SCIENCE AND POETRY. LIMERICKS ON PHYSICS

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Abstract: Defined as a typically humorous, lewd and/or nonsensical verse which adheres to a strict rhyme scheme and joyous rhythm, the form is well known to generations of English-speaking readers. A generalization about limericks divides them in three categories: clean, indecent and intellectual. The category called the "intellectual stream" contains verses upon such subjects as philosophy, science, art and literature, disease, the Devil, contemporary figures, French towns, fictional persons and places, and many other topics, written by a variety of authors. According to a historical timeframe, limericks devoted to Physics cover the main important well-known discoveries in the field from Galileo to Newton, Einstein to Bose and Hawking or refer to such specific concepts like Coriolis force, kinetic energy, angular momentum, protons, neutrons and electrons, quark-dorks, conservation laws, quantum mechanics, Lorenz transformations and so forth. It can be easily detected that limericks on Physics are extremely varied in topic, structure, tone and language; they display skillful rhymes and the language used ranges from scientific to puns to describe physical phenomena and concepts. They use original ideas and indecent allusions are less rare in this area, being serious, semi-serious and funny. Their humour is mild, sophisticated, gentle and subtle and their cognitive and artistic value are unmistakable.

Keywords: limerick, intellectual, Physics

The limerick can be defined concisely as a typically humorous, lewd and/or nonsensical, verse which adheres to a strict rhyme scheme and joyous rhythm. In point of structure, the first two lines rhyme with each other, the third and fourth rhyme together, and the fifth line either repeats the first line or rhymes with it. The form is well known to generations of English-speaking readers.

Though the origin of the limerick is not entirely known, it has an active and long history. Limericks published in eighteenth-century *Mother Goose's Melodies* as early as 1776, are thought to be among the oldest. Poets quickly adopted the form and published limericks widely. By the end of the nineteenth century, main branches of limerick writing - the clean and the indecent developed extensively. Clean ones were widely published and indecent ones were printed privately or circulated orally. Clean limericks published in Punch and other magazines often were constructed using puns or the curiosities of English pronunciation, a pattern used predominantly until present day. The limerick also became a favourite vehicle for satirizing public figures. In the first decade of the twentieth century, limerick writing was very popular when a number of newspapers ran weekly competitions, which usually involved supplying the final line for some given verse. Obviously, the competition limericks followed the "clean" or "intellectual" limerick tradition until the relaxation of censorship from the 1960s onwards.

Nowadays, through blogs and sites of newspapers and professional societies, limerick is also very popular and contests revolve around specific topics. A contest launched by American Physics Society announced in the December 1996 for the issue of *APS News* received a total of 190 limericks, all of them with a title. The Department of Physics from Harvard University has a section of Physics limericks kept by professor David Morin all of them including an explanation of the phenomenon at the beginning.

Speaking about the initial generalization between bawdy and clean limericks, E.O.Parrott considers that trouble with many of the clean limericks is that they are "downright unaggressive, weak and often boring to our modern taste" (Parrott, 1985:7). Secondly, criticism can be made of very many of the indecent limericks where the mere mention of sexual organs, strange ways of sexual intercourse, eccentricities, excrement and so forth, is meant to amuse the reader. Amusement, in this case will largely depend upon individual taste, maturity and what is acceptable in society at the time. This is also valid with every kind of racist limerick.

The third group of limericks called the "intellectual stream" contains verses upon such subjects as "philosophy, science, art and literature, disease, the Devil, contemporary figures, French towns, fictional persons and places, and many other topics"(*ibidem*, 8), written by a variety of authors, both known and unknown, professional and amateur.

Limericks about science deserve a wide audience and considerable interest. They hold a special place within this intellectual category as science is always a subject, which refer to precise facts and knowledge; consequently people should be familiar with an idea, concept or theory in order to understand and laugh at it.

