Repetition and Self-Similarity in Modern Poetics

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Abstract

"Repetition and Self-Similarity in Modern Poetics" offers some notes toward a rethinking of patterns which occur in thought about mathematics and poetics. Repetitions come in an overwhelming number of forms. Because mathematics has no real semantics until we bring it to specific applications, there are no obvious parallels until we enter the realm of syntactics or the structures of linguistic and mathematical forms. Here repetitions are obvious but analogies very difficult to hold together. The paper invites working mathematicians and physicists to think of standard analytical tools brought to both simple and complex poetic forms. Specifically rhyme, consonance and assonance, and rhythm through the use of patterns of accents are examined. Rhyme and rhythm are fundamental tools in our understanding of the way a poem works. Any effort to work with parallels between math and language will do well to consider rhythm and rhyme in poetic forms as evidence of iterative and self-similar features.

What is Here

When we were beginning to talk about the second gathering for the Bridges Conference, Reza Sarhangi suggested that we might get Gar Bethel involved. Gar has been writing and teaching poetic forms for more than thirty years. Much of that time has been spent in the public school system, from grade schools to community colleges, teaching children and young men and women how to make poems. This activity was underwritten for several years by the national Poetry in the Schools project sponsored by the NEA. We are pleased that Gar has found a home in Winfield and now functions as our unofficial city poet laureate. After describing the conference, he readily agreed to talk about a sonnet he had at hand. My contribution is the first part of the paper and may be found under the subhead: "Complexity in Identity". Beginning with some of the simplest of forms, nursery rhymes, street cries, and limericks, I comment on how these simple forms become so perversely complex as does the very issue of identity itself. As an active poet, Gar examines one of his sonnets and comments on its semantics and its syntax under the subhead of "Symmetries, Repetitions, Synthetics, and Semantics in a Sonnet". He acknowledges the difficulty of saying what exactly is controlling the production and structure of the poem. Certainly the public form is an aid but only a small part of the issue. As for the ultimate synthesis of these two perspectives on poetry, we leave it to the reader to join in what is at the very least a trialogic

Complexity in Identity

Repetitions delight the ear and eye as young children learn to read, to write, and to listen. Early nursery rhymes like this one kept many of us amused and sent us to sleep at night.

> Peter, Peter pumpkin eater
> Had a wife and couldn't keep her.
> So he put her in a pumpkin shell
> And there he kept her very well.

The meter, the organization of accented and unaccented syllables, is a little bumpy but the idea is clear. To rhyme is relatively simple. To talk about rhyme in mixed company, e.g. mathematicians, artists, musicians – becomes quickly difficult.

Every culture has its own street cries. A familiar one for the last few days in the United States is

> No more school!
> No more books!
> No more teachers'
> Dirty looks!

Or the even more prosaic

> I'm rubber.
> You're glue.
> Everything I say
> Bounces off me
> And sticks to you.

And this of course reminds us quickly enough of

> Sticks and stones may break my bones
> But words will never hurt me!

Easy enough to recognize the rhyming words in the brief efforts above, "shell/well", books/looks", or "glue/you". With the sticks and stones flying about our bones we must pause for a second to recognize that rhyme or repetition of sounds does not only come at the end of lines of doggerel or of verse. Here the initial consonant sounds in "sticks and stones" provide coherence to the line. We might even point to the terminal "s" sounds we have. The more sophisticated would ask, "Isn't there something else happening with the "my/me" combination and what about the rhythm I hear?

How did something so seemingly simple get so quickly out of hand? And should we call these various forms of repetition examples of symmetry? We Professors of English don't – of course. When a consonant is repeated we call it consonance: "Peter Piper picked a peck of pickled peppers." When a vowel is repeated we call it assonance. Assonance informs our simplest metaphors: from "high, wide, and handsome" to "You low, down dirty varmint, you!" And from "red sky at night/sailors' delight" to "Ashes, ashes. All fall down."

Of course we can always have fun when we play with the distinctions between what our eye sees and what our ear hears. Ear rhymes are easy enough to determine: "Mary, Mary quite contrary." But what do we call lines that close with "rough/bough" or "daughter/laughter" or "love/move/prove/trove"? We call them eye rhymes but for those of you who believe poetry should be oral/aural and not show itself in written form you would not recognize these as rhymes at all. This of course would place you in the middle ages; an era which a few of my friends are delighted to inhabit.

