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Authors(s): Victoria N. Alexander and Stanley Salthe
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Monstrous Fate: The Problem of Authorship and Evolution by Natural Selection

Victoria N. Alexander
Dactyl Foundation for the Arts & Humanities

Stanley Salthe
Professor Emeritus, Brooklyn College of the City University of New York
Visiting Scientist in Biological Sciences, Binghamton University

Abstract: A widely remarked fact about *On the Origin of Species* is that it is not about "origins" per se—singular points at which something new begins—but about gradual changes in the proportions of already existing forms. Artists and others have long resisted Darwin's revolution on the grounds that natural selection does not explain evolution, a theory of which must include a theory of actual creativity. In early 20th-century biology, there were still many vocal and powerful dissenters: William Bateson and C. H. Waddington (also a painter and a poet), Richard Goldschmidt, and D'Arcy Thompson, who were heir to 19th-century teleomechanists and morphologists such as von Baer, Mivart, Owen, Muller, and Geoffroy. Repressed in the 1950s during the hardening of the Modern Synthesis, ideas about evolutionary creativity and progress have bubbled up again. Saltationists have increased in number, and Robert G. B. Reid, in his recent *Biological Emergences: Evolution by Natural Experiment* (2007), describes a neoDarwinian house that is now deeply altered from within. Many of those calling themselves selectionists have actually strayed far from the fold insofar as their research shows that saltatory changes occur and the resulting organisms are immediately viable, making natural selection as a force of change superfluous. Now is precisely not the time for students of literature to start looking to Darwinists for guidance. Rather the reverse is true: neoDarwinists could do well to refocus attention on creativity and the processes whereby variations come to be. This paper examines non-Darwinian authorship in Vladimir Nabokov, Henry James and various other 20th century novelists.

A widely remarked fact about *On the Origin of Species* is that it is not about "origins" per se—singular points at which something new begins—but about gradual changes in the proportions of already existing forms. Interruptions, it is said, between continuously and slightly

modulated forms make some survivors appear strikingly innovative. But natural selection is a prosaic culler, not an imaginative creator. Variations, which are held to occur prior to fitness selection, simply occur, and Darwin was unable to definitely suggest how or why. Subsequently, Darwinians dismissively made it out that they occurred "randomly." Utterly unlike an artist's variations, Darwin's would occur without respect to needs, desires, or habits, and are more likely to have a disintegrating effect on the organism than not. New integration resulting from "random variation" would be but a rare side effect, not an intentionally creative act. In this way, *Origins* provided an alternative for theories of creation while more or less avoiding the subject.

Natural selection's shunning creation in general was bound eventually to vex literary creation in particular. Artistry has had a long philosophical engagement with the notion of a creator and the extent to which one can be thought of as an all-powerful maker of a world. After 1859, the author, as a special case of *self-conscious* primate, retained his privileged capacity as designer for a time, even after the Designer had been banished. But was the author another yet unrealized casualty in the coup d'état? Yes, he was, as, for example, Roland Barthes somewhat belatedly made clear. Using an aleatory model involving selection of physical *and* semiotic mutations, he argued that authorship is constructed by an environment much like Darwin's species, neither of which are the product of active agency.

However, a human author is not as easily unseated as a supernatural one. He keeps coming back. Martin Amis can still claim in the 1980s, long after the supposed death of the author, "I have a god-like relationship [with] the world I've created. It is exactly analogous. There is creation and resolution, and it's all up to [me]" ("Writers"). Such sentiments are characteristic of a number of 20th-century literary notables, such as Paul Auster, John Barth,

Milan Kundera, Thomas Pynchon and others, who, much to the consternation of some of their readers, have complex relationships with teleology and intentionality; they can be seen as out-of-step with the rest of the university-educated public, which is more or less secular and neoDarwinian. A novelist *and* scientist (specifically, a lepidopterist) who accepted evolution as fact, Vladimir Nabokov nevertheless observes,

Three forces make and mold a human being: heredity, environment, and the unknown agent X. Of these the second, environment, is by far the least important, while the last, agent X, is by far the most influential. In the case of characters living in books, it is of course the author who controls, directs, and applies the three forces. (*Lectures* 126)

The conceit of author as Supreme Being survives, because He was created in the artist's image, not the other way round, and so eliminating the former never really threatened the existence or authority of the latter. Darwin had not gotten rid of creativity *simpliciter* by theorizing around a large metaphor for it.

