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Lawyering Somewhere Between Computation and the Will to Act: A Digital Age Reflection

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ABSTRACT

This is a reflection on machine and human contributions to lawyering in the digital age. Increasingly capable machines can already unleash massive processing power on vast stores of discovery and research data to assess relevancies and, at times, to predict legal outcomes. At the same time, there is wide acceptance, at least among legal academics, of the conclusions from behavioral psychology that slow, deliberative "System 2" thinking (perhaps replicated computationally) needs to control the heuristics and biases to which fast, intuitive "System 1" thinking is prone. Together, those trends portend *computational* deliberation – artificial intelligence or machine learning – substituting for human thinking in more and more of a lawyer's professional functions.

Yet, unlike machines, human lawyers are self-reproducing automata. They can perceive purposes and have a will to act, characteristics that resist easy scientific explanation. For all its power, computational intelligence is unlikely to evolve intuition, insight, creativity, and the will to change the objective world, characteristics as human as System 1 thinking's heuristics and biases. We therefore need to be circumspect about the extent to which we privilege System 2-like deliberation (particularly that which can be replicated computationally) over uniquely *human* contributions to lawyering: those mixed blessings like persistence, passion, and the occasional compulsiveness.

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> *Until one is committed, there is hesitancy, the chance to draw back. Concerning all acts of initiative (and creation), there is one elementary truth, the ignorance of which kills countless ideas and splendid plans: that the moment one definitely commits oneself, then Providence moves too. All sorts of things occur to help one that would never otherwise have occurred. A whole stream of events issues from the decision, raising in one's favor all manner of unforeseen incidents and meetings and material assistance, which no man could have dreamed would have come his way. I have learned a deep respect for one of Goethe's couplet's: "Whatever you can do, or dream you can do, begin it. Boldness has genius, power, and magic in it."*
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> - William Hutchison Murray, often incorrectly attributed to Goethe[1]

INTRODUCTION

Increasingly capable machines will transform the work of human experts, including those I am most involved in educating: lawyers.[2] That strikes me as beyond any interesting debate, even if there is some segment of the law professoriate still bemoaning the obvious. At this point, the far more interesting subjects are the relative contributions of machine and human intelligence in making nuanced judgments and solving knotty problems. I borrow this definition of artificial intelligence (AI): machine computation that is capable of simulating some human-like cognitive processes, not merely limited to reasoning, strategizing, planning, and decision-making, but

[1] WILLIAM HUTCHISON MURRAY, THE SCOTTISH HIMALAYAN EXPEDITION (1951). While widely attributed to Goethe, nothing in the quote turns out to have its source in Goethe, as finally concluded by the Goethe Society of North America in 1998. Hyde Flippo, *A Well Known Quote Attributed to Goethe May Not Be Actually Be [sic] His*, THOUGHTCO., https://www.thoughtco.com/goethe-quote-may-not-be-his-4070881(last visited, June 7, 2019).

[2] RICHARD SUSSKIND & DANIEL SUSSKIND, THE FUTURE OF THE PROFESSIONS: HOW TECHNOLOGY WILL TRANSFORM THE WORK OF HUMAN EXPERTS 2 n2 (2015).

capable of processing symbols, context, language, spatial relations, and movement.[3] The AI development currently most relevant to lawyering is machine learning (ML), sometimes referred to functionally as "data mining."[4] This is "the analysis of (often large) observational data sets to find unsuspected relationships and to summarize the data in ways that are both understandable and useful to the data owner."[5] Currently, these state of the art computational tools (1) unleash processing power on vast stores of data to assess relevance in discovery or legal research, or (2) use logic and algorithms to undertake tasks involving complex computations like tax returns.[6] Just how powerful can these tools get? I agree with the characterization of a certain kind of thinking as the AI fallacy, "the mistaken supposition that the only way to develop systems that perform tasks at the level of experts or higher is to replicate the thinking processes of human specialists."[7] But some aspects of human judgment – the mental processes we experience as intuition, insight, creativity, and the will to act – still challenge the capability of the most sophisticated machines. The thesis here is that those qualities will be the contributions of human lawyering well into the digital age.[8]

Yet those qualities, if not under attack, are at least the subject of significant suspicion by some thoughtful scholars and teachers of lawyerly problem solving, decision making, and professional judgment. I have in mind the comprehensive, masterful, and balanced treatise co-authored by Paul Brest and Linda Hamilton Krieger, one I admire enough to use (good-naturedly) as a foil throughout this essay.[9] Brest and Krieger enthusiastically

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[3] Harry Surden, *Artificial Intelligence and Law: An Overview*, 35 GEORGIA. ST. U. L. REV. 1305, 1307 (2019) ("Surden, *Overview*"). For a quick summary of the difference between science fiction like "general AI" and the more common and realistic "narrow AI," *see id.,* at 1308-10*;* MEREDITH BROUSSARD, ARTIFICIAL UNINTELLIGENCE: HOW COMPUTERS MISUNDERSTAND THE WORLD 31-33 (2019).

[4] Harry Surden, *Machine Learning and Law*, 89 WASH. L. REV. 87 (2014) ("Surden, *Machine Learning*").

[5] Illhoi Yoo, et al., *Data Mining in HealthCare and Biomedicine: A Survey of the Literature*, 36 J. MED. SYST. 2431, 2432 (2012).

[6] Surden, *Overview*, *supra* note 3, at 1305.

[7] SUSSKIND & SUSSKIND, *supra* note 2, at 45. On the other hand, I am not going to rehash longstanding criticisms of the AI true believer camp. *See, e.g.,* HUBERT L. DREYFUS, STUART E. DREYFUS, & TOM ATHANASIOU, MIND OVER MACHINE: THE POWER OF HUMAN INTUITION AND EXPERTISE IN THE ERA OF THE COMPUTER (1986) ("DREYFUS").

[8] I *do* feel obliged to make a fine distinction regarding Professor Surden's gentle chiding of futurists on the subject of AI and lawyering. Surden, *Overview*, supra note 3, at 1306 n3. I am interested, whether or not it qualifies as futuristic speculation, in the differences between machines and humans when it comes to deciding and to translating thought into action. That is a practical here and now issue. I also want gently to push back against a certain disciplinary tunnel vision I perceive among many legal academics, namely that what we do and study is reducible a la physics, and therefore amenable to being wholly digitized.

[9] PAUL BREST & LINDA HAMILTON KRIEGER, PROBLEM SOLVING, DECISION MAKING,

take up the baton of another development coinciding with the advent of AI and ML: dual process theories of judgment and decision-making (often referred to as "JDM," an abbreviation I adopt), particularly the System 1 and System 2 modes of "thinking fast and slow" in the behavioral psychology pioneered by Amos Tversky and Daniel Kahneman.[10] In his iconic *Thinking Fast and Slow*, Kahneman laid out the most influential body of work on the difference between fast, intuitive, heuristic System 1 thinking and slow, analytic, data-based, comprehensive System 2 thinking. Those involved in the research express a range of normative views about the pluses and minuses of System 1 thinking. Depending on where you stand in that discussion, there is something of holy or unholy synergy. If you see human judgment as subject systematically to non-deliberative heuristics and biases, then it ought to come as no surprise that deliberation is often viewed as the disciplined parent and *intuition* is the unruly and not-quite-respectable stepchild of the problem-solving family.[11] If we combine algorithmic intelligence with behavioral psychology, the holy synergy is, whenever possible, to find an algorithm, a program, a machine that will take human heuristics and biases out of the problem-solving loop.[12]

Brest and Krieger focus on these tensions in their scholarly yet practical treatment of lawyering judgments. They treat System 2 "deliberation" (my shorthand for all reasoned manipulation of abstract symbols and empirical data), on one hand, and System 1 intuition, on the other, as "essentially two distinct but complementary, approaches to problem solving and decision making."[13] They are respectful of intuition, but in the same way I might be respectful of a useful but dangerous explosive. Indeed, they are inclined to

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AND PROFESSIONAL JUDGMENT: A GUIDE FOR LAWYERS AND POLICYMAKERS (2010) ("BREST & KRIEGER").

[10] DANIEL KAHNEMAN, THINKING FAST AND SLOW (2011). For a popular and readable telling of the Tversky and Kahneman story, *see* MICHAEL LEWIS, THE UNDOING PROJECT (2017). Dual process theories of cognition distinguish between thinking that is "fast, automatic, and high capacity" versus that which is "slow, controlled, and low capacity." Tversky and Kahneman did not originate the concept nor are they the only theorists of it. Charlotte L. Doyle, *Creative Flow as a Unique Cognitive Process*, FRONTIERS IN PSYCHOLOGY, Vol. 8, Article 1348 (2017), 2. But Kahneman's work is popular.

[11] This is particularly true when one refers to intuition as "gut feelings." The incumbent President of the United States has done many of us a disservice. When I refer to intuition, I do not mean to endorse it as a lazy alternative to digging into the details.

[12] Michael Livermore used just that phrase in contemplating the possibility of computationally self-executing legal rules, notwithstanding the famous jurisprudential debates about the "open texture" of language. Michael A. Livermore, *Rule by Rules*, in COMPUTATIONAL LEGAL STUDIES: THE PROMISE AND CHALLENGE OF DATA-DRIVEN LEGAL RESEARCH (Ryan Whalen, ed., forthcoming 2019), available at https://ssrn.com/abstract=3387701.

[13] *Id*., at 11.

metaphorical anthromorphism. Deliberation is the hero. Like an honest person, deliberation is "transparent" to the decision maker.[14] Here are the verbs that the forms of deliberation bring to the party: "expands," "conceives," "critiques," "envisions," "troubleshoots," "fine tunes," "selects," "implements," "enables," "helps," and "inspires."[15] And deliberation is a good friend and teacher. It can be "informed by intuition at the same time it corrects for the limitations and biases of pure intuition."[16] If deliberation has any flaw, it is too slow for most of the decisions we are obliged to make. Then intuition, by necessity, takes over.[17]

By contrast, intuition is at best a flawed antihero, if not a villain. Brest and Krieger cast intuition as invidious and insidious, at least metaphorically. It is "opaque." It is shaped by hard-wired cognitive "schemas" that shape our perception without our being aware of them.[18] It is influenced by affect, "ranging from a 'faint whisper of emotion to strong feelings of fear and dread, to visceral drives such as hunger and sexual need.'"[19] It is merely an antihero and not a villain, however, because it has at least one key benefit: it is fast. Even then, however, going fast can lead to error by causing the decision maker to overlook aspects of the problem or considering "an impoverished set of potential solutions."[20] Not surprisingly, then, when it came time to assess the interaction of deliberation and intuition, Professors Brest and Krieger turned to the behavioral psychology of Tversky and Kahneman.[21] While Brest and Krieger give a fair account of intuition and creative thinking, Kahneman's own view of intuition is dark and only grudgingly sympathetic. If it does not endorse the superiority of machine intelligence, it certainly gives it a leg up. Kahneman's bottom line is "Whenever we can replace human judgment by a formula, we should at least consider it."[22]

My casual empiricism is that, when it comes to dual process theories of cognition, many law professors would echo the normative themes in the Brest and Krieger treatise. We are inclined to keep intuition at arm's-length and inspiration on a short leash for all the reasons Kahneman identifies and then

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[14] *Id*.

[15] *Id*., at 13-14.

[16] *Id*., at 11.

[17] *Id*., at 14.

[18] *Id*., at 17-18.

[19] *Id*., at 19, *quoting* Paul Slovic, et al., *The Affect Heuristic*, in HEURISTICS AND BIASES: THE PSYCHOLOGY OF INTUITIVE JUDGMENT 397-420 (Thomas Gilovich, Dale Griffin, & Daniel Kahneman, eds., 2002).

[20] BREST & KRIEGER, *supra* note 9, at 25.

[21] *Id*., at 21. Indeed, the final paragraph of their acknowledgments says as follows: "The citations make evident our indebtedness to Amos Tversky, Daniel Kahneman, and many social psychologists who developed and expanded the lines of inquiry they began." *Id*., at xxviii.

[22] KAHNEMAN, *supra* note 10, at 233.

a few more of our own. First, there is good science behind the Brest and Krieger inclination to get beyond mere good judgment in common parlance, and to "draw heavily on the field of social science known as '[JDM]', in which 'judgment' refers mainly to the processes of empiricism—how one ascertains facts and makes predictions about the physical and social world."[23] Lawyers are not immune to judgment errors arising from heuristics and biases; "[JDM] focuses particularly on the systematic errors made by intuitive decision makers—all of us, much of the time."[24] Second, intuition or inspiration as the basis for legal outcomes seems simply non-theoretical or anti-scientific. Since Langdell's great dictum, law is supposed to have been "considered as a science" as to which "mastery … as to be able to apply them with constant facility and certainty to the ever-tangled skein of human affairs, is what constitutes a true lawyer…."[25] Scholarship not based in theory is, in the words of the respected and influential Columbia law professor and former University of Virginia Law School dean Robert Scott, "'lazy thinking masquerading as theory' or, worse, mere brute ipse dixit of Dean Scott's bête noir, the 'wise man.'"[26] Third, in other areas of professional endeavor, the point has been, as Brest and Krieger suggest, to bring discipline, rigor, and data to decisions that are better made with the support of discipline, rigor, and data. The quality revolution in manufacturing, the "lean enterprise," has been based on the use of data to undermine the conventional wisdom about efficiency.[27] Evidence-based management is superior to making it up as one goes along.[28]

I worry, however, about the extent to which we, as scholars and scientists, are selling short the non-deliberative process of thought – not just intuition but other forms of non-deliberative judgment as well. This will hardly be a rejection of the behavioral insights. On the other hand, I do not think many serious people would suggest that machines will replace human lawyers. The question is what to emphasize, in education and practice, about human capabilities in the digital age. Should lawyering follow Kahneman's default

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[23] BREST & KRIEGER, *supra* note 9, at xxix.

