aligned with *who* one is.

Subjectivity objectified presents the self as an object, where the *I* becomes an entity, a something that is separated from the world and navigates it as such. Moreover, when the subject as object is regarded in abstract, universal terms, private experience is silenced. When I am reduced to a thing, *me* is transformed into something else, an inauthentic self. “Inauthenticity” (what Sartre calls, *mauvaise foie* or “bad faith”) in the Kierkegaardian tradition refers to the assumption of a false identity that subverts one’s freedom. By identifying and resisting external identifications (incumbent expectations), the existentialist recognizes counterfeit identity and countermands it by asserting independence of choice and action. The more skeptical view (e.g., Freud and Foucault) contends that the “‘liturgy of inwardness’ is founded on the flawed idea of a self-transparent individual who is capable of choosing herself” (Adorno 1973, 70; quoted by Varga and Guignon 2017). And the most basic inauthenticity is when *me* becomes an *it*. In this pose, the subject assumes objectification as reflected in a make-shift mirror that splits *me* into a subject observing another (*me*). From that externalized vantage point, self-consciousness may then peer inside’ to look for “me,” or even style “me” as some-*thing*—an image or an ideal of some sort. In that exercise, “me-ness” then becomes a translation of a mirrored it. And a translation, a representation, by definition cannot be the thing-in-itself.

Kierkegaard conceived self-consciousness in a way quite different from Hegel by placing reflexivity squarely at the nexus of his own selfhood, but again, not as an entity. The self for Kierkegaard shifts from an analytical focus to a subjective one. On Kierkegaard’s view, the self becomes a recursive reflection upon itself that has no end (as culmination). Self-consciousness is “decisive... The more consciousness, the more self; the more consciousness, the

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15 This comment is based on various letters Wittgenstein wrote to Ludwig von Ficker. Discussed by Janik and Toulmin 1973, 190–201 and McGuinness 1988, 287–89.

more will; the more will, the more self" (Kierkegaard 1980, 29). Indeed, reflexivity, the process of relating, is the self. In other words, reflexivity has displaced circumscribed entity with infinite process. And when *me* moves to the inner domain of self-consciousness, it loses identification. Because self-reflexivity has no object, it cannot be identified in relation to another. Simply, there is no Other, no object that might be *object-ified*. Subjectivity resides in its own domain, *sui generis*, independent of predication.

This much seems clear. However, Kierkegaard goes further by turning the endless self-reflexivity outward (Kierkegaard 1980, 13–14; Taylor 1980).<sup>16</sup> The move is profound. Either the self-directed regression continues with no end, or it turns away from further introspection and answers its own inquiry with the only alternative, the Other. This other may be any species of alterity, but for Kierkegaard, man attains his highest state when the other is God.<sup>17</sup> This formulation is the beginning of religious existentialism, and from my perspective, the origins of conceiving the self as a moral category.

I took Kierkegaard's formulation of identity to heart. With the success of the scientific characterization of nature, the knowing agent was caught in the same objectifying application. To objectify this self as an *it* commits an error, a mistake that constitutes much of modern philosophy and whose correction encompasses a vast array of contemporary thought. This orientation does not gainsay the critique of individuality as a product of manipulative social power (Foucault), unconscious opportunism (Freud), or distorted subject-object relations (Heidegger). It makes only a modest claim: The *me* (or *I*) serves as the linguistic label operating in the public domain referencing possessive identity and obligation. And in the private realm that which is called *me* is but a placeholder in the subject-object language of life in the world. Even there the self does not exist in any straightforward sense, but it persists as a useful linguistic

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16 From the twentieth century vantage of a phenomenologist, this process-oriented construction is reaffirmed: "The self is literally no-thing ... self is precisely the peculiarly complex reflexivity itself... In that sense, self turns out to be the *eidōs* of human life" (Zaner 1975, 168).

17 Seeking the divine offers the infinite framework for being, the second part of the synthesis (finite being the first). It is a choice governed by the absurd, but to make that choice is, for Kierkegaard, the final expression of freedom that completes the turn of the reflexive spiral. There, authentication is achieved. Ernst Tugendhat regards Kierkegaard as moving towards a Heideggerian solution by having "the self" relate itself not to itself but to its existence. Through a critique of reflexivity, he thus paves the road towards a phenomenological account of selfhood (Tugendhat 1986, 139–43). On this reading, Heidegger discovers the foreground of his own existentialist and phenomenological account of selfhood in Kierkegaard.

artifice that helps organize experience when one thinks about oneself as an agent. It is what Daniel Dennett calls a “center of narrative gravity” or an “artifact of the social processes that create us.”

Our fundamental tactic of self-protection, self-control, and self-definition is... telling stories, and more particularly concocting and controlling the story we tell others—and ourselves—about who we are . . . Our tales are spun, but for the most part we don’t spin them; they spin us. Our human consciousness, and our narrative selfhood, is their product, not their source.... Like the biological self, this psychological or narrative self is yet another abstraction, not a thing in the brain, but . . . an attractor of properties, the “owner of record” of whatever items and features lying about. (Dennett 1991, 418)

On this view, to navigate the world, a model of agency, a self-told, self-interpreted story, is required (*ibid.*, 427).<sup>18</sup> And within that narrative, subjectivity has its own inviolable legitimacy.

The Kierkegaardian perspective corrects what Lacan tracked to the successive manufacture of distorted, if not false self-representations.<sup>19</sup> Representation is only that, a schema or picture or description of something that defies such an application. I look at my dog and see her as an animate object. She responds to me, we engage, we communicate, and we reciprocate feelings. But she is always a something. A self is a something, as well—something described

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18 Dennett is referring to the Johnson-Laird model theory of cognition, where the world is understood and negotiated by building inner mental replicas of the relations among objects and events that concern us (Johnson-Laird 1983).

19 Jacques Lacan (1901–1981) tracked misidentification to its putative roots in infancy. He took a rather ordinary finding about childhood development and turned it into a school of psychoanalytic thought that dominated France for a generation. He began with Henri Wallon’s report that by six months the human child recognizes herself in a mirror (unlike monkeys of the same age). More than just seeing a self-reflection, Lacan asserted that the infant *identifies* with the mirrored image itself. In other words, the child sees herself *as* that image. So instead of seeing the body in the mirror as a reflection, a representation, the infant thinks that the image is herself. From that seemingly unremarkable observation, Lacan built a scheme that presumed this early event is the beginning of life-long *mistaken* identity, i.e., the origins of neuroses. Accordingly, this infantile construction of an image of its body serves as a persistent template of what will become the structure of later personhood. Or as he put it, “the I is precipitated in a primordial form” at this early stage (Lacan 2006, 76; reviewed in Tauber 2013a, chapter 5). For a contemporary cognitive interpretation see Savanah 2013.

from an external point of view.<sup>20</sup> However, *I* am not a self. I am (as Wittgenstein commented in the *Tractatus*) my world, the world of my experience.<sup>21</sup> So, if I am my world then I am not in it as something separate. I am of my world in a way an object is not.

There is no I, no ego or subject, that stands alone in the world and sees and thinks and confers sense on what it sees and thinks. But there is a language of thought, and the *I* is the formal point of reference for it (Heaton and Groves 1994, 49). On this view, while the public *who I am*, a subject in the world, is identified in relation to others, *me*, in the subjective self-reflexive relation to myself (an identification within the private realm), cannot similarly be identified in relation to another. In the interior confrontation, there is no other, no object that might be objectified.<sup>22</sup> When the *I* becomes a *you*, an object, the *I* has been split into an artifice of predicate language and an epistemology that follows that grammar by instantiating the utter separation of the ego from the world. And when the outward gaze is directed inwards, the romantic indictment of the Enlightenment follows: “Modernity’s Mistake” seeks objectification and order in subjective domains in which it has no jurisdiction.

On this view, the objectification of *me* is the imposition of an imperialistic positivism that has seeped into the deepest crevices of one’s own sense of self. And well beyond the Cartesian ego, Wittgenstein drew the most general conclusion:

Philosophers constantly see the methods of science before their eyes, and are *irresistibly* tempted to answer questions in the way science does. This

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20 For the parallels between Kierkegaard and Wittgenstein on this matter see (Creegan 1989, 116–18).

21 5.63 I am my world.

5.631 The thinking, presenting subject; there is no such thing....

5.632 The subject does not belong to the world but it is the limit of the world.

5.633 Where in the world is a metaphysical subject to be noted?

You can say that this case is altogether like that of an eye and the field of sight. But you do not really see the eye. And from nothing in the field of sight can it be concluded that it is seen from an eye. (Wittgenstein 1981, 151)

To illustrate, imagine Ernst Mach’s drawing of himself in his *Analysis of Sensations* ([1886] 1914). We share, from his vantage, the view of a room, bracketed by the contours of his nose, mustache, and brow. The proportions of his lounging body, the room’s chair, window, bookcase are singularly perspectival: “[T]he self includes—or, more precisely is what it sees” (Ryan 1991, 9).

22 One of Wittgenstein’s most forceful arguments concerns the problematic status of “private language” of mental states (i.e., self-consciousness) that cannot be shared and thus cannot be objectified, i.e., defined (Edwards 1982; summarized in Tauber 2013a, 179–85).

tendency is the real source of metaphysics, and leads philosophers into complete darkness. (Wittgenstein 1960, 18)

In sum, I rest with Kierkegaard's characterization of the sense of self as the reflexivity itself; coupled to Schopenhauer's "extensionless point" that becomes "a viewpoint to know the world, yet distinct from the content of what is known" (Janeway 1989, 296), and Wittgenstein's extrapolation: "I am my world ... The subject does not belong to the world, but it is the limit of the world" (Wittgenstein 1981, 151). In other words, if I am my world, I am not in it as a separate thing, a construction echoing Heidegger's *Dasein* (Tauber 2013a, chapter 4). With these companions, I hold a basic conclusion: subjectivity resides in its own domain, independent of predication and thus objectification. To objectify my subjectivity is to mis-apply the rationality used to describe the natural world, whereby *me* becomes a *what*.

To conclude, the question of the self first explored in my examination of immunology eventually emerged as the lynchpin of my general philosophical education. With my reading of Kierkegaard juxtaposed to Wittgenstein, a plateau of sorts had been reached, in which the limits of analyticity had come into far better focus.

How then would the calculus about identity be further developed? How to construe subjectivity and all that resides in its domain? Although Wittgenstein's deflationary views offered me repose from seeking an analytical answer, my inquiry remained unfinished. After all, his conclusion of silence hardly abdicates the inescapable claims of self-knowledge and the assessment of one's exercise of choice, where the emotional components reside in the white spaces between the lines of the discussion. How might those silences be understood? Where does emotion reside in a Wittgensteinian universe? As explained in the following chapter, I continued to explore the substratum from which the perplexity arises, not for epistemological answers, but rather for ethical guidance. In other words, the *what-am-I?* morphed into the *who-am-I?* question, the core issue of grappling with personal identity.

## Chapter

# 14

## Identity Reconsidered

**I**n our own era, underwriting questions about identity lies self-consciousness in its various formats, namely, what is experienced as the enigmatic me. That agent, the *I*, has been construed in diverse ways: mind in contrast to body, the subjective in contrast to the objective, rational understanding pitted against unconscious desire, reflective consciousness in contrast to the content reflected, etc. In toto these dichotomies point to the intuition that “the ‘I’ bears a relation to itself that is quite unlike its relation to other objects” (Rorty 1976, 13). Indeed, who is this intimate other who shadows my consciousness and leaves me to ponder my own identity? This is the question at the heart of the romantic quandary.

A consciousness of one’s own self and a consciousness of other things, are in truth given to us immediately, and the two are given in such a fundamentally different way that no other difference compares with this. About *himself* everyone knows directly, about everything else only very indirectly. This is the fact and the problem. (Schopenhauer 1969, 192)

By the mid-twentieth century, the *who am I?* had become a central cultural motif. I admit to closely fitting Erik Erikson’s schema of “identity crisis” as my own “self concept” underwent a redressing right on cue (Erikson 1968). I joined a broad cultural and philosophical assessment, one that seems to have suddenly appeared after World War I (Gleason 1983). In Gerald Izenberg’s histori-

cal review, he summarized the unique historical appearance of identity organized by three major interpretations:

1. The correlation of modernization and the rise of secular individualism spawned new notions of identity. These were designed to resolve subjective relativist beliefs against the demands of objective standards derived from the rise of science (Izenberg 2014, 11 referring to Taylor 1989). This challenge of self-defined rules of conduct and identification replaced the given mores of traditional society that bequeaths identity's "ontological security." In the modern context, Westerners constantly reinterpret themselves in the shifting contexts of a restless culture whose only constant is change (*ibid.*, 12 referring to Giddens 1991). Beginning in the 1920s, this self-awareness inaugurated a wide-spread inquiry about identity in literature and political discourses that persisted through the course of the twentieth century.
2. Different meanings of collective identity assumed prominence during the inter-War period that, in various contexts (political, social, and cultural), made the sense of individual identity a self-conscious and highly problematic issue for the first time (Izenberg 2014, 12–23). Individualistic orientations were then pitted against such collective identities construed as political constructs in service of power that seeks to dominate others.
3. The disruptions and resulting insecurities generated by the political and social crises of the mid-twentieth century sowed confusion about identity. In the effort to combat conformism, "finding" and then asserting individual identity assumed new importance in the attempts to gain control of one's life (a notion derived from idealistic expectations of nineteenth century individualism). This effort underwrote the anthem, "to thy own self be true" and other proclamations of authentication marking the identity politics of our own era. Responses to the dislocation of self-identification have stretched between despair (with submission to totalitarian offerings) and self-willed efforts to explore new conceptions of selfhood, in which any essentialist definition or standard is disallowed.

This last orientation led to severe criticisms of agency and selfhood that erupted during the closing decades of the twentieth century. Those diverse postmodern critiques hold a central thesis, by which identity is relieved of serving as a necessary concept in defining human being.

