



Private prescription:

A thought-provoking tonic on the lighter side

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Science with a smile – the limerick

To many, the word limerick conjures up images of humorous, often nonsensical, frequently bawdy, five lines of rhyming verse with an entertaining, ribald and witty punchline. The limerick is, in fact, a relatively modern form of verse with, it is thought, origins in the choruses of 18th century songs sung by Irish soldiers. However, it was not until the early years of the 20th century, with the introduction of limerick contests, that the form gained widespread popularity. Over the years, limericks have exploited the anomalies of spelling, used tongue-twisting sequences and been used to make pithy observations on serious issues. It is not surprising, therefore, that the limerick has even infiltrated science.

Mathematics

The use of the limerick is relatively widespread in mathematics and is often associated with concepts with which people have difficulty in understanding. For instance, in topology, a branch of geometry concerned with the general transformation of shapes, there are what are known as one-sided surfaces. These are surfaces such that an object resting on one side can be moved continuously over the surface to reach the other side

without passing around an edge. They have fascinated mathematicians for centuries and probably the most widely known is the Mobius strip, or band, formed from a rectangular strip by twisting it once and then gluing the two ends. This surface, discovered by the German mathematician August Ferdinand Mobius (1790–1868) has some rather interesting properties as stated in two limericks¹:

A mathematician confided
That a Mobius band is one-sided.
And you'll get quite a laugh,
If you cut one in half,
For it stays in one piece when divided.

And:

A mathematician named Klein
Thought the Mobius band was
divine.
Said he, 'If you glue
The edges of two,
You'll get a weird bottle like mine.'

The second limerick refers to the other well known one-sided surface – Klein's bottle – discovered by another German mathematician, Christian Felix Klein

(1849–1925). It resembles a bottle pulled into itself and, if properly cut in two, results in two Mobius strips.

At a less esoteric level of mathematics, equations have spawned several, very clever, limericks²:

There was a young man of Nepal
Who had a mathematical ball;
The cube of its weight
Times pi, minus eight
Is four thirds the root of **** all.

Or expressed mathematically:

$$(W^3\pi) - 8 = \frac{4}{3}\sqrt{0} \quad (1)$$

Another is an equation in words:

Integral z-squared dz
From one to the square root of three
Times the cosine
Of three pi over nine
Equals log of the cube root of 'e'.

Or expressed mathematically:

$$\int_1^{\sqrt{3}} z^2 dz \cdot \cos \frac{3\pi}{9} = \log^3 \sqrt{e} \quad (2)$$

Physics

It is not surprising that physics is well provided with limericks because many of the theories and concepts are ideal for this form of verse. Some of the best examples refer to Einstein's theory of relativity with its inevitable consequences of the speed of light and dependence of space, time and other measurements on the motion of the observer³:

'If I could move faster than light,'
Mused Einstein, when a lad so bright;
'I could set off one day,
In a relative way,
And return home the previous night.'

And:

When Einstein was travelling to
lecture in Spain,

He questioned a conductor time
and again:
'It may be a while,'
He asked with a smile,
'But when does Madrid reach this
train?'

And:

There once was a fellow named Fisk,
Whose fencing was exceedingly brisk.
So fast was his action
The relativistic contraction
Reduced his rapier to a disk.

Another version of this well known limerick uses the words 'The Fitzgerald Contraction' as the penultimate line because it was George Francis Fitzgerald (1851–1901), the Irish physicist, who first suggested that, when in motion, a body is shorter along its line of motion than when at rest.

My favourite limerick on this theme contains references to both consequences of the limiting character of the speed of light, that is, the foreshortening of rods and the slowing down of clocks. It also has a sting in the tail:

Einstein's is a wonderful notion
That a rod will contract when in
motion,
All the clocks will go slow,
And yet no one will know!
So the matter need cause no
commotion.

Biology and chemistry

Unlike the other two subjects, limericks are much more difficult to find in biology and chemistry. However, Richard Cowen from the University of California (USA), author of the best-selling book 'History of Life' often punctuates his essays on evolution with limericks. Several others make reference to aspects of biology, of which I have chosen two. The first deals with the properties of the glycocalyx, a capsule consisting of a network of polysaccharides surrounding

some bacteria that helps them to resist phagocytosis, exclude bacterial viruses and resist biocides⁴:

Glycocalyx, the slime of bacteria
Helps them to live in a bovine interior.
Powerful drugs
Can't get at these bugs.
It's clearly a substance superior.

The second deals with the observations of David Carrier, who reported that the sprawling locomotion of salamanders and lizards forces these reptiles to compress each lung alternatively as they move, with the result that if they run they are unable to breathe⁴:

The reptilian idea of fun,
Is to bask all day in the sun.
A physiological barrier
Discovered by Carrier
Says they can't breathe if they run.

Perhaps my favourite limerick is one that has both a biological and a chemical theme⁵:

A mosquito was heard to complain
That a chemist had poisoned his
brain;
The cause of his sorrow
Was para-dichloro-
Diphenyl-trichloroethane.

Final word

Space precludes me from giving any more examples, although there are many more on scientific themes. It will be obvious to the limerick addict that I have been selective in that none of the examples have a ribald punchline common to this form of verse. However, they do show that it is possible to use the limerick to make humorous observations on science and yet still be scientifically correct. An interesting feature is that a high proportion of limericks refer to specific scientists by name. Perhaps a personalized limerick could be regarded as the ultimate scientific accolade!

References

- 1 Fadiman, C., ed. (1962) *The Mathematical Magpie*, Simon and Schuster
- 2 Gaither, C.C. and Cavazos-Gaither, A.E., eds (1998) *Mathematically Speaking*, Institute of Physics
- 3 Gaither, C.C. and Cavazos-Gaither, A.E., eds (1997) *Physically Speaking*, Institute of Physics
- 4 Cowen, R. (1994) *History of Life* (2nd edn), Blackwell Science
- 5 Parrot, E.O., ed. (1983) *A Penguin Book Of Limericks*, Penguin Books

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