It can be said that perception, understanding and enjoying of such limericks can be related to the concept of Humor. According to the author Teresa Guerra Gloss, perception of humour may be divided into three levels of analysis depending on the level of comprehension of the reader to which it is directed. There is a universal humour that can be understood by everybody, without regard to culture or formal education, generally known as physical comedy. Humour at the second level comes from sexual, political, or religious jokes, where humour acts as a relief from repression or inhibition. It is also connected to the culture; consequently it is necessary to be familiar with the respective values in order to enjoy the joke.

The third level of humour requires a high command of language and its stylistic devices. "Its main channel of expression is irony. The audience for this sophisticated humour is cultivated and refined. In it we distinguish two kinds: compassionate, directed to the heart; intellectual, directed to the mind."(Gloss, Introduction to PHD Thesis,1989). Taking into consideration the above, science limericks can be roughly placed between the last two categories as they can be comprehended only in reference to a cultural context which often uses stylistic refined devices.

Sciences are generally classified into natural, social and formal sciences. A lot of limerick creations have been dedicated to natural sciences, a subgroup which includes physics, chemistry, biology, mathematics, astronomy and medicine. Some refer to famous men of science, to phenomena, to concepts, some to animate or inanimate beings, although there must always be a character related to it. We focused our study upon Physics, the science of universe as perceived in limericks; it is one of the most frequent and favourite scientific fields mirrored in them.

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Classical period is well represented by its main scientists Giordano Bruno, Galileo Galilei and Isaac Newton in relation to their ideas on the laws governing the universe as we know it. Miles T. Ranter won The Weekly Poetry Contest of Poetry Nook in June, 2020 with the following ones:

Folks reckoned the Earth is so rare
that the rest of all space must be bare
and empty of creatures,
but among all their teachers

one asserted what most wouldn't dare.
That philosopher's surname was Bruno.
His claim? We're not numero uno
and each star is a sun—
that there's not merely one
but bajillions!—a thing we now *do* know?

Galileo di Vincenzo Bonaiuti de Galilei was an astronomer, physicist and engineer, from Pisa. He has been called the "father" of observational astronomy, modern physics, the scientific method, and modern science. Galileo's support of Copernican heliocentrism was met with opposition from the Catholic Church. The issue was investigated by the Roman Inquisition in 1615, which concluded that heliocentrism was absurd and heretical since it contradicted Holy Scripture and forced Galileo to recant.

Martin J. Murphy based the series of three limericks about Galileo on mild, refined humour and irony .The second one uses the well known phrase "We are not amused" expressing distaste, allegedly uttered by Queen Victoria to an equerry who had told a risqué joke; speaking in an interview in 1976, Victoria's granddaughter, Alice, Countess of Athlone, said that Victoria herself told her that she never uttered these famous words. It expresses in fact the popular perception of the Victorians as stern and severe, as in many photographs of the period showing serious rather than smiling faces (The official website for BBC History Magazine and BBC History Revealed.) In this case, it perfectly illustrates the attitude and grim image of Church in mediaeval times. The third limerick uses a pun based on the verb to fire – meaning to be dismissed and a process of combustion or burning, an allusion to Giordano Bruno being burned at the stake for supporting the same theories.

While watching a cannonball's motion,
Galileo conceived of the notion
That natural laws,
Not a mystical Cause,
Ruled the physical world's locomotion.
Though its own view was mostly confused,
The Church was not greatly amused
With this flaunting of Deo
By old Galileo
And ordered it quickly defused.
So the Pope sent some priests who inquired
If it wouldn't be best he retired?
"Undoubtedly you know
What we did for Bruno;
Do you also wish to be fired?"

