

Mathematics and Poetry: Some Impressions

BY AZFAR HUSSAIN

1
I think I've always loved mathematics in my own ways.

True, given the kinds of options that were available in my high school, I enthusiastically opted for what was then called the "Humanities Group." But I enrolled in that group—and later majored in literature—not out of my fear or dislike of mathematics as such.

In fact, very early on in my life, I used to look at mathematical symbols—or, say, at certain mathematical "compositions"—as I would look at paintings or even poems with a sense of awe and wonder. The symbols arranged in certain order on a page—or for that matter, patterns rendered visible—simply looked beautiful to me. They still do. Once in my dream, a dream that I vividly recall, I saw how an entire Shakespearean sonnet morphed into

out on pot.

But I was surely high on the poetry of mathematics itself.

2
The more I read Dante's epic poetry on the one hand, and examine Bhaskaracharya's mathematical works on the other, the more I realize that there has always been some poetry in mathematics and some mathematics in poetry. Of course, poets have long mobilized mathematical imagery, ideas, and insights. Many mathematicians, on the other hand, are known for using poetic lines, images, metaphors. I find it both interesting and instructive that the earliest poet known by name is also the earliest mathematician known by name—Enheduanna. She was the chief priestess of the moon god Nana in the city of Ur and daughter of the Akkadian king Sargon, one who was known to

As Pound puts it: "Poetry is a sort of inspired mathematics, which gives us equations, not for abstract figures, triangles, squares, and the like, but for the human emotions." But, then, it is also true that certain kinds of poems—variously known as typographical poems, concrete poems, *prometa figurata*, or visual poems, or *carmen figuratum*—directly provide those figures, triangles, and squares Pound speaks of. One can readily think of the French poet Guillaume Apollinaire and the American poet e. e. cummings and even—before them—the great French poet Stéphane Mallarmé, among numerous others, who produced typographical poems, attesting to their geometrical imagination.

We discuss some of their poems in a course called "Creativity" that I teach relatively regularly at an American university. It's an interdisciplinary course predicated on the assumption that creativity is not the territory exclusively inhabited and owned by the privileged few but that creativity is to be found in the entire range of lived human practices. Students in this course explore, among other things, not only the apparent similarities and dissimilarities between mathematics and poetry as such, but also the poetic in mathematics and the mathematical in poetry.

We use the text instructively titled *Strange Attractors: Poems of Love and Mathematics*, edited by Sarah Glaz and JoAnne Growney, among other works. That international anthology not only features mathematically inspired poems by such figures as John Donne, Elizabeth Barrett Browning, Emily Dickinson, Rafael Alberti, Langston Hughes, Pablo Neruda, Duniya Mikhail, but also some great selections from Dante's *Divina Commedia* (Paradiso: Canto XXXIII).

We had numerous discussions surrounding those works, making all sorts of points *vis-à-vis* the relationship between mathematics and poetry while one consensus had already emerged: that all the poets I've cited above have what my students themselves came to call a "strong mathematical imagination." I then shared with them the words of the great nineteenth-century mathematician Karl Weierstrass: "It is true that a mathematician, who is not somewhat of a poet, will never be a perfect mathematician."

Weierstrass suggests that both poets and mathematicians pay utmost attention to language itself, avoiding what's unnecessary or even inelegant, and that both cannot operate without using their imagination, striving for the highest excellence at the levels of both language and imagination.

The nineteenth-century English mathematician Augustus de Morgan even puts it bluntly: "The moving power of mathematical invention is not reasoning but imagination."

Remaining attentive to the power of both imagination and language, students in my "Creativity" class further explored certain connections among poetry, music, and mathematics, while even choreographing some lines from Dante's *Divine Comedy*—lines that deploy geometrical images and metaphors with superb effects! Our conversation surrounding the metaphor of "squaring the circle" led to a fascinating discussion concerning numbers themselves—numbers that are rational, irrational, algebraic, even transcendental. And I was then continuously thinking of Pablo Neruda's poem called "Ode to Numbers" side by side with Alain Badiou's book *Number and Numbers* as well as the American poet Carl Sandburg's poem "Number Man," while we also talked about the effects of what are called "logarithmic spirals"—ones famously described by the French mathematician and philosopher René Descartes and ones abundantly available in nature itself.