In terms of theoretical psychology, positing an ego has not clarified the matter, nor has sociological theory definitively drawn lines that separate collective and individual identity.<sup>1</sup> And no better traction has worked with the “person,” another designation (whether considered cross-culturally or historically) that has defied definition. I think it fair to conclude that the identity issue has hardly progressed beyond Marcel Mauss’s claims made in his seminal 1938 essay, which have been widely affirmed and spawned a circumspect literature of the very concept of selfhood as a universal category.<sup>2</sup>

Twentieth-century postmodernists (more specifically, poststructuralists) highlighted the contingency of the self’s construction, whose lack of a reference point precludes order or structure, features required for characterizing a *thing*.<sup>3</sup> Since no transcendental significance to limit meanings exist, they refer to the self’s “indeterminacy”—a decentered subject, no longer an origin or a source, but rather the product of multiple historical, social, and psychological forces. From this perspective, no claims might be held regarding the natural state of cultural structures (e.g., language, kinship systems, social and economic hierarchies, sexual norms, religious beliefs) that would define the self. Complementing these views, a rich anthropological literature effectively revealed the idiosyncratic character of the prevailing notions of Western identity (Roland 1988; Morris 1994). And beyond the social configuration of the members of a society, self-consciousness itself is highly varied, and, no wonder, considering the diverse ways personal identity is conceived as revealed by cross-cultural studies.

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- 1 Philip Gleason (1983, 918) makes a distinction between the psychologists, who endeavor to locate “identity in the deep psychic structure of the individual,” where despite social interactions identity “is at bottom an ‘accrued confidence’ in the ‘inner sameness and continuity’ of one’s own being (citing Goffman 1959), while “the sociologists tend to view identity as an artifact of interaction between the individual and society ... a matter of being designated by a certain name, accepting that designation, internalizing the role requirements accompanying it, and behaving according to those prescriptions.... [T]his sociological view of personality challenges the assumption of continuity in the self. ‘Looked at sociologically, the self is no longer a solid, given entity.... It is rather a process, continuously created and re-created in each social situation that one enters, held together by the slender thread of memory’” (quoting Foote 1951).
  - 2 “I shall show you how recent is the word ‘self’ (*moi*), used philosophically; how recent ‘the category of ‘self’ (*moi*), ‘the cult of the ‘self’ (*moi*) (its aberration); and how recent even ‘the respect of ‘self’ (*moi*), in particular the respect of others (its normal state)” (Mauss [1938] 1985, 3). The papers of this anthology refract the personal identity issue from diverse disciplinary perspectives to offer an excellent summary of how social roles and ideology frame the governing notions of the subject.
  - 3 Feminist critiques have been at the forefront of this reassessment, e.g., Butler 1990; Harcourt 2007; Hurst 2017.

With the postmodern deconstruction, notions of self-understanding and, correspondingly, personal identity, have undergone a sea-change, and with the circumspection initiated by postmodern critiques, the modernist ego lost its footing. What I called “modernity’s mistake” was the attempt to establish a foundation based on the certainty of Cartesian self-consciousness, and more, to objectify it. From a reassessment of self-determination, postmodernists have directed their critiques of falsely imagined individuality. Instead of the autonomous subject described by Kant, agency is now depicted as conflicted, often self-deluded, fundamentally opaque, and directed by archaic drives and desires of which one is unaware and consequently cannot control. These forces may be intra-psychic (Freud) or social, i.e., persons constituted within and by regimes, discourses, and power of which they have little knowledge or control (Foucault), or by historically specified cultural ideals that masquerade as universal norms. With such ambiguities, the status of the self effectively focuses the larger cultural and philosophical divisions that have placed identity politics at the center of postmodernity.

Arguably, the most influential historical-philosophical analysis leading to this postmodern perspective was provided by Michel Foucault. He posited that Man conceived in terms of the Enlightenment ideal was an invention of the modern era (Foucault 1970). He based his account on the pervasive social ether of Power, which putatively defines and controls identity insidiously by establishing hegemony over the individual’s body, action, and thought. In other words, the body becomes an object, and power, the means of its control.<sup>4</sup> On this view, the cultural authority of meaning shapes, even constitutes, the psychological self, the sense of *me*. Generally, one is oblivious to such social forces, but personal choices are but a mirage because the assumed free will underlying an autonomous self-image is but a concoction of conceits that define options and configure responses. In other words, Foucault broadly attacked the basic presupposition of the modernist identity of the individual (autonomous personhood), where the conception of Man as such a being was a construct of a singular moment in history (Schneewind 1998). And with the social conditions of the modernist subject radically altered, a different conception of identity has inevitably taken hold.

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4 For Foucault, power is but a means to define the self and therefore it cannot constitute the self’s very basis, as in Nietzsche’s understanding of the Will to Power that constitutes human vitality (Foucault 2001; Nietzsche 1967; Tauber 1995b). For post-Foucauldian comment along these lines, see Cadava, Connor, and Nancy, 1991; Rose 1996; Schrag 1997; Ruti 2006; Pfister 1997.

With Foucault's ascendance in the intellectual firmament, postmodernism had opened its doors for all to see. He, in effect, joined forces with the Freudian heritage bequeathed by the psychoanalytic revelation of secret desire and fantasy. Instead of accepting the expectations of Reason's role to know the world, govern the social, and attain self-knowledge, a judicious circumspection took hold, where a cautious, aspirational certitude had once resided.<sup>5</sup> Recognizing the limits of thought and the extent of faulty reasoning, the influence of unrecognized emotion, and the determinism of unconscious motivation, together assembled a sense of personal identity clouded by a "hermeneutics of suspicion" (Ricoeur 1970; Scott-Bauman 2009). Freud rendered *me* as a construct in which uncertainty rules the most intimate sense of human being. Yet, on balance, despite invocation by postmodernists, I deny that Freud finds a comfortable home in their camp. Post-Freudian developments certainly draw from the deconstructions ushered in by his work, but those are subsequent developments and draw from postmodern critiques of the knowing ego (Elliott 1999; Fairfield, Layton, and C. Stack 2002). That appraisal does not gainsay how his critique of reason and the limits of self-knowledge laid the groundwork for later postmodern a-rationalists. Yet, his commitment to rationality separates him from what followed. That story has been reviewed elsewhere (Tauber 2013a) and here I am primarily concerned with how Freud constructed the psychoanalytic ego still committed to modernist tenets and how that configuration highlights the conundrum of postmodern critiques.

#### FREUD AND NIETZSCHE

My longstanding interest in Freud's thought provided little direction in deciphering the conscious ego, the *me* I sought to better understand. Students of Freudian theory have long acknowledged that he had focused his efforts on the unconscious at the expense of the ego, and only later theorists made the ego the center of their versions of revised Freudianism. Indeed, Freud explicitly defined psychoanalysis as the "science of the unconscious." So, the vapors of self-

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5 The literature on introspection melds into questions revolving around self-knowledge, and then slips into the vast studies of consciousness (represented by pockets of scholarship based on phenomenological approaches, analytical philosophy, cognitive psychology, neuroscience, etc.). For philosophically oriented essays on self-knowledge/self-deception, see McLaughlin and Rorty (eds.) 1988; Cassam 1994; Ames and Dissanayake 1996; Fingarette 2000; Mele 2001; Carruthers 2011; Gertler 2011; for introspection per se, see Smithies and Stoljar, 2012; Kriegel 2009.

(or ego-) psychology that I had inhaled since the 1970s were not those coming from Papa Freud's cigar. He had other concerns.

Freud assumed a commonsensical understanding of the ego, namely the seat of consciousness that mediates between the deeper psychic drives and external reality. Accordingly, the ego examines and attempts to control the unconscious forces that remain hidden from normal scrutiny. Functioning within a sector of the mind, the ego has the unique property of following rational and logical rules. That faculty, of course, is only part of a more general functional apparatus that serves to mediate the demands of the unconscious and the social reality of the exterior world. This Freudian model determines the ego's topological characteristics and thus it is situated in a mental "location." And locality implies borders.<sup>6</sup> However, there is a fundamental problem with this formulation: the ego as an entity does not exist as more than a functional placeholder in the psychodynamics Freud posited. Drawing from the Kantian understanding, in psychoanalytic theory 1) agency is not defined, only the conditions of knowing; 2) the reasoning faculty has dubious autonomy and is left uncharacterized other than being constitutive to ego psychic functions; and 3) consciousness serves as an observing faculty that processes inputs from the unconscious forces into meaningful understanding through the means of psychoanalysis, at least that is the putative assignment (Longuenesse 2017). Das Ich ("the I") is just the fellow on the couch, whose consciousness is taken as a given.

Freud's underlying premise that emotional recognition and rational insight leads to personal freedom makes self-consciousness the therapeutic means towards psychological and existential health. Yet, Freud does not explicitly consider the character of self-consciousness, the "relation of oneself to oneself," and leaves the ego (ironically) uncharacterized. Moreover, what is the relationship of reason to the general category of consciousness, and more specifically, how is self-consciousness conceived? These questions found little consideration by Freud, as he explained in his *New Introductory Lectures*, "There is no need to discuss what is to be called conscious: it is removed from all doubt" (Freud 1933, 70). Further discernment apparently was not necessary for his theoretical purposes, and in regard to reason, Freud was satisfied with its instrumental use.

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6 In Freud's mature work, *The Ego and the Id* (1923), the ego stretches from conscious deliberation and memory gatherer to unconscious regions as well. Thus, the architecture of the mind assumed a more complex configuration than in his earlier formulations. And from a historical point of view, this work heralds the beginning of a major shift in psychoanalysis to what became "ego psychology."

Moreover, and perhaps surprising, the issue of personal identity finds no conceptual home in Freud's thought. Indeed, he never gave "the self" a passing nod. *Das Ich* in the Freudian context has a specific psychological structural and economic character; its functions are specified. That is not to deny that a latent conception of the self—construed as a sense of "me," i.e., an integrated purposeful person—ultimately orders the narrative story that emerges in analysis (Dilman 1984, 106). So, even though such an implicit identity never explicitly appears in Freud's writings, the analysand does adopt some version of self-identification along these lines. Yet the I has no philosophical or psychological grounding.<sup>7</sup> When "self" rarely appears in the *Standard [English] Edition*, it is misappropriated. Simply, selfhood considered in any formal sense eclipsed Freud's interest. That he only employed the pronominal—s/he, you, and "the I"—attests to a deliberate decision (Tauber 2022).

So, we might fairly ask, who is this agent of inquiry? And who is the object of analysis? Freud offers a deafening silence: *Ich* is simply *I*, a self-reflexive, self-conscious, interpreting *person*. This is a phenomenological identity; the self as some essential or totalizing entity never appears, and to the extent pursued, *Selbst* (self) simply vanishes upon any attempt to define such an entity. Yet, Mr. Analysand lays on the couch, pays his bill, and asserts his "I-ness" freely. On this pragmatic view, the *I* serves as a useful point of reference, but no more. The same lesson was already presented by Kant in the *First Critique*, where the ego is formulated as only a transcendental function, or a placeholder for providing the conditions through which cognition must occur. There is no entity as such (Tauber 2009b).

By avoiding the identity question, Freud found passive support from the key philosophers of his period. Nietzsche naturalized the subject into a medley of competing drives, where consciousness becomes a conceit, conventional morality a disguised egoism, and identity, an assumed masquerade (Kaufmann 1992, 47–166). Indeed, for Nietzsche, *das Ich* "has become a fable, a fiction, a play on words" (Nietzsche 2005, 178). The fundamental difference between their respective psychologies is that while Freud would clamp the ego's own mode of knowing upon a psychic domain that follows a different language and a different logic—a mind of another kind, Nietzsche would celebrate and re-

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7 Note Freud used the word, self (*Selbst*), only once in his writings (fourth paragraph of *Civilization and its Discontents* [1930]). He freely uses *das Ich* (mistranslated as *ego*) as opposed to *Selbst* (self), but the Freudian *ego* does not equate with "the self."

lease that domain from the ego's despotic control.<sup>8</sup> Thus, Nietzsche held the line between the conscious/unconscious domains more securely and recognized the unbridgeable gulf separating them.

Freud would employ rationality as the ego's best tool to control unmediated desire and fantasy, while Nietzsche would scoff and reassign reason whence it came.<sup>9</sup> In other words, desire, emerging from psychic sources well below consciousness and indecipherable in reason's terms, becomes the radical Other only as the result of a relationship imposed from above, i.e., from a conscious ego. And more to the point, the cunning unconscious cannot be so dominated.<sup>10</sup> Denying consciousness as the highest stage of organic development, Nietzsche would insist that 1) the unification of the diverse multiple instincts and the affects are the most astonishing product of evolution (Nietzsche 2003, 29); 2) affective life employs consciousness only as a tool for its own goals (ibid., 29; 45); and 3) ultimately the affects themselves interpret (ibid., 96) leaving consciousness the illusion of its own autonomy (ibid., 8; 228). In sum, the "will" is the human, from raw drive to the most esteemed products of civilization. And then the radical sequence ends with the validation and celebration of emotional life at the expense of Socratic Reason. And in the sweep of his argument, Nietzsche demoted science from its lofty perch as a form of restricted knowledge and thus inaugurated the postmodern assault on Reason and Truth (Koelb 1990).<sup>11</sup>

In his attack on Socrates and celebration of Dionysus (revealing the mysteries lying beyond reason's reach), Nietzsche cut philosophy loose from its Enlightenment traditions. That effort helped frame a *Zeitgeist* where reason

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8 "The unconscious is not susceptible to colonization by Knowledge," yet to become "accessible to the introspective psychological eye" the unconscious has been "harmonized" with (and for) the ego" (Reeder 2002, 18–19).

