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Poetry as Compass: Chaos, Complexity, and the Creative Voice

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Works in the still emerging fields of chaos and complexity theory are beginning to bridge disparate disciplines dealing with apparent disorder, such as biology, ecology, economics, meteorology, and physics. Scientists leading the exploration of chaotic phenomena, including Edward O. Wilson and Nobel prize-winner Ilya Prigogine, argue that science can never be divorced from culture, and that cultural values influence the development of science (Toffler xii, xiii). Indeed, the apparent universality of what are considered complex phenomena suggests that human systems, such as historical and cultural events, societies, and also narratives, are shaped by seemingly “chaotic” scenarios. Rejecting reductionism and determinism, chaos and complexity theory favour a holistic embrace of complexity and flux.

Even though the matrix of complexity theory seems to lend itself very well to the interpretation of art, and literature in particular, relatively little has been written so far applying complexity theory to literary works. However, a few scholars from the humanities such as N. Katherine Hayles, Angus Fletcher, Paul Cilliers, John A. McCarthy, Ira Livingston and others are beginning to explore its potential. Bridging the gap between the traditional cultures of the humanities and science, these scholars’ work constitutes an area of interaction that can be called a “third culture.”

The term “third culture” lies at the heart of John Brockman’s book *The Third Culture*, in which the author discusses the work of several well-known thinkers, including Stuart Kauffman and Francesco Varela, who are directly communicating their

new, sometimes provocative ideas to the general public.¹ The title of the book refers to Charles Percy Snow's 1959 work, *The Two Cultures and the Scientific Revolution*, which describes the conflict between the cultures of the humanities and science. In a second edition of his book, published in 1963, Snow added a new essay, "The Two Cultures: A Second Look," in which he suggested that a new culture, a "third culture," would emerge and close the communications gap between the literary intellectuals and the scientists. The works by the above mentioned literary scholars thus serve to reunite and reconfigure what McCarthy throughout *Remapping Reality* (2006) calls the three main spheres of human interaction, namely the physical, the ethical, and the creative. Complexity theory, then, promises a particularly significant development in literary studies.

In the following, I relate poetry as a genre to complex systems and explain why this approach lends itself particularly well to a study about creativity. This will require us to alter our view and to move from a *mechanistic* model for explaining the emergence of life, to a *systemic* model. In other words, instead of reducing a phenomenon to a single object or concept in order to understand it, we will attempt to see it within its larger context by focusing on the lateral connections between its various parts.

I. A Poetic "System"?

What is a complex system? The term refers to a system of many parts, at many different scales, which are coupled in a nonlinear fashion. In *Complexity and Postmodernism*, Paul Cilliers defines complexity as the interaction of a large number of dynamic elements, each of which is ignorant of the behaviour of the system as a whole. The

¹ John Brockman has continued the themes of "The Third Culture" in the website of the Edge Foundation, where leading scientists and thinkers contribute their thoughts.

interactions are non-linear, short-ranged, and contain feedback-loops, which can be positive or negative, enhancing or inhibiting. In addition, complex systems are open systems, have porous parameters, interact with their environment, and are characterized by a constant flow of energy (2-4). All this ensures the system's vitality. These systems have a history from which they evolve over time, and which is co-responsible for their present behaviour. Therefore, they must have both the ability to store information concerning their environment for future use as well as the ability to adapt their structure when necessary, according to the stored information.

Because they are nonlinear, complex systems are more than the sum of their parts and one side of the connection is not necessarily proportional to the other. This sensitive dependence on initial conditions came to be known as the butterfly effect. The phrase refers to the idea that a butterfly's wings might create tiny changes in the atmosphere that ultimately cause a tornado to appear (or prevent a tornado from appearing). The flapping of the wings of a butterfly represents a small change in the initial condition of the system, which nevertheless causes a chain of events leading to large-scale phenomena. The curve representing this phenomenon resembles a butterfly (Lorenz, 14-15; 181-184).

