

Poetry in Motion

Phil Ramsden

A rhyme

Generals gathered in their masses,
Just like witches at black masses.

("War Pigs", from Lommi, T., Osbourne, O., et al., *Paranoid*, 1970)

Another rhyme

There was an Old Man with a beard,
Who said, "It is just as I feared!-
Two Owls and a Hen,
Four Larks and a Wren,
Have all built their nests in my beard."

("There was an Old Man with a beard", from Lear, E., *A Book Of Nonsense*, 1846)

"Rhyming" using whole words instead of final syllables

A long and honourable history!

Example: the *sestina* form, which dates back to 12th-century troubadours.

Arguably perfected by Dante.

The Maths Jam: a Sestina

Stanza 1

One Saturday, with gladdened heart I gaily **rise**
And greet the Autumn morn at this unwonted **hour**
With strong black coffee's aid, I slowly come to **life**
I shower, shave and dress, bolt down some bread and **jam**
Pick up my case; take laptop-holder on my **back**;
And then anon to Turnpike Lane direct my **steps**.

The Maths Jam: a Sestina

Stanza 2

At Euston station, as I ride the rolling **steps**
That seem to mumble, groan and mutter as they **rise**
I muse: it is another year, and we are **back!**
As time goes by, it seems it quickens by the **hour**
The world's events now seem to cluster, crowd and **jam**
Accelerating as they touch my fleeting **life**.

The Maths Jam: a Sestina

Stanza 3

Inside the station, here is all of human **life**:
With laughter one child matches her Dad's striding **steps**;
A baby cries, is comforted; a human **jam**
Forms now at certain platforms; harassed tempers **rise**;
A parting couple kisses. Boards foretell the **hour**
Of all our trips away or, for some, journeys **back**.

The Maths Jam: a Sestina

Stanza 4

No hesitation grips me; I do not hang **back**.

I know I only travel to enrich my **life**.

My train will carry me from here, in just an **hour**

Or two, as if by some great giant's mighty **steps**

I were transported. Over dale and craggy **rise**

Once more I race; once more I race to you, Maths **Jam!**

The Maths Jam: a Sestina

Stanza 5

Yes, once more I am come to Crewe, my mind to jam
With fresh delights; the daily burdens on my back
To cast away, and once again refreshed, to rise
And marvel, spellbound, as new notions take on life
Some bold and simple; some complex, with many steps
Some but the pleasing playthings of a joyful hour.

The Maths Jam: a Sestina

Stanza 6

Allotted each the briefest twelfth part of an hour
To speak, to show to play, to sing, indeed to "jam"
Each of us mounts stagewards, climbing those steep steps
Defying any inner qualms that urge "Go back!"
For this was mathematics made; this sublime life
Of mind-expanding wonders; let us all then rise!

The Maths Jam: a Sestina

Envoi

Aye, seize the precious **hour**, my friends! Inspired we **rise**
The message of our **Jam** to bear in Gove-cursed **life**,
With ever bolder **steps**. Take heart! Be not turned **back**!

The Sestina's "rhyme scheme"

Every rhyme-word visits every line position exactly once.

The Sestina's "rhyme scheme"

rise	steps	life	back	jam	hour
hour	rise	steps	life	back	jam
life	back	jam	hour	rise	steps
jam	hour	rise	steps	life	back
back	jam	hour	rise	steps	life
steps	life	back	jam	hour	rise

The Sestina's "rhyme scheme"

1	6	3	5	4	2
2	1	6	3	5	4
3	5	4	2	1	6
4	2	1	6	3	5
5	4	2	1	6	3
6	3	5	4	2	1

The Sestina's "rhyme scheme"

1					
2					
3					
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The Sestina's "rhyme scheme"

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3	5	4			
4	2	1			
5	4	2			
6	3	5			

The Sestina's "rhyme scheme"

Etc...

The Sestina's "rhyme scheme"

$$\delta_{\downarrow 6}(u) = \begin{cases} 2u, & 1 \leq u \leq 3, \\ 13 - 2u, & \text{otherwise} \end{cases}$$

Alternatives to the sestina

The quintina

Five stanzas of five lines (plus an *envoi*)

The quintina

1	5	3	4	2
2	1	5	3	4
3	4	2	1	5
4	2	1	5	3
5	3	4	2	1

The quintina

$$\delta_{15}(u) = \begin{cases} 2u, & 1 \leq u \leq 2, \\ 11 - 2u, & \text{otherwise} \end{cases}$$

The *n*-tina

n stanzas of n lines (plus an *envoi*)

$$\delta \downarrow n(u) = \begin{cases} 2u, & 1 \leq u \leq n/2, \\ 2n+1-2u, & \text{otherwise} \end{cases}$$

So does it always work?

The ottina

$$\delta_{\downarrow 8}(u) = \begin{cases} 2u, & 1 \leq u \leq 4, \\ 17 - 2u, & \text{otherwise} \end{cases}$$

The ottina

1	8	4	2
2	1	8	4
3	7	5	6
4	2	1	8
5	6	3	7
6	3	7	5
7	5	6	3
8	4	2	1

So does it always work?

The setting

$$\delta_{\downarrow 7}(u) = \begin{cases} 2u, & 1 \leq u \leq 3, \\ 15 - 2u, & \text{otherwise} \end{cases}$$

The settina

1	7	4	2
2	1	7	4
3	6	3	6
4	2	1	7
5	5	5	5
6	3	6	3
7	4	2	1

Numbers for which it works

That is, values of n for which $\delta \downarrow n$ is a complete cycle, of order n .

$n=1,2,3,5,6,9,11,14,18,23,26,29,30,33,35,39,\dots$

I (and nobody else) call these **sheerly poetic** numbers.

$2n+1=3,5,7,11,13,19,23,29,37,47,53,59,61,67,71,79,\dots$

THEOREM (KNOWN): If n is sheerly poetic then $2n+1$ is prime.

Converse false: for example, $n=8$, $2n+1=17$.

How can we rope in all the primes?

Say that n is **merely poetic** if $\delta \downarrow n \uparrow n$ is the identity.

That is, if the order of $\delta \downarrow n$ divides n .

$n=1,2,3,5,6,8,9,11,14,15,18,20,21,23,26,29,30,33,35,36,39,\dots$

$2n+1=3,5,7,11,13,17,19,23,29,31,37,41,43,47,53,59,61,71,73,79,\dots$

Seems to include all the odd primes.

Theorem I think I've proved

If $2n+1$ is prime then n is merely poetic (and may be sheerly poetic).

Converse false, for example, $n=170$, $2n+1=341$.

List of exceptions...

$n=170, 280, 552, 864, 952, \dots$

$2n+1=341, 561, 1105, 1729, 1905, \dots$

All pseudoprime to base 2.

That is, all satisfy

$$2^{n-1} \equiv 1 \pmod{n}$$

Another theorem I think I've proved

If n is merely poetic then $2n+1$ is either prime, or pseudoprime to base 2.

Converse false, for example: $n=322$, $2n+1=645$.

How can we rope in all the pseudoprimes?

Say that n is **nearly poetic** if $\delta \downarrow n \uparrow 2n$ is the identity.

A third theorem I think I've proved

If $2n+1$ is either prime, or pseudoprime to base 2, then n is (at least)
nearly poetic

Converse TRUE!

(I think. This is a conjecture.)