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Recommended Citation

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Synopsis

Two collections of mathematical poetry edited by poet and mathematician Sarah Glaz are enthusiastically recommended to readers for the quality of the poetry, the diverse voices speaking in many modes—praise, elegy, philosophical musings, story-telling, humor, playfulness—and the variety of ways in which mathematical references are incorporated or illustrated. The work comes from participants in the Bridges conferences connecting mathematics, the arts, and the sciences over the last seven years.

Bridges 2013 Poetry Anthology Edited by Sarah Glaz, Tessellations Publishing, 2016. (US $19.95.)

Bridges 2016 Poetry Anthology Edited by Sarah Glaz, Tessellations Publishing, 2016 (US $19.95.)

These two anthologies [1, 2] sample the math-related work of poets presenting at the Bridges Conferences (2011–2016) connecting mathematics with music, art, education, and culture. Edited by poet and mathematician Sarah Glaz,

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(University of Connecticut), who has also co-edited a collection of mathematical love poems (Glaz & Growney, 2008 [3]), the anthologies offer samples of two to four poems from each featured reader, seventeen poets in the first collection and many of these again plus an additional eleven poets in the second.

Humor, insight, and moving meditations on life, love, loss, time, and death are all to be found here, as one would expect of any poetry—and here these subjects have their corresponding mathematical side: addition, multiplication, subtraction, the number line, zero.

Some poems concern the struggle to be mathematicians in the world, or the story of how the poet came to be a mathematician—for example, Gizem Karaali, in the formal poem "A Mathematician's Villanelle" (2016) writes:

> When first did I learn to cherish the bittersweet taste of mathematics?
> Mental torture, subtle joy, doubt and wonder, me in meaning
> Must have come later, after the games, the limericks, the lyrics. . .
>
> Strange ceremonies awaited me, mystical hymns, magic tricks,
> After the first gulp of water, the first bite, the first bloodletting.
> When first did I learn to cherish the bittersweet taste of mathematics?
> . . .

Some address directly the fear that mathematics is devoid of feeling by reporting their feelings about mathematics. Carol Dorf, in "Dear Ivar" (2013), a response to Ivar Ekeland, author of *Mathematics and the Unexpected*, writes:

> I read your book on the unexpected.
> Like most poets, I opposed mathematics
> when I was young, seeing it as the converse
> to feeling. The previous statement is false.
>
> When I was very young I loved counting
> and zero and even numbers. At sixteen,
> I wanted to imagine calculus as a novel
> of limits and motion. . .
> . . .
>
> Today I am sending this fan letter. Thank you
> for explaining catastrophe and instability. . .

Vera Schwarcz, in "Abstract Equilibrium," (2016) argues for the visceral quality of human lives not captured by the formalisms of simulation:

> . . .
>
> Machines can simulate
> a two player game,
> not live it, as we did.
>
> Ours had more variables,
> less equanimity in nights
> of soft-spoken argument,
> and even more silent
> love. . .

Others, with deceptively simple numbering of events, use math to make us feel the weight of events, as Amy Uyematsu's poem titled "Zap #19" in the 2016 volume conveys the freighted story of the progress of her cancer treatment:

> as a retired math teacher
> I guess it figures I notice
> that today there are 3 technicians
> instead of the usual 2
> and I have 12 more sessions
> with 6 of them designated
> as "breast boosters"
> my mind sidetracking briefly
> to booster shots and bustiers
> I'll have 31 zaps in total. . .

Some poems both take mathematical constructs, and mathematicians, as their subject matter, and use the concepts as metaphorical lenses for life.

For example, the paradox of mathematical infinities in our finite lives has attracted many of the poets. Alice Major, author of a book of essays on poetry and science, (Major, 2011 [4]) writes in the 2013 collection on "Zeno's Paradox":

> . . . We know this series sums
> to a finite thunk and shudder. . .
>
>   . . . Yet something stalls
> in the air, an infinitely subtle slowing.
> Of whatever I have learned when the arrow falls
>   silent, one last sliver will be lost.
>   A final distance will remain uncrossed.

