Conclusion: Re-sizing Worlds

Rabbit *or* duck, that is the question. The rabbit-duck conundrum is a clever nineteenth-century drawing of rabbit and duck merging into one.[1] There are rabbit persons, and there are duck persons. For Ludwig Wittgenstein the picture encapsulates the difference between "seeing is" perception and "seeing as" interpretation. If you see only the rabbit you say "I see this *is* a rabbit." After you have also seen the duck, you say "now I see this *as* a rabbit." Experimental results point to seasonal variations in perceptions. It is rabbits during Easter and ducks during hunting season. For Uriel Abulof this is a story about the relation between freedom and fact. Seeing only one, we can actively work to see the other, and subsequently choose which to see at any given point. But it may not be about choosing one perspective over the other, but rather about negating one of the two so that we do not have to choose.[2] Moving from rabbits and ducks to the risk-uncertainty conundrum, fortified by conventions amply provided by Newtonian humanism, students of world politics prefer negating uncertainty. But in the end, as I have argued throughout, choosing between rabbit *or* duck is making the wrong choice. It is rabbit *and* duck. Incessantly re-sizing worlds is our task.

And Tolstoy's. His *War and Peace* is a fable of follies, a condemnation of hubris, and a plea for humility. Tolstoy sketches memorable portraits: a hyper-active yet ultimately futile Napoleon as the fragile symbol of France's revolutionary army, and a torpid yet supremely sagacious Kutuzov as the authentic representative of Russia's inert peasantry.[3] For Napoleon, strategic genius determines the course of history; for Kutuzov, man's adaptability adjusts to history's flow.

In Tolstoy's account, Napoleon's genius is little more than an invention of the retrospective gaze of adoring historians who write about war as though humans could control it. Napoleon's victory at Austerlitz is a story

[1] Fierke 2022: 48, 220 uses the more recent face/vase image instead to discuss issues of race.
[2] Wikipedia. https://en.wikipedia.org/wiki/Rabbit%E2%80%93duck_illusion, accessed 01/23/25.
[3] Tolstoy 2008. Anderson 2011.

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of Russian incompetence, and in his pyrrhic victory at Borodino Napoleon "acted involuntarily and senselessly."[4] Napoleon's strategic decisions are not the result of his genius. Far from it.[5] The outcome of the war was determined "not by the will of Napoleon, but went on independently of him, by the will of the hundreds of thousands of people who took part in the common action. To Napoleon *it only seemed* that the whole thing happened by his will."[6] Tolstoy's Napoleon is a petty, confused man, accidentally thrust by history into a leading role. He "fulfilled his function of being the representative of power … of seeming to command."[7] But he was only a bit player on the stage of history.

In contrast to an impotent and petty Napoleon, the Russian commander Kutuzov is brilliant for one simple reason: he refuses to attempt to control the uncontrollable. Kutuzov is not credited for defeating Napoleon. Tolstoy writes that this "is the destiny, not of great men … but of those rare, always solitary men who, discerning the will of Providence, submit their personal will to it. The hatred and contempt of the crowd punish these men for their insight into the higher law."[8] Kutuzov's heroism consists of his "self-denial."[9] Rather than impose his will upon history, he is a temporizer who buys time with the motto "patience and time."[10]

His loss to Napoleon at Austerlitz was due to the hubris of Russia's Emperor Alexander I, who demanded a battle that Kutuzov was reluctant to fight. Kutuzov would otherwise have sagaciously refused battle, knowing the limitations of both his troops and his own capacity as commander to steer the outcome to his personal will. At the Battle of Borodino, and elsewhere, Kutuzov leads his army with a light touch. Rather than try to understand the battle as a strategic game, he attempts to understand the morale of his soldiers, knowing that they will determine the outcome: "He listened to the reports brought to him … but as he listened to the reports, it seemed that he was not interested in the meaning of the words being said to him, but that something else in the expression of the face, in the tone of the reporter's speech interested him."[11] Kutuzov does not attempt to impose his will on history. Instead, he attempts to understand his men and do what he can to channel them toward his preferred outcome and ultimate victory.

War and Peace is a great novel – and more. David Welch discusses it as precocious and inconclusive theorizing about international relations, unsurpassed in its description of the commotions and complexities of

[4] Tolstoy 2008: 754. [5] Tolstoy 2008: 782–83. [6] Tolstoy 2008: 785.
[7] Tolstoy 2008: 785. [8] Tolstoy 2008: 1084–85. [9] Tolstoy 2008: 1085.
[10] Tolstoy 2008: 1086. [11] Tolstoy 2008: 805.

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world politics.[12] Bruno Latour treats it as a rich introduction to an altogether different war, now waged in science and technology studies, over the right interpretation of the victory that another French genius, Louis Pasteur, won over microbes.[13] And Samuel Moyn interprets it through the lens of the three short stories Tolstoy wrote during the climactic battle of the Crimean War. They deepened Tolstoy's belief that making war more humane was merely a recipe for more war.[14] For me it is an allegory about the small world of risk and the large world of uncertainty. For Napoleon and his German understudy, General Pfuel, war is a strategic game played mind against mind. The factors that contribute to victory or loss are knowable and can be controlled. Outcomes are determined by the capacity to manipulate the context of the fight, by identifying the opponent's weaknesses and mitigating one's own. In contrast, Kutuzov does not seek to control the uncontrollable. Rather than impose his will on the battlefield, he seeks to discern a few patterns in the confusions created by momentary events and, if possible, link them a bit closer to his fleeting likings. In this he resembles Germany's Chancellor Otto von Bismark, who did not aspire "to control the current of events, only occasionally to deflect them."[15]

This concluding chapter recapitulates the main stories told in this book (section 1); it argues for the unity of knowledge in the natural sciences, the arts and humanities, and the hard and soft social sciences (section 2); discusses eclecticism and experimentalism as compelling intellectual responses to navigate the risk-uncertainty conundrum (section 3); illustrates different forms of coping with the risk-uncertainty conundrum with the help of punditry, scenarios, and forecasts (section 4); draws out the implications of the complementarity of risk and uncertainty for moral luck, policy, and pragmatism (section 5); and, returning to worldviews, points to the affinities that science and religion share in our coping with the risk-uncertainty conundrum (section 6). The book concludes as it began, with a brief message – from Winnie the Pooh.

1. Recapitulation

We need to extend the conventional understanding of the world of politics and world politics to deal with the domain of the uncertain and the risk-uncertainty conundrum. The opening chapters of this book set forth three worldviews that unobtrusively shape our theories and models. Traditional Newtonian humanism expresses our common

[12] Welch 2022: 175–89. [13] Latour 1988: 4–5. [14] Moyn 2021: 18–19.
[15] Davies 1996: 760.

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sense, dating back to the scientific revolution and the Enlightenment. Newtonianism seeks laws or law-like generalizations, sidelining the unpredictability of humans important to humanism. Post-Newtonianism and para-humanism offer alternatives that emerged with the scientific advances made in the twentieth century. They frankly acknowledge the importance of uncertainty. The three worldviews are not well-bounded, coherent wholes. Newtonianism and humanism are at loggerheads on foundational questions about knowledge. Post-Newtonianism contains Newtonianism as a practical but inaccurate view of the world. Para-humanism includes the human but goes around and beyond it. Internal tensions are common to each of the three. This provides the intellectual space necessary for different theories, models, and methods to flourish.

The opening chapters also focus on the factors that shape the risk-uncertainty conundrum. Theories and models conceptualize differently small risky worlds and large uncertain ones. Small worlds have homogeneous contexts, processes that are unchanging, and language use that mirrors the world. In large worlds contexts are heterogeneous, processes vary, and language use helps make the world. Elements of both small and large worlds create the complementarity of risk and uncertainty in a great many situations.

Conventional theories and models of world politics tell stories that are informed by statistical regularities or the assumption that humans are rational. Both routes end up focusing on small, risky worlds. Objective, frequentist statistics are based on the assumption that the world resembles a casino and can be captured accurately by Gaussian statistics with their normal, bell-shaped curves clustering tightly around the mean, and with thin tails. But world politics is not like a casino. It is better captured by power-law statistics with their highly abnormal curves, wide dispersion, and fat tails. Power-law statistics are rarely taught in American graduate seminars and rarely used in the analysis of world politics. Subjective, Bayesian approaches assume that over time processes of social interaction and information updating will lead actors to a shared understanding of the intellectual space in which they play their social games and share the model that explains how the world works. But differences in original beliefs or tacit knowledge, such as worldviews, prevent subjective beliefs from converging with information updating. The two conventional avenues for getting around the risk-uncertainty conundrum are thus closed off, illustrated by the recurrence of many nasty and pleasant surprises in world politics.

Using the world of finance as an example, Chapter 4 is a case study of the limits of theories informed by Newtonian humanism. Rational

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expectation theory evolved in the small world and came to dominate Wall Street with an ingenious simplification that reduced uncertainty to risk through the practice of affirmation founded on the belief that real estate values could move only upward. When experiments showed that people did not behave as this normative theory stipulated, the irrational choices they made were called "biased." Disconfirming evidence did not undermine the theory's attraction of bewitching parsimony and universal applicability. In 2008 various models based on rational expectation theory, which had informed Wall Street practices, proved to be disastrously wrong.

In finance, the large world of uncertainty is often navigated relying on social conventions which provide some help in probing an unfathomable future. Conventions are quicksilver social phenomena reflected in financial markets prone to bouts of euphoria and panic. Reference narratives express realistic rather than rational expectations of how to get by. Conventions spawned improvisations by smart investors, traders, and institutions that were reflected in the securitization and the Value-at-Risk movements. In the years before 2008 risk-management models and ever-widening processes of securitization – credit derivatives building from an underlying pool of collateral – became a powerful convention. It created new markets running into trillions of dollars, formed large asset bubbles, and generated large gains and eventually, after mortgage markets crashed, huge losses running in the hundreds of billions of dollars. Conventions can stabilize uncertainty contingently. But they cannot eliminate it. And they can lead us astray.

The hybrid world of risk and uncertainty exists as markets move from stable to stressed times, from statistical regularities to reflexive human practice creating volatility. The history of accounting charts how the value of risk varies depending on changing consensus, claims, and conflicts. Accounting is not only mechanical counting but also artful interpretation. Like language, contingent practices of calculation, far from passively representing economic reality, actively shape it. The intermingling of risk and uncertainty also marks Wall Street trading. The boundaries separating arbitrage (risk-free trading), hedges (risk-reducing trading), and speculation (risk-seeking trading) are always porous. The Black–Scholes option pricing model and the fair market value movement in accounting were two innovative and, in the end, failing practices that attempted to shift the context and human experience from uncertainty to risk. Even though they do not eliminate the problem of uncertainty, "fast and frugal" heuristics can provide practical coping mechanisms.

For better and for worse, so does the practice of central bankers talking to markets. For several decades before 2007–08, they relied on

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econometric allegories drawn from the theory of rational expectation to shape market expectations. It was the only language that had any credibility. In story-form, reigning finance theory was incorporated into markets as re-presenting rather than representing economic reality. Central bankers were the hub of a system of communication in which numerical expectations under conditions of uncertainty generated fictional rather than rational expectations. Alan Greenspan became the "Oracle of the Fed." He was exceptionally successful at nudging markets in the direction he thought best by deploying his seemingly infinite reserve of opaque prose. Discursive power, he showed, can move the world away from uncertainty and toward risk – for decades but not forever. Story-telling turned out to be an indispensable craft in the fast-paced, hard-headed world of finance.

Chapter 5 focused on the October 1962 Cuban missile crisis, applying both Newtonian humanism and post-Newtonian worldviews. The fit is natural. Quantum physics, after all, ushered in the nuclear era that has affected profoundly both the conduct and the study of world politics. As in finance, the risk-uncertainty conundrum was all too evident as the world hurtled toward nuclear catastrophe. Different models of the missile crisis reflect the small world of risk. The rational actor model focuses on states and their leaders. World politics is a stage and we, as observers, watch and analyze the performances of President Kennedy and First Secretary Khrushchev as well as their advisors. Their rationality and the accuracy of the information on which they acted shaped the outcome of the crisis. Hawks, rational deterrence theory, and the bargaining model of war analyze the crisis in terms of risk. The organizational process and governmental politics models highlight, in addition, the importance of uncertainty introduced by the dispersal of agency that makes human control over events less calculable. Like the rational actor model, the governmental politics model puts human actors at the center of analysis. The organizational process model emphasizes instead routines of relations among collectivities of actors. Both reflect their Newtonian humanist foundation and acknowledge some elements of the risk-uncertainty conundrum. As they confronted that conundrum, in several instances Russians and Americans relied on improvisation and innovation.

More recent analyses are informed by approaches developed in the field of science, technology, and society (STS) that are grounded in post-Newtonianism and foreground uncertainty. They incorporate explicitly technical objects, assemblages, and human beings in a profoundly relational analysis. When relations misfire human choice can matter hugely. Dispersed agency and relational networks of people and objects create innovative practices. This approach diminishes, perhaps implausibly, the

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role of the President from quarterback to mascot. Without denying the stabilizing effects of deterrence, these approaches point to many unforeseeable and unforeseen events that threaten to plunge rational decision makers into inadvertent war. More generally, few outcomes in the development of nuclear weapons were calculable or predetermined. Many were generated by entangling processes, as shown in different studies of US weapons modernization programs, the development of India's nuclear bomb, the importance accorded to nuclear blast effects and the neglect of mass fire effects, and the political creation of the "nuclearity" of African uranium mines. These studies highlight how deeply entangled assemblages of objects and relations among people operating across different scales generate the risk-uncertainty conundrum.