Artists and others have long resisted Darwin's revolution on the grounds that natural selection *does not explain evolution*, a theory of which must include a theory of creativity. In early 20th-century biology, there were still many vocal and powerful dissenters: William Bateson and C. H. Waddington (also a painter and a poet), Richard Goldschmidt, and D'Arcy Thompson, who were heir to 19th-century teleomechanists and morphologists such as Karl Ernst von Baer, George Jackson Mivart, Richard Owen, Johannes Müller, and Etienne Geoffroy St. Hilaire. Repressed in the 1950s during the hardening of the Modern Synthesis, ideas about evolutionary creativity and progress have bubbled up again. Saltationists have increased in number, and Robert G. B. Reid, in his recent *Biological Emergences: Evolution by Natural Experiment*,

describes a neoDarwinian house that is now deeply altered from within. Many of those calling themselves selectionists have actually strayed far from the fold insofar as their research shows that saltatory changes occur and the resulting organisms are immediately viable, *making natural selection as a force of gradual change superfluous*.¹ In all likelihood, the future of evolutionary theory will not be focused on Darwinian evolutionary theory, and natural selection will not overshadow the various other mechanisms (*e.g.* drift, neutrality, repetitive differentiation, orthogenesis, symbiosis) that we know to be at work. Now is precisely *not* the time for students of literature to start looking to Darwin for guidance. Rather the reverse is true: neoDarwinists could do well to refocus attention on creativity and the processes whereby variations come to be.

Natural Selection as a Stabilizer

The theory of evolution by natural selection was developed to be a strictly non-directional mechanism. Accordingly, much of the history of Darwinism in the 20th century involves a gradual divestment of all notions of progressive evolution. One hundred and fifty years after the publication of *Origins*, it is becoming clear that natural selection explains the dynamic stabilization of new forms by way of describing allele changes in populations, but it leaves unsaid how new things get created, progress, or, in fact, actually can manage materially to *evolve*. Natural selection is the mechanism that makes the fact that evolution *has already occurred* more prominent and more likely to continue to become more and more prominent, but it is also the mechanism by which *further* evolution is prevented from occurring by paring down a varied population and genetically fixing adaptations (Reid 69, 365), resulting in a loss of the

¹ As well, some of the "randomness" of the appearance of new possibilities is now looking more like agentive actions whose underlying principles are unknown.

variety needed for further evolution. Currently, the most widely supported models of speciation show that isolation and drift rather than fitness selection are most usually the effective agencies. Furthermore, in stable environments selection can often lead to extinction by reducing adaptability. Alternatively, some forms of natural selection are said to "preserve" as much variability as possible (*i.e.* when natural selection *fails* to select) and gene frequencies shift back and forth, getting nowhere in particular. Thus, the ruling neoDarwinian models provide no support for aspiring literary Darwinists who might imagine that literature is successful only insofar as it serves purposes or tendencies that are appropriate for the human species. It cannot any longer be said that either species or literary themes are gradually shaped by selection "pressures" that favor useful features or serve species-specific natures. And so, in their analyses of literature, Joseph Carroll and company have the equally unpromising options of taking the neoDarwinian high road to their doom (with fitness leading to extinction), or taking the neoDarwinian low and circuitous maze and getting nowhere (with fitness as variability).

This is not to say that Darwinism isn't at all applicable to literature. There is undoubtedly a variant of natural selection operating in the literary realm that is responsible for establishing genres (like species) and making them resistant to change. Eventually, they become so well defined and rigid, they cannot accommodate any new information, and they go out of style. Other works within a genre (competition) and critics (predators) encourage specialization and reduce adaptability/multi-functionalism. Selection codifies literature, establishes useful stereotypes and conventions, without which the "new" could never be defined given the chance, but it also curbs originality, and it prevents genres from evolving rather than promoting their evolution.

Unless one defines it merely as surprise, creativity simply cannot be explored with Darwinian tools. The notion of selection *pressure*, a force applied in a direction (or, more accurately, an offer that cannot be refused), contradicts mutation's fundamentally random nature (with respect to needs) in selectionist discourse. This metaphor has been used by neoDarwinists to smuggle the concept of creativity into a theory that is not about creativity at all (Reid 6, 36-37). Selection pressure cannot imply an active molding sort of agency during the change of a thing. Pressure, if we want to go with the metaphor, is applied to a population, enforcing a statistical average. It never changes the things themselves, rather only their differential appearance in a population. What then causes the change of the particular thing? For that is the real cause of evolution. How *do* new things get created?

Artists intuitively, instinctively understand the how new organization emerges. Artists get a *feel* for creation by making. This paper takes the position that creativity involves self-organization and emergence, processes that occur throughout nature, and we argue that an intuitive understanding of creativity, such as artists tend to have, is also useful in the natural sciences.

Darwin was a great observer, and, carrying a worn copy of Milton on his voyage, (and with Malthus and Adam Smith in mind) he inferred the principle of natural selection, which, though we demote its role in evolution because it has been overblown, was an important realization regarding the role of environmental matching in the existence of living things and in the codification of the biological canon. With all due respect, we nevertheless turn now to what Darwin did not see.