9 "Upon this *illusion we have founded our whole notion of mind, reason, logic*, etc. (none of these exist: they are fictitious syntheses and unities) ... And these in turn we have projected *into things, behind things!*" (Nietzsche 2003, 228)

10 "The 'inner experience' only enters our consciousness after it's found a language that the individual understands . . . i.e., a translation of a state into states *more familiar* to the individual" (Nietzsche 2003, 271; see also 107).

11 "Assuming that nothing real is 'given' to us apart from our world of desires and passions, assuming that we cannot ascend or descend to any 'reality' other than the reality of our instincts (for thinking is merely an interrelation of these instincts, one to the other), may we not be allowed to perform an experiment and ask whether the 'given' also provides a *sufficient* explanation for the so-called mechanistic (or material) world? I do not mean the material world as a delusion, as 'appearance' or 'representation [*Vorstellung*]...but rather as a world with the same level of reality that our emotion [*Affekt*] has..." (Nietzsche 2008, 35).

lost its hegemony to a neo-romantic emotivism.<sup>12</sup> Moreover, for him, the denial of the primacy of affective life was the cardinal feature of Western nihilism, and the root cause of an illusory morality derived from a rationality based on superstition and repressive religion. On Nietzsche's view, Reason (and the false pretenses of consciousness, more generally) became a tool of enslavement, both to control instinctual life and to impose social conformity. Where Freud would plea for reason as our only hope against a riotous unconscious, for Nietzsche, defining and then reforming the despotic rational ego lies at the heart of his diagnosis of, and prescription for, European nihilism. And on that basis, with consciousness demoted and Reason defrocked, the deconstruction of the morality based upon these precepts presented the stage for the postmodern deconstruction of the enshrined self, for better and for worse.

And then from other quarters, as already discussed, Wittgenstein delegated any attempt to objectify the self as misplaced philosophical "nonsense" of "poor grammar" and a defunct metaphysics (Tauber 2013a, chapter 7), while Heidegger's Dasein's "receptivity" and integration within the world replaced the self-conscious ego altogether (Tauber 2013a, chapter 4). Freud joined this illustrious company in similarly dispensing with the ego as an entity, although an implicit understanding of agency operates throughout his opera. He invokes the authority of individuals to probe their inner emotion and thought, and, as a result of this introspection, a new understanding of that experience conferred by a more acute self-consciousness opens the possibility of insight, emotional rebalancing, and therapeutic success. Basically, the reflexive component of psychoanalytic self-consciousness becomes the means of achieving a revised sense of personal history and identity through a process that putatively generates options and choices arising from insight and reconstruction. At least, those are the claims.

Although Freud had focused on the unconscious, his followers shifted their attention to the conscious ego. Ego psychology, first enunciated in the 1920s, did not fully emerge until Heinz Kohut developed an explicit "psychology of the

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12 Nietzsche's strategy was based on an aesthetic-based approach to emancipate thought, and the Übermensch (Overman) stands for de-sublimated art that has been returned to life. No longer passive, the aesthetic is creative in its receptive mode of experience (Früchtl 2008, 152–53). Achieving this heightened subjectivity influenced Adorno and Horkheimer, who recognized that expanded "thinking" must include the emotive, but they emphasized (in the *Dialectic of Enlightenment*, chapter 2) the "dark side" of the id out of control. Nietzsche, in fact, offered a balanced view. While celebrating the sensuous, he argued that only through the "bond of brotherhood" between Apollo and Dionysus, might the supreme goal of all art be obtained (Nietzsche 1999, 104).

self” in the 1970s. Kohut, a member of the object relations school of psychology, sought to extend psychoanalysis to a more holistic consideration of the individual, namely one whose identity becomes a focus of concern. Yet, and this represents an irony, Kohut made no attempt at defining the self and simply acknowledged an implicit understanding based on empirical observations that he called, “psychological manifestations”:

My investigation contains hundreds of pages dealing with the psychology of the self—yet it never assigns an inflexible meaning to the term self, it never explains how the essence of the self should be defined.... Demands for an exact definition of the nature of the self disregard the fact that “the self” is not a concept of an abstract science, but a generalization derived from empirical data. (Kohut 1977, 310–11)

What that “generalization” might be beyond the pronominal “I” or “me” cannot be derived from Kohut’s psychology. Indeed, what he meant by a generalization apparently sufficed as firmer definition remained elusive.

Other psychologists similarly abdicated a definition of identity. For example, Erik Erikson, who popularized “identity crisis” assumed the same agnosticism, because the object of inquiry, identity, similarly escaped explicit definition (Gleason 1983, 914–45). The original “crisis” designation referred to World War II veterans who, “through the exigencies of war lost a sense of personal sameness and historical continuity” (Erikson 1968, 17). Erikson offers little more than this cursory definition of identity and admits in the opening passages in his reflections that

the more one writes about this subject [identity], the more the word becomes a term for something as unfathomable as it is all-pervasive. One can only explore it by establishing its indispensability in various contexts. (ibid., 9)

Although “identity crisis” enjoyed wide popularity and became a central motif of adolescent psychology and sociology, Erikson’s theory of identity met resistance throughout the human sciences and eventually was dismissed.

As identity became more and more of a cliché, its meaning grew progressively more diffuse, thereby encouraging increasingly loose and irresponsible usage. The depressing result is that a good deal of what passes for dis-

cussion of identity is little more than portentous incoherence. (Gleason 1983, 931)

Such pronouncements endorsed the philosophical sages and joined other choruses that either lamented or celebrated the demise of the self. And with the ego's expiration, one might well inquire, who then is the moral agent?

### THE SELF, A MORAL CATEGORY

As already noted, by the closing decades of the twentieth century, the self had become a highly problematic conception. Instead of an ideal of autonomous individuality, the postmodern deconstruction depicted the contingencies of identity determined by unrecognized social and psychological forces. On this view, the sovereignty of the modernist ego is at best a deceptive construction, a product of a particular metaphysics (Cartesian) and supported by an insidious ideology (late capitalism). On that basis, the self's very authenticity has been contested. However, if the ethical notion of individual responsibility holds, personal identity distills down to the primacy of moral agency. Putting aside the debunked original psychoanalytic model of the mind and the panoptics of Foucauldian notions of Power (Paternek 1987), both Freud and Foucault (cited here as exemplars of the self's deconstructivists) ultimately committed to an ethical view of the person: Foucault pursued "the care of the self" (McWhorter 1992; McGushin 2007) and Freud followed the ancient divine Delphic command—*gnothi seauton*.<sup>13</sup> What *askēsis* (self-discipline) or *gnothi seauton* (know thyself) mean today differ from the expectations of the ancient Greeks, but across the millennia, the imperative of self-inquiry and self-awareness remain intact as ethical dictates, in which such an inquiry constitutes the foundation of moral cognizance. The self-knowing subject is irreducible and in this sense remains

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13 *Gnothi seauton* literally translates to "know thy soul or psyche." Although there is a Greek pronoun for self in Plato, it is not used as a substantive; *psyche* functions as the noun corresponding to our self (Griswold 1986). To know oneself is to know the psyche, which is best declared in its virtue and wisdom, *sophia*, upon which Socrates's entire ethic is erected. *Psyche's* complex and laden meanings may be simplified as that which is capable of attaining wisdom or, in Socratic terms, as the true self: "The living man *is* the *psyche*, and the body ... is only the set of tools or instruments of which he makes use in order to live ... [L]ife can only be lived well if the *psyche* is in command of the body. It meant purely and simply the intelligence, which in a properly ordered life is in complete control of the senses and emotions" (Guthrie 1971, 149–50). The roots of such an ethos may be discerned in Ionian scientific thought and in Pythagoreanism (Onians 1951).

the basis of *me*. Simply, moral agency is the framework in which *who I am* is enacted within a web of values that define relationships, guide behaviors, qualify choices, measure consequences, and mediate motivations.

Without enslavement to an exterior or prior morality, a morality which is ultimately posited as abstract from human will, what is there to stop ethics being reduced to subjective whim? ... The answer lies in how we conceive of who or what *we* are ... in our conception of subjectivity, that thinking subjectivity and thinking ethics become inseparably entwined. *Ethics itself entails an assumption of subjectivity*. Assuming a subjective position is already an ethical venture. (Neill 2011, 11, emphasis added)

Charles Taylor asserts (in the form of a question) the key point: “Is there a sense in which the human agent is responsible for himself which is part of our very conception of the self?” (Taylor 1976, 281–82). Yes. Why? And here a great assumption or belief orients all that follows:

... the human subject is such that the question arises inescapably, which kind of being he is going to realize. He is not just de facto a certain kind of being, with certain desires, but it is somehow “up to” him what kind of being he is going to be.... [W]e have the notion that human subjects are capable of evaluating what they are, and to the extent that they can shape themselves on this evaluation, are responsible for what they are in a way that other subjects of action and desire (higher animals for instance) cannot be said to be. It is this kind of evaluation/responsibility which many believe to be essential to our notion of the self. (Taylor 1976, 282)

I attest to this belief, thereby acknowledging its assumptions, and the story narrated here is an illustration of the kind of inquiry such an orientation entails.

Taylor is building on a long line of existential thinkers (Kierkegaard, Nietzsche, Sartre, Camus, and Heidegger), who have made human choice—the whom-I-want-to-be—the central characteristic of one’s humanity. Whether we are free to so act is another question. However, the assertion that we might act by choice is the freedom that already sets the course of the road we travel. And on that basis the key component of the identity issue becomes clear: the existential challenge for one who makes choices, whether “free” or only imagined as independent, becomes the determinative element setting life’s course. Simply, those selections establish one’s identity. And the result of that line of

reasoning resets the anchor of identity: the agent viewed through the moral prism is irreducible.

What one cares about and identifies with, what values are embraced, which choices are made and behaviors enacted, define *me*. *Who am I?* embeds identity as an agent of responsibility, whose constancy in relationships and character traits determines expectations and reciprocity. Self-knowing identifications largely determine choices that have both immediate and future effects and thus constitute the practical aspects of ethics. Here, moral inquiry is considered in the most general sense of knowing *who I am* in the context of the fallibilities of self-knowledge.

Beneath the uncertainties that plague decision-making, lies a deeper conundrum about the very basis of ethics. In the sectarian world, morality has

no “foundation”—no cause, no determining factor. For the same reason for which it cannot be wished or maneuvered out of existence, it cannot offer a convincing case for the necessity of its presence. In the absence of a foundation, the question “How possible?” makes no sense when addressed to morality. Such a question calls morality to justify itself—yet morality has no excuse, as it precedes the emergence of the socially administered context.... That question demands that morality show the certificate of its origins—yet there is no self before the moral self, morality being the ultimate, non-determined presence; indeed, an act of creation *ex nihilo*, if there ever was one. (Bauman, 1993, 13)

This non-foundational orientation, at least for me, provided a starting point for ethical reflection and ways to approach the self question from an utterly different perspective than the one offered by Descartes and all those who sought “the thinking thing.” With this deconstruction, how might *moral* structure of agency be reconceived and redirected? Beyond some pragmatic, utilitarian, and self-gratifying optimization, what guides social and individual perfection? Given the ether of relativism in which we live, does perfectionism reek of a discarded nineteenth-century idiom (Cavell 1990)? Have we really evolved to a “post-humanism” of homogenized consuming cyborgs (Hayles 1999; Wolfe 2010)? Is social transformation a vain hope as each of us is paralyzed by the paroxysms of power that jostle us like so many leaves in a windy storm (Foucault 2001)? To what degree has the latitude for social liberation been curtailed by shifting and unstable signifiers that leave meaning an evanescent property of human discourse (Derrida 1974; 1978a; 2011)? Has the linguistic turn truly

locked us within language, and reality then becomes a product of the discourses in which we are imprisoned (Sarup 1993)? If these questions are answered in the affirmative, then we are left only with what Rorty describes as a political ideal of “solidarity,” where we group together to coalesce around pragmatic solutions generated by shared needs (Rorty 1999). Of course, without foundations those needs are themselves contentious, and the question of what constitutes the “glue” of the commune remains nebulous.

### ON PERSONAL UNCERTAINTY

MacIntyre ascribes the *who am I?* question as the central challenge of ethics, not *what* to do, but asking, and then asserting, an identity. From that base, choices are made and enacted. With those responses, moral agency is established, and all the rest follows (MacIntyre 2007). What one cares about and identifies with, what values are embraced, which choices are made, and behaviors enacted define *me* (Olson 1999). Those self-defining actions fall along a continuum of unconscious (or at least, undeliberated) decisions to profound self-reflective decisions. The latter are of concern here. Much of culture criticism and philosophical discussion have left deep uncertainties about self-knowledge and rational deliberation. Indeed, uncertainty is most intimately experienced in our own sense of selfhood, the primary derivative of self-consciousness.

Introspection arises anew with new challenges and self-assessments shift as the I's perspective, circumstance, and context change. Layer upon layer of telling (in any format) shift how pieces of the past are sorted and assembled. These narratives then re-characterize *me* as a projection of what seems self-justifying to oneself and explanatory to others. Such tales are crucial for grounding behavior by establishing goals, conferring responsibility, bestowing reasons for choices and actions, etc. However, their consistency, comprehensiveness, and veracity cannot be assured. Indeed, the fallibility of self-examination is *the* constant of the entire enterprise. So, given such embedded uncertainty, how does one accurately represent an inner state, an emotion, a memory?

Wittgenstein's telling critique did not argue that such stories were ‘wrong,’ but they could not be ‘true’ in any final sense. A Wittgensteinian-inspired psychoanalysis would offer insight through “perspicuous presentations,” whereby interpretations are not confused as establishing scientific *causes* of unconscious forces, but rather provide insight into the *reasons* psychic events appears as they do, and the influence antecedents might have on behavior and affect. Accordingly, those reasons will become more accessible and thereby enrich interpreta-

tions by allowing them to ‘speak’ for themselves, i.e., to become manifest. And, more generally then, Wittgenstein tracks this confusion to the ego’s representational functions contrived for its most intimate other, the unconscious, from the modes by which we know the external (Bourveresse 1995; Tauber 2010, chapter 2).