Language can mirror or make worlds. The crisis of October 1962 was told and understood differently by different actors. In Washington and Moscow it was understood as a thin slice of history, a brief crisis luckily resolved peacefully. In Havana it was one episode of a long history of American hostility seeking regime change in Cuba. These differences in understanding contradict linguistic compression, reject the Newtonian device of radical simplification, and deny the importance of the ambiguities of language. More broadly, the October crisis underlines the importance of language in the discursive construction of the national interest. It was not the missiles as material objects but the meaning attached to them that created the crisis. In Washington the crisis was perceived as an offensive and secretive move by a Soviet Union intent on introducing nuclear weapons into an American sphere of influence. In Moscow the crisis was seen as a defensive move to consolidate peace in the Caribbean by preventing the US from waging war against a Soviet ally. Furthermore, in the interest of stabilizing the deterrence system psychologically, it was a move to reduce slightly US nuclear superiority, which was so large as to make a decapitating first strike on the Soviet Union a credible American option. Finally, technostrategic talk about the effects of nuclear war neuters weapons of their enormous destructive potential. It creates the impression of humanity as firmly in control. The possibilities that inhere in large world uncertainty are thus silenced and the complementarity of risk and uncertainty is denied. Language becomes a tool to think about the unthinkable in antiseptic terms rather than describing what the unthinkable would look like on the ground. It re-presents a small world of controllable risks rather than representing a large world of unfathomable uncertainties.

With reference to humanity's natural environment and global warming and its symbolic environment and AI, Chapter 6 discusses theoretical approaches that are shaped by para-humanism. The chapter raises a host

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of issues involving the conundrum of risk and uncertainty. In the era of industrialization powered by fossil fuel, human mastery of nature and a supposedly passive earth have altered the material conditions of life by creating global warming. For those informed by para-humanism and thinking in geological time scales human activation of the earth's dormant forces has created unfathomable uncertainties that are inseparable from current risk assessments. Humans have also left a deep imprint on their virtual ecosphere. For para-humanism the material and symbolic are closely linked. Mass application of new technologies in the second half of the twentieth century has set the stage for a new phase of human history. Specifically, AI promises to change the virtual world with as-yet unknown and unknowable effects. From the perspective of para-humanism the impacts of technology on the natural and symbolic ecospheres are deeply entangled. In their politics they are both marked by the risk-uncertainty conundrum.

Conceiving of the earth as knowable ecosystems, as does Earth System Science (ESS), points to small worlds of calculable risk. ESS shares with Large Language Models (LLMs) a small world, risk-based view offering practical mitigation strategies. These models and the mathematical or verbal language in which they are cast "represent" the world. Resembling the economic models discussed in Chapter 4, they offer improvisational technologies, such as geothermal and marine engineering, that experiment with different forms of carbon capture. Developed worldwide at an accelerating rate, to date these technologies have not yet been adopted on a wide scale because of their scientific, economic, and political uncertainties. The political economy of the transition away from fossil fuel illustrates the improvisational politics of reform-mongering and concrete problem solving.

An expansive para-humanist worldview makes it possible to articulate theoretical approaches that grapple with large world uncertainties. The concept of the Anthropocene captures a novel condition and new uncertainties in geological time. Inconclusive debates about how to name the current geological era are conducted in a register strikingly different from the discussion of ESS and different mitigation strategies. Humans as a self-conscious species, operating at planetary scale and in geological time, have "intra-vened" in creating impactful processes. With unknown and unknowable effects these processes are transforming the material and symbolic ecosystem on which humans depend and which they shape. Machines becoming part of nature, by being taken to be natural, is no longer a far-fetched idea. In plain sight, it is happening now.

The insertion of technology into humanity's future currently plays out in the domain of language, perhaps the most basic cultural technology

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humans share. LLMs are generating new kinds of uncertainties as they link humans to non-human objects. And as they are beginning to speak of "an AI" rather than "AI," it is humans who appear to be ready to ascribe algorithms and machines with human qualities. Developed during the last half a century, AI technology opens up the possibility of Artificial General Intelligence (AGI). It may evolve beyond LLMs into the creation of a conscious "other," a profoundly innovative and radical turn in human practice. AI could lead to large-scale catastrophes threatening the survival of the species. And it could lead to a quantum jump in knowledge that might produce viable approaches to reduce global warming. We simply do not know. Recklessly or cautiously, blindfolded we move on, seeking to master the symbolic and virtual world in the future as we mastered the natural one in the past.

Finally, Chapter 7 deals with power and returns to Newtonian humanism and the complementarity of risk and uncertainty. Drawing on Hobbes's Leviathan, the conventional understanding of power is Newtonian. Power is an instrument of control shaping risks. A post-Newtonian and para-humanist concept of power makes us think of the potentialities and uncertainties of protean power. Like risk and uncertainty both kinds of power are tethered together, tightly. Humans act intentionally, but the outcomes of their actions are often unforeseen and unforeseeable. In the large world of uncertainty power potentialities circulate and are perpetually reconfigured. The politics of the past and the politics of the future move in this vast space of potentiality as it interacts with the fleeting and undefinable moment of Now in which humans make their political choices and wield and engage with different kinds of power. Unable to solve the risk-uncertainty conundrum, they follow different practices that act back on political contexts, human experiences, and control and protean power.

2. Arts and Sciences: The Unity of Knowledge

Even though the faculty of a modern university operates in different silos, for good reasons Deans and Presidents ritualistically invoke the unity of Arts and Science during graduation ceremonies. For mathematician David Hilbert humans are a knowledge-seeking, knowledge-creating species: "we must know, we will know."[16] With the distance between lab, study, and studio shrinking, evolutionary biologist E. O. Wilson proposes consilience or unity as the best way of overcoming the division between the different branches of knowledge.[17] He repeats for our times the

[16] Quoted in Wilson 1998: 48. [17] Wilson 1998, 2014.

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optimistic belief of the Enlightenment in a unified corpus of knowledge. Unity is not the result of knowledge fields "jumping together," the original Latin meaning of the word "consilience." Instead, the prospect of unity is the result of vibrant stories that Wilson extends from the natural sciences to the arts, the humanities, and the social sciences.[18] Drawing on his encyclopedic knowledge, he grounds his argument in hard-wired epigenetic rules and the co-evolution of biology and culture. Tracking complex relations, Wilson is not pleading a case for simple, genetic determinism. But order rules the world.[19] And that requires establishing the conceptual unity of all fields of knowledge through synthesis and integration.[20] Francis Bacon is Wilson's lodestar.[21] Bacon's understanding of science was broad and extended beyond the natural sciences. Repeated testing by experiment was for him the cutting edge of all knowledge. To experiment meant for Bacon more than today's conventional understanding of the controlled manipulation of different conditions to draw causal inferences. It covered all human experimentation to bring about change in a world that was like science: open-ended and evolving.[22]

I share with Wilson the belief in the unity of knowledge.[23] I reject, however, the argument that the natural sciences are the tip of the spear of consilience. Are the gaps between the different branches of knowledge too wide to be bridged?[24] Based on their astounding accomplishments over the past four centuries, Wilson wagers that the natural sciences provide the best model for universal consilience. For him, history tells only one story: "from severe philosophical doubt to increasing scientific, realistic, repeatable, and transparent reality."[25] The truth of the fundamental unity of knowledge may not yet be clear, but it will reveal itself in due time. Although Wilson seems to doubt his own arguments at times, this makes natural scientists the "conquistadors out to melt the Inca gold" that unifies human knowledge.[26] By Wilson's own logic and evidence, as I will show at the end of this section, consilience exists in plural knowledge claims made in unending conversations carried out in different, translatable languages. Unity is an unending quest, not a result. A never-ending stream of stories shows that it is "turtles," "stones," or whatever "all the way down."

[18] Wilson 1998: 9. [19] Wilson 1998: 8, 14, 29, 44.
[20] Wilson 1998: 13, 58–60, 228, 230. [21] Wilson 1998: 27–28.
[22] I discuss experiments and experimentation at greater length in Chapter 3.
[23] Wilson 1998: 257–59.
[24] On this point I am deeply indebted to clarifying conversations with Stefano Guzzini.
[25] Wilson 2014: 53–54. [26] Wilson 1998: 230.

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Wilson's vision of the conceptual unity of all branches of knowledge enjoys a long lineage that predates Bacon. For the Greeks music and astronomy were two sides of the same coin. Astronomy was the study of relationships among observable, permanent, external objects while music was dealing with invisible, evanescent, internal relationships. Art is not entertainment as in the pages of the *New York Times*. It cuts as deep as science and philosophy and perhaps deeper. In joy and grief singing is a universal practice of making sense of life.[27] In William Egginton's captivating book examining the nature of reality in philosophy, physics, and literature through the works of Kant, Heisenberg, and Borges, this is the central point. All images of the world are fundamentally flawed because the flaws are inseparable from philosophical, scientific, and artistic knowledge itself. The different kinds of knowledge gained enable us to peer into the dark while at the same time draping "a new veil over our enlightened eyes."[28]

It is easy to forget that the tensions and contradictions that inhere in Newtonian humanism have varied over time. And so has the distance between different branches of the sciences and the humanities. For example, Leonardo da Vinci was a "Renaissance man" in the original sense of that term. He was an artistic and a scientific genius. Leaving aside his artistic genius, his scientific brilliance is less appreciated. Leonardo's ingenious experiments calculated the gravitational constant to an accuracy within 10 percent of the modern value – without the mathematical tools and measurement instruments available to Galileo and Newton.[29] Da Vinci is a perfect personification of the unity of "Arts and Science." Both are concerned with the experience of the mysterious, the beauty of meaning making, the continual reorganization of our conceptual space and of seeing the world anew.[30]

After around the year 1500 the main objectives of knowledge – the true, the good, and the beautiful – evolved gradually into different domains which we label today as the natural sciences and the humanities. The nineteenth century brought a further compartmentalization of scientific disciplines as the humanities rallied and made a countermove against the expansive claims of the natural sciences.[31] Excluded from this two-fold division, the social sciences came into their own a little later in the nineteenth century and replicate within themselves the split between the natural sciences and the humanities. Some disciplines (economics, sociology, and political science) followed the natural sciences, others (history, anthropology, and area studies) the humanities.[32] Building bridges across

[27] Paulnack 2003. [28] Egginton 2023: xiv, 281. [29] Broad 2023a. [30] Rovelli 2023.
[31] Lee and Wallerstein 2004b. [32] Wallerstein 2004: 74–75.

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this divide is difficult. Illustrating tensions in the social sciences more generally, new academic fields, such as science, feminist, and post-colonial studies, have in recent decades ignited intellectual firestorms – productive debate for some, acrimonious culture war for others.

Max Weber suggests a middle ground. Emerging at the end of an empirical investigation as statements of the essence of a social situation, his ideal types were circumscribed generalizations, guides for future inquiries rather than law-like generalizations.[33] Informed by changing scientific practices, by the beginning of the twenty-first century metatheoretical debates have moved beyond Weber. Some of the silos that the natural and humanistic sciences had built for themselves in the previous century have shown some cracks. Theories and models that are informed by post-Newtonian and para-humanist worldviews sometimes insist that the natural sciences and humanities are dealing with the same mysterious problems. In the reigning Copenhagen interpretation, post-Newtonianism suggests that an external, God's eye perspective on the world does not exist. Similarly, para-humanism insists that all life forms, including human beings, are part of a deep, encompassing web of intra-relations. For both there is no distinction between inside and outside. When humans take measurements of the world, it is nature that is taking measurements of itself. The Laws of Nature are not eternal and objective but the accretions of human experiences and practices.[34] The connections between the arts and sciences are manifold and conducive to creative thinking.

As in the arts, invention is an important task of the sciences. The invention of new concepts can signify profound changes in how to conceptualize the world and perform in it. We can be "lost for words" and some things are "beyond words." Epiphanies of the mind that are cast into new theories and models can result from flipping perspectives, for example from the "outside" of things to their "inside," from "objects" to "subjects," and from "inter-relations" to "intra-relations." The flip side is the product of invention, a combination of intellectual and conceptual innovation. In this perspective science is concerned as much with human subjectivity and consciousness as with rendering a photographic record of reality. The scientific and the sacred sometimes work in similar ways and meet in the domain that can lie beyond reason and belief. Jeffrey Kripal calls that domain "supernatureculture."[35]

An ideas-only argument overlooks sense perception and discovery, which have been central to the vast changes science has wrought in the

[33] Jackson 2016: 22–25, 154–63.
[34] Smolin 2000: 25. Unger and Smolin 2015: 8, 356, 385–89.
[35] Kripal 2019: 11–13, 15–17, 43, 45.

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world. For sure, ideas, concepts, and language matter. Galileo and the Catholic Church communicated well. Galileo caused controversy and consternation less by what he said and more by how he said it. He and the Church disagreed – strongly. For Galileo, science was about the discoveries which stem from new encounters with sensory reality. In terms of accurate prediction and useful intervention, his new science was superior to the older science of Aristotle. Since then, aided by the signal contribution of Newton and myriads of scientists, the process of scientific progress has accelerated greatly. An important reason for the success of the natural sciences has been their ability to reframe mysteries that must be pondered into puzzles that can be solved. By the middle of the twentieth century, for example, in terms of prediction and practical application the new science of quantum physics was vastly superior to Newton's classical model. But physicists continue to disagree on the meaning of quantum and, curiously, often are uninterested in probing it further. But, without a deeper understanding, none of the astonishing practical applications of quantum physics help us comprehend more fully the cosmos humans inhabit.[36]

As was true in the Renaissance, invention and discovery are deeply entangled. As David Wootton observes, "experience, in the form of observations, and experiments directed at making discoveries … made possible the invention of science."[37] What has changed is the scale and scope of science, specifically its knowledge-making and knowledge-disseminating institutions. But like concepts that infuse different worldviews, facts that make up our data cannot be read off the world. The measurement problem in quantum physics illustrates a general point. Quantum objects behave differently when they are observed and when they are not. When nobody looks these objects exist in "superpositions," different possibilities of various positions, in the universe. Only when we look do they snap into a definite location.[38] For Bruno Latour, a French anthropologist and radical empiricist, this makes total sense. Facts do not simply exist to be discovered. In science chance favors the well-prepared. Laboratories quite often convert chance discoveries into invented necessities.[39] Statistical data are often derived from codebooks that reduce complex and contested interpretations to simple numerical values. In that translation it is easy to forget that the results of quantitative studies are based on qualitative observations and judgments. Latour insists that facts are fragile. As is true of concepts, we always need to remind ourselves where facts come from. "Matters of fact" are always also "matters of concern." Trial and

[36] Carroll 2019. [37] Wootton 2015: 53. [38] Carroll 2019. [39] Latour 1988: 84–87.