And, finally, the class as a whole, I thought, experienced the sheer beauty of mathematics itself, as we watched and discussed a few videos about the infinite geometry of doodling itself, making the point that to doodle is to produce an infinite number of beautiful spatial patterns—patterns that can even sing, dance, act. Is geometry itself then music spatialized? The answer in the class was in the affirmative. And speaking of patterns, I recall the English mathematician G.H. Hardy: "A mathematician, like a painter or poet, is a maker of patterns."

Now one might still wonder what is actually so poetic about mathematics. The writer JoAnne Growney (whom I mentioned earlier) brings up certain examples of fine poetry within mathematics in the form of rhetorical questions: "Is Euclid's proof of the infinitude of primes poetic? What about the Pythagorean Theorem or the equation that asserts that the sum of all negative powers of 2 is equal to 1?" She offers her own choice that I find agreeable. It's the "Pigeonhole Principle," which, as she succinctly puts it, "is a statement that, like a mantra, and like a good poem, takes on new meaning again and again: if the number of pigeons residing in your pigeon house is more than the number of pigeonholes, then at least one pigeonhole must have more than one pigeon."

3
Let me now categorically and quickly make a few more points concerning the relationship between mathematics and poetry, while also keeping in mind the question of music as well as the world in which we produce our poetic, mathematical, and musical works.

To begin with, basic things like rhythm, rhyme, order, pattern, symmetry, symbols—ones that variously obtain in poetic production—immediately involve the mathematical itself. Moreover, while both poetry and mathematics deliver their "truths"—as Emily Dickinson once put it: "Tell all the truth but tell it slant"—it is also true that both mathematics and poetry *also* continue to suggest and provoke all possible combinations and configurations of symbolic and tropic phenomena, which, however, remain anchored in the material world in the final instance.

And, of course, music and mathematics—as many musicologists have shown—speak to one another in various ways. But their exchanges do not merely reside in how they symbolically represent our world, but also lie in the ways in which both 'make' and mobilize abstractions that—however heightened and 'pure'—cannot simply free-float out of the horizon of human history.

Further, as far as mathematics in particular is concerned, it cannot but function rhetorically ('rhetoric' being the art and science of persuasion). Think, then, of the ways in which mathematics, like poetry, uses analogies, homologies, contiguities, substitutions, equivalences, and so on—or, say, simile, metaphor, metonymy, synecdoche, and so on—while also mathematics, like music in particular, uses refrains and repetitions—also to be found in poetry—while even improvising so many different kinds of syllogisms in their attempts to persuade.

But all mathematical and poetic *tropologies*—if you will—finally remain anchored in the material world insofar as the act of making connections and combinations—an act that is of course common to both mathematics and poetry—cannot operate *in vacuo*, but certainly needs a base. And that very base is constituted by the body and nature.

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a 14-line mathematical equation right under my eyes!

Indeed, way before I began to read the French philosopher Alain Badiou—whose love of mathematics is unmistakable—I had realized in my own way that mathematics is more than just logical proofs; that mathematics cannot always be reduced to conventional logic; and that mathematics at a certain level does not have to do with even computational accuracy but it surely involves the power of our imagination.

As I recall, I even told a mathematics teacher during my Dhaka University undergrad days that there's poetry in mathematics. He laughed out loud, thinking that I was crazy or even stoned

govern the region of Sumer during the period between 2334 and 2279 BCE.

In their book *Discovering Patterns in Mathematics and Poetry*, Marcia Birken and Anna C. Koon rightly provide other examples of poet-mathematicians that history has witnessed: Eratosthenes of Greece (274-194 BCE), Omar Khayyam (1048-1131), Lewis Carroll (1832-1898), Piet Hein (1905-1996), among others. All of them—their different styles and approaches notwithstanding—found striking and even stimulating parallels between poetry and mathematics, even anticipating Ezra Pound's crisp contention that poetry is a kind of inspired mathematics, among other things.



FICTION

Commute of an old man

RUSAFA HUSSAIN

Year 2060: I was a lonely kid. Sometimes I felt as if I lived my whole life alone. There were different people here and there, fluttering in and out, at the intersection where our lives crossed, before the roads untangled and moved apart.

