
A Single Theory of Limited Liability Companies: An Evolutionary Analysis

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“Evolution on a large scale unfolds, like much of human history, as a succession of dynasties. Organisms possessing common ancestry rise to dominance, expand their geographic ranges, and split into multiple species The groups they replace retreat to relic status, being diminished in scattershot fashion by competition, disease, shifts in climate, or any other environmental change that serves to clear the way for the newcomers Once in a while, in a minority of groups, a lucky species hits upon a new biological trait that allows it to expand and radiate again, reanimating the cycle of dominance on behalf of its . . . kin.”²

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2. EDWARD O. WILSON, *THE DIVERSITY OF LIFE* 94 (1992).

I. INTRODUCTION

A. Purpose

The purpose of this essay is to analyze the question of whether there *is*, or *should* be, a single theory for interpreting and understanding the limited liability company (LLC). *Should* is the epitome of a normative question and could quickly devolve into an ideological morass without hope of resolution. Fortuitously, the recent thirtieth anniversary of Richard Dawkins's *The Selfish Gene*³ suggests an analytical perspective on the question that may offer observational insight beyond ideological argument.

The perspective suggested by Dawkins's landmark book is at two levels: (1) the entity level and (2) the law codification level. It is an evolutionary view that the LLC "seeks" success by the proliferation (reproduction and use) of the LLC form by individual firms—that is, from the perspective of the LLC as an artificial organism. This metaphoric perspective is certainly fanciful but is illuminating. *First*, the change in perspective is consistent with Dawkins's hope for *The Selfish Gene*. The preface to the book's second edition (of three) states:

Rather than propose a new theory or unearth a new fact, often the most important contribution a scientist can make is to discover a new way of seeing old theories or facts . . . [A] change of vision can, at its best, achieve something loftier than a theory. It can usher in a whole climate of thinking, in which many exciting and testable theories are born, and unimaginable facts laid bare.⁴

3. RICHARD DAWKINS, *THE SELFISH GENE* (3d ed. 2006) (previous editions published 1976, 1989). The submission of this essay also roughly corresponds with the market release of the much ballyhooed computer game "Spore." According to one review,

Spore is an enjoyable game that pulls off an interesting balancing act. On one hand, it lets you create a creature and guide its maturation from a single cell to a galactic civilization through an unusual process of evolutionary development. Because the tools used to create and revise this creature are so robust and amusing, and each creation's charms are so irresistible, it's hard not to get attached to your digital alter ego. On the other hand, this intimacy is abandoned in the long, later portions of the game, when you lead your full-grown civilization in its quest for universal domination.

Kevin VanOrd, *Gamespot Editors' Review*, Sept. 4, 2008, http://reviews.cnet.com/pc-games/spore-pc/4505-9696_7-31484467.html (last visited Apr. 20, 2009); see also Seth Schiesel, *Playing God, the Home Game*, N.Y. TIMES, Sept. 5, 2008, at E1, available at <http://www.nytimes.com/2008/09/05/arts/television/05spor.html> (last visited Apr. 20, 2009).

4. DAWKINS, *supra* note 3, at xvi. Dawkins explains further:

[I]t is for this kind of reason that I prefer not to make a clear separation between science and its 'popularization.' Expounding ideas that have hitherto appeared only in the technical literature is a difficult art. It requires insightful new twists of language and revealing metaphors. If you push

Second, metaphors are the language of “scientific” explanation because science (like law) “is an attempt to explain phenomena that cannot be experienced directly by human beings, by reference to forces and processes that we cannot perceive directly.”⁵

In deference to Dawkins, this essay analyzes the question of whether there *is* and *should* be a single theory of the LLC through an evolutionary lens from the genetic perspective of individual statutory provisions that manifest as specific *traits* of a firm organized as an LLC. The essay provides necessary evolutionary and genetic background and context before tentatively matching concepts from biology to law.⁶ The balance of the first part of the essay describes the idea of the selfish gene in order to use it as an analytical aid to determine if there is or *should* be a single theory of the LLC and, if so, identify that theory. Part II defends the choice of biological evolution as an analytical metaphor and provides an introduction to other fundamental concepts and ideas in biological evolution. Part III frames and focuses the metaphor to specific features of the limited liability company and its “genetic code,” exploits selected metaphors from biological evolution as applied to LLC law, and mines the metaphor for suggestions and observations about alternative futures for the LLC.⁷ Finally, but before concluding, Part IV posits there both *is* and *should* be a single theory of LLCs.

B. The “Selfish” Perspective

The heart of understanding the “selfish gene” is to recognize the difference between *genes* and *individual organisms* and the definition of *success*:

novelty of language and metaphor far enough, you can end up with a new way of seeing. And a new way of seeing, as I have just argued, can in its own right make an original contribution to science.

Id.

For an example of another use of evolution in legal analysis see Susan Haack, *The Pluralistic Universe of Law: Toward a Neo-Classical Legal Pragmatism* (Univ. of Miami School of Law Research Paper, 2008), available at http://papers.ssrn.com/sol3/papers.cfm?abstract_id=1188519 (last visited Jan. 24, 2009). Professor Ribstein has written that statutory variations of LLCs by state “create statutory mutations.” Larry E. Ribstein, *Possible Futures for Unincorporated Firms*, 64 U. CIN. L. REV. 319, 365 (1996).

5. RICHARD LEWONTIN, *THE TRIPLE HELIX: GENE, ORGANISM, AND ENVIRONMENT* 3 (2000). The larger context of the quote is

It is not possible to do the work of science without using a language that is filled with metaphors. Virtually the entire body of modern science is an attempt to explain phenomena that cannot be experienced directly by human beings, by reference to forces and processes that we cannot perceive directly because they are too small . . . or too vast . . . or the result of forces that our senses cannot detect . . . or the outcome of extremely complex interactions

Id.

6. See *infra* notes 59-207 and accompanying text.

7. See *infra* notes 16-59 and accompanying text.

If selection tried to choose DNA molecules directly it would hardly find any criterion by which to do so. All genes look alike, just as all recording tapes look alike. The important difference between genes emerges only in their *effects*. This usually means effects on the processes of embryonic development and hence on bodily form and behavior. Successful genes are genes that, in the environment influenced by all the other genes in a shared embryo, have beneficial effects on that embryo. Beneficial means that they make the embryo likely to develop into a successful adult, an adult likely to reproduce and pass those very same genes on to future generations.⁸

The technical term for the manifestation of the gene as a *body* is *phenotype*.⁹ Thus, “the phenotypic effects of a gene are the tools by which [the gene] levers itself into the next generation.”¹⁰

Whether a gene is “beneficial” is seen marginally at the level of the individual organism as an expression of its *genotype* (gene recipe).¹¹ The whole body of the organism can be seen as a resultant manifestation of the sum of its gene expression, and generally what is good for the organism is good for the gene.¹² There are exceptions to the general rule. “[G]enes that beat the system” exist.¹³ These genes exert an effect that is detrimental or neutral at the phenotypic level, but “good” for the replication of the gene itself. They “cheat” the “other genes with which they share the same body.”¹⁴ Their mutation, which results in their adaptation to the genetic environment in which they are embedded, is beneficial to the replication of the genes, but bad for the organism:

Every time genes replicate within cells and cells divide within a multicellular organism, there is potential for some to gain at the expense of others and the welfare of the group as a whole. When this happens, the whole becomes less of an organism and more like a mere group. The subelements become less like organs and more like quarreling organisms with their own separate agendas. The harmony of an organism cannot be taken for granted. It requires the evolution of mechanisms that prevent subversion from within.¹⁵

8. DAWKINS, *supra* note 3, at 235. This chapter first appeared in the second edition in 1985. The selfish-gene perspective is then scaled upward. The individual organism that contains the successful gene will propagate better than its competitors. In turn, a species with more successful individuals will, itself, be more successful: “Success in biology is an evolutionary idea. It is best defined as longevity of a species with all its descendants.” WILSON, *supra* note 2, at 129. Those species that can “diversify” have probably “better balanced their investments and will probably persist longer into the future.” *Id.* at 129-30.

9. See DAWKINS, *supra* note 3, at 235.

10. *Id.* at 238.

11. DANIEL C. DENNETT, *DARWIN’S DANGEROUS IDEA: EVOLUTION AND THE MEANING OF LIFE* 77-78 (1995).

12. See DAWKINS, *supra* note 3, at 235.

13. *Id.* at 236 (attributing quoted phrase to James Crow).

14. *Id.*; see also *infra* notes 186-199 and accompanying text.

15. DAVID SLOAN WILSON, *EVOLUTION FOR EVERYONE: HOW DARWIN’S THEORY CAN CHANGE THE*

II. CONTEXT, BACKGROUND & EXTENDING THE ANALOGY

A. Taxonomy: The Analytical Baseline

Taxonomy is the science of classification.¹⁶ The late evolutionary biologist Stephen Jay Gould observed that it

is often undervalued as a glorified form of filing—with each species in its folder, like a stamp in its prescribed place in an album; but taxonomy is a fundamental and dynamic science, dedicated to exploring the cause of relationships and similarities among organisms. Classifications are theories about the basis of natural order, not dull catalogues compiled only to avoid chaos.¹⁷

One feature of taxonomy for purposes of this essay is that it, in one sense, is a record of lineage. That is, the “pattern of descent with modification defines our family lineage.”¹⁸ Taxonomy, therefore, is a guide that “test[s] the accuracy of our hypothesized family tree.”¹⁹ In other words, “Knowing how descent with modification works is key to unlocking biological history, because descent with modification can leave a signature, which we can detect.”²⁰ One non-gene based way to ascertain descent and lineage, and thereby inform taxonomy, is comparative anatomy. Comparative anatomy leaves signatures of origins and lineage. Illustratively,

Our middle ear contains a record of two of the great transformations in the history of life. The origin of our stapes, and its transformation from a jaw support bone [to part of the inner ear], began when fish started to walk on land. The other big event took place during the origin of mammals, when bones at the back of a reptile jaw became our malleus and incus [other small bones in the middle ear].²¹

Law also relies on taxonomy to classify cases and statutes based on selected features. The resulting *structural* pattern discloses the doctrinal relatedness and lineage of the law. A recent article suggested alternative taxonomic criteria and

WAY WE THINK ABOUT OUR LIVES 135 (2007).

16. STEPHEN JAY GOULD, *WONDERFUL LIFE: THE BURGESS SHALE AND THE NATURE OF HISTORY* 98 (1989).

17. *Id.*

18. NEIL SHUBIN, *YOUR INNER FISH: A JOURNEY INTO THE 3.5-BILLION-YEAR HISTORY OF THE HUMAN BODY* 175 (2008).

19. *Id.*

20. *Id.*

21. SHUBIN, *supra* note 18, at 164.

described legal taxonomies: “Lawyers inevitably classify cases according to specified factual attributes. Did someone make a promise? Did one person touch another person? Whether in Roman law, in the English common law, or in the modern American legal system, legal taxonomies are structured around the underlying factual attributes of transactions.”²²

The quoted article follows in the long tradition of questioning the salience of the selected characteristics used to create a legal taxonomy and the manner of classifying cases into underlying doctrine. Grant Gilmore, too, questioned contract taxonomy. For example in *The Death of Contract*:

The first point to be made is that the general theory of contract was never as neat and tidy and all-of-a-piece in the real world as it was made to appear in casebook and treatise and Restatement The apparent unity of doctrine was achieved through what might be called an extremely selective handling of the case material.²³

Gilmore’s observation echoes criticism of biological taxonomies based on species categories. Dawkins observed that species and speciation are definitional in biological taxonomy and account for the absence of some (but not all) missing link species. There is no room for ambiguity: “[Z]oologists always insist on classifying a specimen as in one species or another. If a specimen is intermediate in actual form (as many are) zoologists’ *legalistic* conventions still force them to jump one way or the other when naming it.”²⁴

B. Selecting the Selector and the Composition of the “Stuff” Selected

Creating a legal taxonomy is a human endeavor based on judgment rather than natural selection by survival in the rough-and-tumble-world of biological evolution. Further, the currency in the trade of legal taxonomy is law, which itself can be characterized as a mere artifact of sentient life and, perhaps, as no more than a fleeting abstract idea devoid of the stuff on which evolution works. These distinctions between law and flesh seem lethal to the usefulness of biological evolution as a metaphor for law and fatal to the analytical perspective central to this essay. The distinctions are, however, neither lethal nor fatal. This subpart of the essay briefly discusses why the metaphor remains appropriate in the face of these distinctions.

The *first* distinction can be restated as one between *natural* selection by the physical environment and *artificial* selection by human judgment. As a starting point, the mechanism of selection does not undercut the doctrine of evolution

22. Darian M. Ibrahim & D. Gordon Smith, *Entrepreneurs on Horseback: Reflections on the Organization of Law*, 50 ARIZ. L. REV. 71, 74-75 (2008).

23. GRANT GILMORE, *THE DEATH OF CONTRACT* 61 (1974).

24. RICHARD DAWKINS, *CLIMBING MOUNT IMPROBABLE* 106 (1996) (emphasis added).

because variation, replication (heredity), and variable “success” are present regardless of the mechanism that determines success or its basis of selection.²⁵ “The details [of “success”] depend upon our particular traits and the environments we inhabit.”²⁶ Indeed, “the opening chapter of *Origin of Species*”²⁷ was artificial selection by breeders of fancy pigeons. The standards for traits used for the breeding of pigeon varieties might seem arbitrary and a matter of taste or whim. From a genes-eye perspective, however, it is a matter of replicative consequence. That is, if the pigeon that was “your” (the gene’s) phenotypic expression (your *vehicle*) manifested the desired characteristic, “you” would enjoy greater replicative success than competing genes that manifest as other phenotypic traits. The selected pigeons could be said, “In evolutionary parlance . . . [to] have increased their *fitness* and become *well adapted*” even if only to the whims of their breeders.²⁸

Artificial selection does place a premium on the selector’s choice of trait. Mistaken judgment about the desired trait may thwart the *purpose* for which selection is made. A real story recounted by David Sloan Wilson provides a striking example.²⁹ Bill Muir, a poultry scientist, sought to increase egg production in caged chickens through selected breeding (artificial selection).³⁰ He postulated two hypotheses and tested them.³¹ The first test was to take the highest producing individuals from each cage and breed them.³² The second test was to take the individuals from the highest producing cages (teams) and breed them.³³ He followed each experiment for six generations:

[H]e showed a slide of hens selected by the first method The audience gasped. Inside the cage were only three hens, not nine, because the other six hens had been murdered. The three survivors had plucked each other during their incessant attacks and were now nearly featherless. Egg production plummeted What happened? *The most productive individuals had*

25. Evolutionist David Sloan Wilson identifies the necessary components of biological evolution as variations, consequences, and heredity. “Consequences” is the component that includes success (or lack thereof). In his words:

Then we add *consequences*. The differences between you and me [variations] sometimes *make* a difference in our ability to survive and reproduce. Perhaps your superior size enables you to take my stuff or even kill me directly. Perhaps my inferior size enables me to survive the winter on less food.