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error is central. Everything is real, everything is a work in progress, and everything is negotiated and co-produced by humans and non-humans.[40]

This opens the space for shared conversations about the difficulties, for example, of how to understand the enduring problems of risk and uncertainty. Writer Amitav Ghosh believes that literary fiction finds great difficulty in building extreme events such as global warming into compelling narratives. Fiction, Ghosh argues, produces sensible cause and effect tales, as in this traditional Bengali story: "A tiger. A hunter. A tiger." The story has a tiger-friendly plot, while most of us pity the hunter mauled by a tiger. For Ghosh the modern novel and probability, as in a world of the unexceptional, are twins. Unlike its precursor, Ghosh argues, the modern novel seeks to conceal the exceptional through fillers that keep narrativity under control. The unheard is moved to the background, the everyday to the foreground.[41] The incomprehensible is left to genres such as science fiction and fantasy. Journalist Scott Patterson agrees. With notable exceptions, such as *War and Peace*, in his words "literary fiction has as its domain the little life, the daily comings and goings and small-world problems."[42]

Soon after delivering his celebrated two-cultures lecture in 1959, C. P. Snow came to the same conclusion.[43] Adding some further pages to a new edition published a few years later, he conceded that he had overstated the differences between the worlds of science and literature. His treatment of the literary side was plainly inadequate. In his original lecture the visual arts, music, and architecture, for example, were not mentioned. Yet science and mathematics had a profound influence on modern art. Pablo Picasso's use of geometry at the beginning of the twentieth century was central to the development of cubism – an act of incomparable, destructive creativity. The artistic appropriation of the scientific concept of the fourth dimension became a conduit for a conceptual reformulation of pictorial space.[44] Furthermore, in the second half of the twentieth century theoretical physics, astronomy, and cosmology elevated the importance of imagination, metaphor, and analogy. This, too, helped narrow the divide between the natural sciences and the humanities while enriching traditional understanding of scientific thinking as a combination of rigorous deduction and controlled inference from empirical observations.[45] The computer revolution has also built new connections between science and the arts. And so have the public science movement and various "third cultures" and transdisciplinary fusions in the form of sci-art, artscience, and "arts-science" found in environmental studies.[46]

[40] Muecke 2022. [41] Ghosh 2016: 16–19. [42] Patterson 2023: 107.
[43] Snow 1993 [1959]. [44] Ambrosio 2016.
[45] Collini 1993: xlviii. Galileo Commission 2019: 33–35. [46] Chang and Ivakhiv 2020.

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In 2024–25 the Getty Museum sponsored a massive exhibit *Blended Worlds: Experiments and Interplanetary Imagination*, one of about seventy installations running in about seventy institutions all over Southern California. NASA's Jet Propulsion Lab explored entanglement under the title of "connectedness" and motivated by the question "how do we engage with the unknown?"[47]

Bridges between the natural sciences and the humanities have of course always existed. Science fiction dates back to the seventeenth century, to Kepler's *Somnium* and Bacon's *New Atlantis*. In the first few decades of the twentieth century, quantum physics and twelve-tone music shattered conventional understandings of both science and music. Surrealism revealed deep connections between art and chance. In modern art, as in physics, chance became for some the deepest of all laws. Dadaism, for example, left much to chance, opening up previously unknown images, perspectives, and perceptions. Insignificant words became powerful thunderbolts offering spiritual insights. After World War II Jackson Pollock's radical freedom celebrated as sacred a disorder rooted in accidental, spontaneous methods. His paintings were not a Dadaist release of the unconscious but "a single, integrated use of chance as a means of unlocking the deepest possible grasp of nature in its broadest sense."[48] In 2022 one of America's most celebrated writers, the late Cormac McCarthy, published two novels that discuss in depth topics such as quantum physics and the nature of consciousness. In the same year the pictures of Nebulas and the Cartwheel galaxy taken by the James Webb Space Telescope, once converted to the color spectrum the human eye can access, could easily provide the visual background for sci-fi movies.

The analysis of turbulence, to cite another example, has bedeviled engineers, mathematicians, physicists, meteorologists, astrophysicists, and oceanographers interested in chaotic manifestations in the flow of air, water, and other fluids.[49] The patterns in these flows never repeat themselves. After more than a century of attempts, describing and explaining them continues to be an enormous challenge. Statistical measures of turbulence provide the empirical material for turbulence theories. Artists have painted, drawn, and photographed clouds, waves, and waterfalls for many centuries. Their perceptions, just like those of scientists, are shaped by history and culture. In contrast to the evolutionary change of science since the seventeenth century, however, artistic vision transcends time. Scientists probe underlying mechanisms of flows. Artists seek to please the eye and produce an esthetic effect, providing perspectives that

[47] Pogrebin 2024. [48] Brecht 1966: 9–10.
[49] Rosenau 1990 applies the concept of turbulence to the analysis of world politics.

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scientists cannot capture. In Daston and Galison's study of images in many areas of science "mechanical objectivity" in the nineteenth century and "trained judgment" in the twentieth are eventually followed by a new "hybrid space" in which "presentation" trumps "representation."[50] In nanofacture, for example, flow visualization is "indispensable in helping us to develop models and theories based on phenomenology … Ways of seeing become ways of knowing."[51]

The building of new connections between the humanities and the sciences can be an arduous task. In relatively new academic fields such as history of science and in the social sciences more generally, the engagement of different versions of positivist, realist, and constructivist thinking became in the 1990s a focal point of shared concern. I experienced this first-hand at Cornell. In the mid-1990s then Cornell president Hunter Rawlings chaired a faculty meeting debating the reports of three task forces addressing the main issues Cornell faced in the natural sciences, humanities, and social sciences. The first two reports were received and debated without much acrimony. The social science report quickly became a free-for-all. A frustrated Rawlings terminated the session early. Muttering on his way out something about "zoo" and "unacceptable behavior" he asked me what had just happened. I told him that he had just witnessed the social sciences at their best, debating fundamental issues of ontology, epistemology, and methodology. Many proponents on either side of the social science debate are fighting blindfolded over the two elephants they believe live in the same room, never stopping to ask whether, perhaps, there is only one.

Their belief has deep roots and is shared by many who disagree on pretty much everything else. The distinction between methods of inquiry in the natural sciences and in the humanities was a signal accomplishment of Wilhelm Dilthey and, subsequently, Max Weber. For Dilthey the distinction refers to two different epistemic achievements. The natural sciences aim for predictive accuracy by means of general causal explanations (*erklären*) of the natural world. The humanities seek interpretive and evaluative understandings (*verstehen*) of specific social and historical contexts. The humanities or humanistic sciences (*Geisteswissenschaften*) concern themselves with reflections about human beings in history.[52] In the contemporary analysis of world politics we see Dilthey's distinction in the epistemological and methodological disagreements between "rationalists" or "positivists" on the one hand and "reflectivists" or "interpretivists" on

[50] Daston and Galison 2007: 42–50, 382–83. Warhaft 2022: 365–66.
[51] Warhaft 2022: 360–62, 366. See also Cartwright and Nakamura 2009.
[52] Dilthey 1927: 17, 143, 146–48, 205–27, 279, 315; 1924: 180, 317–38; 1922: 36. Tuttle 1969: 8, 9, 11, 25.

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the other.[53] Problem solving and critical theory have coexisted, barely, like estranged siblings in a dysfunctional family.[54]

Conventional arguments about the difference between the natural and the humanities and social sciences celebrate, rightly, how much we have learned. But they overlook that advancing the frontiers of knowledge both diminishes and increases our ignorance. Standing on the shoulders of giants, we see problems they did not know existed. The unknown looms large as a problem of knowledge for all sciences.[55] Nature is not passive and inert but active and creative. This "re-enchanted" view of science pushes aside some of the traditional boundaries separating the natural sciences from the social sciences and humanities.[56] All three are part of an integrated natural, social, and cultural universe evolving in time.[57] This view would not have surprised Dilthey. Known for his effort to carve out a place for the humanities, for him, all scientific and humanistic inquiries were part of one enterprise sharing complementary and overlapping purposes across different disciplines.[58] Similarly, for philosopher Nelson Goodman "the arts must be taken no less seriously than the sciences as modes of discovery, creation and enlargement of knowledge in the broad sense … science and art proceed in much the same way with their searching and building."[59]

This argument is supported strongly by those Wilson develops in *Consilience*. As one of the most eminent evolutionary biologists of the twentieth century, he argues that up to about 100,000 years ago "genetic and cultural evolution were closely coupled." But with the rise of civilizations, cultural evolution has "sprinted ahead at a pace that left genetic evolution standing still by comparison."[60] The deep epigenetic rules created before the advent of Neolithic societies continue to operate as background conditions. But today the key question for all sciences, humanities, and social sciences is how far did epigenetic rules of evolution allow different cultures to diverge? "What, in the final analysis, joins the deep, mostly genetic history of the species as a whole to the more recent cultural histories of its far-flung societies?"[61] Wilson dismisses with a laconic "too bad" the for now insoluble mystery of the rise of symbolic language and the explosion of cultural evolution.[62] Astonishingly, particular features of culture have emerged that reduce Darwinian fitness. "Culture can indeed run wild for a while, and even destroy the individuals

[53] Fierke 2018: 1–3. [54] Cox 1981. [55] Taleb 2007: 181. [56] Kauffman 2008.
[57] Lee 2007; 2011: 5–6. Gulbenkian Commission 1996: 60–64, 75. Lee and Wallerstein 2004a.
[58] Hamid 2016: 635–37. Harrington 2000: 436. Apel and Krois 1987. Kinzel 2018.
[59] Goodman 1978: 102, 107. [60] Wilson 1998: 171. [61] Wilson 1998: 137.
[62] Wilson 1998: 146.

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that foster it."[63] As I argue in Chapter 6, we live in an era of unheard of acceleration in geological and evolutionary time. Man-made climate change is upending geological time. And computer scientists working in the field of Artificial Intelligence (AI) have in about half a century "traversed the equivalent of hundreds of millions of years of organic evolution."[64] The cultural world now operates autonomously from the dictates of biological evolution.

The slack in the epigenetic leash leads to complex outcomes. It is too pat to assert that art transmits feelings that science explains.[65] Art also creates feelings. It is not imitation but self-creation. Unencumbered by epigenetic rules art is world-making. Wilson calls this "the subtle manifestations" of both biology and culture.[66] What I called above "both-and" rather than "either-or" thinking, such subtlety undercuts Occam's razor and theoretical parsimony operating in the natural sciences.[67] And it validates Wilson's occasional asides that the transcendental worldview of science as the key to unlocking all the secrets of life might be wrong.[68] In fact, the insistence that science can allow only empirically verified or falsified statements is itself not an empirically falsified or verified scientific statement but a background assumption on which the natural sciences rest – on the back of turtles, that is, of unresolved metaphysical disagreements. Ultimately, the status of science has little to do with being true and false or right and wrong, and everything with being useful.[69] In a world teeming with possibilities, metaphysical assumptions distinguish between what is relevant for us and what is not. A gold-digger who is ignorant of what gold looks like will not find it. The slack of the genetic leash thus gives the humanities and soft social sciences an important voice in the conversation among the different branches of knowledge about the risk-uncertainty conundrum.[70]

The language instinct is distinctly human and a precondition for what Wilson calls "true" culture.[71] It is a product of evolution that comprises "arbitrary words and symbols invented purely to convey information."[72] But language is more than a conveyor belt for information transporting words and symbols. It is also a cultural technology that makes humans believe in things that do not exist in the real world. In all domains of human endeavor – religion, science, philosophy, art, politics – Richard Rorty argues, truth is made rather than found. Scientists, for example, invent descriptions which are more useful than other descriptions for predicting and controlling what will happen. The world did not speak

[63] Wilson 1998: 171. [64] Wilson 1998: 134. [65] Wilson 1998: 127.
[66] Wilson 1998: 163. [67] Wilson 1998: 57. [68] Wilson 1998: 60.
[69] Galileo Commission 2019: 20, 32. [70] Wilson 1998: 60–61. [71] Wilson 1998: 145.
[72] Wilson 1998: 142, 128.

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Newtonian and then switched to speaking Quantum. Physicists did. Space and time are unreal and can be unmade, as Einstein demonstrated. And as with science so with religion, philosophy, and art. They, too, are not intrinsic features of an objective world. This more capacious view of language is hotly contested by Wilson and many others who are committed to the idea of truth as being found and to the sciences doing something other than offering useful descriptions of the world with a contested relationship to truth. Fierce contestation points to the centrality of conversation as the unifying feature of all knowledge-seeking rather than to consilience as a science-based, gradual conquest of our ignorance.[73] Color vocabulary illustrates this contestation nicely. For Wilson "culture has risen from the genes and forever bears their stamp."[74] The senses create the symbolic coding that represent the world.[75] "Poor" color identification is thus based on our understanding of language as a mirror of reality.[76] But ambiguity in the identification of color can also be the "rich" ground on which the arts and humanities make their creative contributions to human knowledge. They do so not by shrinking the material world to enhance precision but by enlarging the symbolic one to stretch imagination.

