

The Power of Persistent Patterns

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This paper is ancillary to a SubTech session entitled “Electronic transformation in law firms.” That session will showcase two leading law firms – one each from the United States and the United Kingdom – that are deploying advanced knowledge technologies in support of innovative forms of service delivery. We will hear about online advisory systems and internal know-how repositories that illustrate the dramatic potential of new technologies. We’ll also talk about how such substantive systems may be transforming law practice itself, and what that means for the legal education system.

I spend most of my working life these days designing and building eminently practical systems like those mentioned above. But SubTech is always about bridging between high practicality and high theory. So I offer the below fragments in that spirit, reporting some ideas about which I am still very much in a state of enthusiastic confusion.

From here to patternity

I’ve been drinking deeply – if sporadically – from the literature of biological evolution in the last several years, both for its innate fascination, and in search of useful insights into the nature of law practice, legal technology, and the legal industry. How might, for instance, theories of biological evolution shed light on techniques for optimizing the environment of cognitive tools and materials in which legal professionals work? In what ways might principles of genetic variation and natural selection be applied in contemporary law office automation? What challenges and opportunities are involved as we attempt to alter the code and change the metabolism of complex law practice organizations through new technologies of practice?

These considerations have led me into more hopelessly general questions about complex systems in nature and culture. Where do patterns (in structure or behavior) come from? Where do they go? How do they change? Do patterns inherently persist? Do they have some inherent power to resist change? (And is therefore “the power of persistent patterns” a tautology? Do stable forms persist by definition?) Are patterns agents, catalysts, artifacts, or mere epiphenomena?

To be a bit more concrete, consider the wide range of domains and forms in which patterns (orderly shapes in space or time) are observed:

- ❖ **The physical (inorganic) world** – weather, wind patterns, tides, life cycles of stars, electromagnetic waves, snowflakes, revolution of planets
- ❖ **Biology** – DNA, cells, embryology, the immune system; cycles arising from predator satiation, like the 17-year cicada or 120-year flowering bamboo; the deer flies that emerge every late June and attack the back of my head on my walks through the nearby woods
- ❖ **Psychology** – consciousness, memory¹, metaphor
- ❖ **Culture, society** – languages, musical compositions, business cycles, the biannual SubTech ritual
- ❖ **Mathematics** – the Mandelbrot set
- ❖ **Technology** – punch cards for the Jacquard loom, software
- ❖ **Law** – regularities arising from doctrines like *res judicata*, *stare decisis*

It turns out that almost everything that is interesting, that we care about, is a pattern, rather than stuff. (Consider, for instance, the grandfather's axe, which has been "in the family" for generations, and somehow retains its identity despite having had its blade and handle replaced several times. Or the 11-dimensional strings or "branes" whose resonant cavities may somehow account for the properties of all sub-atomic particles. Or our own individual bodies, which persevere pretty much intact despite constantly gaining and shedding molecules. Or legal knowledge systems that transcend their momentary implementations.) At bottom, maybe there *is* no "stuff."

What interesting and useful commonalities might there be among some of these contexts and instances? By better understanding their natural dynamics, can we better shape the patterns we face in the world of law and technology to our own ends?

Bio/Tech

Biology is particularly interesting and relevant as a domain in which patterns persist and evolve. It provides a rich vocabulary, and is a great source of metaphors and insights. To be sure, there are dangers of simplistic misapplication (cf. Herbert Spencer's social Darwinism), but conceptual breakthroughs like population thinking and other highly nuanced theoretical accomplishments are to be found in few disciplines as readily as in biology.

One doesn't hear much about machine creativity, but most would agree that the seemingly "mechanical" processes of natural selection have turned out to be pretty

¹ My daughter Mary recently brought home a trumpet, the latest in a series of instruments she has half-heartedly chosen to learn. While I haven't played a brass instrument in more than thirty years, I was amazed to discover that my fingers remembered the valve combinations for the major scale. This involves a simple sequence of finger positions, to be sure, but it seems nonetheless remarkable that such a pattern could lie dormant for so long and yet be so effortlessly recalled.

creative. Nature has discovered effective structures and strategies for accomplishing some of the same things we humans are trying to do. Hence the field of “bio mimetics”. There have been many early experiments in self-assembly of materials and circuits, in machines that grow like living organisms, based on biological phenomenon of one molecule recognizing another.² The use of genetic algorithms as programming techniques is another example of bio-mimicry.