Literary critic Angus Fletcher appropriates the metaphor of an eighteenth century chamber group of musicians who play without a conductor and concludes that "what emerges is the capacity of a system to develop its own ensemble character" (206). In order to elucidate the autopoietic character of a poem and explain why it can be considered a complex system, it will be both necessary and useful to start by determining in what ways poetry differs from other genres in literature. In other words, what makes lyric poetry so particularly fitting for a study about creativity?

As Niklas Luhmann points out in his system theory of art, poetry is a special case among literary genres since it takes place in the medium of perception as well as in

a linguistic code, thus increasing the number of dynamic interactions between “parts” of the system. In literature, and especially in its condensed form, namely poetry, these dynamics appear in such techniques as symbol, metaphor, motif, irony, and pun – essentially in any linguistic device that forces us to understand and experience one thing in terms of another (125). While this can be said to be true for all verbal arts, poetry is certainly the extreme case. Luhmann elaborates on the reason poetry stands apart:

Only at the level where symbols, sounds, meanings, and rhythms conspire – a level that is difficult to “read” – do poems refer to themselves in the process of creating forms. They generate contextual dependencies, ironic references, and paradoxes, all of which refer back to the text that produces these effects. Supported by the text, poetic self-reference may eventually articulate itself explicitly – not as a flat, abrupt statement, but as a form within the nexus of forms that constitute the text (125).

The two main characteristics of lyric poetry, then, are first, that written poetry not only appeals to our thinking but also, or perhaps even more so, to our perception. In other words, the form of the poem is important – how important remains to be seen. Secondly, Luhmann suggests that there is an underlying level, a kind of deep structure, which is the locus of poetic self-reference and thus the place from whence form emanates.

How, then, does poetic self-reference function as catalyst for form? Aesthetic self-referencing has long been a crucial structural factor in both music and the visual arts. Eva Müller-Zettelmann, in her 2005 essay “‘A Frenzied Oscillation’: Auto-Reflexivity in the Lyric,” points to the mirror compositions of Johann Sebastian Bach and Paul Hindemith, as well as the original meta-painting of Velasquez, Magritte, and M.C. Escher as examples of this technique (125ff.). Ira Livingston refers us to the linguist Roman Jakobson, who identified self-reference as the predominant linguistic function of poetry, which he labelled poeiticity. Livingston explains the term as referring to the way poetry tends to call attention to itself as an artefact of language so as to make

what is being said secondary to *how* it is being said. Livingston argues that beyond the formal patterning of poems such as rhyme and meter, poetic self-reference edges into “metadiscourse” in which text takes itself as one of its themes. These self-references can produce multiple and contradictory effects. They can call the realism of the text into question and urge readers to become aware of the act of representation as a thing in itself (Livingston 58, 59).

Müller-Zetzelmann elaborates further on what she calls “the metalyric.” She diagnoses an interpretative stagnation resulting from the lack of clear or even basic definitions and standardized analytical categories concerning self-referential poetry. Taking as the starting point for the history of metalyric reflection the works of Archilochos (seventh century B.C.) and Sappho (seventh to sixth centuries B.C.), Müller-Zetzelmann outlines its evolution down to the lyric production of the twentieth century, emphasizing in particular the similarities between the Romantic period and the twentieth century. She notes that poetic guidelines in the classical period were still presented in the form of an explicit system of argumentation. However, for the Romantics the poetic imagination with its synthesis of form and content was the only way of creating an approach to the world that embraced more profound relationships. The new axiom of the indissoluble link between beauty and the truth, between form and content, marked the slow demise of explicit metapoetry, as well as the advent of a type of metalyric that made increased use of the technique of implicit or non-discursive presentation. This growing “opaqueness in poetic metaphor,” Müller-Zetzelmann explains, was linked in the twentieth century to a new type of metalyric technique—as used extensively in concrete poetry—which focused on the fictionality of a text by means of a total devaluation of its content and the use of auto-referential elements of textualisation (127).

