MATHY POEMS

from

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BRIDGES Conference Poetry reading

about the poet

A self-portrait / bio using seven favorite lines of poetry:

I lift mine eyes unto the hills
How does your garden grow?
I make my magic / of forgotten things
I learn by going where I have to go
Will go on prancing, proud and unafraid
As truth can live with right and wrong
Rage, rage against the dying of the light

(Lines are from the *Book of Psalms*, *Mother Goose*, Muriel Rukeyser, Theodore Roethke, Adrienne Rich, E E Cummings, and Dylan Thomas.)

Contents

More and More Primes

Lemma: Every integer greater than one has a divisor that's prime.

This is a dialogue between two voices – a ***left*** voice and a ***right*** voice.

Start with 2, 3, 5, 7,
11, 13, 17, 19, and so on.

These numbers evenly divisible
only by themselves and 1.
These primes.

Sometimes the list
has large gaps -- like 18
between 523 and 541

– but, not always!
Close like twins we find
9629 and 9631.

How many primes
can be found?

Euclid (around 300 BC)
proved a finite list
cannot contain them all.

Does this mean there are
infinitely many primes?

Euclid used proof
by contradiction. He began by supposing
the opposite of what he sought to prove.

That seems dangerous.
Like supposing a defendant
is guilty while trying
to prove her innocence.

Suppose there is a finite list of all the primes.
Then calculate a marvelous number M
by multiplying all these primes
and — to the product -- adding 1.

Let me visualize the number M –
to get it I add 1 to the product
of all the primes. ·
Like M = 2 times 3 times 5 times 7 times 11 (and so on) plus 1
Mighty and marvelous M.

The number M thus must have
a prime divisor p.
.

Ah, you are applying the epigraph.
I have been waiting for that.

And p must be a *new* prime
not on our list. For if M is divided
by a prime on our finite list
the division will not be even, instead
there will be a remainder of 1.

EEEEK. Slow down,
This hurts my head like "The Love Song
of J Alfred Prufrock." Too much
for my brain. Euclid was smart
and famous. And I am a girl.

So now we have two opposite statements.

1. We have a finite list of all the primes.
2. Our finite list is missing at least one prime.

This contradiction lets us know
it was incorrect to suppose
there is a finite list of primes.
The opposite must be true.
The list of primes is infinite.

EEEEK.
Slow down,
This hurts my head like "Tender
Buttons." Too much
for my brain. Euclid was smart
and famous. And I am a girl.

You are correct. Mathematics,
like poetry and proof of innocence,
requires more than one interrogation
to reveal itself.

Fool's Gold

Not a cashmere sweater for the moths to eat,
nor a Picasso print to hide a dent in plaster.
No more scarves or earrings or a bread machine,
no crystal perfume vials or precious inlaid boxes.
Please, no plants I might allow to die.
Celebrate this birthday with numerology.
Select and give a number. I like large primes—
they check my tendency to subdivide
myself among the dreams that tease
like iron pyrites in declining light.

Consider seventeen. Its digits will
turn heads when I wear it large and crimson
on a grey T-shirt. Watchers will wonder
whether I pay tribute to the ancient Flood
that started and drew back on seventeenths
of Hebrew months, or if I count invasions
of northern India by the warlord Mahmud,
or if, like early Muslims, I base the world
on it — sum of one, three, five, and eight—
basic corner of a magic square.

I know a mathematician . . .

always busy
counting, doubting
every figured guess,
haply idling,
juggling, knowing
logic, measure, n-dimensions,
originating
playful quests,
resolutely seeking theorems,
unknowns vanish :
wrong xs, ys -- zapped.

Pigeons in Their Pigeonholes

*Remember that **n** always will denote a positive integer.* --Anonymous (math professor)

My friend, don't be mislead—
while the Pigeonhole Principle seems
informal, it's a very general idea of what always happens
when you have more objects than compartments in which to place them.

If we have ***5*** holes and more than ***5*** pigeons, and if each pigeon
enters a hole, then at least one of the holes will contain more than one pigeon.
If we have ***n*** holes and more than ***n*** pigeons, and if each pigeon
enters a hole, then at least one of the holes will contain more than one pigeon.

.

We can have more fun
if we move on from pigeons.

If a mail-carrier has more letters to deliver
than there are mailboxes on the mailroom wall,
then at least one box will get more than one envelope.

If we pick three cards
from a standard red-black deck,
at least two will have the same color.
If we pick five at least two have the same suit.

Is it true that in any sequence
of thirty words in *The Washington POST*
at least two of the words will start with the same letter?

In any group of 500 people
will two or more share a birthday?

At any happy hour
with two or more people,
will there be at least two people
who have the same number of friends?