[24] *Id*.

[25] C.C. LANGDELL, SELECTION OF CASES ON THE LAW OF CONTRACTS vi (1871).

[26] Jeffrey M. Lipshaw, *Contract as Meaning: An Introduction to "*Contract as Promise *at 30*," 45 SUFFOLK L. REV. 601, 605-06 (2012).

[27] For the classic exposition of the difference between lean production and mass production, *see generally* JAMES WOMACK, DANIEL T. JONES, & DANIEL ROOS, THE MACHINE THAT CHANGED THE WORLD 21-69 (1990).

[28] JEFFREY PFEFFER & ROBERT I. SUTTON, HARD FACTS, DANGEROUS HALF-TRUTHS & TOTAL NONSENSE: PROFITING FROM EVIDENCE-BASED MANAGEMENT 3-6 (2006) (attributing Cisco's unusually successful track record in digesting acquired companies "without heartburn" to its "systematic examination of evidence about what went right and what went wrong in other companies' mergers").

rule and substitute formulas (particularly those capable of being translated into machine code) for human judgment wherever possible? If so, what is the best that algorithms and data science have so far offered lawyers for purposes of making their most sophisticated judgments? To the extent that making legal judgments and solving problems involve prediction and optimization, what do the tools of operations research, and processes like data mining, clustering, linear programming, decision trees, Bayesian updating, Markov models, Monte Carlo simulations, and the like bring to the party? And what are their limits? That is the subject of Part I.

In Part II, I jump to the far extreme of those qualities heretofore presumed to be reserved to humans. Over a forty-year professional career, in Kahneman's lexicon, my thinking has been both fast and slow. What that really means (with a nod to Ralph Nader) is that often I was unsure at any speed. At the same time, I made binary "go/nogo" decisions in the face of complexity and uncertainty. I have no doubt that much of what Brest and Krieger call deliberation can and will be replicated in machine thinking. But I am convinced, for the time being, that those machines can neither think inspirationally nor translate thought into action because they are not biological lifeforms evolved to the point that they perceive themselves as having ends or purposes (*telos*). Even in a mundane lawyering exercise (my example will be Audrey and her problem with a neighbor's impending violation of the zoning ordinance in her pastoral township), effective legal care-giving draws on a wide continuum of capabilities, with computation and formal logic at one end and the ability to perceive and act in pursuit of human ends and purposes at the other.

The purest form of System 2 thinking can be modeled computationally, symbols reducible to machine code consisting of 0s and 1s that replicate some forms of human reasoning. As we move on the thinking continuum *away* from computation, we encounter human characteristics less amenable to such reduction: intuition, insight, decision, and judgment, and the perception of purposes and ends. Then, beyond the end of the mental continuum, there is action itself. I have simply encountered too many close decisions in which the data supports arguments either way but for which the course of action requires a leap into the unknown. We are charged with teaching students to think like lawyers, but thinking that way, at best, only takes you to the precipice. It does not impel you to act. Acting is an aspect of *being* in the world. We can act and *be* without thinking; we can think without acting; we can translate our thoughts into action; we can reflect on what we are and what we have done. But the dark and despairing lesson is that acting (not just deciding) in the face of uncertainty means confronting a world "where

wildness lies in wait."[29]

Kahneman's heuristics and biases, the inspiration to solve problems, and the will to act stem from the same source: we are more than mere thinking machines. Trying to reconcile algorithmic calculations, at one extreme, and the will to act, at the other, leads to just the kinds of regress you would expect when trying to reconcile the fundamentally irreconcilable. To suggest that our goal, as lawyers or anyone else, is to cleanse our judgment-making of anything but algorithmic rationality is like suggesting that we cleanse human reproduction of its dependence on sexual desires. Neither inspiration nor sex is going away any time soon. We will have to live with the complements of deliberation and that which is beyond it. And like all matters involving irreconcilable complements – position and momentum in quantum mechanics; completeness and consistency in formal axiomatic systems; objective experience and subjective qualia; or how a good God permits evil – the experts explain but their explanations merely orbit some physical or metaphysical singularity that, to paraphrase Kant, is the final but unreachable Unconditioned truth.

I am not hopeful about law school pedagogy on this topic. In the singular moment of acting upon judgment, the complementarities of slow System 2 deliberation, on one hand, and fast System 1 thinking, on the other, cannot be reconciled. They can only be managed. For practitioners, it means that action, if not insight as well, will always be a leap into the wildness of the unknown. For those professors charged with educating those practitioners, the most likely outcome is that we can merely offer examples, empathy, and solace. Or to say, "Whatever judgment you can make, borne somehow out of data, intuition, and inspiration, begin it."

I. DIGITAL CAPABILITY AND LAWYERING

To paraphrase Brest and Krieger, if the task requires lawyers to ascertain facts and make predictions about the physical and social world, what AI tools are available? There is now a significant body of literature for the non-technical reader demystifying the claims of AI one sees, for example, on television commercials for IBM's Watson or for Microsoft's products. What follows is a baseline assessment of the state of the art in reducing real-life business and legal problems to computation.

A. Algorithmic Decision-Making Tools Generally

The term "artificial intelligence" is, at best, imprecise. Since World War

[29] PETER L. BERNSTEIN, AGAINST THE GODS: THE REMARKABLE STORY OF RISK 331 (Wiley, 1998) (quoting G.K. CHESTERTON, ORTHODOXY (1909).

II, the name for the discipline consisting of computational models for prediction and optimization in operational milieus like businesses, armies, or hospitals has been "operations research."[30] Its tools include linear regression forecasting, non-linear and multiple regression, time series forecasting, linear programming, multi-period planning, integer programming, efficiency analysis, multi-goal and non-linear programming, decision trees, Bayesian analysis, Markov models, queuing theory, Monte Carlo simulations, and stochastic risk optimization.[31] The tools provide mathematical solutions for problems of optimization like inventory management, railroad car placement, staff scheduling, investment risk management, television advertising sales, facilities placement, mail order catalog deliveries, human and machine waiting lines, and construction bidding.[32] When armed with computational logic and vast processing power, the tools outperform humans in generating relatively non-ambiguous answers when applying complex sets of constraints to equally complex circumstances.[33] Nevertheless, the key to effective use of the tools is knowing when and where their particular structure fits the problem to be solved.[34] In the sophisticated use of operations research tools to solve optimization problems, a human supplies the ends, namely the specific quantity, the "objective," to be determined mathematically based on a finite set of input variables and constraints.[35]

Many of the tools of operations research now fall within artificial intelligence, machine learning, or data mining, as I defined them above.[36] The most important tool for lawyering is data mining, which has come "to include pattern recognition, database design, artificial intelligence, visualization, etc."[37] In contrast to other operations research optimization tools, "data mining, without a hypothesis, explores data that have been collected in advance, and discovers hidden patterns from data. In short, data mining is a process of producing the general (i.e., knowledge or an evidence-based hypothesis) from the specific (i.e., data)."[38] If there is an additional implication to ML beyond data mining, it is that ML involves "iterative

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[30] DREYFUS, *supra* note 7, at 170-77 (1986); SAUL I. GASS & ARJANG A. ASSAD, AN ANNOTATED TIMELINE OF OPERATIONS RESEARCH: AN INFORMAL HISTORY (2005).

[31] RICHARD BRONSON & GOVINDASAMI NAADIMUTHU, SCHAUM'S OUTLINE OF THEORY AND PROBLEMS OF OPERATIONS RESEARCH (2d ed. 1982).

[32] *Id*., *passim*.

[33] Surden, *Overview*, supra note 3, at 1317-18. *See also* Illhoi Yoo, et al., *Data Mining in HealthCare and Biomedicine: A Survey of the Literature*, 36 J. MED. SYST. 2431, 2432-33 (2012).

[34] DREYFUS, *supra* note 7, at 191-92.

[35] *See, e.g.,* BRONSON & NAADIMUTHU, *supra* note 31, at 1, 155, 169; DREYFUS, *supra* note 7, at 171-72.

[36] *See supra* notes 3-6 and accompanying text.

[37] Yoo, et al., *supra* note 5, at 2432.

[38] *Id*., at 2433.

adjustment of mathematical parameters, data retention, and error correction techniques" by which the "ML algorithms are said to automatically update (or 'learn') through repeated exposure to data and optimise performance at various classification, prediction, and decision-making tasks."[39]

In machine learning, the programmer uses one or more of the above tools to create a model that predicts something. In every instance, the parameters of the model are reduction of something in the real world to a mathematical formula. In "supervised" or "predictive" learning, the programmer creates a model using tools like classification rules, regression, or time series analysis. Meredith Broussard's example is a model that will predict which credit card customers are likely to make late payments. The programmer feeds the model "training data," namely vast amounts of information about customers who paid late, and tests the model's predictions against results the programmer already knows. When satisfied with the model's accuracy, the programmer deploys it against the remaining data to generate predictive outputs. In "unsupervised" or "descriptive" learning, the programmer uses algorithms designed to spot hidden patterns in the data and thereby discover relationships between inputs and outputs previously not visible to the human programmer. The algorithmic tools consist of clustering, association, summarization, and sequence discovery.[40] As Harry Surden points out, "machine-learning systems are designed to learn and improve over time."[41] A good example is an email spam filter. It may begin as a supervised learning system with training data that the human programmer knows constitute either spam or desired email, and can be supplemented with unsupervised learning that associated particular data with spam.[42]

B. The State of the Art in Algorithmic Lawyering

I agree with Professor Surden's observation that current AI technology tends to work best for activities where the tools of machine-learning are effective, which are also those aspects of thinking that suit System 2 deliberation. A significant asset of AI technologies is that they *are* less prone to System 1 heuristics and biases. The flip side is that they "work poorly, or

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[39] Christopher Markou & Simon Deakin, *Ex Machina Lex: The Limits of Legal Computability*, https://papers.ssrn.com/sol3/papers.cfm?abstract_id=3407856.

[40] BROUSSARD, *supra* note 3, at 92-94; Yoo et al., *supra* note 5, at 2433. The Yoo article contains an extensive explanation of the algorithms used in supervised and unsupervised learning, including classification algorithms (naïve Bayesian, neural network, decision tree, support vector machine, classification based on association (CBA), ensemble, and adaptive boosting), clustering algorithms (hierarchical and partitional), and association algorithms, along with guidelines for using them. *Id*., at 2433-41.

[41] Surden, *Overview*, supra note 3, at 1313.

[42] *Id*., at 1312-15.

not at all, in areas that are conceptual, abstract, value-laden, open-ended, policy- or judgment-oriented; require common sense or intuition; involve persuasion or arbitrary conversation; or involve engagement with the meaning of real-world humanistic concepts, such as societal norms, social constructs, or social institutions."[43] I confess that I view most of the algorithmic lawyering tools, while technically interesting, as unexciting. These tools perform statistical analysis with greater precision or unleash processing power on vast stores of data, far beyond the capacity (or patience) of a human being. I am far more interested in the state of the art in machine simulation of the most subtle and nuanced human judgments – outcome predictions in the face of uncertainty and outcome optimization when the factors to be juggled resist expression in a finite and accessible set of mathematical equations.[44] Thus, what is the cutting edge, defined as those systems coming closest to simulating a practicing lawyer's most System 1 thinking?[45]

1. Well-established usages

a. Advocacy and policy analysis

Brest and Krieger offer almost 120 pages of superb text on lawyers' and policymakers' use of probability, statistics, regressions, and Bayesian analysis. The applications are primarily matters of proof – how to demonstrate that a particular foam insulation caused a particular rash outbreak; how to identify a cancer cluster; how to determine if an employer is engaged in wage-discrimination against certain classes of employees or that the death penalty is being imposed unduly based on race; and the correction of representativeness error in litigation (e.g. the "confusion of the inverse" in conditional probability manifested as the "prosecutor's fallacy").[46]

b. Texts as data: e-discovery and legal research

The application of machine learning to the massive documents often collected in litigation discovery is now almost passé. The key is that lawyers

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[43] *Id*., at 1322.

[44] Though it is over thirty years old, the Dreyfuses' *Mind Over Machine* is still a powerful and informed assessment of the limitations of AI. *See supra* note 30.

[45] Because my concern here is about judgment and decision-making, I have not included the area of "smart" or "computable" contracts. *See* Harry Surden, *Computable Contracts*, 46 U.C. DAVIS L. REV. 629 (2012); Jeffrey M. Lipshaw, *The Persistence of "Dumb" Contracts*, 2 STAN. J. BLOCKCHAIN L. & POL'Y 1 (2019).

[46] Brest & Krieger, *supra* note 9, at 123-239.

are using supervised and unsupervised machine learning on text – statutes, cases, regulations, documents – rather than quantitative data. Such learning requires "reducing text to numeric data that can be quantitatively analyzed to identify and characterize patterns."[47] An example is "technology-assisted review" (TAR). A lawyer creates a set of training or "seed" data based on documents the lawyer knows are relevant or irrelevant to the case. Through this process, the software learns which documents are relevant and irrelevant, and applies this analysis and coding to the overall data set, marking documents. The software becomes more adept at recognizing relevant documents because it learns from each training.[48] In litigation discovery, machine learning has fundamentally changed the game (although whether for better is still an open question) by routinely beating human trainers in retrieving relevant information.[49]

"Text as data" is also the basis for commercially available legal research platforms. In the most advanced versions, the system tries not just to retrieve cases but also to generate something approaching the text of the argument the lawyer wants to make.[50] The systems use natural language processing, i.e., the application of the algorithmic tools of supervised and unsupervised learning to text, to assess the relevance of cases, statutes, and regulations. Neural nets update and revise the quantitative relationship among the variables relevant to the question posed by the researcher.[51] Examples include ROSS[52] and Casetext's CARA.[53]

2. The cutting edge

Those are well-established or, at least, developing tools lawyers use to support their advocacy or policy positions, or to mine data revealing relationships that are helping in solving problems. Nobody would responsibly

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[47] MICHAEL A. LIVERMORE & DANIEL N. ROCKMORE, LAW AS DATA: COMPUTATION, TEXT, AND THE FUTURE OF LEGAL ANALYTICS ("LIVERMORE & ROCKMORE") xx-xxi (2019); Michael A. Livermore & Daniel N. Rockmore, *Distant Reading the Law*, in LIVERMORE & ROCKMORE, at 3, 11.