Creativity: Authorship and Evolution

Creativity, as artists have always known, occurs by purposeful though unpredictable leaps or by what American pragmatist Charles Sanders Peirce called "abduction." An artist's new themes often come on suddenly, in a flash of inspiration sparked by contingency, and speak directly to the needs, desires, and habits of the writer or of the story or poem, *i.e.* they are significant to his purposes or way of being in the world. The theme immediately "works" (or not). Additional selection, as editing, may fine-tune themes so that they function more precisely, but selection doesn't make them workable in the first place. Viability is a product of self-organizing processes, during which actual creative writing occurs (See Alexander "Poetics"). Selection can only dispose what self-organization has already proposed (Batten et al.).

The human brain is a biological system, more complex than any other, but not ruled by different physical laws from any other. The brain creates in the same way that nature creates more generally, by emergent self-organization, with natural selection acting later, if at all.² Having this or that thought does not depend on a single neuron firing or not. Instead it depends on the stability and plasticity of an entire system of interrelated neurons and neuronal groups. These organizing tendencies define authorship. Original, purposeful authorship, in nature and in literature, cannot be explained (away) by the theory of evolution by natural selection. Indeed, a new theory of authorship availing itself of 21st century neuroscience and complexity science can be used to help describe evolutionary processes. As our own creativity may be more familiar to

² It is probably unnecessary to add that we do not advocate the position that the mind is controlled by a homunculus-like self. The theory of self-organization disposes of the need for such fantasies.

us than that outside us, an anthropomorphic perspective can, we think, be a guide rather than an impediment to the study of self-organization in nature.³

In nature, stability generally persists for a time automatically in a homeostatic system, in which all the parts are constrained by the whole. But when the system gets too rigid or well-defined, it may begin to *react to* rather than *interact with* the environment, which can have a disequilibrating effect (Cf. Salthe *Development*) and it may perish. If this goes far enough but not too far, the parts of the system can reorganize into a different system. It is these kinds of sudden changes that result in the variability that natural selection can then work on. We argue that *gradual* change is not the key to understanding how evolution occurs. Significant change, change that matters and that can be noted, is systemic.

If, instead, we follow the Darwinist model, the steady accumulation of small or "single point" changes would merely be incorporated into the existing systems and there would be no real creativity. Radical and strikingly new forms, we claim, are system-wide re-integrations between hierarchical levels, rather like a Kuhnian paradigm shift. As Susan Oyama has argued, a gene-centered atomistic theory, like natural selection, which is thought of as working on separate structures and separate functions bit by bit, disregards the way in which stability emerges, through the interrelation of varying parts that form hierarchical systems. Because the organism is not the focus of evolution for neoDarwinists, hierarchical organization has not played a prominent role in evolutionary theory. When the organism's actions and habits are considered, the complex structure of the organism does become relevant (Salthe *Evolving*), and the idea of

³ This is the position advocated by Peirce.

authorship—the individual having some control over and taking some responsibility for the course of evolution—can be reintroduced into evolutionary theory.

Following Robert G. B. Reid in the next sections, a few of the sources of biological creativity are described and related to artistic creativity. Radically new forms, often non-utilitarian, can appear suddenly, maintaining themselves and existing as if *for their own sakes* for some time until they either find a use or become a liability and disappear. Next, in charming examples from Vladimir Nabokov, Milan Kundera, and late Henry James, we see that some of these emergent forms have a *tendency* to become useful eventually. When an answer to an incorrigible problem is finally found, even though by chance in some sense, one has had it in mind all along, as a kind of yet undetermined potential or adaptability. As James noted at the beginning of the 20th century, authorship is a force much like fate, which works "by chance" and yet prepares the way ahead of itself as if it possessed some prescient knowledge.

Sources of Biological Creativity: Variations on a theme

A major source of biological creativity results from an inherent tendency in nature to promote adaptability. Adaptability can come from a number of sources, including various forms of repetitive differentiation of any kind of holon: gene, protein, cell, organ, organism, or society (Reid 164-169). The doubling of a holon is not exactly random with respect to needs. It's like packing a spare or having an alternative plan; it can sometimes be benign (genetic change is often neutral and/or its effects remain latent) and it very well could come in handy if the

environment fluctuates.⁴ In fluctuating environments, the original unit can continue its usual function, while the copy can assume a different role. Differential function may occur simply because the copy is different by virtue of its being additional (more *is* different when thresholds are reached and bifurcations occur) or, the copy, being superfluous, may be at liberty to mutate in any way short of being inimical to the organism.

