
Bruce Pardy

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THE HAND IS INVISIBLE, NATURE KNOWS BEST, AND JUSTICE IS BLIND: MARKETS, ECOSYSTEMS, LEGAL INSTRUMENTALISM, AND THE NATURAL LAW OF SYSTEMS

Bruce Pardy*

I. INTRODUCTION

The motto “Soit Droit Fait” appears on the crest of the law school where I teach. Translated, the phrase means “Let Right Be Done.” It reflects the instrumentalist’s mantra: law is a means to an end, or a tool for the social good.1 In this essay, I will argue that legal instrumentalism is inconsistent with the nature of dynamic systems and in particular ecosystems and markets. The notion of dictating particular ecological or economic ends conflicts with the natural behavior of these systems and their immutable rules.

The basic features of ecosystems and markets are not controversial. No one versed in the ways of these systems would seriously propose to control the population of butterflies or the price of duct tape. Yet result-oriented measures and practices have become commonplace, not because the systems are misunderstood but because the role of law is misconceived. Law is not able to dictate how ecosystems or markets operate.

On the other hand, ecosystems and markets can provide insight about how law should work. Legal decisions emanate from a system of governance. This system should operate more like ecosystems and markets than like technicians attempting to fix problems one at a time. Isolated, instrumentalist legal commands are incompatible with the operation of law as a system. Providing ad hoc answers on a case-by-case basis is as much of an affront to legal principles2 as controlling butterflies is to the nature of an ecosystem. Instrumentalism is a flawed method by which to govern systems, but systems can reveal effective ways to approach the legal enterprise.

In this article, I will first make observations about instrumentalism in the context

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2. See id. at 484 (“The U.S. legal system is in imminent danger of becoming less of a system of law . . . [T]he rule-bound character of the system is reduced when achieving purposes or focusing on ends becomes the paramount goal of judges . . . [A] legal system requires that judges render decisions according to the applicable rules, not according to their own political views or preferences.”).
of legal theory and then about the nature of ecosystems and markets. On the first topic, I rely heavily upon the works of Brian Tamanaha and, on the second topic, upon the commentaries of Jane Jacobs and William Ashworth. I then propose an approach to the legal governance of ecosystems and markets that is consistent with their characteristics and reflects a concept of law as a dynamic system.

II. LEGAL INSTRUMENTALISM

In modern welfare states, instrumentalism abounds. Courts frequently rely on policy grounds to justify idiosyncratic results in particular cases. Governments develop policies and programs designed to address a multitude of specific social issues. Legislatures grant administrative agencies broad mandates with minimal oversight, and officials act with their own initiative to craft solutions to what they perceive as pressing community needs. Everywhere state actors take it upon themselves to pursue the ends they deem appropriate.

Nowhere is the triumph of instrumentalism more apparent than in environmental law, where the battle between rule-based governance and result-based discretionary decision-making has more or less been won by instrumentalists. Occasional attempts are made to identify or articulate abstract principles, but these principles tend to be malleable and vacuous, providing political and legal decision-makers with more room, not less, to craft the results that they prefer in any particular situation. Unlike many other areas of law where conflict between instrumentalism and rule-based adjudication is not even acknowledged, the campaign against general rules in environmental law has been explicit on occasion. The case has been made that the nature of environmental problems and of ecosystems makes general rules impossible, or at least impractical.


[A]n effective and long-lasting environmental law cannot be constructed around a series of abstract substantive principles. There is a reason that no Restatement (First) of Environmental Law exists or is in process. The candidate suite of principles such as advance environmental impact assessment, polluter pays, precaution, and sustainable development are useful starting points but they can only serve as guideposts to structure a dynamic, but inevitably ad hoc, decision making processes.

Id. (citing Beanal v. Freeport-McMoRan, Inc., 969 F. Supp. 362 (E.D. La. 1997), aff’d, 197 F.3d 161 (5th Cir. 1999)).

Despite the continued existence of command-and-control regulation, it has fallen out of favor, condemned as ineffective and futile, and it never really qualified as "rule-based adjudication" in any event. Ecosystem management has replaced command-and-control as the dominant methodology in environmental law. This new methodology is a thoroughly instrumentalist practice that overtly rejects rule of law ideas such as precedent and the application of general rules. Instead, it claims to address each new environmental situation as a unique case.9

An instrumentalist approach to market governance is more controversial than it is in environmental law, but even in the economic realm, instrumentalist measures are common. Examples include subsidies for the building of manufacturing facilities in particular cities or states, government bailouts for troubled banks, welfare programs to cure poverty, government grant programs to support particular towns or regions, grants or loans for "family farms," and subsidies for development of alternative energy technologies.

Instrumentalist law can be legislative, adjudicative, or a combination of both. Instrumentalist statutes are of two types. They can consist of either specific rules that apply to particular facts or parties, or vague rules that provide wide discretion to fashion unique solutions to particular social problems. These two types of legislation seem quite different—one is specific and non-discretionary, and the other is vague and very discretionary. However, they are both instrumentalist in nature: the first because the rule itself is designed to achieve a specific purpose and the second because the statute creates a regime within which officials have the discretion to determine specific outcomes in specific situations. The process of applying the latter has the effect of producing the former—applying a vague, discretionary rule produces a specific rule for a specific factual circumstance. The outcome is a series of result-oriented, isolated decisions that lack common principles.

In the realm of adjudication and administration, the instrumentalist's mantra to "do the right thing" conflicts with the premise of the rule of law that government decision-makers are not free to do as they think best, "to innovate at pleasure... roaming at will in pursuit of [their] own ideal[s] of beauty or of goodness,"10 but are constrained by the content of the law. Instrumentalism in this context is exactly contrary to the rule of law since, like beauty, "the right result" lies within the eye of the beholder. The traditional meaning of the rule of law is a system of governance based upon generally applicable, abstract rules and limited state discretion, in which the government is subject to the same law as individual citizens.

Stripped of all technicalities, [the rule of law] means that government in all its [activities] is bound by rules fixed and announced beforehand—rules which make it possible to foresee with fair certainty how the authority will use its coercive powers in given

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Brian Tamanaha explains that these two broad ideas—the rule of law and legal instrumentalism—presently constitute an uncomfortable dualism in the American legal system.

The legal tradition in the United States combines two core ideas. The first idea, known broadly as the rule of law, is that government officials and citizens are obligated to abide by the regime of legal rules that govern their conduct. The second idea, what I call legal instrumentalism, is that law is a means to an end or an instrument for the social good. Both ideas are taken for granted and are equally fundamental in contemporary U.S. legal culture. It is seldom recognized that the combination of these two ideas is a unique historical development of relatively recent provenance and that, in certain crucial respects, they are a mismatched pair.12

Both of these ideas have become firmly established as legal norms even though they directly conflict, at least when applied to courts and other adjudicative bodies. “Although legal theorists have put forth compelling arguments that rule-bound judging and a focus on purposes and ends cannot in principle be combined, this combination has in fact taken place in U.S. legal culture.”13

These two ideas have both methodological and substantive components. They are based on different premises about the process of reaching legal decisions and about the content of the law. I have attempted to summarize the basic distinctions in Figure A below.

