

RATIONALITY AND THE TAMING OF COMPLEXITY

*Ronald J. Allen**

It is a great honor to have been invited to give one of this year's Meador Lectures, a series that is a catalogue of the most important contemporary scholars working on matters related to the structure, composition, and regulation of society. It is a particularly distinct honor to be invited by the University of Alabama and its School of Law, which together, in my opinion, embody the two greatest civilizing forces of humanity: education and the rule of law. Talk of civilizing forces may seem out of place while wars are still being fought, innocents slain, and an unacceptable level of intolerance persists, whether of religion, sexual preference, or other irrelevancies. Notwithstanding such reproaches to human charity, we are in the midst of the most rapid increase in knowledge and extension of human rights that the world has ever witnessed. When the history of this era is written, one chapter will focus on the remarkable fact that integral to all the accomplishments of civilization that I mentioned, and many more in addition, have been the remarkable American system of higher education and our commitment to the rule of law. None of these accomplishments would have been achieved were we not collectively committed both to the social stability that emerges from the rule of law and to the never ending pursuit of human potential that is at the heart of the educational process. The American colleges and universities collectively are one of the glories of western civilization, one of the true jewels in the crown, with a place of honor for this fine University; another jewel is the actualization of the rule of law as, again, is embodied by this distinguished School of Law.

And now on to the task, which is to try to shed some light on the question of rationality. I must say that I am impressed by the generosity of the Faculty in suggesting that I might add something to what has been one of the central philosophical questions since the beginning of recorded history and that has brought forth efforts from every major philosophical figure

* John Henry Wigmore Professor of Law, Northwestern University; Fellow, China Political Science and Law University; President, Board of Foreign Advisors, Evidence Law and Forensic Sciences Institute, China Political Science and Law University. This lecture was delivered as part of the Meador Lectures on Rationality at the University of Alabama School of Law on January 27, 2011. I am indebted to Michael Pardo for having commented on an earlier draft.

that has ever lived. In addition to being a philosophical question, the nature of rationality has become one of the central empirical questions of modern science that is generating rapid increases in knowledge about the operation of the brain and, to a lesser extent, the operation of the mind.¹ Matching the Faculty's generosity with my own naïve optimism in the face of such a task, or perhaps my cluelessness as to its true daunting nature, I will give it a try.

I will first lay out the central thesis that I intend to develop and defend today. Its essence is that the central, largely unnoticed, challenge of the legal system is to domesticate complexity and that the effort to do so is one of its organizing features; indeed, the struggle with complexity may be one of the most general explanatory features of the legal system. As I will attempt to show, viewing the legal system through such a lens is clarifying in a large number of ways, and the domesticating of complexity is a unifying perspective that uncovers similarities in otherwise apparently disparate phenomena. Viewed from such a perspective, for example, the law's difficulty with both questions of law and questions of fact comes into better focus (although I should parenthetically note that, in my opinion, questions of law are questions of fact).² The domesticating of complexity explains more aspects of the trial of disputes specifically, and dispute resolution more generally, than any other hypothesis, as it also enlightens disparate practical and philosophical debates about the meaning of law, the significance of discretion, and even sheds light on perennial issues such as the distinction between rules and standards or rules and principles.

There is a corollary to my central thesis, and this corollary gets closer to more conventional debates about rationality. As I will argue in a moment, but just accept for now, the twin domains of the legal system—law and fact—are immensely, almost infinitely, complex, each being bubbling cauldrons of interacting variables often too numerous to articulate and certainly too numerous to compute, often continuous rather than discrete, and often unknown to the observer. Moreover, legal regulation involves not just litigation behavior, but also primary behavior, and their interaction. The standard approach to legal regulation, again whether of law or fact, is to attempt to regulate all of these things and their interactions with simple rules, where “rule” means the articulation of necessary or sufficient conditions for actions.³ But notice the tension that is the wellspring of this lecture. A tool—the standard concept of a rule in this case—is being

1. See, e.g., PATRICIA SMITH CHURCHLAND, NEUROPHILOSOPHY: TOWARD A UNIFIED SCIENCE OF THE MIND/BRAIN 1–4 (Jerome A. Feldman et al. eds., 1986).

2. Ronald J. Allen & Michael S. Pardo, *The Myth of the Law-Fact Distinction*, 97 NW. U. L. REV. 1769, 1769–1807 (2003).

3. Ronald J. Allen & Alan E. Guy, *Conley as a Special Case of Twombly and Iqbal: Exploring the Intersection of Evidence and Procedure and the Nature of Rules*, 115 PENN. ST. L. REV. 1, 22 (2010).

employed in contexts in which its application is almost doomed to failure by any reasonable criterion. Simple deductive rules are being employed to regulate infinitely complex social dynamics, and the results seem preordained to be awkward, unanticipated, and occasionally perverse. This is not a criticism of rules. Rules are enormously valuable tools. Rather, it is simply to note that what makes a tool valuable is its appropriate use, and there may be, as I intend to argue, a mismatch between the tool of “rules” and the environment to which this tool is often applied.

This perspective also sheds light on a larger question of rationality. All those distinguished philosophers, and now decision theorists and various empiricists, who over the ages have addressed the meaning or essence of rationality, did not agree on very much.⁴ Indeed, today there are innumerable views on and definitions of “rational” and “rationality.” Why might this be? Take my specific thesis about the legal system and extend it to the human condition generally. Perhaps apart solely from such mind-blowing questions as why does the universe exist and where does it come from, one of the most astonishing things that we as humans can observe is how our species has been able to regulate our environment. That challenge, though, is the central problem of the legal system as I have described it. Sitting in this comfortable room surrounded by all the benefits of an advanced society, we may lose sight of how cold and threatening the universe really is, and how at every level, from star and galaxy formation down to the billions of pathogens that infest every one of us in this room, an intense ongoing struggle for survival is unfolding. Black holes sweep up millions of stars in what appears to be an inevitable death spiral, and yet out of this chaos in some mysterious way may come regenerative forces; inside your own bodies analogous competitions for survival unfold at the microscopic level. And here we humans are perched—and those in this room for the most part comfortably perched unlike most of humanity—halfway in between, as it were, the cosmic and microscopic struggles for survival, able to observe both and do so largely freed from the grip of survival anxiety as well as pain, suffering, and debilitating conditions that comprise the normal lot of virtually every other organism that we are capable of observing. As we all know, Thomas Hobbes described the natural state of humanity as “solitary, poore, nasty, brutish, and short,”⁵ much as I am suggesting the life of all observable entities might be analogously described (although one does have to analogize here—what “short” means