As we struggle with the intricacies of repetitions in poetry, we occasionally glance over our shoulders and wonder how each of your symbols, in mathematics or physics, has achieved its universality. The issue of identity in any field is enormously complex. We play with words like same, synonymous, isomorph, iteration, repetition, self-similarity. And uniform/uniformity, symmetry, and equality. The philosopher, Ludwig Wittgenstein, once wrote his mentor, Bertrand Russell, from a self-imposed exile: "Identity is the very devil!" Logician Gottlob Frege also was pulled into this century's valiant effort to provide a logical base for mathematics discovered another devilish identity issue in the infamous "Cretan Liar's Paradox". While traveling under many guises this problem in self-reference undercut years of work by Frege, Russell, and Alfred North Whitehead. Arguably it also provided the conclusion for Kurt Gödel's 1930 Undecidability Proposition [1].

Epimenides was a Cretan (a man from the island of Crete) who said that, "All Cretans are liars." If the statement is provable, he is a liar. And therefore the statement is false. So long as we can maintain a distinction between truth versus provability, we can play with language versions of the paradox. Wittgenstein observed, "You can go on like that until you are black in the face." And for him, it didn't matter. But for Alan Turing and the computer linguists and mathematicians who followed, it became a crucial issue [2]. Certainly as a programming obstacle, it aided the undoing of the much celebrated quest for artificial intelligence a decade or more ago.

Whitehead warns us of the illusion of identity with a discussion of the variable in mathematics and logic.

> ...the variable, though undetermined, sustains its identity throughout the arguments. The notion originally assumed importance in algebra, in the familiar letters such as x, y, z indicating any numbers.

> The use of the variable is to indicate the self-identity of some use of "any" throughout a train of reasoning. For example in elementary algebra when x first appears it means "any number". But in the train of reasoning, the reappearance of x always means"the samae number" as in that original appearance. Thus the variable is an ingenious combination of the vagueness of any with the definiteness of a particular indication [3].

Whitehead is even harsher in dealing with the metaphysical assertion implied by the humble and innocent looking equal sign.

While few working mathematicians trouble themselves much with Gödel or with questions like "whither the foundations of mathematics", it would still be reassuring to hear that some of these issues are raised in a math class or two upon occasion. Phillip Davis has called for a "hermeneutics" of mathematics to be created. That is a field, which examines the semantics of math as well as its syntax. While I am not sure we need one more field examining these philosophical issues, I am convinced that the history and philosophy of mathematics enterprise is a useful one and that it and we will profit from the insights of working mathematicians.

We should not be terribly alarmed however. Henri Poincaré assures us that much energy and time has been spent trying to keep the wolves of contradiction and paradox from calculus. But as he says, to our surprise, "the wolves were already inside the fence, before we even began our work". Some have begun to suspect that paradox actually enables systems and while we might gloss over it, we rarely eliminate it.

The issue of the length of the coast of England which is featured so prominently in Benoit Mandelbroit's commentary on fractal geometry has a predecessor in Wittgenstein's question about what exactly constitutes the shore line of an island. While Mandelbrot approaches the issue from one direction,

we can quickly see the issue when we ask what exactly is the line we are measuring in this perplexing distinction between water and land. So much of our work at the end of the century and before, in our poetry, mathematics and by extension physics, has been the investigation of that realm between one and not one (1=1 and 1≠1) or in symbolic logic between *p* and ~*p* in which *p* stands for proposition.

Metrics or scansion in poetics further complicates the issues of symmetry, repetition, or identity. Scanning is the act of determining the types and number of poetic feet in a line of poetry or in a complete poem. We determine feet by the use of accents indicated by a slash (/) and an unstressed syllable indicated by a *U*. And thus we have *U/* called an iamb; */U* called a trochee; *UU/* called an anapest; */UU* called a dactyl; *//* called a spondee; and *UU* called a pyrrhic foot.