12. Tamanaha, supra n. 1, at 469.
13. Id. at 489 (emphasis in original).
Figure A: Instrumentalism and the Rule of Law

<table>
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<th>Instrumentalism</th>
<th>Rule of Law</th>
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<td><strong>Methodological premise</strong></td>
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<td>Result-based adjudication (legal realism, policy-based reasoning)</td>
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<td><strong>Law consists of</strong></td>
<td><strong>Variations:</strong> Rules from statutes and cases (positivism)</td>
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<tr>
<td>No binding content until filled by the decision-maker (law is essentially empty, each case on its own facts)</td>
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<td><strong>The right result</strong></td>
<td><strong>Variations:</strong> Required by the rule (formalism)</td>
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<tr>
<td>Variations: Greatest benefit and least burden (utilitarianism)</td>
<td>Consistent with the content of natural law (natural law)</td>
</tr>
<tr>
<td>Maximum economic efficiency (law &amp; economics)</td>
<td>Can be articulately rationalized as consistent with principles (Dworkin)</td>
</tr>
<tr>
<td>Greatest social equality (egalitarianism)</td>
<td>Etc. (depending on the group in control)</td>
</tr>
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A. Methodological Premises

The defining characteristic of adjudicative instrumentalism is result-based reasoning, the practice of resolving particular cases on the basis of the desirability of the answer. Where instrumentalist adjudication includes reasons, as in a court decision, it typically makes generous use of policy grounds and case-specific observations to justify the decision. Instrumentalism promotes adjudication that reflects the judge’s personal perception of right and wrong, and thus submits citizens to coercive control that is unfettered by democratic accountability. Result-based decisions are highly discretionary and difficult to challenge or appeal on the grounds of legal error since the basis of the decision was not primarily application of substantive law in the first place. The school of thought known as legal realism makes the case that whether or not adjudicative decision-makers acknowledge participating in result-based reasoning, their decisions will tend to reflect their own personal predilections, rather than consist of an objective, neutral result derived purely from the application of a rule, as formalism would prescribe.

The methodological premise of the rule of law is that decision-makers are the instruments through which the law is applied but are not the source of the law. The most literal variation of this approach, formalism, a label that is today often used in a derisive manner, has come to stand for a rigid, formulaic conception of law in which legal rules are mechanically applied to facts in order to produce an objective answer. Formalism is jurisprudence’s version of the computer. If the inputs are correct (accurate facts and the relevant law), then the outputs should follow automatically without the interjection of the moral preferences of the decision-maker. If adjudication actually worked this way, then a literal rule of law, free from the personal inclinations of state officials, would be possible. But formalist theory is susceptible to the criticism that its

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15. The language of judicial decision is mainly the language of logic. And the logical method and form flatter that longing for certainty and for repose which is in every human mind. But certainty generally is illusion, and repose is not the destiny of man. Behind the logical form lies a judgment as to the relative worth and importance of competing legislative grounds, often an inarticulate and unconscious judgment, it is true, and yet the very root and nerve of the whole proceeding. You can give any conclusion a logical form.

16. “[C]ourts are the mere instruments of the law, and can will nothing.” Tamanaha, supra n. 1, at 492 (quoting Chief Justice John Marshall in Osborn v. Bank of U.S., 22 U.S. 738, 866 (1824)).
17. F.A. Hayek, The Constitution of Liberty 153 (U. of Chi. Press 1960) (“It is because the lawgiver does not know the particular cases to which his rules will apply, and it is because the judge who applies them has no choice in drawing the conclusions that follow from the existing body of rules and the particular facts of the case, that it can be said that laws and not men rule.”).
19. The formal rule of law is complementary to an instrumental view of law when considered in connection with legislative declarations of law. . . .

When moving from legislation to judging, however, the proposition that judges should strive to achieve purposes and ends when deciding cases . . . raises a direct conflict with the formal rule of law.
ideals do not reflect the actual dynamics of legal problem-solving. The difficulty is not simply that legal officers are seduced by the temptation to reflect their personal preferences, but that the process of applying general rules to specific facts can produce inherent ambiguities within which skilled legal practitioners can bob and weave. Answers in hard cases are not formulaic or automatic but call for interpretation, reasoning, and argument. However, on the formalists' side, not all cases produce debilitating ambiguity. Application of a rule to a case that falls within the kind of cases that the rule was designed to address will often provide straightforward results—results that a purely instrumentalist approach might disregard in favour of a decision more to the liking of the adjudicator or administrator.  

Ronald Dworkin's notion of articulate consistency is less mechanical than legal formalism but more fettered than instrumentalist result-based adjudication. He writes:

[The doctrine of political responsibility] states, in its most general form, that political officials must make only such political decisions as they can justify within a political theory that also justifies the other decisions they propose to make. The doctrine seems innocuous in this general form; but it does, even in this form, condemn a style of political administration that might be called, following Rawls, intuitionistic. It condemns the practice of making decisions that seem right in isolation, but cannot be brought within some comprehensive theory of general principles and policies that is consistent with other decisions also thought right. . . .

[This] doctrine demands, we might say, articulate consistency.  

I will return to Dworkin's articulation of legal decision-making in section IV below.

B. What Law Consists of

In an ideal instrumentalist universe, there is no independently existing legal content that binds decision-makers. Such content would constrain them from "doing right" in each new situation. While instrumentalists do not go so far as to decry the existence of statutes, it is not difficult to find examples of courts that view statutory provisions as narrow fetters on their general discretion, unfortunate inconveniences to be disregarded or dismissed when they stand in the way of a proper result.

In a rule of law universe, law has predetermined content not subject to the whims of the decision-maker. Positivism is the most literal variation. It offers a clean, value-free, black and white description of what constitutes law: statutes enacted by legislatures.
regulations created pursuant to statutory authority, and common law precedents. For the positivists, laws are simply commands, and there is no necessary connection between law and morals. These laws bind courts and administrative officials. No other content with the force of law exists. Positivism's main methodological difficulty derives from the inevitable gaps that arise between rules. If there is no other source of law to fill gaps, then once a gap arises, the decision must be discretionary. Thus, it is possible within a positivist approach to end up with instrumentalist decisions.

Still under the rule of law umbrella, but in contrast to positivism, is the concept of natural law. Natural law contains inherent, substantive limits on what legislatures and judges can do. a "notion that there are legal limits on law itself, limits derived from divine law, natural law, principles of reason, or customs descended from time immemorial." The earliest formulations of natural law theory tended to link reason with some notion of a deity and thus tended to be influenced by theology. Contemporary revival of natural law ideas reflect a wide spectrum of content, from Fuller's eight minimum procedural requirements to Finnis's seven human goods or basic forms of human flourishing. The main difficulty with the concept of natural law is that it calls upon the state to enforce particular views about morality and goodness. The idea that there are inherent moral limitations on the power of legislatures or judges is burdened by the subjectivity of moral preferences and the diversity of views within a pluralistic society, which makes the proposition of immutable natural law difficult to maintain. One can see the subjectivity of those preferences simply by observing the wide variation between the

25. Tamanaha, supra n. 1, at 474-75 (quoting Thomas Aquinas who stated that "[e]very human positive law has the nature of law to the extent that it is derived from the Natural law. If, however, in some point it conflicts with the law of nature it will no longer be law but rather a perversion of law." (citation omitted)).
26. Id. at 474 (emphasis in original) (footnote omitted).