Placing one’s emotion in a representational mode must, as the romantics had noted a century before, make the experience into something else. Not so much a distortion as simply another representation, an entity onto itself within a frame of reference deliberately different from the original. After all, mental states are not objects, whose characteristics may be captured. The language of subjectivity is a *poesis*, approximations that rely on shared experience and extrapolations, because correspondence cannot be attained.

I refer to my own venture recounted here. As I probed my own memories, the instability of recall was unsettling. What did I omit, distort, or misplace? Repercussions of such doubt soon appeared as the limits of language seemingly loomed wherever I looked. How in *fact*, could I describe my feelings and experience in the *present*? I became increasingly aware of the gap between my pre-linguistic thought and its expression. Perhaps because I was getting older, I came to recognize that the ‘space’ between my mental state and its articulation had seemingly widened....or at least I had become more clearly aware of its presence.

Subjectivity, or better, the *description* of subjectivity became a paramount interest. I grew increasingly impatient with musicology and art criticism and found myself listening to concerts and visiting museums to simply hear and see without imposing analysis. I shed literary criticism and started to read poetry and high literature without the structural analysis I had been taught. The ineffable seemed to appear with regularity, whether walking in the woods or watching the ducks fly overhead. The mystery of love rested more quietly. And as I entered my eighth decade and ventured to write of my past, the enigma of memory raised the specter of language’s limits more acutely. While I self-consciously assembled my autobiography much like a puzzle whose pieces had lain scattered, the work seemed to progress much like painting a cubist self-portrait, whose aesthetic rested firmly within the eye of an artist, who has taken “a wrench to reality” (Bell 2014).<sup>14</sup>

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14 I am referring to a private two volume history of three generations of my family’s fathers and sons, a narrative that begins in Hungary at the beginning of the twentieth century and stretches into the present period. The dedication and much of the narrative material of *The Triumph of Uncertainty* draws from that work.

The refinements of retrospection are inescapable. The attempt to be self-critical hopefully corrects, at least partially, the distortions imposed by time and the bias that grows from changing sentiments. What is important today may have had minimal, if any, significance in the past. The reflexive tale is both a hermeneutical treatise and a work of art in the sense that memory has:

a knack for selection, the taste for detail. . . . Memory contains precisely details, not the whole picture; highlights if you will, not the entire show. The conviction that we are somehow remembering the whole thing in a blanket fashion, the very conviction that allows the species to go on with its life, is groundless. (Brodsky 1986, 489)

More, the protagonist of memory is notoriously unstable, the story of myself is always in flux, and the narrative freezes the moving present (Conradi 2001, 293). And as one's self-image changes in time, emotional elements shift and here temperament comes to the foreground.

How one reviews the choices made and interpretations derived cannot escape the power of the present that inescapably frames the recount.

[M]emory betrays everybody, especially those whom we knew best. It is an ally of oblivion, it is an ally of death. It is a fishnet with a very small catch, and with the water gone you can't use it to reconstruct anybody.... Presumably the whole point is that there should be no continuum: of anything. That failures of memory are but proof of a living organism's subordination to the laws of nature. No life is meant to be preserved. Unless one is a pharaoh, one doesn't aspire to become a mummy. (Brodsky 1986, 492–93).

Of course, memory is radically fragmented and incomplete. Nodal points of objectivity hardly suffice to reconstruct a life and thus minimalist reconstructions must suffice. Indeed, do I truly recall the feelings or even the circumstances that enveloped a diary entry or a photograph?

Given such limitations, the *I* appears in varying degrees through the articulation of self-consciousness and the narration of personal history. Freud explained the psychology of reconstructing the past as the workings of "screen memories." These are what is recalled in the present to shield or to hide traumas that have been repressed or at least softened. He eloquently described the intractable lost reality of childhood:

It is perhaps altogether questionable whether we have any conscious memories *from* childhood: perhaps we have only memories *of* childhood. These show us the first years of our lives not as they were, but as they appeared to us at later periods, when the memories were aroused. At these times of arousal the memories of childhood did not *emerge*, as one is accustomed to saying, but *were formed*, and a number of motives that were far removed from the aim of the historical fidelity had a hand in influencing both the formation and the selection of the memories. (Freud 2003, 21)

Yet a story is told, indeed, must be told. Out of the complexities and noise of the everyday and the chaos of the disruptive, one imposes sequences and linkages to build coherence. And then from that ordering, given the selection and partial recall, how is the exposition to be judged?

The stories others tell about you and the stories you tell about yourself: which ones come closer to the truth? ... But, actually, that is not the question on my mind. The true question is: In such stories—is there, as a matter of fact, a difference between true and false? ... Is the soul a place of facts? Or are the alleged facts only the deceptive shadows of our stories? (Mercier 2008, 142; quoted by Prinz 2012, v)

A most reasonable question, for within the domain of the personal, truth assumes varying valences. Indeed, we allow latitude for the subjective account and so one can only claim best intentions to capture that which is now gone. Pushing aside Freudian psychoanalytic mechanics, the key dictate still holds. Although, we might seek to free the conscious *I* from the shackles of the unconscious, or more generally from reconstructed memories framed by present prejudice, the question of identifying the true *me*—the unconscious forces propelling selection and bias in the configuration of my memory and character—cannot be resolved.

With these comments on memory, Freud's seminal contribution to characterizing the postmodern subject appears in full relief: we are strangers to ourselves.<sup>15</sup> But more, the entire attempt to discern our inner life as an objectification is futile. Beyond the limits of articulation and the distortion of memory,

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15 The nomenclature debate about "ego" reflects this general issue. In a post-Freudian context the use of "subject" in lieu of ego or self is a convention that avoids the failings of "selfhood" and the ambiguities of "person." See Ogden 1992; for a broader discussion, see Tauber 2013a, chapters 5 and 6.

the autobiographical report is always both incomplete and adjusted to fit within the circumstances of the present. And precisely because the psyche is sequestered from objective appraisal, veracity assumes its own criteria. These hermeneutical limits strike at the heart of the psychoanalytic enterprise as well as the myriad other introspective attempts that at best approximates *knowledge*.

With this reckoning, this essay on uncertainty has come full circle. By re-examining the Freudianism of my youth, I generated philosophical ways of thinking about selfhood generally, and self-knowledge, in particular (Tauber 2010; 2013a). As a modality for understanding human subjectivity, Freud offered a new way of thinking about the *fallibility* of retrospection. Psychoanalysis is but one way of reconstructing memory and depicting one's mental state, and while the derived narratives are salutary for some, philosophically, Freud did not escape Wittgenstein's critique. In that re-assessment, I began to understand the imbroglio that had so befuddled me, in which the "nonsense" of objectifying introspection is the core error leading to skepticism and self-doubt (Tauber 2013a). In a vicious recursive spiral, the 'object' recedes from recall:

The deep significance of our modeling of autobiographical memory in just this way is perhaps apparent: if a remembered event is represented internally by such an allegedly corresponding thought-object, and if that remembered event is in part relationally constituted, then we cannot assume that the event does in fact correspond to the object before the remembering mind. And with this skeptical gap, we would forever be wondering if we, quite literally, knew what we were, if not talking, then thinking, about. If the memory-object is made wholly knowable by the remembering mind by severing its external relational-connectedness, then it loses what Davidson called, succinctly, its semantics. (Hagberg 2008, 227)

On this account, because of the construction of the "theater of the mind," mental images are paraded as semantic representations of memories, feelings, and thought. Autobiographical consciousness cannot escape the skepticism that adheres to the distortions and partiality of such reconstructed mental "objects."

Not to gainsay the crucial importance of seeking self-knowledge, without the assurances of objectivity, the uncertainty generated by even this most intimate analysis of the psyche jeopardizes the ethical order. After all, self-knowledge undergirds the exercise of free choice. If scrutinized motivations, undeclared prejudices, unacknowledged desires remain hidden, then how can *I* be responsible for my actions? Indeed, on what basis does one make choices? Prac-

tical demands impose moral imperatives, but uncertainty is not thereby resolved. Here, peering at the chasm of psychic skepticism, we find the enigma of constructing an architecture of the self and, more specifically, rendering an autobiographical account to explain or justify actions by which such a subject assumes responsibility for actions and choices. Then we might well ask,

How do we go about the life-defining process of making a ‘picture’ of ourselves which we then come to resemble? How does the selectivity displayed in choosing what to include and what to leave out – or seemingly avoid – determine both the content and the outlines of that picture? How might we characterize, and give more exacting expression to, the process – a process that is centrally significant for any project of self-investigation – of altering the ‘angle’ of a life’s major items? Skepticism is never just whimsically adopted,...it is *motivated*. (Hagberg 2008, 203-4)

In short, *intro-spection* embeds a semantic error: There is nothing to *see*! There is no Archimedean point to appraise oneself and obtain a detached, objective perspective. The logic of perception cannot be applied, and verisimilitude cannot be established. As a result, cognitive dissonance leads to the skepticism entrenched in looking for me. Yet we persist to peer and scrutinize. Despite much evidence to the contrary, we remain cautiously confident in the rational assembly of reasons and motivations, in the employment of sensible choices. In philosophy I found its most vigorous exercise; in psychoanalysis I found its hope.

The underlying commitment of psychoanalysis is the therapeutic promise. Asserting the ego’s ability to reason and analyze, Freud implicitly embraced Kant’s conception of freedom leading from Reason. The entire enterprise is thus based on notions of free will, in the face of psychic determination. Self-appraisal leads to personal liberation, not a final escape from one’s fate (as determined by personality and past experiences), but in strengthening the sense of understanding *who I am*. Accordingly, an unenlightened ego transmutes to an identity in which insight (with a corresponding self-identification) becomes a set point for therapeutic success.

Demurrals abound. Much of twentieth-century criticism, as well as psychoanalytic tenets, concerning freedom of choice belies this ambidextrous position. The exercise of rationality cannot escape the obscure, even hidden effects of social, existential, historical, and emotional factors that go into play in any reasoned decision. Freud can hardly claim originality in building psychoanalytic theory on such unknowns, for the history of such skepticism dates to early

modernity itself. Hume, long preceding Freud, argued that ethics are grounded in human need, emotion, and caprice that are rationalized into moral justifications. His insight highlighted reason's heterodox variations—not everyone has to reason in the same way—and consequently individuals might arrive at divergent choices, each of which may be reasonable within their own frame of reference. Arguments based on austere logic did not necessarily coincide with a rationality framed by social contingencies and diverse values. In other words, something more than reason is “rational.” And such flexibility leads to relativism and the undermining of the entire Enlightenment edifice.

Yet psychoanalysis is founded on rational insight and an implicit self-responsibility that asserts moral authority. The therapeutic potential of self-appraisal does not lead to a final escape from one's fate (as determined by personality and past experiences), but in strengthening the sense of understanding *who I am*. And from that position moral agency is re-defined.

Note, a paradox lies at the base of the entire enterprise: we are determined by unconscious psychic dynamics and yet we are free to make ethical decisions as best we can.<sup>16</sup> Those decisions are based on Reason, just as Kant professed, but unlike Kant, Freud recognized the weakness of rationality; how rationalization may work as a defense mechanism; how illusion nurtures fantasy; how denial obscures psychic realities, and so on. On this view, Freud's signal accomplishment has been to present psychic reality in terms of chastened rational pretensions.

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16 Knowing the resistance to admitting the loss of freedom, Freud repeatedly admonished any resistance to accepting the reality of psychic determinism, a claim that lay at the very foundations of psychoanalysis: “You nourish the illusion of there being such a thing as psychical freedom, and you will not give it up. I am sorry to say I disagree with you categorically over this” (Freud 2017, 49). Freud's conviction is based on his own philosophy of nature and the science grounded in the causation he thought exhibited in nature. Freud's psychic dynamics are modeled on an assumed simple mechanical physics. If that presumption is discarded, another metaphysics takes hold (discussed below). As he goes on to opine, “you nourish a deeply rooted faith in undetermined psychical events and in free will, but that is quite *unscientific* and must yield to the demand of a *determinism* whose rule extends over mental life. I beg you to respect it as a fact. . . . I am not opposing one faith with another. It can be *proved* (Freud 1917, 106; emphasis added). For Freud, ethical choices are dictated by an unconscious “superego” and moreover, whatever rational insight we might discern is, in the end, determined by still unidentified motivations that likely serve as elaborate rationalizations. Accordingly, he leaves the analysis with the Delphic imperative, “Know thyself!” but still shackled. Freedom resides in the self-knowledge obtained through psychoanalysis and, much like Spinoza before him, such insight is all the freedom one might enjoy.

Freud, despite acknowledging the absence of a given moral scaffolding and the precarious status of the rational ego, still endorsed the exercise of reason as the sole resource for rescuing the future from human self-destructiveness.

The voice of the intellect is a soft one, but it does not rest till it has gained a hearing. Finally, after a countless succession of rebuffs, it succeeds. This is one of the few points on which one may be optimistic about the future of mankind, but it is in itself a point of no small importance. And from it one can derive yet other hopes. (Freud 1927, 53)

How to understand this key proclamation? First, Freud drew from the resources developed as a scientist to put such faith in reason. Science—even the most constructivist understanding of its enterprise—affirms the irreducibility of the rational subject. Freud’s conception of freedom, of self-knowing, is affirmed precisely by the objectivity marking science’s success. So even when self-understanding is recognized as only a faint echo of a scientific standard of knowledge, we at least have a model of a reliable rationality. Whatever its demerits, when applied to the moral or subjective, reason still offers a wedge to break the hold of the a-rational components of the mind and to counter the anarchic skepticism unleashed by Freud’s own insights.