WILSON, *supra* note 15, at 17.

26. *Id.*

27. EDWARD J. LARSON, *EVOLUTION* 84 (2004).

28. WILSON, *supra* note 15, at 18.

29. *See id.* at 33-34.

30. *See id.* at 34.

31. *See id.*

32. *See* WILSON, *supra* note 15, at 34.

33. *See id.*

achieved their success by suppressing the productivity of their cagemates. Bill had selected the meanest hens in each cage and after six generations had produced a nation of psychopaths.³⁴

The slide shown of hens selected using the team (cage) production method, on the other hand, “contained all nine hens, plump and fully feathered . . . Egg production had increased dramatically . . .”³⁵ This, rather obviously, illustrates the importance of matching the desired trait to the desired outcome. It also suggests that *cooperation*, as a trait, is desirable in some circumstances.³⁶

The *second* possible foil to the evolutionary metaphor is the substance on which choice is made.³⁷ Biological evolution operates on the level of critters (*phenotypes*), which are but the biological manifestations of the expression of genes (aggregated as *genotypes*).³⁸ Law and organizations, conversely, are but abstract artifacts, though perhaps an extended phenotype,³⁹ of the selfish gene. Arguably, artifacts are simply too far removed from biological evolution for the metaphor to hold.

There exist two mitigating defenses to the suggestion that the distinction between flesh and artifact is fatal to the metaphor. One defense is that artifacts are proximate extensions of the phenotype and are, therefore, not so remote as they might first appear. Another defense is that from a different perspective artifacts may be an independent subject of evolution as a separate phenotype. In the latter defense, the organisms creating the artifacts would serve in a capacity similar to that of a genotype in biological evolution.

The first argument that biological evolution is an acceptable metaphor for “artifacts” is that artifacts are so associated with their maker as to be an extension of the flesh and blood. In the biological world some objects are so closely associated with an organism that they may be used for species

34. *Id.* The last sentence calls into issue some great debates within biology about group selection.

35. *Id.*

36. Dawkins underscores the nonexclusive nature of “selfish” in the *Introduction* to the thirtieth anniversary edition of *The Selfish Gene*:

Given the dangers of that style of error, I can readily see how the title could be misunderstood, and this is one reason why I should perhaps have gone for *The Immortal Gene*. *The Altruistic Vehicle* would have been another possibility.

Another good alternative to *The Selfish Gene* would have been *The Cooperative Gene*. It sounds paradoxically opposite, but a central part of the book argues for a form of cooperation among self-interested genes.

DAWKINS, *supra* note 3, at ix.

37. See *supra* note 25 and accompanying text.

38. See DAWKINS, *supra* note 3, at 238.

39. See *id.*

identification and taxonomic-classification purposes. An example is the spider web. Different spider species make different web designs. Dawkins suggests a mudpot made by a wasp “gets its elegance and fitness . . . from exactly the same process . . . as gave elegance and fitness to the wasp’s own body.”⁴⁰ The distinction between flesh and blood and artifact, therefore, may not be as great a divide as it first appears.

Of course, wasps are not sentient and humans are. A wasp’s mudpot or a spider’s web, therefore, may still be “different.” Certainly the manner of “decision making” between wasps, spiders, and humans is different in degree, if not kind. Nonetheless, Dawkins observes, “Engineers are often the people best qualified to analyse how animal and plant bodies work, because efficient mechanisms have to obey the same principles whether they are designed [selected] [by humans] or [by natural selection].”⁴¹ In effect, both processes *discover* underlying principles independent of whether the maker is consciously aware of the discovery.

The second defense for using biological evolution as a metaphor for purposes of this essay follows logically from Dawkins’s observation about the helpful role of engineers in understanding naturally evolved mechanisms. The

40. DAWKINS, *supra* note 24, at 19.

41. *Id.* Dawkins designed a program to evolve spider webs by simulating genes, gene mutation, and the behavior of spiders spinning webs. The fitness of the webs was judged based on randomly generating fly flight patterns. The virtual spiders generating the webs lived, died, and reproduced based on how well “their” webs fared in an energy cost-benefit analysis on the web.

The result, he reports, is that “something like natural selection can work in a computer to produce artificial webs that are more efficient in catching flies than the original webs.” *Id.* at 64. The graphic webs generating the webs over generations look strikingly similar to “real webs.” *See, e.g., id.* at 63.

The computer algorithms are a form of artificial selection. For example, one of the many artificial decision algorithms designed by the human programmer is “how costly a given length of ‘silk’ is, in the same currency as the value of a ‘fly.’” *Id.* at 64, 66-67. Moreover, the “rate at which fly ‘flesh’ is converted into baby spiders is also decided by the programmer.” *Id.* at 65. These decisions are somewhat arbitrary though thoughtful. Dawkins recognizes the distinction in the different *manner of decision making* by the spider in nature and the programmer. *See id.*

In real life, none of these decisions is arbitrary. None of them is really a decision at all, and no computational machinery is used to make them. They just happen, naturally and without fuss. Fly flesh just *is* converted to spider offspring flesh, and the currency conversion factor just *is*. If we come along afterwards and calculate it, that is our business.

Id.

More starkly, if a mutation in a real spider makes its web less efficient it dies sooner and produces less offspring than spiders without the mutation. If, on the other hand, a computer simulation does not yield webs that are similar to nature, the programmer rethinks her algorithm or input values and tries again, hoping for a more *realistic* result. Both processes are a kind of trial and error.

Professor Schwarcz provides an example of applying engineering concepts to law and business. He suggests the complexities of financial instruments interrelate with (and amplify) financial market failure stating, “these complexities are characteristic of complexities in engineering systems with nonlinear feedback.” Steven L. Schwarcz, *Complexity as a Catalyst of Market Failure: A Law and Engineering Inquiry* 5 (Duke Law School Public Law & Legal Theory Paper No. 216, 2008), available at <http://ssrn.com/abstract=1240863> (last visited Jan. 24, 2009).

defense is that artifacts (like LLCs and LLC laws) are themselves *phenotypes* (bodies) that evolve on their own terms in the context of a human environment.

Professor Henry Petroski, Professor of Engineering and History, uses clear evolutionary overtones in two of his books detailing the history of artifact design.⁴² He suggests that understanding the design history “of silverware makes it easier to understand the diversity of everything from bottles, hammers,⁴³ and paper clips to bridges, automobiles, and nuclear-power plants.”⁴⁴ Consider the number of tines on a fork as an illustrative microcosm of design history: “Putting aside acceptance and custom [fashion?], what makes the fork work, of course, are its tines. But how many tines make the best fork and why?”⁴⁵

Petroski suggests, based on historical evidence, that the two-pronged carving fork keeps a roast from “rotating” and allows the fork to slide “in and out of the meat relatively easily”; thus, it “has remained essentially unchanged since antiquity.”⁴⁶ The table fork, on the other hand, added a third tine.⁴⁷ The third tine holds “pierced” food more securely as it travels from table to teeth and also allows it to “function more efficiently as . . . a scoop.”⁴⁸ His historical abstract of the fork observes that five- and six-tined forks have been produced and used, “but four appears to be the optimum.”⁴⁹ To me, at least, the design history of the fork appears similar in process to a computer-aided evolutionary trajectory of simulated spider webs developed by Dawkins to test his extended phenotype

42. For example, Professor Petroski asks, “Is the proliferation of made things, such as the seemingly endless line of serving pieces that complement a table service, merely a capitalist trick to sell consumers what they do not need? Or do artifacts multiply and diversify in an evolutionary way as naturally as do living organisms, each having its purpose in some wider scheme of things?” HENRY PETROSKI, *THE EVOLUTION OF USEFUL THINGS* 21 (1992).

43. In Petroski’s other book referenced herein, he abstracted the design history of hammers:

Better hammers resulted from eliminating the failures. [E]ven the best of rocks have limitations as hammers Among the problems with a hammer-rock can be that it is awkward or uncomfortable to wield. An improvement might be sought in the shape of the rock or in providing a handle for it—or from replacing the rock with something better. In time, a growing variety of metal hammer heads and wooden hammer handles, appropriate to a variety of tasks and grips [appeared]. Among such diversity, one might expect that there was a single best hammer for a particular task. All others would fail to work as well at that task. Should all existing hammers fail to work properly for a newly developed task, then a still newer hammer might have to be developed. By the latter part of the nineteenth century, some five hundred different types of hammers were being produced in Birmingham, England, alone.

HENRY PETROSKI, *SUCCESS THROUGH FAILURE: THE PARADOX OF DESIGN 2* (2006).

44. PETROSKI, *supra* note 42, at 3.

45. *Id.* at 10.

46. *Id.*

47. *See id.* at 11.

48. PETROSKI, *supra* note 42, at 11.

49. *Id.*

hypothesis in biological evolution.⁵⁰

Still, forks, spider webs, and wasps' mudpots are tangible *things* as opposed to pure abstraction like either law or an operating LLC firm. For present purposes, it might be sufficient to observe simply that these tangible *things* are but physical manifestations of *something* controlling or guiding their production and "design."⁵¹ Nevertheless, Petroski, for his part, sees no distinction between design of tangible and intangible things. Indeed, he devotes a chapter in one of his books to the design of intangible artifacts.⁵² He specifically identifies *things* like national constitutions as matters of design where "failure to anticipate . . . can be disastrous."⁵³ Moreover, he recognizes the *coevolution* of *things* and their human environment. Concerning silver tableware, he even observed an example of the regulatory role of government in limiting the proliferation of utensils:

As late as 1926, some patterns were still being made with as many as 146 distinct kinds of utensils. To help simplify the situation for American industry, Herbert Hoover, then secretary of commerce, recommended—and members of the Sterling Silverware Manufacturers Association adopted—a list of fifty-five items as the greatest number of separate pieces that would be in any pattern thereafter introduced.⁵⁴

Even things yet closer to pure ideas like lectures and books are designed, according to Petroski, and he further states that "[c]ritics are nothing if not failure analysts."⁵⁵ His thoughtful observations, while not authoritative,

50. See *supra* note 41.

51. Note that not all artifacts designed by humans are first conceived based on conscious recognition of underlying principles. Some are based on observation and trial and error. See, e.g., *supra* note 43 (discussing hammers). Some are based on intuition. See generally JONAH LEHRER, PROUST WAS A NEUROSCIENTIST (2007). And some are based on observational narrative or from another way of knowing. Cf. FRITJOF CAPRA, THE TAO OF PHYSICS: AN EXPLORATION OF THE PARALLELS BETWEEN MODERN PHYSICS AND EASTERN MYSTICISM (1991). At some point these alternatives to *scientific* design from first principles blur the distinction between conscious human design and unconscious design by spiders. See ROBERT C. ELLICKSON, ORDER WITHOUT LAW: HOW NEIGHBORS SETTLE DISPUTES (1991) (providing criticism of assumption that people reason from first legal principles to resolve disputes).

52. PETROSKI, *supra* note 43, at 81-96 (Chapter 3, captioned *Intangible Things*).

53. *Id.* at 5.

54. PETROSKI, *supra* note 42, at 134. An unrelated story in the popular press suggests that Hoover's actions were the result of "complaints from retailers, who couldn't afford to keep full settings of numerous patterns on hand." Charles Perry, *What the Heck Is That? An Heirloom*, L.A. TIMES, Nov. 26, 2003, at F-1, available at <http://articles.latimes.com/2003/nov/26/food/fo-tableware26> (last visited Jan. 24, 2009).

55. PETROSKI, *supra* note 43, at 81. Readers familiar with literature on evolution will note that I have fastidiously avoided the use of the term *meme* which was coined by Dawkins in *The Selfish Gene*. It is tempting to integrate *memes* in this essay but I fear, *first*, it would be more complicating than it is worth because it is unnecessary for present purposes and I do want to cleave to the biological evolution model; *second*, *memes*, while fascinating, have not yet scientifically matured; and, *third*, *memes* deal with the emotionally charged (if misunderstood) topic of cultural transmission and any inclusion could be terribly distracting. Nonetheless, the topic is at least related to the one in the text of the essay so I briefly acknowledge

certainly give evidence that intangible artifacts are subject to design, and as such they evolve to the same extent that tangible artifacts may evolve.

Petroski stresses the importance of integrating the knowledge gained from the success and failure of previous design attempts in future iterations (generations). In biological evolutionary terms, recall, success is fitness for a specific environment that increases reproductive success rates. Petroski emphasizes the importance of heeding past failures this way:

Success and failure in design are intertwined. Though a focus on failure can lead to success, too great a reliance on successful precedents can lead to failure. [I]t also masks potential modes of failure. Emulating success may be efficacious in the short term, but such behavior invariably and surprisingly leads to failure itself Past successes, no matter how numerous and universal, are no guarantee of future performance in a new context.⁵⁶

His warning about the dangers of mimicking past success too aggressively echoes the iconic evolutionary narrative of the male peacock's tail in biology.

memes in this note.

Dawkins speculated,

But do we have to go to distant worlds to find other, kinds of replicator and other, consequent kinds of evolution? I think that a new kind of replicator has recently emerged on this very planet.

. . . We need a name for the new replicator, a noun that conveys the idea of a unit of cultural transmission, or a unit of imitation.

Examples of memes are tunes, ideas, catch-phrases, clothes fashions, ways of making pots or of building arches. Just as genes propagate themselves in the gene pool by leaping from body to body via sperms or eggs, so memes propagate themselves in the meme pool by leaping from brain to brain As my colleague N.K. Humphrey neatly summed up an earlier draft of this chapter: “. . . memes should be regarded as living structures, not just metaphorically but technically. When you plant a fertile meme in my mind you literally parasitize my brain, turning it into a vehicle for the meme's propagation in just the way that a virus may parasitize the genetic mechanism of a host cell.

DAWKINS, *supra* note 3, at 192.