What I have tried to do is to discern and articulate the natural laws of a particular kind of human undertaking, which I have described as "the enterprise of subjecting human conduct to the governance of rules."

What I have called the internal morality of law is . . . a procedural version of natural law . . . .

Id. at 96.
31. See Tamanaha, Law as Means to End, supra n. 3, at 131 (quoting Alasdair MacIntyre, Theories of Natural Law in the Culture of Advanced Modernity, in Common Truths: New Perspectives on Natural Law 91, 93 (Edward B. McLean ed., ISI Books 2000) ("[N]o fact seems to be plainer in the modern world than the extent and depth of moral disagreement, often enough disagreement on basic issues."); Oliver Wendell Holmes, Natural Law, 32 Harv. L. Rev. 40, 42 (1918) ("[T]o those who agree with me I am uttering commonplaces and to those who disagree I am ignoring the necessary foundations of thought.").
content of natural law proposed by Fuller and that proposed by Finnis.

Natural law and instrumentalism start in opposite corners, the former proposing that law has inherent content that limits the actions of state officials and the latter denying that it does or that it should. However, their abstract goals are strangely similar in that both purport to give legal force to subjective preferences. These preferences are found either within the particular version of "natural law" being professed as natural or within the instrumentalist priorities of officials crafting solutions.

C. The Right Result

Through instrumentalist eyes, law is merely a tool. It has no inherent content of its own. It is bereft of internal sensibility, an empty vessel that can be filled by whoever is politically or legally powerful enough to fill it. The "right result" depends on who has the reins.

Utilitarianism, a dominant variation of instrumentalist philosophy, is an ethical or jurisprudential theory that identifies social utility as the objective of law and social action. It often manifests as a rough calculus of benefit and burden assessed at a community level. Utilitarianism can be adapted to serve a variety of interests, as benefit and burden may be defined at will. Groups with vastly different agendas can claim to be utilitarian, defining and redefining the proper result in accordance with their own interests and predilections, sacrificing the rights of the individual in favour of a vague notion of the collective good. Policy considerations tend to be offered as rationales to legitimize arbitrary preferences, masking the subjectivity and moral relativism inherent in the utilitarian inquiry.

Other variations of the "right" result—such as economic efficiency, egalitarian distribution, socially conservative values, and preservation of life—vary with the prevailing belief about what is good and desirable. Stripped to its core, instrumentalism is not much more than an unfettered power to coerce. As Brian Tamanaha describes,

Fundamental disputes exist over what social justice requires, the proper trade-offs between liberty and equality or between formal and substantive equality, the enforcement of moral and religious norms in the public and private spheres, the rights of women, minorities, and gays and lesbians, the appropriate distribution of resources and opportunities, conditions of employment, the balance between economic development and harm to the environment, and so on. The old faith that the sciences will supply answers to these questions now smacks of naiveté—the natural and social sciences are themselves caught up in the battles among groups, with contrary studies enlisted to serve all sides...

These attitudes fuel the militant "groupism" that is a standout feature of contemporary discourse...

All of these groups confront one another in various legal arenas—in cause litigation, in legislative and administrative lobbying, and in battles over judicial appointments—and

32. Bix, supra n. 18, at 214.
33. "[I]t is fair to surmise that a greater proportion of contemporary judges are judicial pragmatists... Judicial decisions today routinely cite policy considerations, consider the purposes behind the law, and pay attention to law's social consequences." Tamanaha, supra n. 1, at 490.
routinely claim to be acting in the name of the public good.\textsuperscript{34}

\section{Summary: The Problem}

In the absence of natural law, law is a vacuum. It can be filled by whatever interest manages to gain access to state power to achieve particular ends. The alternative is to prescribe predetermined legal content that reflects an “objective” truth about what is good, desirable, right, and proper—but that proposition is a fiction. It would entrench a particular view about what is good that, in a pluralist society, cannot reflect the predilections of all members of the community to which it is applied.

What is the alternative? What approach can protect against arbitrary exercise of state power used to pursue particular ends, be they evil or benevolent, and avoid the imposition of one group’s priorities over others? Are there principles that are natural, unassailable, objectively true, and independent of human preference?

\section{Ecosystems and Markets}

It is no revelation that ecosystems and markets are both dynamic systems or that they share important features.\textsuperscript{35} These systems are not just collections of things, like widgets or frogs, but consist of elements interacting in a complex web of relationships and patterns\textsuperscript{36} that together amount to phenomena different than the sum of their parts. They contain mechanisms that express and process information and produce patterns and outcomes. Some elements have a physical form, such as widgets and frogs, but many do not, such as a sale of goods. The goods may have a physical form, but the transaction itself does not.\textsuperscript{37}

These systems operate according to their own immutable characteristics and rules. They are organic and evolutionary, changing through time, rather than existing in a fixed or static state. They arise spontaneously and are neither created nor destroyed by the actions of individual people or agencies. However, their operations can be perverted when their characteristics and principles are not respected. Below are brief descriptions of some of these characteristics and principles. This list is by no means exhaustive, and sketches of this length hardly do these features justice, but they illustrate the forces at

\textsuperscript{34} \textit{Id.} at 481–82.

\textsuperscript{35} “[T]he laws of ecology and the laws of economics are, at heart, the same set of laws.” Ashworth, \textit{supra} n. 5, at 205 (emphasis omitted). “Today, the study of competitive dynamics is standard fare in business schools. But, ironically, the professors never mention that nature has been playing by the same rules for eons.” Michael Rothschild, \textit{Economy as Ecosystem}, in \textit{The Libertarian Reader: Classic and Contemporary Readings from Lao-tzu to Milton Friedman} 243, 247 (David Boaz ed., Free Press 1997).

\textsuperscript{36} Every organism is defined by the information in its genes, but a living thing also is defined by its relationships to its prey, competitors, and predators. In the same way, an organization is defined by its technology and by its associations with its suppliers, competitors, and customers. From a bionomic perspective, organisms and organizations are nodes in networks of relationships. As time passes and evolution proceeds, some nodes are wiped out and new ones crop up, triggering adjustments that ripple across each network. Constrained by its key relationships, each organism and each organization is held in its niche, pursuing the same goal—the survival of the genetic or technological information it carries. Rothschild, \textit{supra} n. 35, at 243.

\textsuperscript{37} A written contract may provide evidence of the exchange but does not constitute the exchange itself.
work that make ecosystems and markets dynamic, self-governing entities.