Second, Freud *must* assert hope in rational analysis to fulfill an ethical imperative. Reason cannot be relinquished despite its tenuous standing, for otherwise we abdicate *any* attempt to fulfill the human mandate—not to face Being, but to do right. Accordingly, self-appraisals constitute the beginning of moral behavior in the process that ends with choices and responsibility assumed for those decisions. To the extent one deliberates, the exercise of self-reflection, limited and inescapably biased, comprises the wellspring from which the “right” is determined. And here we find Freud’s deepest lesson about a Western credo: one continues to struggle against one’s Oedipal fate—not necessarily the primal family drama, but rather to answer *who am I?* Psychoanalysis thus taps into a foundational notion of personal identity that still has a powerful hold on identity politics.

And third, Freud recognized that the pivotal cathartic moment in psychoanalysis is the emotional recognition of trauma and its catharsis. Arriving to that point and finding a resolution thereafter requires a melding of feeling and understanding. Thus Reason alone, conceived as an austere logical exercise, is insufficient. Another model has taken hold in which the subjective (broadly conceived) partakes in the analysis. On this view, while logic rules

as an ideal, within the human psyche, the Kantian paradigm has been supplemented by recent descriptions of “emotional intelligence.” Accordingly, no strict line separates the emotional domain from reasoning. Indeed, emotions provide cognitive appraisals or value judgments that contribute to human reasoning (Matthews, Zeidner, and Roberts, 2002). This cognitive theory of emotions has been most aptly applied to moral philosophy and has made strong claims:<sup>17</sup>

Emotions are not just the fuel that powers the psychological mechanism of a reasoning creature, they are parts, highly complex and messy parts, of this creature’s reasoning itself ... [A position based on] three salient ideas: the idea of a *cognitive appraisal* or *evaluation*; the idea of *one’s own flourishing* or *one’s important goals and projects*; and the idea of *salience of external objects as elements in one’s own scheme of goals*. (Nussbaum 2001, 3–4)

On this general view, the analytical partners with the ever-present subjective.

Even with this expanded notion of intelligence, self-knowledge cannot be fully realized. Falling between the assurances of the rationalists (who provide no Archimedean point to appraise oneself and thereby obtain a detached, objective perspective) and the postmodernists’ dismissal of the rational conceit, the *I* ceaselessly recedes. Its pursuit can only result in Sisyphean labor, a quest that seeks understanding embedded in a skepticism that allows no rest. However, the authenticity of self-assessment may not be the critical question, for the issue-at-hand is the examination itself. I cite Sartre, for whom the question of *Who am I?* is not a psychological project as much as an ontological determination: Where do *I* stand in the universe of possibilities? That question in turn rests within the context of a dynamic and open-ended relation to human being (conceived both socially and existentially). The subject’s freedom then resides solely in recognizing her state of being and either heroically or despondently, facing her fate. Nihilism is then fully engaged, not in its finalizing destructive configuration, but rather as the positive force that Nietzsche celebrates as the release of the Will of Power.<sup>18</sup> And as one faces the chasm of nihil-

17 The literature on this topic is immense. See Solomon 1993; 2004; 2007; de Sousa 1997; Blackburn 1998; Nussbaum 2001; Goldie 2000; 2010; Prinz 2007; Ben Ze’ev 2000.

18 Nietzsche used both active and passive forms of nihilism, reflecting either an increased or reduced “power of spirit” (Nietzsche 1967, 17). A “divine way of thinking,” (ibid., 15) denies God, but arises from “a reverence for the Self, a love of this life, and a desire to be creative” (Thiele 1990, 88). Nietzsche employed *nihilism* with these double meanings in different

ism a stark choice looms: Seek meaning grounded in a search of one's own or turn away and march with the multitude. I cannot help but smile in recalling those first encounters with Nietzsche and Thoreau, who beckoned me forward.

In conclusion, Freudianism is best understood as a moral venture: ethics requires free will and freedom consists of self-knowledge, albeit flawed, incomplete, and confused by unconscious desire. Thus, beyond the therapeutic rationale, an underlying moral program is at work in which accountability is embedded in self-analysis and self-evaluation. Simply, psychoanalysis provides a procedure for making personal responsibility constitutive to agency. On this view, the search for identity is itself a moral procedure where the self-interrogation itself becomes the *who I am*.

Here we find the heart of Freud's humanist conception of human potential and the full ethical dimension of psychoanalysis, in which the evolution from patient to liberated soul constitutes both a psychological project and an ethical venture. But I hasten to add, the Freudian construct is only one way of understanding motivations and the effects of memory, and the cardinal point is not the particularities of one method or another, but to recognize that the general exercise of reconstructing one's personal past is constitutive to identity. On this view, the effort of thawing a "frozen" past to its dynamic "unfrozen" state is, as Iris Murdoch put it, "*a constant responsibility*," because with the exercise of re-enactment, the *I* is ethically reconstructed (Hagberg 2008, 203, citing Conradi 2001, 274).

On this view, Freud emerges as a social philosopher, a cautious utopian thinker who grudgingly (and inconsistently) opts for human freedom or choice, which, despite the force of post-humanist criticism and the shredding of psychoanalysis's scientific pretensions, sits at the core of his vision, one from which we continue to develop (Tauber 2012c; 2013e).<sup>19</sup> Accordingly, while the voice of reason is subdued, it remains all that humans possess to maintain their moral prerogative.

I am still aligned with Freud's reliance on fallible reason despite the obvious effects of biased judgment and rationalized emotion. I take note of the failure to establish a science of the mind based on psychoanalysis, for I cannot dismiss

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contexts. In general, I have used the term in the pejorative (i.e., passive) sense, although here, nihilism fits into a heightened sense of self-reliance and consequently carries its positive connotation.

19 Note, Freudianism joins the same general promise of rationality that undergirds all modern political philosophies from classical liberalism to the totalitarian and all in between (Berlin 1958, 144).

the profound philosophical error of his efforts at introspection (Tauber 2013a). However, these objections do not gainsay his signal accomplishment. For me, Freud's view of *das Ich* is not about the scientific basis of psychoanalysis, nor its therapeutic efficacy, but rather the powerful implications of redefining agency in new terms of uncertainty and the self-consciousness that undergirds behaviors essentially defrocked of rational pretensions. Discrediting Freud's clinical claims and fully acknowledging the deep philosophical flaws of psychoanalytic theory are matters settled long ago. However, he nevertheless holds the preeminent title of authoring contemporary notions of identity, namely, the skepticism of self-knowledge and its conceits. He also rightfully claims the title, Last Defender of Reason (humbled perhaps), who, as a moralist, insisted on the exercise of self-analysis and self-correction. Irrespective of the success of achieving some idealized psychic balance, the exercise itself became the focus of my own interest. Freud had followed an ancient precept: the Oedipal struggle of understanding one's fate in terms of one's identity, specifically, "character is man's fate" (Heraclitus, fragment 119). I take "character" to encompass identity in moral terms, the ways in which one functions in society, and how one assumes responsibility and exercises it.

Admitting the ego's postmodern dismissal, I found Freud's staunch adherence to modernist precepts salutary. I endorse his attempt to renew the humanist project and despite the powerful critiques levelled against him, I consider his moral effort to assert personal responsibility an enduring contribution. As for the truth claims he made, well, that is another story.<sup>20</sup> Simply, I admired the moral message and rejected the posited psychic mechanisms. At what seemed to me the point of no return, I rejoined Freud's own retort to a pervasive pessimism, namely, we have no choice but to employ a rationality whose weaknesses have been revealed in full embarrassment. This position leaves me straddling the modern/postmodern line.

#### A NOTE ON METAPHYSICS

The underlying metaphysics guiding Freud's thought is vividly displayed on the certain-uncertain axis framing our discussion of agency. He modeled psychic force fields on linear Newtonian mechanics governed by push-pull dynamics. Such determinism disallowed freedom of choice, whatever apparent

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20 I referred to this truncated understanding as "Freud without Oedipus," namely, Freudianism without the clinical explanations and psychic structures he proposed (Tauber 2013d).

self-awareness and introspection suggested. Like Hume before him, morality rested in a sea of emotivism inured from rational control. James held a radically different philosophy of science, wherein he rejected the idea of necessity. Instead, he embraced chance as the underlying metaphysics that governed nature. Whereas Freud lacked a rationale for the freedom of choice, James, committed to a different metaphysics, found such freedom in the uncertainty bestowed by chance.

James was a member of a group of thinkers at Harvard in the 1870s, who assembled to informally discuss philosophy. Led by Chauncey Wright, they called themselves “The Metaphysical Club,” which included the luminaries that would eventually be regarded as the early authors of pragmatism (besides Wright and James, Charles Peirce, and Oliver Wendell Holmes, Jr.) (Weiner 1949; Madden 1963; Menand 2001). They drew two startling conclusions: First, science and the facts derived from its workings are the currency of reality; how those facts are gathered and placed into models and theories is the result of drawing lines of causation that fell well beyond simple linearity with consequences already discussed. Moreover, also drawing from Hume, they rejected the idea of necessity and embraced chance as the underlying metaphysics that governed nature. For them, *chance* was another word for *freedom*—freedom of will, freedom of choice. While “chance begets order,” that order, as exemplified by statistical mechanics of gases, is a depiction of the disorder and the chance interactions of myriad particles (Peirce 1992, 358). In the spirit of Emersonian self-reliance and the guiding American assertion of manifest destiny (personal and national), James developed the notion of chance—as opposed to determinism—as the conduit to his central dogma, the “will to believe.”

In one direction, the will points to the spiritual and all that lies outside scientific investigation, and, in another tack, the will refers to the freedom of choice required for assuming responsibility that grounds moral agency. As James declared in the self-willed escape from a debilitating depression, “My first act of free will shall be to believe in free will.”<sup>21</sup> This was a leap of faith (or in another parlance, acceptance) that found its basis in the rejection of a deterministic universe, and thus “rather than see doubt and uncertainty as troublesome or negative, [James] recognizes that what we call freedom in human affairs rests on and grows out of what in physics is called chance—that is, not

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21 James’s quote is from a diary entry (April 30, 1870, cited by Richardson 2006, 120) and like every biographer of James I have read, Richardson highlights the influence of Charles Renouvier (1815–1903), who embraced Kant’s notions of autonomy and freedom. (See Richardson 2006 177; 247.)

determinism” (Richardson 2006, 177; see also 247). Thus, James asserted the capacity to create, and thereby assert the freedom of human action through self-reflection and rigorous scrutiny of one’s own desires.

On that view, uncertainty assumes a new meaning with a novel application. James moved chance from an epistemological characteristic to positing a means for a moral agenda. A sleight of hand, perhaps, but if one accepts, as I do, “ethics without ontology” (Putnam 2004) and thus a morality “incurably *aporetic*” (Bauman 1993, 11), fundamentally resistant to a restricted rational deliberation, then one must search beyond the deductive and the rational to claim moral agency.<sup>22</sup> In this sense, uncertainty is not only constitutive of ways in which nature is understood, but contingency becomes integral to one’s own sense of being.

With the loss of foundations in systems of thought heretofore believed grounded in presuppositions that had both logical and experimental support leaves irreducible “indeterminism...a pluralistic, restless universe, in which no single point of view can ever take in the whole scene” (James 1992, 589). James goes on to note that “a mind possessed of the love of unity at any cost” would find this state of affairs “inacceptable” (James 1992, 590). Indeed, post-modernity set in such instabilities has reframed commonly held notions of personal identity. The contrasting views of moral agency—driven by the competing metaphysics adopted by Freud and James, respectively—underlies that portrayal.

James’s counterview illustrates metaphysics at work. In this instance, how chance has taken up residency in the human soul by exercising notions of freedom that undercut Freud’s mechanical determinism. Not to be further drawn into this nest of issues, let us simply allow their respective positions to reside in the compatibility thesis.<sup>23</sup> As far as I am concerned, neither had the means to decide the issue one way or the other, nor do we. The free will-determinism debate is endless and seems to me irresolvable. Instead of arguing, I retreat to my Wittgensteinian corner and mutter, a pox on your metaphysical arguments. We proceed by assuming autonomous choice and acknowledging fallible rea-

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22 Putnam (2004) maintained that ethical judgments could not claim some overriding objectivity. The attempts to establish and defend objectivity as a foundation for ethics (or mathematics, for that matter) must fail and more, such justifications are extraneous to ethics (and mathematics) and thus misguided. He made his case oblique to the arguments of Foucault, Derrida, and Rorty, and instead endorsed Dewey’s pragmatism, namely, the understanding of ethics as the best justified position arising in the flux of historical contingencies.

23 Compatibilism is the third option of free will’s standing relative to causal determinism: yes, no, and compatible (McKenna and Coates 2021).

son by accepting the uncertainties undergirding each. And at some point, our analytics withdraw and life continues its indeterminate course. At best, we recognize and then accept the uncertainties embedded in understanding this state of our being.



# Conclusion

“If art is an image of the world seen through temperament, then philosophy may be called a temperament seen through its image of the world.”

Ludwig Lewisohn (1932, 331)

In our era, certainty has been defaulted and as a result truth, ethics, modes of knowledge have each undergone radical re-appraisal and transformation. The resulting guises of uncertainty have been considered here as the tug of war between different ways of knowing and their claims for legitimacy; the character of moral agency; the stakes at risk in the ascendancy of a postmodernism that challenges Enlightenment ideals of Truth; and, finally, the limits of philosophy, or more specifically, the limits of thought itself. The loss of foundations sits at the core of these perplexing predicaments of modern life, where limited self-knowledge governs one’s intellectual exercises and ethical commitments. Each of these faculties draws upon the subjective, and, more particularly, the emotional well-spring of the psyche. Efforts to subtract the affective denies its stubborn presence and subtle guidance. Plato famously argued the point in *The Symposium*.<sup>1</sup> There, the affective is placed as the original ‘motor’ of philosophical discourse. Love ascends the erotic ladder from passion to love of wisdom. Simply, philosophy is sublimated desire (Solomon 2004). My desire has been declared here. To share the excitement of exercising what has been called, “the philosopher’s desire” seems to me the abiding value of the Socratic enterprise (Egginton 2007). And the time for such reflection seems particularly auspicious, for we live in a time of great transitions, if not crisis.