[48] Thomson Reuters, *How to make the e-discovery process more efficient with predictive coding*, https://legal.thomsonreuters.com/en/insights/articles/how-predictive-coding-makes-e-discovery-more-efficient (last visited, July 8, 2019). *See also* Surden, *Machine Learning*, *supra* note 4, at 110-14; LIVERMORE & ROCKMORE, *supra* note 47, at xiv-xvi.

[49] *Id*., at xv.

[50] Dana Remus & Frank Levy, *Can Robots Be Lawyers? Computers, Lawyers, and the Practice of Law*, 30 GEO. J. LEG. ETHICS 501, 521 (2017).

[51] Id., at 522.

[52] KEVIN D. ASHLEY, ARTIFICIAL INTELLIGENCE AND LEGAL ANALYTICS: NEW TOOLS FOR LAW PRACTICE IN THE DIGITAL AGE 351-52; (2017) ROSS, http://www.rossintelligence.com.

[53] CASETEXT, https://casetext.com/product.

suggest that they are anything but tools to assist the human lawyer. Rather, "machine intelligence is used to augment human cognition in a competitive strategic environment."[54]

Far greater challenges for algorithmic solutions lie in those problems in which lawyers must assess business and legal outcomes in the face not just of risk but of great uncertainty. The great theorist of risk and uncertainty, Frank Knight, distinguished the two: "It will appear that a *measurable* uncertainty, or 'risk' proper … is so far different from an *unmeasurable* one that it is not in effect an uncertainty at all."[55] A lawyer confronts uncertainty in counseling on almost every aspect of the convergence of business imperatives and legal considerations. Does the prospectus and registration statement filed with the SEC comply with all of the disclosure requirements of the Securities Act of 1933? Does the acquisition of the Z Corporation not violate Section 7 of the Clayton Act because it does not tend to diminish competition?[56]

The prototypical prediction for a lawyer is the outcome of litigation. Some cases, like personal injury, repeat themselves sufficiently that lawyers can develop either databases or heuristics that assist in the valuation (i.e. prediction of the outcome).[57] Harry Surden has speculated whether a machine-learning program in discrete areas of litigation, like workplace discrimination, might use data from previous lawsuits to assess outcomes in new cases.[58] Most business litigation, on the other hand, arising out of claims, for example, of contract breach, antitrust violation, or intellectual property infringement, are "one-off" in the sense of having so many variables, both substantive and procedural, as to resist measurable uncertainty (i.e. risk).[59] In other words, the machine-based predictive models must (a) be based on capturable data, (b) assess cases with similar pertinent features, (c) be able to avoid overfitting the data, and (d) avoid dealing with myriad extrinsic policy

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[54] LIVERMORE & ROCKMORE, *supra* note 47, at xv; Remus & Levy, *supra* note 50, at 523 (legal research systems like ROSS still require "substantial human role in defining and directing research").

[55] FRANK KNIGHT, RISK, UNCERTAINTY & PROFIT 205 (1964), *quoted in* BERNSTEIN, *supra* note 29, at 219.

[56] Detlev F. Vagts, *Legal Opinions in Quantitative Terms: The Lawyer as Haruspex or Bookie?* 34 BUS. LAW. 421, 423 (1979).

[57] *See, e.g.,* Peter Toll Hoffman, *Valuation of Cases for Settlement: Theory and Practice,* 1991 J. DISPUTE RES. 1, 6-7 (settlement value heuristic as a multiple of the special damages); Yun-chien Chang, et al., *Pain and Suffering in Personal Injury Cases: An Empirical Study,* 14 J. EMPIRICAL LEG. STUD. 199 (2017).

[58] Surden, *Machine Learning*, *supra* note 4, at 103-05.

[59] Vagts, *supra* note 56, at 427 (contemplating action X, the client asks the lawyer (1) how likely will X be detected, (2) if detected, how likely is it to be challenged legally, (3) if challenged, what is the likely outcome, and (4) what is the likely cost of an adverse decision on point (3)).

or other business imperatives.[60]

The accounting and legal professions long ago confronted each other on casting contingent liabilities in probabilistic terms.[61] Within GAAP, the United States mathematical model for financial accounting, uncertain liabilities are troublesome.[62] Under Statement of Financial Accounting Standards 5 ("SFAS 5"), a contingency is "an existing condition, situation, or set of circumstances involving uncertainty as to possible gain … or loss (hereinafter a 'loss contingency') to an enterprise that will ultimately be resolved when one or more future events occur or fail to occur."[63] The accounting profession groups loss contingencies into three buckets: "probable," meaning that the future event is likely to occur; "reasonable possible," meaning that the chance of the event is more than remote but less than likely; and "remote," meaning the chance of the event is slight. SFAS 5 requires recording the loss contingency as a liability if (a) the present available information indicates the future event is "probable," and (b) the amount of loss can be reasonably estimated.[64] Suffice it to say that the decision to accrue or not to accrue a charge on the financial statements can be significant for the enterprise's management and equity owners.[65]

Under generally accepted auditing standards, the auditors will request that a representative of the client (the chief financial officer or the controller) send a request to the client's lawyers who are representing it in any litigation that involves a loss contingency. The request will, among other things, ask the lawyer to opine on the loss contingency using the buckets set forth in SFAS 5. The form of the request and the response have been the subject of longstanding dialogue between the accounting and legal professions, with the latter's response set forth in a lengthy policy adopted by the American Bar Association. I can boil the message of the policy into one sentence. For many different reasons, "a lawyer should normally refrain from expressing judgments as to outcome except in those relatively few clear cases where it appears to the lawyer that an unfavorable outcome is either 'probable' or 'remote.'"[66] The ABA's reason for taking that position is that lawyers'

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[60] Surden, *Machine Learning*, *supra* note 4, at 105-07.

[61] *Id*., at 422-24.

[62] Karen M. Hennes, *Disclosure of Contingent Liabilities*, 33 J. ACCOUNTING & PUB. POL'Y 32 (2014); Jamie L. Yarbrough, *Mind the GAAP: Moving Beyond the Accountant-Attorney Treaty*, 92 TEX. L. REV. 749 (2014).

[63] FINANCIAL ACCOUNTING STANDARDS BOARD, FINANCIAL ACCOUNTING STANDARDS NO. 5: ACCOUNTING FOR CONTINGENCIES 4 (March 1975).

[64] *Id*., at 4-5.

[65] R. Alexander Swidler, *Toeing the Line: The Delicate Balance Attorneys Must Maintain When Responding to Auditor Inquiry Request Letters*, 50 IND. L. REV. 969 (2016).

[66] COMMITTEE ON AUDIT INQUIRY RESPONSES OF THE AMERICAN BAR ASSOCIATION, STATEMENT OF POLICY REGARDING LAWYERS' RESPONSES TO AUDITORS' REQUESTS FOR

relatively common usage of probabilistic terms has no meaningful predictive use. Thus, when a lawyer says to a client, "I think you have a 60-40 chance if we go to trial, that usage was "only undertaken in an effort to make meaningful, for limited purposes, a whole host of judgmental factors applicable at a particular time, without any intention to depict 'probability' in any statistical, scientific or empirically-grounded sense."[67]

To get a sense of how overwhelming this can be in the moment of decision, take a case in which I had some involvement and whose facts are on the public record.[68] Corporation A bought a business from Corporation B. After the deal closed, A discovered that the business is not nearly as profitable as it expected. In real life, A filed a lawsuit against B, claiming securities fraud, common law fraud, and breach of the representations and warranties in the acquisition agreement. But let us return, hypothetically, to the business and legal decision whether to file the lawsuit in the first place. In addition to all of the substantive and legal issues involved in the case, another uncertainty would have been the effect of the disclosure to the securities markets upon the filing the lawsuit that (a) the acquisition had been problematic, and (b) A's due diligence capabilities rather than any legal infirmity may have caused of the problem.

Presently the tools that might have provided A's management with a mathematical answer to the question "what should we do?" are as undeveloped as the General AI of science fiction. In theory, data could be available to support regressions and therefore probability estimates for every factor involved in the decision. Clustering could assist in determining whether there were relationships among the factors not previously detected by management or its lawyers.[69] Decision trees could provide a logical structure for reaching a conclusion, with the probabilities at each juncture set by the previously discovered regressions and relationships. Neural networks could adjust those relationships as additional data came to light. Computational models of legal reasoning and legal analysis could be employed.[70]

INFORMATION 8 (2003).

[67] *Id*., at 16.

[68] Great Lakes Chemical Corp. v. Monsanto Co., 96 F.Supp.2d 376 (D. Del. 2000); Great Lakes Chemical Corp. v. Pharmacia Corp., 788 A.2d 544 (Del. Ch. 2001). It did not go well for the good guys in either forum.

[69] *See* Surden, *Machine Learning*, *supra* note 4, at 107-08. For a detailed assessment of the application of machine learning tools to the fair use doctrine in copyright law (i.e., opining whether a particular use was fair), *see* Stephen McJohn & Ian McJohn, *Fair Use and Machine Learning*, *forthcoming*, NORTHEASTERN L. REV., https://papers.ssrn.com/sol3/papers.cfm?abstract_id=3406283 (2019).

[70] *See, generally,* ASHLEY, *supra* note 52; Charlotte S. Alexander, et al., *Using Text Analytics to Predict Litigation Outcomes*, in LIVERMORE & ROCKMORE, supra note 47, at

Apart from the business factors in the decision, I suspect little has changed between 1979, when Harvard Professor Detlev Vagts assessed the prediction of litigation outcomes for purposes of SFAS 5, and 2017, when the Legal Analytics Lab of Georgia State University conducted its own empirical study. Vagts presciently contemplated the use of mathematical representations of outcomes by way of decision trees using probabilities of success at each node.[71] He concluded, however, that, except for recurring incidents in the insurance context, "that the precision called by such a representation is seldom likely to be present in legal situations."[72] The Georgia State researchers used the tools of machine learning on text in all employment law cases in the United States District Court for the Northern District of Georgia from 2010 to 2017 (5,111 cases, approximately 8,600 court documents, and 200,000 text entries from docket sheets).[73] Not to take anything away from the admirable work but, as the researchers concluded, general predictive models for lawsuit outcome, much less predictive models for one particular area like employment litigation, are a long way off: "It is too early to claim that litigation pathways are now predictable … or that judges' decisions can be easily classified, forecast, or understood in bulk."[74] Moreover, even if researchers can refine the model, legal diagnoses (including predictions of litigation outcomes) will struggle with the same issue that medical researchers face in mining data in aid of clinical diagnoses: "garbage in, garbage out."[75] And even if the model can predict litigation outcomes, will it also assess the circum-litigation issues like those facing Corporation A when deciding whether to litigate at all?

Might legal AI software develop "intuitions" about legal outcomes in the same way that AlphaGo and AlphaGoZero seem to have developed intuitions about moves in the game of Go? The answer is that the AI "intuition" is in fact unsupervised machine learning on a vast amount of data, namely the millions of games of Go that the machine plays with itself, and then the use of that learning to assess probabilities of success at each move.[76] I believe the

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275-311; Surden, *Machine Learning*, *supra* note 4, at 102-07.

[71] Vagts, *supra* note 56, at 424-25.

[72] *Id*., at 428.

[73] Alexander, et al., *supra* note 70, at 276.

[74] *Id*., at 310. Other attempts to predict case outcomes have used relatively restricted data sets, including Canadian capital gains tax cases, Supreme Court of the United States opinions, trade secrets cases, and intellectual property cases. ASHLEY, *supra* note 52, at 107-26. As Professor Ashley notes, humans still do most of the work determining the significant features of prediction, with machine learning more helpful in determining the weight to accord the feature. *Id*., at 125. *See also* Remus & Levy, *supra* note 50, at 524-25 (automated legal analysis and strategy involving prediction of outcomes "[a]s of now … can only be constructed for repetitive and fairly narrow tasks under specific bodies of law….").

[75] Yoo, et al., *supra* note 533, at 2445.

[76] Vince Tabora, *Artificial Intuition and Reinforcement Learning, The Next Steps in*

issue is "garbage in, garbage out." Real life presents far more possibilities than even the complex strictures of AlphaGo. So perhaps someday something that looks like AI legal intuition will exist. But that still does not end the inquiry. AlphaGo "knows" that its job is to win the game. How did it learn or decide that? I thus turn to an assessment of less algorithmic or deliberative forms of judgment, decision-making, and action.

II. ENDS, THOUGHT, AND ACTION

A. A Segue (or a Leap) from Algorithms (Machines) to Ends (Minds)

Only a fool or a Luddite would deny the impact and the value of both System 2 deliberation and algorithmic analysis in support of decision-making. Yet the distinguished theorist and practitioner of intuition, Gary Klein, has a profound assessment of the relative benefits of System 1 and System 2 thinking when it comes to insight. He correctly observes that the emphasis of the H&B community is to use System 2 thinking to reduce the common errors produced by System 1 intuitions. He noted, however, "it is important to counterbalance this negative impression of System 1 with a sense of awe and appreciation about the insights we create and the discoveries we make."[77] My own sense of awe and appreciation also includes "our ends and purposes and our will to act based on them." I am a poor excuse for a futurist, but I will bet those will be the last aspects of our experience to be digitized. The tools of the digital age are still tools even if they may become more inscrutable. Tools will not be agents until and unless they learn to determine their own ends and purposes and the will to propel themselves in their pursuit.