4. See, e.g., ARISTOTLE, *THE NICHOMACHEAN ETHICS* (Terence Irwin trans., Hackett Publ'g Co. 2d ed. 1999) (350 B.C.); IMMANUEL KANT, *GROUNDWORK FOR THE METAPHYSICS OF MORALS* (Thomas E. Hill, Jr. ed., Arnulf Zweig trans., Oxford Univ. Press 2003) (1785); JÜRGEN HABERMAS, *I THE THEORY OF COMMUNICATIVE ACTION* (Thomas McCarthy trans., Beacon Press 1984) (1981); ANTHONY T. KRONMAN, *MAX WEBER 72–95* (1983); LEON POMPA, *HUMAN NATURE AND HISTORICAL KNOWLEDGE: HUME, HEGEL AND VICO* (1990).

5. THOMAS HOBBS, *LEVIATHAN* 84 (A.R. Waller ed., Cambridge Univ. Press 1904) (1651).

to the life of a star as it struggles to break free from the gravitational pull of a black hole is obviously a relative matter, and I have no idea what a bacterium in the sights of a natural killer T-cell [cytotoxic lymphocyte] feels).

How did humans get into this enviable position, this almost God-like ability to observe the destructive and creative forces of the universe all around us from comfortable chairs at the University of Alabama, and not to be in too much pain while doing so? The short answer is the topic of this series of Meador Lectures—rationality. It looks like the human organism has somehow managed to carve a relatively comfortable niche out of the surrounding chaos through the exercise of cognition.⁶ What exactly does that mean, though? Hobbes gave a political answer: our ancestors were able to see the need to consent to the authority of a Leviathan that would bring order to the chaos.⁷ The problem is that various thinkers through the ages have looked at different aspects of the human struggle for survival and given different answers to what facilitated it, identifying differing cognitive tools that collectively contributed to the success of our species.

Before moving on to those differences, I need to express an important qualification. The debate over rationality in the law seems to be located almost exclusively over the comparison between means/ends rationality, on the one hand, and a competing conception of justice on the other.⁸ Although this comparison does actually map onto an important issue concerning the nature of rationality, it is nonetheless a somewhat impoverished discourse, the topic of rationality being considerably richer than one might imagine from reading the legal literature. This impoverishment has two interrelated sources. It stems from the impact of economics on the law and legal scholarship, which in turn has prompted a vigorous reaction and counterassault from those who reject the putatively cold, utilitarian, cost-benefit approach to life. This debate has been focused primarily, indeed, virtually exclusively, on the morality of the differing positions, and in that regard, it is much like the great bulk of legal scholarship that as you all know is largely normative. In my opinion, and I am quite serious about this, this explanation of the impoverished state of discourse over rationality in the law is yet a further demonstration of the relative inutility of normative work, which leads me to try to avoid it as much as possible (and I must say a further demonstration of your wisdom in focusing in-

6. A struggle that modern neuroscience suggests begins at birth as the human organism has to bring its own brain under control. See, e.g., ALISON GOPNIK, *THE PHILOSOPHICAL BABY: WHAT CHILDREN'S MINDS TELL US ABOUT TRUTH, LOVE, AND THE MEANING OF LIFE* (2009).

7. See HOBBS, *supra* note 5, at 115–119.

8. Nestor M. Davidson, *The Problem of Equality in Takings*, 102 NW. U. L. REV. 1, 31–37 (2008) (discussing the conflict between equality norms and means-ends rationality in the context of regulatory takings).

quiry on rationality in this series of lectures). If I had more time, I would explain this view further, but for now I will have to be content simply to point out the raging debates between utilitarians and their opponents over their respective, idiosyncratic, autobiographical views of the good life obscure the interesting facts of the matter and their implications concerning what it might mean to be rational. I, by contrast, want to talk about the facts of the matter, to the extent I am able to do so.

Similar to what I will try to demonstrate is essentially the story of the legal system: those engaged with the general question of rationality observed the almost infinitely complex interaction of the human race with a threatening environment and observed many different cognitive tools that contributed to that success, to which the label of rationality was applied. In addition to the Hobbesian political view, as Nicholas Rescher noted, the “logician takes *consistency* to be the bulwark of rationality, the scientist *evidential cogency*, the economist *efficiency*,”⁹ and one might add, as Russ Shafer-Landau does, many philosophers see appropriate substantive commitments as the essence of rationality and others think:

[R]ationality is to be understood *procedurally*: being rational or exercising one’s rationality essentially involves a series of operations over one’s existing commitments. These operations involve deduction, induction, abduction, and instrumental reasoning. Being rational is a matter of enacting particular kinds of reasoning processes that have their origin in a set of commitments that are not themselves rationally assessable.¹⁰

This by no means exhausts the topic.¹¹ Shading into epistemology and under the waning influence of foundationalist theories, there is revised interest in pragmatism, one of the topics on which there is a relatively robust legal literature.¹² Yet, there are disputes even within the adherents to one view or the other, such as the extent to which practical reason is “wholly self-centered.”¹³

Generalize this. What different people saw as the essence of rationality simply amounted to which of these various tools happened to be of interest

9. NICHOLAS RESCHER, *RATIONALITY: A PHILOSOPHICAL INQUIRY INTO THE NATURE AND THE RATIONALE OF REASON* 8 (1988).

10. RUSS SHAFER-LANDAU, *MORAL REALISM: A DEFENCE* 221 (2003).

11. For, among other things, a recent collection of the various uses of the term, see RAYMOND S. NICKERSON, *ASPECTS OF RATIONALITY: REFLECTIONS ON WHAT IT MEANS TO BE RATIONAL AND WHETHER WE ARE* (2008).