*The Triumph of Uncertainty* has focused on the contemporary configuration of the problematic self, whose agency goes to the core of social and political life.

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<sup>1</sup> See Introduction, footnote 10.

Indeed, each of us has been subject to the cultural undercurrents that are changing Western identities, and these have wide ramifications. How one thinks of personhood determines criteria of personal responsibilities and obligations; standards of truth require understandings about self-knowledge and the application of objective ways of knowing. Self-reflection and emotional maturity depend on recognizing both the depths of self-knowledge and its limits. Conceptions of selfhood penetrate every aspect of human life, and if the parameters governing personhood are in question, the entire social edifice shakes with uncertainty. What else might one expect, given the metaphysical airs we breathe? Indeed, we do well to consider that

in every age the common interpretation of the world of things is controlled by some scheme of unchallenged and unsuspected presupposition; and the mind of any individual, however little he may think himself to be in sympathy with his contemporaries, is not an insulated compartment, but more like a pool in one continuous medium—the circumambient atmosphere of his place and time. (Cornford 1965, viii)

Cornford asserts, correctly I believe, that some underlying supposition is at work that determines our governing metaphysics by which we understand the world and ourselves within it. However, identifying that “medium,” composed of presuppositions closed to further analysis or revision, is hardly obvious (Collingwood 1940). The notions of personal identity and the metaphysics that define the universe in which we live are only faintly perceived, if discerned at all. While fish don’t know they are wet, humans comprehend to varying degrees that they are “swimming.” The challenge is to recognize the currents and depths of those waters and search for the coordinates to a safe harbor.

Cornford pondered such a metaphysics in the context of his study of Greek philosophy’s emergence from mythical thinking. We might well pose the same set of questions again in our own confusing milieu of transitions to whatever is coming next. Specifically, how do different kinds of thought—broadly understood as the subjective and the objective—find their rightful standing? How do the various perspectives offered by science and hermeneutics converge on understanding our very selves? What might one *know*? And those seemingly fundamental questions then point to an even deeper inquiry that orients a response to Cornford’s observation: What is the “circumambient atmosphere” of our own place and time as we experience it personally?

Tracking the transformation of idealizing epistemological certainty to accepting constitutive uncertainty has comprised much of my own journey through modern philosophy. Note, I came to my initial understanding from science, not philosophy. Beyond the insights obtained from revisiting the natural sciences, other trains of thought converged on appreciating the limits of knowledge and the psychological constraints on decision making and rationality more generally (Tauber 2013d). And when the net of issues is cast even wider, the cultural upheavals that generated distrust of major institutions and instigated changes in personal mores and social standards could only reenforce this underlying seismic shift in expectations about the surety of knowledge, writ large. Once those lessons derived from multiple sources were internalized, I could accept that the certainties I sought in normal life represented an innocent, misconceived desire. And here uncertainty appears in its distinctive post-modern garb, a particular costume of our cultural moment.

*The Triumph of Uncertainty* has reported how I changed my own attire in the context of sorting out different ways of knowing, both their conflict and their fragile coexistence. In juxtaposing the calls of the scientific and hermeneutical strategies by which the world is understood, I have endeavored to show their shared metaphysics of uncertainty. I must admit that the certainty/uncertainty division is much like how one might view the proverbial cup as either half full or half empty. Given my temperament, I am most interested in the vacant spaces. Others may justifiably view the matter with a more affirmative attitude. The issue is not one of right or wrong; there is no settlement at stake. The matter reflects a mindset, perhaps a carriage of feelings about oneself and the world in which one inhabits. No defense required. So, I close with admittedly highly personal reflections on the “the circumambient atmosphere” I have breathed (Cornford 1965, viii), the metaphysics of chance that begat the uncertainties described in this narrative.

Beyond being privileged to witness the deliberations at the center of philosophical debate about the character of science, I did find “answers” of a sort. Not the ones I originally conjectured, but responses both far more expansive and problematic than those expected. While I thought my goal was *Certainty*, I found myself, after unavoidable delays and unanticipated meanderings, at the Temple of *Uncertainty*. There I now reside with my fellow seekers. They comprise a provocative assembly and, fortunately, a most congenial lot! These include Ananke, the Greek goddess of necessity, and Tyche, the goddess of chance. Ananke is a primordial deity whose power over fate and circumstance was respected by mortals and the gods, themselves. As to Tyche, she presides

over fortune, good and bad, especially when cause is not evident. An interesting philosophical point then arises. For the ancients,

chance as Fortune is the entity that chooses when no one (no attributable human subject) does it. Human finality is replaced by a divine intention, even if the god is blind, or whimsical. Yet the preliminary philosophical definition should be kept free of any substantialization. Chance as an absence of finality cannot be an authority of choice; chance does not choose, because it does not exist as an agent. It is rather, in its purely conceptual form (Aristotle, Darwin, Cournot), the status of an event without finality or intentionality regarding on what it has an effect. Chance is not what chooses when nobody does, but the characteristic of an event that does not show a finality. Strictly speaking, there is no “chance” as a substantive referring to a thing. There are only effects or phenomena of chance. (Morizot 2012, 57)

These mythic personifications turn chance into an acting subject. According to anthropomorphic cognitive habits, to make something happen, someone or something must cause it. Chance thus becomes an agent that acts when no attributable subject does. So, just as the immune self serves to organize complex phenomena around a recognizable human construct, so too does Theodon, a newly contrived god who has recently appeared to personify reality and uncertainty.<sup>2</sup> Yes, perhaps we need a new deity to account for the unsettling of what we see but do not understand.

The vapors of uncertainty have escaped from ruptured foundations and swirl around the confounding predicaments of modern life. Not to be glib, postmodernism up-turned Descartes’s geometric (i.e., ordered) depiction of reality with an altogether different vision. Twentieth-century art shows us the seismic changes pictorially: abstraction distilled the real; space flattened; perspective became ambiguous; surrealism asserted the irrational; cubism fractured objects (and human subjects) into disparate parts; abstract expressionism (e.g., Jackson Pollock) created “happenings”—both chaotic and oddly ordered; and then “pop art” collapsed art itself into the ordinary, where “meaning” becomes radically individualized, if not trivialized. If the artist truly rep-

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2 Theodon appeared on the internet without attribution to ancient sources, but is cited as the fatherless child of Nyx (the embodiment of night), whose siblings include Nemesis (goddess of fortune and vengeance), Thanatos (death), and Apate (personification of deceit) (McKibban 2014).

resents the reality in which we live, then these various portrayals are not invented, but rather offer reflections (perhaps, refractions) of the world in which we live, but now stripped of modernist conceits, foremost the sanctity of Reason and a given Reality. We have insight about the cognitive web in which we now live, and we even have some comprehension as to why we are caught in its strands. However, disquiet reigns. We seek new articulations as we mumble a language that fails to fully describe our predicament. From whence will we behold clarity?

I pause. I swear that upon completing the last sentence, my computer froze and would not permit me to compose again until I shut it down and re-started. Apparently the ghost in the machine had sent me a message: "You seek clarity? Another form of certainty! You have been explicating for over 300 pages how knowledge originates with *irresolvable* uncertainty and how subjectivity, individualized and dynamic, yields to no order other than one's own negotiated settlement with the Real. Understanding and accepting the limits of the analytical is the issue at hand. It's always been an issue for you. So just say it as best you can and finish this treatise!"

I thought to retort with Walt Whitman's celebrated "Do I contradict myself?/Very well then I contradict myself,/(I am large, I contain multitudes)" (Whitman [1855] 1973b, 88). Instead, I merely whispered, "Okay." Yet, I hasten to add why I linger in the modernist camp. Let me offer an image to explain.

Imagine Rodin's dramatic sculpture, *The Thinker*, placed on a river raft. The boat has no bulwarks and is lurching about in rough waters. The lines holding the flimsy craft to shore were first loosened by philosophers and then some were completely untied by culture critics. If the Raft of Reason loses its moorings, *The Thinker* will inevitably fall into the waters. I know he sits firmly on *terra firma* at sites all over the world. Indeed, I myself have seen him in Paris, Zurich, Montreal, Venice, New York, Washington, Baltimore, San Francisco, Pasadena, and Buenos Aires. However, I can't shake the picture of him rocking on that raft. Already, the halyards from a make-shift mast holding him upright groan from the strains of the tossing vessel. I fear his time for rescue is growing shorter. I watch bewildered and alarmed. I wonder about our fate if, in fact, the raft is set loose and he tumbles over-board.

Perhaps the Enlightenment is but a blip on history's course. That cultural ideals have shifted is undeniable. The question I ponder is to what degree the pendulum will swing back from the arational pole to the more rational one. I ask what is the role of philosophy in righting the destabilized raft holding

Rodin's masterpiece? To what extent am I satisfied with the lessons learned during my travels across the intellectual landscape described here? At the very least, I note that Prudence has raised his hoary head. Yes, I have relinquished foundations and formal systems, but I still think *The Thinker* should be secured. In that sense, *clarity* illumines the way to a new equilibrium.

#### CODA

Although experienced with varying degrees of concern, few academics in the humanities have not contemplated their place in the titanic historical movements of science's ascendance and the humanities' retreat. Most lament the shift in values (and corresponding resources and rewards) that have demoted the importance of a liberal education and the place in which the "human condition" is seriously considered. Much of this cultural inflection has been laid at the door of the technological revolution, but I regard those developments as accompanying rather than causing the cultural shifts we are witnessing.

While we are amidst huge technological innovations that will have their own massive effects, a century ago, reality was transformed. We are still adjusting to those seismic changes. During that epoch, now stretching into our own, new languages arose (e.g., Kandinsky, Woolf, Joyce) and new pathways built in traditional landscapes: art (abstraction), music (Schoenberg), myth (Frazer), self-knowledge (Freud), religious existentialism (Dostoevsky), agency (Heidegger), analytical tools (Wittgenstein), and so on. And perhaps most singularly, physics—relativity and quantum mechanics—radically changed our very concepts of time, space, and causality.<sup>3</sup> I see this period as the hinge between a Before and After. Philosophy's inflection during this era became my focus of study when three domains—epistemological, moral, and existential—seemed to coalesce around how to understand uncertainty, whose metaphysics reach all the way down the Chain of Being. And I am not referring to only the quantum universe or the dynamics of complex biological systems, but most directly in terms of confidence in knowing *who I am*. After all, the metaphysics of uncertainty is felt no more intimately than in terms of personal identity and its inescapable shadow cast by the stranger within.

With the postmodern deconstruction of the self, notions of self-understanding have undergone a sea-change. Caught in those tides, I sought the intellectual answers that would serve to buoy me in the swirling currents. And

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<sup>3</sup> See chapter 6, footnote 13.

while my academic studies organized my explorations, I now recognize that the intellectual insights have not adequately carried the weight of my queries. And the reason seems evident now: *subjectivity* as such is not easily tackled by philosophy. I find this omission ironic, for the psychological, *qua* the subjective, has come to define Westerners' sense of self-identification.

On reflection, I should have read Jean-Jacques Rousseau at an early point in my studies. That oversight became apparent when I met one of his most insightful critics, Jean Starobinski, who would clarify the terms of the "Search for Me" (Starobinski 1988). Rousseau had described his acute self-consciousness and accompanying isolation as an existential condition. However, more directly, he fashioned himself out of step with the world he inhabited. Certainly, the notoriety surrounding his exploits confirmed his own originality, or some would say, idiosyncrasies. Rousseau's various social predicaments became a model for the sensitive romantic souls who followed, where an acute self-consciousness became a mode of being. And the hallmark of those self-reflections, seemingly based on a valorization of the personal and the unique, displayed the truth of one's own individuality.

Rousseau, Romanticism's godfather, asserted that authenticity of selfhood is fashioned by the very search of identity. The fundamental error committed by "self-discovery" was the presupposition that such a self exists as a *thing*. "Who am I?" may be answered by various social refractions, but that approach skirts the matter at hand, at least as posed by those who seek an introspective endpoint. To apply the method of objective investigation to subjectivity is a profound category error. Instead, as famously described by Kierkegaard, the self is that which reflects upon itself, what he called "a relation that relates itself to itself" (see chapter 14; Kierkegaard 1980, 13–14). As reiterated here in various contexts, one's personhood is an endless recursion; there is no entity, there is no core, no essence, there is no objectification of personal identity, there is only self-reflection—a self-consciousness that splits *me* into a subject inquiring about oneself (Tauber 2006d). Of course, since there is no *object* to be found, objectivity does not apply. Characterization of an entity with definition, boundaries, or any criteria applied to descriptions of a natural object simply does not apply to the self-examined *me*. Instead, a self-image is composed during the search and, according to Rousseau, that process is the ultimate creative act.<sup>4</sup>

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4 Although I have cited some of the psychoanalytical literature devoted to this crucial recognition in previous chapters, I have not fairly represented my indebtedness to Lacan here, whose

Both Heidegger and Wittgenstein placed the subject *in* the world. In that move, self-consciousness is eclipsed as an object of thought. After all, subjectivity cannot be *object-fied*.