Tom Petsinis reaches a similar resolution in his poem "Zeno's Paradox" (2016), saying:

> And if I've walked half my allotted life
> To reach the tip of this peninsula,
> My death is there, sharp as the horizon,
> A dream approached but never realized.
>
> When I think of infinite division
> Nature is made more eternal through me.
>
> I will never reach the end of this line.

Mike Naylor (2016) of Norway gives another take on the paradox in a brisk and funny Dr. Seuss-like performance of sharing the last cookie at Zeno's First Conference on Infinite Sums in "The Last Crumb," a poem that also plays on the parable of the loaves and fishes:

> We'd invited them all, but who thought they'd all come!
> To Zeno's First Conference on Infinite Sums.
> We'd gathered together in Aleph-Null square,
> And an infinite number of people were there!
> . . . .
>
> George, the main speaker, asked me for the news,
> And I said "I'm afraid that it's simply no use.
> "One cookie is all that survived the buffet,
> "And one cookie will not feed these people, no way."

. . . .

He gave me a stopwatch and said, "Would you mind?
"I'd be ever so grateful if you'd watch the time
"For I'll double my speed as I slice up each one
"And in just sixty seconds the job will be done."

Nineteen additional stanzas entertainingly enact this feat of apportionment, accompanied by illustrations.

Emily Grosholz, philosopher of mathematics, writing on "Reflections on the Transfinite" in the 2013 volume, concludes:

You are the great collection of desires,
Forever incomplete, unsatisfied,
Toward which all finite sequences in time
With little steps so trustfully aspire.
Though you outrank them all, see how they run
Like atomies of fire toward the sun,
Sent over the abyss with no alarm
To make the leap across into your arms.

Amy Uyematsu asserts, in "Infinity to the Nth Power" (2013):

. . . Old Man Pythagoras
was insecure about the whole matter–
deeming the finite masculine and good,
while infinity was feminine–both had to be
subjugated–as if either could.
I rather like being a woman who tries
to embrace the ever emerging infinite, especially
when it comes to love and my own unfolding
of wonder after wonder.

Michael Bartholomew-Biggs observes, in "Numerical Analysis Quasi-Haiku Sequence" (2013):

TAYLOR'S THEOREM

If we knew it all
for just a single moment
we'd hold the future.

What else qualifies these poems as mathematical? Glaz lists some of the ways: mathematical language and metaphor, play with geometric or symbolic imagery, the use of mathematical ideas or history as content, the life histories of mathematicians, mathematical means of structuring poems, and mathematical constructs as "commentary on life, ideas, and emotions."

For example, Mike Naylor of Norway in the 2016 collection offers a punning concrete poem in the form of a branching "Decision Tree"; and a literal rendering of the increasing fractal waviness of the seashore line in "Water's Edge."

Kaz Maslanka, blogger at "Mathematical Poetry," offers visual art as illustration of verbal equations (2013). Here is an example:

"Singularity": secrets = (Nightmares)(Truth)/(a flower).

Tatiana Bonch-Osmolovskaya, creates playful word arrangements in "Squaring the Sphere" and "Sandglass" (2013).

The life histories of mathematicians and their ideas figure in a number of the poets' works; the story of Newton vs. Leibniz, for example, in Sarah Glaz's "Calculus" (2013):

I tell my students of Newton versus Leibniz,
the war of symbols, lasting five generations,
between The Continent and British Isles,
involving deeply hurt sensibilities,
and grievous blows to national pride...

Emmy Noether, immigrant from Nazi Germany, is the subject of Francisco José Craveiro de Carvalho's poem, "Emmy Noether at Bryn Mawr," translated from the Portuguese by Sarah Glaz and the author (2013):

> The class had come to an end
> midway through her
> demonstration.
>
> It happens.
> Even when you plan
> a clean break.
>
> Students were leaving
> unaware
> that having
> lost already home and country
>
> Ms Noether's
> next lesson
> would be attended
> by death.