12. On pragmatism qua epistemology, see NICHOLAS RESCHER, *COGNITIVE PRAGMATISM: THE THEORY OF KNOWLEDGE IN PRAGMATIC PERSPECTIVE* (2001). In the legal literature, see RICHARD A. POSNER, *LAW, PRAGMATISM, AND DEMOCRACY* (2003); Daniel A. Farber, *Legal Pragmatism and the Constitution*, 72 *MINN. L. REV.* 1331 (1988).

13. STEPHEN L. DARWALL, *IMPARTIAL REASON* 13 (1983).

at the moment to that person. In an interesting way, this reflects, although by no means perfectly, the dynamic relationship between rules and the legal system I mentioned earlier. Rules are used by the legal system in an attempt to regulate the environment; rationality theorists pick out cognitive tools—rules of thought, one might say—that contribute to regulating the environment and attach the label “rationality” to them. In both cases, it turns out the relationship between the simple rule, whether legal rule or rule of thought, and the surrounding environment is quite complex, with the “rule” capturing only a narrow slice of the relevant domain.

As I see it, just to be clear, “rationality” is a simple reference to success in controlling our environment, which is attributable to the myriad regulatory measures our minds have been able to construct and employ effectively to tame various aspects of the chaos swarming around us. As Whitehead said, in an unfortunately neglected essay, “*The function of Reason is to promote the art of life.*”¹⁴ And the art of life in turn amounts to active engagement in “modifying the environment In the case of mankind this active attack on the environment is the most prominent fact in his existence.”¹⁵ A derivative of this point of view is that it is pointless to talk about the essence of rationality if one means by that which of the various cognitive tools is the true bearer of the core meaning of the concept. It is decidedly not pointless, by contrast, to investigate the utility and limits of different rules of thought, as the very point that I am making here is that one of the rules of thought—a little bit of a meta rule, I suppose—is that it makes imminent sense to match the rule of thought to the challenge posed by the environment.

Before I apply this general way of thinking to the legal system, I need to note its dark side. It is not just the dark side to the exposition of rationality that I am providing here; rather, it is the dark side of the conceptual foundations of any systematic treatment of the meaning or nature of rationality that those of you interested in these concepts cannot ignore. There is an obvious Darwinian aspect to the concept of rationality as I have developed it. In speaking of the conditions of success of the human race, I am indirectly speaking of the conditions of reproductive success or survival success. That means that these cognitive tools I have referred to most likely have evolved due to their utility in helping our ancestors survive and reproduce, but that in turn means that we may have no good ground to think of them as true or reliable, indeed as “rational.” All we know about them is that they have survival value. That crunching sound that you hear is rationality swallowing rationality.

14. ALFRED NORTH WHITEHEAD, *THE FUNCTION OF REASON* 4 (Beacon Press 1958) (1929).

15. *Id.* at 7–8.

As I say, this point is applicable to every exposition of rationality, and it is one of the worries of both modern philosophy and science.¹⁶ Moreover, although I have explicitly referred to the Darwinian nature of my argument, the problem applies to any attribute of existence that has been forged through an evolutionary process. All one knows of such things is that they have contributed to survival and reproduction; one has no good reason to think that any product of evolution is “true” in any sense. Indeed, it is not even clear what my word “know” in the previous sentence might mean.

Like the problem of free will, indeed in a sense it is the problem of free will, it is not at all obvious how to get out of the box. Darwinism in one sense is just an explication of the implications of a deterministic world. If the world is deterministic, then not only do we have no free will but also our conceptions of rationality are just synonyms for different descriptors of evolutionary success rather than being what some of us would like to think rationality is—indeed what all of us would like to think rationality is, I suspect. I should confess that I am on record as rejecting free will,¹⁷ yet even for me it is somewhat disheartening to think that I am standing here as no more than a complex collection of atoms whizzing around under the control of physical forces, and it is not very consoling to think that even my sense of “disheartening” doesn’t really exist except as a strange physical phenomenon.¹⁸

Thankfully, there are other mysteries in life in addition to whether there is such a thing as rationality, and one especially pertinent at the moment is consciousness. We are self-aware, or so we think, and thus we have the sense that we can observe ourselves and our condition, and make adjustments to our behaviors that are in our best interests, even if at the end of the day all that really means is that it improves our survival prospects. Not that one should be disdainful of improving one’s survival prospects. Thinking about things this way has the decided advantage of changing the focus somewhat from discovering what is true to discovering what works. I say “somewhat” because the two surely are not hermetically sealed off from one another; we will often figure out what works by figuring out what’s true and what is true based on what works. But still, we can put all the Humean¹⁹ and Darwinian counsels of despair aside by focusing

16. See, e.g., Robin Attfield, *Darwin’s Doubt, Non-deterministic Darwinism and the Cognitive Science of Religion*, 85 *PHILOSOPHY* 465 (2010).

17. Ronald J. Allen, *Miranda’s Hollow Core*, 100 *Nw. U. L. REV.* 71, 76–77 (2006).

18. One escape from this counsel of despair is religion, of course, but in my opinion that handles the problem of rationality by yielding to it, which is equally depressing. And logically troubling. God created the universe and everything in it, including us, and bestowed upon us free will. But, if we have free will independent of God’s will, we, not God, make the universe. The difficulties are obvious, which is why I ignore them mostly, except when invited to do distinguished lectures such as this one which calls for us to think as deeply as possible about the subject.

19. Mario J. Rizzo, *Justice Versus Benevolence: A Modern Humean View*, 9 *MINN. J. L. SCI. &*

on what appears to us to work or to be explanatory. The suffocating implication of this line of reasoning that pursuit of truth is not our hereditary right can become liberating by not constraining us to search for the impossible but instead for the useful.

So now under that admonition, let us turn back to the legal system. The legal system is a small part of a huge optimization problem. I asserted earlier today that the twin domains of the legal system—law and fact—each are each immensely, almost infinitely complex, each being bubbling cauldrons of interacting variables too numerous to articulate let alone compute, often continuous rather than discrete, and often unknown to the observer, and now is the time to justify this assertion.