A. Scarcity

In ecosystems and markets, resources are scarce. Scarcity is the state in which the supply of a resource is insufficient to meet all the demand for it. For example, in an ecosystem, the population of organisms is limited by the availability of food. Scarcity does not mean that the supply of food is inadequate to maintain organisms within the system. Instead, it means that the supply of food limits the population to what it is at any given moment in time. In a market, purchasers seek to avoid scarcity by obtaining the resources that they desire, and producers and sellers seek to respond to scarcity, meeting demand at the highest possible price. Scarcity drives the dynamics of supply and demand in both ecosystems and markets.

B. Supply and Demand

In a sense, a market is the relationship between supply and demand.

What economists call the law of supply states merely that, all other things being equal, as the price of something rises, suppliers will supply more of it. The law of demand is similar but reversed: as the price rises, consumers will demand less. All markets do—all they do—is establish a balance between these two opposing tendencies.

The relationship between supply and demand determines how much of a good will be produced, how much will be sold, and at what price.

Supply and demand is also a fundamental characteristic of ecosystems. Resources are not bought and sold, of course, but the relationship between supply and demand (or between availability and need, to use non-economic terms) creates the conditions for competition and adaptation of individual organisms and for the evolution of species. When seeds are plentiful and the demand for seeds from seed-eating birds is modest, meaning the demand is within the supply, then competition for seeds is minimal. There is room for the population of seed-eating birds to grow, and the pressure to adapt and evolve is minimal. The situation is reversed when the demand for seeds exceeds the supply, resulting in acute competition for seeds and downward pressure on population. In this situation, conditions exist for adaptation to eating some other food source.

C. Autonomous Individuals

Supply and demand are aggregate phenomena borne of individual action. A multitude of sellers and buyers make their own self-interested choices about what to sell and buy and at what price. A market expresses collective conclusions without collective decision-making. This is Adam Smith's "invisible hand" in action. The individual

39. Id. at 98.
40. Id. at 116 (emphasis in original). “The great nineteenth-century British essayist and skeptic Thomas Carlyle was once said to have remarked to a friend that the best way to train an economist was to purchase a parrot and teach it to repeat the phrase supply and demand over and over.” Id. at 115 (emphasis in original).
41. Every individual is continually exerting himself to find out the most advantageous employment
quest for survival plays a similar role in ecosystems. The system’s relationships and patterns result from the actions of individual organisms. The central importance of the individual in both systems does not deny the existence of communities, whether social or organic, but community arises from the aggregate behaviour of individuals. Without autonomous individuals, ecosystems and markets do not exist.

D. Pursuit of Self-Interest

Each of the autonomous individuals within markets and ecosystems is engaged in the pursuit of self-interest, which produces both competition and cooperation with other individuals. In markets, genuine competition means that no single enterprise can control supply, demand, or price. It requires many buyers and sellers for each good and service, access to accurate information, low transaction costs, low barriers to entry, and the absence of government subsidization, which falsifies costs and prices. Concentration of market power interferes with competition because each transaction does not reflect a negotiated bargain but rather reflects the resolve of the party with the power to dictate price, for example, by restricting supply. The information provided by such transactions is false because it does not reflect the relationship between supply, demand, and price that would exist if many buyers and sellers operated in the market for that good or service. Competition in ecosystems operates similarly as the engine of adaptation and evolution. As in markets, ecosystem competition is skewed by monopolistic forces because they render false information. Success no longer depends on competition and adaptation but on system dominance, which allows the monopolist to determine outcomes. In modern ecosystems, the monopolists are human beings.

E. Survival of the Fittest: Adaptation, Specialization, Efficiency

Competition between autonomous individuals for scarce resources leads to adaptation through technological and commercial innovation within markets and behavioural and genetic evolution in ecosystems. As Michael Rothschild explains,

\[
\text{[i]n both ecosystem and economy, survival rewards efficiency. Inefficiency is}
\]

for whatever capital he can command. It is his own advantage, indeed, and not that of the society, which he has in view. But the study of his own advantage naturally, or rather necessarily leads him to prefer that employment which is most advantageous to the society.

[H]e intends only his own gain, and he is in this, as in many other cases, led by an invisible hand to promote an end which was no part of his intention. Nor is it always the worse for the society that it was no part of it. By pursuing his own interest he frequently promotes that of the society more effectually than when he really intends to promote it.


42. For example, in ecosystems organisms may exist in a symbiotic relationship; and in markets, people pool capital to pursue common economic goals. In a market, even people who hate each other have cause to cooperate when it is in their self-interest to do so.


44. Ashworth, supra n. 5, at 112; Jacobs, Nature of Economies, supra n. 4, at 108.

45. Jacobs, Nature of Economies, supra n. 4, at 35.

46. Id.
punished by extinction. Attempting to escape scarcity, species as well as industries fragment into ever more-specialized offshoots. By adapting to the peculiarities of their niches, ecologic and economic life forms become more efficient at making offspring and products. Lacking any grand design other than the urge to escape threats to their continued existence, genes and technology spontaneously weave living webs of ever more-intricate filigree. The future details of these stunningly complex systems are unknowable, but their basic architecture and historical direction are quite clear and similar.47

Sometimes adaptations follow a gradual pattern of progression from an existing state. In a market, an enterprise may expand a product line or pursue sales in a new territory. Human evolution has seen a gradual increase in brain size and loss of body hair. Sometimes imminent failure can require radical adaptation.48 An enterprise producing canoes at a greater cost than their market price faces collapse unless it takes the road less travelled and develops a new product line—kayaks perhaps, instead of canoes. However, if kayaks do not bring profits either, the business may be forced to develop unrelated products or services, utilize new skills, adopt other modes of production, hire different employees, or move to other locations. In ecosystems, evolutionary adaptations can produce radically new structures or survival strategies. Jacobs describes two examples of developments that fit into this category:49 the emergence of multi-celled organisms from a population of single-celled creatures and, much later, the emergence of air-breathing vertebrates from an ancestry of marine vertebrates. Such adaptations arise spontaneously as a survival response to system conditions.

F. Diversification and Resilience

Competition leads to increased efficiency and specialization for individual organisms and enterprises, which in turn increases diversity and resilience in the system. Diversity is a measure of variety. For example, a market contains a diversity of skills, services, goods, capital, and modes of production and transportation. Likewise in each ecosystem, there is a diversity of species, genes, nutrients, habitats, and more.50 Resilience is a measure of a system's ability to maintain its relationships in the face of disturbances.51 Diversity generally enhances resilience because it makes the system less susceptible to disruption or failure of one or more of its elements. In an ecosystem, the decline of a dominant species because of a sudden or catastrophic event could significantly alter the nature of the ecosystem, unless the system is diverse to the extent that the decline of one species is mitigated by the presence of others occupying the same