The segue from algorithms to ends begins with a story. I spend the summers in northern Michigan. I am an alumnus of the University of Michigan, and our family has a significant connection with the University's medical school. The University's development office holds a large event in the area each summer, and we usually have a chance afterwards to attend a dinner with leader of the med school. At one such event, Carol Bradford, the executive vice dean for academic affairs (the chief academic officer within the University's broader health system) gave her usual after-dinner talk about the school. Thinking about this essay, I asked her, at the end of the Q&A, about AI and medicine and what she thought the last thing about health care

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Machine Learning, BECOMING HUMAN: ARTIFICIAL INTELLIGENCE MAGAZINE, https://becominghuman.ai/artificial-intuition-and-reinforcement-learning-the-next-steps-in-machine-learning-6f2abeb9926b (Nov. 18, 2018).

[77] GARY KLEIN, SEEING WHAT OTHERS DON'T: THE REMARKABLE WAYS WE GAIN INSIGHTS ("KLEIN, INSIGHT") 98 (2013).

to be digitized would be. Like me, she lauded what AI would bring to the party. But after just a few seconds of thought, she answered "The interaction with the patient."

Later, I asked both her and myself why that seemed like a correct answer, and then proceeded to answer my own question. I had thought about something else she had discussed during the talk, Michigan's approach to its selection of incoming students (something close to 8,000 applications for about 170 spots). She noted that Michigan might have slipped in the U.S. News rankings because its admissions process emphasized certain goals perhaps at the expense of GPA and MCAT scores. It reflected something she had previously written: that the school's curriculum would have "at its core, the expectation that our students will be change agents who transform medicine and health care," that the everyone in the community "share these expectations," and that students' voices "often have spurred adjustments to the proposed course of action."[78] The abstraction of "transformation" jumped out at me, evoking what the Greeks called *telos*, meaning purposes or ends, from which the word *teleology* derives. Aristotle observed, not just in human tendencies but in nature itself, what he called "final cause," or that "for the sake of which things happen." [79] That is, nature seems to present invariable sequences of events that seemingly occur not incidentally or by chance, but for a purpose. For example, animals grow teeth in regular patterns because such arrangements of teeth are good for the purpose or end of promoting the animal's survival.[80] Transformation is teleological. Dean Bradford's vision for the school rested on agents who perceived ends and purposes, who saw a need to change from what is now to what ought to be in the future. Caring for a patient is teleological. The provider and the patient each have a subjective end or purpose, and those ends have been fused or melded. And ends and purposes are what are least capable of being digitized.

This conversation followed on my own contemporaneous experience of providing care, albeit as a lawyer. I board a horse at a stable located on a 100-acre farm in an idyllic rural, pastoral township in northern Michigan. The owner of the stable (call her Audrey) approached me, concerned about a potential noisy and congested commercial use on a nearby farm and its effect on both the quality of the neighborhood generally and on the well-being of her equine charges specifically. Audrey asked if I would help her craft comments to the township supervisory board in opposition to the use. I said "Of course." Over the course of a long career I have been involved in far

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[78] Carol R. Bradford, *Our Voices of Change*, MEDICINE AT MICHIGAN (Summer 2017), http://www.medicineatmichigan.org/news-research/2017/summer/our-voices-change.

[79] Falcon, Andrea, *Aristotle on Causality*, STAN. ENCYCL. OF PHIL. (2019), https://plato.stanford.edu/ archives/spr2019/entries/aristotle-causality/>.

[80] ARISTOTLE, PHYSICS Book II, §8.

more complex transactions where far more money was at stake. But this was legal care-giving in microcosm. I will return to the story after further consideration of ends and purposes, not to disparage the analytics in my lawyering on Audrey's behalf, but to observe what a small part they constituted of the entire legal care-giving relationship.

But now it is time for a leap, not just a segue. I consider it a mistake to assess human versus machine capability merely by focusing on the increasing capabilities of machines. It strikes me as more than plausible that human thought is "shaped crucially by the peculiarities of our human bodies, by the remarkable details of the neural structure of our brains, and by the specifics of our everyday functioning in the world."[81] I want to come at intuition and insight not to criticize their System 1 flaws or to explore their conceivable replication in digitized rationality, but to consider them as features of minds existing in a physical world.[82] What is it about our psychological natures and physical embodiments that produce non-deliberative thought, the desire to achieve an end, and the will to pursue the end? How might our hardwired tendency to infer purposes and ends even in mindless processes, our innate categorizations, and our ability to break or transpose those categories inform lawyerly judgment and decision making beyond Kahneman's ideal of perfect rationality? And what does it mean to act rather than merely to think about acting?

My thesis is that ends, purposes, and the will to act are likely as critical to effective lawyering as thought. Even beyond intuition and insight, they will remain particularly human contributions to lawyering in the digital age. This is not merely a question of empirical judgment (i.e. science) but also one of philosophy. Bear with me as I deliberate about what the focus on deliberation and System 2 thinking leaves out.

B. The Embodied Telos

1. The evolution of ends

Before his early death, John von Neumann, widely considered one of the smartest people who lived in the twentieth (or any) century, began to develop a theory of both biological and machine automata.[83] What I mean by an

[81] GEORGE LAKOFF & MARK JOHNSON, PHILOSOPHY IN THE FLESH: THE EMBODIED MIND AND ITS CHALLENGE TO WESTERN THOUGHT 3-5 (1999).

[82] Dale Purves, *What does AI's success playing complex board games tell brain scientists?* 116 PNAS 14785, 14786 (2019) ("The presumption is that AI solves problems the way humans do, ignoring the fact that the way we solve problems is largely a mystery.")

[83] He never completed the work. His colleague, Arthur Burks, compiled part of it in JOHN VON NEUMANN, THEORY OF SELF-REPRODUCING AUTOMATA (Arthur Burks ed., 1966) (the PDF version of the complete book, to which my page cites refer, is available at

automaton is a mechanical (artificial) or biological (natural) system that undertakes tasks toward the accomplishment of a purpose.[84] A Turing machine or its physical instantiation, a digital computer, is an automaton.[85] Von Neumann's broad, uncompleted project was to develop a formal, abstract (i.e. mathematical) complete model of automata "lying in the intermediate area between logic, communication theory, and physiology."[86] It was to be to all automata what the conception of the universal Turing machine was to computers, namely a mathematical abstraction incorporating the essential elements of universality, constructability, self-reproduction, and evolution.[87]

Von Neumann thought the basis of comparison between mechanical and biological automata lay in *code*, "a system of logical instructions that an automaton can carry out and which causes the automaton to perform some organized task."[88] In biology, these instructions might involve "nerve pulses appearing on the appropriate axons, in fact anything that induces a digital logical system, like the nervous system, to function in a reproducible, purposive manner."[89] He speculated on the translation between *complete* codes (what we would call machine code) and *short* codes (what we would now call higher level programming languages) and their biological nervous system analogs.[90] But he died even before finishing his chapter on self-reproduction and evolution.[91] Nevertheless, he recognized that extension of a theory of self-producing automata to biological systems would be its most problematic aspect.[92] For example, computers are designed to stop when there is a single error so the engineer can find it and correct it. Not so in natural organisms. Von Neumann speculated:

> The fact that natural organisms have such a radically different

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https://archive.org/details/theoryofselfrepr00vonn_0) ("VON NEUMANN, AUTOMATA"). Part of it consisted of manuscripts of the undelivered Silliman Lectures at Yale University, published posthumously as JOHN VON NEUMANN, THE COMPUTER AND THE BRAIN (3d ed., 2012) ("VON NEUMANN, COMPUTER"). Ray Kurzweil claims that of the five key ideas that underlie the information age, von Neumann was responsible for three and contributed significantly to the fourth. Ray Kurzweil, *Forward to the Third Edition*, in VON NEUMANN, COMPUTER, at xi-xii. *See also* MELANIE MITCHELL, COMPLEXITY: A GUIDED TOUR 123-26 (2009).

[84] VON NEUMANN, COMPUTER, *supra* note 83, at 70-71.

[85] Arthur Burks, *Editor's Introduction*, in VON NEUMANN, AUTOMATA, *supra* note 83, at 14.

[86] VON NEUMANN, AUTOMATA, *supra* note 83, at 91.

[87] *Id*., at 91-93.

[88] VON NEUMANN, COMPUTER, *supra* note 83, at 70-71.

[89] *Id*., at 71.

[90] *Id*. at 71-83.

[91] VON NEUMANN, AUTOMATA, *supra* note 83, at 93.

[92] *Id*., at 91.

> attitude about errors and behave so differently when an error occurs is probably connected with some other traits of natural organisms, which are entirely absent from our automata. The ability of a natural organism to survive in spite of a high incidence of error (which our artificial automata are incapable of) probably requires a very high flexibility and ability of the automaton to watch itself and reorganize itself.

This is tantalizing.[93] Have we learned anything in the intervening sixty-plus years that bears on how a natural or digital automaton might come to be able to construct its own ends, to have its own teleology? I start with the bald assertion that we have subjective inner consciousness, the source of which is still difficult to explain, and that teleology is a by-product of that consciousness.[94] The key evolutionary step toward subjective and self-referential consciousness, under neuroscientist Michael Gazzaniga's thesis, was "semiotic closure," whereby living systems evolved a "self" capable of replication by way of symbols (e.g. patterns of DNA nucleotides) existing within the system itself. [95] Thus, a computer, even one capable of machine learning through neural nets, is not a closed semiotic system because the ultimate codemaker is a programmer who is not part of the system.[96] As von Neumann observed and is still true, "The use of a modern computing machine is based on the user's ability to develop and formulate the necessary complete codes for any given problem that the machine is supposed to solve."[97] Thus, there are no non-natural self-reproducing automata, and semiotic closure continues to be a matter of biology rather than cybernetics.

There is an even more fundamental thesis about teleology as an inherent feature of evolved organisms, of which we humans are one of the most complex examples. Meaning descends and evolves both biologically and as a matter of thought. Kahneman derides the idea of simplified hindsight narratives of cause-and-effect – winners writing the history – masking the randomness of events in the world. But there is a plausible thesis that winning genes also write the history. The kind of interpretation that Kahneman thinks is misguided is at the very heart of the evolution of conscious life itself. The evolutionary biologist David Haig has reflected on the relationship of the randomness of natural selection and the powerful sense of evolution having

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[93] Particularly so, as von Neumann died in February 1957 and Watson and Crick first announced their proposed structure for DNA in April 1953. J.D. Watson & F.H.C. Crick, *Molecular Structure of Nucleic Acids: A Structure for Deoxyribose Nucleic Acid*, 171 NATURE 737 (1953).

[94] A portion of the discussion that follows appears in Lipshaw, *supra* note 45.

[95] MICHAEL S. GAZZANIGA, THE CONSCIOUSNESS INSTINCT: UNRAVELING THE MYSTERY OF HOW THE BRAIN MAKES THE MIND 181-97 (2018).

[96] *Id*., at 188.

[97] VON NEUMANN, COMPUTER, *supra* note 83, at 71.

an Aristotelian final cause.[98] As he observed about himself, there was no way to know which of his father's sperm would fertilize his mother's egg. And if his father's father, an ambulance driver in the First World War, had not survived the second battle of Villers-Bretonneux, there would have been no such sperm at all. Writes Haig:

> The point of this reductio ad absurdum is that, while all evolutionary processes are, in principle, reducible to physical causes, no feasible account can be causally complete. Every story needs a place to begin which leaves many things unsaid. So too, all scientific explanations include items that, for present purposes, are accepted without explanation.[99]

Haig's fundamental point is that merely to look at evolutionary processes in terms of what Aristotle would have called "efficient cause," the explanatory of how things work, seems incomplete. What final cause supplies is meaning derived from an otherwise seemingly random process.[100] That meaning comes from interpreters. Outside interpreters (i.e. scientists and technicians) may derive meaning from particular information in DNA sequences to achieve their ends. Hence, a technician who reads T rather than A in the output of an automatic sequencer may infer that a fetus will express hemoglobin S. A geneticist may use selectively-neutral single-nucleotide polymorphisms to isolate a disease causing gene.[101]

But interpretation of the code may occur within the organism itself. Genetic molecules interpret the text in other molecules and replicate by interpreting themselves. Texts and interpreters represent each other reciprocally. The same molecular text can mean different things to different interpreters. Reciprocal representation occurs between the strands of DNA, between DNA and the messenger RNA that transcribes it, between a protein and the mRNA from which it is translated, and between DNA and a protein. At increasing levels of complexity, from RNA polymerases to amino acids to proteins to cells to neurons to brains, "[l]ife is made meaningful by a multitude of mindless interpreters reinterpreting the molecular metaphors of other mindless interpreters."[102] Consistent with Gazzaniga's description of semiotic closure, Haig notes, "Organisms are self-constructed interpreters of genetic texts in environmental context."[103] That is, environment interacts with such organic semiotics to produce natural selection, the "complex

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[98] David Haig, *Fighting the Good Cause: Meaning, Purpose, Difference, and Choice*, 29 BIOL. & PHIL. 675, 695 (2014)

[99] *Id*., at 676.

[100] *Id*., at 677.

[101] *Id*., at 681.

[102] *Id.,* at 682.