For a book length treatment of *memes* see, e.g., ROBERT AUNGER, *THE ELECTRIC MEME: A NEW THEORY OF HOW WE THINK* (2002). The subtitle alone suggests that *memes* are one level too deep for purposes in this essay because I take the position “how we think”—that is, what goes on inside our heads—is not *necessary* for purposes of the current analysis because “how we think” is just another evolutionary adaptation. See *supra* note 51. Could it be consciousness and emotions are simply evolved traits to, on average, *force* us to make survival and reproductive decisions? See DYLAN EVANS, *EMOTION: THE SCIENCE OF SENTIMENT* (2001); MATT RIDLEY, *THE ORIGINS OF VIRTUE: HUMAN INSTINCTS AND THE EVOLUTION OF COOPERATION* (1996); cf. CHARLES DARWIN, *THE EXPRESSION OF EMOTIONS IN MAN AND ANIMALS* (Univ. of Chicago Press 1965) (1872). There is an ever expanding literature on decision making and judgment. See, e.g., *THE CAMBRIDGE HANDBOOK OF EXPERTISE AND PERFORMANCE* (K. Anders Ericsson et al. eds., 2006); *EMERGING PERSPECTIVES ON JUDGMENT AND DECISION RESEARCH* (Sandra L. Schneider & James Shanteau eds., 2003); SALVATORE RIZZELLO, *THE ECONOMICS OF THE MIND* (1999); *LAW AND THE BRAIN* (Semir Zeki & Oliver Goodenough eds., 2004).

56. PETROSKI, *supra* note 43, at 3.

The length of a male peacock's tail is a signal, a positive attribute, for sexual selection by the female. That is, female peacocks prefer to mate with males possessing long tails. Thus, the genes for males with long tails are more successful replicators than those of male peacocks without them (remember the phenotype is the *vehicle* of the genes).

The hypothetical reason for the female peacocks' *preference* (not conscious, so far as we know) is because only strong, healthy, non-parasitic males have long tails. This is, the narrative goes, simple natural selection. In fact, long tails make the male more vulnerable to predators because long tails impede efficient flight. The males with long tails, therefore, are healthy and strong, because the weak or sick long-tailed males get eaten, genes and all.

Law Professor William Rodgers discussed peacocks' tails and other evolutionary *maladaptations* to illustrate more general principles.⁵⁷ Rodgers suggests the peacock's tail, for example, illustrates the danger of the simultaneous pursuit of two things because divergent goals make it difficult to fully achieve either one.⁵⁸ Simply, the longer tail makes the design of *phenotypic* vehicle suboptimal but makes it more successful in mate selection by females. It also illustrates another evolutionary idea. Successful genetic traits can *runaway* because there is a positive genetic feedback loop. Petroski uses the designing of bridges for ever-increasing spans and the catastrophic failure of the Tacoma Narrows Bridge to make the same point about mimicking past design "success" in the world of artifacts:

Conquering failure and overcoming limitations are what invention, engineering, and design are all about. Unfortunately, victory can be an intoxicant. Pride in the new successful thing typically turns in time to nonchalance, as the once-revolutionary thing becomes a common thing. Common things gradually become virtually invisible things, and the multiplication and extension of common things come to be done with little memory of the failures of which they were born. When failure is left behind, success leads with a confidence that the uncharted future does not warrant. In bridge building, following success means taking a path that demands that ever-longer spans be based on shorter versions. The path is fraught with danger and is epicyclic. In time, success encounters failure again, and the pattern repeats.⁵⁹

So we have now come full circle in defending biological evolution as *close enough* to the design of artifacts to hold promise as an analytical tool for

57. See William H. Rodgers, *Where Environmental Law and Biology Meet: Of Pandas' Thumbs, Statutory Sleepers, and Effective Law*, 65 U. COLO. L. REV. 25, 48-56 (1993).

58. *Id.* at 50.

59. PETROSKI, *supra* note 43, at 161-62. A computer game that reminds me of the "evolution of artifacts" is "Fantastic Contraptions," available at <http://www.addictinggames.com/fantasticcontraption.html> (last visited Apr. 20, 2009).

determining whether an LLC does, or should, have a single ideal theory. Along the way, we have established a baseline of evolutionary concepts and their operation. Some of these concepts are important for later analytical use.

The next part of the essay contains its core analysis. It will first metaphorically analyze the LLC as a biological phenotype (a vehicle for genes). It then turns to a deeper analysis of what might be called the *LLC genotype* where it will be necessary to add a bit more description of biological evolution. Finally, it speculates on possible futures for the *LLC species*.

III. EVOLUTIONARY FRAMING OF THE LLC: OBSERVATIONS AND ANALYSIS

A. *The LLC Phenotype & Selection*

This section applies evolutionary analysis and adopts the perspective of the firm organized as an LLC as phenotype (the vehicle for “legal” genes) for analytical purposes. It is the level of the phenotype that the individual “organism” interacts with its environment and is subjected to natural or artificial selection.⁶⁰ This is the level of expressed (manifested) traits and characteristics.

The *environment* in which the biological phenotype lives includes both the ecology of other plants and animals, and inorganic physical features like climate, chemistry, and geology. The ecology of plants and animals provides an evolutionary interdependent space:

Species live in the niches afforded by other species. They always have and presumably always will. Once initial life arose and began to diversify, exchanging molecules that might poison or feed one another, organisms joined into a coevolutionary dance, jockeying for places next to one another as mutualists, competitors, predators and prey, or hosts and parasites.⁶¹

The physical environment, too, shapes the path of evolution. For example, dinosaurs likely became extinct as the result of a meteor strike, which radically changed the environment, and the demise of the dinosaurs gave rise to the proliferation of mammals.⁶² For current purposes, I posit the LLC analogues of

60. See *supra* notes 25-36 and accompanying text.

61. STUART KAUFFMAN, *AT HOME IN THE UNIVERSE: THE SEARCH FOR LAWS OF SELF-ORGANIZATION AND COMPLEXITY* 215 (1995).

62. See DENNET, *supra* note 11, at 303; RICHARD FORTEY, *LIFE: A NATURAL HISTORY OF THE FIRST FOUR BILLION YEARS OF LIFE ON EARTH* 239-60 (1997) (Chapter 6, *Theories of the End*). Fortey details some of the debates about dinosaur and other extinctions. Regarding the asteroid theory he analyzes the reasons that life, including mammals, might have survived when dinosaurs did not:

Birds and mammals, of course, survived and prospered. We know that they were hot-blooded, and thus it can be suggested reasonably enough that they could have outlived a cooling event that would

biological ecology are the other types of organizational *entities* and other business *arrangements*; for physical environment, things like *business climate* including taxation, other regulatory laws, and the *economy*. Extending the comparison between biological and LLC evolution by near syllogism therefore yields something like the following: The LLC “exploited” economic niches by “evolving” a unique combination of organizational characteristics that take advantage of the efficiency afforded by a single level of income tax.

The LLC first appeared in Wyoming in 1977 but did not gain widespread use until a change in its environment occurred, especially a change in the tax environment.⁶³ This evolution was recorded in real time as follows:⁶⁴

Three years ago, *The Business Lawyer* published the first comprehensive survey of the law relating to limited liability companies (LLCs), *The Limited Liability Company: A Study of the Emerging Entity*. When that article was written, only eight states had passed LLC statutes. There was no settled model for the LLC, no settled tax treatment beyond the rudimentary partnership tax classification of some Wyoming LLCs, and no clear recognition of LLCs outside of their formation states. “Emerging” aptly described the LLC form.

As this Article was being written, all U.S. jurisdictions except Hawaii and Vermont had passed LLC statutes. There are Uniform and Prototype LLC laws, a comprehensive Internal Revenue Service (IRS) Revenue Procedure dealing with LLCs, and explicit statutory recognition of foreign LLCs in forty-eight (now fifty) states. Thousands of LLCs have been formed across the country, often at a greater rate than limited partnerships. The LLC has

have finished off a cold-blooded reptile (assuming dinosaurs were cold blooded, of course); their small size might also have helped them to shelter from the worst effects. Flowering plants survived as seeds I have a problem with the insects.

FORTEY, *supra* note 62, at 253-54.

63. See Susan Pace Hamill, *The Origins Behind the Limited Liability Company*, 59 OHIO ST. L.J. 1459, 1463 (1998).

64. Reading articles from the 1990s about LLCs is a bit like a paleontologist looking at the fossil record. The materials and presentation that I prepared for this *Symposium*, held on June 13, 2008, included the evolutionary history and extended the metaphor of biological evolution to paleontology by speculating about the evolutionary root species and branch bifurcations in the LLCs’ *tree of life*. Therein I suggested that property, agency, and contract law were all predecessors of the LLC. I also suggested that the LLC shares certain characteristics similar to partnerships and, further, that the LLC branched from the partnership phenotype, which itself continues to evolve and branch. While such a discussion is relevant and adds a certain depth to the metaphor, I have not included much of the paleontological discussion here because it can be seen as a separate topic, because it complicates and muddles the analysis, and because of length constraints on this essay.

Paleontology, like law, is now a multidisciplinary subject and its approach is similar to law enforcement’s investigation of violent crime scenes (particularly *cold cases* where some physical evidence has been preserved). Readers interested in drawing their own analogies for LLCs from paleontology might consult a number of good “dinosaur” books. See generally PHILLIP MANNING, *GRAVE SECRETS OF DINOSAURS: SOFT TISSUES AND HARD SCIENCE* (2008) (chronicling science, to date, surrounding a 1999 fossil find in Badlands of North Dakota).

emerged.⁶⁵

Another entity evolved to compete in the same or similar economic niches as the LLC. It was the limited liability partnership (LLP). An article entitled, *Limited Liability Partnerships: The Next Step in the Evolution of Unincorporated Business Organizations*, contemporaneously chronicled its emergence.⁶⁶ The emergence of LLPs is consistent with notions from biological evolution, because even a “super-hero” phenotype cannot continue domination with a static strategy.⁶⁷ That is, LLPs (as an organism, phenotype) “evolved” features similar to the LLC “in order to” exploit the same or similar *economic niches* in the ecosystem.

The evolution of the LLP illustrates another feature of biological evolution on the phenotypic level: *path dependency*. Simply, path dependency is both cause and result of *accumulation changes* over generations. While a genetic mutation that causes a change in the phenotype may be based on chance mutations, the process of evolution is not completely left to chance because Darwinian evolution builds step by step on an existing product. It solves the improbability of, for example, an eye springing fully formed in a single generation, by “breaking the improbability up into small, manageable parts.”⁶⁸ Rather than leaping up the face of the mountain to complexity, evolution goes “round the back of Mount Improbable and crawl[s] up the gentle slopes, inch by . . . inch.”⁶⁹

Another iconoclastic evolutionary narrative illustrates the idea of path

65. Larry E. Ribstein, *The Emergence of the Limited Liability Company*, 51 BUS. LAW. 1, 1 (1995) (footnotes omitted). This explosive growth of LLC law is comparable to the evolutionary concept of “punctuated equilibrium” that has roiled among evolutionary biologists. See Thomas Earl Geu, *Chaos, Complexity, and Coevolution: The Web of Law, Management Theory, and Law Related Services at the Millennium*, 66 TENN. L. REV. 137, 221-51 (1998) (providing discussion of punctuated equilibrium).

66. See Robert R. Keatinge et al., *Limited Liability Partnerships: The Next Step in the Evolution of the Unincorporated Business Organization*, 51 BUS. LAW. 147, 147-48 (1995) (footnotes omitted).

67. This is because a new competitor better for an ever smaller micro-niche will either evade or evolve from the super-hero phenotype. In biological evolutionary theory, this is known as the *trade-off principle*. The trade-off principle is operatively described as follows:

Suppose one single phenotype—call it the super-hero phenotype—could do everything better than any other. Natural selection would discover it and promote it. All other phenotypes would disappear. Only one homogeneous super-hero species would remain.

The tradeoff principle asserts that a super-hero species does not exist and has never existed. It says that phenotypes excel at most functions by *losing* the ability to perform other functions well. Tongue-in-cheek, the humorist Ephraim Kishon put the point perfectly: “If only they’d manufacture pins with heads on both ends, nobody would prick himself.”

MICHAEL L. ROSENZWEIG, SPECIES DIVERSITY IN SPACE AND TIME 151 (1995).

68. DAWKINS, *supra* note 24, at 77.

69. *Id.*

dependency. It is the panda's thumb. The panda's thumb is used to strip leaves and shoots from bamboo. The thumb is remarkably efficient. Anatomically, however, the panda's "thumb" is not a thumb at all but the modification of a different structural component of the wrist. According to Stephen Jay Gould:

An engineer's best solution is debarred by history. The panda's true thumb is committed to another role [as a running and clawing digit], too specialized for a different function to become an opposable, manipulating digit. So the panda must use parts on hand and settle for an enlarged wrist bone [the radial sesamoid,] and a somewhat clumsy, but quite workable, solution. [This adaptation] wins no prize in an engineer's derby. It is, to use Michael Ghiselin's phrase, a contraption, not a lively contrivance. But it does its job and excites our imagination all the more because it builds on such improbable foundations.⁷⁰

The "evolution" of the LLP from general partnership law is path dependant, like the panda's thumb, because it adds a feature to an existing body type (the general partnership).⁷¹ The "new" idea may be revolutionary, but the basic structure of the phenotype remains the general partnership. The added feature is useful in certain economic ecosystem niches, in this case, in competition with the LLC. Stated another way, the evolution of limited liability within the general partnership phenotype increases the fitness of that phenotype for *particular purposes*.

The LLC, itself, has undergone phenotypic change through gradual adaptations, too. An illustration of such a change is the refinement of the charging order. For example, the Revised Uniform Limited Liability Company Act (RULLCA) charging order provision is clearer and less susceptible to misinterpretation than the charging order provision in the Uniform Limited Liability Company Act (ULLCA).⁷² The charging order is also an example of the panda's thumb phenomena because it has been adapted for purposes for which it was not originally designed. The charging order is now sometimes used as an asset-protection tool for a member to protect her "personal" wealth as opposed to as a mechanism for protecting the entity and the *other* members from a member's personal creditor.⁷³

70. STEPHEN JAY GOULD, *THE PANDA'S THUMB: MORE REFLECTING IN NATURAL HISTORY* 24 (1980).

71. The limited liability feature was the result of relatively few changes in RUPA. See, e.g., UNIF. P'SHIP ACT § 106(b) (1997) [hereinafter RUPA] ("Governing Law"); § 306(b) & (c) ("Partner's Liability"); § 1001 ("Statement of Qualification"); § 1002 ("Name"); § 1003 ("Annual Report").

72. See Thomas E. Rutledge, Carter G. Bishop & Thomas Earl Geu, *Foreclosure and Dissolution Rights of a Member's Creditors: No Cause for Alarm*, 21 PROB. & PROP. 35, 36-38 (2007). Compare REV. UNIF. LTD. LIAB. CO. ACT § 503 (2006) [hereinafter RULLCA], with UNIF. LTD. LIAB. CO. ACT § 504 (1996) [hereinafter ULLCA].