We live in an era of especially rapid change in the balance between the amount of working knowledge that is encoded in the human mind and that which is encoded in artificial devices. The rise of non-biological intelligence is likely to be the defining feature of the 21st century.

Law is a midplace between the born and the made, between the naturally evolved and the humanly contrived. Law itself *is* a societal technology; one of those grand hybrids of artifice and evolution – a system the understanding of which can be advanced by building and using simpler normative systems. Law's job as a societal institution and as a profession is to express and enforce norms – patterns of behavior. It's not coincidental that law, genetics, and software each involve “code” as a core instrument.

By way of background

I have been interested in the study of dynamic systems from multidisciplinary perspectives for many years, and began writing about them in a legal context over twenty-five years ago. (You might say there have persistent patterns in my own thinking about persistent patterns.)

Language as metaphor

My earliest relevant piece ([Lauritsen 1977] – a lengthy but unpublished law school paper) borrowed the concepts of grammar and linguistic competence from Chomskyan psycholinguistics for a theory of legal consciousness. Since law “turns in on itself and evolves in part according to its own internal dynamics” it seemed productive to compare it to another contingent product of history, human language.

According to Chomsky, there are universal features shared by all natural languages (e.g., structure-dependence of grammatical rules), which are innately present as part of the “original equipment” of all human minds. This endowment accounts for the spontaneity and creativity even infants demonstrate with language, accomplishments that seem out of proportion to the complexity of the tasks performed. Transformational grammars mediating between deep and surface structures allow speaker-hearers to make correlations of sound and meaning. I claimed that similar cognitive mechanics enable legal thinkers to replicate and predict collectively established correlations of facts and normative outcomes.

² The shell of abalone, for instance, is 3000 times tougher than naturally occurring minerals made of the same substance – a remarkable piece of “engineering” [research by Belcher at University of Texas at Austin].

This “synchronic” view of legal consciousness was accompanied by a “diachronic” one. Dynamic instability arises from inevitable ambiguities and contradictions in a legal grammar, producing a plurality of grammars (e.g., due to discrepancies between espoused rules and actual legal practices). Most deviations are checked, but occasionally some are adopted – “incorporated into the competence” – of enough others to effect a change in the collective grammar. Such a “reception” will usually upset the pre-existing equilibrium, giving rise to further deviations, first in individuals, then in the community at large. The iteration of this process over time brings forth modes of consciousness fundamentally different from their predecessors. There are two distinct dimensions of change: explicitness and generality (intention/extension). At any point in history, a variety of deviations are in the process of being received (illustrating a general inseparability of concurrent transformations). “Prescient” and “anachronistic” modes of thought compete for dominance, both exerting pressure for taxonomic change.

I applied this framework to the emergence of the idea of a distinction between implied-in-fact and implied-in-law contracts in 19th century American jurisprudence. A crisp and explicit differentiation of those two kinds of contracts was an operative principle of the highest order to legal scholars after the 1870’s; it was unknown or unimportant for most prior to the Civil War. Dozens of cases and textbooks showed the steady progress of this transformation.

I was not particularly attentive to biological analogs in those days, but now see how my theory of changes in collective legal consciousness might be enriched by thinking in terms of human selection of “memes” [Dawkins 1990]³ and other biology-inspired insights.

Routine thoughts

[Lauritsen 1990] was an “extended abstract” on “Computational Intelligence and the Paradoxes of Legal Routine.” I noted that many forms of undeniably routine activities, such as using written or spoken language, appear dependent upon forms of subcognition (e.g. pattern recognition) that seem unlikely to be Turing-computable. And I suggested that legal doctrine, legal consciousness, and structures of lawyering behavior can be viewed as fractal structures left behind by chaotic processes. Routine can be both emergent and artifactual. Again, evolutionary theory would have been a welcome addition.