We start with the world of fact as regulated by the law of evidence. The rules of evidence themselves are relatively discrete rules of necessary and sufficient conditions, leavened within a number of instances with allocations of discretionary authority to trial judges.²⁰ This regulatory system is supposed to be applied to what is conventionally thought of as the trial evidence, which means the testimony and physical objects entered “into evidence” at trial. If these categories were exhaustive of juridical evidence, they should provide an exhaustive basis for deducing liability, but they do not. Even though nowhere referred to in any rule of evidence, fact finders may take into account what is known as “demeanor evidence,” which means their observations of the witnesses.²¹ This is in one sense trivial, but in another it points to the yawning gap of complexity into which we are descending. The treatment of demeanor evidence essentially says that fact finders are to take into account their observations, but their observations include their entire life histories.

Consider some of the implications of this point. Without rules of logic, propositions uttered by witnesses lead logically nowhere, but rules of logic are, so far as I am aware, virtually never the object of proof at trial. Neither are rules of language. It is simply accepted that a fact finder can process information and deliberate on it, but how the fact finder understands what the witness means is obviously critical to fact-finding. Thus, the concept of evidence must expand beyond the material adduced at trial, even if that category is expanded to include such matters as demeanor evidence and rules of deduction. A sufficient body of knowledge and sufficient intelligence to use it to appraise the evidence offered at trial must also be part of the evidence of liability. The law of evidence, in turn, if it is truly to be regulatory, must regulate the interaction between what is

TECH. 883 (2008) (discussing Humean theory).

20. See, e.g., Thomas M. Mengler, *The Theory of Discretion in the Federal Rules of Evidence*, 74 IOWA L. REV. 413, 59–66 (1989).

21. See, e.g., Jeremy A. Blumenthal, *A Wipe of the Hands, A Lick of the Lips: The Validity of Demeanor Evidence in Assessing Witness Credibility*, 72 NEB. L. REV. 1157 (1993).

adduced at trial and the ensuing inferential process. To grasp how complex that relationship is, reflect on the inferential complexity of the following very mundane example of a standard inferential problem at trial:

Suppose a witness begins testifying, and thus a fact finder must decide what to make of the testimony. What are some of the relevant variables? First, there are all the normal credibility issues, but consider how complicated they are. Demeanor is not just demeanor; it is instead a complex set of variables. Is the witness sweating or twitching, and if so is it through innocent nerves, the pressure of prevarication, a medical problem, or simply a distasteful habit picked up during a regrettable childhood? Does body language suggest truthfulness or evasion; is slouching evidence of lying or comfort in telling a straightforward story? Does the witness look the examiner straight in the eye, and if so is it evidence of commendable character or the confidence of an accomplished snake oil salesman? Does the voice inflection suggest the rectitude of the righteous or is it strained, and does a strained voice indicate fabrication or concern over the outcome of the case?²²

But this is only the beginning of the complexity facing juridical fact-finding. The scope of potential disputes, all which are to be regulated by the law of evidence, is as wide as that of human affairs. Law surrounds us with multiple webs of regulation that reach into every facet of our existence.²³ Any rending of any portion of any of those webs can result in a legal dispute, and the evidence about that dispute can come from any conceivable source. To construct effective, rule-like, a priori regulation of such matters requires knowledge of the infinite combinations and permutations of human interactions and their implications, which would then have to be reduced to sets of necessary and sufficient conditions.

Such an encompassing view of human affairs à la the movie *The Minority Report* is beyond the scope of human intelligence. So, too, is its legal counterpart of reducing the legal regulation of any area of law worth talking about to a deductive structure. I think it is fair to say, in any event, that no body of law has ever been able to accomplish this objective, no matter how narrow the body of law or the amount of resources poured into the effort. A wonderful example of this is the tax code, which is lengthy and complex in its own right and supplemented by regulations and orders

22. Ronald J. Allen, *Factual Ambiguity and a Theory of Evidence*, 88 NW. U. L. REV. 604, 625–26 (1994).

23. See, e.g., 18 U.S.C. §§ 1–2725 (2006) (federal regulation of crime); 7 U.S.C. §§ 1–8901 (2006) (federal regulation of agriculture); 11 U.S.C. §§ 101–1532 (2006) (federal regulation of bankruptcy).

of a magnitude more complex and detailed than the code itself.²⁴ Yet, every new statute or provision, or its elaboration in the regulations, generates not just compliance, but further avoidance mechanisms that then have to be addressed in turn, and the race between the regulators and the regulated goes on *ad infinitum*.²⁵

The challenge of effective legal regulation presses even more deeply than just the surface complexity of the standard statutory form. To see this, it is helpful to separate primary behavior from litigation behavior. Primary behavior is everyday behavior of the population, including economic and private behavior (and any other sort).²⁶ Litigation behavior is activity directed toward formal resolution of disputes.²⁷ The two are not definitionally precise; there is a gray area of negotiation and compromise that leads to or away from formal litigation but plainly involves dispute resolution, but I will put that detail aside. Primary behavior deals with what a society thinks is right and wrong, with creating the conditions for efficient economic behavior, regulating social interactions and institutions, and so on. The various forms of justification for substantive law are almost as varied and as complex as the behavior they regulate, but in general have to do with what a society believes to be morally correct and economically efficient behavior.²⁸ Facilitating such behavior is the typical objective of social organization generally, and the law specifically. Litigation behavior, by contrast, involves parties attempting to resolve disputes that have arisen over claims about inappropriate primary behaviors or to rectify social disruptions that have occurred through alleged violations of substantive laws.²⁹ Most current analyses focus on either primary behavior or litigation behavior, as though they were separate spheres of influence with internal logics of their own. Much contemporary scholarship, for example, focuses on the effects or efficiency of substantive legal rules, ignoring litigation effects; other scholarship focuses on analogous questions regarding litigation behavior, ignoring primary behavior effects. This separation, while analytically useful in many contexts, misses or distorts the central regulatory issue.

Perhaps the most critical implication of the distinction between primary and litigation behavior is that resources spent on litigation appear to most legal commentators as dead weight social losses that add nothing of

24. See generally Louis Kaplow, *Accuracy, Complexity, and the Income Tax*, 14 J.L. ECON. & ORG. 61 (1998).

25. See William B. Barker, *The Ideology of Tax Avoidance*, 40 LOY. U. CHI. L.J. 229 (2009).

26. See generally Gideon Parchomovsky & Alex Stein, *The Distortionary Effect of Evidence on Primary Behavior*, 124 HARV. L. REV. 518 (2010) (discussing the theory of primary behavior).