[103] Haig, *supra* note 98, at 682.

causal dependence between past environments and patterns and processes within cells."[104] Even the passage of semiotic information is random, affected, for example, by culling or mutation.[105]

Haig's thesis is that the winning genes and the winning organisms write the history. The evolutionary process takes on what appear to be ends and purposes because, in retrospect, it is the narrative of how the organism came to be, out of all the myriad possibilities, what it is *now*. Says Haig:

> There is a causal story behind each and every mutation, each and every chiasma, each and every choice of a mating partner, each and every union of gametes, each and every catastrophe that did not happen. But this story is untellable because of incomplete information, chaotic dynamics, and computational complexity. And if it could be told, the story would be incomprehensible. One must simplify to tell a tale, giving greater salience to some items and leaving loose ends.[106]

Nevertheless, Haig's own interpretation of after-the-fact narrative building is significantly more optimistic than Kahneman's. Final cause, the imputation of ends or purposes by way of metaphor and narrative, has explanatory oomph. We explain how we got to here because we are here by the way we got here. "Natural selection is both a metaphor and a metaphorical process of recursive representation. It is a meaningless, purposeless, physical algorithm that produces things for which meaning and purpose are useful explanatory concepts."[107] That random process produces, among other things, ourselves, "rational agents, with beliefs and desires, pursuing conscious goals, exchanging truthful and deceptive information, who can delight in a meaningful life."[108]

The theoretical biologist and complex systems researcher, Stuart Kauffman, has a similar thesis about final cause. In contrast to the systems modeled by physics, the biosphere as a whole is nonergodic. It is unpredictable yet not entirely random in its evolution. Unlike systems physics studies at the atomic level, the complex molecules of organic matter are not capable of visiting all possible states. In other words, the universe has created all of the possible stable atoms, but it is has not created all of the possible proteins.[109] In Aristotelian terms, biological organs and organisms

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[104] *Id*.
[105] *Id*., at 688.
[106] *Id*., at 694.
[107] *Id*., at 695.
[108] *Id*.
[109] STUART A. KAUFFMAN, A WORLD BEYOND PHYSICS: THE EMERGENCE & EVOLUTION OF LIFE 2-4 (2019).

have purposes, that is, final cause or reasons for existence, that are not reducible to the wholly efficient causes of physics.[110] Hearts, for example, "*exist in the nonergodic universe above the level of atoms by virtue of their functional role in abetting the survival of living, evolving organisms having such hearts*."[111]

The punchline here is to distinguish our particular biological form of self-reproducing automata as uniquely conscious and capable of pursing ends and purposes. Michael Gazzaniga suggests that consciousness is an instinct, adopting William James's definition: "the faculty of acting in such a way as to produce certain ends, without foresight of the ends, and without previous education in the performance."[112] Some instincts, like "anger, shyness, affection, jealousy, envy, rivalry, sociability, and so on," we share with other animals.[113] In the case of humans, higher-level mental states that arise in the cerebral cortex interact with instincts arising in the sub-cortex to produce complex behaviors, all of which we perceive as consciousness, and its by-product, free will.[114] Not only do we have instinctive ends, but we can propel ourselves to act on them.[115] I am willing to compare myself with AlphaGo, the apparently intuitive game-playing machine. Even if has a telos that is to win games of Go, a human gave it that purpose. I am pretty sure that AlphaGo has not achieved semiotic closure in which its ends might include continued self-replication, survival, beliefs, desires, or delighting in a meaningful life.

2. The telos of System 1 thinking

Brest and Krieger focus on how lawyers and lawyer-educators should approach what they characterize as empirical judgments; "how one ascertains facts and makes predictions about the physical and social world."[116] Indeed, much of the debate about JDM is really about cause-and-effect, the relationship of everything that has happened up to the moment of judgment to everything that will occur after it. We do a pretty good job of teaching lawyers how to take stock of the past and use it rationally to assess the future. We are not as good about the problem of deciding in that moment what to do

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[110] *Id*., at 11-15.

[111] *Id*., at 7 (emphasis in original). Like Gazzaniga, Kauffman proposes a biological explanation – "constraint closure" – for the appearance of self-generated ends or purposes in closed biological systems like cells. *Id*., at 27-31.

[112] GAZZANIGA, *supra* note 95, at 232, *quoting* William James, *What is an Instinct?* 1 SCRIBNER'S MAG. 355 (1887).

[113] *Id*., at 231-36.

[114] *Id*., at 232-35.

[115] *Id*., at 235.

[116] BREST & KRIEGER, *supra* note 9, at xxix.

next, and then mustering the will to do it. I want to move the needle further away from Kahneman's skepticism even than the more balanced approach of Brest and Krieger, one I think still unduly privileges deliberation as the check on all thing non-deliberative. Getting better at educating the practice of deciding and acting entails understanding what Kahneman's influential behavioral psychology leaves out about getting from thought to action.

The point of turning to theoretical biologists like Gazzaniga, Haig, and Kauffman is this: ends and purposes are the difference between algorithmic, physics-like, computational processes and human thought. No being whose "thought" originates in ones and zeroes (like the tools of operations research) has ends beyond those supplied by another being with ends – and humans are the only such being yet extant. Kahneman's philosophy of judgment and decision-making privileges a particular conception of cause-and-effect that operates more like physics than biology. He measures human judgment against a purified and mathematical computation of risk. Human beings regularly and predictably perceive causal relationships in ways not supported by the mathematical probabilities an objective observer could demonstrate. What I am suggesting here is the connection between heuristics and biases, on one hand, and ends and purposes (*telos*), on the other, in human attributions of cause-and-effect.

To be clear, I am sympathetic to Kahneman's contempt for certain attributions of cause-and-effect. What he calls the "illusion of understanding" is otherwise known as hindsight bias, the tendency to say after-the-fact that the observer "knew it all along."[117] One of Kahneman's examples is my own bête noire: the willingness of so many observers to contend after the fact that they *knew* the 2008-09 financial crisis was the inevitable bursting of a bubble.[118] What he calls the "illusion of validity" is in turn the elevation of the illusion of understanding into an unfounded confidence in one's ability to predict the future based on the past. And underlying both illusions is "our tendency to construct and believe coherent narratives of the past."[119]

But that is precisely what *telos* is. May we really dismiss it as nothing but an illusion? Thinkers at least as eminent as Kahneman have been more circumspect. Kant was likely as skeptical as Kahneman about the attribution of a narrative to causation in nature or human events. Kant saw no *a priori* reason to assume that nature had purposes as human beings have them. Instead, he thought it was an aspect of *human* nature, as minds observing the apparent order and design of the world, to infer purposiveness in nature from

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[117] KAHNEMAN, *supra* note 10, at 202-03.

[118] *Id*. at 201. *See* Jeffrey M. Lipshaw, *The Financial Crisis of 2008-2009: Capitalism Didn't Fail, but the Metaphors Got a "C"*, 95 MINN. L. REV. 1532, 1533-34 (2011).

[119] KAHNEMAN, *supra* note 10, at 218.

the fact of human purposiveness.[120] Like Kahneman, Kant was careful to distinguish what human beings could know (as opposed merely to believe) about cause-and-effect. Kahneman's contempt for those who claimed previous *knowledge* of the inevitability of the financial crisis is palpable and justified. They can only say now that they knew it *would* happen because it *did* happen. They may have thought or believed it would happen; that, however, is not the same as knowledge. And the import to Kahneman is the pernicious illusion "that the world is more knowable than it is."[121] Kant had a similar view; indeed, he considered "transcendental illusion" to be the mistaking of belief engendered by pure reason for empirical knowledge.[122] Kant acknowledged the power of the causal narrative at the same time he recognized proof or disproof of such purposes in nature to be beyond the capability of human knowledge.[123]

As I said, I am sympathetic to Kahneman's view that, when it comes to after-the-fact attribution of cause-and-effect, the winners write the history. Indeed, it is eerily consistent with Haig's evolutionary account, even down to the example from the randomness of fertilization. Those who reflect on it (i.e. employing their System 2 thinking) recognize that "reality emerges from the interactions of many different agents and forces, including blind luck, often producing large and unpredictable outcomes."[124] They are less inclined to explain the relationship of past and future by way of grand and coherent theories. They are skeptical of any image of the "march of history" that "implies order and direction." As Kahneman points out, there was a moment in time, just before an egg was fertilized, when there was fifty-fifty chance that embryo that became Hitler would be female (and thus presumably not likely to have lived a life like Hitler's).[125] Indeed, we *should* be skeptical of such grand attributions of order and direction between the past and future.

With all due respect to Kahneman, I suspect that teleology is more than mere illusion or cognitive error. To deride the illusion of understanding and validity as sources of the mistakes is to underestimate how those same illusions, when cast more favorably as teleology, foster creativity and initiative. Teleology, including the "illusions" of System 1, stem from the fact that we are biological lifeforms that have evolved to perceive ourselves as having ends and purposes. Those ends and purposes bring something to the judgment and decision-making process that a machine (at least under present

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[120] IMMANUEL KANT, CRITIQUE OF JUDGMENT 153-54 (J.H. Bernard trans., Dover Publications 2005) (1790).

[121] KAHNEMAN, *supra* note 10, at 201-02.

[122] IMMANUEL KANT, CRITIQUE OF PURE REASON 590 (trans. Paul Guyer and Allen W. Wood, 1999) (1781).

[123] KANT, CRITIQUE OF JUDGMENT, *supra* note 120.

[124] KAHNEMAN, *supra* note 10, at 220.

[125] *Id*., at 218-21.

technologies) cannot. So merely to dismiss the creation of narrative as a distortion or oversimplification of the complexity of cause-and-effect is to ignore the adaptive benefits of choosing and acting in a way that goes beyond rational thought. To dismiss the illusions of understanding and validity is to dismiss their sources – our human ability to contemplate the *telos*.

Our goal ought not to be the containment of those evolved characteristics but encouraging their positive development for the benefit of lawyerly judgment. My thesis in the remainder of this essay is that to deride System 1 in favor of deliberative System 2 is to downplay just how important ends, purpose and action are to the moment of judgment.

C. Intuition As More Than Mere Thought

When must less rational or reflective processes supplement or replace analytics in sophisticated judgment-making? The first such process is intuition. I define it as "an experienced-based process resulting in a spontaneous tendency toward a hunch or a hypothesis."[126] Brest and Krieger provide an example *par excellence* for lawyers. A young lawyer is trying her first case as lead counsel. She is about to make a legally warranted hearsay objection when the more experienced second-chair lawyer tugs at her sleeve and says to let it pass. Why? It is because the more experienced lawyer knows that the subject matter of the testimony is unimportant, that judges and juries get annoyed by lawyers who object too much, and the judge was communicating her increasing irritation.[127]

This is precisely the kind of professional intuition, borne of experience and cycles of learning, we respect. Kahneman quotes Herbert Simon: "The situation has provided a cue; this cue has given the expert access to information stored in memory, and the information provides the answer. Intuition is nothing more and nothing less than recognition."[128] While the "fast and frugal" mental processes of intuition may lend themselves to the errors produced by heuristics and biases, they do not strike me as particularly mysterious. It may be harder to understand or identify its components than for System 2 deliberation. However, that form of intuition is still about using facts to make predictions about the physical and social world. And to the extent that intuition is merely very, very fast processing of many data inputs, it does not surprise me that AI as, say, in the case of AlphaGo, makes what

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[126] Thea Zander, Michael Öllinger, & Kirsten G. Volz, *Intuition and Insight: Two Processes that Build on Each Other or Fundamentally Differ?* 7 FRONTIERS IN PSYCHOLOGY, Art. 1395 (2016), at 2, doi:10.3389/fpsyg.2016.01395.

[127] BREST & KRIEGER, *supra* note 9, at 5.

[128] KAHNEMAN, *supra* note 10, at 11, *quoting* Herbert A. Simon, *What is an Explanation of Behavior?* 3 PSYCH. SCI. 150, 155 (1992).

appear to be intuitive judgments.[129]

Much of the debate about deliberation and intuition involves the substitution of the latter for the former when it comes to empirical judgments and predictions. How likely is it that something will occur? The core of Kahneman's work with Tversky is that cognitive heuristics and biases – primarily involving the availability and representativeness of information and the "anchors" or "frames" from which that information is observed – lead to predictable illusions or errors of judgment (often referred to as "H&B"). In particular, subjective and intuitive assessments of probability vary from the results that would be predicted by the mathematics of probability and statistics.[130] The science of H&B theory largely turns on laboratory style experiments in which subjects are asked to assess the probability of an event. The famous example is the "Linda experiment." Subjects are told that Linda is thirty-one years old, single, outspoken, and bright. As a student, she was deeply concerned about issues of discrimination and social justice, and participated in anti-nuclear demonstrations. Subjects were then asked about the probability that Linda possessed series of possible characteristics. In the starkest form of the experiment, the question to the subjects was which of these two alternatives was more probable: (a) Linda is a bank teller, or (b) Linda is a bank teller and active in the feminist movement. Kahneman and Tversky reported that respondents consistently chose (b) overwhelmingly over (a). This was the case even though as a matter of simple logic, all of (b) must be contained in the set of (a). Logically, (b) cannot be more probable than (a). Kahneman and Tversky called this the conjunction fallacy: people judge the conjunction of two events to be more probable than the probability of one of the events alone.[131]

While there is a contending school known as "fast and frugal" ("F&F") that engages with the H&B theorists on the nature and the cognitive value of the heuristics themselves, their debates have turned largely on the results of psychological laboratory experiments and their interpretation.[132] I am more

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[129] Purves, *supra* note 82, at 14785-86.

[130] *See generally* Amos Tversky & Daniel Kahneman, *Judgment Under Uncertainty: Heuristics and Biases*, 185 SCIENCE 1124 (1974).

[131] KAHNEMAN, *supra* note 10, at 156-59.