Rhetoric is not merely a device for letting matters "hang in the air," avoiding scientific objectivity and Occam's razor.[77] The invention of metaphor has given culture "a life of its own" that acts independently of the rules of evolution.[78] Wilson proves that point in his writing. He is a master of metaphorical language.[79] Language and discourse are productive in creating symbolic worlds. In Wilson's own words "the arts are eternally discursive," and cultures grow into a "universe of seemingly infinite possibilities."[80] As purveyor of information, language, I argue in Chapter 2, mirrors or "represents" the world passively. As a productive force, language also "re-presents" the world in acts of creative world making. We all experience the power of world making when reading a novel or seeing a play. Order governs science in search of small, predictable worlds. It is stumped by the uncertainties created by the power of imagination and the chaotic cultural forces in history that are operating autonomously from their genetic base.[81] For biologist J. B. S. Haldane "the universe is not only queer but it is queerer than we can imagine."[82]

Each knowledge community has "its own language."[83] And each has different tools, rules, and criteria of validation.[84] The absence of a

[73] Rorty 1989: 3–4. [74] Wilson 1998: 177. [75] Wilson 2014: 48.
[76] Wilson 2014: 48–49. [77] Wilson 2014: 47. [78] Wilson 1998: 177.
[79] Wilson 1998: 70–71, 177, 230, 239. [80] Wilson 1998: 242, 243.
[81] Wilson 1998: 182. [82] Quoted in Wilson 2014: 53. [83] Wilson 2014: 46.
[84] Wilson 2014: 46, 52.

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common language can create some problems of translation. But translation, not the Tower of Babel or Babble, is normal. It is what we do in everyday life to make ourselves understood. To be sure, political authoritarians and intellectual imperialists insist that we must unify all languages into an all-purpose Esperanto. I argue in Chapter 7 that Thomas Hobbes made that case four centuries ago for the world of politics. Today, many biologists and economists follow in his footsteps. But Hobbes and his successors failed miserably, defeated by the autonomy of a culture now unshackled from the leash of evolution.

Knowledge-seeking humans deal with different aspects of a world that resists being fully known. They live on separate islands surrounded by seas of ignorance. Increasing our knowledge will create bridges by drying up some of the seas. But new knowledge always leads to new questions, new seas, and new islands. On the record of the past, as Wilson tells it, the hope that human knowledge will eventually solve all the riddles of the world is based, in his own words, on "blind faith."[85] You cannot argue with the blind faith of a scientist that is rooted in the thrill of the chase. But you do not have to accept it. Wilson concedes that if, against all reason, "everything is reduced to epistemological confusion … in the best spirit of the Enlightenment, we will start all over again."[86]

Contra Wilson, for me everything is always elevated through encompassing dialogue. Stephen Jay Gould focuses on this central point. He claims convincingly that in the sciences and the humanities knowledge-seeking is profoundly complementary. *E pluribus unum*. Appropriating Benjamin Franklin's reported quip after the signing of the Declaration of Independence, in the pursuit of wisdom "we must all hang together, or we shall all hang separately." Gould calls this "a consilience of equal regard."[87]

In words, numbers, and pictures theories and models tell stories created by individual imagination. Newtonian humanism is often marked by contradictions at Bohm's "explicate" level. But at the "implicate" level, it is profoundly complementary.[88] On the record of the past, as I read it, and informed by Wilson's captivating stories, I put my "blind faith" in the unending conversation among different knowledge-seeking communities, sharing their plural insights in translatable languages, and united by their disagreements about what are the important questions worth fighting about.

[85] Wilson 1998: 227–28. [86] Wilson 1998: 48. [87] Gould 2003: 259, 265.
[88] Bohm 1980: xviii.

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3. Eclecticism and Experimentalism

Eclecticism and experimentalism offer practical ways of coping with the unending and unsettled quest for knowledge in general and, specifically, the conundrum created by the complementarity of risk and uncertainty. In his play *Copenhagen*, Michael Frayn interprets a fateful meeting between Bohr and Heisenberg in terms of binary distinctions: social or natural, micro or macro, laws of men or laws of nature, internal states of consciousness or external states of being, intentionality or history, and discursive or material facts. Like atoms, humans, in his view, are discrete individuals with inner characteristics. While the meaning of quantum physics remains a subject of intense debate, it points to a different perspective of a deeply entangled world. Humans do not have pre-existing, determinate mental states. Instead, they are part of an entangled state of indeterminate agencies that are captured in a determinate state only when specific measurement procedures are adopted. It is the measurement procedure, the "cuts" we make into the world with our conceptual apparatus, not the will of the observer or experimenter that creates determinate states. Humanists agree. Humans are intelligent sentient beings in a world to some extent of their own making. We are unavoidably part of the social and natural environment that we seek to comprehend and navigate. Risk and uncertainty are resources for rather than impediments to eclecticism and experimentalism.

On this view, the binaries that pervade Frayn's literary vision do not match the mutual constitution of entangled agencies. Distinct agencies do not precede the process of interaction. Rather they emerge in the process of "intra-action." Agencies do not exist as individual elements but only in relation to their mutual entanglement.[89] For students of world politics power dynamics emerge from entangled relations operating under conditions of risk and uncertainty. They do not exist as the property of things or actors. The diversity and heterogeneity of world politics require us to shed our habitual preference for arguing in terms of binary distinctions. "Either/or" is less helpful in our analysis of world politics than "both/and."[90] As diverse voices gain in strength, we could do worse than heed Samuel Beckett's celebration of the color grey: "It is grey we need – Made of bright and black, Able to shed the former Or the latter, And be the latter Or the former – Alone."[91]

"Both-and" has been the central theme running through this book's analysis of the political world and world politics. The risk-uncertainty conundrum operating in small *and* large worlds; three internally

[89] Barad 2007: 5, 19, 22–23, 33. [90] Qin 2018: 287. [91] Beckett 1958.

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incoherent worldviews generating story-telling theories *and* practical models of small, risky *and* large, uncertain worlds; homogeneous *and* heterogeneous contexts, invariant *and* variable processes, and language that "represents" *and* "re-presents" as markers distinguishing small from large worlds; the empirical cases of political economy, security, and the environment showing the risk-uncertainty conundrum in different settings; and the effects of Hobbes's control power *and* Machiavelli's protean power; the sciences *and* the humanities as contradictory *and* complementary ways of knowing the world. From beginning to end mine has been a story of entanglement.

Eclecticism is a plausible intellectual strategy for dealing with the risk-uncertainty conundrum and this "both-and" world.[92] Among students of world politics it has had some prominent supporters. Critical of excessive simplification, Hans Morgenthau, for example, insisted that most theories of international relations do little more than "provide a respectable protective shield behind which members of the academic community may engage in noncontroversial theoretical pursuits."[93] And Kenneth Waltz argued that "the prescriptions directly derived from a single image are incomplete because they are based upon partial analysis. The partial quality of each image sets up a tension that drives one toward inclusion of the other."[94] This has not stopped tribes of scholars from dividing themselves into different schools of thought. They overlooked the promise of eclecticism for more fully knowing the world. Eclecticism creates spaces for capturing the complexity of real-world problems that practice and policy must engage, while trying out innovative ideas, establishing new dialogues, and working toward provisional agreements that may help on issues of theory.

Newtonian humanism provides the foundation for simple, anthropocentric theories, post-Newtonianism and para-humanism for complex, non-anthropocentric ones. These worldviews produce theories that are not necessarily antithetical. Bruce Western, for example, combines simple, single-outcome explanations with complex, processual ones.[95] Confidence in complex explanations increases across multiple empirical tests provided by simple ones. Andrew Abbott also bridges the difference between simple and complex models, leaving room for both causality and contingency, and deploying both quantitative-statistical and qualitative-interpretive methods.[96] In his view social science should not only restrict itself to the analysis of issues that are free of contextual influences and

[92] Sil and Katzenstein 2010a, 2010b, 2011. Sil 2020. Reus-Smit 2013.
[93] Morgenthau 1967: 213. [94] Waltz 1959: 230.
[95] Western 2001: 360–74. Krause 2016. [96] Abbott 1998: 172–77.

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lend themselves to efficient cause analysis. Complex phenomena strongly affected by their temporal and spatial context must be analyzed not only with time-series data but also with other methods including event history as well as sequence, network, and spatial methods.[97] Abbott insists that much of science is description, not "mere description."[98] Since only a small fraction of all the regressions that have been run are ever published, "we should stop kidding ourselves about science and hypothesis testing … as a descriptive technique, regression is quite poor."[99] Western's and Abbott's way of thinking sets an appropriately high standard for students of world politics and is productive for addressing the risk-uncertainty conundrum as it appears in different theories.

A combination of simple and complex models can work well in the analysis of world politics. In the field of international political economy it can be useful to derive some risk-based, baseline expectations about factors of production in international markets even when those expectations prove to be wrong as soon as they engage a more complex social economy that operates also in the domain of the uncertain.[100] Similarly, in security studies the primacy of power politics, understood in strictly materialist terms, can help establish baseline expectations even though its analysis will prove misleading in theory and practice as it has to grapple with the dynamics of power that, going beyond the notion of control, also operate in the domain of protean power possibilities.[101] Keeping analysis simple by relying on the central story sidesteps the danger of ending up deep in the weeds and in a hopeless muddle.[102] But this is not the final word. The advice forgets the Latin proverb *cave ab homine unius libri* – beware of the man of only one book because, perhaps, he never had more than one idea.[103] For megalomaniacs the temptation is seductive to have a go at playing Newton, Darwin, or Einstein and finding the One Law, Great Theory, or Master Hypothesis that unifies all. More mundanely, in a messy world it is hard for all of us to withstand the siren call of parsimony and elegance.

Approaches informed by any one theory risk rigid adherence to unacknowledged foundational positions that all too often can become a hindrance to understanding. They give themselves the license to bypass by fiat aspects of reality that do not fit clearly into their metatheoretical parameters. Important factors are all too often "blackboxed" or treated as "exogenous." Such simplifying moves help generate elegant knowledge claims about selected aspects of small worlds. They neglect political

[97] Abbott 1998: 175–76. [98] Gerring 2012. [99] Abbott 1998: 174.
[100] Cochrane 2011. [101] Sil and Katzenstein 2010a, 2010b. [102] Cochrane 2011.
[103] Gould 2003: 249.

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scientist Peter Hall's reminder of "extensive endogeneity and the ubiquity of complex interaction effects" characterizing large worlds.[104] "Ordinarily," Albert Hirschman writes, "scientists are happy enough when they have gotten hold of one paradigm or line of causation. As a result, their guesses are often farther off the mark than those of the experienced politician whose intuition is more likely to take a variety of forces into account." Focusing on only selected factors runs the risk of "a particularly high degree of error."[105]

The tight coupling of theories with a fixed set of foundational principles often poses a barrier to both understanding and acting. It tends to lead to the unhelpful exclusion of important observations and dynamics, frequently obscuring or distorting the very problems that need to be understood and addressed. Incorporating alternative approaches grounded in different metatheories can produce a more expansive exploration of interconnected political processes.[106] Eclecticism lends itself to addressing problems of wide scope that incorporate the messy realities of the world, accommodate rather than bracket potential sources of uncertainty, and engage pragmatically with concrete issues of practice and policy.

As I have argued in Chapter 3, experimentation is a watchword of such an approach. It is illustrated by little children drawn magnetically to stray iPhones. "Children learn about the world by trying out something and seeing what happens."[107] In the words of Albert Hirschman "the principal enemy is orthodoxy: to use the same recipe, administer the same therapy, to resolve the most various types of problems while ignoring that things are always more complicated in reality."[108] We are all children when we play in large worlds. Similarly, Charles Sabel and his colleagues have advocated experimentalism as a promising form of governance compared to traditional top-down approaches in national, regional, and global affairs. The key is bringing relevant knowledge and authority to bear on policy problems. Information sharing and coordination within shared regulatory frameworks combine enhanced political participation with policy learning in decentralized systems with mutual monitoring.[109]

It is the relationship between us and the world that generates multiplicities of risks and uncertainties. Students of world politics have traveled some distance to capture that multiplicity with concepts such as plurilateralism, heteropolarity, multimodality, deep pluralism, and no one's world. Multiplicity has been propelled by often unexpected developments such as the end of empire, the multiplication of states, the emergence of

[104] Hall 2003: 387. [105] Hirschman 1970: 341, 343. [106] Sil 2020: 439.
[107] Bohm 1968: 138. Chandler 2014: 34, 190. [108] Hirschman 1998: 110.
[109] Dorf and Sabel 1998. Sabel and Zeitlin 2010. Sabel and Victor 2017b. Taleb 2012: 115–16.

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transnational politics, the end of the Cold War, and China's rapid rise.[110] World orders and disorders do not exist in the singular. At any moment they coexist in multiple competing and co-evolving forms.[111] Whatever the nature of the unit in world politics – tribe, clan, society, state, polity, empire – multiplicity in make-up and relation are its distinctive mark. The absence of centralized authority in world politics is no more than that – an absence. It diverts attention away from the presence of a multiplicity of contexts, processes, and linguistic practices.[112]

Marked by risk and uncertainty, across different spatial, temporal, and political scales the world is a deeply entangled mesh of multiplicities inviting eclectic modes of reasoning and experimental ways of doing.[113] That mesh encourages us to try out different things, creating novel options. There is no free lunch, of course. Forgetting small world risk may sacrifice helpful practice. Ignoring large world uncertainty may surrender to unwelcome surprise. But they embolden us to take different "cuts" into the risk-uncertainty conundrum posed by the real world. Whichever way we cut, one thing is for sure: we cannot eat our cake and have it too.

4. Peering into the Future

Peering into the future is like pissing into the wind. The stuff you produce comes right back at you – with a vengeance. Before 2007/08 the forecasting models on which most banks and central banks relied assumed, surprisingly, an economy without many of the variables that drive the financial system.[114] Working with data and reports supplied by the staff of the Federal Reserve, members of the Federal Open Market Committee (FOMC) submit their individual forecasts of output growth, inflation, and unemployment prior to the biennial publication of the Fed's Monetary Policy Reports to Congress. Forecast errors are an imperfect, indirect measure of the risk-uncertainty conundrum facing the FOMC. But individual forecasts about important macroeconomic variables vary widely, and accurate forecasts are extremely rare. Alan Greenspan acknowledges that policy makers and forecasters are doing "exceptionally well" if they can get projections right 70 percent of the time.[115] This is wildly overoptimistic. In practice, the FOMC members have missed Greenspan's benchmark by a wide margin. Between 1992 and 1998, for example, out of 360 separate forecasts for each of four variables, there were

[110] Borus 2009: 7–11. [111] Biersteker 2022. Adler 2019. Ish-Shalom *et al.* 2021.
[112] Rosenberg 2016: 128–29, 132, 135–41. [113] Powel 2020: 546–47, 549–53.
[114] Kay and King 2020: 348. Abolafia 2020: 30–31, 156. [115] Greenspan 2010: 209.