27. See generally Chris Guthrie, *Better Settle Than Sorry: The Regret Aversion Theory of Litigation Behavior*, 1999 U. ILL. L. REV. 43 (1999) (discussing the theory of litigation behavior).

28. See Parchomovsky & Stein, *supra* note 26.

29. See Guthrie, *supra* note 27.

value to society. Litigation costs do not produce useful goods, material or intellectual capital, and thus, spending resources on litigation behavior is equivalent to throwing good money away. That is why most procedural and evidentiary codes begin with phrases such as that found in Rule 1 of the Federal Rules of Civil Procedure to the effect that the rules of civil procedure “should be construed and administered to secure the just, speedy, and inexpensive determination of every action and proceeding.”³⁰ This is echoed in Rule 102 of the Federal Rules of Evidence, which states: “These rules shall be construed to secure fairness in administration, elimination of unjustifiable expense and delay, and promotion of growth and development of the law of evidence to the end that the truth may be ascertained and proceedings justly determined.”³¹ These are noble expressions of high aspirations for the law of evidence and procedure, and they are radically misleading, as I will try to explain.

Substantive law tries, among other things, to ensure that people will bear the true cost of their behaviors. This is a simple expression but it has profound implications. Primary behavior almost invariably does not simply produce socially valuable goods; it usually does so with costs attached. When a factory produces cars or computers, it also produces environmental waste, for example. Driving a car can be a social good by making transportation more efficient, but it, too, produces waste products and can cause injury. One of the most important aspects of the substantive law is the effort to align costs with behavior—this is critically important to creating the optimal incentives for the production of the behavior in question. If, say, a factory can just dump its waste product in the river or on its neighbor’s property, it externalizes some of its costs to its neighbors or those who live on the river or rely on it for their welfare and can produce cars or computers at a cost lower than the actual cost, which will result in an over production of cars and computers. Lowering the cost of the production of an item typically encourages its production, as raising the cost discourages it. By contrast, optimal production of social goods is approximated by producing them at cost, which is why one important objective of the substantive law is to make people bear the true cost of their behaviors.

This concept applies to everything in society. Driving a car creates both benefits and imposes risks, and when you drive a car, you, too, should bear the true cost of your behavior. When I run a red light and hit another car, I should bear those costs, just as a factory that produces cars should bear all the costs of their production. There is good reason to believe that making everyone bear the true cost of his behavior will lead to

30. FED. R. CIV. P. 1.

31. FED. R. EVID. 102.

each of us making choices that will more likely optimize primary behavior than if we are insulated from the costs of our action or if we can externalize those costs to others.

We now need to return to the question of litigation costs because they increase the cost of the underlying primary behavior. Consider again our car factory. In addition to having to pay wages, purchase raw material and machinery, and dispose of waste products, the factory will have to bear the litigation costs of law suits. These raise the cost of producing goods, but without providing any value. The cars are not better built than they otherwise would be; pollution is not decreased, and so on. It is in this sense that most legal commentators view litigation expenses as dead weight social losses. They provide nothing in return. Thus, the objective is to get the costs of litigation to zero—to assure, in other words, compliance with the law with zero expenditure of resources. That is the objective, and that is what underlies the provisions in our rules quoted above.

But are those provisions sensible? Or, to reflect my previous comment, how can they be radically misleading? What could be wrong with lowering such transactions costs? What could be wrong with it is precisely what I have been discussing the last few minutes. What do you do when your favorite store holds a sale and reduces the price of the clothes that you like or the jewelry that you covet? You buy more of it. Price affects consumption. As prices go down on any desired good, consumption goes up. If the price of dispute resolution went down tomorrow, you and I would both predict that consumption would go up. If the price went to zero, consumption would commensurately go up dramatically.

What could be wrong with lowering the costs of justice? The answer is that a costless legal regime could very well stimulate the overproduction of its product and actually produce social harm. Because legal disputes are not costless, individuals and institutions must make decisions as to how to dispute—whether to use the formal legal process or some other means. You will come into contact with untold numbers of individuals who perhaps will violate your rights, or you will violate theirs. Perhaps vegetation from your land will fall onto your neighbor's land. Perhaps they will park their cars in such ways as to impede your access to your parking place. How do you handle such matters now? Through negotiating with the alleged violators of your rights. If the costs of litigation were zero, however, you could simply sue them rather than negotiate with them. Reducing the costs of litigation to zero thus could dramatically affect the manner in which people interrelate in society, and those changes might very well be undesirable. Rather than having to talk to and negotiate with people to solve everyday problems of life, you could get an official resolution from the government.

To be clear about the complication that I have introduced here, my point is that forms of dispute resolution compete with each other, and, for

some sorts of problems, some may be preferable to others. It might be a social loss if people could too easily turn to the government to resolve certain kinds of disputes. Thus, the costs of litigation are not necessarily dead weight losses. They may contribute to social goods by providing incentives for the resolution of disputes in ways other than formal litigation or the involvement of government, and, of course, accuracy in adjudication may also provide beneficial social incentives.

We can now see more clearly the complex optimization problem we are facing. Even if we could eliminate litigation costs, it is not obvious that we should. And the actual problem of allocating the unavoidable transaction costs of litigation complicates the problem even further. Even if as a rough cut people should bear the true cost of their behavior, there are many reasons to provide subsidies in one direction or another, and indeed, it is not altogether clear precisely what a “cost” is in many instances.

I now want to generalize the point I have been developing the last few minutes. Contrary to the conventional view of legal scholarship, the litigation process cannot be analyzed separately from its effects on primary behavior. Primary and litigation behavior are not hermetically sealed off from each other, and they cannot be analyzed separately in the abstract. Their interactive effects must be taken into account. Primary behavior obviously affects litigation behavior, but so too does litigation behavior affect primary behavior and in more subtle ways than conventionally is believed.