Along with this “growing opaqueness,” Müller-Zettelmann sees as the decisive feature of twentieth century lyric a “particular focus on the linguistic medium” which she likens to the linguistic turn of contemporary philosophy. She then undertakes a classification of what she considers metalyric elements, analyzing the conditions, forms and functions of self-reflection in poetry, in contrast to rather vague definitions of other critics. She explains:

Metalyric poems refer to lyric inspiration, to the poetic creative process, to the social task of literary creation, or to the intended reader’s reception. The list of possible meta-themes could be extended further, but their semantic common denominator is in their reference to some aspect of the fictionality of the lyric work of art. Whenever either the aesthetic construction (*fictio*) or the inventedness (*fictum*) is thematized or presented, we have some form of metalyric writing (132).

Müller-Zettelmann differentiates between critical and non-critical metapoems, explicit versus implicit, as well as between self-and non-self metalyric texts. She describes as specifically interesting about self-metalyric forms the “impossibility of distinguishing between the act and the object of textualisation” (132). To make her point, she cites Jean-Pierre Dupuy:

Between the operator and the operand, the program and the data, the cause and the effect, the meta-language and the language, there is a continuous reversal of levels, a frenzied oscillation, in which each in turn sits on the higher level, then on the lower, and so on, not unlike two rivals, each of whom briefly gains the upper hand without ever completely defeating each other (106).

What Dupuy and Müller-Zettelmann refer to as “frenzied oscillation” is, interestingly, precisely that activity from which the meaning of the poem emerges. Rather than static words that can be interpreted in a linear fashion, the incessant movement apparent between different levels of signification in a metalyric poem is testament to the energy emanating from it.

Another crucial aspect of metalyric poetry is its effect on the reader. The metalyric, Müller-Zettelmann proffers, is a form of self-focusing which forces the reader to consciously come to terms with various aspects of fictionality to an extent which exceeds that which is usual for the genre (141). She concludes that the metalyric refers to poems that are self-referential, (lyric) literary texts, and in fact to any kind of art, which, in an explicit discursive or implicit 'showing' fashion, draws particular attention to its own creation (142).

II. Deep structure: a Theory of Truth

In what way then, does a self-referential poem or "meta-poem" function as a complex system? Let us start with the obvious: a poet employs the main scientific idea in complexity, namely the notion of a self-organizing system since a poem generally lacks an obvious developmentally straightforward plot, i.e. it is non-linear, both in content as well as in form. This is often evident from just looking at the "broken lines" of a poem (Fletcher 191). Nevertheless, the individual parts (words) of a poem are interconnected; they interact on a level of deep structure, the level which Niklas Luhmann referred to as that where symbols, sounds, meanings, and rhythms conspire. The term "deep structure" is quite common in linguistics and especially in the study of syntax. The deep structure of a linguistic expression is a theoretical construct that seeks to unify several related interacting forms.²

The interaction of the individual parts of a poem results in a whole that is naturally emergent rather than artificially predetermined. In a poem, individual parts retain their differences and their distinctness, even as they form a coherent unity. This concept of constant change radically contradicts the traditionally held belief, based on

² For more information on "deep structure," see David Crystal, *A Dictionary of Linguistics and Phonetics* (Oxford: Blackwell Publishers, 1996), p. 125

the Cartesian paradigm of a mechanistic world that follows strict and predetermined rules. This metaphysical realism is generally associated with the correspondence theory of truth, according to which an object is represented when it is reconstructed according to a fully described blueprint, an exact replica or archetype, in a linear step-by-step fashion that excludes alternative paths. It supports the view that truth is correspondence to a fact, from which it follows that truth consists in some relation to reality.

This view is somewhat problematic, of course, because we have no access to facts independently of the statements and beliefs that we hold. We cannot look over our own shoulder to compare our beliefs with a reality apprehended by other means than those beliefs, or perhaps further beliefs. Thus, nothing is definitive but instead, everything is relative to something that, again, is merely relative.

The latter stance accurately describes the coherence theory of truth which allows contradictions and alternatives; in fact, it must have contradictions if it is to be complete. The coherence theory of truth holds that the truth of a proposition consists in its being a member of some suitably defined system of other propositions: a system that is consistent, coherent, and possibly endowed with other virtues, provided these are not defined in terms of truth.³ Thus, according to the coherence theory of truth a statement is true if it “coheres” with other statements, false if it does not.