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twenty-five perfect forecasts of inflation, twenty-one for unemployment, eight for real GDP, and not a single correct forecast of the growth of nominal GDP. Fewer than 4 percent of all forecasts issued were correct.[116] Put bluntly, the forecasts are not very good. As Christina and David Romer have noted, "someone trying to forecast inflation should move away from the FOMC forecast, not toward it."[117] The FOMC evidently was not operating in the small world of calculable risk.

More recently, in April 2023 the consensus outlook for the American economy among economists and Wall Street analysts moved from soft landing, to hard landing, to no landing, back to hard landing. By midsummer soft landing was again the favorite, before interest rates reportedly entered an era of undefined but surely unsettling "peak uncertainty."[118] Not so for central bankers, who had talked about inflation as "transitory" in the summer of 2022 but as "persistent" in the summer of 2023. It comes as no surprise that Wall Street's latest obsession is an unknowable number called "term premium."[119] It exists only in theory and contains everything other than investors' expectations for short-term interest rates set by the Federal Reserve Bank. The term premium incorporates uncertainty about the long-term inflation outlook. But the rapid decline of inflation rates in the fall of 2023 proved both term premium numbers and central bankers wrong. Now, central banks hope that AI may help them to better understand inflation. More data transforming uncertainty into risk by studying the past is a hope that springs eternal.[120] In the words of journalist Eshe Nelson "that's like driving a car and somebody painted your front screen so you can't look forward. You can only look through the back window to see what inflation was last month. That probably ends with you in the ditch."[121]

But there is a second side to this story of failure. Without forecasting, economic predictions arguably would have been even worse. Over the twentieth century forecasting has evolved from aiming at "correct" predictions to actively shaping an inherently unpredictable future by coordinating the expectations of relevant economic and political actors. Hoping to nudge growth upward, Federal Reserve officials and private sector economists are understandably overly optimistic in their forecasts. Between 2010 and 2019, if the consensus forecast of GDP had been true, the American economy would have grown by 1.3 trillion dollars more than it actually did.[122] Similarly, in medicine two-thirds of the time doctors' Palliative Prognostic Scores are overly optimistic in predicting a

[116] Katzenstein and Nelson 2013b: 243. McCracken 2010.
[117] Romer and Romer 2008: 231–32. See also Edge and Gürkaynak 2010.
[118] El-Erian 2023. Smialek 2023b. [119] Goldfarb 2023. [120] Nelson 2023b.
[121] Nelson 2023a. Wendt 2001. [122] Leonhardt 2019: A21.

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patient's time before death.[123] As is true of language, the economy is not merely represented by theories or models but is enacted by them. Believing in their truth, actors behave to make them come true. Through their use of language, central bankers self-knowingly act to construct out of an unknowable economy one that is knowable for market participants. And they seek to learn about that unknowable economy so that they can recalibrate their own constructions and regenerate favorable economic conditions. In a manner of speaking, they are "in" on the process of discursive performativity.[124] "We are no smarter than the system we study."[125] In the spring of 2023, for example, the Federal Reserve sought to both reduce a high inflation rate and bolster an economy experiencing a serious banking crisis. It chose a middle ground for action, a modest increase of the interest rate. It did not have, or claim to have, any data suggesting that its number was the best number. Instead, it talked up this figure as an appropriate response expressing its conviction that inflation and the crisis both mattered – the Federal Reserve playing yo-yo with the risk-uncertainty conundrum.

Despite all the difficulties that the future poses, all of us – including politicians, bureaucrats, pundits, and scholars – mobilize our imagination and take different approaches to get a sense of what is coming our way and meet it well. That can mean making a singular prediction and seeing whether it comes to pass. It can mean developing scenarios and making contingent claims. And it can mean developing forecasts with probability assessments about future developments, based on today's best knowledge. Peering into the future takes different forms: predictions, scenarios, and forecasts.[126]

Pundits are eager to deliver the goods on prediction markets with an insatiable demand for unlocking the secrets of the future. But, as Karl Marx once quipped, they are the first ones to fall off when the train of history hits a curve.[127] Pundits do not have the cognitive style of successful forecasters.[128] They portray themselves as having unique and penetrating insights into the future that give them the license to make bold claims. George Friedman is a good example. He has published many books. I recall one of his earliest, *The Coming War with Japan*, published to great acclaim in 1991.[129] That war has been a long time coming. The world still waits – no longer with bated breath. Published in 2009, his *The Next Hundred Years* predicts that by around 2020 China will be divided

[123] Großekathöfer and Schlak 2024: 89. [124] Holmes 2014: 25. [125] Cochrane 2011.
[126] Jasper, Ursula, Myriam Dunn Cavelty, and Andreas Wegner. N.d. Book Proposal: The Possibilities and Pitfalls of Prediction: Academic Contributions to Future-Oriented Policy-Making, submitted to ETH Zurich, p. 3. Jasper 2016.
[127] Tetlock 2009: 57. [128] Tetlock 2005. [129] Friedman 1991.

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into regional fiefdoms and Russia's military will collapse shortly thereafter.[130] Today's news from China and Russia does not fill the particulars of that bill either. Although all too often they cushion their predictions with vagueness and complex conditionals, pundits like Friedman typically end the prediction race as royalty-rich also-rans.[131] But not all is lost for those willing to plough assiduously the field of punditry. The "wisdom of the crowd" logic holds here as well. Taking the whole group of pundits and averaging their predictions improves substantially the signal-to-noise ratio of their individual publications.[132]

Scenario building cultivates imagination rather than speculation and calculation.[133] It is something Peter Schwartz, a practitioner and CEO of Global Business Network (GBN), developed over many decades.[134] Scenarios are built around predetermined factors that are visible in their early stages while their consequences are still indeterminate. They do not constitute the full range of the unexpected. Other system-changing disruptions are totally unpredictable and are far more common than most people realize. By Schwartz's reckoning such global disruptions have occurred about once a year in the early twenty-first century.[135] Scenario thinking acknowledges the inevitability of surprise and fortifies our ability to anticipate and deal with it. This is the central theme running through Schwartz's *Inevitable Surprises*.[136] Re-reading the book twenty years after its publication leaves the reader with the impression of a creative mind that got many of the long-term challenges right, including demography and migration, the continued evolution of the computer revolution, and climate change. The consequences of these factors are the stuff of today's headlines. But some of Schwartz's long-term projections about politics, such as the future of China and the United States, are remarkably off the mark. China did not embrace orderliness in its foreign policy but evolved instead into a new kind of revisionist power. And the United States did not become a disorderly rogue empire where trust in government is returning but a hollowed out, deeply distrustful, and polarized polity that appears to have lost its way in the global system.[137] Politics appears to defy trend analyses stretching over long time periods. The orders it creates always remain subject to disruption.

In addressing the risk-uncertainty conundrum, scientific forecasting of world politics has shown some encouraging results for illuminating the medium term of about three to five years.[138] But peering further into the

[130] Friedman 2009. [131] Gardner and Tetlock 2011b. [132] Tetlock 2009: 61.
[133] Oppenheimer 2016: 5. [134] Schwartz 1991. [135] Schwartz 2003: 11.
[136] Schwartz 2003. [137] Schwartz 2003: 118–23, 126–27.
[138] Bruce Bueno de Mesquita, email message, 05/12/22. Scoblic and Tetlock 2020: 15. Braumoeller 2012: 194–212.

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future has proven to be impossible. Hence the risk-uncertainty conundrum persists. Peter Scoblic and Philip Tetlock tell us why, by listing some of the difficulties encountered in forecasting developments in world politics: laws and regularities are elusive and debatable; data are often unavailable; variables number in the thousands and interact in countless ways; history is a series of unfolding events with contingent branching paths; tectonic shifts can hinge on mundane occurrences; and future events cannot be deduced easily from theoretical principles or induced from past experience.[139] But what Tetlock calls a "techno-optimistic" outlook persists among the leading scholars in this field, "a common belief that it is possible to do at least a bit better and perhaps a lot – and that technology can help" in transforming some uncertainties into risk.[140]

Bruce Bueno de Mesquita tackles the risk-uncertainty conundrum with a small world, reductive approach that merges the best qualitative assessments of country experts – about the relevant players, the options they perceive, the salience of the issue for them, and their relative clout in a particular issue space – with the deductive logic of game theory. It is the combination of expert judgment and the game theoretic model that gives his approach an eye-catching predictive power of better than 90 percent (as stated by at least one official of the CIA, for which Bueno de Mesquita's company has done a lot of work over the years).[141] The game theoretic model that Bueno de Mesquita banks on is a rational model of human choice. That model is based on tacit and common knowledge assumptions, that is, pre-theoretical worldviews and assumptions of how the world works. Those assumptions may be realistic in some situations when everyone plays the same game, such as the band-width auctions Bueno de Mesquita often refers to, held on both sides of the Atlantic among corporate and government technocrats. But often players do not play the same game. Mentioned in the subtitle of Bueno de Mesquita's book, the "brazen self-interest" that motivates his model has built into it traits that are shared widely among American economists and that resonate with some aspects of American culture.[142] But while Republicans and Democrats may share an understanding of the concept of "interest" I am not convinced that they share the same model of how American politics works. And because of differences in their conceptions of the "self" the average Chinese and the average American foreign policy expert probably also have very different views of how the world works.

[139] Scoblic and Tetlock 2020: 14–15.
[140] Tetlock 2010: 485–86. In the area of finance, for example, the existence of grey swans points to the promise of competing models yielding further insight and predictive power. See Patterson 2023: 131–33, 142–46. Bueno de Mesquita 2014a, 2014b.
[141] Bueno de Mesquita 2011, 2010. Tetlock 2009: 65. [142] Bueno de Mesquita 2009.

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Game theorists typically assume away, or take to be irrelevant, the tacit and common knowledge that players bring to the table. Their view of human nature is uncomplicated. Everybody is rational, so calculations or guesses of how rational the other side is are either unnecessary or easily made.[143] Thus the messiness of the large world is kept at bay. Furthermore, as Tetlock points out, compared to a game theoretic algorithm the relative predictive success of expert judgments is not easy to pin down. Is it really true that it is the game theory rather than the wisdom of the crowd of experts that accounts for the success of this approach?[144] Tetlock also insists, and Bueno de Mesquita agrees, that the test of different forecasting approaches can be established only through rigorous tournaments carried out over years.[145] Since Bueno de Mesquita's model is proprietary, it is not clear when such a tournament might be organized.

Self-described skeptics about forecasting, Dan Gardner and Philip Tetlock have developed a different approach. They assembled a group of 280 volunteers from all walks of life who over many years were asked about a wide array of issues, yielding 28,000 predictions. Gardner and Tetlock concluded that these volunteers were only slightly more accurate in their predictions than random guessing and slightly less accurate than simple extrapolation of existing trendlines. But experts differ in their predictive accuracy. Working in small teams, "super forecasters" are almost twice as accurate in their prognoses than untrained experts working alone.[146] Successful forecasters have a distinctive cognitive style. They are eclectic and circumspect in temperament, not beholden to any particular view or theory, opportunistic in their use of data, and attentive to both micro-processes and mega-trends.[147] "Centrist, cognitive flexible foxes had significantly better predictive track records than wedded-to-orthodoxies hedgehogs … this success was relative; foxes did only slightly better than extrapolation algorithms."[148] A currently running multi-year prediction tournament is testing Tetlock's preliminary findings about different cognitive styles. Tetlock bets that when we break questions about the future into smaller pieces our ignorance is flushed into the

[143] Blakely 2020: 37–38. Braumoeller (2012: 211) discusses some other assumptions of Bueno de Mesquita's model.
[144] Tetlock 2009: 66. Gardner and Tetlock 2011b.
[145] See Bueno de Mesquita 2014a for an extended presentation and defense of his approach, and 2009 and 2010 for applications; http://decision-making.moshe-online.com/criticism_of_bueno_de_mesquita.html, accessed 07/03/24 gives extended criticisms. Thompson 2009 offers a balanced discussion of Bueno de Mesquita's work.
[146] Großekathöfer and Schlak 2024: 89.
[147] Tetlock and Gardner 2015. Gardner and Tetlock 2011a. Großekathöfer and Schlak 2024.
[148] Tetlock 2010: 471. Cochrane 2011.

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open. It enables us to hear the stories that the problem wants to tell us rather than our tried-and-often-not-so-true assumptions that have guided us in the past.[149] The hope is to become clearer about what we can and cannot forecast and how we can best do so. Weather forecasters are exemplary in having a good sense of what they do and do not know. Their predictive accuracy declines sharply beyond three to four days. The inflection point for political forecasts, Tetlock and Bueno de Mesquita seem to agree, is around three to five years. Unsurprisingly, shorter time periods increase our ability a little to peer into the future. Baked into the risk-uncertainty conundrum, surprises are bound to occur, always. In short, creative and important work on the complementarity of risk and uncertainty focuses on answers to specific forecasting questions, clustering around broad scenarios that capture some important long-term trends. Even though, unavoidably, it leaves unanalyzed inescapable, radical uncertainty, this procedure is useful in giving decision makers an evolving sense of plausible futures.[150] With much effort and fortified by a large dose of humility people can "make accurate forecasts about at least some developments that really do matter. To be sure, in the big scheme of things, human foresight is puny, but it is nothing to sniff at when you live on that puny human scale."[151]

This discussion has sampled only three approaches for peering into the future. Others exist. The "realistic utopias" of John Rawls, and the "imaginations" of Richard Rorty are not built around predetermined factors. Straying beyond the recognition of new possibilities, they flirt with the domain of the unimagined and unimaginable.[152] Taking a different tack, the Decision Making Under Deep Uncertainty (DMDU) approach does not seek the optimal policy for a probabilistically knowable future. It relies instead on the simulation of thousands of possible worlds and tries to identify policies that are robust across a wide range of futures. Significantly, DMDU seeks to incorporate in meaningful deliberations the stakeholders who would be affected by these policies, eliciting the tacit knowledge they have about particular contexts. Experts and stakeholders jointly monitor the results of policies, thus limiting technocracy and emphasizing the integrity and agency of the communities that experts purport to serve.[153] Peering into the future by this or any other means is what we cannot help but attempt to do. The question is how to do so best.