73. See generally Daniel S. Kleinberger, Carter G. Bishop & Thomas Earl Geu, *Charging Orders and the New Uniform Limited Partnership Act: Dispelling Rumors of Disaster*, 18 PROB. & PROP. 30 (2004); Elizabeth

Finally, the charging order represents accumulated adaptation that when combined with the adaptation of other features, increases the LLCs' fitness for the estate-planning niche. One of the other important features, in that regard, is the default rule that dissociation does not require a liquidating distribution to the dissociating member.⁷⁴ Under RULPA (1976/1985), for example, a limited partner in an at-will limited partnership could withdraw and receive payment for its interest within six months.⁷⁵

The default rule of no statutory withdrawal right in RULLCA is important for estate-planning purposes (among other purposes) because under federal wealth transfer tax any variation from the state default rules is ignored for purposes of valuing an interest in a "family" LLC.⁷⁶ Other default features (or traits) that improve LLC fitness for the estate-planning niche include perpetuity of life,⁷⁷ the limited transferability of members' interests coupled with the limited governance rights accorded a transferee,⁷⁹ and the broad LLC purpose which is not confined to "for profit" business.⁸⁰

Of course, the LLC is used broadly across a number of industries and not just for estate-planning purposes.⁸¹ The phenotype is itself flexible. Biological evolution suggests at least three possible sources for this flexibility. The *first* is that like omnivores, the LLC has "evolved" a generalist "strategy." There are costs associated with the generalist strategy. One cost is illustrated by the estate-planning and asset-protection features built into the genotype as default rules. As default rules, they will apply on a latent basis. It is as if immunity against a certain disease is built into the organism even though for some purposes that protection may be *maladaptive*. An example of this kind of genetic strategy from the biological human phenotype is sickle-cell anemia: "The sickle-cell mutation, which causes blood cells to collapse in the absence of oxygen, is frequently fatal to those with two copies of it [on the genetic level], but only mildly harmful to those with just one copy."⁸²

Somewhat consistent with the peacock's tail, however, there is a benefit to

M. Schurig & Amy P. Jetel, *The Alarming Potential for Foreclosure and Dissolution by an LLC Member's Personal Creditors*, 20 PROB. & PROP. 42 (2006).

74. See RULLCA § 404(b).

75. See REV. UNIF. LTD. P'SHIP ACT § 604 (1976) (amended 1985) [hereinafter RULPA]. The Prefatory Comments to ULP (2001) state, "Due to estate planning concerns, several states have amended RULPA to prohibit limited partner withdrawal unless otherwise provided in the partnership agreement." *Prefatory Comments to UNIF. LTD. P'SHIP ACT* (2001).

76. I.R.C. § 2704(b)(3)(B) (1996).

77. See RULLCA § 104(c).

78. See, e.g., RULLCA Art. 5 (2006).

79. RULLCA § 701(a)(5).

80. RULLCA § 104(b); see also Thomas Earl Geu, *Selected Estate Planning Aspects of the Uniform Limited Partnership Act (2001)*, 37 SUFFOLK U. L. REV. 735, 829-49 (2004) (providing general overview of the kinds of features that make an entity fit for estate-planning purposes).

81. See generally DAVID G. EPSTEIN ET AL., BUSINESS STRUCTURES 811 (2d ed. 2007).

82. MATT RIDLEY, GENOME: THE AUTOBIOGRAPHY OF A SPECIES IN 23 CHAPTERS 141 (1999).

those individuals who have the trait and survive:

[T]hose with one copy are largely resistant to malaria. [T]he blood of Africans living in malarial areas [have been tested] and . . . those with the mutation were far less likely to have the malaria parasite as well. The sickle-cell mutation is especially common in parts of west Africa where malaria has long been endemic, and is common also in African-Americans, some of whose ancestors came from west Africa in the slave ships. Sickle-cell disease is a high price paid today for malaria resistance in the past.⁸³

Thus, the default rules of the LLC, given the *disease* of wealth transfer taxation and its devastating effect on the reproductive fitness of individual LLCs living in that particular niche, protect against that specific threat even though the trait may be maladaptive for phenotypes competing in other niches. In effect, the default rule extends the kinds of niches that the LLC inhabits, even though it may be maladaptive, however so slightly, for *some* individual LLCs in other selected niches.⁸⁴

A *second* source of flexibility in the LLC phenotype might be designed *polymorphism*. Polymorphism exists when the same genes have the ability to express one or more phenotypes either sequentially (different phenotypic stages for the same individual, think tadpole) or alternatively (different adult phenotypes). Classic examples of this kind of phenotypic plasticity⁸⁵ are the social insects where two very different phenotypes—worker and queen—develop *alternatively* from the same type of egg.⁸⁶ The developmental trigger for worker or queen seems to be provided from outside the egg by the kind of food made available to the larva:

It is during the larval period that the choice is made to develop to either the worker or the queen. Strong evidence exists that royal jelly and worker jelly differ in controlling the level of a hormone needed during the brief time of larval development to the queen. Royal jelly raises the level of juvenile hormone during this critical period; in fact, topical application of juvenile hormone can induce the formation of a queen. Research is just beginning on how the larva responds to the royal and worker jellies to generate the different morphs. It is known that several genes are differently expressed in the worker and the queen. Workers, though smaller, are in fact more complex in their

83. *Id.*

84. See MARC W. KIRSCHNER & JOHN C. GERHART, THE PLAUSIBILITY OF LIFE: RESOLVING DARWIN'S DILEMMA 84 (2005).

85. *Phenotype plasticity* is the technical term. See, e.g., Anurag A. Agrawal, *Phenotypic Plasticity in the Interactions and Evolution of Species*, 294 SCI. 321 (2001) available at <http://www.sciencemag.org/cgi/content/full/294/5541/321> (last visited Apr. 20, 2009).

86. See also KIRSCHNER & GERHART, *supra* note 84, at 87-89.

anatomy and physiology than queens, which are basically egg-producing factories with many rudimentary body parts.⁸⁷

On the phenotype level, polymorphism could “explain” the variety of LLC body types that inhabit very different economic ecosystems and different niches within the same ecosystem. That is, the way the genotype is expressed could depend on developmental factors triggered by the environment consistent with the *need* of the *selfish gene* to be replicated with the greatest frequency.

The *third* possible source of phenotypic LLC flexibility is that flexibility is an *unintended* feature associated with other *selected* traits. That is, flexibility could be the byproduct of the selected trait. An example of an unintended trait from the physical world is a *spandrel*:

In a famous essay that criticized evolutionary biologists for relying too heavily on the concept of adaptation, Gould and Lewontin . . . themselves eminent evolutionary biologists, said that many biological structures are like a spandrel, which is the area created by two adjoining arches. Arches are clearly functional in the design of a building but spandrels are merely the byproducts of arches. These spaces are sometimes used for artistic purposes, but their “function” is secondary at best. Similarly, noses hold up our glasses, but this “function” of noses is clearly secondary to breathing and smelling.⁸⁸

This line of reasoning would imply that design flexibility in LLCs is a design *constraint* (or necessity) based on the *fact* of its other features.⁸⁹ Daniel Dennett makes a spirited argument against “unintended” features. He contrasts architectural *necessity* to adaptation by arguing *smooth* spandrels *have* been selected: “[T]here are in fact indefinitely many ways that those spaces could be filled with masonry, all of them about equal in structural soundness and ease of building.”⁹⁰

The divide between Gould, Lewontin, and Dennett can be narrowed by the evolutionary concept of *preadaptation*.⁹¹ Preadaptation is based on path dependency. It identifies the evolution of existing structures into new *unrelated* structures.⁹² It may be that a spandrel, loosely defined, is a necessary

87. *Id.* at 89.

88. DAVID SLOAN WILSON, *DARWIN’S CATHEDRAL: EVOLUTION, RELIGION, AND THE NATURE OF SOCIETY* 44 (2002).

89. See DENNETT, *supra* note 11, at 269.

90. *Id.* at 271. Dennett then suggests that the idea of a space where arches meet, under a loose definition of “spandrel,” might be a true statement. *Id.* at 272.

91. “Preadaptation” is a rather unfortunate selection of jargon because it can suggest “preordination” of a future evolutionary path. It does not mean *preordination*. *Id.* at 280. Rather, it simply is the flipside of the *path dependency* coin. See *supra* notes 68-73 and accompanying text (discussing path dependency).

92. See, e.g., DENNETT, *supra* note 11, at 281; *supra* text accompanying notes 20-21 (discussing evolution of jaw).

design constraint when using arches, but that once “made,” further evolved into a *selected* feature. As Dennett suggests, “[Churches are] not granar[ies]” and the “primary function of . . . domes and vaults was never to keep out the rain—there were less expensive ways of doing that.”⁹³ He gives two reasons why spandrels might have been *selected*:

First, it is . . . close to the minimal surface area (and hence might well be viewed as the optimal solution if, say, the number of costly mosaic tiles was to be minimized!). Second, this smooth surface is *ideal* for the mounting of mosaic images . . . [Spandrels] are adaptations, chosen from a set of equipossible alternatives for largely aesthetic reasons.⁹⁴

Thus, if *domes* are the primary selection criteria, then *spandrels* are a design constraint (or problem). The design *problem*, in effect, was an opportunity (a preadaptation) for a mosaic solution to emerge. Conversely, if *a space for mosaics* was the primary selection criteria, then the architects had to use domes (the design constraint became using dome architecture). Either way, the dome and the spandrel are coupled features that evolved together. From this perspective, LLC flexibility may be a necessary byproduct of other LLC features; perhaps, for example, that some optional features are incompatible.⁹⁵ The main point is that it is possible that a given feature or trait has no function and that “[i]t exists because of hidden connections with other traits.”⁹⁶

Regardless of its source, the LLC’s flexibility is now an important operational feature. It allows the LLC to express a variety of phenotypes, each with its own combination of features, each arguably tuned to a slightly different niche in the economic ecosystem. Phenotype plasticity, whether a selected trait or a design necessity, is *conserved* generation to generation only if it bestows advantages to the current phenotypes possessing the trait. The environment, after all, selects only those phenotypes fit for the “purpose” they are deployed. Otherwise, the individuals die young without reproducing.

93. DENNETT, *supra* note 11, at 274.

94. *Id.* 273-74.

95. Another example comes from selective (artificial) fox breeding. Dmitry Belyaev was the director of the “Department of Fur Animal Breeding at the Central Research Laboratory of Fur Breeding” in the Soviet Union. WILSON, *supra* note 15, at 42. One of his jobs was to “create a tamer variety of silver fox.” *Id.* He started selected breeding in 1959, based only on the trait of tameness. *Id.* “Forty years . . . later” his experiment “produced a new breed [of fox] that . . . was eager for human contact.” *Id.* at 42-43. However,

[t]he most amazing thing about the experiment . . . was that the foxes had become like dogs in *other* respects. Their tails had become curly. Their ears had become floppy . . . Their legs had become shorter and their skulls more broad. These physical traits had not been selected, but they still came along for the ride, as if connected to the behavioral traits of tameness by invisible strings.

Id. at 43.

96. *Id.*

Once an organism “tunes itself” to a particular niche, however, it may no longer be adaptively advantageous to conserve this flexibility. The very flexibility of the phenotype that allowed some individuals to exploit a niche may become disadvantageous from the genes’ eye view. It becomes disadvantageous when the very flexibility that produces an advantageous trait causes some individuals in subsequent generations to lose the gains created by the flexibility. *Conserving* (hardwiring) the specific combination of traits is advantageous because all offspring will then possess those traits and be more successful in the specific niche and thus more successful in replicating their genes.⁹⁷ Over time this adaptation to a specific niche may result in different species; one species, perhaps tuned to a narrow specialty and another, perhaps, remaining a generalist species.

Another way different species emerge is known as *geographical speciation*. As explained by E. O. Wilson,

A species multiplies into two or more daughter species when its populations are isolated from one another long enough by geographical barriers. In this example, based on a composite of real cases, the parental species is at first widely distributed across terrain composed mostly of grassland The local climate grows wetter, and a river splits the species in two, so that now one population lives in grassland and the other in woodland In time the two populations evolve apart, until they attain the level of new species When the river barrier disappears, the two forms are able to live together without interbreeding⁹⁸

Speciation provides an interesting metaphor for LLCs because it suggests that (1) it is *possible* that LLCs could speciate based on industry, purpose, or function; and (2) it is *possible* that speciation will occur because laws developed in different states (geography).⁹⁹

So far this essay has discussed *vertical evolution*; that is, evolution from a common ancestor. Common ancestry is not the only reason why different species exhibit similar features or traits. Similar traits can emerge independently in otherwise dissimilar species because the trait is useful. For example, limited liability seems ubiquitous across a wide variety of entity phenotypes such as corporations, LLCs, LLPs, and even unincorporated nonprofit associations.¹⁰⁰ Under this paradigm, similar features evolve because of common *environmental* pressures on different organisms. Evolutionary biologists call this *convergence*. Indeed, critters living in different places but under very similar environmental conditions may come to have many common

97. See *supra* note 67.

98. WILSON, *supra* note 2, at 60-61.

99. See *infra* notes 206-207 and accompanying text.

100. See, e.g., UNIF. UNINCORPORATED NONPROFIT ASSOC. ACT (1996).

features. For example, the “Tasmanian wolf of Australia, a marsupial, [and] the ‘true’ wolf of Eurasia and North America, a placenta mammal . . . converged to occupy similar niches” on different continents.¹⁰¹ As a result of performing the same function within the ecosystem, the two wolves outwardly resemble one another even though they have several distinct differences.

Marsupials are mammals,¹⁰² but they differ from other mammals in significant ways. Marsupials have distinctive reproduction systems that include juveniles’ premature birth followed by development in a pouch. They also have different pelvic structures than other mammals.¹⁰³ Finally, marsupials markedly differ from other mammals in brain structure, brain size, and skull size in relationship to brain size. As a result of the brain differences, “marsupials are notably less intelligent than placenta [other] mammals It is not surprising, therefore, to find a repertory of behavior that differs somewhat from that of the more advanced placentals.”¹⁰⁴ As a result of the difference in intelligence, marsupials are far less vocal and there “seems to be little detectible social organization”¹⁰⁵ In summary then, marsupials, including Tasmanian wolves, differ physiologically and behaviorally from placental wolves even though they have many common traits, their outward appearance is similar, and they fill the same niche in their respective ecosystems.

Some features seem to be common to a wide variety of dissimilar critters. These features are like *really helpful ideas*. So helpful, in fact, that evolution has found widely different mechanisms to perform roughly the same function in many different lineages. One such *really helpful idea* is the eye. According to Dawkins,

It has been authoritatively estimated that eyes have evolved no fewer than forty times, and probably more than sixty times, independently in various parts of the animal kingdom. In some cases these eyes use radically different principles. Nine distinct principles have been recognized among the forty to sixty independently evolved eyes.¹⁰⁶

On the margin, while high-resolution image forming eyes provide the best sight, they might not fit other phenotypic parameters or be optimal for the animal. For example, if a snail had eyes the quality of the human eye, the necessary size of the eye “would probably be too costly to make and too heavy and bulky [for the snail] to carry around.”¹⁰⁷ The snail with such well developed eyes might have a very good view of its predator as it was being

101. WILSON, *supra* note 2, at 95.

102. *See Mammals*, 23 THE NEW ENCYCLOPEDIA BRITANNICA MACROPAEDIA 360 (15th ed. 1994).