This is a powerful insight but is also deeply troubling, for it means that the problem of social organization is much more complicated than is typically believed. For example, there may be some types of litigation where behavior (both primary and litigation) are optimized by a low or zero cost litigation process. However, there may be other types of litigation that are optimized by infinitely high costs—in other words, cases that should not be brought. Perhaps family disputes are an example of this latter category. Other cases may be somewhere in between, in that behavior is optimized by the impositions of some costs. But now you see precisely what I mean when I say that the problem of social organization is more complicated than it appears. The task for the legal system includes trying to determine how to respond in the face of such complexity—which cases should be encouraged to be brought, and which should not.

This story of complexity continues into the future as well. One standard jurisprudential problem is the regressive nature of the law, as reflected in the common problems of how to apply a precedent or interpret a legal document. Most law formation reflects what has happened and responds to it, but what has happened bears a most complicated relationship to what will happen. To some extent what has happened lays the foundation for what will, but we only dimly perceive all the variables that con-

tributed to the past. Laws put in place or cases decided in light of the most recent disaster, whether environmental, financial, health care or national security related, become just a small part of the background to the unfolding future; thus, our ability to intelligently regulate that future through the extant law is quite limited. Indeed, as the tax law example indicates, the law put into place often is stimulative of efforts to avoid it and, for all these reasons, faces an intensely organic rather than static environment.

Somewhat ironically then, in a lecture dedicated to the complexity of the object under investigation, there is one commonality among all the different perspectives one might take on the legal system, and that, of course, is complexity. Things are at least simple to that extent. In any event, the reality of the legal system is that it is not a nice, tidy, simple, and static context, but instead is a bubbling cauldron of messy, complicated, organic, evolutionary processes. The standard tool used to regulate this bubbling mess is rules, and it is the friction between that tool and many of the uses to which it is put that explains in general why fact-finding and legal regulation are viewed as so often problematic. This same relationship is explanatory of many legal puzzles, such as, in ascending order of importance, the curious implications of standard legal error analysis, the rules versus standards debate, and the meaning of “law.”

The simple concept of a rule as setting necessary or sufficient conditions from which outcomes may be deduced is an example of monotonic logic in which the addition of postulates or assumptions simply adds to what may be deduced from the previous assumptions. Monotonic logics are powerful tools, as the rise of modern mathematics and the success of many scientific fields demonstrate. They work best when their operant assumptions accurately capture their domains, which means they work quite well, in Hayek’s famous dichotomy, in made systems such as games, and less well in grown or organic systems, which typify much of the human condition.³² A large part of debate over rules and their limits is often implicitly about the complexity of the relevant domain and one’s tolerance for mistakes of different kinds. As the number of pertinent variables increases or when some of them are continuous rather than discrete, the deductive problem quickly becomes computationally intractable, even for computers let alone humans. And of course if a new variable pops up that was not previously anticipated, all deductive bets are off, as it were. In either case (computational intractability or failure of imagination), algorithmic approaches that rely on extant rules generate the standard critiques of the indeterminate nature of rules. In reality, it is not that rules are indeterminate but that they are being put to a task for which they are not optimal.

32. FRIEDRICH A. HAYEK, RULES AND ORDER 35-54 (1973).

There are alternative forms of logic, however, that are nonmonotonic or defeasible logics in which new assumptions restructure the problem. Deduction may still operate, but the additions of new variables or unanticipated values of existing variables are accommodated in ways that fundamentally change what may be inferred. These forms of logic drive a large part of the work in artificial intelligence, although they have had almost no impact on legal thought. The normal legal/jurisprudential concept of a rule is the definite, hypothetico-deductive form as suggested above, but nothing in the nature of a rule says whether that form is to be applied to pre-existing facts, as is normally implicit in the rule debates, or instead as directions about outcomes, as exemplified by the regulation of physical forces. In a previous article that tried to show how this way of thinking explained the current turmoil over the pleading requirements generated by the Supreme Court's *Iqbal* and *Twombly* cases, I gave the following example of the difference between these ways of thinking:

Consider the "rule": "At the end of the day hose down the boat to clean it." The water pressure from the hose will matter to such a rule. One could further elaborate the rule in such a form as "turn the spigot two full revolutions to start the water flow and then hose it down," or one could say "turn the spigot until the water pressure from the hose is adequate to loosen the material on the side of the boat but not so strong as to adversely affect the paint job." The point is that both the precise water pressure from a hose and the pressure needed to do the job will depend on other variables than turning the spigot, such as temperature, water pressure in the system, water usage in the area, the nature of the stuff stuck to the side of the board, and so on. Many physical forces are like this. For example, homeostasis in organisms is achieved through dynamic equilibria of many interacting systems that almost surely could not be reduced to a computable algorithm.³³

I will give another example from a brilliant article by an artificial intelligence researcher, Tim Van Gelder, that I came across many years ago, which has inspired in significant ways some of what motivates this lecture.³⁴ Van Gelder was examining the limits of the computational model of cognition and speculating as to what the alternative might be. One possible answer is that cognition may be less like computation and more akin to a dynamic regulator, such as the Watt Centrifugal Governor that was a critical part of the Industrial Revolution.

33. Allen & Guy, *supra* note 3, at 24.

34. Tim Van Gelder, *What Might Cognition Be, If Not Computation*, 92 J. PHIL. 345 (1995).

Essential to the Industrial Revolution was the growth of the textile industry in England, and critical to that was the demand for a consistent energy source with only very limited variability. The steam engine provided the energy, but its pistons provided episodic bursts of energy rather than a smooth, continuous stream. The addition of a flywheel helped, as it does in the cars we all drive today, but not enough for the spinning of thread. One potential solution to this problem might be computational, and it would look like this:

*Static*³⁵

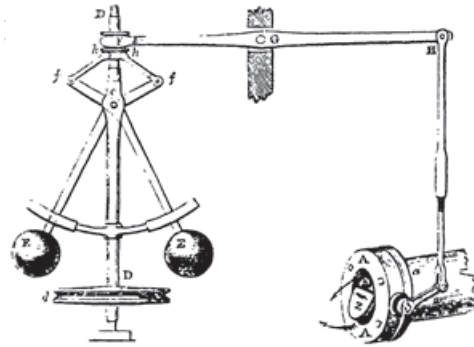
1. Measure the speed of the flywheel.
2. Compare the actual speed against the desired speed.
3. If there is no discrepancy, return to step 1. Otherwise,
 - a. Measure the current steam pressure;
 - b. Calculate the desired alteration in steam pressure; and
 - c. Calculate the necessary throttle valve adjustment.
4. Make the throttle valve adjustment.
5. Return to step 1.