In such attempts we cannot help but also peer into the past. "Historical sensibility," writes Francis Gavin, "is less a method than a practice, a

[149] Jackson 2024: 24. [150] Scoblic and Tetlock 2020: 16–18.
[151] Tetlock and Gardner 2015: 249. [152] Hellmann 2020: 57.
[153] Avant *et al.* 2024: 178–79.

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mental awareness, discernment, a responsiveness to the past and how it unfolded in our present world."[154] In thinking about the future, the recognition of new possibilities is often impeded by what Galbraith, following Keynes, calls the "conventional wisdom."[155] Studying the past can make us aware of otherwise unimagined possibilities. For every tomorrow has its own history. "Studying the past will not tell us what to choose, but at least it gives us more options."[156] An always astute Keynes recognized that the long-run entailed the entanglement of the certainty of death with the uncertainties of limitless possibilities.[157] Beliefs about probability and possibility in both past and future are hidden companions in how analysts of world politics cope with the risk-uncertainty conundrum.[158] Interrogated from the perspectives of the present, the past is as open as the future. When planning ahead, it helps therefore to expect the unexpected.

5. Moral Luck, Policy, and Pragmatism

Moral luck is about the attribution of human intentionality in contingent circumstances. It points to the challenge of passing judgments under conditions of risk and uncertainty when the consequences of human action are unknown or unknowable. Policy encounters it repeatedly as it copes with the world in response to pressures it cannot escape from and opportunities it does not want to forego. Pragmatism relies for its compass on prudence and habituated actions and discursive practices that always remain open to interrogation and reformulation.[159] Searching for the big theory, social law, master cause, or killer method are for pragmatists futile exercises betraying a foolish hubris.

Moral Luck

How does the risk-uncertainty conundrum affect moral judgments of human action?[160] A few moral intuitions form the foundations upon which "complex moral worldviews are constructed."[161] And the risk-uncertainty conundrum affects those intuitions. Moral luck raises problems of human agency and circumstantial contingency. If we are to hold ourselves and others responsible as moral agents, we must be able to show that we and those we judge are intentional agents who cause the outcomes of their actions. It is choice not chance that matters. But since contingency

[154] Gavin 2016: 3. [155] Suckert 2022. Galbraith 1998: 8. [156] Harari 2015: 60.
[157] Eich 2024a: 1–2, 5, 139–76; 2025; 2024b. [158] Gailmard 2014: 69–82.
[159] Barkin and Guzzini 2025.
[160] Williams 1993: 251; 1981. Nagel 2013. Latus 2019, 2024. [161] Tavernise 2021.

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also shapes the consequences of human choice this is problematic. The paradox of moral luck rests on our holding incompatible views about the importance of conscience and consequence, that is, about the inward world of the actor and the outside world.

For Kant morality has nothing to do with luck understood as the contingency of circumstance.[162] Morality is a matter of human will, which is good in itself.[163] Once human beings make a particular choice they can be judged morally, for the choice they have made is under their control. What matters morally is not the effects of action but the act of choosing that emanates from within an actor, in full accord with the self. All humans are capable of choosing. What happens after the act is immaterial for moral judgment. Kant assesses the morality of human choice because a universal standard guides all humans: everyone has the capacity to will, so everyone can be held to the same moral standard.[164] This is Kant's basis for grounding moral choice on principle. Consistency and purity of choice are all that matter. Kant's argument denies any space to moral luck – instances, that is, according to Andrew Latus, "where luck makes a moral difference."[165] "To eliminate luck from human life," writes philosopher Martha Nussbaum, puts "that life, or the most important things in it, under the control of the agent."[166]

Undeniably, however, there are many instances where it becomes difficult if not impossible to insist that morality is luck-free. The inner state of an individual and morality are not fully insulated from external consequences and the effect of the actions of others. This agrees with the intuitive idea that morality contains both Kant's purist idea and the view that circumstances matter.[167] The classic example is of two drunk drivers. Traveling along the same route, one hits a child on the way home, the other does not.[168] One ends up a killer, the other simply goes to bed. Neither chose to kill, but through happenstance one did. Did – and if so how – luck play a role in our moral assessment of each driver? Similarly, as Thomas Nagel notes, German citizens faced the quandary of joining or opposing the Nazi party in the 1930s and 1940s.[169] Had an SS officer been born to a farmer in Kansas instead of a shopkeeper in Munich, he might have gone on to live a perfectly normal and moral life. So, is he morally unlucky and the farmer's son from Kansas the morally lucky one? Given the randomness of birth and the impossibility of knowing counterfactually how people might respond under different conditions, how should we assess the context and contingency of birth?

[162] Kant 1784 [1998]. [163] Nagel 2013: 322; Nelkin 2023.
[164] Kant 1784 [1998]: 4, 394. [165] Latus 2019: 105. [166] Nussbaum 2001: 4.
[167] Williams 1981: 22. Nagel 2013: 326–28. [168] Latus 2019: 105–06.
[169] Nagel 2013: 326.

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There exist two different tracks to scrutinize Kant's approach. First, can human beings really undertake consistent, self-willing, rational justifications? This matter may not be as cut and dry as Kant argues. Second, under conditions of uncertainty what do context, process, and language do to the idea of a unified self in Kant's argument? Tracing all the external influences that make us who we are leaves a picture quite at odds with the self-willed, intentional, fully-in-control Kantian subject.

Justification rests in part on the success of human endeavor.[170] To a considerable degree the justifications of actions are dependent on what happens subsequently. As a result of the effects of the initial choice, the justifying subject at the beginning may later become a very different person. Luck may end up playing a significant role in what we often take to be straightforward deliberation.[171] Bernard Williams uses the example of Gauguin to make this point. Gaugin leaves his family to become a famous painter. If he succeeds, Gaugin gives his great art to humankind, and we judge him on that basis. If he fails, Gaugin is an immoral deserter of those who needed him. Or he is both. But luck plays an important role in our judgment.[172] Put differently, Gauguin decides, under conditions of uncertainty, what will happen and who he will become. This undermines conceptions of morality grounded solely on individual will and the unproblematic attribution of praise and blame. In a realistic conception of life and living, can moral judgment be restricted to insulate human beings from luck and uncertainty?[173] Do we not have to insist on a broader view that acknowledges uncertainty and is responsive to life's realities?[174]

Human beings, Thomas Nagel holds, are shaped by external factors all of which guide our assessments of morality. There is really no conception left of the fully self-willed, choice-making subject that has a meaningful impact on the world.[175] We experience life as if we were autonomous agents in full control over our actions. Thus, we attribute similar control to others and assess them morally.[176] The result yields a paradox: we experience life as agents with control whereas our general assessment of the impact of context, luck, and uncertainty undermines that view of the self. For Nagel, this is an ineradicable part of human life, revealed by the problem of moral luck.[177]

These are important philosophical issues. Donna Dickenson proposes narrowing the scope of examination to particular sites, in her case medical ethics. Practical ethics, she argues, might help us to better understand and

[170] Latus 2019: 106. [171] Williams 1981: 36, 38–39. Williams 1993: 251.
[172] Williams 1981: 22–26; for discussion see also Latus 2019: 106–07.
[173] Williams 1981: 21. [174] Williams 1981: 35–39. [175] Nagel 2013: 328.
[176] Nagel 2013: 327. [177] Nagel 2013: 324, 328. Latus 2019: 108–11.

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perhaps resolve the moral luck paradox. She argues that Kant's insistence on the importance of an individual's choice is too small. In contrast, utilitarianism holds the moral agent responsible for too much, for actual and potential outcomes.[178] In Martha Nussbaum's words, at stake in questions of moral luck is the "thorough intermingling of what is ours and what belongs to the world, of ambition and vulnerability, of making and being made, that are present in this and any human life."[179] The risk-uncertainty conundrum pushes us to engage problems of moral luck. Reducing large world uncertainty to small world risk, Newtonians typically bypass this moral dimension of politics. Acutely aware of the full registers of unpredictability, humanists do not. This illustrates once more the incoherence and richness of Newtonian humanism.

Policy

How does politics unfold in an uncertain world? How, for example, do small and vulnerable states navigate unfathomable uncertainties and great vulnerabilities? Aesop offers an answer. They live out the fable of the frog, the snake, and the owl. Afraid of being devoured by the snake, the frog asks the owl "what should I do?" The owl replies cryptically "learn how to fly!" And this is what the frog did. Small states do not soar like eagles. Instead like frogs they cultivate their capacity to jump. Appearing to land on their stomachs, they in fact land on their feet. Thus, they retain the ability to jump again and again, changing their course as they make their way. "In a world of great uncertainty and high-risk choices, this is an intelligent response. Frogs can escape snakes … not because they have found a solution to the problem of change but because they have found a way to live with change."[180]

Some ways of learning about, navigating in, and coping with the world are more practical than others. Living forward, we understand backwards. In a world of risk and uncertainty the two kinds of knowledge serve different purposes. Managing risk relies on "hard" tools, coping with uncertainty on "soft" ones.[181] The first does not translate easily into the second. Although they are not necessarily antithetical, "driving with the rearview mirror" is a fool's errand.[182] Remaining attuned to both, it is left to the owl's practical wisdom (*phronesis*) to assist in conveying and coping with "informed uncertainty effectively."[183]

[178] Dickenson 2003: 1–64. [179] Nussbaum 2001: 5. Fahlquist 2019: 8–16, 75–84.
[180] Katzenstein 1985: 211. [181] Sachs 2023: 539, 543. [182] Wendt 2001: 1022.
[183] Barma and Goldgeier 2022: 1773. DeMartino 2022: 74.

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Taking a leaf from the military, many students of international relations and foreign policy embrace the notion of grand strategy. They prefer soaring like eagles to hopping like frogs. But meeting large world uncertainties in a Napoleonic manner is a losing cause, and not only in Tolstoy's novel. As the US was facing a sea of novel and unfathomable uncertainties at the end of the Cold War, George Kennan, elder key official and revered author of that war's containment doctrine, was unconvinced that a grand strategy was either needed or helpful. He argued that a complex world cannot be mastered with one grand design. "Discard this traditional American fondness for trying to solve problems by putting them into broad categories" he admonished.[184] The fondness for grand and tidy theories is not only American. Bringing nothing but death, destruction, and an ocean of tears, Germany and China, too, have pursued their "Final Solution" and their "Great Leap Forward."

In a classical article on public policy, Charles Lindblom makes the case for creative improvisation, what he called the science of "muddling through."[185] Small-scale problems are simple and can be solved mechanically, choosing the means that best satisfy ends that have been clarified and ranked. Complex problems require a different decision calculus. Decision makers expect to meet their often inchoate goals only partially and do not separate means from ends as they make their choices. Limited comparisons among options, what Herbert Simon called satisficing, rather than rational-comprehensive planning define the science of muddling through. Improvisation creates policies and practices that are both relevant and realistic. And it includes the art of sitting still, of not choosing among existing options, and of delaying choice to wait for additional information as situations evolve, as was true of President Kennedy in 1962. A former co-chair of Goldman Sachs and Secretary of the Treasury in the Clinton administration, Robert Rubin, ended many of his meetings with his favorite line: "so we don't have to make a decision on this today, do we?"[186] For Rubin luck and smarts were both indispensable in a complex and uncertain world. He made his way aware of the probabilities of white and black swans he could cope with and hopeful patience in the face of contingencies he could not control.[187]

Uncertainty can be paralyzing and prevent necessary policy action. But it can also stop us from running on auto-pilot and force us to take a second look.[188] Policy makers have often pointed to "the unknowability of political possibilities" as the reason for not trying to achieve ambitious goals.[189] But the spaciousness of uncertainty can create room for trying new things. In

[184] Kennan 1994. [185] Lindblom 1959. [186] Weisberg 1998.
[187] Rubin, Robert 2023: 1–50, 281. [188] Jackson 2024. [189] Hirschman 1991.

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different contexts muddling through can give way to pushing for wildly ambitious policies and practices. Suddenly "possibilities" replace "impossibilities." In response to the outbreak of a global pandemic in the spring of 2020, many states took drastic steps that would have been unthinkable in normal times and that had eluded them on other burning issues, such as nuclear disarmament and global warming.[190] Structural obstacles and adversarial forces melted away. Existential challenges, as the pandemic illustrated, can open up political possibilities. Governments, movements, and non-governmental actors may not be able to "power over" (understood as actual capability) obstacles. But spurred by imagination they may be sufficiently empowered to "power to" or "power with" (understood as the capacity to actualize potentialities with or without others) to navigate the world.[191] Hope embraces the unknown and unknowable. It sees openings in complexity and uncertainty. Often it does its work underground, not in the glare and glitz of center stage.[192] Its transformative power is protean. It lingers around the edges until it breaks through, unpredictably, transforming politics.