Darwin among the documents

How about looking for evolutionary phenomena among the cognitive tools and materials with which legal professionals work? It may be productive to apply natural-selection-among-replicators ideas to documents and precedents. The scarce resources they

³ Dawkins’s theory of the selfish gene seems to have been largely discredited – see. e.g. [Gould 2002] – but his idea about memes has become quite a powerful meme of its own. See e.g. Susan Blackmore, *The Meme Machine*.

compete for are human attention, valuation, and use. Those with effective contents and *Baupläne* (body plans, or blueprints) live on to reproduce themselves through the preferential adoption of legal drafters. We often see “explosive speciation” into previously vacant niches.

Are lawyers maladapted to the Internet economy because their attitudes and habits evolved in an era of hourly billing, just as modern humans tend to overeat fat and salt because their ancestors on the African savanna found those things in scarce supply?

Organisms conveniently “do their thing” without constant supervision. Could we somehow “grow” knowledge systems? Will it eventually make sense to talk about domestication, cultivation, hybridization, breeding, and genetic engineering in relation to our practice tools? How do we inject natural hardiness into our artificial systems?

Of ecosystems and egosystems

Mechanisms of adaptation and change within and across organizations are the focus of managers everywhere. Innovation adoption theorists spin metaphors like “crossing the chasm” and “tipping points”. We should actively explore biological analogs like the concept of punctuated equilibrium, which has been fruitfully applied in such fields as the history of tools, learning theory, and group dynamics.

Viewed as an organism or an ecosystem, a law firm preserves its essential identity through a number of metabolic processes that looks surprisingly like the homeostasis of an organism.

Usefulness in a broad sense seems to me a key to sustainability. Richard Dawkins talks about the “extended phenotype” – the whole fabric of results a genotype produces in the world (e.g., a spider’s web, a beaver’s dam.) Patterns emerge and persist that are somehow useful to an environment. Fitness (organism perspective) is related to usefulness (competitor/environmental perspective)

There is thus a mutual dependence of egosystem and ecosystem, and just perhaps an invisible hand through which activities of selfish lawyers produce higher order. (Sacred texts or other artifacts are often preserved by an adoring priesthood because they give meaning to their lives, and/or power to do what they desire.)

Both law and technology are in significant part historical sciences like biology. We can't understand the present or affect the future without taking the past into account. (Even physics may someday turn out to have a dimension of historical contingency rather than purely timeless laws - as we reach back and try to understand, for instance, what turns were made in the earliest universe that account for the properties of subatomic particles.)

Sustenance and disruption

An extensive literature on the economics of legal IT has emerged in the last few years, some drawing upon mainstream business strategy books like Clayton Christensen's *Innovator's Dilemma*⁴ and Evans & Wurster's *Blown to Bits*.⁵ Richard Susskind's *Transforming the Law* is one of the best full-length treatments. Yet none of these seem to draw much upon the natural sciences, which might suggest concepts like background extinction and the origin of evolutionary novelties through intensification or change of function. (Gould calls this "exapatation.") Let alone things like the spontaneous emergence of self-sustaining vortices in a moving fluid when its velocity outweighs its viscosity by a number known as the Reynolds number.

Living on the edge of chaos

It's easy to wax metaphysical about morphogenesis, thermodynamics, and self-organizing systems. Where might all this be taking us?

The system dynamics of law practice, at all levels of organization (individual, group, firm, industry), is a critical subject of research and scholarship. Computer-based knowledge tools are now essential elements. I see far too little of the real-world-grounded multidisciplinary these activities require.

These studies also have significance for international justice. We need to accept the possibility, the probability, that yet unimagined systems of societal ordering remain to be encountered and developed. If earthly civilization manages to survive for another 100 years, does anyone suppose that it *won't* evolve technologies of social ordering that will make contemporary forms look primitive?

Unlike nature itself, we haven't had, and don't have, the immensity of geological time within which to wait out the gradual accumulation of tiny adaptive increments. We can try speeding up the clock in cellular automata games, mimicking processes of natural selection, and otherwise taking a page from the book of nature. But lawyers, law teachers, and legal technologists are also going to need a lot of plain old persistence if the powerful patterns of justice we espouse are to be perpetuated.

⁴ See, e.g., [Hokkanen and Lauritsen, 2002]

⁵ See, e.g., Duncan, Barton, & McKellar, Extending Richness and Reach: Empirical Evidence from Public Access Web sites of UK Legal Practices, <http://elj.warwick.ac.uk/jilt/01-2/duncan.html>.

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