103. *Id.*

104. *Id.* at 358.

105. *Id.*

106. DAWKINS, *supra* note 24, at 139-40.

107. *Id.* at 141.

devoured! Conversely, even very small primitive eye spots that can do no more than sense bright light might be distinctively advantageous for survival and reproduction compared to “blind” individuals of the same species.¹⁰⁸

Perhaps *limited liability* is like the eye: a very good idea that has independently evolved among different species of business organizations. There is, after all, value even in such primitive limited liability mechanisms as the use of independent contractors. Moreover, corporate-style limited liability uses a very different mechanism than, say, limited partnerships under RULPA 1976/1985.¹⁰⁹

Convergence and *really good ideas* in evolutionary biology suggest that features shared by different types of phenotypes do not necessarily indicate a close lineal relationship between them. It is critical for a veterinarian or zookeeper, for example, to know whether a critter is a *Tazmanian* wolf or a *real* wolf. While they share common features and perform similar functions in an ecosystem, they are different animals. In terms of entity law, the evolutionary metaphor seems to support the following observation about the comparative traits of cooperatives and other organizations by Israel Packel:

Instead of a direct approach as to whether a particular rule, in the light of the reason for the rule, should be applied to cooperatives, courts in the past tended to create the preliminary hurdle of determining whether cooperatives are to be treated as corporations, partnerships, or other joint ventures. . . . The uselessness of such an analysis becomes even more apparent when it leads to a statement that cooperatives “are somewhat of a hybrid, partaking both of the nature of a corporation and of a partnership. [(citing *Philadelphia School Dist. v. Frankford Grocery Co.*, 103 A.2d 738 (Penn. 1954)].”¹¹⁰

108. *See id.* at 142-43.

109. A standard formulation for corporate shareholder liability is in the Revised Model Business Corporation Act (RMBCA), which in relevant part states:

“Unless otherwise provided in the articles of incorporation, a shareholder of a corporation is not personally liable for the acts or debts of the corporation except that he may become personally liable by reason of his own acts or conduct.”

REV. MODEL BUS. CORP. ACT § 6.22(b).

The Revised Uniform Limited Partnership Act, on the other hand, is quite different in its approach. Its provision is predicated on status. That is, limited liability for limited partners is based on the fiction that the general partner will have unlimited personal liability. Unless the limited partner acts *like* a general partner and a creditor is misled by that action, the limited partner will be protected. *See* RULPA § 303 (1976) (amended 1985) [hereinafter RULPA (1976/1985)]. In an odd way, RULPA (1976/1985) contains control elements that would be factors in piercing the corporate liability shield in equitable piercing actions. The distinction in mechanism is the important point for present purposes.

The convergence of fiduciary duties in unincorporated and incorporated entities has been discussed. *See Questions to Symposium Participants, Symposium: The Convergence of Fiduciary Duties in Unincorporated and Incorporated Entities: The Issue, Its Implications, Its Limitations*, 28 DEL. J. CORP. L., 999 (2003).

110. ISRAEL PACKEL, *THE ORGANIZATION AND OPERATION OF COOPERATIVES* 5-6 (4th ed. 1970).

At best, therefore, general statements about phenotypic features may be helpful at only the grossest level of description; and as Packel implies, alone, they do not constitute the level of detail required for analytical purposes.

Additionally, the metaphors suggest that features that first appear to be equivalent might be designed and operate in very different ways. This, again, suggests that there is mischief in over-reliance on general labels like *limited liability*,¹¹¹ or perhaps even *entity*¹¹² or *contract*.¹¹³

*B. Of Entities, Individuals, Groups, and Genes: "Groups All the Way Down" and Back Up Again*¹¹⁴

The term *entity* is noteworthy in LLC law because it seems to correspond to the individual organisms (phenotypes, bodies) of a species. Recall selective pressures operate in biological evolution on individual organisms. But what is an individual organism or, for that matter, an entity? What is the relationship between and among *pieces* of a biological "individual" that make it at least *seem* bounded? Even from a biological perspective,

Individuals appear much more real to us than groups. Individuals are physically discrete, whereas groups seem like fuzzy abstractions. We endow individuals with mental properties such as intentions and self-interest and regard groups as just a convenient word for what individuals do to each other in their pursuit of self-interest.¹¹⁵

111. See *supra* note 110 and accompanying text.

112. See generally *infra* text accompanying notes 133-139 (describing slime mold behavior).

113. *Contract* is multidimensional and, as questions concerning contract theory or doctrine plumb foundational issues, is complicated. Compare, for example, the following three quotes:

1. "One shift in method from the Restatement [of Contracts] to the Restatement Second is revealed by the dominance of standards over rules in the processes of contract formation and interpretation." Richard E. Speidel, *Restatement Second, Omitted Terms and Contract Method*, 67 CORNELL L. REV. 785, 786 (1982).
2. "Contracts with discretion illustrate most vividly that the world of the contract does not simply contain some one determinate action that is required on the part of the discretion-exercising party. Rather, it contains a restricted set of possible acts-for-reasons-in-circumstances. Other reasons are not a part of that world, and action for those reasons is a breach of contract." Steven J. Burton & Eric G. Andersen, *The World of a Contract*, 75 IOWA L. REV. 861, 869 (1990).
3. "Contract is an amalgam; it defies simple reduction, heuristic reduction, into accessible theoretical terms. The reason for that is largely because of the nature of Contract doctrine and because theoretical analysis cannot yield the results we would have it yield. The deck is stacked against the endeavor." Peter Alces, *Unintelligent Design in Contract*, 2008 U. ILL. L. REV. 505, 554 (2008).

114. WILSON, *supra* note 15, at 133 (Chapter 18, *Groups All the Way Down*).

115. *Id.*

Rather obviously, “Not every clump of cells can be awarded the honor of being called a body [an individual].”¹¹⁶ For example, “[a] mat of bacteria or a group of skin cells is a very different thing from an array of cells that we would call an individual.”¹¹⁷ In a body, the single cells *cooperate* in order to perform functions that lead to more surviving offspring carrying the selfish genes that necessarily “made” the body.¹¹⁸ Typically, this requires a division of labor through cell specialization resulting in, for example, organs.¹¹⁹

The importance of multicellular cooperation for purposes of biological evolution is difficult to overstate: “New creatures with whole new capabilities came about: they got big, they moved around, and they developed new organs that helped them sense, eat, and digest their world.”¹²⁰ When the cooperation and balance between cells breaks down, bad things happen to the individual organism:

A cancerous tumor, for example, is born when one batch of cells no longer cooperates with others. By dividing endlessly, or by failing to die properly, these cells can destroy the necessary balance that makes a living individual person. Cancers break the rules that allow cells to cooperate with one another.¹²¹

Careful readers will have noted the shift from a focus on individuals, easily perceived, to *cells*; that is, the necessity of *cells* to cooperate in order to develop new capabilities. Lynn Margulis, a cell biologist, takes this idea near its logical extreme: “[T]here is no such thing as individuals, only societies.”¹²² As a result, the previous block quote concerning cancers as noncooperating cells can be transformed into the more general statement by a different biologist:

Every time genes replicate within cells and cells divide within a multicellular organism, there is potential for some to gain at the expense of others and the welfare of the group as a whole. When this happens the whole becomes less of an organism and more like a mere group. The subelements become less like organs and more like quarreling organisms with their own separate agendas. The harmony of an organism cannot be taken for granted. It requires the evolution of mechanisms that prevent subversion from within.¹²³

116. SHUBIN, *supra* note 18, at 117.

117. *Id.*

118. *See id.* at 118.

119. *See id.*

120. SHUBIN, *supra* note 18, at 119.

121. *Id.* at 118.

122. WILSON, *supra* note 15, at 134.

123. *Id.* at 135.

In a wonderfully self-referential way (for purposes of this essay), *real* biologists use the metaphor of human society to describe how cells cooperate: “These facts about genetics and development are sometimes called laws because they are so widespread, but now they have acquired the *other* meaning of the word “law”—a social contract designed to promote the common good.”¹²⁴

It is the evolution of cooperation, perhaps better styled as *control*, that may very well have been one of the biggest *very good ideas* in biological evolution. Professor Margulis claims that it was evolution from groups to individuals, not individuals to groups, that drove this idea:

“Many symbiotic associations exist today, such as bacteria and algae that live within the tissues of protozoa. [Margulis] conjectured that when the members of a symbiotic association become sufficiently dependent upon each other, they make a transition from organisms to organs and the association becomes a new higher-level organism.”¹²⁵

I posit *the* point of transition caused by interdependence described by Margulis is the bifurcation point more generally between *individual* to *entity*. Thus, at least for sake of argument and metaphor, entities are not created—they *emerge*.¹²⁶

Indeed, the notion that entities *emerge* is recognized by the federal income tax classification regulations. For an organization to choose between partnership and corporate (association) tax status requires the electing

124. *Id.* at 136 (emphasis added). More directly:

My use of words borrowed from human social life . . . is not just poetic license to indulge a general audience. It is how the experts talk to each other. A single review article titled “The Social Gene” by Harvard biologist David Haig, a recognized authority on the subject, used the following words: allegiance, binding agreements, cabal, . . . contractual arrangement, corrupt, deceit, . . . fair play, firm, fraud, free-riders, . . . institutions, licensing . . . marketplace, misappropriate, monopoly, motivation, . . . partnership, . . . self-interest, . . . team, trade, transaction costs, and unauthorized. No one fifty years ago could have dreamt that these words would be used to describe genetic, developmental, and physiological interaction within a single individual!

Id. at 136-37 (citation omitted).

125. WILSON, *supra* note 15, at 134.

126. The term *emergence* represents a deep concept that is at the heart of complex adaptive systems theory, which studies the underlying laws and principles of systems that exhibit evolutionary features not limited to biological evolution. For purposes of this essay, evolution is used metaphorically. It might be far more than a metaphor. See generally STEVEN JOHNSON, EMERGENCE: THE CONNECTED LIVES OF ANTS, BRAINS, CITIES, AND SOFTWARE (2001); KAUFFMAN, *supra* note 61. There is a growing body of literature about complex adaptive system theory and law. See, e.g., Thomas Earl Geu, *Chaos, Complexity, and Coevolution: The Web of Law, Management Theory, and Law Related Services at the Millennium*, 65 TENN. L. REV. 925 (1998) (providing dated but relatively thorough review of that literature).

organization to be an *entity*.¹²⁷ One of the regulatory tests for determining entity status states that “[a] joint venture or other contractual arrangement may create a separate entity for federal tax purposes if the participants carry on a trade, business, financial operation, or venture and divide the profits therefrom.”¹²⁸ Those entities, as members of a taxonomic classification that might be labeled unincorporated entities, are distinguished from entities that have deemed to have chosen entity status by organizing under state corporate laws. An entity’s choice to form under state law corporate acts renders it ineligible to elect partnership income tax treatment.¹²⁹

Similar classification questions have a long and storied history in state partnership law. They are frequently styled as a debate about whether a partnership is an *aggregate* or an *entity*;¹³⁰ here, there “is some question whether an LLC should be a corporate-type separate entity or merely an aggregate of individual members.”¹³¹ Whether an LLC is aggregate or entity is important for purposes of (1) defining the organization and (2) determining the relationship, covariant control, and relative rights between members (cells) and between the members and the organization.

According to one scientist cells needed to develop the following “tools” for bodies (entities), to emerge: (1) “They needed to be able to communicate with one another”; (2) “They needed to be able to stick together in new ways”; (3) “[T]hey needed to be able to make new things, such as the molecules that make our organs distinct.”¹³²

The demarcation between aggregate and entity is not a clean one. As previously posited, it is the difference between symbiosis and dependence.¹³³

127. Treas. Reg. § 301.7701-1(a)(1) (2006).

128. Treas. Reg. § 301.7701-1(a)(2).

129. Specifically:

“A business entity organized under a Federal or State statute, or under a statute of a federally recognized Indian tribe, that is referred to as incorporated or as a corporation, body corporation, or body politic.”

Treas. Reg. § 301.7701-2(b)(1).

130. As stated in a treatise:

At common law, a partnership was considered to be an *aggregate* of the individual partners, rather than a distinct legal *entity* separate from the partners. Extrapolating the *aggregate* theory to its extreme, a partnership is nothing more than a relationship between persons acting for a common business purpose. For that common business purpose, these persons jointly own assets, jointly incur obligations, and conduct a pro rata share of the partnership business in their own behalf.

J. WILLIAM CALLISON & MAUREEN A. SULLIVAN, PARTNERSHIP LAW AND PRACTICE: GENERAL AND LIMITED PARTNERSHIPS § 3:1, 3-2 (2006) (citations omitted).

131. LARRY E. RIBSTEIN & ROBERT R. KEATINGE, 1 RIBSTEIN & KEATINGE ON LIMITED LIABILITY COMPANIES § 3:8, 3-10 (2d ed. 2008).

132. SHUBIN, *supra* note 18, at 119.

133. See *supra* notes 122-128 and accompanying text.

A biological illustration of the line of demarcation may be slime mold. During the summer months, slime mold behaves as an aggregate: “[D]isguised as a trail of amoebae, shapeless, or at least continually mutable, growing and dividing as they absorb nutrients from the leafy detritus.”¹³⁴ As the growing season ends, however, “a strange transformation happens.”¹³⁵ The slime mold acts as an entity, it “hardens into a definite shape”¹³⁶ and “it ceases its animal like wandering to become something like a fungus”¹³⁷: “In some species there is a series of inflated balloons, in others a line of little ‘spinning tops’ borne on short stems, in others again there are delicate spindles supported by a tracery of rods.”¹³⁸

In effect, sometimes slime mold acts as an aggregate and sometimes as an entity. Its attributes are cyclical according to season, which is somewhat reminiscent of polymorphism.¹³⁹ What would it mean if *unincorporated* organizations are similar to slime mold?

A casebook on business associations suggests one answer. It observes that in partnership law some provisions of RUPA “are more consistent with the aggregate theory than the entity theory” even though RUPA contains an express provision stating that a partnership is “an entity distinct from its partners.”¹⁴⁰ Conversely, the casebook correctly observes that “there are provisions in UPA that are more consistent with the entity theory than the aggregate theory,” even though UPA does *not* contain the *entity* provision.¹⁴¹ Finally, the casebook approvingly uses this quote: “Neither practitioners, arbitrators, or courts should place too much reliance on either the aggregate theory or the entity theory.”¹⁴²

The answer suggested by the casebook, therefore, is that aggregate and entity-based provisions exist side by side in unincorporated law, that each provision is discrete, and that as a practical matter, to find an answer one needs only to look to the specific provision at issue without the need for an overarching *theory* of organization.¹⁴³

This may be a good answer for most, even nearly all, issues; but unless the

134. FORTEY, *supra* note 62, at 73.

135. *Id.* at 74.