Poet JoAnne Growney offers a narrative of mathematician Sophia Kovalevsky's short life in the details of "With Reason: A Portrait" (2013):

> Because she was Russian . . .
> Because she had abundant curly hair . . .
> Because she loved mathematics . . .
> Because she was born in the 19th century . . .
> Because lecture notes for calculus papered her nursery walls . . .
> Because her parents forbade her to leave home . . .

In the 2016 volume you can find Stephanie Strickland's "The Romans Captured Archimedes," Manfred Stern on Georg Cantor, Eveline Pye on Florence Nightingale. In the 2013 volume, Emily Grosholz writes to Hourya Sinaceur, contemporary mathematician and historian, reflecting on the ways that mathematicians have been silenced in the past.

Engineering problems requiring mathematical analysis figure in Michael Bartholomew-Biggs' poems from Fred and Blossom (2013)–a story of a romance resulting in a couple's life together designing a light airplane: "So How Do You Design an Aeroplane?"

> . . . So like a child you have to learn
> from other people's work. There's much
> the miller or the yachtsman knows
> about the shape and trim of sails
> to stop them breaking when they borrow
> from the wind sufficient force.

The mathematical modeling of cognitive function informs poet Philip Holmes' reflection on identity and our life experience in this excerpt from his formal sonnet "Minding One's Business" (2013):

> Spikes fly from head to toe; we feel the
> clutch of signals taken up, released:
> a world of sense and memory from which
> all action springs. But here's the scruple:
> Is correlation cause? And where am I?
>
> If not bound by muscle, then by nerve:
> we've come to learn this much. Our bodies
> hold the present in their pasts, afford a grasp
> against the day's assault, the waste of light. . .

Formal structure adds a mathematical frame to Madhur Anand's 13-syllable lines in poems, near sonnet length, that muse on the identity matrix, species loss, and, here, "Type One Error" (2016):

> I avoid news, talk to strangers, walk around the block
> a thousand times and toss nickels for random samples.
> I still get a few false positives. I'm fine. It's good.
> That in reality I should have ordered the eggs
> Benedict. "Straw" yellow would bring out the living room
> walls more than two coats of "Hay Stack." . . .

What are the backgrounds of the poets? Glaz summarizes the varied mathematical connections of the poets in the 2016 volume as "college professors doing research in mathematics, statistics, environmental studies, history, philosophy and education; engineers; higher-education administrators; librarians;

professional artists; writers, translators, and poets; primary and secondary school teacher, and more." More than half are women.

The poems are all in English, (though they include US, Canadian, British, and Australian speakers, with translations of Russian, Iranian, and Portuguese work in the 2013 anthology and, additionally, poems from Norwegian and German writers in the 2016 volume.) Poets are arranged by alphabetical order of last names in both volumes.

The large-format books (with attractive mathematical cover designs of sculpture (2013) and fractal curves and tessellations (2016)) run to 60 and 75 pages respectively and are available from the publishers.

I recommend the two collections to readers highly for their variety, insight, love of mathematics, and playfulness, as well as the meetings from which the poets come.

The Bridges Conferences on Mathematics, Music, Art, Architecture, and Culture have been held annually since 1998; the 2017 Bridges Conference will be held at University of Waterloo in Waterloo, Ontario, Canada, 27-31 July 2017, including a reading of poetry exploring mathematical themes.

References

[1] Sarah Glaz, ed. *Bridges 2013 Poetry Anthology*, Tessellations Publishing, Phoenix AZ, 2013.

[2] Sarah Glaz, ed. *Bridges 2016 Poetry Anthology*, Tessellations Publishing, Phoenix AZ. 2016.

[3] Sarah Glaz, & JoAnne Growney, eds. *Strange Attractors: Poems of Love and Mathematics*, A.K. Peters, Wellesley MA, 2008.

[4] Alice Major. *Intersecting Sets: A Poet Looks at Science*, University of Alberta Press, Edmonton, Canada, 2011.