47. Rothschild, supra n. 35, at 246.
49. Id.
50. Paulo A.L.D. Nunes, Jeroen C.J.M. van den Bergh & Peter Nijkamp, The Ecological Economics of Biodiversity: Methods and Policy Applications 9–13 (Edward Elgar Publ. 2003) (explaining the important distinction between different levels of biodiversity (e.g. gene diversity, species diversity, ecosystem diversity, functional diversity)).
51. In ecology, this term has come to refer to both “the magnitude of disturbance that can be absorbed” and speed of an ecosystem’s return to equilibrium “without flipping the current ecosystem to another regime of behavior.” Id. at 12 (citations omitted). See also C.S. Holling, Resilience and Stability of Ecological Systems, 4 Annual Rev. Ecology & Systematics 1, 14 (1973).
or similar niches. In a diverse market, the failure of one mode of food production is evolutionary rather than catastrophic if there are other modes also in operation. Individual efficiency and specialization is not the same as system efficiency. Competition rewards the former, but the latter is not the measure of diversity or resilience.\footnote{52 See Thomas Homer-Dixon, The Upside of Down: Catastrophe, Creativity, and the Renewal of Civilization 229–33 (Is. Press 2006); Jacobs, Nature of Economics, supra n. 4, at 108.}

G. Failure Is a Necessary Event

Competition leads to winners and losers. Failure is as normal and necessary as success. Unlike the meaning of failure in social contexts, failure in ecosystems and markets carries no moral judgment. It is merely one of the possible conclusions for individual strategies in a particular system context. All organisms die, and every species’ survival strategy includes eventual failure for its individual members. In markets, not all enterprises die, but failure in the form of bankruptcy or other termination is the appropriate destiny for unsuccessful commercial strategies.

Failure provides at least three essential functions. First, it produces information for a system’s patterns and feedback mechanisms. For example, a declining population of prey fuels positive and negative feedback loops (see \((h)\) below) and excess inventory directs future resource allocation and production. Second, failure provides food and/or raw materials for the organisms and enterprises that are still alive.\footnote{53 Jacobs, Nature of Economics, supra n. 4, at 89–90.} For example, rotting logs provide habitats for animals and insects and the useless assets of bankrupt corporations become useful assets of new entrepreneurs. Third, failure opens up opportunities and niches to be filled by other organisms and entrepreneurs. Economies, like nature, abhor vacuums.\footnote{54 See id. at 117.} Each vacancy created by the demise of an organism or an enterprise is an opportunity to be taken up by other, better-adapted competitors.

H. Dynamic Stability and Self-Correcting Mechanisms

Dynamic stability means active avoidance of collapse.\footnote{55 See id. at 84; Holling, supra n. 51, at 14 ("[S]tability ... represents the ability of a system to return to an equilibrium state after a temporary disturbance; the more rapidly it returns and the less it fluctuates, the more stable it would be.").} While failures of organisms and enterprises are necessary events, failure of the system itself is not. Operating within these systems are at least two kinds of mechanisms or responses that act to avoid or minimize instability and collapse, and to enable adaptation to new conditions. Positive feedback is “the enhancement or amplification of an effect by its own influence on the process which gives rise to it.”\footnote{56 The Concise Oxford Dictionary of Current English 1066 (Della Thompson ed., 9th ed., Clarendon Press 1995).} In ecosystems, for example, positive feedback loops exist where there is growth; they are the mechanisms that produce biomass expansion. Plants transform the sun’s energy through photosynthesis into matter consumed by plant-eating animals, which helps to fertilize the soil, which feeds increased plant growth, which produces more available food for other herbivores,
which leads to more fertilization. In markets, positive feedback is a common phenomenom reflecting the basic principle that economic activity begets more economic activity. An enterprise imports raw materials, combines them with labour and technology to produce exports, pays its labourers and suppliers who purchase goods and services, including imports, from other suppliers, and then purchases more imports with profits from its exports with which it makes more exports and so on.\(^\text{57}\) Positive feedback can be thought of as a self-fueling process.\(^\text{58}\)

Negative feedback is the reverse: "the diminution or counteraction of an effect by its own influence on the process giving rise to it."\(^\text{59}\) In ecosystems, the relationship between predator and prey often acts as a negative feedback loop. The more wolves there are, the more rabbits that are eaten; the more rabbits that are eaten, the harder it is to find rabbits; the fewer rabbits there are, the fewer wolves who can survive; the fewer wolves there are, the fewer predators looking for rabbits; the fewer rabbits that are eaten, the more rabbits there are to reproduce; and so on. In markets, the supply and demand relationship provides negative feedback to limit incorrect allocation of resources. If too many enterprises produce more apples than there are customers who wish to buy them, price will decline, eventually to a level lower than apples cost to produce. Some enterprises will either stop producing apples and shift to something else or go out of business. As the number of producers falls, the supply of apples in the market decreases. As supply decreases, the price rises. And so on.

I. Non-Linear Systems in Non-Equilibrium

Ecosystems and markets are evolutionary, not revolutionary. They exist in a state of non-equilibrium\(^\text{60}\) and never reach a fixed or fully evolved state, but are in a continual process of change. For some of these systems, the rate of change is rapid; for others, it may be very slow. Their destinies are not shaped in a particular moment, but change by virtue of the effects of an infinite number of interactions and relationships through time. They are non-linear and unpredictable.\(^\text{61}\) Even if every single influence could be taken into account, their futures would still be unknown.\(^\text{62}\) Everything is connected to everything else,\(^\text{63}\) and it is not possible to isolate an element in order to understand its behaviour separate from the many other forces and events to which it is attached.

\(^{57}\) Jacobs, *Nature of Economies*, supra n. 4, at 94.

\(^{58}\) Id. at 95.


\(^{61}\) Jacobs, *Nature of Economies*, supra n. 4, at 137.

\(^{62}\) Id.

J. Summary: Order without Direction, Development without Decree

Markets and ecosystems run themselves. Their fundamental rules have not been created or invented by human beings, and cannot be changed by government design. The “invisible hand” guides the market; the expression “nature knows best” reflects the operation of ecosystems. All participants are equally subject to their forces; systems do not play favourites. Governments may impose taxes, restrict supplies, or subsidize production but cannot eliminate the relationship between supply, demand, and the price for a particular good. Regulation can attempt to control water use, movement, and treatment but cannot change the nature of the water cycle. Human action can affect the outcome of system processes, but it cannot change the nature of those processes.

The existence of these immutable system features does not mean that there cannot or should not be laws that apply to markets and ecosystems. On the contrary, ecosystems and markets need laws to protect them from forces that might otherwise interfere with and distort their operation. Calling these systems “immutable” does not mean that they are impervious to external forces, but only that their internal principles are independent of state regulation, moral argument, or personal preference. They cannot be manipulated to behave as something other than systems. Therefore, legal rules and principles need to account for the manner in which they operate.

IV. The Law of Systems—a New Natural Law

An instrumentalist approach to ecosystems and markets conflicts with the nature of these systems because it prescribes ends. Fashioning the “right” results in particular situations or responding to specific social, economic, or environmental problems is not an appropriate objective because a focus on results is anathema to the operation of systems. Instrumentalist practices govern systems as though they are not systems at all by attempting to control, manage, and dictate outcomes.