136. *Id.*

137. *Id.*

138. FORTEY, *supra* note 62, at 74. It gets even better. As this essay goes to press, a group of scientists “showed that a slime mould negotiated the shortest route between two exits in a maze,” indicating it has a “primitive intelligence” borne of cellular computation. *Slime Mould Solves Maze Puzzle*, NEWS IN SCIENCE, Sept. 28, 2000, available at <http://www.abc.net.au/science/news/stories/s189608.htm> (last visited Apr. 20, 2009).

139. See *supra* notes 85-87 and accompanying text.

140. EPSTEIN ET AL., *supra* note 81, at 82.

141. *Id.*

142. *Id.* (quoting ROBERT W. HILLMAN, ALAN W. VESTAL & DONALD J. WEIDNER, GENERAL AND LIMITED LIABILITY PARTNERSHIP UNDER THE REVISED UNIFORM PARTNERSHIP ACT 52 (1996)).

143. EPSTEIN ET AL., *supra* note 81. “The debate . . . is of very limited practical significance.” *Id.*

organizational statute is comprehensive and complete in all respects, there will be open issues within a section or gaps between inconsistent provisions (one aggregate based, one entity based) that require interpolation. A good example of this kind of issue is whether a court *should* imply the existence of an equitable derivative action to LLCs (based on entity theory) or whether a legislature *should* adopt statutory derivative procedures.¹⁴⁴

The one-on-one provision inquiry looks a lot like the premise upon which promises were made about the human genome project. That is, identify the gene, discover the trait that matches the gene, and then figure out how to fix the gene if it is the cause of a problem or a source of weakness. Such a process works well for some, but certainly not all, of the interesting human biological issues. The genome project has indeed identified an impressive number of disorder-gene associative pairs, but more recently a cataloguing and matching approach has been taken to try to identify networks of genes that may relate to widely different diseases.¹⁴⁵ The results of initial research have been in graphic form, and in one form, the graphic result looks like a map of the cosmos. As reported in the popular press,¹⁴⁶ “The research is already starting to change nosology, as the field of disease classification is known. Seemingly dissimilar diseases are being lumped together. What were thought to be single diseases are being split into separate ailments.”¹⁴⁷

Just because an “issue” can be traced to a given gene, therefore, does not mean that the gene is used only for that purpose or that other genes are irrelevant to the manifestation of the issue. In fact, separate genes are used in shifting combinations for different kinds of functions and traits.¹⁴⁸ This makes a short excursion into the biology of genomes and genetics necessary.

Genes (or metaphorically, discrete statutory sections) are simply pieces of information, “chunks of software that can run on any system,” or paragraphs, words, and letters in a story.¹⁴⁹ The way that these pieces of information,

144. See, e.g., Larry E. Ribstein, *Reforming Limited Liability Company Fiduciary Litigation*, (Univ. Illinois Law & Econ. Research Paper No. LE08-017, 2008), available at <http://ssrn.com/abstract=1146662>.

145. Kwang-II Goh, Michael E. Cusick, David Valle, Marc Vidal & Albert-Laszlo Barabasi, *The Human Disease Network*, 104 PROC. NAT'L ACAD. SCI. 8685 (May 22, 2007).

146. See *id.* at 8686-87; see also Andrew Pollack, *Redefining Disease, Genes and All*, N.Y. TIMES, May 6, 2008, at F1.

147. Pollack, *supra* note 146.

148. See *supra* notes 145-147; *infra* notes 158-162 and accompanying text.

149. RIDLEY, *supra* note 82, at 180-81. Ridley extends the analogy for the organization of genetic information as follows:

Imagine that the [human] genome is a book.
There are twenty-three chapters called *chromosomes*.
Each chapter contains several thousand stories, called *genes*.
Each story is made up of paragraphs, called *exons*, which are interrupted by advertisements called
INTRONS.
Each paragraph is made up of words, called *codons*.
Each word is written in letters called *bases*.

“words,” are selected and deployed actually and ultimately tell the story of the phenotype in which they are embedded. Intuitively, at least, this makes sense because humans have only “about one and a half times [the number of genes as] those of a fruit fly”¹⁵⁰ and mice “share at least 80% of their genes” with humans.¹⁵¹ Most of the *words* in the mouse and human stories are the same. The trick to understanding how genes work to express such different phenotypes is to figure out how they interact and what controls and limitations are involved in the interaction. Perhaps a caricature of those genetic mechanisms will illuminate how specific sections in LLC statutes *should* (or at least *could*) interact and suggest a line of inquiry for such knotty problems, inter alia, as the aggregate-entity paradox.

Previously, I said that genes provided a recipe.¹⁵² And there is a distinction between a recipe and a blueprint. According to Dawkins, genes, “in different aspects of their behaviour, are sometimes like blueprints and sometimes like recipes.”¹⁵³ The process by which genes replicate *themselves* is like following a blueprint. There is a “one-to-one mapping between bits of gene and bits of protein”¹⁵⁴ A blueprint is reversible: “Give an engineer a car and he can reconstruct its blueprint.”¹⁵⁵ The next developmental step, however, is more like a recipe. That is, “There is seldom a simple one-to-one mapping between particular genes and ‘bits’ of body.”¹⁵⁶ Instead, “there is a mapping between genes and rates at which processes happen during embryonic development.”¹⁵⁷ Dawkins describes the relationship by stating,

There is no . . . one-to-one mapping in the case of a recipe. You can’t isolate a particular blob of soufflé and seek one word of the recipe that ‘determines’ that blob. All the words of the recipe, taken together with all the ingredients, combine to form the whole soufflé.¹⁵⁸

The *genetic* perspective emphasizes networks and begs the question of network regulation. The recipe metaphor used by Dawkins introduces

Id. at 6. “There are one billion words in the book . . . as long as 800 Bibles.” *Id.*

150. KIRSCHNER & GERHART, *supra* note 84, at 109.

151. *Mouse Clues to Human Genetics*, BBC NEWS WORLD EDITION, Dec. 4, 2002, available at <http://news.bbc.co.uk/2/hi/science/nature/2536501.stm> (last visited Apr. 20, 2009). “[I]f one considers just the different classes of genes . . . then the similarity rises to 99%.” *Id.*

152. See *supra* text accompanying note 11.

153. RICHARD DAWKINS, *A DEVIL’S CHAPLAIN: REFLECTIONS ON HOPE, LIES, SCIENCE, AND LOVE* 105 (2003).

154. *Id.*

155. *Id.*

156. *Id.*

157. DAWKINS, *supra* note 153, at 105.

158. *Id.*

sequencing through time as a component of any regulation concerning development of the individual *phenotype* (body).¹⁵⁹ It is the idea of regulation of development that explains how the mouse and the human can be so radically different (relatively speaking) but still share such a large percentage of genes in their respective gene catalogues.¹⁶⁰ In effect these regulatory genes, which account for less than 10 percent of all genes,¹⁶¹ act as switches in the network playing an important role in determining the pattern of the network at any given time.¹⁶²

In biology, there is a short DNA sequence called homeobox that appears in eight different genes and the “eight genes that contain homeobox are called *Hox* genes.”¹⁶³ All *Hox* “genes are genes for switching other genes on or off” within the nucleus of every cell.¹⁶⁴ The *Hox* genes’ regulation performance is cued to its immediate environment.¹⁶⁵ In some ways then, the individual cells comprising the biological body are like the members of the LLC, which are its *physical* component. That is, each member (cell) carries the LLC genome packet (the law and the operating agreement) for reference.¹⁶⁶

159. See text accompanying *supra* note 153. The *time and developmental* component of “evolution” has made a comeback in the past decade or so:

At the annual meeting of the Society for Integrative and Comparative Biology in January of the year 2000, a new Division was formed: the Division of Evolutionary Developmental Biology. This new organization would serve as a home for a lively field by the same name: evolutionary developmental biology, popularly known as evo-devo. In the minds of many of its practitioners (especially the more junior ones), evo-devo was new . . . Nevertheless . . . [t]he conceptual connection between the development of the individual (ontogeny) and the evolution of a lineage (phylogeny) predates the 1859 publication of Darwin’s *Origin of Species*.

RON AMUNDSON, THE CHANGING ROLE OF THE EMBRYO IN EVOLUTIONARY THOUGHT: ROOTS OF EVO-DEVO 1 (2005).

160. See Sean B. Carroll, Benjamin Prud’homme & Nicolas Gompel, *Evo-Devo: Regulating Evolution*, SCI. AM., May 2008, at 61-62; see also *supra* text accompanying notes 150-152.

161. Carroll et al., *supra* note 160, at 61.

162. *Id.* at 62.

163. SHUBIN, *supra* note 18, at 108.

164. RIDLEY, *supra* note 82, at 177; see also *infra* text accompanying note 167.

165. RIDLEY, *supra* note 82, at 177.

166. As related to embryonic development, Matt Ridley says that each cell has a “hand-held GPS” to “taste the soup within itself” and determine its location relative to the developing body. *Id.* at 175. With this information, it consults its homeotic gene guidebook to take appropriate action through regulatory switching:

There are no computers [GPSs] and no guidebooks, just a series of automatic steps in which gene switches on gene. But a guidebook is a handy analogy, nonetheless, because the great beauty of embryo development, the bit that human beings find so hard to grasp, is that it is a totally decentralised process. Since every cell in the body carries a complete copy of the genome, no cell need wait for instructions from authority; every cell can act on its own information and the signals it receives from its neighbours.

Id.

This completes the metaphor. To reiterate, LLC members are the physical *cells* that build the LLC and the *law*

LLC statutes have interpretive provisions that perform a function analogous to that performed by Hox genes. In RULLCA (2006), for example, section 110 is captioned “Operating Agreement; Scope, Function and Limitations.”¹⁶⁷ Its baseline feature is that it provides that the operating agreement governs what might be termed the internal affairs of the LLC.¹⁶⁸ Section 110 then establishes the default nature of the Act’s provisions followed by a list of specific statutory provisions where modification by the operating agreement is limited.¹⁶⁹ It also contains subsections in a series that provide express authority for the operating agreement’s ability to govern specified topics.¹⁷⁰ The last subsection in the list probably best illustrates the regulatory nature of the section as it provides the manner that a court is to interpret (and make manifest) the phrase “manifestly unreasonable” as that phrase is used in a prior subsection.¹⁷¹

While section 110 may be a central regulatory gene, it is not the only regulatory gene in the LLC code. Other regulatory genes (sections or provisions) include section 111 (captioned, “Operating Agreement; Effect on Limited Liability Company and Persons Becoming Members’ Preformation Agreement”)¹⁷² and section 112 (captioned, “Operating Agreement; Effect on Third Parties and Relationship to Records Effective on Behalf of Limited Liability Company”).¹⁷³ Of course, the purpose of the LLC¹⁷⁴ and its “powers” section¹⁷⁵ are also regulatory and, together with the operating agreement and the other regulatory provisions, work together to manifest very different LLC phenotypes exhibiting distinct behavioral traits under different “environmental” conditions.

Illustratively, under the default, the phenotype’s immune behavior will be very different if a member acts in a disloyal way in a manager-managed LLC than in a member-managed LLC.¹⁷⁶ Even so, immune behavior by the member-managed and manager-managed LLC would be very similar under

(the operating agreement and codified LLC law) is the genetic code that each member references to govern its own behavior.

167. RULLCA § 110 (2006).

168. *Id.* § 110(a).

169. *Id.* § 110(c), (d).

170. *Id.* § 110(e), (f), (g).

171. RULLCA § 110(h).

172. *Id.* § 111.

173. RULLCA § 112 (2006).

174. *Id.* § 104.

175. *Id.* § 105.

176. Using RULLCA (2006), for example, a member in a member-managed company owes the company and the other members fiduciary duties of loyalty and care (as further detailed in the relevant section). RULLCA § 409(a). If the LLC is manager-managed, however, members do not have those particular duties (again as further detailed therein) but managers do have them. *Id.* § 409(g). The *contractual* obligation of good faith and fair dealing applies to both members in member-managed LLCs and to *both* members and managers in a manager-managed LLC. *Id.* § 409(d). Interestingly, but explicably, RULLCA determines whether an LLC is member- or manager-managed by looking to the operating agreement rather than to a required public filing. *See Id.* § 407(a).

similar circumstances if the operating agreement expressly adopted a higher duty of loyalty for members in the manager-managed LLC.¹⁷⁷

Although the embryonic ontology (development) of an LLC has statutorily defined stages,¹⁷⁸ once organized, the LLC may continue developing through the operating agreement. Indeed the plasticity afforded the operating agreement, at least absent self-limitation, is quite remarkable because it has few formal requirements. Under RULLCA:

“Operating agreement” means the agreement, whether or not referred to as an operating agreement and whether oral, in a record, implied, or in any combination thereof, of all the members of a limited liability company, including a sole member The term includes the agreement as amended or restated.¹⁷⁹

Over time, therefore, the LLC *could* change its shape by changing its genetic code or by modifying how its regulatory genes operate. It has the capacity to be sequentially polymorphic.¹⁸⁰

The LLC has the further genetic capacity to possess *internal* symbiots that are not part of its “body.”¹⁸¹ Such symbiots, under RULLCA, *might* include a person that is not otherwise a party to the operating agreement who has the power to approve (or disapprove) an amendment to the operating agreement.¹⁸² The Delaware Limited Liability Company Act extends its symbiotic reach even further by providing that the limited liability company agreement (operating agreement), “may provide rights to any person, including a person who is not a party to the limited liability company agreement, to the extent set forth therein.”¹⁸³ Non-manager employees seem like *internal* symbiots, while creditors and supply contractors rather seem to be outside the body (external symbiots).¹⁸⁴

Obviously, any change (mutation) in regulatory genes can have a remarkable effect on the phenotype without necessarily changing much else in the

177. The operating agreement can vary the fiduciary duties but cannot *reduce* or eliminate some of them if to do so is “manifestly unreasonable” standard. RULLCA § 110(d). It may also “prescribe the standards by which to measure the performance of the contractual obligation of good faith and fair dealing” RULLCA § 110(d)(5). Therefore, because of the flexibility and authority of the operating agreement, an LLC may increase the fiduciary duties and the standards by which they are measured for members in a manager-managed company to a level equal to (or depending on the terms of the operating agreement even exceeding) the fiduciary duties of managers in the same company.