Some of the poetry which is often identified by the use of rhythmic repetitions is well known. The limerick and the sonnet are recognized cultural forms which have entertained and informed us for much of our history. On line, we can find dozens of sites featuring each form with both offensive and non-offensive content. In selecting examples I have erred on the side of prudency. If you have forgotten, the traditional limerick sounds like this:

> A flea and a fly in a flue
> Were imprisoned so what could they do?
> Said the fly, "Let us flee!"
> "Let us fly!" said the flea.
> So they flew through a flaw in the flue.
> *Ogden Nash*

And here is one with a nod to Einstein:

> There was a young woman named Bright
> Whose speed was much faster than light.
> She set out one day
> In a relative way,
> And returned on the previous night. [4]
> *Author Unknown*

If only to close this nonsense verse with a nod of appreciation toward our host:

> There is a young Persian named Reza
> Who in control theory could sure turn a phrase.
> With a nod and a wink,
> Diverse fields he did link
> To create a complex math and arts maze.
> *Dan Daniel*

We can also find a definition on-line (What is a Limerick?)
(http://pwl.netcom.com/~pentatet/whatis.htm). A few of the rules are:
   1.) Lines one, two, and five must rhyme.
   2.) Lines three and four must rhyme.
   3.) The poem must contain five lines.
   4.) Lines one, two, and five must have three metric feet.
   5.) Lines three and four must have two metric feet,
   6.) The metric feet must be anapests (da da DUM or UU/) although the leading foot of each line may be an iamb (da DUM or U/).

7. The trailing foot of each line may have a trailing unaccented syllable (da da DUM da or UU/U).

While there are many other directions, these seven rules produce a small machine which will turn out innumerable recreational limericks.

Repetitions of course are fundamental to doing science, math, music, poetry and roofing a house. Nobel Prize winner Richard Feynman tells of his father's efforts to train his son as a scientist when the boy was still in a highchair. He set up bathroom tiles on his tray and then like dominoes Richard would push them over. "Pretty soon, we're setting them up in a more complicated way: two white tiles and a blue tile, two white tiles and a blue tile, and so on. When my mother saw that she said, "Leave the poor child alone. If he wants to put a blue tile, let him put a blue tile.' But my father said, "No, I want to show him what patterns are like and how interesting they are. It's a kind of elementary mathematics." So he started very early to tell me about the world and how interesting it is." (*What Do You Care What Other People Think?* p. 12) Along the way his father also taught him that the most amusing truth of life is that it is all just repetition. "No matter how complicated the business is, the main point is to do it again!" (p. 13)

This doing it again should not surprise us in mathematics or art. It is fundamental to the matter and culture or sign systems which have made us and our world. We teach this truth at every opportunity. The sonnet is another of those forms which have continued for several hundred years. One of the most common forms is that produced by Petrarch. A sonnet is a fourteen line poem, usually in iambic pentameter or five feet of unaccented and accented verse (U/ through ten syllables). The Petrarchan sonnet is divided into an octave (first eight lines) and a sestet (last six lines). The octave presents a problem or situation which is then solved or commented on in the sestet. The most common rhyme scheme is ABBA ABBA CDE CDE. The Shakespearean sonnet was brought to England from Italy. Shakespeare did not invent the form but he brought it to something approaching perfection. The most common rhyme scheme is ABAB CDCD EFEF GG. Here the concluding couplet (GG) often undercuts or comments on the thought created in the rest of the poem.

I have asked Gar Bethel to present one of his sonnets with some discussion about what he sees after the fact and act of creation.

Symmetries, Repetitions, Synthetics, and Semantics in a Sonnet

Connections
Sunset, autumn, an intense glowing light
before a chilly night, perhaps the last
something to dive into like a woman
or hope, like acting the father to a child.

or writing a poem that wants to last
as some events enter into a man
and revive the energy of a child
and have him flying into a blind light.

For a moment, sun glares off my window,
and a bird flies into its charged center
where he feels, he must, there's a passage through.

Stunned, he drops unwinged to the ground we know.
I'm inside the place he wished to enter

hoping to shed light on this risky view.
Gar Bethel

This poem is about the difficulty in finding an absolute. This theme is evidenced on three levels – the argument line by line of the poem, the basic structure of the poem, and the vocabulary used. All of the levels reflect the theme through the use of repetition and variation.

The poem begins with standard symbols for the end of a process or the end of a life – sunset and autumn before the death of a chilly winter. The first eight lines present metaphoric last efforts to find something firm to hold on to – a woman, hope, raising children creating art that revitalizes the writer as well as the reader. These last two efforts are standard means of attempting to survive past death. The final six lines are a description of a bird flying into a window and the writer's tentative conclusion. The first part talks about diving into and flying into and the last part delineates a specific diving flight. This is one of many repetitions and variations.