As in the natural world, so in the political: contingency and complexity are pervasive.[193] The context processes and discourses defining the pathways to desired outcomes all matter. Tracking different pathways can open up unforeseen potentialities. The large world of uncertainty remains too obscure to identify shifts in any or all of them with any degree of precision. Focusing on the present rather than getting lost in the distant future and identifying some of the contingencies that could shape that future are reasonable alternatives.[194] Bridging the gap between scientific research on world politics and the world of policy thus has become more urgent and common.[195] For example, scholars have tried to learn some of the lessons of the Vietnam war in the 1960s. Then, Thomas Schelling's work on compellence helped shape the unsuccessful, "horrific U.S. strategic bombing campaign," and Walt Rostow "took his models of economic development" directly into the Johnson administration.[196] Scholars bridging the gap are reminded today to balance more thoughtfully and navigate more carefully among the four I's of policy advice: influence, interlocutors, integrity, and inclusion.[197]

[190] Pelopidas and Verschuren 2023: 6.
[191] Pansardi 2011. Göhler 2009. Slaughter 2017: 161–82. [192] Solnit 2016.
[193] Cartwright 2019: 57–76. Barma and Goldgeier 2022.
[194] Dienstag 2009: 172. Bernstein *et al.* 2000: 53.
[195] Avant *et al.* 2024. Tama *et al.* 2023. Barma and Goldgeier 2022. Jentleson and Ratner 2013. Jentleson 2011.
[196] Barma and Goldgeier 2022: 3. [197] Barma and Goldgeier 2022: 4–12.

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In the small world of risk, the more we know, the less we think we don't know. In the large world of uncertainty, the more we know the less we know as we become aware of new frontiers of unexplored knowledge. When advisors mistake the large world of uncertainty for the small world of risk, the unintended or unanticipated consequences of well-intentioned advice can cause gratuitous harm. Accepting uncertainty instills instead a healthy measure of humility. It moves policy toward continuous engagement with stakeholders to elicit the tacit, contextual knowledge they possess. And, following the advice of economist Edward Leamer, it pushes back against the annunciation of unassailable truths and encourages instead the construction of plausible stories that help us meet the future well. For Leamer, speaking of "theory and evidence" risks drawing too tight a connection between both to the point of tempting us to claim that the evidence proves a theory. Thus, it could connote inaccurately an incessant march toward unobtainable levels of certitude. He favors instead honesty about the unavoidable limits of expert knowledge and pleads for the courage to let go of "the intoxicating presumption of knowing the unknowable and controlling the uncontrollable."[198]

Pragmatism

This book has focused on the risk-uncertainty conundrum, worldviews, theories, models, and methods.[199] Reducing or enlarging metaphorical worlds from large to small or small to large can be justified by pointing to the relative homogeneity or heterogeneity of contexts, the invariance or variability of processes as well as the representative and re-presentative forms of linguistic and discursive practices. The book has also explored financial, nuclear, and environmental crisis politics and the nature of political power. Eclecticism, acceptance of the provisional nature of all knowledge, and belief in the creativity of human action in a world whose future is often not known give my arguments pragmatist sensibilities.

Charles Sanders Peirce's "pragmaticism," William James's "empiricism" and "pluralism," and John Dewey's "experimentalism" and "instrumentalism" have provided the foundations for pragmatist theory. To them pragmatism did not mean, as it does today, mere expediency. For pragmatists, theories are provisional and fallible answers for dealing with the world. Pragmatism offers a unifying theory of human thought

[198] Avant *et al.* 2024: 178, 180.

[199] I thank Cheryl Misak for her repeated, careful readings of various drafts and her diplomatic way of nudging me to a better understanding of pragmatism.

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and action.[200] It takes practice as the starting point. Enlarging the Cartesian imperative of thought leading to action, Peirce insisted that action can also lead to thought. Our actions tell us who we are and what we want. Sooner or later habituated action and thought are challenged and revised in newly arising, problematic situations that require creative adaptation. Belief and habit thus are rules of action that are perpetually revoked and rethought under changing conditions.

The more recent extension of pragmatist thought by Richard Rorty, Donald Davidson, and Robert Brandom has underlined both the dependence of all observations on language and the importance of worldviews for our deepest convictions. Individual beliefs and wishes are deeply embedded in worldviews, a web of mutually reinforcing, self-altering practical beliefs. It is difficult to break these beliefs into discrete parts. Understood as tacit knowledge, worldviews thus channel scientific experience as they do all other experiences. But the world does not force us to choose any specific language. That is our choice, constrained by the facts the world throws at us.

Language and discourse delimit the world we observe. Cause and effect do not exist as ontological givens. They are more or less useful conceptualizations validated not by making us feel comfortable but by helping us get around the world successfully. Knowledge is discovered and invented. The world does not present itself in discrete parts called facts. Many things that exist in the natural world are the effects of causes that do not depend on human mental states. This is the domain of the natural sciences. But many things that exist in the social world are the effects of human intentions and actions. The world will tell us whether we have carved it well or not. And that includes the description of cause and effect relations in the political world. If we program ourselves in a particular language, we may impute cause and effect only to the world. Theories understood as stories, metaphors, and the generative power of language more generally all aim at offering persuasive descriptions of the world. Different vocabularies are not only more or less accurate media for copying the world but also more or less useful tools for navigating it. We thus need to thread the pragmatist needle between positivism's misguided insistence that science is special in providing an accurate mirror of the world and relativism's wrong-headed assertion that we can just make up the world led by our imagination.

[200] I am basing this discussion on Hellmann's far-reaching, well-sourced and trenchant discussion (2022: 4–11) and *International Studies Review* 2021.

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What does pragmatism tell us about the practice of social science?[201] It offers a critique of positivism without surrendering to relativism.[202] It is impartial among different kinds of theory. It accepts the dynamism of social processes that are defining and redefining human choices. It focuses attention on how the material and ideal interests of actors are constituted, how these interests relate to cognitive dispositions and emotions, how they are integrated into institutional and social environments, how all of these are grounded in and shaped by overarching worldviews, and what all of this entails for coping with risks and uncertainties.[203] Pragmatism is interested in the consequences of different truth claims. It encourages continuous engagement with the world and the building of shifting consensus. It embraces piecemeal and provisional knowledge about the world. Where it is useful to focus on metaphorically speaking small worlds and risk, we should rely on positivist methods. But we should never forget that the actors we study typically face the risk-uncertainty conundrum and normally are not rational; that the world is not stationary and is marked by many endogenous changes and frequent exogenous shocks; that some of our assumptions are articles of faith embedded in the worldviews informing our theories and models; and that the uncertainties that inhere in nature and politics require us to cultivate our sense of humility more than our ambition of intellectual mastery.[204]

And what does pragmatism tell us about practice and policy? In the words of philosopher John Kaag, it seeks to "clip the wings of abstract concepts in order to ground philosophy in the particularities of everyday life."[205] It champions consensus through competition in beliefs about how to meet the future well rather than seeking correspondence with an external reality. And it addresses problems that are relevant for human betterment. It carries knowledge from one situation to the next, ready to reformulate or augment it as a new problematic situation may require. It supports conversations especially when it bridges the gap between practical difficulties and inherent possibilities. In short, it favors "the experimental redeployment of pieces of knowledge in light of new experiences and changing situations."[206] Its aim is to develop rules for our forward-looking conduct in the world rather than to create a catalogue of

[201] In my discussion of pragmatism I have relied heavily on Cheryl Misak's (2013, 2016, 2020) rich account of the history of pragmatism, Robert Brandom's (2011) intellectual history *cum* political theory, Emanuel Adler's and Vincent Pouliot's (2011) extensive introduction of the practice turn to the field of world politics, Fritz Kratochwil's (2018) profound treatment of praxis with a follow-on discussion of his book by Hellmann and Steffek (2023), and Emanuel Adler's (2019) different but often complementary discussion of world ordering. See also Lechner and Frost 2018.
[202] Marks 2018: 217–18. [203] Haas and Haas 2009. [204] Bernstein *et al.* 2000: 45.
[205] Kaag 2009: 70. [206] Sil 2020: 440.

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mechanisms, supported by experiments, that has no discernible bearing on how we should conduct ourselves. In the words of Bentley Allan, pragmatism offers an "agile base for an experimental approach to politics."[207] This stance helps in orienting us to the uncertainties of the world, juggling configurations of different causal factors, and locating points of possible engagement with the world of policy and practice. "By mapping the complexity of social worlds within legible frameworks, we can provide a flexible starting point for understanding and action without the dream of control."[208] In short, pragmatism accepts the risk-uncertainty conundrum without indulging in fantasies of conquest or coddling prospects of surrender.

In social science and in policy, pragmatist sensibilities include an orientation toward the public, active engagement with actual problems that need to be solved; the making of practical knowledge displayed by showing that one knows one's way around the world; a dialogical inclination for encounters with other perspectives; sense making through providing for narratives of how the world hangs together; learning from backward-looking experience and forward-looking imagination; an inclination to bridge divides between various dichotomies (such as nomothetic and ideographic analyses, explanation and understanding, positivism and reflectivism, problem solving and critical theory, means and ends); a disposition to focus on timeliness that eschews claims to timeless validity; experimentation; ready acceptance of the incompleteness of all knowledge; and the embedding of moral values and commitments in thought-inducing action.[209] This distillation of pragmatist sensibilities points to a flexible disposition in engaging the world of practice and policy and – spurred by sitting on the knife's sharp edge – a dogged insistence to re-examine habitual intellectual preferences.

World politics has its police officers and fire fighters.[210] Police officers are optimists. They want to create order. For them the world is completely knowable. Its events and course can be controlled. Fire fighters are pessimists. They want to contain disasters. For them the world is not completely knowable. Its events and course defy mastery. For fire fighters the promise of a better future does not justify excessive harm in the present. Fire fighters are pragmatic. Camus was a fire fighter when he wrote "he who dedicates himself to … history dedicates himself to

[207] Allan 2022: 247. [208] Allan 2022: 247–48.

[209] This characterization of pragmatist sensibilities is based on the material presented in Bauer and Brighi 2009. Sil 2009. Pratt *et al.* 2021. Haas and Haas 2002, 2009. Kivinen and Piiroinen 2018. Hellmann *et al.* 2003. Hellmann 2020. Grimmel and Hellmann 2019. Reus-Smit 2013: 601–06. Sil and Katzenstein 2010a: 43–48.

[210] Dienstag 2009: 170–72.

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nothing, and, in turn, is nothing. But he who dedicates himself to the duration of his life, to the house he builds, to the dignity of mankind, dedicates himself to the earth … and sustains the world again and again."[211]

6. Uncertainty in Religion and Science

An apocryphal story about the psychologist Raymond Cattell, who advanced a statistical method, factor analysis, speaks to the relation between science and religion. Asked by his students whether one could apply the method of extracting underlying factors from a matrix of variables to the matrix of factors, thus simplifying the analysis down to the last factor, he answered in the affirmative. And when this procedure was done until only one factor was left, what would that factor be called? Cattell answered without hesitation: "the G-Factor." Why would it be called the G-Factor, the inquisitive students asked. And Professor Cattell answered with a smile: "G stands for God." Like eclecticism and experimentalism, punditry, scenarios, forecasts, and pragmatism, science and religion are instances of us living in multiple realities – examples of the profound human capacity for meaning making.[212]

I started this book with Dilthey's and Weber's concept of worldview that has had no discernible effect on discussions of world politics. Dilthey focused on philosophy, the arts, and history, Weber on religion. Weber's concept of rationalization was not fully attuned to the fact that humans can live in multiple realities. The most important one is the ordinary, taken-for-granted reality of daily life. It seems unquestionably natural, with its coordinates of time and space. Practical interests rule that reality. However, we do not spend all of our time in that reality.[213] Sleeping and dreaming, for example, operate in different dimensions that can contradict the logic of daily life. So do other human activities: watching a movie or a play, gazing at a piece of art, reading, listening to music or stories, and playing games. All of these divert us from daily life and suspend or alter its rules.

Science and religion belong to those other realities. Both have developed variegated practices and different ways of knowing. Neither takes the appearance of daily life for granted. Both inquire into the possibility that the world may be different than it appears. Religious and scientific practices are rooted in the world of imagination that can reflect back on our daily life and thus shape it.[214] Scientific and religious journeys always encounter still another bend in the river promising new vistas – old ideas

[211] Camus 1991: 301–02. [212] Fierke 2022. [213] Bellah 2011: 2.
[214] Bellah 2011: 112–14.

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thought anew or new ideas no one has thought before. These ideas are consequential, the source of bloody wars and lasting conflicts. With salvation in the afterlife as the ultimate prize, how could it be otherwise for religious communities? And in the sciences and humanities, the "culture wars" between supporters of naturalistic explanations of causes and adherents of humanistic interpretations of meanings have been prolonged and intense. Deeply shared by religious and scientific communities is imperfection – imperfection in faith and imperfection in knowledge. Imperfection generates an unending human striving for better and for more.

Imperfection and striving create connections across what many believe to be an unbridgeable chasm separating science from religion. The Galileo Commission warns against mistaking the inclusive practice of science with scientism as an exclusive worldview.[215] As an open-ended practice in an open world, despite its amazing progress across the last four centuries, science does not have to be grounded in a naturalist metaphysics, materialist ontology, and reductionist-empiricist methodology. It can entertain the possibility of other foundations that would permit matter and mind to exist as co-evolving, irreducible aspects of reality. The Cartesian cut between conscious events existing "inside" our brains and material events "out there" breaks the underlying unity of the world that science seeks to capture. In its quest science sets demanding standards for evidence. The astonishing advances that brain sciences have made in recent years led Edward O. Wilson to conclude almost two decades ago that in the brain "no particular site remains that can reasonably be supposed to harbor a nonphysical mind."[216] In a materialist way of thinking, the burden of proof rests with dissenters citing contrary episodic evidence based on personal experience of miracles and revelations. Or does the burden rest with materialist arguments? Quantum physics after all has come to the conclusion that probabilities collapse into reality only when a conscious mind exists to measure and observe, shaping conceptions of time and space and everything else in the cosmos.[217] Wilson would be the first to admit to shifting burdens of proof. The scientific quest does not operate like a fundamentalist religion. It is open-ended and ecumenical.

Both science and religion seek to understand experience.[218] And both are grounded in unprovable background assumptions. This is self-evident for faith-based religions. As for science, Gödel, I am told, proved

[215] Galileo Commission 2019: 4, 6, 28. [216] Wilson 1998: 108.
[217] Klavan 2024. Fierke 2022. Grove 2022a. Douthat 2024b.
[218] Galileo Commission 2019: 13, 19. Fierke 2022.