There are two obvious problems with the computational solution. First, it requires a person doing it, which is costly, and second, it may or may not produce a smooth enough source of energy. A different solution was provided by a brilliant engineer, James Watt, in 1788 that placed movable arms on a spindle at the center of the flywheel, whose motion was transmitted instantaneously to the valve regulating the flow of steam.³⁶ If the rotation of the flywheel speeds up, the arms extend, which transmits to the valve and closes it until the proper equilibrium is reached, and vice versa.³⁷ The mechanism looked like this:

35. *Id.* at 348.

36. REV. DR. RICHARD L. HILLS, HIS TIME IN ENGLAND, 1774–1819, at 58–65 (2005).

37. *Id.*

*Dynamic*³⁸

To be sure, my invoking the centrifugal regulator is more in the nature of a metaphor than a systematic presentation of a method of thought. Even if the metaphor captures the reality of cognition, how it does so is still mysterious. We know that we think differently from computers, but how it is done is the great challenge of artificial intelligence and neuroscience.³⁹ Nonetheless, looking at certain common legal problems with this dichotomy in mind is at least interesting and perhaps enlightening. It certainly is explanatory of the difficulties discussed earlier today of fact-finding and law creation. Applying normal deductive techniques to fact-finding or law creation results in lumpy, episodic results analogous to the results of an unconstrained steam generator. Whether there is an actually practical alternative, I will address in a moment. Before doing so, I will briefly explain how the three issues I identified earlier, the curious implications of standard legal error analysis, the rules versus standards debate, and the meaning of “law,” are again at least enlightened by this perspective.

One important legal issue is how to set rules of decision at trial, the civil standard of proof being a “preponderance of the evidence” and the criminal standard of proof being “beyond reasonable doubt.” The justifications for these rules is that errors should be allocated evenly between the parties in civil cases (or its analogue, that the total number of errors should be kept to a minimum), and in criminal cases, innocent people should be protected by skewing errors away from the conviction of the factually innocent. These are perfect examples of straightforward legal

38. Van Gelder, *supra* note 34, at 349.

39. The evidence is overwhelming that other patterns of problem solving other than computational cognition work. It was recently reported that bees can solve the traveling salesman problem, without the benefit of computers. *Bees' Tiny Brains Beat Computers, Study Finds*, THE GUARDIAN (Oct. 24, 2010), <http://www.guardian.co.uk/world/2010/oct/24/bees-route-finding-problems>.

rules with straightforward explanations. They are also perfect examples of the limits of such rules and explanations, for taken at face value they lead to remarkably perverse results.

In civil cases, this approach to the decision rule makes no distinction between a world in which no mistakes are made at trial and world in which every case is wrongly decided (assuming that roughly half of the plaintiffs are deserving). In criminal cases, the admonition that it is ten times worse to convict an innocent person than acquit a guilty person tolerates a system in which for every 100 cases there are 90 wrongful acquittals, 9 wrongful convictions, and 1 correct decision. Moreover, this approach neglects the effects that trials have on other decisions, such as the decision to settle, and neglects the effects of all of that on both the question whether to litigate and primary behavior.⁴⁰ A much more compelling way to look at the social task is to optimize the four kinds of decision that can be reached at trial—correct and erroneous ones for either party—and their relationships to anterior behaviors.

The curiosities of the conjunction paradoxes may have a similar explanation of being by-products of simple rules applied in complex domains. The simplest example of the paradox follows from a few simple propositions: (1) The proof rule in a civil case is preponderance of the evidence, which means greater than a .5 probability; (2) The proof rule applies to each element; (3) The objective is to allocate errors equally over the parties; and (4) A mistake would be made if liability were imposed despite the failure to prove an element. Consider a simple case of two elements that are statistically independent and that are each found to have a probability of .6. This would result in a plaintiff's verdict, but the probability of at least one element being false is $1 - [.6 \times .6] = .64$, which means errors would be skewed against defendants. The curiosities press considerably deeper because even this result depends on the distribution of deserving plaintiffs and defendants that go to trial and the accuracy of the probability assessments. In short, the conventional discourse about burdens of proof is a conceptual mess, for which the solution is conceptualizing the trial as a form of inference to the best explanation, with the parties having the creative and practical obligations to advance competing stories for the benefit of the fact finder.⁴¹

The rules versus standards (or principles) debate is similarly misdirected. The standard quarrel is to contest Dworkin's distinction of crisp rules that govern if applicable to standards that are more vaguely formu-

40. Larry Laudan & Ronald J. Allen, *Deadly Dilemmas II: Bail and Crime*, 85 CHI.-KENT L. REV. 23 (2010).

41. See Allen, *supra* note 22; Michael S. Pardo & Ronald J. Allen, *Juridical Proof and the Best Explanation*, 27 L. & PHIL. 223 (2008).

lated and have a dimension of weight⁴² on the ground that these are two different matters.⁴³ The example given above of “keep the boat clean” demonstrates some of the difficulties; it is a standard, but with very precise rule-like qualities. More generally, the distinction that matters is not between two separate things—the set of rules and the set of standards—but among (not “between”) problems of differing complexity, with some reaching the point of computational intractability or failure of legal imagination and thus defying the use of deduction to get acceptable results.⁴⁴ As complexity increases, what the right thing to do is becomes less clear because any particular outcome competes with more alternatives, which is also why a “rule” mutates from being directive to a consideration that has to be “weighed” by reference to the alternatives.

