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### Mathematical Poetry at Bridges 2012

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## REPORT

### Mathematical Poetry at Bridges 2012

After the conclusion of the Mathematical Poetry event at the 2011 Bridges conference in Coimbra, Portugal, Sarah Glaz began planning its successor. This year's poetry event took place as part of Bridges 2012 at Towson University in Towson, MD, where Bridges founder Reza Sarhangi lives and works. Not only did Sarah Glaz identify and invite over two dozen poets who combine mathematics and poetry in their professional lives, as she herself does, she also found a variety of poet-critics to deliver papers about the poems that arise from the combination. And she is already planning ahead for Bridges 2013, in Enschede, Holland. Our thanks to her for all her hard work! The poetry reading was held in the handsome Kaplan Concert Hall on the campus of Towson State University, with handouts prepared by the poets, and copies of their books, available at the edge of the stage. Here is a brief summary of their presentations.

Stephanie Strickland, known for inventing hypertext and hypermedia poems, opened the reading with poems which in this instance sat quietly on the pages of her handout. They were variously about Maxwell's use of quaternion algebra (essential to the formalization of electromagnetic phenomena: since quaternion algebra has a higher group symmetry than the algebra of vectors or tensors, it reveals more about electromagnetic dynamics), Grothendieck's global vision, Galois' group theory, 'kernels of a new realm' and Gödel's 'abundance theorem'. It takes a poet to appreciate the latter, perhaps, and to offer 'particular thanks for showing Rule-governed systems are / richer than even / can be described or defined, exhaustively at one / time, so always // nougats to be made that can't / be toothed—or distoothed—within the Rule // but that will be stickily true, nonetheless. . .'. .

Alice Major is a Scot who ended up in Edmonton, Canada, not far from the Banff International Research Station for Mathematical Innovation and Discovery; not long ago, she was appointed the first poet laureate of Edmonton. She read poems about numbers first, one and nine. (Dante's Beatrice was a nine, because the square root of nine is three, the number of the Trinity. Parmenides' God is one; but the God of the *Timaieus* creates the world out of triangles.) In her poem, 'The Number Line', Major invokes a child who realizes that the discrete must involve the continuous: 'She already knows her numbers / and the gaps between the

integers— / how they stretch enormously long / like coils on the spiral toy / that swings its elastic length down stairs / one step at a time'. And in her poem, 'In the City of the Poor', she observes, 'irrationals / drop from the number line', as they do, like icicles from eaves.

Geof Huth's poems are not so much *about* mathematics as structured *by* mathematics. A 'piem', for example, is a poem based on pi: each word has a number of letters that is a value of a numeral in pi, in order, and what stands for the zeros are stanza breaks. This poem, of course, goes on and on, and will remain forever unfinished. Here is the first stanza: 'See a seen. / A shape inviolate / of wonder often has possi / bilities unthought. / Numbers expressed are / an orb extended. Rays / recall an orches / tral set. The musician / can do whatnot, exploring / music'. Now that's enjambment! While American, Huth has lived on four continents and nine countries. He is an expert on visual poetry, and is an artist as well as a poet. He wrote a collection of 365 poems, one on each day of his fiftieth year, and is at work on a collection entitled *Phyllotaxis*, which will eventually have 999 poems.

Phil Holmes, an Englishman transplanted to the United States, is a poet and Professor of Applied Mathematics at Princeton, specializing in nonlinear dynamics. He read a poem called 'Gaps' about the Cantor set, which is constructed by taking out the middle third of a line segment, then the middle thirds of the two remaining bits, then the middle thirds of the four remaining bits and so forth. The Cantor set is very strange: it is uncountable (though its Lebesgue measure is 0), compact, complete (as a metric space), perfect (as a set) and totally disconnected. As Holmes writes, 'each point divided from // the next, but oh! so close, / infinitely numerous / as what you started with / and carefully have pried apart. // Will there be time to measure up / this dust of unremembering?'. One answer to that question occurs in his 'Liszt at Midday, 1994', which ends, 'The reply comes pale as leaves / stripped against a bruised sky / fifty years swept into the air / in gusts of sudden light'.

JoAnn Growney's handout, 'Mathy Poems', was canary yellow and, like the poems in Huth's handout, shapely or at least diagrammatic. Her tribute to Sarah Glaz's organization of our poetry reading is a diamond, which I cannot here reproduce. Her tribute

‘With Reason: A Portrait’ to Sophia Kovalevsky is very long, but the ending lines can serve as synecdoche: ‘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 Kovalevsky died’. But what a life it was.

Emily Grosholz’s handout was full of pictures, many of them taken at the Mathematisches Forschungsinstitut at Oberwolfach, Germany, where the river reminded her of Maxwell’s equations and the mountains of Cantor’s infinities. Like the other poets, she loves the interplay of the whole numbers and the reals: ‘the reals are really not like numbers / that we are used to count with, to begin / and go up stepwise. They are number flooded / by continuity, the line upbraided / by differential strands to labyrinth. / They are the shape and cardinal of freedom. // Abysses along abysses along abysses, / yet perfectly defined. As if we charted / a finest-grained Grand Canyon with passing walls / through which a sourceless unplumbed river ran, / like moonplate cumulant in tiers above / the river of waning sunlight’. Next she plans to write about elliptic curves and Riemann surfaces, on writing-paper tori.

Tatiana Bonch-Osmolovskaya also writes shape-poems (for example an hourglass, in both English and her native Russian), and poems about numbers, including a poem about pi. Each haiku-like stanza in ‘By my father’s order sent to the school of mathematics, I perceive the beginning of transcendence’ represents pi in a different way, and the girl’s rebellion against the irrationalities of school: ‘Call seven girls together, / Give them twenty-two ribbons. / Their suffering would not come close to mine’, or, the last one, ‘A flock of geese crosses the autumn sky: / Three

birds, another one, four more, one again, five. . . / I will not raise my eyes from the book’. Pi is also turned into a (round) pie, an apple pie baked by the teacher’s wife.

Sarah Glaz (a Romanian transplanted to Connecticut, via side trips to Israel and Italy) ended this part of the reading with more poems about numbers, as well as a welcome return to abstract algebra: not groups this time. In ‘Late Afternoon at the Workshop on Commutative Rings’, she falls into a reverie induced by Italian hours: ‘*The nature of a faithful content ideal / of a Gaussian polynomial over a commutative ring / a source of excitement for a number of years / proves to be locally principal / The first idea relayed from mind to mind / at last reached perfect formulation // Vino rosso o vino rosso. . .*’. Following a list of excellent Italian red wines, she concludes, ‘Silken on the palate like a Puccini aria / on the lips of Maria Callas’. Quod erat demonstrandum.

The poetry reading then expanded into an open microphone reading, with poems by Carol Dorf, Deanna Nikaido (whose new book of love poems, *Voice Like Water*, has a CD attached and a beautiful cover), Janice Dykacz, Suzie Garfield and Barry Cipra. Carol Dorf is the poetry editor at Talking Writing – see in particular the entry from 9 January 2012, where Carol reflects on ‘Why Poets sometimes Think in Numbers’, and the ‘Math Poetry’ entry by Sarah Glaz from February 17. Along the same lines, JoAnne Growney maintains a blog entitled Intersections – Poetry with Mathematics, and figures prominently in MathPoetry.wikispaces.com. So the poetry reading ended, like inflation, with an extremely rapid, exponential expansion into the world of poetry slams and blogospheres. Somewhere overhead the Muse reminds us not to let verbal and visible pyrotechnics muffle the sweeter music of the spheres.

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