The alternative is to establish and enforce general rules and principles that protect ecosystems and markets from undue influence, so that these systems may operate according to their inherent characteristics and thereby create their own ends. Like traditional conceptions of natural law, a “natural law of systems” restricts the powers of the state by setting limits on what the law can do. However, it rests on a different premise than the old natural law, which through time has been based upon a variety of customs, moral judgments, and procedural or behavioural norms, each of which reflects a particular subjective view of what is good. A natural law of systems reflects the

64. In his introduction to Michael Rothchild’s Economy as Ecosystem in The Libertarian Reader, supra n. 35, at 243, David Boaz states that the economist William A. Niskanen, former member of the President’s Council of Economic Advisors and Chairman of the Cato Institute, has three portraits on his wall, one of Isaac Newton, one of Adam Smith, and one of Charles Darwin, and underneath each portrait is the inscription “Order without Direction.”

65. It is significant that one of the commonest objections to competition is that it is “blind.” It is not irrelevant to recall that to the ancients blindness was an attribute of their deity of justice. Although competition and justice may have little else in common, it is as much a commendation of competition as of justice that it is no respecter of persons.

Hayek, supra n. 11, at 101.
immutable characteristics of dynamic systems rather than moral preferences and provides a structure for defining the boundaries of law and the liberties of individuals.

A natural law of systems consists of rules and principles that protect the features and characteristics of markets and ecosystems. While markets and ecosystems have their own intrinsic principles and characteristics, they require human laws to protect them. Without such laws, markets and ecosystems are vulnerable to corruption by forces inconsistent with their operation. For law to do this job, it too must operate as a system. Like ecosystems and markets, it must be internally coherent. Every rule and principle should be connected. Every decision should be related to all others. Within a properly constituted legal system, there is an answer for every problem that arises. Such a system treats its participants dispassionately and equally, subjecting all to the same rules; systems do not play favorites nor take account of special circumstances.

A. Market-Protecting Laws

Without laws to protect them, markets can become dysfunctional. In *The Wealth of Nations*, Adam Smith wrote:

Commerce and manufactures can seldom flourish long in any state which does not enjoy a regular administration of justice, in which the people do not feel themselves secure in the possession of their property, in which the faith of contracts is not supported by law, and in which the authority of the state is not supposed to be regularly employed in enforcing the payment of debts from all those who are able to pay.

In the absence of a legal regime designed in accordance with the operation of markets, commercial transactions could be replaced by other kinds of struggle such as the exercise of physical force. A peaceful market exists where there is government with power to enforce rules against physical conflict, breach of contractual promises, and concentration of market power. Such rules allow markets to function by defining the conditions under which all transactions will take place. Neither laissez-faire economics nor economic subsidies are consistent with this approach. The former does not establish the conditions that ensure peaceful, competitive markets, and the latter directly interfere with their operation.

A legal rule or principle designed to protect markets must be generally applicable. Prohibitions on physical force, breaching contracts, monopolistic power, and the use of child labour are all of this kind. A specific rule that applies only to a particular kind of

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66. The liberal argument is ... based on the conviction that, where effective competition can be created, it is a better way of guiding individual efforts than any other. It does not deny, but even emphasizes, that, in order that competition should work beneficially, a carefully thought-out legal framework is required and that neither the existing nor the past legal rules are free from grave defects. Nor does it deny that, where it is impossible to create the conditions necessary to make competition effective, we must resort to other methods of guiding economic activity. ... And it regards competition as superior not only because it is in most circumstances the most efficient method known but even more because it is the only method by which our activities can be adjusted to each other without coercive or arbitrary intervention of authority.

67. Parts of this section are adapted from Bruce Pardy, *Regulatory Creep Revisited*, 1998 N.Z. L.J. 352.

68. Smith, *supra* n. 41, at 449.
transaction or activity distorts the market’s signals and mechanisms. When generally applicable rules exist and there is perfect competition within the market, Adam Smith’s “invisible hand” operates—the market determines supply, demand, and price; resources are allocated in accordance with their highest value uses, and the system’s mechanisms operate. Market competition can occur in an economy to which many laws apply, while competition will be skewed in a lightly regulated economy if the regulations are not generally applicable. The market’s function does not depend on whether there are many or few generally applicable rules because they apply to all of the actors in the economy; therefore, none of those persons are placed at a competitive disadvantage. All bargainers are subject to the same restraints.

Market-protecting laws may have distributive effects if they do so across the market. They may affect the bargaining power of parties in a particular transaction relative to each other but not the bargaining power of the parties relative to their competitors. For example, a rule providing for a minimum wage will affect the bargain reached between a company and an unskilled worker. In the absence of the minimum wage law, the worker might have accepted less pay than the level of the minimum wage. The content of their bargain has been influenced by the rule. However, what has not changed is their bargaining position relative to their competitors’ bargaining position. There is no change to what each party can offer the other, relative to other parties with whom they could decide to contract instead. All companies are subject to the minimum wage law. Therefore, the law places no enterprise at a competitive advantage or disadvantage. Similarly, none of the worker’s competitors are able to offer their labour to the company for less than the minimum wage in an attempt to be more competitive. Whether the worker is paid minimum wage or some amount above minimum wage will depend upon the aggregate of the market transactions for unskilled labour. The existence of the rule does affect the bargains reached, but even in the presence of the rule, the “invisible hand” of the market operates to determine the final price for labour and the number of jobs available.

Laws distort a market when they interfere with particular transactions, particular kinds of transactions, the supply of particular kinds of goods, or a particular class of traders. They change particular outcomes rather than the community rules about entering into transactions, and they upset the relative competitiveness of the players by forcing some players to tolerate restrictions or obligations that their competitors do not have or by creating advantages that not all competitors enjoy. A minimum wage law that distinguishes between waged employees and independent contractors, making one group subject to the rule and the other not, distorts the market. Since both groups sell their labour, such a rule does not treat all transactions for the sale of labour in the same way. Instead, it shifts the purchase of labour towards independent contractors and away from employees. Government subsidies for nuclear electricity mean that the nuclear industry does not do business under the same conditions as the suppliers of other forms of energy. Rules that stipulate that particular goods are to be sold only by a particular party, such as a marketing board, virtually eliminate the market by designating a single seller. In markets, failure is a necessary event. Laws that attempt to protect enterprises from 69. Except foreign firms.
economic termination skew the market’s mechanisms.

B. Ecosystem-Protecting Laws

Ecosystems also need legal rules and principles to protect them. While human beings were, at one time, merely one species among many within ecosystems, human activity now dominates the landscape. Markets and ecosystems are inextricably linked. Pursuit of self-interest is a key component of both markets (competing buyers and sellers) and ecosystems (competing organisms), but the competition of buyers and sellers within markets can cause harm to ecosystems. One of the functions of ecosystem-protecting laws is to protect ecosystems against encroachment from market activities. Ecosystems provide the platform of "ecosystem services" on which markets rest and human beings rely for survival and economic exchange: air and water purification, soil generation, climate stabilization, photosynthesis, pollination, waste decomposition, and so on. These services are rarely in a concrete form that can be owned, and therefore they do not constitute goods and services within markets. Consequently, they cannot be bought and sold, and there is no private incentive to produce or conserve them. The absence of property rights in ecosystem services renders them common resources, owned by no one, and therefore susceptible to "the tragedy of the commons," leading to overuse and eventual depletion or destruction.