[132] The most prominent F&F theorist is Gerd Gigerenzer. *See* GERD GIGERENZER, RISK SAVVY: HOW TO MAKE GOOD DECISIONS (2014) ("GIGERENZER, RISK"); GERD GIGERENZER, GUT FEELINGS: THE INTELLIGENCE OF THE UNCONSCIOUS (2007) ("GIGERENZER, GUT"). In *Thinking Fast and Slow*, Kahneman characterizes Gigerenzer as his and Tversky's "most persistent critic" but only refers to him briefly and dismissively in three footnotes. KAHNEMAN, *supra* note 10, at 449, 457, 461.

The central theme of Gigerenzer's critique is that the various heuristics are not violations of probability theory but only become problematic when H&B theorist adopt a "normative theory of probability." Gerd Gigerenzer, *How to Make Cognitive Illusions Disappear: Beyond "Heuristics and Biases,"* 2 EUR. REV. SOC. PSYCH. 83, 86-87 (1991). For example,

interested in the critiques that arise from the study of intuition in real-life applications. That is the work of Gary Klein, who has studied "how people use their experience to make decisions in field settings."[133] Klein observed what he has called "naturalistic"[134] or "intuitive"[135] decision-making.[136] Klein is no mystic; his view is that "intuition is based on accumulated and compiled experiences."[137] He acknowledges the need to balance intuition with rational analysis but contends that "rational analysis can never substitute for intuition."[138] What interests me most about Klein's work is his definition of intuition as "*the way we translate our experience into action*,"[139] something I suspect gets lost in the laboratory settings from which most of the H&B versus F&F debate arises. He recounts his first research project, studying how firefighters made quick life-or-death decisions in the face of the confusion and uncertainty of a disaster. The subject of the study, the firefighters themselves described it themselves as beyond thought: "they didn't really consider anything; they just acted."[140]

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there is something about the rules of language rather than logic that is supporting the respondents' intuition that Linda is both a bank teller and a feminist. That is, the rules that govern the meaning of the word "and" in formal logic do not necessarily transfer to conversations that take place in context outside of the experiment. GIGERENZER, GUT, at 93-99. Gigerenzer's other criticism of the H&B experiments lies in the difference between risk and uncertainty. Risk is calculable; uncertainty is not; heuristics can be helpful when the issue is one of the latter. GIGERENZER, RISK, at 32-42. For a thorough review of the debate between the H&B and F&F schools, *see* MARK KELMAN, THE HEURISTICS DEBATE 2011).

[133] GARY KLEIN, SOURCES OF POWER: HOW PEOPLE MAKE DECISIONS ("KLEIN, SOURCES") 1 (1998). Brest and Krieger cite Klein's work extensively, conceding ultimately that "developing the systematic habits of thought inherent in deliberative decision making improves subsequent problem solving done at the intuitive end of the spectrum, or at least facilitates reflective monitoring of intuitive judgments." BREST & KRIEGER, *supra* note 9, at 16-17, 28, 298-99, 632.

[134] KLEIN, SOURCES, *supra* note 133, at 1.

[135] GARY KLEIN, THE POWER OF INTUITION ("KLEIN, INTUITION") xiv-xv (2003).

[136] In contrast to his dismissive treatment of Gigerenzer, Kahneman devoted an entire and respectful chapter in *Thinking Fast and Slow* to his differences with Klein, his "most satisfying and productive adversarial collaboration." KAHNEMAN, *supra* note 10, at 234-44. In 2009, Kahneman and Klein co-authored a remarkable article about their contending views. Their conclusion reflects a truth often lost in the vehemence of some academic debates, which is that reality is complex and no particular model has the final word on something as nuanced as professional expertise. Kahneman, the HB spokesman, conceded that "a psychology of judgment and decision making that ignores intuitive skill is seriously blinkered"; Klein, the NDM spokesman, conceded that "a psychology of professional judgment that neglects predictable errors cannot be adequate." Daniel Kahneman & Gary Klein, *Conditions for Intuitive Expertise: A Failure to Disagree*, 64 AM. PSYCH. 515, 525 (2009). See also KLEIN, INTUITION, *supra* note 135, at 7.

[137] *Id*., at 5.

[138] *Id*.

[139] *Id*., at xiv (italics in original).

[140] *Id*., at xiii.

On the question of lawyerly intuition in the digital age, part of being a great diagnostician is recognizing the symptoms of a particular disease, whether it be medical, legal, technological, or social. Nobody is suggesting that machine learning and the processing of big data will be anything less than transformational in identifying those patterns.[141] At the same time, nobody can be seriously suggesting that lawyers are to operate without using intuition, or that algorithms could seriously replace intuition even as to empirical matters of prediction or optimization. The key is to understand what kind of empirical judgment one is making, and to avoid all of the mistakes, whether the law of small numbers, the illusion of certainty, or the confusion of risk and uncertainty, and to use algorithms when it is appropriate to do so.[142] We will always have to make some decisions where there is insufficient data to avoid the law of small numbers or where the judgment truly is one of uncertainty rather than risk. Klein's assessments of intuitive decision-making arose out of field observations rather than laboratory tests of the effect of heuristics. Like the circumstances he observed, the setting for many lawyerly decisions involve "time pressure, high stakes, experienced decision makers, inadequate information …, ill-defined goals, poorly defined procedures, cue learning, context …, dynamic conditions, and team coordination…."[143]

Nevertheless, the paradox of the judgment and decision making debate is the infinite regress that requires an ultimate default to intuition rather than analytics. Brest and Krieger do not deny the importance of intuition and insight; they only contend that deliberation needs to be a check on it. But when the stuff hits the fan (so to speak) and the decider has to decide whether the conclusion just reached is an appropriate use of data and intuition or instead another instance of predictive error, the final call is something more approaching intuition than deliberation. Indeed, Kahneman himself despaired of his own ability to distinguish analytics and intuition when considering his own decisions. The best he could offer was good, if ultimately circular, advice. When the lonely actor feels the urge to act, test that urge against the advice of water cooler gossips and trusted critics.[144] When it comes to filtering out the noisy data that may cause judgment to be unreliable, look to algorithms whenever practical, except when not practical.[145] Klein's implicit

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[141] As applied to diagnostics in medicine, *see* I. Kononenko, *Machine learning for medical diagnosis: history, state of the art and perspective*, 23 ARTIFICIAL INTELLIGENCE IN MEDICINE 89 (2001); Yoo, *supra* note 5.

[142] *See* ASHLEY, *supra* note 52, at 3 (predicting "a new kind of legal app, one that enables cognitive computing, a kind of collaborative activity between humans and computers in which each performs the kinds of intelligent activities that they can do best.")

[143] KLEIN, SOURCES, *supra* note 133, at 4.

[144] KAHNEMAN, *supra* note 10, at 417-18.

[145] Daniel Kahneman, Andrew M. Rosenfeld, Linnea Gandhi, & Tom Blaser, *Noise: How to Overcome the High, Hidden Cost of Inconsistent Decision Making*, HARV. BUS. REV.

conclusion about the regress is consistent with mine: even researchers who are skeptical about intuition rely on it themselves both in mind and body.[146] And the end of the regress in practice is not analysis but the translation of experience into action through intuitive judgment.[147]

D. Insight

1. The difference between intuition and insight

Lawyers who want to make judgments and predictions about the relationship of data, whether evidence or case law, ignore the tools described in Part I at their risk. It is deliberate System 2 thinking *par excellence*. But nobody can seriously suggest that intuitive System 1 lawyering judgment is not and will not continue to be part of the lawyer's toolkit. Indeed, my reaction is that the move from algorithmic to seat-of-the-pants *predictive* or *empirical* judgments is not particularly interesting, at least when it comes to testing the bounds of machine and human contributions to the exercise of practical wisdom in the professional context. If intuition is, per Gary Klein, the result of accumulated and compiled experiences, it sounds like something machine learning *might* replicate. I am more than willing to categorize intuition as another means, albeit less amenable to scientific reconstruction, of making empirical predictions.

That still does not address setting the problem into a mode of solution. Brest and Krieger provide another apt example in lawyering. A small manufacturer in Southern California terminates all of its employees without prior notice in order to move its operation to Vietnam to take advantage of lower labor costs. The federal WARN Act does not apply to the layoffs, and the codified California "at-will" employment doctrine seemingly bars any relief in the form of severance pay. A commercial lawyer who volunteers pro bono for a legal services agency looks at the Labor Code provision permitting termination at will on "notice" to the other party. The lawyer knows that, under the Uniform Commercial Code, notice of termination of a continuing relationship would have to be "reasonable." Why isn't it the same for an employment contract?[148]

Consistent with Klein, Kahneman, and Herbert Simon,[149] I view intuition "as tacit hunches or feelings that come to mind with little conscious

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39 (Oct. 2016).

[146] KLEIN, INTUITION, *supra* note 135, at 6-7.

[147] *Id*., at 20-21.

[148] BREST & KRIEGER, *supra* note 9, at 68-69.

[149] *See supra* note 128.

awareness of processing."[150] What is important to me is that intuition is best thought of as a substitute for what we can know through other means of empiricism. Per Richard Brock, "[t]he experience of intuition, an explicit feeling of knowledge that is not fully articulable, bridges the boundary between the tacit and the explicit."[151] Insight, per Brock's summary of the literature, is different even if "it is related to, and often confused with intuition."[152] Insight is variously described as "the process by which a problem solver suddenly moves from a state of not knowing how to solve a problem to a state of knowing how to solve it";[153] as "'pure Eureka events', insights in which the emergence of the new idea is 'extremely fast', an existing idea is replaced by a new model and 'the process is not explainable via normal reasoning processes";[154] or, in Brock's own summary, "an explicit awareness of novel relations between concepts that arrives with apparent suddenness and little conscious awareness of processing."[155]

I thus want to distinguish the non-deliberative processes of intuition and insight. While a machine might well functionally replace intuition as a matter of bringing past experience to bear on a problem, the digital replication of insight – the decision which algorithm to apply to the problem – will be a far tougher nut.[156]

2. Non-deliberation as insight or inspiration

Consider the Brest and Krieger hypothetical in which it occurs to the lawyer to apply a concept from one area of the law to another. The noted philosopher of law, Susan Haack, described the literature on these lawyering "aha moments" as "luxuriant, to say the least—a steamy, tangled jungle in which it would be easy to get hopelessly lost."[157] I do not believe that insight

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[150] Richard Brock, *Intuition and insight: two concepts that illuminate the tacit in science education*, 51 STUDIES IN SCI. EDUC. 127, 128 (2015).

[151] *Id*., at 131.

[152] Brock, *supra* note 150, at 132.

[153] *Id*., *quoting* R.E. Mayer, *The search for insight: Grappling with Gestalt psychology's unanswered questions*, in THE NATURE OF INSIGHT 3, 3 (R.J. Sternberg & J.E. Davidson, eds., 1995).

[154] Brock, *supra* note 150, at 133, *quoting* J.J. CLEMENT, CREATIVE MODEL CONSTRUCTION IN SCIENTISTS AND STUDENTS 103-04 (2008).

[155] Brock, *supra* note 150, at 133.

[156] For a doctrinal application of the difference between a machine's mere functional replication of human activity and more fundamental issues in human cognition, *see* Mala Chatterjee & Jeanne C. Fromer, *Minds, Machines, and the Law: The Case of Volition in Copyright Law*, *forthcoming*, 119 COLUM. L. REV. ___ (2019), *available at* https://ssrn.com/abstract =3392675.

[157] Susan Haack, *On Logic in the Law: "Something, but not All,"* 20 RATIO JURIS 1, 21 (2007).

derives from magic or divine gifts. Yet the infinite regress of problem setting, of deciding what you need to accomplish (your end or purpose) and only then selecting the tool or the algorithm or the app that is suitable, is among the most irreducible mysteries I have ever pondered.[158] The best I can do here is refer to others who have also confronted the mystery.

Categories and the evolution of meaning. Cognitive scientists George Lakoff, Mark Johnson, Gilles Fauconnier, and Mark Turner argue persuasively that much (if not all) of thought derives from "conceptual embodiment" – "[t]he idea that the properties of certain categories are a consequence of the nature of human biological capacities and of the experience of functioning in a physical and social environment."[159] Dean Bradford's use of the word "transformation" in health care is a prime example of the kind of conceptualization – a journey from here to there – Lakoff might say is a direct link from our physical being in the world to how our thoughts get shaped.

In his seminal work on categories, Lakoff rejected the metaphor of "mind as computer," merely undertaking disembodied and abstract symbol manipulation, and in which categories exist merely as the means of understanding the relationship of symbols independent of human experience.[160] Lakoff insisted instead that "human categorization is essentially a matter of both human experience and imagination—of perception, motor activity, and culture on the one hand, and of metaphor, metonymy, and mental imagery on the other."[161] As extended by Fauconnier and Turner, the theory holds that insight and imagination arise not from computation-like mental processes but from human conceptual systems originated in bodily experience, the ability to juxtapose categories, to break the accepted schema, or to transfer ideas from one domain to another[162] Their

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[158] This capability is sometimes referred to as abductive reasoning. *See* JEFFREY LIPSHAW, BEYOND LEGAL REASONING: A CRITIQUE OF PURE LAWYERING 34-40 (2017).

[159] GEORGE LAKOFF, WOMEN, FIRE, AND DANGEROUS THINGS: WHAT CATEGORIES REVEAL ABOUT THE MIND 12 8, 338-43 (1987). Lakoff and his collaborator, Mark Johnson, assert that all thought derives from metaphors that our brains developed from the fact of their being embodied in human beings. GEORGE LAKOFF & MARK JOHNSON, PHILOSOPHY IN THE FLESH: THE EMBODIED MIND AND ITS CHALLENGE TO WESTERN THOUGHT 3-5 (1999). Like Steven Pinker, I find their insights to be useful and persuasive without having to adopt the extreme view that any concept generated by thought derives from a metaphor of embodied physical experience. STEVEN PINKER, THE STUFF OF THOUGHT: LANGUAGE AS A WINDOW INTO HUMAN NATURE 235-78 (2007). I have previously summarized this view. Jeffrey M. Lipshaw, *The Financial Crisis of 2008-09: Capitalism Didn't Fail, But the Metaphors Got a "C"*, 95 Minn. L. Rev. 1532 (2011).