Clearly then, context is a vital concept in this theory. The emergent “one” represents the “many,” though not by identical correspondence but by coherence, which is not necessarily linear at all. This concept of “e pluribus unum” has also been applied to other realms, as in the notion of the melting pot; it implies that a number of ethnic groups, cultures, and religions in a society will fuse together to produce new cultural

³ Cf. Frank P. Ramsey, Nicholas Rescher and Ulrich Majer, *On truth : original manuscript materials (1927-1929) from the Ramsey Collection at the University of Pittsburgh* (Dordrecht: Kluwer Academic Publishers, 1991). See especially chapter two on the Coherence Theory of Truth, pp. 25-42.

and social forms.⁴ Of course, this newly formed unit is not a static one but will continue changing and (re-producing), as will its constituent parts.

III. Perpetual Metamorphosis: The Soliton

Angus Fletcher attributes to precisely this notion of ongoing change the special place poetry holds in human history, affirming that “it is indeed hard to imagine that poetry could have played a part in human history had it not been a mysterious use of language, whereby a play of perpetual metamorphosis distinguishes the poem from all other use of language” (177).

We can imagine at this point a wave as symbol for the coherent surge of energy travelling through individual parts without displacing them, that is, the pattern of a system is conserved while its constituent matter is in flux (Fletcher 105). A wave merely picks up individual water molecules and releases them again. The water participates in the wave’s movement for only an instant and then falls back. McCarthy, as well, sees the potential of the *soliton* (the scientific term for a stable solitary wave), for helping us to understand creative processes as the “merging of complementary and contradictory impulses” (61).⁵

Ira Livingston points out that such a process of regular interplay of patterned energy through matter also “constitutes the first manifestation of God in the Judeo-Christian Bible: ‘The spirit of God moved across the face of the waters’” (79). The spirit of God, a figure for the very essence of all creation, then, is likened to the wave that

⁴ This idea was common in the USA in the first half of the twentieth century, and is exemplified in the motto on American coinage *e pluribus unum*: one out of many.

⁵ The term was introduced in the 1960’s, but the scientific research of this phenomenon had started in the nineteenth century when John Scott-Russell, a Scottish naval engineer, observed a large solitary wave in a canal near Edinburgh. It was not until the mid 1960’s when scientists began to use modern digital computers to study nonlinear wave propagation that the soundness of Russell’s early ideas began to be appreciated.

temporarily changes its environment. This wave-form is essential to any sustainable system since it lives only when it is changing shape. The same could be said of words of a poem washing over a human mind: words are essentially “recruited” to participate in a moment’s thought and then fall back onto the paper. The poem itself is not in fact consumed by being read; the words, lines, and stanzas, as well as the overall structure as it is laid out on paper remain the same (79).

Clearly, however, this metaphor is problematic since it leaves out something absolutely crucial: the words in a poem are not merely what Ira Livingston calls “filler” for thoughts; they are what one thinks *with* as well as *against* (79). In other words, the poem is not only self-sustaining, it also creates; it does more than “use” what is present, it actually produces new components, as any living system does. This leads us to the characteristic organization of living systems, namely the process of autopoiesis.

IV. Autopoiesis

Autopoiesis literally means “self-production” and is derived from the Greek “auto” for “self” and “poiesis” for “creation” or “production.” It expresses a fundamental complementarity between structure and function. The term was originally introduced by Chilean biologists Francisco Varela and Humberto Maturana in the early 1970s and refers to the dynamics of non-equilibrium structures; that is, organized states that are sometimes also called dissipative structures, which remain stable for long periods of time despite matter and energy continually flowing through them.

The canonical example of an autopoietic system, and one of the entities that motivated Varela and Maturana to define autopoiesis, is the biological cell. It is made of various biochemical components such as nucleic acids and proteins, and is organized into bound structures such as the cell nucleus, various organelles, a cell membrane and cytoskeleton. These structures, based on an external flow of molecules and energy,

produce the components which, in turn, continue to maintain the organized, connected structure that gives rise to these components (Maturana, Varela 82).