Like laws for markets, ecosystem-protecting laws are generally applicable and shield system functions from interference. Neither an environmental free-for-all nor particularized management is consistent with this approach. The former does not protect ecosystems from human excess, and the latter attempts to intervene in their operation. The legal challenge is to identify, in abstract terms, when human impact has exceeded the limits that an ecosystem’s self-governing mechanisms can tolerate without altering the ecosystem’s developmental path. Cut down a few trees here and there, and no permanent change occurs to the forest. Clear-cut a hundred acres and the ecosystem is fundamentally altered. Drawing an environmental line in the sand is conceptually difficult. How much impact upon an ecosystem is too much? Human beings play a


72. Ruhl et al., The Law and Policy of Ecosystem Services, supra n. 71, at 10.


74. Other issues arise as well. Upon which ecosystem is the impact to be assessed? Are the ecosystems to be protected the ones that now exist even if they have already been altered by human activity, or the ones that are thought to have existed in the past, prior to human disturbance? I address these and other issues in developing a generally-applicable environmental limit in Bruce Pardy, In Search of the Holy Grail of Environmental Law: A Rule to Solve the Problem, 1 McGill Intl. J. Sustainable Dev. L. & Policy 29 (2005). For an alternative reformulation of environmental law, see Michael M'Gonigle & Paula Ramsay, Greening Environmental Law: From Sectoral Reform to Systemic Re-Formation, 14 J. Envtl. L. & Prac. 333 (2004).
dual role in ecosystems. On the one hand, they are elements like any other, and their animal-like actions within the system are conceptually no different than those of deer, warthogs, or termites when they feed, breathe, and die. As in markets, each of these participants pursues its own survival and self-interest, and the system expresses the results of their successes and failures. But also as in markets, monopolies impede competition in ecosystems. If human beings overrun the environmental game, then the game is no longer being played according to its rules. As I have stated elsewhere,

Human beings are part of nature when they are the ecological equivalent of one of the many competitive buyers and sellers in a perfectly competitive marketplace. Human beings are part of nature when they exist within an ecosystem as one of many perfectly competitive species; when they exert impact that, while it may contribute to the interactions in the system and thus influence the nature of the change that the ecosystem experiences, is not disproportionate to the impact exerted by other species in the system. That is, where humans are just one of the many elements in a system and through their participation as one of the elements, contribute to the evolution of the system (that is, the nonequilibrium of the system) then humans are part of nature and the change is natural. When any organism eats, breathes, dies and decays, those activities produce impacts on the system that are natural, whether the organism is a flower, tree frog or human. However, when humans exert a disproportionate influence on the state of a system, like a monopoly in a marketplace, they are not part of nature, but stand outside it. Their role is unlike that of any other organism. Under these conditions, the changes experienced by the system are not guided by the "invisible hand" of system interactions, but are wrought by one of its elements alone.

These disproportionate human effects may be benevolent or evil, careful or careless, managed or mismanaged, or centrally-planned or laissez-faire. Regardless of origin or intent, they exceed the system's ability to maintain its character and evolutionary path in the presence of disturbance. The purpose of ecosystem-protecting laws is to identify and prohibit such effects with rules and principles that apply generally to human activities in all ecosystems.

Generally applicable rules are notoriously absent in modern environmental law.

As many have observed, environmental law has substantially influenced other, established areas of law such as administrative law, international law, property, torts, and water law as well as more remote subjects such as corporations, securities regulation, and intellectual property. However, when one sums up the cases, statutes, and administrative regulations that make up the core of what most people consider environmental law, one is hard pressed to reduce them to a set of distinctive, fundamental principles, let alone rules that can be applied to a wide range of current and future issues, as one can do in other areas of "real law."
The philosophy of ecosystem management has come to dominate environmental governance, sometimes explicitly, and sometimes in the absence of a formal declaration or specific statutory regime. Ecosystem management is an approach to environmental governance whose purpose is to measure, control, and change ecosystems to produce the most desirable environment in human terms. One of the main tools of ecosystem management is "adaptive management," a methodology that relies on building models of ecosystem dynamics and then using rigorous testing, monitoring, and evaluation of policy implementations to provide the feedback necessary to promote long-term ecosystem integrity. Adaptive ecosystem management purports to protect ecosystem function, but it is a distinctly instrumentalist practice consisting of isolated, targeted decisions made for particular and varied purposes. A recent report by the National Academy of Science's research arm, the National Research Council, in an investigation into the Missouri River ecosystem, stated:

The concept of adaptive management promotes the notion that management policies should be flexible and should incorporate new information as it becomes available. New management actions should build upon the results of previous experiments in an iterative process. It stresses the continuous use of scientific information and monitoring to help organizations and policies change appropriately to achieve specific environmental and social objectives.

The pursuit of specific environmental and social objectives means that different preferences will be expressed in different situations. Isolated decisions disregard total load, or the cumulative ecosystem impact produced by all human activity—past, present, and future. The attempt to dictate results means that elements within the system are not

sometimes at multiple levels of government, as though ecosystems did not exist. If ecosystems were protected, much of the attention now paid to other environmental and health concerns would be unnecessary because they would not be in peril. Protected ecosystems would not contain contaminants that cause environmental diseases. Separate legal regimes for the protection of endangered species would be redundant because wildlife habitat would not shrink. No separate forest management regime would be needed because forest ecosystems would be governed by the general rule. The subjects of modern environmental law are elements of ecosystems. If ecosystems were preserved, then ecosystem elements would be protected as well.

Pardy, supra n. 74, at 41 (footnote omitted).

78. Pardy, supra n. 76, at 675. Daniel Botkin states:

Having altered nature with our technology, we must depend on technology to see us through to solutions. The task before us is to understand the biological world to the point that we can learn how to live within the discordant harmonies of our biological surroundings, so that they function not only to promote the continuation of life but also to benefit ourselves: our aesthetics, morality, philosophies, and material needs.

Nature in the twenty-first century will be a nature that we make; the question is the degree to which this molding will be intentional or unintentional, desirable or undesirable.


autonomous nor engaged in a truly competitive pursuit of self-interest, the information
normally produced through system interactions is not accurate, the system’s self-
governing mechanisms are thrown off, the system’s evolutionary destiny is altered, and
the ability of the system to function as a system is compromised.

C. Law as a System

If law was to operate as a system, it would have features that resemble those of
ecosystems and markets. It would reflect their intrinsic neutrality and would consist of
general rules and principles that apply equally to all the participants within the system—
citizen and government, strong and weak, rich and poor. Systems do not play
favorites. These rules and principles would be consistent and coherent.

Every insect eaten by a bird has meaning for the state of plants and animals in an
ecosystem; every sale of shoes has meaning for the state of commerce in a market; every
court judgment and administrative edict has meaning for the state of the law within its
jurisdiction. These decisions emanate from the system, not from the inclinations of the
individual decision-maker. Each decision is related to all others and to its rules and
principles—taking precedent seriously means that everything is connected to everything
else. The mandate of decision-makers is not to “do right,” but instead to “let the system
speak.”