Yesterday, after lighthearted days of counting pigeons and
solving puzzles, I found two poems about pigeons
by Mila Aguilar. Her birds were caged and
had clipped wings and
will never get home.

And then I thought about how mathematics
is such a clean sharp picture
of just one side of things.

Mila D Aguilar is a Filipina poet and journalist who was arrested for subversion in the 1980s
and who now lives and reports in Manila—producing video documentaries.
I found her poems "Pigeons for My Son" and "Freed Pigeon I Shall Be"
in *Wall Tappings, Women's Prison Writings* (Feminist Press, 2002).

With Reason: A Portrait

Sophia Kovalevskaya (1850-1891)

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 . . .
Because a woman could not travel abroad from Russia
without her father or a husband . . .
Because she found a kind man to marry . . .
Because ideas came to her in torrents . . .
Because she married a man she did not love . . .

Because her sister died . . .
Because her mind was powerful . . .
Because her passion was mathematics . . .
Because her mentor was Karl Weierstrass . . .
Because she extended Cauchy's theorem
for partial differential equations . . .
Because she could not care for her daughter
when exhausted by mathematics . . .
Because she investigated the refraction of light . . .
Because she knew Saturn's rings are unstable . . .
Because she wrote novels and a memoir . . .
Because she struggled with happiness . . .

Because she went to Sweden and the Northern Lights . . .
Because she understood fixed points completely . . .
Because her paper on the Rotation of a Solid Body
about a Fixed Point won the Bordin Prize . . .
Because she continued Abel's quest to express Abelian integrals
using elliptic functions . . .
Because she was the first woman professor
at a European University . . .
Because her colleagues were not women . . .
Because she had a friend -- Anne-Charlotte Leffler --
and they wrote a play together. . .
Because she dreamed mathematics even in a lover's arms . . .
Because a poet wrote "To her whose star shines bright" . . .

Because she caught influenza, complicated by pneumonia,
at age 41 Sophia Kovalevskaya died.

Girl-Talk

*Remembering **Toni Carroll** (1942-2012) – mathematician, computer scientist, humanitarian, activist, and friend.*

When two math-friends visit
the Baltimore Art Museum, on a day
when no non-maths are lurking nearby,
we may – with no fear of harming –
chatter our mathiness.

When we pass
Max Bill's *Endless Ribbon*,
one of us may remark that the Mobius strip
is a math notion peculiarly popular
among non-mathematicians.

As we walk by tiled walls,
you can expect one of us to want
a photo of the mosaic pattern that shows so well
the symmetries of the square, a friendly group
one meets early in abstract algebra.

Both of us fight envy
of the Cone sisters who knew Gertrude Stein
and Matisse and Picasso. And one of us wonders
why some need two names while others
find fame with only one.

Michael Heizer's title,
Eight-part Circle, draws us outside.
Instead of a fragile curve, however, we find
a gathering of granite wedges –
"Eight parts of a disk."

My friend is smart and kind.
She tells me to relax my mathishness
and give the artists poetic license. Only Humpty Dumpty
and other mathematicians want narrow,
exacting limits on what words mean.

Some Snowballs and Squares

Syllable counts shape these poems – the squares have the same number of lines as syllables per line and the snowballs grow or melt by one syllable as one moves from a line to its successor.

There is no
place to throw
that's away.

Conquests of
nature are
mistaken.

If icebergs melt,
what metaphor
to use for the
hidden problem?

All over the world
fashionable shoes—
trendy, hazardous,
uncomfortable—
keep women in place.

The smallest of us must
be smarter than the rest
of them to stay alive.
Bioluminescent
organisms know how
to hide behind their light

Quietly the dark creature starts--
it drinks a quart of the water
from our reservoir. Then each day
it gulps twice as much as the day
before. If no one notices
this monster's thirst until one-fourth
the water's gone, what time is left
to arrest the vast consumption?

Numbers

One
added
forever,
joined by zero,
paired to opposites—
these build the integers,
base for construction of more
new numbers from old: ratios,
radical roots and transcendentals,
transfinite cardinals—conceptions bold!

The Math-Poet

Her
research
is in rings--
coherent rings,
flat ideals, and on.
But Sarah Glaz goes far
past mathematics, into
poetry -- writes of calculus
and e and lots of other things. She's
organizing a poetry
reading at Bridges Math-Art
Conference at Towson
University
on Saturday,
on July
twenty-
eight.

More *MATHY POEMS* by JoAnne Growney and other poets may be found at "Intersections: Poetry with Mathematics" at http://poetrywithmathematics.blogspot.com and at http://joannegrowney.com.

Growney will lead a BRIDGES poetry workshop on **Sunday, July 29 at 4:30 PM in CA 3005**. All are welcomed. Come and write!