While it was newly introduced to biology in the 1970s, the concept of autopoiesis had long been part of the legacy of structuralism. A system manufacturing its own components figured prominently in Saussure's structuralist linguistics, as well as found applications in sociology, namely, as mentioned previously, in Niklas Luhmann's system theory. One of the differences between structuralist systems and autopoietic systems, however, is that structuralism models systems as organizations that are frozen at a single moment in time. Autopoiesis, on the other hand, understands them as patterns of ongoing events that are continually changing, oscillating between different poles. In other words, an autopoietic system perpetuates itself through its own (internal) operations, which in turn implies that the system is structurally determined, since it is the structure which determines its identity at any given moment.⁶

The autopoietic property of a poem as its defining aspect is perhaps most apparent when one tries to translate a poem, as opposed to translating prose. German twentieth century dramatist and poet Gottfried Benn, for instance, claims that "Lyrik ist national" (poetry is national), while images, statues, and symphonies are "international" is based on the premise that colors and sound exist in nature, words do not (Benn, "Probleme der Lyrik," 510). What he means by this is that the word is rooted in consciousness in the sense that a person's consciousness defines each and every word.

However, a word's rootedness is in fact not only national but based on many other factors as well. This is apparent when we encounter such rhetorical devices as metalepsis and metonymy, for example. The former is a figure of speech in which one

⁶ Paul Cilliers exemplifies the notion of connectionism proposed here in the analogy of post-structuralism, specifically the theory of language proposed by Saussure and extended by Derrida (Cilliers 37). According to Saussure, language is a system made up of arbitrary signs, which acquire meaning only through their relationships with other signs, namely through a system of differences.

thing is referenced by something else which is only remotely associated with it. Often the association works through a different figure of speech, or through a chain of cause and effect. It can refer to the combination of several figures of speech into an altogether new one. Similarly, metonymy is the substitution of one word for another with which it is associated. Thus, metonymy works by calling up a whole domain of usage and an array of associations.

Both metalepsis and metonymy work in a non-linear fashion and are based on the premise that parallel to genetic evolution, the human lineage added cultural evolution, and the two forms of evolution are linked, a phenomenon biologist Edward O. Wilson refers to as “gene-culture coevolution” (138). Wilson justifies his claim by pointing out that just as natural selection is the determining factor in genetic evolution, “certain cultural norms also survive and reproduce better than competing norms, causing culture to evolve in a track parallel to and usually much faster than genetic evolution” (139). Language, religion, myths, and art are all productive and therefore individually evolving components of the whole of that which we call “culture.” If we can accept this premise to be true, we have established a causal connection between semiotics and biology.

Obviously, then, a word put in a specific context can mean more than originally implied, and even a single word by itself will provoke an array of associations depending on the background and present state of the observing individual.⁷ Add to that

⁷ Gottfried Benn exemplifies this concept in the English word “nevermore”: “„nevermore“ mit seinen zwei kurzen verschlossenen Anfangssilben und dann dem dunklen strömenden „more“, in dem für uns „das Moor“ aufklingt und „la mort“, ist nicht „nimmermehr“ – „nevermore“ ist schöner. Worte schlagen mehr an als die Nachricht und den Inhalt, sie sind einerseits Geist, aber haben andererseits das Wesenhafte und Zweideutige der Dinge der Natur” (Benn, “Probleme der Lyrik,” 511). What is quite stunning in this quotation is the realization that while the term “nevermore” clearly has different connotations for different readers, the number of potential meanings is in this case increased by the fact that Gottfried Benn is not a native speaker of the English language. In fact, he could have derived “his”

the context the word is presented in and the number of possible connections becomes even greater. Take Noam Chomsky's example of a meaningless sentence which nevertheless turned out to all the more meaningful: "Colorless green ideas sleep furiously" (15). Though perhaps nonsensical in its combination of words at first sight, the sentence can be given meaning through polysemy to create a functioning, meaningful system. The sentence seems to suggest that some ideas that are lively but relatively new and untried (green) and apparently invisible or easy to ignore or emotionally neutral (colorless) nonetheless must struggle desperately or violently (furiously) to remain unconscious (sleep), a phrase certainly not unimaginable in poetry. Of course, what Chomsky seemed to really *mean* was that the sentence is meaningless, which reflects precisely the anxious disavowal that seems to underlie the carefree confidence of rationalist science, namely that to disavow contradiction and metaphor is to "sleep furiously" (Livingston 41).