Within a law of systems, as in ecosystems and markets, individuals are
autonomous and able to seek out their own self-interests. They are permitted to make
their own decisions and craft their own survival strategies based on the generally
applicable framework that the law provides, and they are allowed to succeed or fail on
the basis of those strategies. Statutes do not protect people (or market participants, or
ecosystem organisms) from themselves, and administrative and adjudicative decision-
makers do not modify the content of the law in accordance with the context of the case or
the personal circumstances of the parties. People have liberty to do as they wish unless

81. The logic of mutual gain from voluntary exchange is perfectly general. It rests only on the self-
interest of individuals in a world of scarcity. It is not particular to one culture, one time, or one set
of values. Most important for these purposes, the logic of exchange is not role specific. It does not
speak about one set of rules for employers and another for employees, or one set for landlords and
another for tenants. It does not create one set of rules for people who are rich and powerful and
another set for those who are frail or meek.

82. In a sensible legal system, the evolution of the law should make litigation less and less necessary
over time. If the law had been built up around broad, solid, comprehensible principles of justice
over hundreds of years, as we like to believe it was, then surely by now we should possess an
integrated system of principles that every member of society could readily grasp and use to guide
his or her conduct, even in a changing world.

There should be increasingly greater certainty about the principles a court would apply in
handling any conflict or grievance, and therefore less likelihood of the conflict ever finding its way
into a courtroom. . . .

Instead, what we have experienced over the past few decades is exactly the opposite—an
explosion of litigation and a profusion of unclear, irreconcilable and swinging-pendulum case law.
Karen Selick, Legal Aid Underfunding Isn’t the Problem, 26 Canadian Law. 54, 54 (June 2002).
they cause others harm, including distorting a market (such as by exercising monopoly power) or corrupting an ecosystem (such as by causing permanent change to an ecosystem’s characteristics).

The jurisprudential theory that is most consistent with a conception of law as a system is perhaps Ronald Dworkin’s notion of law as an interpretative enterprise. According to Dworkin, within the law are principles sufficient to provide a correct answer to any legal problem. Like markets and ecosystems, law does not leave room for vacuums.

How can the law command when the law books are silent or unclear or ambiguous? Legal reasoning is an exercise in constructive interpretation...; our law consists in the best justification of our legal practices as a whole...; it consists in the narrative story that makes of these practices the best they can be.

Dworkin’s conception of law is neither mechanistic, like formalism, nor discretionary, like instrumentalism. Instead, it is an evolutionary, coherent whole with internal integrity. “The adjudicative principle of integrity instructs judges to identify legal rights and duties, so far as possible, on the assumption that they were all created by a single author—the community personified—expressing a coherent conception of justice and fairness.” This “single author” is internally consistent. Its principles apply throughout. Each decision within this system relates to all of the others. “Law as integrity... requires a judge to test his interpretation of any part of the great network of political structures and decisions of his community by asking whether it could form part of a coherent theory justifying the network as a whole.”

Within this framework, legal disputes consist of contests between rights—rights of self-interested parties competing for the coercive help of the state—and the resolution of these complaints is based upon principle, not policy.

Arguments of principle attempt to justify a political decision that benefits some person or group by showing that the person or group has a right to the benefit. Arguments of policy attempt to justify a decision by showing that, in spite of the fact that those who are benefited do not have a right to the benefit, providing the benefit will advance a collective goal of the political community.

83. The major categories of which are physical or reputational harm to person or property (the law of torts), breach of contract, and violation of another’s property rights. See generally Epstein, supra n. 81.
86. Dworkin, supra n. 84, at vii.
87. Id. at 225.
88. Id. at 227.
89. Id. at 245.
90. Dworkin, supra n. 24, at 294.
When legal outcomes are based upon rights, there is no room for the pursuit of individualized justice or personal moral preference, which Dworkin rejects as incompatible with the systemic nature of legal reasoning:

Law is also different from justice. Justice is a matter of the correct or best theory of moral and political rights, and anyone's conception of justice is his theory, imposed by his own personal convictions, of what these rights actually are. Law is a matter of which supposed rights supply a justification for using or withholding the collective force of the state because they are included in or implied by actual political decisions of the past.91

I have set out in Figure B below the basic differences that result when law is approached as an instrumentalist exercise and when it is regarded as a dynamic system.

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91. Dworkin, supra n. 84, at 97.
In a competitive market, no single player can determine price, supply, or demand. In a proper legal system, no single official can determine a legal answer. The diversity of functions between different branches of government, the separation of powers between those functions, and the doctrine of precedent prevent any state actor from deciding what should be done about any particular problem. Legislatures pass statutes
that contain generally applicable rules and principles but must rely on administrative officials for implementation and on courts for application to particular cases. Administrative officials implement statutory directives, but only by the means of the rules and principles that the statutes contain. Courts decide particular cases, but only those particular cases brought to them by the executive branch or private parties, and only in accordance with the rules and principles passed by the legislature and/or the rules and principles articulated by previous courts. When law is a system, the powers of any single official are extremely limited. The diversity of functions provides resilience and stability. There are built-in self-regulating mechanisms—the appeal process, the provision for judicial review of administrative action, and the ability of legislatures to pass amendments to general rules in response to results reached by courts in particular cases. Like markets and ecosystems, law is evolutionary. It can and does change, but when operating as a system, it changes in a coherent and internally consistent manner.

V. CONCLUSION

Law has less control over the world than it might appear. Ecosystems and markets may be interfered with, but the nature of their processes cannot be altered. These systems are not just collections of things. They consist of relationships and interactions that express information and produce outcomes. They are organic and evolutionary, changing through time. These systems have intelligence. The idea of dictating specific ecological or economic results is inconsistent with the way they behave. The appropriate role for law is to set generally applicable boundaries within which markets operate and to establish generally applicable limits on the degree to which human actions encroach upon ecosystems. Its proper mandate is to protect these systems from manipulation rather than to seek to manipulate them.

Law is a system too. Its abstract features should resemble those of ecosystems and markets: generally applicable rules and principles, intrinsic neutrality, internal coherence and integrity, and autonomous individuals. The mandate of decision-makers is not to "do right" but instead to "let the system speak." Instrumentalist legal decisions are made as though they are isolated events, but they are not. They produce distorted information and ignore the law of unintended consequences that applies when everything is attached to everything else. Hard cases make bad law only when they are in the hands of an instrumentalist decision-maker. Instrumentalism promotes adjudication that is context-driven and therefore personal and arbitrary. It invites the unfettered exercise of state power to pursue specific ends and the imposition of one group's priorities over others. It erodes the rule of law and approaches the legal enterprise as though it is not a system. Instrumentalism attempts to treat ecosystems and markets as though they are the simple subjects of results-oriented legal commands, but they cannot be commanded in that way.

The hand is invisible, nature knows best, and justice is blind. Establish the general conditions, and then let the systems run. Once generally applicable legal parameters are established, the "right" result is what the system says it is. The right price is the price dictated by competitive supply and demand. The right environmental conditions are those produced by protected, unmanaged ecosystems. The right decision is that prescribed by the generally applicable principles of a precedent-based system of law.