In literary terms, repetitive differentiation is the age-old idea of "variations on a theme." Sub-plots mirror plots, minor characters provide foils for major ones, and recurring motifs indicate analogous relationships. A single representation of the theme might get the point across, but not as effectively. Variations of the same theme build an overall organization that guides and stabilizes the interpretation of a poem or story. Being thus organized is what makes a narrative "artful" or makes it seem as if an artist is responsible. In *Immortality* Milan Kundera⁵ reflects on how a person's "fate" is really his/her theme. Life, he says,

does not resemble a picaresque in which from one chapter to the next the hero is continually being surprised by new events that have no common denominator. It resembles a composition that musicians call *a theme with variations* (275), and he adds, "you won't escape your life's *theme*." The way "events are synchronized" insures this (225). Kundera's dismissal of the picaresque form as not representing life truly may be seen as a dismissal of Darwinian random variation (random with respect to needs). Like many artists, he recognizes an "artistic" shape to life. But this shape exists due to nature's inherent self-organizing tendencies, which both constrain, resulting in limited number of forms, only those

⁴ In general, *adaptable* or multi-functional organisms are not as fit in stable environments as *adapted* or specialized ones. Hence evolution tends to get stifled during periods when natural selection reigns.

⁵ A textual characterization of the author who appears in Kundera's novel.

that have parts that are similar/contiguous or metaphoric/metonymic, and enable, resulting in variety and adaptability within those constraints. Artists may be able to recognize these tendencies in nature insofar as their own creative processes are self-organizing.

A literary theme, as a way of communicating meaning or perspective, is more stable or robust the more variants it has, because it tends to be self-reinforcing; flexibility invites varied interpretation (so that alternatives are easily imagined) while a theme's emerging constraints make the appropriate alternatives more and more apparent. A literary theme is an identity; it defines what the work does to its readers, and a biological theme is similarly defined as a way of being in an environment. The rigidity of a single "fit" variation can equal fragility; specialization vulnerability, but flexibility results in stability. In literature, a theme that is reflected and refracted in its various parts will be more successfully read. Artists use repetitive differentiation and contrapuntal themes to increase the beauty of their work by appealing to the aesthetic senses of *dynamic* stability and holistic effect.

An explicit search for "variations on themes" guided the German teleomechanists (noted above) who were the pioneers of evolutionary theory in the years directly before Darwin (see Lenoir). As the teleomechanists believed that in biology, as in art, variations on themes occur spontaneously, without the aid of natural selection, and because of the harmonic dynamism they possess (the adaptability of having an alternative way of responding, for example), self-organized systems tend to be self-maintaining. Even if selection "pressure" were creative it would not be needed to improve forms. *Progress and improvement as complexification is inevitable under the conditions of repetitive differentiation.* As William C. Wimsatt stresses, "one

does not need special circumstances—or selection—to form self-organizing states or properties: one needs special circumstances to prevent them" (qtd. in Reid 14).

Thus nature's tendency to make copies of itself, which as copies—as additional—are not identical, leads to a stabilizing diversity and adaptability. Gradual selection processes are not needed to favor repetitive differentiation or to urge it on. It is a kind of biological change that is expected and common.

Sources of Biological Creativity: The runaway playfulness of internal drives

In times of abundance when only the sick and old are preyed upon, *any* new form may persist and multiply. As well the environment need not be viewed as selecting against the inferior for they take themselves out of the game by not being self-maintaining even with adequate resources. For those with (what even Darwin recognized as) "innate" persistence of being (See Reid 46), survival is more or less assured, and overall variety increases in the population. In such times, there can be artful playfulness and unrestraint, and (almost) "anything goes." Colors get brighter or more varied, tails and horns grow longer or shorter, segments are added or subtracted, and bold experiments with "polka dots and stripes" can be conducted. All sorts of useless novelties, so long as they are not detrimental, are allowed. Biological forms can then become outrageously stylish, curbed it seems only by the need for overall coherence, which we might take to be a kind of aesthetic judgment. The main source of playfulness would be inherent genetic and dynamical drives, including self-amplifying mechanisms that produce more and more of the same within the limits of adequate function. What has been called "orthogenesis" (*i.e.* directed evolution) can result in changes that follow patterns, reflect

symmetries and cannot be called "random" with respect to beauty or form. Reid gives detailed descriptions of the physiological constraints that naturally lead to orthogenesis without selection for reproductive fitness (265-284). Suffice it to say here for our literary audience that mutations (genetic or other) are generally concordant with the original configurations, very much as with meaningful creative change in art, which is largely metaphoric (similar) or metonymic (contiguous). Iteration of similar and/or contiguous changes, rather than merely random changes or changes reflecting a much wider range of possibilities, *results in structural patterns and associations*, the basic building blocks for the creation of systems and sub-systems, that is, for life, art and language (Alexander "Poetics"). New forms are self-organized: they evolve on their own, without natural selection.

Outrageous style and whimsy may attract the attention of mates (as it does book reviewers), but only after the fact of their appearance. As Reid observes, sexual selection cannot be the mechanism that initiated, for example, the overdevelopment of the antlers of Irish elk. Self-amplifying allometric drives likely increased their antlers in correlation with increased body size, prior to and without selection. It might be said that experimental literary forms such as *Finnegans Wake* go the way of the Irish elk, being retained now in collections. Self-amplifying and self-referential styles produce systems that have laws unto themselves and don't get checked by the discursive environment.