By establishing new connections, the self and reality are constructed anew. This perpetual de- and then re-construction follows from our urge to give form to what seems chaotic. The search for form, or rather, the need to introduce order to anything we are confronted with, in fact defines our life. Lyric poetry, specifically the montage poem can be considered a prime example of such a self-organizing as well as self-producing (i.e. autopoietic) system. As we have established, a word is assigned meaning through the context it is presented in and at some point—perhaps through gene-culture co-evolution—it is locked into a certain meaning, which implies that at this point, it is static, or, to put it drastically: *dead*.

particular meaning of the word even without knowing the German equivalent of "nevermore," indeed without even being familiar with the word's English pronunciation. This suggests that we can create meaning even when we are not aware of the original intention of an author/ a word/ a poem, or are even familiar with the language words are presented in. (All translations are my own).

In a poem, the (rigid) structure of a word's syntactical and semantic (i.e. traditional) context is dissolved. This technique of montage disengages existing connections; grammatical, syntactic as well as semantic associations within words are called into question or can be destroyed altogether. In that it produces fragments, montage destroys a text's linearity: words are extracted from their traditional frame of reference/usage. From this it follows that a montage-poem cannot be the traditional descriptive or narrative kind of poem but, rather, it reflects, generally on itself. Clearly, then, there is incessant movement, though not of the linear kind. It is precisely this movement which induces the creative impetus; it creates entirely new connections between words.

It is for this reason that in most cases, a poem's "structure" relies entirely on the moving, wave-like energy created by rhetorical, rhythmical, and phonetic devices (such as anaphors, assonances, and alliterations) which indeed replace traditional poetic order. In other words, this surge of energy which Benn calls "Form" (form) replaces the traditional grammatical, syntactical, and logical order. In other words, a seemingly chaotic system composed of disjointed, inconsequential and therefore nonsensical parts emerges as an autopoietic system that is now artistically joined, consequential and, as a result, meaningful. This meaning is never predetermined and static, but constantly in flux. It can only be realized if the complexity of the system is embraced, not by reducing the system to its parts since a reductionist approach obscures what is absolutely essential: the in-between-space where creativity takes place.

V. Poetry as Compass

Thus, what naturally follows from our need *for* form is our compulsion *to* form, to create. Benn as well likens creativity to a natural concept: "Creation is the craving for form, man is the cry for expression, the state constitutes the first step in this direction,

art is the second, we know of none other,” (Benn, “Rede auf Stefan George,” 12). The ongoing impetus to create structure and thereby to grow is a clearly a natural one, and it is intrinsic to poetry. If we were to take Benn’s statement a step further and interpret his admittedly ambiguous choice of the word “creation” (“Schöpfung”) as “genesis” we can claim that the hitherto held belief of creation as a divine act can be seen as a natural one. The author, part of the organic process of life himself, essentially imposes order on chaos by creating another organism, an autopoietic system, in the form of a poem.

Much like a compass, poetry can aid both the poet as well as the reader (who in fact becomes poet himself) in this quest for direction, for order, for meaning, and thus ultimately for self-definition, in that it can point to sporadic centers of equilibrium (meaning) in an ongoing oscillation between poles. “A poem is the question of and the search for the self – always,” Benn has said (Benn, “Probleme der Lyrik,” 501). Hence, poetic creation is a natural component of the forever unsuccessful endeavour to find definite answers. Combining the knowledge of the sciences with that of the humanities can help us understand why the goal of absolute balance – absolute *meaning* – can never be achieved: essentially, our search for order is based on the chaos we perceive around us. Chaos is thus the prerequisite for order, and there would be no impulse to create without the need to do so. It is for this reason that chaos lies at the very bottom of the creative impulse that defines both natural life and poetry.

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