For a postmodernist, a theory of subjectivity does not *describe* anything. It produces a version of subjectivity from elements available in the culture, projects it out into the world, and seeks to establish it through one or more of the legitimating discourses accepted by that culture, for example, science, religion or psychology.... Each culture then, and within each subculture, makes certain modes of subjectivity possible and renders others difficult to maintain or even invisible.... The meaning of experience is constituted in particular discursive frameworks, and each such framework has legitimizing and normative strategies for creating (and enforcing) effects such as “necessity,” “illusion,” “psychological health,” or “nature,” as well as “self,” “individual, and many others. Thus, any description we give of subjectivity is no more and no less a story than any other. (Fairfield 2002, 73)

I agree, albeit some stories are far better and others far worse, but the point is well-taken and a re-conformation of the modernist notions of personal identity follows:

1. In the culture of my youth, I “learned that to be was *to be* a cohesive self” (ibid., 94). Not only is the modernist singularity a limited description of agency, another fact belies any such conceit. *I* am a multiplicity of identities living in a multi-dimensional culture and situated in diverse values and configurations of others.
2. Seeking insight into *me*, my story, constantly shifting its focus and drawing different interpretations, in the end, is a narrative composed to fulfill needs of cohesion and minimizing conflict. Indeed, an “account of my subjectivity is itself an aspect of my subjectivity, [for] while I can never stand fully within myself, I can never stand fully outside myself either” (ibid., 93).
3. I claim psychic unity in the sense that I assume responsibility for my actions. This tenet adheres to a strict ethical understanding of the subject, in which *me* and *I*, to the extent that such designations are a something, must be construed as moral constructs.

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views philosophically echo Wittgenstein’s own thesis: “the subject is a position produced in language, not a signifier that refers to an actual mind of a person” (Benjamin 2000, 81). And, again, in this schema, “the I is an other” (Lacan 1954–1955, 7). For Lacan’s relation to Freud, see Tauber 2013a, chapter 5.

These modest guidelines place us far from the original Cartesian destination. But the fantasy of an attainable ideal, a theory that would account for the causal and inferential network of propositions that underlie knowledge, was a vain dream. Although Descartes sought a foundational epistemology, the introspective investigation failed to find such an underpinning. And with that outcome, the putative groundwork of certainty he built collapsed. With Cartesian conviction dismissed, much else fell aside as well, with ramifications stretching from epistemology to ethics. The corollaries of those postmodern disruptions have seeped into every crevice of our culture. Indeed, the consequences of our revised metaphysics are staggering.

Nevertheless (despite the accuracy of Kierkegaard's phenomenological description and the cogency of Wittgenstein's advocacy for perspicuity), the ego ("the thinking *thing*") remains ensconced in Western culture. It testifies to a hard-won battle against skepticism, for with the repository of the ego, Descartes established modernist philosophy with ramifications in every conceivable formulation of identity and agency. Herein lies the substratum of my own exploration—the crisis growing from the larger culture-wide confusion of how we conceive ourselves as persons in a period in which "all that is solid melts into air." Marx's famous quip is prescient well beyond its prognostications about capitalism, for he diagnosed the crisis of modernity itself (Berman 1982, 15). Upon this unsteady platform, my greater theme points to the consequences of lost foundations, none of which are more evident than in the sphere of the personal. It is there that the triumph of uncertainty most clearly finds expression.

Psychological uncertainty resonates with the culture of doubt so plainly expressed in literature and the visual arts over the past century. What we know, both about the external world and most immediately about ourselves, and how that understanding influences conceptions of the subject have radically shifted over a short period of time. We need not be Freudians to recognize the irrationality of much of how we live, the hidden prejudice of emotion, the bias conferred by experience, the seductions of ignorance where we assume knowledge. At the center of a destabilized understanding of agency, doubt-ridden legitimacy of the truth claims derived from self-inquiry has displaced the confidence of the self-knowing ego. Indeed, acknowledging how unconscious motivations and lost (repressed) memories conspire to make us strangers to ourselves bestows unrequited doubts about our very identities. our very identities.

The quest for *me* is truly the never-ending story. But rather than regarding that search perjoratively, a sign of immaturity or neurosis, I see the exploration as an ethical venture, for (as explained) such self-cognizance is the basis of

moral agency. And if that position is followed, we then must recognize that the uncertainties spawned by postmodernism is, above all else, an expression of a moral crisis. On this view, the clarity we seek is in response to the opacities constitutive to our very identities configured by an enveloping skepticism. On that note, I return to Nietzsche of my youth, who, as “the Physician to Culture” so clearly diagnosed our condition.

A long time ago, at about age 15, I discovered Nietzsche’s works at the back of a drug store in a swivel bookcase full of all kinds of titles. For some reason, I picked this short anthology, and although I had little understanding of what I read, a message of promise had been transmitted. My teenage soul, beset with confusions and torment, heard a voice that evoked hope and maybe even inspiration. And then, much later as I proceeded along the Philosophical Highway, I felt Nietzsche’s shadow hovering over my shoulder. I had not escaped his provocation; responses were demanded. My discovery began with the very first lines of his *The Will to Power*, “Nihilism stands at the door: whence comes this uncanniest of all guests?” (Nietzsche 1967, 7). He diagnosed nihilism as the sickness of the West and the imprint of his aphorisms provoked by that over-riding theme remains indelible and vital. His urgent and dire challenge seem as relevant to me now as when we first met. Although I admit trepidation in even approaching the question of nihilism, I see no escape. Such a guest, invited or not, is present and must be seated or ushered out. Whatever our fate in dealing with him, he cannot be ignored. His very presence demands a response. Indeed, if he is only a visitor, as I believe Nietzsche hoped, then he will pass if confronted.

The challenge is an ethical endeavor requiring a commitment to search for meaning boldly and creatively, whether aesthetic, spiritual, moral, or emotional. Yet, “talking about meaning and meaninglessness is one of the last taboos. The question of meaning makes us uncomfortable” (Ford 2007, xv). In the sense Dennis Ford is referring to meaning, one is hard-pressed to find serious consideration among contemporary philosophers. Certainly, meaning described in terms of personal significance is not easily defined, and at least in the context of my analytic explorations, meaning and reference refer exclusively to problems in philosophy of language. So, we must turn to poetry, aesthetics, ethics, and religion, areas of discourse that Wittgenstein called, “nonsense,” namely, topics placed well beyond philosophy’s borders. So, if philosophy fails to engage the sickness of nihilism, the pursuit must follow other pathways.

Following Dewey, one might regard the re-vamping of philosophy advocated by Wittgenstein and Rorty as another bifurcation of philosophy’s road (Dewey

1910, 19). One fork leads to continuing the trajectory as a critical pursuit, while another route (one also followed by Heidegger and Levinas under different guises) leads to a place where, at some point, one may contentedly leave analysis and arrive at “the end of philosophy” (Baynes, Bohman and McCarthy, 1987; Hutto 2006; Thomas-Fogiel 2011). Others designate that terminus, “peace” (Wittgenstein 1968, 52e). The respite resides in appreciating how philosophy has failed, although failure is not truly the correct category for assessing the pursuit that so absorbed me. After all, philosophy is about discerning how to live a good life and to the extent that the tradition informs, so much the better. No, the collapse is strictly an in-house affair, a peculiar kind of finale: The deflationary view shows that something other than critical thinking is required to address the questions most firmly embedded in the soul. They cannot find analytical ‘solutions.’

By temperament, I rest easily at this juncture, but that does not mean I have completed my inquiries. I know, better than anyone, the limits of my own understanding and the psychology that refracts it. Such circumspection only acknowledges the recurrent tension highlighted in this narrative between subjective and objective ways of knowing. So, I close with comments on temperament to explicitly declare (and celebrate!) the implicit psychology underwriting this essay. I am admitting to a widely shared sentiment among fellow travelers in the territories I have traversed:

[As] soon as there is a question of explanation, of interpretation, of appreciation, though the special method of the historian remains valuable, the personal element cannot be ruled out, that point of view which is determined by the circumstances of his time and by his own preconceptions. Every historical narrative is dependent upon explanation, interpretation, appreciation. In other words, we cannot see the past in a single, communicable picture except from a point of view, which implies a choice, a personal perspective. (Geyl 1968, 15)<sup>5</sup>

I had read this passage in college and filed the message away for later consideration. I appreciate Peter Geyl’s comment in ways I could not imagine more than 50 years ago. I now realize that the underlying philosophical attitudes that lie at the seat of my analyses appear again and again to guide my critical writings.

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5 This quote is from the Dutch historian, Peter Geyl, whose study of Napoleon’s standing showed a strong correlation between the historian’s view of Napoleon and the political context in which the work was composed.

Clearly, the question of immune selfhood drew my attention not only for its philosophical interest and the opportunity to contribute new scholarship, but as a problem framed by the issue of personal identity, an emotional affinity that pulled me to the topic. And as amply elaborated, the questions of identity were hardly contained by the scientific problem originally presented as I went well beyond immunology in my pursuits of the beguiling self. Here, at the crossroads of philosophy and psychology, the recurrent theme of temperament raises its shy head.

The boundaries separating philosophy and psychology are not only easily crossed, but they witness heavy traffic. Of course, philosophy is not psychology, but each approach should take account of the other. Their strict division ignores not only the empirical evidence that psychology and cognitive science provides philosophy (on rationality, motivation, unconscious processes, etc.), but denies the voice of character that is so instrumental in every respect of a philosopher's labor—the choice of the problem, the way it is developed, the conclusions drawn. William James got it just right: philosophy is an expression of what he called, “temperament.”

The history of philosophy is to a great extent that of a certain clash of human temperaments. . . . Of whatever temperament a professional philosopher is, he tries, when philosophizing, to sink the fact of his temperament. Temperament is no conventionally recognized reason, so he urges impersonal reasons only for his conclusions. Yet his temperament really gives him a stronger bias than any of his more strictly objective premises. . . . Yet in the forum he can make no claim, on the bare ground of his temperament, to superior discernment or authority. There arises thus a certain insincerity in our philosophic discussions: the potentest of all our premises is never mentioned. (James 1987b, 488–89)

James did not dismiss the logic, argument, or analytic interpretation of philosophical discourse, but rather he acknowledged that underlying the most sophisticated presentations, the expression of character whispers loudly. From a similar position, Nietzsche denigrated philosophical posturing where

what essentially happens is that [philosophers] take a conjecture, a whim, an ‘inspiration’ or, more typically, they take some fervent wish that they have sifted through and made properly abstract—and they defend it with rationalizations after the fact. They are all advocates who do not want to be

seen as such; for the most part, in fact, they are sly spokesmen for prejudices that they christen as “truths” ... (Nietzsche 2002, 8)

Nietzsche joined James in tracking the source of philosophical machinations to the philosopher’s underlying character:

I have gradually come to realize what every great philosophy so far has been: a confession of faith on the part of its author, and a type of involuntary and unself-conscious memoir; in short, that the moral (or immoral) intentions in every philosophy constitute the true living seed from which the whole plant has always grown. Actually, to explain how the strangest metaphysical claims of a philosopher really come about, it is always good (and wise) to begin by asking: what morality is it (is he—) getting at? Consequently, I do not believe that a “drive for knowledge” is the father of philosophy, but rather that another drive, here as elsewhere, used knowledge (and mis-knowledge!) merely as a tool.... [Th]ere is absolutely nothing impersonal about the philosopher; and in particular his morals bear decided and decisive witness to who he is—which means, in what order of rank the innermost drives of his nature stand with respect to each other. (ibid., 8–9)<sup>6</sup>

Some might say that with the introduction of the psychological, the bounds of philosophy are broken. I disagree. The “temperament” orientation only broadens our comprehension by showing how a question is approached and developed as the outcome of the underlying disposition of the philosopher. More, I reject the rigid separation of the subjective from the analytical that takes form and expression from the well of the personal. To separate ideas from their psychological origins is to miss much of the philosophy itself.<sup>7</sup> More than argument and analyticity, James and Nietzsche are embracing philosophy as a way of life. And in that comprehensive view, the psychology is implicitly initiating and directing the course of thought. Yet this interplay is not often explored. The reticence is easily explained: the topic falls in the cracks separating psychology

6 Despite this agreement, little else connected Nietzsche and James; the German reminded the American (“half the time”) “of the sick shrieking” of a “dying rat” (James 1987a, 42).

7 *The Romantic Conception of Life* (Richards 2001), a work that assiduously conjoins Romantic philosophers’ personal life and psychology to the philosophy they developed, is one of the best counterexamples to Thomas Nagel’s assertion that the work of a great philosopher “is extracted from a flawed and messy self so that it can float free, detached from the imperfect life that produced it” (Nagel 2001, 31). Ironically, the biography of Bertrand Russell that Nagel reviews is a fine case study of exactly the opposite judgment.

and philosophy. More, it violates the pride of analyticity. Philosophers like to think of themselves as driven by compelling argument, and yet motivations (pertaining to what is addressed) and emotion (the timbre or tilt of the argument) clearly impact their writings. In other words, as already noted throughout this essay, philosophy weakly addresses the subjective.

Perhaps official philosophy resists recognition of its dependence upon resources that it draws from the mind's affective life. Certain areas of philosophy systematically tend to eschew a number of difficult questions on the grounds that they are peripheral or not quite to the point; obtruding emotional issues, in fact, are usually 'described' as tangentially connected to truth claims, insufficiently clear, unfocused, inappropriately articulated, excessively controversial or sub-rational. According to Le Doeuff [Le Doeuff 1989], since the activity of separation and division is philosophically productive (as the proper 'field,' or Kantian island, is created by its exclusions), philosophy ultimately creates itself through what it represses... (Fiumara 2001, 5)<sup>8</sup>

The pursuit of knowledge is hardly a neutral pursuit. The tradition of Plato, Spinoza, Hume, and Nietzsche showed that the affects must be accounted in the philosophical calculus.

The affective effects on judgment are well-known, and one might well ask what the "fragility of pure reason" portends.<sup>9</sup> If an irreducible a-rationality lies at the core of Reason, then identifying the knowing subject's blind spot (undetected emotional effects) is critical for knowledge assessment. Indeed, if reason is not self-inclusive, then its claims, even within its own province, are undermined (Fiumara, 2001, 12). At base, the critique hinges on how to regard the philosophical enterprise. Following Rorty, traditionally philosophers have sought to "break out of the world of time, appearance, and idiosyncratic opinion into another world—into the world of enduring truth" (Rorty 1989b, 29). However, if a skeptical view of such efforts is adopted and one seeks a more inclusive understanding of rationality than what the customary logic of analytics can offer, then a more comprehensive formulation of Reason—one that factors the emotions and everyday experience—must be sought. The

8 For a more thorough critique of Kant's orientation, see Schott 1988.

9 For a sampling of the literature see relevant essays in Solomon 2004 and Johnson-Laird 2006, 72ff.

affective is inescapable, and with that claim I would repair the rift between the subjective and the objective by recognizing the continuum of different kinds of knowing. Certainly, as testified by this autobiography, emotional elements must be accounted to explain the origin, pursuit, and, finally, resolution of the philosophical questions posed here. On this general view, my engagement with philosophy is then simply my story told through multiple dimensions of my ‘me-ness.’