[160] LAKOFF, supra note 159, at 8, 338-43.

[161] *Id*., at 8.

[162] LAKOFF, *supra* note 159, at xiv-xv; *see generally* MARK TURNER, COGNITIVE DIMENSIONS OF SOCIAL SCIENCE: THE WAY WE THINK ABOUT POLITICS, ECONOMICS, LAW,

particular contribution was the concept of double-scope blending, in which we create a new conceptual frame that is different from its influences, not corresponding to either of them, but instead creating an entirely new meaning.[163] Indeed, they claimed that double-scope blending "is the mental capacity that makes human beings human, the one that separates them, and phylogenetically did separate them, from other species and from earlier anatomically modern human beings."[164] Whether it also separates human from artificial intelligence is probably an open question, although Turner's informed speculation is (a) that human meaning "descends" analogous to physical evolution, in the sense of "some meanings interact, in environments, to produce new meanings that inherit some of their aspects from the prior meanings but that have emergent meaning of their own that not contained in the prior meanings,"[165] and (b) that "partial" models of meaning, as in artificial intelligence, "have problems 'scaling up' to include the 'rest' of the system."[166]

This latter point is evocative of Haig, Kauffman, and Gazzaniga. Human meaning is the product of a complex adaptive system, one that "cannot be partitioned into entirely separate modules, or into rudiments plus overlays."[167] Just as the biological semiotic closed system is its own interpreter and the creator of its own ends and purposes, human insight results from a cognitive system that interprets – i.e. creates emergent meaning – and perceives its own ends and purposes. On the other hand, as Lakoff observed, the symbols being processed within a computational (i.e., AI) mind are meaningless unless someone or something outside the system supplies the basis for making those symbols represent a reality external to the system.[168] Moreover, algorithmic systems work by way of discrete rules that predictably process particular inputs into particular outputs. Human conceptual systems, like thought and language, do not work the same way. When we think or use language, we extend categories, engage in polysemy, or use idioms that are *motivated*. That is, those phenomena are neither arbitrary (i.e. simply random) nor are they necessarily predictable. And algorithmic systems have (and are likely to continue to have) a problem generally in replicating that kind of motivation.[169] Even in mathematics, that most formal and logical of

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AND SOCIETY (2001).

[163] *Id*., at 11. For a detailed discussion, including examples, *see* Jeffrey M. Lipshaw, *The Venn Diagram of Business Lawyering Judgments: Toward a Theory of Practical Metadisciplinarity*, 41 SETON HALL. L. REV. 1, 58-63 (2011).

[164] TURNER, *supra* note 162, at 52.

[165] *Id*., at 140.

[166] *Id*., at 143.

[167] *Id*.

[168] LAKOFF, *supra* note 159, at 348-49.

[169] *Id*., at 346-48.

disciplines, insights or breakthroughs, are an aspect of the embodied human mind. Machine thinking is a simulation of human thinking. As the mathematician William Byers observed, "An algorithm cannot generate creativity. In fact [sic] the reverse is true—creativity is what produces algorithms."[170] In short, insight or inspiration, conceived of as the descent of unpredictable yet non-random, emergent, and heretofore unexpressed meaning, is still uniquely human.

Problem solving. Perhaps the iconic observer of the distinction between professionals' use of technology and setting the problem was Donald Schön.[171] Schön assessed the rise in the 20th century of Technical Rationality, under which professional activity came to mean "instrumental problem solving made rigorous by the application of scientific theory and technique."[172] He saw the essential issue in Technical Rationality not as *problem solving* but *problem setting*. Thus, professional judgment mediates between, on one hand, the foundation of stable disciplines "grounded in systematic, fundamental knowledge, of which scientific knowledge is the prototype"[173] and, on the other, evoking Susan Haack's metaphor, the indeterminacy of the "swampy lowland where situations are confusing 'messes' incapable of technical solution."[174] How professionals mediated between the problems and the tools to solve them was "reflection-in-action:" "the 'art' by which practitioners sometimes deal well with situations of uncertainty, instability, uniqueness, and value conflict."[175]

Gary Klein's field study is further evidence of the swamp of theory about insight. The stories he collected of discovery and invention persuaded him that the experience of insight defies easy reduction to theory and that "[t]he best we can do … is to move the posts forward."[176] For example, the iconic "aha" moment might not be as sudden as others suggest. In his case studies, a slight majority of insights were sudden, but the rest were gradual.[177] Ultimately, he proposed an insight model that was a matrix of motivation, trigger, activity, and outcome. The reasons for wanting discovery or invention might arise from the observation of inconsistencies or contradictions, curiosity about connections or coincidence, or a desperate need to solve a problem. The result might be to reset the "anchors" of one's

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[170] WILLIAM BYERS, DEEP THINKING: WHAT MATHEMATICS CAN TEACH US ABOUT THE MIND ix-x (2015).

[171] DONALD A. SCHÖN, THE REFLECTIVE PRACTITIONER: HOW PROFESSIONALS THINK IN ACTION (1983).

[172] *Id*., at 21.

[173] *Id.,* at 23.

[174] *Id.,* at 42.

[175] *Id.,* at 50.

[176] KLEIN, INSIGHT, *supra* note 77, at 107.

[177] Id., at 92-93.

beliefs about the situation – either to reimagine the circumstances to eliminate the contradictions, to articulate a new foundation for belief, or to reject the basis of existing beliefs.[178]

At far end of the thinking continuum farthest from computation is a concept called "flow," an experience in which actors in sports, games, occupations, rituals, and the arts have the "sense of having stepped out of the routines of everyday life into a different reality, clear goals every step of the way, immediate feedback, effortless attention, action and awareness merged, balanced between skill and challenge, time distortion, and spontaneity."[179] I confess I am a latecomer to the scholarly treatment of flow. When I first heard of it, I thought it was some brand of New Age mysticism. In fact, it is a serious treatment of a difficult subject – creative inspiration – taken seriously by serious people. The seminal theorist of flow is Mihaly Csikszentmihalyi, the former head of the department of psychology at the University of Chicago, whose scholarly and popular output on the subject is prodigious.[180] Among the serious people taking flow seriously are Kahneman himself. According to Kahneman, engaging in System 2 deliberation is more difficult than System 1 thinking, because the former requires the application of mental work and self-control. Flow, he acknowledges, is a state of effortless concentration on the task at hand.[181] And, as I now realize, I take it seriously because I experience it. On a regular basis, ideas pop into my head during the daily routine in which I walk the dog on the same circuit. I sit down at the computer to write, intending only to spend a few minutes, but look up and realize I have been at it for several hours. The point is the embodied subjective physicality of the endeavor, not that it is merely the product of disembodied thought.

Brest and Krieger devote an entire chapter, entitled "Generating Alternatives: Creativity in Legal and Policy Problem Solving" to what they call "divergent thinking" and what I would call insight.[182] As far as I can tell, however, they never really distinguish between, on one hand, intuition as a fast and frugal means of making an empirical or predictive judgment (Kahneman's bête noire) and, on the other, insight as the source of a new or

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[178] *Id*., at 101-08.

[179] Doyle, *supra* note 10, at 1.

[180] *See, e.g.,* MIHALY CSIKSZENTMIHALYI, FLOW: THE PSYCHOLOGY OF OPTIMAL EXPERIENCE (1991); MIHALY CSIKSZENTMIHALYI, CREATIVITY: FLOW AND THE PSYCHOLOGY OF DISCOVERY AND INVENTION ("CSIKSZENTMIHALYI, CREATIVITY").

[181] KAHNEMAN, *supra* note 10, at 40-41. Others include Brest and Krieger, BREST & KRIEGER, *supra* note 9, at 73, 79, and my friend and colleague Jessica Silbey in her work on the relationship of "eureka moments" to the law of intellectual property. JESSICA SILBEY, THE EUREKA MYTH: CREATORS, INNOVATORS, AND EVERYDAY INTELLECTUAL PROPERTY 35-36, 65-66 (2014).

[182] BREST & KRIEGER, *supra* note 9, at 61-90. They discuss "divergent thinking" at 66-67, 74-76. They cite the work of Fauconnier and Turner on conceptual blending at 73.

different way of seeing the problem. For example, in the section headed "The Roles of Intuition and Analysis in Empirical Judgment," they cite two examples of unconscious judgment, one about assessing whether it is safe to cross a street with a car in the distance, and one about Kekulé's inspiration in a dream about the structure of benzene.[183]

I do not want to overstate the dichotomy. We have already seen the conception of intuition as a direct translation of experience into action without the intermediation of deliberate thought. Moreover, there are unconscious judgments, particularly creative ones, with aspects of both empirical intuition and inspiration. Mihaly Csikszentmihalyi's influential "system" model of creation (cited by Brest and Krieger[184]) demands, in addition to the creative insights of the individual creator, a domain of symbolic rules and procedures in which the creator works, and a field of other individuals who are the gatekeepers of the domain.[185] Nevertheless, there is research distinguishing intuition from insight. And tarring insight with the predictable errors one might find with intuitive empirical judgments is, in my view, a mistake.

E. Action and Will

Everything so far has to do with thought and how it might precede a decision or even action. Here I want to consider action itself. It is hard to argue with the proposition in Brest and Krieger that "developing the systematic habits of thought inherent in deliberative decision making improves subsequent problem solving done at the intuitive end of the spectrum, or at least facilitates reflective monitoring of intuition."[186] I am not in the least critical of their decision to conclude the volume on that note.[187] Nor do I think even they believe such deliberation ends the story of what lawyers bring to the party.[188] But *doing* differs from *thinking*, whether System 1 or 2. There needs to be an end not only to reflection, but an end to deciding

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[183] *Id*., at 119-20.

[184] *Id*., at 73, 79.

[185] CSIKSZENTMIHALYI, CREATIVITY, *supra* note 180, at 27-28; BREST & KRIEGER, *supra* note 9, at 77-80.

[186] BREST & KRIEGER, *supra* note 9, at 632.

[187] *Id*., at 637 ("The overarching hypothesis of this book is that academic study can lay the foundation for developing expertise in problem solving, decision making, and professional judgment on the job.").

[188] Elsewhere, Dean Brest wrote: "Solutions are often constrained or facilitated by the law, but finding the best solution—a solution that addresses all of the client's concerns—usually requires more than technical legal skill." Paul Brest, *Skeptical Thoughts: Integrating Problem-Solving Into Legal Curriculum Faces Uphill Climb*, DISP. RESOL. MAG., Summer 2000, at 20, 22

itself in favor of acting on the decision.

Brest and Krieger offered not just tools for developing professional expertise in problem solving and decision making, but an academic foundation for doing so. I want to focus on the link between academic theory in a discipline like lawyering and its practice in the field. On that very linkage in psychotherapy, Steven Cooper has written of the psychotherapist's "return of the repressed positivistic," the desire (conscious or not) to impose the science of the therapist's professional discipline on the patient's problem, whether or not that imposition is justified.[189] I have come to believe that the privileging (by Brest and Krieger, Kahneman, and others) of unadorned rationality, culminating in algorithmic thinking and embodied in AI, is the *UN-repressed* positivistic. What I mean is that such thinking insufficiently distinguishes between professional tools and their users, and the users' *choice* to use those particular tools in pursuit of an end.

I am hardly the originator of this critique. The philosophical existentialists were engaged in a similar reaction to the unadorned and exquisite rationality of science and technology long before I was born. Several of their insights help splash some cold water on the infatuation with AI-lawyering. If you were inclined to skip what follows, a pithy expression of that philosophy might be the epigraph to this essay or the adage, attributed to Woody Allen, that either eighty or ninety percent of either life or success is showing up.[190] The full quote, from Allen's co-writer, Marshall Brickman, is even more on point: "'Showing up is 80 percent of life.' Sometimes it's easier to hide home in bed. I've done both."[191]

I will hardly do justice to Heidegger, Sartre, and others, but here is the capsule.[192] The existentialists were dissatisfied with how positive and objective science came to terms with what was essential to a human being. The difference between tools (say, a saw) and me (a human) is that tools "are defined by the social practices in which they are employed, and their properties are established in relation to the norms of those practices." The difference between objects of "perpetual contemplation or scientific investigation" (say, a planet) and me (a human) is that the objects "are defined

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[189] I have previously explored this topic in LIPSHAW, *supra* note 158, at 120-23, and Jeffrey M. Lipshaw, *What's Going On? – The Psychoanalysis Metaphor for Educating Lawyer-Counselors*, 45 CONN. L. REV. 1355, 1370-81 (2013).

[190] William Safire, *On Language; The Elision Fields*, N.Y. TIMES MAGAZINE (Aug. 13, 1989).

[191] Susan Braudy, *He's Woody Allen's 1-1-Silent Partner*, N.Y. TIMES (Aug. 21, 1977), at 83.