178. See RULLCA Art. 2 (captioned “Formation; Certificate of Organization and Other Filings”).

179. RULLCA § 102(13) (2006).

180. See *supra* note 85 and accompanying text.

181. See *supra* note 126 and accompanying text.

182. RULLCA § 112(a).

183. DEL. CODE ANN. tit. 6, § 18-101(7) (2008).

184. *Id.*

genotype as suggested by the similarity of the human and mouse genotypes. Dawkins illustrates the possible effect of merely changing regulation of existing genes in the context of biological evolution as follows:

The giraffe's neck has the same complicated arrangement of parts as the okapi (and presumably as the giraffe's own short-necked ancestor). There is the same sequence of seven vertebrae, each with its associated blood vessels, nerves, ligaments and blocks of muscle. The difference is that each vertebra is a lot longer, and all its associated parts are stretched or spaced out in proportion.

The point is that you may only have to change one thing in the developing embryo in order to quadruple the length of the neck. Say you just have to change the rate at which the vertebral primordial grow, and everything else follows.¹⁸⁵

This helps visually illustrate how the LLC genotype can exhibit very different LLC phenotypes.

There is one last topic to revisit at the genotype level, and it brings us back full circle to the *selfish gene*: Cheater genes at a different level.¹⁸⁶ Matt Ridley observes, "The genome is littered, one might almost say clogged, with the equivalent of computer viruses, selfish, parasitic stretches of letters which exist for the pure and simple reason that they are good at getting themselves duplicated."¹⁸⁷

These parasitic genes have at least two deleterious effects. *First*, they are somewhat like digital chain letters clogging the mail.¹⁸⁸ At the very least, these parasites make gene replication inefficient. According to Ridley, "Approximately thirty-five percent of human DNA consists of various forms of selfish DNA, which means that replicating our genes takes thirty-five percent more energy than it [would] need [without the cheaters]."¹⁸⁹ *Second*, they *can* have a phenotypic effect: "Like more conventional parasites, genetic parasites can harm their host. As they insert themselves at random places in the genome, they can cause diseases."¹⁹⁰ The defense against these parasites are well-organized arrays of genes that "worked together well and could shut out cheating genes," in part, because they can "faithfully replicate themselves."¹⁹¹

The existence of genetic parasites is not surprising given Dawkins's notion

185. DAWKINS, *supra* note 24, at 103.

186. See *supra* text accompanying notes 13-15.

187. RIDLEY, *supra* note 82, at 127.

188. *Id.*

189. *Id.*

190. CARL ZIMMER, PARASITE REX: INSIDE THE BIZARRE WORLD OF NATURE'S MOST DANGEROUS CREATURES 127 (2000).

191. *Id.* at 128.

of genes as *selfish replicators* and bodies as their *vehicles*.¹⁹² These genes have simply found for themselves an efficient form of replication without having to build their own bodies: “Nor should it be a surprise to find that genomes, like bodies, are habitats replete with their own version of ecological competition and co-operation.”¹⁹³

Extending the idea of parasitic genes to the LLC “code” suggests that the analogue of a parasitic gene would be a *rogue* provision (statutory section) that is added not for purposes of increasing the fitness of the LLC phenotype but simply for the sake of its own replication. Such provisions catch a ride, so to speak, on the LLC vehicle because it is cheaper than building a new vehicle. Unfortunately, it may be difficult to distinguish *standard* evolution by mutation from a genetic parasite. Conceivably, almost any novel provision added to the LLC “code” is a candidate for pejorative classification as a parasite (cheater).

At some point, LLC cheater genes could cause phenotypic effects that are maladaptive and that begin genetic feedback loops similar to the peacock’s tail in biological evolution.¹⁹⁴ Some mutations of cheater genes could be immediately lethal.

One relatively recent novel statutory addition to the LLC law of a handful of states is the series concept.¹⁹⁵ Another is modification of the charging-order provisions to prohibit foreclosure on transferable interests.¹⁹⁶ Both of these changes, at least in the short term, may improve the replication of the entire LLC genotype in which they are embedded. A given jurisdiction, for example, *could* well “believe” that its LLC genome will be copied (replicated) in more LLC phenotypes with those provisions than without them; that is, more LLCs will organize and domicile in that jurisdiction.¹⁹⁷ It remains to be seen, however, whether these genes correlate to *phenotypic* success for individual LLCs. That is, for example, whether these provisions are similar to the genes manifesting sickle cell anemia, which is “good” for the survival of the gene, but which exacts a high cost on a significant number of individuals possessing it.¹⁹⁸

Given the network nature of how genotypes “work,” adding new genes, whether termed beneficial or maladaptive, complicates the *design problem* and

192. RIDLEY, *supra* note 82, at 128.

193. *Id.*

194. *See supra* note 57 and accompanying text.

195. *See* Ann E. Conaway, *A Business Review of the Delaware Series: Good Business for the Informed*, 1677 PLI/CORP. 645 (2008).

196. *See, e.g.*, VA. STAT. ANN. § 13.1-1041.1 (2008).

197. This is simply regulatory competition. *See e.g.*, Mark J. Loewenstein, *Delaware as Demon: Twenty-Five Years After Professor Cary’s Polemic*, 71 U. COLO. L. REV. 497 (2000); Omari Scott Simmons, *Branding the Small Wonder: Delaware’s Dominance and the Market for Corporate Law*, 42 U. RICH. L. REV. 1129 (2008); Mathias M. Siems, *Regulatory Competition in Partnership Law* (Dec. 20, 2008) (unpublished working paper, on file with the Social Science Research Network), available at <http://ssrn.com/abstract=1223735> (last visited Apr. 20, 2009).

198. *See supra* text accompanying notes 82-84.

adds complexity to the tasks necessarily performed by the regulatory genes. A gene adding a new *trait* option increases the number of available genotypic network patterns geometrically, not arithmetically. Assuming these genes have phenotypic effect means they create multiple new ways to form suboptimal phenotypes.

Research considering contractual complexity uses the term *cognitive load*¹⁹⁹ to express a design problem similar to the one of increasing the number of “genetic choices” in the LLC genotype. Cognitive load “refers to the extent to which parties . . . are able to understand [the] contract.”²⁰⁰ The import of the term is that

in the context of the bounded rationality that contract parties face and given the cognitive load of contracts and its implications for the information processing ability of contract parties, there may very well be an upper limit to the actual level of complexity . . . that contract parties are able to absorb.²⁰¹

Cumulatively, new social-science research is generally consistent with cognitive-load research in contract; that is, sometimes less choice is more:

[S]ocial science researchers are discovering that “the fact that *some* choice is good doesn’t necessarily mean that *more* is better.” Such findings are antithetical to classic economic theory because this theory does not admit to limitations in human cognition . . . Behavioral economics and decision-making psychology, meanwhile, draw attention to precisely these tradeoffs.²⁰²

The danger of cognitive load to the regulatory genes seems particularly acute when some *genes* must be default rules in order to express a trait fit for a narrow niche even though those traits might be suboptimal for other ecosystem niches.²⁰³ By way of further explanation, for a phenotype to be optimally fit in niches where the default rule is suboptimal requires the evolution of even more sophisticated regulatory genes to “opt-out” of the default rule (dominant gene in Mendellian genetics). Nonetheless, from the *selfish genotype* perspective

199. John Hagedoorn & Geerte Hesen, *Contractual Complexity and the Cognitive Load of R&D Alliance Contracts* 1 (Am. Law & Econ. Assoc. Annual Meetings Working Paper No. 20, 2008), available at <http://ssrn.com/abstract=1119802> (last visited Apr. 20, 2009).

200. *Id.* at 9.

201. *Id.* at 29.

202. Natalie Ram, *Tiered Consent and the Tyranny of Choice*, 48 JURIMETRICS J. 253, 269 (2008) (quoting BARRY SCHWARTZ, *THE PARADOX OF CHOICE: WHY MORE IS LESS* 19 (2004)) (further citation omitted). See generally, Schwarcz, *supra* note 41.

203. A possible statutory example is the absence of redemption or buy-back provisions in order to maximize estate-tax planning opportunity (though there are business reasons for this choice in many circumstances). See *supra* notes 74-80 and accompanying text.

additional alternatives may increase the number of its replications in the short term even though suboptimal for many individual phenotypic manifestations. At the very least, more genes also would imply the necessity of the evolution of better regulatory gene arrays to help coordinate the gene arrays that may be simultaneously expressed at any given time.

Similar concerns based on a limited empirical sampling of LLCs formed in one state has led one commenter to publicly suggest rewriting his state's LLC Act to tune its genotype to "primarily . . . provide an 'off-the-shelf' statutory LLC agreement for unrepresented members."²⁰⁴ If the revision were made, it might begin a process of *geographical* speciation of LLCs.²⁰⁵

Instead of geographical speciation, the cost in *efficiency* caused by cognitive load could also lead to environmental pressure for *vertical* speciation. Under vertical speciation, a single LLC genotype would branch into several separate specialized species of LLCs, each branch more efficiently tuned to a narrower range of uses (ecosystem niches).²⁰⁶

Perhaps the first step toward *LLC speciation* has been accomplished through the generation of practice forms for specific LLC phenotypes. Eventually, it is conceivable that those "forms" could be recognized statutorily and imbued by the legislative process with special features adopted to that use for a *conserved pattern* of default traits. Speciation could also occur through mimicry of other organizations that for other legal purposes or policy reasons, might require the genetic engineering (or, less intrusively, artificial selection) of a specific LLC default pattern. An example of the latter might be the newest uniform "unincorporated act": The Uniform Limited Cooperative Association Act.²⁰⁷

204. John Cunningham, *The New Hampshire LLC Act: Bad News for LLC Members Who Lack Good Lawyers*, JOHN CUNNINGHAM'S LLC NEWSL. FOR TAX & LEGAL PROF. (Law Offices of John M. Cunningham, Concord, N.H.), Feb. 12, 2008, available at <http://www.llcformations.com> (last visited Apr. 20, 2009). He bases his suggestion on two purported facts: (1) "That most New Hampshire LLCs have only one or two members and very limited initial capital"; and (2) "That at least one-third of all New Hampshire LLCs have been formed without the assistance of lawyers." *Id.* (citation omitted). Cunningham's observations come close to a *biomass* ecological perspective. By way of illustration, E.O. Wilson implies we sometimes focus on the unusual, which blinds us to the more universal:

"No one looks twice at a sparrow or squirrel, or even once at a dandelion, but a peregrine falcon or mountain lion is a lifetime experience. And not just because of their size (think of a cow) or ferocity (think of a house cat), but because they are rare."

WILSON, *supra* note 2, at 36. They are rare because the available energy from the sun nourishes a pyramid of plants and animals and "[e]ach level above the plants diminishes [as a percentage of total biomass] until you come to the top carnivores, which are so scarce that the very sight of one in the wild is memorable." *Id.* Yet the carnivores are dependant, ultimately, on plants for the energy they consume because they eat the herbivores: "[T]hey are [paradoxically] the first to suffer when the ecosystem starts to erode." *Id.*

205. See *supra* text accompanying notes 98-99.

206. See *supra* text accompanying notes 98-99 (discussing speciation). For example, in the Galapagos a single species of finch branched into thirteen contemporary species. WILSON, *supra* note 2, at 101.

207. The Uniform Limited Cooperative Association Act (2007) (ULCAA) was derived from unincorporated cooperative laws in Wyoming, Minnesota, and Tennessee. See James B. Dean & Thomas Earl

Projected *speciation* of the LLC is, of course, wildly speculative and any projection presents only one of many possible futures for the LLC. The take-home lesson is that biological evolution suggests that LLC evolution cannot extend forever by the simple addition of more and more genetic choices because (1) the possibility of the emergence of maladaptive or lethal cheater genes and (2) because the resultant cognitive load will swamp the current regulatory genes and lead to material inefficiencies for the LLC entity.²⁰⁸

Speculation about speciation accomplishes another salutary thing for this essay, and that is to extend the metaphor of biological evolution to a logical end. The essay started with taxonomy and the evolution of phenotypes. It extended phenotypic analysis to artifacts designed by phenotypes in defense of the use of the evolutionary metaphor and presented a brief overview of biological evolution. It then compared an organism's selfish genotype to statutory LLC law therein emphasizing the role of homeotic (regulatory) genes. Finally, it projected one of many possible futures for the further evolution of the limited liability company. We can now use the observations of the LLC generated by the use of biological evolution as a metaphor in an effort to identify a single *theory* of the LLC.

IV. A SINGLE THEORY OF LLCs

This essay has used biological evolution as a metaphor to help understand the LLC and has now introduced enough background to extend the metaphor in an attempt to identify the "single" theory of the LLC. Translated into evolutionary terms the task can be restated as identifying the LLC's evolutionary strategy.

A central principle of biological evolution is that evolution takes place because of selection advantage at the level of the individual phenotype. It is the fitness of the individual phenotype in its ecosystem that determines both its success and, ultimately, the success of the species.

Geu, *The Uniform Limited Cooperative Association Act: An Introduction*, 13 *DRAKE J. AGRIC. L.* 63, 73-74 (2008). According to ULCAA's *Prefatory Note*:

This Act (ULCAA) combines an unincorporated and flexible organizational structure with cooperative principles and values in order to obtain increased equity investment opportunity for capital intensive and start-up cooperative enterprises. It encourages equity investment by allowing, but not requiring, a limited cooperative association to have voting investor members in addition to patron members.

Another defining feature of this Act is that it is based in large part on unincorporated law and entities formed under it are intended to be unincorporated entities for state law purposes in the style of limited liability companies and limited partnerships.

Prefatory Note to UNIF. LTD. COOP. ASSOC. ACT. (2007) [hereinafter ULCAA].

208. See *supra* note 67 (*please*, it is important here, too!).

Surveying the LLC as a species requires a rough awareness of the ecosystems that the LLC phenotype inhabits and the role it plays within those ecosystems. A comparison of phenotypes across ecosystems is necessary, and might be sufficient, to tease out the evolutionary strategy of LLCs.

LLCs inhabit a breathtaking spectrum of ecosystems. Even the most passing awareness of how LLCs are used identifies the following overlapping ecosystems: investment funds, real estate development, “family” business planning, low profit social organizations,²⁰⁹ not-for-profit ventures, asset protection, estate and wealth transfer planning, operating businesses across a variety of sizes measured by number of members or amount of investment, professional service firms, multiple entity management structures, research and intellectual property joint ventures, and natural resource ventures, among others.