Nabokov's Humbert, who he describes as "pavonine" (*Lolita* 163), may be seen as a fine example of the kind of peacock ostentatiousness we've been describing here. A monster of the pastoral tradition, Humbert shows little or no restraint and takes bucolic conventions, such as hyperbole, idealized love, incongruous mixing of the urbane and uncouth, and self-

consciousness, to further and further extremes. This runaway playfulness is self-organizing, forming by its own inertia of more and more and more, and, in repeating, it remakes.

Nabokov's engagement with the pastoral poems of Andrew Marvell has been noted by several, but none has sufficiently noted the exaggerated bucolic pattern in *Lolita*.⁶ We recall that Theocritus' lover's complaint pastoral features Polyphemus, a Cyclops monster impossibly in love with a beautiful sea nymph Galatea who, like Lolita, spurns her lover. Virgil's shepherd Corydon suffers from unrequited love and burns with passion for the comely boy Alexis, who is denied him by taboo (at least by 20th century standards) as is Humbert's child love. Burning for the lover is a typical pastoral affliction. Fire burns throughout Marvell's *Damon the Mower* who suffers from love of elusive Juliana. As well, Lolita is the "light of [Humbert's] life, fire of [his] loins" (9) and she rejects him. Frames, like the foreword to *Lolita*, are often used in pastorals to separate author from narrator, and the narrator is sympathetically depicted—the work focuses intensely on the lover's pain—despite his monstrous form, in some cases or in others, a shepherd's reputed lack of sophistication. The basic narrative pattern and stylistic forms are already established in early pastoral complaints, and Nabokov intensifies them, following the many pastoral writers of the 18th century who intensified the genre's self-referentiality, self-conscious hyperbole and so forth—to the extent that pastoral outdid itself (like the Irish elk). Pastoral conventions coincidentally have much in common with the techniques of parody—exaggeration of style, self-referentiality, and incongruously mixing of the high and low—such that with late 18th century pastoral it can be hard to tell if an especially enthusiastic pastoral writer is serious or not. As Judith Haber has noted, all pastorals tend to have anti-pastorals

⁶ See Michael Long in *Marvell, Nabokov: Childhood and Arcadia* (Claredon Press, 1984).

contained within their own forms (they are always already "too much"). It may be that a common tendency to misread Humbert's story as a "love story" can be blamed on the way the anti-pastoral or parody blends in with the pastoral like good camouflage. We may say that Humbert's ornate style is produced the runaway playfulness that is inherent in pastoral conventions, aided by parody through processes resembling evolutionary convergence, and is self-amplifying like orthogenetic evolution.

Brian Boyd, arguably heretofore Nabokov's most excellent reader, has recently turned Literary Darwinist, and now insists that Humbert's intensely literary and artful pose and our appreciation of them "are biological adaptations: [they] are ...[of the kind of] features that natural selection has designed into humans over time because they led to higher rates of survival and reproduction" ("Art of Lit" par 8). Boyd cites the utility of playfulness for developing brains and the obvious advantages involved in being interested in patterns in the environment. *Lolita*, he claims, as an attention-getting reworking of the all-important reproductive fitness narrative (a.k.a "love story"), speaks to universal needs in humans. Strangely, Boyd is here ignoring Nabokov's self-proclaimed preference for the "non-utilitarian delights" of art (Boyd *Nabokov's Butterflies* 86).

That literature may be useful is not debated. But, contra Boyd, we argue that Humbert's speech patterns and Nabokov's narrative patterns were not necessarily written nor are they enjoyed *because* they are useful. Boyd claims he is providing an "analysis of the origin of art and story" ("Art of Lit" par 22). He almost seems to want selection to be an agent of creative change that assisted Nabokov as he wrote. More directly, he claims that we take pleasure in Nabokov because we are being controlled by our programmed genetic drives which favor new

and interesting reproductive fitness narratives, but Nabokov needs no such help. We can imagine instead that Humbert is simply the lovelorn shepherd *self-amplified* to grotesque parody.

We may say that Humbert represents, in the end, a "hopeless monster" whose internal drives are his own undoing. As Marvell observes, "By his own scythe, the Mower mown" (108). And while such amplifications are self-maintaining and self-organizing, making them robust and able to survive without the aid of selection, their structure never finds a use in the environment which would redeem them or take them in a new direction. Nature is rife with such examples. These self-amplification stories are comic-tragedies, but sometimes they beat the mundane predictability of biologists' just-so stories, which have too much in common with the narrative tradition of theodicy, and which Voltaire lampooned so well.