[192] I am relying on this excellent summary: Steven Crowell, *Existentialism*, STAN. ENCYCL. PHIL. (Winter 2007 ed.), https://plato.stanford.edu/archives/win2017/ entries/ existentialism/. The quoted material in this paragraph is from that unpaginated text. Brackets indicate my modifications and all emphases shown are in the original.

by the norms governing perceptual givenness or scientific theory-construction." The existentialist argument was that, unlike a saw or a planet, "[w]ho I am depends on what I make of my 'properties'." I am more than my *facticity*, the physical or social properties a third-person could observe about me. What makes me *"*me" is that I am capable of having an attitude about my own facticity, that I am engaged practically in the world, that I am an "agent … oriented by the task at hand as something to be brought about through [my] own will or agency." The existentialists called this personal and subjective perspective "transcendence." And facticity and transcendence, even though they are aspect of the same being, me, cannot be reduced to each other. They are complementary qualities of existence. As to facticity, I exist as matter of molecules built into proteins and organs. As to transcendence, I can make a difference in the facts of the world in which I exist. But transcendence is not "a function of anonymous forces (third-person or logical possibility) but a function of [my] *choice* and *decision*."

The will to act in pursuit of one's own subjective perception of ends and purposes is the key difference between a human lawyer and the most developed AI. The philosopher Steven Crowell notes Charles Taylor's phrase – humans "are 'self-interpreting' animals … where the interpretation is constitutive of the interpreter."[193] Evolution, cybernetics, and philosophy converge on the same point. Human lawyers are self-reproducing automata. They have evolved through semiotic closure into beings capable of perceiving ends and purposes and having a will to act that cannot be reduced to mere third-party scientific explanation. They have intuition and insight, capabilities that resist scientific reduction because they seem to arise from both objective facticity and subjective transcendence. My conclusion is Heideggerian. He observed of cabinetmakers the following:

> His learning is not mere practice, to gain facility in the use of tools…. If he is to become a true cabinetmaker, he makes himself answer and respond above all to the different kinds of wood and to the shapes slumbering within wood…. In fact, this relatedness to wood is what maintains the whole craft. Without that relatedness, the craft will never be anything but empty busywork, any occupation with it will be determined exclusively by business concerns.[194]

The programmer, not the machine, is still the cabinetmaker in the metaphor. In supervised learning, the programmer decides whether the training data supports the predictive algorithms. Even in unsupervised learning, if the machine responds to shapes slumbering in the data, it is because the

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[193] Crowell, *supra* note 192.

[194] MARTIN HEIDEGGER, WHAT IS CALLED THINKING 14 (Fred D. Wieck & J. Glenn Gray, trans., 1968).

programmer gave it the tools, the algorithms defining what constitutes a pattern, to do so.

I am not closing off the possibility that a von Neumann of the future will successfully build a self-reproducing automaton capable of insight and action. If Sartre said of it as he did of a human being "condemned to be free: condemned because he did not create himself, yet nonetheless free, because once cast into the world, he is responsible for everything he does,"[195] it might as well be the cabinetmaker and not merely the tool. But that is still the stuff of science fiction or fantasy.

F. Lawyering in the Face of Irreconcilable Complementarities

The overarching meta-theme for those of us who lawyer (or educate lawyers) in the digital age is not to be seduced by the telic allure of Technical Rationality. The nature of *telos* is the inclination to seek order and coherence, ends and purposes perhaps when there are none. Explanations are troubling when they fail to cohere, whether they are inconsistencies in descriptive science (say, as between relativity and quantum mechanics) or normative attribution of blame (say, a lawyer's theory of the case that does not hang together). Not surprisingly, Karl Llewellyn's wisdom to new law students eighty years ago was that the work of a lawyer or judge in determining the law proceeds on the assumption "that all the cases everywhere can stand together. It is unquestionably the assumption you must make, at first. If they can be brought together, you must bring them."[196] Lawyering tools include rules and the logic it takes to apply them to circumstances. Those are fair game for sophisticated algorithmic analytics.

Kahneman was correct in observing the human desire for causal coherence; his primary concern was for the frequency with which humans appear to explain empirical events coherently but mistakenly. My sense is that he has merely substituted one form of coherent narrative for another. Granted, however, the substitution is warranted when the tasks at hand are predictions and risk assessments amenable to applications of mathematical models. When lawyers deal in those issues, they should turn to the tools set out in Brest and Krieger. But when facing uncertainty rather than mere risk, lawyers need to be circumspect in privileging deliberation (and its extreme in algorithms) over less deliberative aspects of thought, decision, and action. Some aspects of problem solving simply do not (and will never) cohere. When we think about reconciling what algorithmic and human lawyers bring to the party in the digital age, humans have it all over computers in dealing

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[195] JEAN-PAUL SARTRE, EXISTENTIALISM IS A HUMANISM 29 (Carol Macomber trans., 1997).

[192] K. N. LLEWELLYN, THE BRAMBLE BUSH: ON OUR LAW AND ITS STUDY 50 (1960).

with those.

Some things, like infinite regresses, complementarities, and asymptotic limits, by their very nature, will never hang together, or never be resolved conclusively. That is a hard pill to swallow for lawyerly minds committed to rationality. Fundamental non-coherence, indeed failure, of explanation is what the mathematician William Byers calls the blind spot, "things that are real but which the mind cannot grasp and thus cannot capture through words, symbols or equations."[197] The neuroscientist Michael Gazzaniga speculates that such a fundamental non-coherence is at the heart of our subjective consciousness in an objective world. While we still do not understand how the brain's neurons create our sense of personal consciousness, the answer is *not* going to lie in more and more granular reduction of biological processes to the deterministic assumptions of classical or quantum physics. Rather, the idea that needs to be borrowed from quantum physics is complementarity: some things "have complementary properties that cannot be measured, and thus known, at the same time."[198]

Non-coherence shows up in the struggles to explain intuition and insight. But the non-coherence most relevant to lawyering in the digital age has to do with things like showing up. The existentialists were on to something; nothing explains the transition from deliberating about a problem, even deciding what to do about the problem, and moving from mere subjective thought to doing in the physical world. When Audrey wanted me to go to the meeting, I was condemned to be free. I could (and did) come up with a dozen reasons why I was not really needed. Even so, I still went. That was more than mere decision; it was a commitment to action.

I am open to the possibility that someday, somewhere, somebody will proffer a reductive explanation of that freedom, but I am skeptical that either System 2 deliberation or artificial intelligence will resolve it. In the meantime, I am open to suggestions about how to incorporate both non-coherence and the commitment to action into the law school curriculum. Some people are thinking about it. A prime example is the University of Miami's LawWithoutWalls, led by Professor Michele DeStefano.[199] One of Stuart Kauffman's interesting observations is the difference between the "adjacent possible" in physics, on one hand, and biology and, by extension, complex systems like economies, on the other. As to the models of the former type, consider chess or AlphaGo. There the adjacents possible – the possible next configurations of the board – are not only predictable but finite (albeit immense in number). As to the latter type, there are no laws by which anyone

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[197] WILLIAM BYERS, THE BLIND SPOT: SCIENCE AND THE CRISIS OF UNCERTAINTY 1 (2011).

[198] GAZZANIGA, *supra* note 95, at 171.

[199] LAWWITHOUTWALLS, http://lawwithoutwalls.org.

can deduce or "prestate" the adjacents possible – i.e., new uses and new functions for biological characteristics or technological developments.[200] Those systems "explode in diversity," with each new species in biology or each new innovation in goods in service creating the possibility of even more creation.[201] Professor DeStefano's similar point for lawyering is that the world of evermore complex *becoming* is the one that business clients (at the very least) face every day.[202] The value of her insight is to cross the disjunction between mere thought and action: "What [business clients] really need, whether they want their lawyers to actually create innovations or not, is for their lawyers to learn *how* to innovate."[203] The problem, Professor DeStefano suggests, is that lawyers, by inclination and training, have trouble leaping from the possible to the adjacent possible in dealing with that complex *becoming*.[204]

I would only amend that slightly. Kauffman's core thesis is that the adjacents possible of physics (and all computational intelligence) are defined by the rules that permit the transformation of one state into another. They are thus capable of being "prestated" or predicted. But the adjacents possible of innovation are not so capable of prestatement or prediction.[205] For the digital age, it is not that lawyering by deliberation or algorithm will fail to see *any* adjacent possible. It *will* predict the predictable. But dealing with uncertainty, disruption, and non-coherence – the non-algorithmic adjacents possible – is likely to be the province of the human lawyer armed with intuition, insight, and the will to translate thought into action.

G. The Rest of the Care-Giving Story (a Microcosm of Lawyering)

How did the aspects of lawyering beyond deliberation affect my work on Audrey's problem? I used a digital tool. In less than ten minutes on Westlaw, (a) I was able to see the series of "if-then" propositions that established the impermissibility of the use (the area was zoned agricultural and the proposed use was not listed as one permitted as of right or one of the limited uses available by special approval of the planning commission), and (b) I found

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[200] KAUFFMAN, *supra* note 109, at 115-39.

[201] *Id*., at 106-07.

[202] Michele DeStefano, *Innovation: A New Key Discipline for Lawyers and Legal Education*, in MICHELE DESTEFANO & GUENTHER DOBRAUZ, NEW SUITS: APPETITE FOR DISRUPTION IN THE LEGAL WORLD 90 (2018). Professor DeStefano offers some practical suggestions for leaps in lawyering to the discontinuous adjacent possible in MICHELE DESTEFANO, LEGAL UPHEAVAL: A GUIDE TO CREATIVITY, COLLABORATION, AND INNOVATION IN LAW 98-100 (2018).

[203] *Id*.

[204] *Id*., at 100.

[205] KAUFFMAN, *supra* note 109, at 133-34.

several Michigan Court of Appeals cases barring precisely that commercial use under identical zoning ordinances in other townships. Indeed, I found them in the Michigan state and federal cases database by entering only three search terms: "agricultural," "zoning," and the name of the particular objectionable use at issue. By some accounts, AI technology like ROSS can already use machine learning in the process of converting a natural language narrative into an assessment of the legal outcome.[206]

But what else was involved? First, there was some element of insight. Audrey was under the impression that her task was to oppose a special approval of the commercial use. It quickly became clear to me that her legal position was far stronger than that; one of the cases stood for the proposition that the township had no authority even to grant an approval because the use was not on the list. Second, intuition (rightly or wrongly) intervened. The neighbor had already invested a significant amount of money in construction. Would that affect the outcome, given that the logic of the law seemed to require the forfeiture of the investment? I was aware from experience in other areas that courts rarely favor forfeitures. I am not a land use lawyer, but one of my best friends is. I called him to ask and he responded that the issue of wasted money ought not to be a factor in a township's or a court's treatment of the impermissible use. Finally, there was action. I helped craft comments that Audrey would be comfortable reciting in public (her style of speaking not mine), attended the meeting to provide her moral support, discussed a united effort with a number of the neighbors, schmoozed township officials before the meeting, wrote a letter on behalf of the neighbors to the planning commission, calmed Audrey when developments agitated her, assessed the competencies of and interviewed several local lawyers who would take over the work when I left at the end of the summer, and anticipated possible next moves (including responding to any proposed change to the zoning).

To their credit, Brest and Krieger capture much of what I experienced in this vignette. A problem occurs when "the world we would like varies from the world as it is."[207] And solving the problem has a metaphoric physicality: "to navigate through the problem space—through the virtual area between the actual or potential unsatisfactory space and the desired state."[208] Here is what the privileging of deliberation misses, however. Brest and Krieger acknowledge the role of lawyerly intuition. They grapple with the mysterious aspect of insight. Still, they do not capture the fullest extent to which effective lawyering is more than just an exercise in analytic thought; considering the

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[206] Steve Lohr, *A.I. Is Doing Legal Work. But It Won't Replace Lawyers, Yet.*, N.Y. TIMES (Mar. 20, 2017), at B1, https://www.nytimes.com/2017/03/19/technology/lawyers-artificial-intelligence.html.

[207] BREST & KRIEGER, *supra* note 9, at 8.

[208] *Id*., at 9.

adjacents possible and then doing something about them requires every mental and physical tools we have at our disposal.

When I contemplated Audrey's ends and purposes as a matter of facticity, they became my ends and purposes as a matter of transcendence. It was not enough merely to think about the problem. Rather, I became the agent, through my choice and my decision, of the change from the world as it was to the one it should be, and the captain, as it were, in the navigation of the problem space. Would that I could only have been a dispassionate third-party observer of the problem, dispensing wise counsel and moving on to other concerns. No, as Sartre noted, I was condemned to be free, cast into the world, and responsible. It made me effective. It also kept me up at night; I attribute that to the existential despair that I might *not* be effective. And, as Sartre also noted, "[D]espair means that we must limit ourselves to reckoning with only those things that depend on our will, or on the set of probabilities that enable action."[209] The despair fuels something – call it passion, persistence, or compulsiveness – that, even if not borne of noble causes, is still an aspect of action that is beyond rational thought. Does the AI really care?

CONCLUSION

The digital age portends two trends for lawyering having a real synergy: (a) the privileging of System 2 deliberative thinking, with its aspirations to pure rationality uncompromised by the heuristics and biases observed in System 1 thinking, and (b) the pervasiveness of *computational* deliberation – artificial intelligence or machine learning – substituting for human cogitation in more and more of a lawyer's professional functions. Human lawyers will, however, still bring something to the party. Unlike even their most sophisticated digital counterparts, human lawyers are and will continue to be self-reproducing automata. They are and will be beings who can perceive ends and purposes and have a will to act in their pursuit, characteristics that resist easy scientific explanations. Their subjective "transcendence" – intuition, insight, creativity, and the will to change the objective world – means they will continue to respond to clients' problems as Heidegger's metaphorical cabinet maker responds to the shapes slumbering in the wood. And the machines will never be capable of being anything other than tools in that craft. Intuition, insight, creativity and the will to act are as much a part of our System 1 inclinations as the heuristics and biases that can cloud our empirical judgments. As we saw in even the response to Audrey's mundane problem for lawyering, we need to be circumspect in privileging System 2-like deliberation (particularly that which can be replicated computationally)

[209] SARTRE, *supra* note 195, at 34-35.

over those uniquely *human* contributions to effective lawyering.