Introducing an account of temperament might well be construed more of a literary effort than analytic. Is that truly an indictment? The art of philosophy draws from many sources including the passions, and how the rational and emotional mix strikes me as integral to understanding a philosopher’s intent and multiple dimensions of his imagination. When I read Goethe, Kant, Schopenhauer, Kierkegaard, Nietzsche, and Wittgenstein with an ear attuned to their temperament, I hear their voices more clearly. Their ideas grow from the psyche, the inner temperament, so even in the skewed perspective of the first-person narrative, a more complex, multi-dimensional presentation of ideas emerges. Obviously, such a correspondence has limits, but engagement, at least for me, “goes all the way down,” for the source of philosophical inquiry originates from personal experience, particular circumstances, and the murky depths of the subjective.

Acknowledging the subjective as integral to philosophy’s analytics (e.g., Hume, James, Nietzsche, Johann Fichte) does not denigrate the logic, argument, or analytic interpretation of philosophical discourse, but rather admits that underlying the most sophisticated presentation, philosophy expresses the intimate voice of the philosopher. Emotional components derived from experience and organized by personality are inextricable from the philosophical questions asked and the answers found. Note, I have made little effort to formally discuss how philosophy and psychology relate to each other, but I am satisfied that *The Triumph of Uncertainty* illumines the “temperament thesis,” as a case study if you will, and in the process, provides a distinctive kind of philosophical exercise.<sup>10</sup> In sum, to separate ideas from their psychological origins is to miss much of philosophy itself. And I make a stronger claim: to identify temperament becomes a philosophical exercise, inasmuch as such inquiry is constitutive to the basic precept of philosophy as self-knowledge. This hardly can

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10 A case study is a tried and proven method drawn from my clinical experience. Such individual examples do not qualify as evidence in the sense a randomized trial does, but they are used as a provocation, a stimulus for inquiry and further study (Taavitsainen and Pahta 2000; Nissen and Wynn 2012; 2014).

be taken as a radical notion. After all, Socrates repeatedly exhorted his students with the divine Delphic command—*gnothi seauton*, “know thyself.” And so here I end my story.

If I were to picture the tale of my intellectual journey, it would follow the Chinese linear landscape tradition and depict an elderly man sitting on a wagon drawn by twin oxen. They slowly wind up a mountain trail with switchbacks and dips, and after a long trek, the wanderer rests at a spot where a magnificent panorama opens and new vistas summon. The path continues but its terminus remains shrouded in clouds.

This story of explorations, begun in childhood bafflement and renewed in adult dread, tells a pilgrim’s tale about confused identity, philosophical dispute about knowledge, and, finally, reflections on moral agency and self-knowing. The passionate sources have been exposed, and although philosophy is not often presented in a personal voice, for me the abstractions of the mind only find their rightful place in the depths of the soul. There, philosophy draws its vitality. I cannot claim being finished, for the matters described here inevitably remain open. So, the end of this romance is a bit premature, but I have directed enough time and effort to capturing the past. The future again beckons.

## Appendix—The Modernist Self

Famously, Descartes posited that God could not trick him about his own self-consciousness. With this general understanding, he initiated modern philosophy's attempt to establish epistemological foundations with the certainty of himself as "a thinking thing," a notion based on a rather simple deduction about the certainty of one's own self-awareness.<sup>1</sup> This certainty is, after all, the product of the commonsensical view that a self is "essentially a subject of experience ... of inner conscious presence. It's the kind of thing human beings have had in mind ... in talking of 'my inmost self,'" namely that thing which thinks and experiences (Strawson 2009, 9).

Reflexivity had appeared as a trope of understanding the subject during the early modern period, which is hardly surprisingly considering the preoccupation with optics, on the one hand, and cognitive introspection, on the other.

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1 The subject-object cognitive schema requires two metaphysical domains: *res extensa* (material in all its forms) and *res cogitans* (the mind). Man was the site of their exchange. Descartes' early critic, Pierre Gassendi (1592–1655) objected to the entire enterprise: "Even though you recognize that you think, you do not know of what nature you, who think, are.... [Like a blind man] on feeling heat and being told it proceeds from the sun, should think he has a clear and distinct idea of the sun, inasmuch as, if anyone ask him what the sun is, he can reply: "It is something that produces heat" ... [Y]ou have a clear and distinct idea of yourself? You say you are not extended [material]; but in so doing you say what you are not, not what you are. In order to have a clear and distinct idea, or, what is the same thing, a true and genuine idea of anything, is it not necessary to know the thing itself positively, and so to speak affirmatively, or does it suffice to know that it is not any other thing?" (Gassendi 1970, 197). Descartes' self-assurance that he *knew* that he thought is insufficient to make the jump that he has substantive knowledge of what that "thinking thing" is.

“Reflexive” as used to refer to “thought as bending back upon itself” first appears in the 1640s, when theologians, philosophers, and poets embarked on an introspective inquiry only to stop at some point to redirect consciousness into the world.<sup>2</sup> Indeed, reflection as perception of oneself or attention to what is in us organized the Cartesians. However, one almost forgotten Henry Jeanes (an obscure English minister, 1611–1662), appreciated the infinite regress encoded in reflexivity: “Then the mind in its reflexive workings can proceed *in infinitum*” (Jeanes 1656, 42). Such self-reflection fails to find a definable bedrock of the ego’s *is-ness* that can be held as some object. Commonly understood, we are selves in the world, and our actions, speech, and behaviors hang on a designated person. Yet the question remains, beneath the clothes of our behaviors, what holds all of these components of identity intact? In essence, self-reflection regards my self in the same way a third-party observer (whether through self-consciousness or another) sees *me*. This is the foundation upon which Descartes built his entire epistemology.

Locke extended Descartes’ construction for a full-fledge philosophy of the self as a neutral, rational, and independent “knowing agent.” That description in turn derived from an ideal of objectified science. Such a detached witness might study nature dispassionately and thereby obtain scientific truth. This atomistic (or core) self was part of early modern scientific theory, which held that objectivity required separation of the knowing agent from the world she inspected. Indeed, the Lockean observer assumes the power to view the world neutrally, and thereby distance the mind “from all the particular features which are objects of potential change” (Taylor 1989, 171). The first-person viewpoint that demanded disengagement, would ideally become a “view from nowhere”—neutral and universal, where no perspective was favored (Nagel 1986). Here is the origin of modern positivism, namely, the idealized objective knower. This newly conceived observer achieved a universal standing when extrapolated to the civil world as a political agent (the basis of citizen autonomy at the expense of monarchical authority) and soon became the ideal of individualized personhood in broader cultural and psychological respects.

Identity did not take on its current psychological connotations until Locke called into question the unity of the self in his magisterial, *Essay Concerning Human Understanding* (chapter 27, 1689). Selfhood had not been identified as

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2 At approximately the same time, “‘conscious’ as meaning ‘inwardly sensible or aware’ appears first in 1620, ‘consciousness’ or ‘the state of being conscious’ in 1678, and ‘self-consciousness’ or ‘consciousness of one’s thoughts, etc.’ in 1690. In German the equivalent terms are found in the same period. . . .” (Whyte 1978, 42–43).

a philosophical issue so long as the traditional Christian conception of the soul held sway, but it became a problem when Locke declared that human identity is ephemeral and based in fluctuating consciousness whose unification of successive states is held together only by an incomplete and imperfect memory. In other words, the self is not a *thing* as Descartes had asserted and, moreover, Locke failed to provide a means by which identity cohered beyond the continuity of memory. He made no attempt to offer a philosophical basis for the self as such.

Despite the elegance of Locke's construction, by the mid-eighteenth century, the cracks in the statue began to appear. Hume simply observed his own self-consciousness and noted that the self is but a "bundle ... of different perceptions," and because the fleeting perceptions of his consciousness could not coalesce around a self, he concluded, that "all the nice and subtle questions concerning personal identity can never possibly be decided ..." (Hume 1978, 262).<sup>3</sup> He thus dismissed the notion of a self "insofar as it is accessible through inner experience" that consists only of perceptions. In other words, he sought an epistemological basis for identifying the self and noted that because his self-consciousness was comprised of fleeting perceptions or thoughts, he "never can catch" *himself* "at any time without a perception, and never can observe any thing but the perception" (*ibid.*, 252).

And as he dismissed any such entity as the self, Hume also introduced the so-called "hard problem" of consciousness, the piecemeal aggregate of perceptions—fragmentary, often incoherent, frequently rationally disordered, and powerfully driven by the "passions." Notwithstanding Descartes's certainty of an ego as some basic organizing principle for me-ness, no one has satisfactorily offered a definition of what self-reflection *is*. How is a subjective mental state explained as arising from physical processes? What is the circuitry that provides self-reflection, I-ness, reasoning, etc.? Freud, the neurologist might have had confidence that a future "science of the mind" would bridge the so-called explanatory gap of the mind/body problem, but this promissory note cannot be assured of payment. There seems to be an irreconcilable difference of the first- and third-person perspectives: consciousness, the subjective experience of being, is inaccessible to objective studies. We can correlate physical

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3 Hume went on to write, "...and are to be regarded rather as grammatical than as philosophical difficulties" (*ibid.*). Beyond asserting that the self "has no clothes," i.e., no basis in fact, Hume laid the corner stone for Wittgenstein's later faulty grammar argument that became a central theme of twentieth century philosophy (see Tauber 2013a, chapter 7; for overview, see Thiel 2011).

traces of some conscious processes, but there is no translation of the physicality to the subjective experience. In other words, subjectivity cannot be reduced to physical terms, and the argument in philosophical circles is whether this is an ontological or epistemological problem. This issue in many respects has nagged modernity from its very origins, namely the basis for understanding selfhood in terms of self-consciousness. Simply, what is such experience and what function might it serve?

Kant gave up the quest altogether and contented himself with defining the conditions for knowing. He concurred with Hume that the self cannot be construed as an entity and further agreed that the sense of a unitary self is the inevitable consequence of the mind's structure. However, their respective interpretations differed. Hume thought the notion of selfhood is based on the activity of the imagination working on experiential material, while Kant argued that self-consciousness is a necessity of thought, a psychological construct that constitutes the necessary conditions for cognition:

Now no cognitions can occur in us, no connection and unity among them, without that unity of consciousness that precedes all data of the intuitions, and in relation to which all representation of objects is alone possible. This pure, original unchanging consciousness I will now name transcendental apperception. (Kant 1998, A 107, 232)<sup>4</sup>

Accordingly, the self is not an observable *thing*, but rather belongs to the *noumenal* domain—a something that is not part of the describable natural world. So beyond positing the requirements of an epistemological agent, Kant left in abeyance any other criteria for designating the ego's what-ness and was content with accounting for self-awareness as a necessary condition of thought itself. For Kant, "I think" does not lead to the Cartesian ego, to some object, or to a soul. It means simply, and exactly what it says: "I think" expresses "our consciousness of being engaged in a mental activity we take to be our own" (Longuenesse 2017, 1). No further claims are made, or, according to Kant, can be made.

There are three claims (or features) for this faculty: identity, unity, and self-consciousness (Paton 1951, 102–105). The subject must be identical through time, for without such identity, the ability to recall and maintain continuity would fail. The basis of unity refers to the requirement of an active subject to

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4 "Apperception" refers to a necessary condition of experience, i.e., the mental process by which an idea is assimilated to the body of previously derived ideas (see Pippin 1989, 19).

unify her experience. This ability in turn rests upon the third feature, that of self-consciousness, which refers to the capacity to reflect on its own unity and identity, a constitutive condition of experience. Thus, Kant argued for an active and self-aware consciousness. This construction fulfills Kant's epistemological requirements of a knowing self, but more, the ability to self-reflect is demanded for his understanding of human autonomy. This construction became the foundation of selfhood construed as a moral category: for Kant, to be moral requires reasoned autonomy. Note, *das Ich*, "the I," has shifted from an epistemological construct to a moral one. Simply, for Kant, the ego enterprise was architected to create an autonomous individual capable of exercising autonomous judgment.

In sum, instead of searching for a *something*, Kant posited the requirements of an epistemological agent, employed that schema for his ethical project, and left in abeyance any other criteria for designating the ego's what-ness. He narrowed the inquiry to an account of self-awareness as a condition of thought itself. However, this description is not an explanation. Philosophically elegant, on what basis might his postulated structure be tested? Or better, known to be true? He provided a cogent model for the "transcendental requirements" of a knowing agent, but more, the ability to self-reflect is demanded for his understanding of human autonomy, the true telos of his presentation, i.e., selfhood construed as a moral category. For Kant, to be moral requires reasoned autonomy, a mind functioning self-reflexively, rationally, and independently (Schneewind 1998).

Kant's successors during the Romantic period continued to wrestle with the problem of subjectivism, but one might fairly conclude by 1800 that the understanding of the self remained enigmatic. There is no stepping out of the self; no Archimedean point exists to appraise oneself and obtain a detached, rational perspective. Simply, we are radically contextualized and immersed within life. Accordingly, the self as such does not exist as an object or entity, but because of the very construction of agency built on the subject-object structure of our language, a knowing agent orders experience as a subject, as an ego. From that grammar, a self emerges. But once committed to that structure, a gap always exists between the subject (the epistemological agent) and the world. That is the defining characteristic of the modernist self irrespective of its various modifications. And this is the key point of the attacks launched by Hegel and later Romantics.



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