There come the memories, hazy remembering on the daily office commute. The train ripples and lurches across the city. The same journey, the same office, for 25 years, as I age in the belly of the beast. I've aged a day, every day, for 25 years, as I travel on these familiar tracks, where time resumes and is free to flow with a vengeance. After I step out of this locomotive, time will stand still once more, I will feel immortal, unable to die, though I'm merely a happy, nondescript man going to his nondescript job.

(Year 2035: The brochures guaranteed I'd be happy. The operation success rate was 100%. Nothing could go wrong.)

All wounds heal eventually, or so they say. I couldn't recall who "they" were exactly, just a vague conversation, that has been swept away by time. I tried my best to heal, did my best to form connections with people. I considered them to be the antidote to my perpetual loneliness. But I would soon realise, there was nothing as temporary as human connection. What a waste.

A week ago, I wasn't allowed to donate blood. Was simply handed back my medical file and was told I was not eligible. I wanted to ask "Why?" but I suppose I already knew.

(The procedure was completely safe. It was expensive, yes, but a life-preserving procedure, according to my therapist. I wanted an escape. I wanted to die.)

Then why can't I donate blood? I pick at the bandages on my left arm. The scab itches. Yesterday, I almost threw myself on the path of an oncoming train. Not on purpose. Never on purpose, mind you. It was as if my feet had a mind of their own. My muscles opposing every signal I sent. But mind over matter, and I managed to force myself to stand still, muscles straining, sweating, under my neatly ironed attire. I was safe. I boarded the train and got to work.

(I was only 27, at the prime of my youth, I couldn't just die. I had promise. Potential. I just landed my first job at a brand-new firm. So, I went for the surgery. Worth every dime.)

No one taught me the mechanics of how to deal with loss. Then again no one can prepare one for the loss of a loved one. The avalanche of grief, the suffocating pain, reached unbearable limits. But it wasn't the worst part. The worst part came afterwards. When all the anger, grief and pain faded away, and nothing replaced those feelings. At the point where my mind was just a wasteland of empty nothingness, I was begging for the pain back. But the numbness is invasive. It feeds and crawls and settles deep, ready to share your body. I wasn't depressed, not quite. I just wasn't... there, anywhere. But that was ages ago. Decades. Last night, I went to the roof. When I returned to my senses slightly disoriented,



I found my feet flirting with the roof's edge. Unable to step forward or back. I was left with a growing suspicion that I climbed up so I could jump, without having any memory of doing so. This was not supposed to happen.

(They said, the surgery could erase it all. Self-destructive tendencies, self-harm, all those thoughts, and attempts. Suicide was a thing of the past, they said. I said, sounds great.)

Afterwards I felt fine. Better than I had in ages. It was nice, doing normal things, like drinking tea at a cafe, without thinking about killing myself. I was fine now. I just started to develop a slight problem with talking to people. Making conversation

just seemed a bit strange, like we were on different planes. Also, I guess I just didn't see the point in talking so much... so I didn't. My bosses were happy. I did my work quietly, efficiently. I got a raise.

And things were fine. Until a month or two ago. I don't remember when it started. But one day I realised I had unknowingly started hoarding sleeping pills. I never had any trouble sleeping. I flushed them down the toilet.

I did not want to kill myself. I was happy. I did not even feel a flicker of sadness for the last two and a half decades. So why are the attempts happening again?

(Millions of people underwent the surgery. The

knife and scalpel did wonders. People who were once broken, are now able, functioning members of society. Our labour and contributions are valued.)

Perhaps it was simply another layer of betrayal. When your body is in defiance of your existence, when your mind has forgone that role. The operation success rate was 100%. My mind was whole. I am whole. I am a whole person. I do not want to die. My body just simply wants to break itself.

The other day I had accidentally sliced my arm while making dinner. I disinfected and wrapped it up properly. The damage wasn't as bad as I anticipated, despite the quantity of blood. I didn't even have to take the next day off.

Ah, this is my station. I exit the train. I put on a bright, bright smile, and head to work. Under the sun, I am immortal. And, unable to die.

[Extract from a 2035 newspaper: A remarkable scientific breakthrough has been achieved. Humanity reigns supreme. No longer are mental health issues a plague of mankind, a hindrance to our economic growth and welfare. We have miraculously overcome a problem which was once seen as insurmountable. Radonex group has officially announced depression, anxiety, bipolarity disorder can now be surgically cured. Long live mankind.]

*Long term effects of this procedure are yet to be observed.]

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