The basic structure of the poem is a sonnet, which might be seen as an equation in which variations have been used to provide a different view of a fundamental problem. The poem emerges from a whole history of sonnets, but like all art strives to be original, to strike a fresh perspective. Sonnets have fourteen lines with each line ten syllables long with five beats per line. The second line of this poem is a perfect iambic pentameter. All other lines are variations. There are two types of traditional sonnets – Petrarchan, which separates the poem like an equation into eight lines setting up a problem and six lines reaching some conclusion. A variation of this structure is the Shakespearean sonnet, which presents three quatrains setting up the problem and the last two lines offering a conclusion.

"Connections" varies its approach enough to have the third from the last line fit as smoothly with the previous three lines, making the last two lines a sort of concluding couplet. There are other variations on the standard sonnet. The last six lines are rhymed traditionally, but the first eight (in keeping with the theme of futility in discovering an absolute) only appear to rhyme. In fact they do not rhyme at all but only repeat words, except for "man" and "woman" which are half rhymes.

The man/woman opposition brings this discussion to the level of vocabulary. At this point the variations take on a more pronounced contradiction. Any attempt at discovering an absolute runs into such contradictions. On one side of the poem's equation you have "hope" on the other "hoping", "enter" as achievement and "enter" as wish, flying as metaphor and flying as description. Other variations in the revelation of opposites under the guise of identity or sameness are – "glowing light"/"blinding light", "the last" (termination)/"want to last" (continuation), and "shed light" (reveal information about)/"shed light" (throw off light like water off a duck). The last example is called ambiguity.

Another method is used to create an unstable atmosphere in keeping with the theme. It might be called controlled chaos – the illusion of randomness under artistic control. This method often manifests itself in surprises, which keeps the reader alert and challenged – "perhaps the last" (what?) then your eyes move to the next line ("surprise"). Moving from one line to the next in this way is called enjambment – "woman" to "hope" (are they in the same category or different ones?). Another surprise can be seen in the unexpected "we know" which might have been the expected "below", but here forces the reader into the middle of an unanswerable problem.

Finally, there are a series of contradictions that again repeat and vary the quest for some absolute. The whole poem is written from a male perspective. Looking for the "charged center" of a woman is one example. The perspective is definitely phallic – diving into, searching blindly for some answer, and yet the last two lines switch perspective. The writer is now inside watching himself fail to gain access into an absolute and yet hoping against all reason to discover something. This reflects a series of ideas in which

the writer lacks mastery over life – with a woman, "acting" a father, the poem not the writer wanting to last, the light blind, not the writer. In the end as he approaches a "chilly night", this creator attempts to depict the difficulty in discovering a solid formula for understanding. The poem is like one of those complex equations you see on a chalkboard behind a professor in a Hollywood movie.

In addition, it must be emphasized that the passionate outburst of the first eight lines dominates the whole poem with its life affirming images. Consequently, that section of the poem has the most poetic repetitions or assonance – glowing, hope poem; perhaps, last, acting, last, man, have; light, night, dive, child, writing, revive, child, flying, blind, light. Although the next section dutifully recounts a foiled and stunned fall from free flight, it is the change of perspective in the last two lines that takes priority by reestablishing the writer's life affirming quest and not some failure of that quest.

References

[1] See for discussion Ernest Nagel and James R. Newman, *Gödel's Proof,* New York University Press, 1958. First published in German in 1930 and then translated in English the following year, the paper was titled: "On Formally Undecidable Propositions of *Principia Mathematica* and Related Systems." *Principia Mathematica* was by Russell and Whitehead. Gödel placed the essence of various language paradoxes into a mathematical form, thereby avoiding the problem of truth which is viewed as distinct from the question of provability with regard to mathematical propositions. He created a proposition that says of itself "I can't be proved." If the statement is false, the system is inconsistent. If the statement is accurate, then the mathematical system is incomplete because it holds accurate but unprovable propositions.

[2] Ray Monk, *Ludwig Wittgenstein: The Duty of Genius*, New York: Macmillan, 1990, 415-416. Turing's biographer says of this debate over the significance of paradox in propositional logic: "AMT [Alan Mathison Turing] sometimes liked to give the impression that he had scored off Wittgenstein at some point, but if so the evidence is not to be found in the transcript." Alan Hodges, *Turing: The Enigma* (New York: Simon and Schuster, 1983), 152-147, 546-547n. If any one "scored", it was Turing – if only for his insistence on the importance of "contradiction".

[3] Alfred North Whitehead, *Modes of Thought* (New York: Macmillan, 1968), 106-107.

[4] Favorite Limericks – http://www.hooked.net/~kristena/faves.html (May 1, 1999).