Sources of Biological Creativity: Mixed Metaphors and Genres

The transmission of language and literature is not controlled by anything like genes, and thus writings more easily acquire characteristics that may be passed on to future writings. Linguistic innovations achieved by catachresis, mixing genres, and foreign borrowings are relatively common powerful ways of creating radically new forms of organization. Biologist Lynn Margulis may be credited with bringing into public awareness the extent to which organisms also evolve radically through "macaroni" associations that may occur at many levels of organization, from molecules and cells to organisms and societies. As Reid notes,

Exons, the functional subunits of genes, can also be mixed and matched to produce a variety of proteins. Also, protein domains, once they have been synthesized according to the exon codes, can be mixed and matched to make novel protein molecules.

Intimate endosymbioses of prokaryotes gave rise to the eukaryotic cells of protocists, fungi, plants, and animals. When eukaryotic cells formed multicellular associations, they could then differentiate and undergo epigenetic evolution. (95-96)

An evolving lineage does not have to wait upon the right mutation to make major improvements. Nature, almost like an imaginative poet, can create by experiment, bringing two very different things together at the right time making an unprecedented union that is more complex than the sum of its parts. What each biological unit does to put itself in a fruitful relationship with another biological unit matters and helps determine what can eventually be made heritable after genetic assimilation. We can say, then, that such changes speak directly to the needs of the actors involved.

Recalling Mary Shelly's *Frankenstein*, Margulis calls symbiotic associations "flashes of evolutionary lightning" (8), and her work argues that monsters, often defined as mixed species, do not occur exclusively in fantasy literature, but roam and populate the earth. Some "monsters" may be of the union of two whole organisms, but more commonly a little monstrous mixing and matching of subsystems within an organism leads to a new phenotype—one that opens the eyes of natural selection, for without such "monsters," there is nothing of major import for it to see.

The "Hopeful Monster" and Fate

In 1940 Richard Goldschmidt coined the term "hopeful monster" in an effort to explain how evolution might proceed much faster by producing very different forms (monsters) suddenly by radical mutation which just happen to fare better (thus, "hopeful") than others. Goldschmidt's idea was formerly much abused, but it has gained enough respect these days that many are taking

the time to revise it according to new evidence. What is significant about a hopeful monster is the fact that its radically new form is emergent, unpredictable and not determined strictly by prior conditions. That is, no one sees it gradually coming on. The term "monster" is intended to convey the meaning of its Latin root for "omen" or "prodigy," some kind of organism (self-organized form) that is surprisingly unlike its parents. Its new order, form and organization, is made immediately coherent during development, and so is dynamically stable and self-maintaining: it doesn't need natural selection, competition or predators, to make its viability apparent. (Its "Darwinian viability" will be judged after the fact in comparison with other types in the population.) Then, in addition to being self-maintaining and highly adaptable, as if that weren't enough to be almost a kind of miracle, some hopeful monsters may find a specific utility for their order and organization beyond self-maintenance, propelling them toward increased reproduction. Some may find utility for their highly complex particular structure and integration that had *not* been formed nor complexified because of its utility—that is, not formed or complexified by natural selection, but by emergent self-organization alone. This seems almost too coincidental—like so many endings in sentimental literature. *But unexpected potential utilities are an unavoidable property of any complex system because of its inherent adaptability.*

A hopeful monster's potential may be activated through his habits, what it does while exploring a new environment. Hopeful monsters have a better chance of thriving in fringe zones where there are unanticipated conditions: and no stabilizing selection. Poetic creativity too tends to emerge in exile. When a usual language system or algorithmic code breaks down or becomes ineffective, a poet in possession of a large semiotic fortune will experiment with new tools, trying first those most similar to or coincidentally near in his mind to the old tools, and from

there, tenuous connection by tenuous connection, he can explore newer and newer ways of interacting with his world. His ability to make connections has been supplemented by his needs, which have affected his habits and desires. His search, as Kundera noted, is not totally random: because what he does is similar to or near in his mind to what he has done before, it reflects his personality, his background, identity and tastes.

Similarly in biological terms, under adverse or unfamiliar conditions, error-prone copies (within any kind of ongoing internal process) produce variants, "monsters," some of which may respond favorably to the new conditions. In some cases, new forms can appear in direct response to stressful new conditions when, for example, previously latent error-prone copying tendencies start producing variants, some of which are adaptable to the new conditions (Tompkins *et al.*). The poetic geniuses of nature are individuals who possess the latent ability to produce "error-prone" copies or variations on their themes. NeoDarwinists will try to say that mutations under conditions of stress are not directed, but "random," and thus fit their model of natural selection. What this criticism misses is the point that directedness works using chance, that is, the ability to perform purposefully entails the capacity to be adaptable to various situations, in part by using whatever fits—which sometimes means making use of error. As James Joyce rightly observes, "A man of genius makes no mistakes. His errors are volitional are the portals of discovery" (9.228–29). Performing purposefully does *not* entail having a single preprogrammed specific trait that will fit the new situation. Such a capacity would make an organism an automaton, a robot, not a bona fide agent (for further argument, see Alexander "Poetics").