At the deepest level, the point I am developing is that resolving issues within the legal domain requires taking into account the cognitive capacities of everyone involved and that a ubiquitous form of human reasoning involves inference to the best explanation. I believe this sheds light on yet another aspect of the rules debate, one championed by Fred Schauer in particular, which focuses on authority.⁴⁵ Who gets to decide what kinds of mistakes are made? Requiring that rules be followed, the argument goes, preserves the authority of the rule maker over that of the person implementing the rule. The rule maker takes everything into account and the rule follower does not and instead just follows the rule.⁴⁶ I believe this to be literally impossible. When the purported rule follower takes cognizance of a rule, it is done within the person’s entire conceptual framework. The person can follow the rule only if, all things considered, that is best thing to do. The rule plays a part in that, and I do not deny in many instances it is a crucial part, but it remains only part of the story. This is precisely why in some instances rules are followed and in others they become factors; it all depends on the surrounding circumstances as conceived by the person implementing the rule. For that person to say that nothing else but the rule is to be taken into account already takes everything else into account.

Third, the puzzle of what the “law” is and more deeply over what “law” may turn out to be is little more than a puzzle over how to handle increasingly complicated situations that may also involve unanticipated

42. RONALD DWORKIN, *TAKING RIGHTS SERIOUSLY* (1977).

43. See, e.g., Joseph Raz, *Legal Principles and the Limits of Law*, in RONALD DWORKIN AND CONTEMPORARY JURISPRUDENCE 73 (Marshall Cohen ed., 1984); FREDERICK SCHAUER, *PLAYING BY THE RULES: A PHILOSOPHICAL EXAMINATION OF RULE-BASED DECISION-MAKING IN LAW AND IN LIFE* (1993); Frederick Schauer, *Prescriptions in Three Dimensions*, 82 IOWA L. REV. 911, 912–15 (1997).

44. Allen & Guy, *supra* note 3, at 18.

45. See Schauer, *Prescriptions in Three Dimensions*, *supra* note 43.

46. See, e.g., SCHAUER, *PLAYING BY THE RULES*, *supra* note 43, at 21.

variables. This, it seems to me, is what implicitly drives a large part of the debates over the nature of the common law, statutory interpretation, how to apply legal language such as Constitutions over time, and so on.

On the jurisprudential plane, I think that what I have explained sheds light on the Hart/Dworkin debate, and in fact goes considerably further to demonstrate the literal impossibility of the strong Dworkin program of law as integrity. The short version of the argument is that law does not exactly run out, as Hart thought,⁴⁷ but instead is, first, constructed with the past in mind, and, second, faces an impossibly complex future. The answer to this is not to unfold the law in the fashion that would make it most integrated by reference to some set of moral principles, as Dworkin argues,⁴⁸ because there is literally no way to know what that might be. Even if all the relevant variables were known, computing the best fit is intractable. The matter is even worse if there are unknown variables, as again your own experience demonstrates there invariably are. Adding a new variable to a dynamic system is not the same as adding another assumption in a monotonic logic, like Euclid's fifth postulate. Introducing something new to a dynamic system requires that all the previous relationships be reconsidered, as well as the relationships between previous variables and whatever is added. What was computationally intractable becomes more complicated still.

In sum, the domesticating of complexity explains more aspects of the trial of disputes specifically, and dispute resolution more generally, than any other hypothesis that I can think of, as it also enlightens disparate practical and philosophical debates about the meaning of law, the significance of discretion, and even sheds light on perennial issues such as the distinction between rules and standards and the meaning of the law. But one large issue looms. If the cognitive tools of rule and deduction quickly run out leading to these perennial, and in my judgment misguided, debates, what replaces them? How does one take the metaphor of the centrifugal regulator and fashion it into useful tool? As I mentioned before, in one very important sense this is the central question of modern artificial intelligence and neuroscience, which means I do not have a definitive answer. But I do have a suggestive one, and it is a generalization of the explanation given above for the proof paradoxes.

One important and ubiquitous tool of thought is to examine and compare the possibilities that occur to us to explain or predict some state of affairs. The nature of the comparison involves such things as consistency, coherence, consilience, simplicity and so on.⁴⁹ Rather than search for the

47. DWORKIN, *supra* note 42.

48. DWORKIN, *supra* note 42.

49. PETER LIPTON, *INFERENCE TO THE BEST EXPLANATION* (2d ed. 2004).

overarching theory or edifice, as is the task of Dworkin's Hercules,⁵⁰ the search is for the better or best of the explanations that we have available to us. This directly captures the genius of the common law and even more generally the adversarial process, but its power, although embodied in the law, is so because it is embodied in human thought. Like human thought, and another example of the genius of the common law, one decides only the facts and arguments presented, thus leaving an open mind toward the claim that a prior decision gave inadequate consideration to a problem. The organic adversarial process can continue to function with affected parties searching for the limit or flaw in some prior holding and arguing for a change or clarification. The entire system thus acts as a complex parallel processing system that permits perturbations in the status quo from one node to ripple through the system with whatever effects result, and the system then eventually returns to a new equilibrium. Dworkin's metaphor of Hercules,⁵¹ to be blunt, has the matter exactly backwards. We should not aspire to the impossibility of a top-down know-it-all, but instead, we should facilitate a bottom-up, fluid process that never reaches stasis. Similarly, although less noted, statutory and constitutional exegesis unfolds similarly under the influence of the advancing of competing conceptions of the best reading of the language. And again, if some issue was not presented in a previous case that, when taken into account, suggests a better reading of the language, the better reading is adopted for now. The criteria of "better" involve both the criteria of thought noted above, and in addition, anything that conventionally is accepted as an appropriate legal consideration, and arguments over precisely what that is are handled in the same way as arguments over their implications.

This view answers in a way Dworkin's challenge to Hart, the final point that I will make. When the law runs out, what is left is not unbridled discretion, and thus *ex post facto* law making, but instead, gaps are filled by inferring the best explanation of the matter at hand under the guiding influence of the parties, and of course with institutional checks such as appellate review and legislative intervention. This is not a completely unambiguous process, but it is considerably less ambiguous than vague references to judicial discretion or the invoking of a literally impossible edifice such as law as integrity. Moreover, any result in any particular case is simply another datum whose effects ripple through the system in many instances prompting others to contest it in various ways, and so on. This may very well explain why the risk of *ex post facto* law making has never been viewed as the problem Dworkin thought it to be and why Dworkin's

50. RONALD DWORKIN, *LAW'S EMPIRE* (1986).

51. *Id.*

solution has never convinced very many people. In any event, it is the best explanation that I can give.