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mathematically that it is impossible to construct any system that can prove its own foundations. Left unattended, scientific background assumptions risk becoming articles of faith. In the analysis of world politics and several other social sciences, Newtonianism is a good example. Voltaire saw Newtonian science as an explanatory model that was about to replace religion.[219] He missed that science, despite its usefulness, is, like religion, based on the bedrock of unprovable belief. Science has no particular faith or creed. It entertains all possibilities, shifting the burden of proof to one side or the other, depending on the weight of existing evidence. Is consciousness an epiphenomenon, a complex emergent phenomenon of neuronal functioning, or an independent factor that is indelibly fused with life's physical substratum? There is no obvious answer to this question. But future strivings and more and better knowledge will help – that is the promise and hope of scientists like Wilson. There is nothing to preclude the possibility that, subject to conventional scientific methods of testing, experiences gained through contemplative training and meditative methods could contribute to the evolution of a biologically based consciousness. In the name of mindfulness such an eventuality would change both science *and* religion.[220]

Edward Wilson believes that mind is reducible to matter, Max Planck that mind is matter's irreducible matrix.[221] Such strong disagreements convinced Erwin Schrödinger, another leading physicist of the twentieth century, that the border separating science from religion is fleeting.[222] The history of the modern era is not only a story of rupture, of the displacement of one worldview by another. It is also a story of continuity as theology has retained an important influence in the era of science.[223] The hidden origins of modernity precede the Enlightenment. They can be found in the metaphysical and theological struggles that ended the medieval world.[224] What mattered were questions about the nature of God and the nature of being rather than the subsequent story of human control over nature. At its inception modern science neither opposed nor displaced religion. Unwittingly, science thus became an extension of earlier theological debates. And this, Gillespie argues, has created a concealed theology of philosophical disagreements that has stretched into the present. God does not disappear. God-like attributes and capacities are transferred to nature and humans. In the shift from divine to natural law, disenchantment thus merges with re-enchantment.[225]

[219] Galileo Commission 2019: 43. [220] Galileo Commission 2019: 86.
[221] Wilson 1998: 105–35. Galileo Commission 2019: 90. [222] Burgess 2018.
[223] Bain 2020. [224] Gillespie 2008: 12, 14. [225] McClure 2010.

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Religious worldviews remain deeply embedded in contemporary world politics in other ways.[226] They provide a hidden script about order in anarchy that lies at the center of realist theories of international relations.[227] As the founder of modern political science, Hobbes offers a "worldly application of a theological pattern."[228] Existing in the state of nature, humans are believers in God and acknowledge their obligations under God's law. These are real obligations rooted in real law, made and enforced by humans on the basis of and legitimized by their worldviews. Just as God created the universe, so humans can create the commonwealth and an international order with an imagined sovereign. In Bain's reading, Hobbes is thus a theorist of interstate society rather than of international anarchy.[229] If this is plausible, then contemporary realist theories of order are not strictly modern or secular. Nominalist theology remains embedded in modernist conceptions of sovereignty as either immanent and necessary or imposed and contingent order.[230] In this view, religion lives on in the era of secular science and the study of world politics. "The core constituents of the Judeo-Christian world-view have traveled in a multiplicity of forms to make up the dominant 'secular' cosmology characteristic of much of 'western thinking' and 'science' today … the theological origin of the search for order, in our everyday discourse and indeed in science, is important to recognize."[231] Reasoning from God or Nature we postulate a first cause of the universe. While Europe traveled on the "internal" road of secularization without religious pluralization, the "external" imperialist and colonial road of intercultural and interreligious encounters has produced a global system of religious pluralism.[232] Today, the connections between religious and secular cosmologies are typically implicit, often contradictory, and always consequential.[233]

Asian international relations theories are similarly inflected by religion.[234] Confucianism permeates Yan's moral realism, Qin's cultural relationalism, and Zhao's *tianxia* (world order) philosophy. Indeed, Mahāyāna Buddhism instructs that autonomous and independent subjectivity of the kind informing realist or liberal theories of international relations is an illusion. The healing of divided worlds emanates not from essentialized subjectivities but from relational engagements. Buddhism, Confucianism, and Daoism do not believe in the segregation of binary oppositions. Object is subject. We are others. Individuals are urged to transcend the strict separation of one from the other by denying the existence of exclusive and autonomous subjectivity. Since the world is

[226] Byrnes 2022. [227] Bain 2020. [228] Mitchell 1993: 78. Bain 2015.
[229] Bain 2020: 130–31. [230] Bain 2020: 9–10. Gillespie 2008.
[231] Kurki 2020: 26–27. [232] Casanova 2019.
[233] Kurki 2020: 39–40, 67–68, 79–80. Kragh 2004: 12, 51. [234] Fierke 2022.

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always in flux there is no enduring subjectivity. Impermanence is a close cousin of life's uncertainties. Shimizu and Noro argue that Mahāyāna Buddhism relativizes subjectivity even further than other forms of relationalist discourses and theorizing such as the *yin/yang* dialectics of Daoism and Confucianism.[235] This insistence on life as motion and unceasing change is not a trait specific to Asian religion. Henri Bergson (life as flow), William James (human consciousness as a flowing stream), and Alfred Whitehead (life as flux) have made similar arguments. And it resonates with the reinvention of the sacred as a new scientific worldview in which God as the generator of life is akin to the reverence-instilling creativity of the natural and social universe itself.[236]

People are drawn to science or religion, and sometimes to both at the same time, as they seek to navigate the uncertainties of their lives. But as Mark Lilla argues, humankind is ill equipped to deal with uncertainty. We are an impatient lot, and we demand that god, science, or both satisfy our craving for knowledge about the future. We are not content when told that some kinds of knowledge are unobtainable. Instead, we are drawn to those who promise more than they can deliver. Priestesses then and pundits now eagerly provide their apparently inexhaustible supply of unobtainable knowledge to an eager audience. We have a hard time acknowledging uncertainty because it makes us aware of our vulnerability. We want to be on a power walk into the future "when in fact we are always just tapping our canes on the pavement in the fog."[237]

As in religion, so in science the yearning for an ordered and rational cosmos and life without uncertainty is very strong. Moving in a fear- and anxiety-inducing fog, science and numbers acquire a semi-magical power. Even though we are their creators, we put an extraordinary faith in them as modern oracles of truth. "Numbers acquire their power the same way the gods acquire theirs – humans invest them with virtues they want their rulers to have … Our numbers, like our gods, promise to govern us well … We count to learn what's happening in our world and to gain control over our lives."[238] According to American writer Phil Klay, confronted with uncertainty

> science is a quintessentially human method of trying to control that chaos … Adrift in the world, uncertain of the future, hostage to fate, but possessed of increasingly powerful tools for carving up pieces of the world and putting them under the microscope, is it any wonder that we increasingly turn to science when

[235] Shimizu and Noro 2021: 4–5. Shimizu and Noro 2023.
[236] Kauffman 2008: xi, 283. [237] Lilla 2020.
[238] Stone 2020: 100–01, 178. Merry 2016. Spiegelhalter 2019.

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looking for deliverance from our human predicaments? … We want the comfort of certainty.[239]

To many religion offers that comfort as they search for the meaning of being a very small part of a very large whole.[240] Like science, religion is a way of "being in" the world. "If a relational cosmology is grounded in faith or in the pursuit of what is 'really real,'" writes Timothy Byrnes, "then the unknown itself is the basis of Truth and the human propensity to resistance is ultimately futile. We are, some religious worldviews might suggest, in the act of 'becoming' through our relationships not only with each other, but also with that which we cannot measure, define or know."[241] In contrast to non-dogmatic religions like Buddhism and Hinduism, which tolerate the uncertainties and foibles of divine personages, fundamentalist political projects of doctrinal religions wish to create predictable order. Cosmological uncertainty unleashes a yearning for clarity and the comforts of the promise of eternal life. But even dogmatic Catholicism, Byrnes argues, invites believers to more than conformity and oppression resting on unshakable ontological certainty.[242] Communion with God requires acts of courageous faith. And "faith," as Block says in Bergman's *Seventh Seal*, "is a torment. It is like loving someone who is out there in the darkness but never appears, no matter how loudly you call."[243] "Confronted with the inexplicable problem of suffering and in a state of profound unknowing," Byrnes suggests, believers turn to Jesus "in a search for meaning within uncertainty and suffering. In this context then faith is the acceptance of uncertainty, not a search for comforting explanations that will dispel it."[244] In the end, all religions require "the life-defining act of leaping, faithfully, into the unknown."[245]

As their followers grapple with uncertainty, Charles Taylor sees secularization as furthering both science and religion. People cannot live without a sense of the immanent and the possibility of transcendence.[246] In science and religion a meaningful life can be had by all. Believers and non-believers alike strive to lead a morally demanding life. Instead of fitting into a slotted place in the cosmos, everyone is called to construct a good life through personal development and choice. Believers believe while doubting. And non-believers are not indifferent to the transcendental. The outcome is not a clash between atheism and religious devotion. Instead, science and religion accommodate each other and, together, feed a spiritual pluralism to cope with uncertainty. In Taylor's terms, we

[239] Klay 2020: 10. [240] Ossio 1997: 549. [241] Byrnes 2022: 262.
[242] Byrnes 2022: 261–62. [243] *The Economist* 2020: 68.
[244] Email correspondence with Byrnes, 04/12/20. [245] Byrnes 2022: 262.
[246] Taylor 2007. Brooks 2013.

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should avoid conceiving of religion and science in the singular, each as an overarching, coherent worldview. Instead, their various elements are loosely coupled and circulate in scientific, religious, philosophical, social, and political discourses and practices. They provide the raw material for actors who try to construct more or less compelling and more or less contested religious and scientific narratives that place humanity in the world. We can engage these narratives as we clutch the categorical assertion of a universally valid truth. Or we can seize the opportunity and subject ourselves to the requirements of "warranted assertability," which can never reach a state of certainty, by relevant and often ill-defined communities of practice. Entering a "different world of definitions and procedures," we learn anew as we chance the disruption of earlier certainty.[247]

John Dewey's *Quest for Certainty* delivered a full broadside against the search for certainty in fixed, intrinsically stable realms of knowledge.[248] Reflective knowledge is based on the test of actual human experience. Uncertainty is for the most part a practical matter that cannot be eliminated. It has its bad disruptive sides, of course, but also its good, hopeful ones. Learning and improving human practice instills a welcome measure of stability into an uncertain world. We hedge our lives with the soothing comforts of our everyday habits. That comfort is a necessary, contrived condition of being in an uncertain world. For better and for worse, our habits become us as we navigate the uncertain vicissitudes of life. They can enable and empower us; and they can disable and stifle us. It is not only habits. All truth claims are part of changing language games. Changing the game leads to changes in the conceptual landscape and the discarding of old and the discovery of new truths. But truth is one; people call it by different names.[249]

Theoretical biologist and complex systems theorist Stuart Kauffman holds in reverential awe the uncertainties of the web of life and history. Remaining partly lawless, the world tumbles forward without breaking any laws of physics. This is one way of identifying God. It is "our chosen name for the ceaseless creativity in the natural universe, biosphere, and human cultures … we typically do not and cannot know what will happen. We live our lives forward, as Kierkegaard said. We live as if we knew, as Nietzsche said."[250] And if *fortuna* smiles on us, we live our lives with grace, faith, and courage, moving forward into mystery. This worldview accommodates

[247] Jackson 2015: 16–17.
[248] Dewey 1929: 36, 50, 70, 213, 278, 281, 292. Keane 2021: 4–5.
[249] Fierke 2022: 3, 53 quoting the Rig Veda. [250] Kauffman 2008: xi.

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both compelling and inadequate reason. Uncertainty is not a problem to be solved but a condition to be experienced and coped with.[251]

In today's conventional understanding, religion is about beliefs while science is about facts. But the border between these domains, as well as philosophy, which has put searching questions to both, is porous and, in the case of quantum physicist Schrödinger, best captured by the concept of worldview.[252] Werner Heisenberg, too, was less than definitive about the separation between religion and science: "In science … a certain statement could be simply right and another statement wrong … It is decided by nature, or if you prefer by God."[253] The human encounter with the code of the cosmos does not render scientific worldviews implacably opposed to religious ones. Both are more or less successful attempts to stabilize and imbue with meaning a world filled with gut-wrenching uncertainties. Niels Bohr appears not to have cared one way or the other. According to a possibly apocryphal story told by Elaine Pagels, a colleague visiting him in Denmark was taken aback by a horseshoe nailed over Bohr's barn door. He asked assertively that surely Bohr did not believe such stuff. Bohr's answer was telling: "Of course not! But it works whether you believe in it or not."[254]

In this book I have argued that the complementarity of risk and uncertainty operates in an entangled world. Developed in the nineteenth century, Newtonian humanism is the sweet common sense which invisibly shapes the risk-inflected theories, models, and methods we rely on to describe and explain the political world and world politics. The evolution of the sciences during the twentieth century has generated post-Newtonianism and para-humanism as alternatives that are more open to acknowledging uncertainty's part in the conundrum we face. My stories of specific domains, the politics of finance, nuclear crisis, and global warming, show how closely uncertainty and risk are tethered together. And so are, in general, control and protean power. Neglecting uncertainty is neither smart nor wise. It impairs convincing analysis and encourages foolish policies.

I hope I have told my story well. If I have succeeded, and also if I have not, after so many tales about the risk-uncertainty conundrum in small and large worlds, like Winnie the Pooh this story-teller is left sitting in his chair, thinking Great Thoughts to himself about Nothing, closes his eyes and nods off.[255]

[251] Jackson 2024. [252] Schrödinger 1985. Burgess 2018. Wilber 1984. Smetham 2010.
[253] Quoted in Pagels 1982: 74. [254] Pagels 2019: 13. [255] Milne 1928: ix–x.

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