Hopeful monsters tend to appear in the generations after catastrophes when environments have changed, or else soon-to-be-parents of monsters venture out, to where they find fewer or no

competitors or predators, who, as specialists stabilized by natural selection, would not be as adaptable as they. Reid describes how the physiological responses to a new environment during development can activate potential adaptability, and possibly create *a number* of new phenotypes in a single generation. This addresses the main critique of the hopeful monster idea, that a single individual would be relatively powerless to affect change in a population of overwhelming numbers. That is, some new forms would not be produced only as singletons, but in several copies, in what is, as well, a relatively small population. Conditions unfamiliar to an exploring group could activate a wealth unseen adaptability, a vague sort of potential whose specificity would be *determined by the environment* (Salthe *Natural*). As long as the offspring continue to be exposed to this environment they will develop true to the type of the monstrous parents. Eventually, the type will be stabilized by genetic assimilation and offspring will then no longer be able to revert to the old wild type even if they developed under the old conditions. In this narrative of change, the organism takes as agentive role in evolution. Its actions would be purposeful in a 21st century sense of causing selfhood (creating its organization as identity and vice versa).

In neoDarwinism, organisms have no agentive control of their own evolution. Thus, any exploratory behavior of an organism into a new environment, which act changes its fitness, is viewed as just the occasional, and not necessary, realization of accidental propensities via random fluctuations and excursions. What evolves is just what happened to happen. This is why natural selection has been called a "theory of higgledy-piggledy"! After variants are generated at random with respect to needs, the selection regime itself is just a negative, mechanical, process

of culling. In the resulting theory we are, as zoologist George Wald famously quipped, the products of editing, not of authorship.

A new definition of agency is needed that suits a post-Darwinian, emergentist view. Creative authorship, as an example of agentive action, evolves from the habits of the writer as he explores new territory, like a "hopeful monster" activating hidden potential meanings. He is purposeful but does not move toward a defined goal (a unsuitable metaphor for *emergent* purpose, as it would already be existing in the spatial/temporal distance/future), but he does create a pattern or trend. He has directionality without prediscerned direction. (Orthogenesis is similarly defined as movement in a direction without respect to a goal.) Most of the time his world works for him in the way he has come to expect, but sometimes there are surprises. If the surprise, a mistaken interpretation ("I thought that was food!" said one prokaryote about another) turns out to be beneficial, evolution occurs and the directional pattern potentially branches. An agent's pattern of behavior, expressing his selfhood, is not equal to the material individual, but constrains that agent's actions. It is limitation (through directional interpretation, recognizing and using the same things over and over again), but also possibility (through misrecognitions and misinterpretations that happen to be beneficial). Intentionality emerges in the habitual actions of an agent which tend to be self-organizing and thus self-maintaining, but which are also ready to evolve when conditions have become "wrong." Chance favors the well-prepared mind and error-prone mind that is highly adaptable and multi-functional. Our new emergentist view of an agent is illustrated very well by the hopeful monster, who, making its way in the world, refuses to respect the law of higgledy piggley. The monster's story is organized in ways that reflect an artistic (rather than religious or superstitious) notion of purpose, *telos*, or fate.

Henry James as Hopeful Monster

James often invoked the metaphor of fate to describe authorship. A belief in fate, in a broad sense, is a belief in a force presiding over the universe—much in the way an author, as Amis noted, controls his world. In his autobiography *A Small Boy and Others* (1913), James makes about ten explicit uses of the word "fate" and more than twice as many references to the idea of destiny. In the first few pages James refers to himself as a young boy "foredoomed" to wonder, "dawdle and gape," his only function being to receive impressions, impressions that would only later be useful (25). He declares it was "preordained" that "nature and fortune" dealt him an imagination and a sensibility as his only faculties of application (10). At a tender age he was "fatalistically aware" of his character and "resigned" to it (25). He held the conviction that life represented "something more than what immediately and all too blankly met the eye" (411), noting the presence of shaping force that could not be explained by any reductive account.

Although James' definite interest in writing does not emerge until much later, in the second volume of his autobiography *The Middle Years* (1917), James as a small boy is presented as a writer, albeit yet undiscovered. James' early life was not spent idly, however much it might have seemed so to the "others." But while he was preparing for his fate, he had nothing "to show" and appeared like "some commercial traveler who has lost the key to his packed case of samples and can but pass for a fool while other exhibitions go forward" (10).

Henry and his brother William were undoubtedly shaped by their contemporary Darwin, and yet we find Henry invoking fate. Pragmatism, the philosophy developed by William and Peirce was inspired by Darwinism and retained, especially under Peirce's pen, a strong

teleological component (See Short). Early Pragmatists saw natural selection explaining final causality not explaining it away. This may be partly why directiveness survives in James' fiction, disassociated from predeterministic Christianized versions of teleology, and reconnected with the more abstract (and artistic) notion of fate. Fate emerges "by chance," but differently from natural selection it works with respect to needs or habits and has a strong tendency to bring about poetic justice. Because, again as Kundera noted, fate is really one's self-organizing theme, variable patterns are built in to the way we exist in the world, and our patterns are readily reflected in the environment in ways that are, by our definition, poetic.