LLC phenotypes compete in these niches with business corporations, limited partnerships, business trusts, trusts, cooperatives, general partnerships, limited liability partnerships, nonprofit corporations, and unincorporated nonprofit associations, among others. Moreover, the sophistication of the members range from unsophisticated to highly sophisticated.²¹⁰

The variety of ecosystems inhabited by the LLC and the range of its role within those ecosystems indicate that flexibility is a hallmark phenotypic trait of the LLC. The previous discussion of the LLC genotype explains that this flexibility is achieved at the genetic level through flexible “optional” provisions coupled with a suite of regulatory genes (Hox).²¹¹ It is this array of regulatory genes that control if and when the other statutory provisions (the nonregulatory genes) will be expressed.²¹²

The regulatory genes guard against maladaptations caused by cheater genes and coordinate the activity of the cells into a *group* (an aggregate), which may emerge at a higher level as an organism, an *entity*.²¹³ Slime mold is an illustration of an organization of cells from the biological world that sometimes behaves as an aggregate and sometimes as an entity.²¹⁴ In addition, there are examples of biological phenotypes that exhibit plasticity similar to the flexibility of the LLC phenotype. This plasticity expressed itself either as *serial* or *alternative* polymorphism.²¹⁵

Biological evolution informs this analysis that any single theory of the

209. See Robert R. Keatinge, *LLCs and NonProfit Organizations—For Profits, Nonprofits, and Hybrids*, 42 SUFFOLK U. L. REV. 553 (2009).

210. Cf. Karen Walker, *NEW YORK LIMITED LIABILITY COMPANIES AND PARTNERSHIPS: A GUIDE TO LAW AND PRACTICE*, 1 N.Y. PRAC. § 1.19 (2008).

211. See *supra* text accompanying notes 163-171.

212. See *id.*

213. See *supra* notes 122-132 and accompanying text.

214. See *supra* text accompanying notes 133-139.

215. See *supra* notes 167-184 and accompanying text.

polymorphic LLC must focus on the genetic level and center on the suite of regulatory genes. Thus, it suggests the single theory of LLCs must involve interpretive protocol; it must include the way in which the regulatory genes deploy the rest of the genotypic catalogue to manifest a phenotype fit for its ecosystem. Any theory of the LLC must account for how the environment interacts with the LLC phenotype as it develops and matures because the environment heavily influences the expression of genes through the regulatory suite. Nonetheless, there are limits to flexibility in biology and, ultimately, the phenotype. In biology, lethal mutations cause abortion or stillbirth without reproductive capacity.

The basic genotype of any LLC is the operating agreement as constrained by the particular LLC statute under which it is organized.²¹⁶ Of course, much genotypic variation occurs from the portion of the LLC genome supplied by the operating agreement. The statute under which the LLC is organized also supplies a great deal of variety. For example, some statutes specifically state that “maximum effect [be given] to the principle of freedom of contract”²¹⁷ and, further, fiduciary duties vary.²¹⁸ Additionally, some state statutes underscore that the operating agreement has statutory authority to provide for certain features like *series* and the governance of specified nonmembers.²¹⁹ As previously suggested, while not necessarily determinative of the particular phenotype, the existence of several genotypic features and the tension created by their interrelationship provide clues about the phenotype and the range of its expected behavior.²²⁰

216. See *supra* note 86 and accompanying text.

217. DEL. CODE ANN. tit. 6, § 18-1101(b) (2008).

218. The fiduciary duties of loyalty and care evolved in successive generations of the Uniform LLC acts. By way of illustration ULLCA (1996) states, “(a) *The only fiduciary duties* a member owes to a member-managed company and its other members are the duty of loyalty and the duty of care imposed by subsections (b) and (c).” ULLCA § 409(a) (1996) (emphasis added). The Revised Act, on the other hand, states, “(a) A member of a member-managed limited liability *company owes to the company* and, subject to Section 901(b), the other members *the fiduciary duties of loyalty* and care stated in subsections (b) and (c).” RULLCA § 409(a) (2006) (emphasis added). Beyond “mere” semantics, ULLCA states, “(b) A member’s duty of loyalty to a member-managed company and its other members *is limited to the following . . .*” ULLCA § 409(b) (emphasis added). Importantly, the following change was made in RULLCA: “(b) The duty of loyalty of a member in a member-managed limited liability company *includes the duties . . .*” RULLCA § 409(b) (emphasis added).

219. See *supra* notes 194-198 and accompanying text. There is also the engineering design lesson derived from successful bridge designs. It is possible to become “intoxicated” with the success of a particular design and push it to the point of failure. See *supra* text accompanying note 56. It is also possible to artificially select traits on mistaken beliefs and end up with the correlative law cages of psychopathic chicks. See *supra* note 34 and accompanying text.

220. Sometimes, however, the tensions created are difficult to resolve and may be maladaptive because, like the peacock’s tail, the tension is created from pursuing two inconsistent goals. The following statement interpreting an LLC organized in Wisconsin illustrates one such tension:

The paramount importance of flexibility and freedom of contract is evident throughout the WLLCL. All statutory provisions dealing with governance, membership, finance, dissolution and even fiduciary duties may be varied by the operating agreement. The drafters intended the operating

The regulatory protocol for the interpretation that the metaphor of biological evolution suggests is consistent with part of an interpretive protocol outlined in an article about fiduciary duties in unincorporated limited liability entities. In it, Chief Justice Steele of the Delaware Supreme Court stated,

The court's approach should be, first, to examine the agreement to determine if the act complained of is legally authorized by statute or by the terms of the agreement itself. If so, a court should then proceed to inquire whether the implementation of the lawful act requires equity [fiduciary duties are almost exclusively matters of equity *in Delaware*; in other states this would require recourse to the fiduciary duties contemplated by the statute] to intervene and craft a remedy? At this point, the court should look to the agreement to determine the extent to which it establishes the duties and liabilities of the parties, i.e., their bargained for, negotiated, contractual relationship. Is the agreement silent about traditional fiduciary duties, but creates a fiduciary relationship consistent with those duties thus allowing the court to imply them by default? . . . Finally without regard to traditional overlays of scrutiny under the . . . law of corporate governance, has a party breached its implied covenant of good faith and fair dealing?²²¹

Variance in the underlying law of the jurisdiction of LLC organization, of course, will vary the substance of the inquiry suggested by Chief Justice Steele. The protocol, however, will be similar in kind but dependent in degree, on the particular state statute's emphasis of the contractual underpinnings of the LLC. There are two reasons why reliance on contract principles does not end the inquiry even in states that have expressly emphasized the contractual nature of

agreement to give members the opportunity to establish the real law applicable to the LLC, *even with the attendant risk to the unsophisticated investor.*

Notwithstanding this approach, it was also intended that the LLC form be suitable for the "mom and pop" grocery store. The drafters hoped that the LLC would provide an inexpensive and simple vehicle that did not require legal guidance at every step. Indeed, it was visualized that an operating agreement would not even be required for many LLCs or that the agreement would merely focus on the specifics of the business deal, permitting the statute to fill in the gaps. *Thus, the default provisions were drafted with a common-sense business approach.*

Kasten v. Doral Dental USA, LLC, 733 N.W.2d 300, 309 (Wis. 2007) (footnote omitted, emphasis added). In the footnote accompanying the quoted material the court observed:

We note that the drafters intended 'that the LLC would provide an inexpensive and simple vehicle that did not require legal guidance at every step.' Some LLCs may decide that the inspection rules of the WLLCL do not meet their needs and therefore adopt their own rules.

Id. at 309 n.9 (emphasis added).

221. Myron T. Steele, *Judicial Scrutiny of Fiduciary Duties in Delaware Limited Partnerships and Limited Liability Companies*, 32 DEL. J. CORP. L. 1, 25 (2007).

the LLC. *First*, contract has a rich doctrinal texture of its own.²²² *Second*, states have adopted quite different approaches to contract interpretation.²²³ Both reasons are embedded in Chief Justice Steele's conclusion concerning the contractually based Delaware law and fiduciary duties:

I conclude that parties to contractual entities such as . . . limited liability companies should be free—*given a full, clear disclosure paradigm*—to adopt or reject any fiduciary duty obligation by contract. Courts should recognize the parties' freedom of choice . . . and should not superimpose . . . judicial scrutiny associated with [fiduciary duties], where the parties have not contracted for those governance mechanisms in the documents forming their business entity.²²⁴

The quote seems to leave interpretive room, for example, for an analysis of the sophistication of the parties and the respective bargaining power of each.²²⁵

Relatedly, the open definition of the operating agreement suggests that determining the actual behavior or the behavior expected under the operating agreement, *and as modified thereafter*, is relevant to phenotype identification.²²⁶ It is possible that, like the slime mold, any particular LLC can be designed to act as an aggregate under certain conditions and times and for specified purposes, and like an entity under other conditions and times for other purposes.²²⁷

It is possible, of course, that the operation of the regulatory genes in a given genotype will manifest a phenotype near a polar end of a composite continuum running between aggregate and entity. Illustratively, an LLC may be crafted to "look" *just like a corporation* and consistently adopt an *entity* theory for that individual LLC phenotype. A lesson from biological evolution, however, is

222. See *supra* note 113.

223. An abstract from a recent article states in part:

This paper compares New York's contract law with that of its most natural competitor, California. It turns out that New York strictly enforces bargains and displays little tolerance for efforts to rewrite deals *ex post*. California, in contrast, is more willing to reform contracts for reasons of fairness, equity, morality or public policy. The revealed preferences of *sophisticated parties* support arguments by Schwartz, Scott and others that *formalistic* rules offer superior value for the interpretation and enforcement of *commercial* contracts.

Geoffrey P. Miller, *Bargaining on the Red-eye: New Light on Contract Theory* (N.Y. Univ. Law and Econ. Research Paper No. 08-21, 2008), available at http://papers.ssrn.com/sol3/papers.cfm?abstract_id=1129805 (last visited Apr. 20, 2009) (emphasis added).

224. Steele, *supra* note 221, at 4.

225. See *id.*; see also *supra* notes 204-205 and accompanying text.

226. See *supra* notes 167-171 and accompanying text.

227. See *supra* text accompanying notes 133-139. The biological tools necessary to build a body in biology are instructive here as well. See *supra* text accompanying note 132.

applicable here. *An LLC is not a corporation* even though an individual phenotype is designed to “look” *just like a corporation*. Simply, a *Tazmanian* wolf is not a *real* wolf even though they share common features and fill the same niche in their respective ecosystems.²²⁸ The zookeeper and veterinarian need to know the distinction between the two “wolves” in order to provide appropriate care. Moreover, just because a snail and an eagle both have eyes and can “see” does not mean that their eyes are physiologically similar.²²⁹

Conversely, the phenotype will affect (but not necessarily control) the way the individual genes are deployed and manifested including the genes supplied by the LLC statute. The mouse and human, after all, share 80 percent of their genome.²³⁰ This does not mean that analogies between the mouse and human genomes should not be used. Rather, such analogies must be used appropriately.²³¹ A Wisconsin Supreme Court opinion concerning LLC member inspection rights, for example, follows the general *regulatory gene protocol* suggested by biological evolution and is consistent with Chief Justice Steele’s observations. The case clearly and carefully distinguishes the inspection rights in the LLC statute from those in Wisconsin’s corporation law, on one hand, and from its limited partnership law on the other.²³²

In short, a number of metrics exist concerning phenotype identification under LLC law, and like the recipe function performed by genotypes in biological evolution, recourse to both the ingredients and process are necessary in order to understand the phenotypic soufflé.²³³ The *cost* of phenotype plasticity, of flexibility, is a high cognitive load that requires a rather sophisticated and developed array of regulatory genes for phenotypic success.

228. See *supra* text accompanying notes 101-105.

229. See *supra* notes 106-109 and accompanying text.

230. See *supra* text accompanying notes 150-151. Moreover, there is always the issue of whether a phenotypic trait was “selected” or merely incidental—a spandrel. See *supra* notes 88-90 and accompanying text.

231. As Chief Justice Steele observed:

For purposes of this article, it must be accepted that fiduciary duties will be developed in each new business context by drawing analogies from duties recognized in already existing contexts But given their [limited partnerships and LLCs] rapid growth and continued variety, there is also a danger in continuing to analogize principles of fiduciary duty as used in the corporate governance context to the internal governance of limited partnerships and limited liability companies. Wrong analogies can be drawn for many possible reasons: a lack of appropriate focus, a desire to effect a particular purpose or result, or a desire to delegate or distribute power so that the fiduciary can act more effectively while preventing the fiduciary from effecting its own conflicting needs.

Steele, *supra* note 221, at 8-9 (footnote omitted).

232. *Kasten v. Doral Dental USA, L.L.C.*, 733 N.W.2d 300, 313, 317 (Wis. 2007).

233. See *supra* text accompanying note 158.

V. CONCLUSION

This essay has identified selected points of comparison between biological evolution and LLC law for purposes of informing the question of the theory of the LLC. One broader inference from these comparisons is that designing law is not so different than the natural design process of biological evolution and that law, like the spider's web, can be seen as just another artifact that is an extension of the human phenotype.

The focus of this essay has been on the law of LLCs. The law of LLCs, while an evolved artifact, acts as the genotype for *real* companies formed by and for the benefit of their members. From this perspective, members of an LLC are like individual cells, each carrying a copy of the law governing the LLC to which they refer as they interact with other cells within the LLC organism and with the external economic environment.

The evolutionary analysis suggests that the single theory of the LLC relates to its inherent plasticity and fundamentally is a theory of how its genetic code's regulatory (Hox) genes operate. The single theory of the LLC looks to its variable recipe and the unique soufflé that is prepared each time the recipe is used rather than to the list of its ingredients exclusively.

This *single theory* suggests that LLCs carry a high level of complexity (cognitive load) that geometrically increases as existing provisions mutate or new provisions are added. Moreover, the evolutionary metaphor cautions the existence and possible introduction of genetic parasites (cheater genes) into the LLC for purposes other than the success of the LLC as an operating phenotype.

Finally, evolutionary biology suggests that at some point in time accumulated complexity may become maladaptively inefficient for some uses for which the LLC is now used. In turn, it suggests these inefficiencies may create pressure for *speciation* (for example, bifurcation into different statutory *types* of LLCs) or, perhaps, will create room for competition from unrelated species for selected niches in the ecosystem where LLCs now dominate.

Using the metaphor of evolution is but one analytical tool to help gain an understanding of the theory of the LLC. Standing alone, the metaphor to biological evolution *means* nothing, but it may help *explain* quite a lot.²³⁴

234. This is a close paraphrase of an observation made by my teenage son, Taylor Dodd Geu, in an unrelated context. Perhaps in the not so distant future evolution, complex adaptive systems, and law will be more than metaphorically linked. Cf. MARTIN A. NOWAK, *EVOLUTIONARY DYNAMICS: EXPLORING THE EQUATIONS OF LIFE* (2006); Paul H. Robinson, Robert Kurzban & Owen D. Jones, *The Origins of Shared Institutions of Justice*, 60 *VAND. L. REV.* 1633 (2007).