James perceives the handiwork of fate in situations in life that seem wonderfully author-contrived, that seem to exhibit artistic design, that seem well staged and perfectly dramatized. But most significantly "the fine artistry of fate" is detected in those crucial events in life that finally uncover one's destiny (121). In *Small Boy* when Henry James recalls the story of his allegedly irresponsible uncle Henry who lived to take competent control of his kinsmen's wealth, he sees a "rich a rounded picture" where before he had only seen "wild possibilities" (121). His uncle Henry was a hopeful monster. No one predicted his success, and yet the potential was there. By applying the hand of fate to his own history as well, James shows how, unbeknownst to those who shared his early days, he had always been a writer, just as Uncle Henry had always been worthy of his family's trust. Finally, the environment reveals the hidden potential, which had been there all along, full-fledged complex and ready, waiting to be utilized. *There is no gradual shaping of character in James' autobiography. It is there at the outset.* Emerging at his birth, his purpose maintains itself and is coherent without being useful beyond self-maintenance. Only much later in his life does he too, like a hopeful monster, finally discover his vocation as

writer, and his particular talents, ways of organization and ways of being, come to function in society.

Nabokov's Beautiful Monster

As described above, the artistic mind can also have a perverse infatuation for a *hopeless* monster like Humbert, but there is another, as yet unmentioned aspect of directiveness adored by artists: the simply beautiful monster. In this prodigy, self-organized patterns function, not in a useful way as with the hopeful monster (not resulting in teleological adaptation or proliferation), but function merely to amuse and delight us.

Nabokov, outspoken on evolutionary theory, provides us with examples of self-organized butterfly wing patterns that illustrate the difference between the hopeful and the beautiful monsters (Alexander "Nabokov" and "Neutral"). For Nabokov, a beautiful monster demonstrates in "nature the non-utilitarian delights [he] sought in art," (Boyd *Nabokov Butterflies* 86). A monstrously hopeful butterfly may boast concentric ring patterns that resemble eyes that can scare off predators. A beautiful monster butterfly has concentric ring patterns that form the image of a drop of dew. Nabokov noted one specimen with a line along the wing edge running through the "dewdrop" that was shifted in a perfect imitation of refraction. Masterfully rendered, praised Nabokov, but a coincidence, a selectively neutral instance of false mimicry. (It is difficult to imagine what function or advantage could be ascribed to an imitation of a dewdrop on a butterfly wing. That is, this pattern does not exist because it was selected for the advantage a resemblance conferred.) Since such cases of false mimicry confer no reproductive advantage—they merely amuse—Nabokov notes they "seemed to have been invented by some waggish artists precisely

for the intelligent eyes of man" (Boyd *Nabokov Butterflies* 178). For Nabokov it was the task of the poet to imitate this tendency in nature, for to do so illustrates so well the author behind agent X. A waggish artist himself, Nabokov delights us endlessly and famously in *Lolita* with coincidental patterns, the recurring instance of the number 342, false mimicry of Humbert and Quilty, and other workings of "McFate" that very much suggest an author-contrived story with many non-utilitarian patterns refracted throughout.

But the only conclusion this compels us to take is that nature works like an artist, not that there is an artist behind nature. Art and nature are not different and antithetical enterprises, and the study of artistic practices, such as Nabokov undertook, sheds much light on the way nature creates, seems to make jokes, delighting in irony and in enchantments.

Conclusion

Despite the title of Darwin's famous book, natural selection cannot explain origins, or the actual presence of forms and behaviors, although it may explain the prevalence of some of them. It is limited to historical explanations, as it acknowledges no evolutionary tendencies other than those that are the result of accident preserved in genetic information. The material world is much more complex and "artistic" than that, and its underlying patterns and tendencies cannot be ignored. If natural selection does not explain form in organic evolution, should it be used to form analyze literature?

Applying one discipline to another, in this case science to the arts, there is a danger that one may bend the other to its will. Perhaps only when both disciplines reciprocally benefit is an interdisciplinary effort worth doing. Art is no handmaiden to science, merely illustrating what

science has already figured out. It will not do to treat literature as a vast repository of case studies for social Darwinists to sort through. Art does the work of knowing too. This essay has tried to suggest that artistic knowledge can be knowledge of the real physical world. Art is a deep study of patterns and processes that, as "made-up," has abstraction built into its methodology, making it, like science, applicable to a wide range of areas, to butterflies, the development of small boys, the interests of lovers, criminals, madmen and politicians, to whatever authors put in the worlds over which they continue to reign.

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