The modern understanding of planetary motion came from the efforts of astronomer Tycho Brahe and physicist Johannes Kepler in the 16-th century; according to them, planets move on ellipses about the Sun. In his *Principia* eighty years later (1687*), Isaac Newton* provided a physical theory that supported all three of Kepler's laws, a theory based on Newton's laws of motion and his law of universal gravitation. Newton proposed that the gravitational force between any two bodies was a central force $F(r)$ that varied as the inverse square of the distance r between them. Starting from this, Newton showed that the orbit of any particle acted upon by one such force is always a conic section, specifically an ellipse.The anecdote goes that Edmund Halley came to visit Newton at Cambridge in August 1684 to ask him if he knew what was the curve followed by the planets around the Sun. Newton answered immediately that it was an ellipsis and that he had already calculated it, but oddly enough he could not remember where he had put his papers. However, he agreed to retrieve the

calculations and after two years, the eccentric scientist published his work of genius *Principia*. " Nearer the gods no mortal may approach" said Halley about his friend.(Bill Bryson, 2010: 65-66).A limerick on this subject by David Morin has an explanation he thought to be necessary:

Newton's law of gravitation holds over a vast range of distance scales. Apples, moons, and stars all behave in the same manner, dependent on the 1/r form of the gravitational potential.

Newton said as he gazed off afar
From here to the most distant star
These wond 'rous ellipses
And solar eclipses
All come from an1 over r

Within Physics one of the most frequent topics is the is universally known theory of relativity and *Albert Einstein* one of the most prolific subjects. The famous and well-known equation in human history, $E = m^2$, translates to "energy is equal to mass times the speed of light squared." In other words, energy (E) and mass (m) are interchangeable. They are, in fact, just different forms of the same thing. But they're not easily exchanged. Because the speed of light is already an enormous number, and the equation demands that it be multiplied by itself (or squared), a small amount of mass contains a huge amount of energy.

Although Einstein name does not appear in it, the classic limerick which explained Einstein's special theory of relativity first appeared anonymously in the Punch of 19 December 1923. The author was Arthur Henry Reginald Buller (1874– 1944), a British–Canadian mycologist, Fellow and then President of the Royal Society of Canada.

There was a young lady named Bright
Who traveled much faster than light
She set out one day,
In a relative way,
And came back the previous night

Numerous limericks are coined around the theory of relativity, its consequences and its applications in real life.

E=mc squared
Relativity renders me slightly deflated
'Specially when speeds become sharply inflated
As fast as light travels
The physics unravels
And time as we know it gets grossly dilated

The following limerick uses a verse technique which serves best the subject of dilated relative time(last line very long):

The effects of dilation of time
Are magical, strange, and sublime.
In your frame, this verse,
Which you'll see is not terse,

Can be read in the same amount of time it takes someone else in another frame to read a similar sort of rhyme.

Einstein's main research themes, relativity and quantum mechanics were the subject of an interesting study on limericks written by the author Sachi Sri Kanta; he located on the internet many limericks devoted to relativity theory and even an naughty one produced by Michael R. Burch (Current Science, 2015 : 1171).

Einstein, the frizzy-haired
Proved E equals Mc squared.
Thus, all mass decreases
As activity ceases.
Not my mass, my ass declared!

Erwin Rudolf Josef Alexander Schrödinger was a Nobel Prize-winning Austrian-Irish physicist who developed fundamental results in quantum theory: the Schrödinger equation provides a way to calculate the wave function of a system and how it changes dynamically in time. In quantum mechanics, Schrödinger's cat is a thought experiment that illustrates a paradox of quantum superposition. In the experiment, a hypothetical cat may be considered simultaneously both alive and dead as a result of its fate being linked to a random subatomic event that may or may not occur. The second limerick creates a humorous effect by associating the experiment with the society for animal protection.

Professor Schroedinger
Quantum mechanics may cause you to groan
The state of the kitten can't surely be known
The odds have increased
But alive or deceased
Reality hangs on observance alone.

Protecting Schrodinge"s Cat
by Devlin Gualtieri

PETA was out in full force,
But not for a dog or a horse.
At Schrodinger's place
They pleaded their case
For the sake of his cat, of course

Stephen Hawking was an English theoretical physicist, cosmologist, and author. Between 1979 and 2009, he was the Lucasian Professor of Mathematics at the University of Cambridge, the same position held in the XVII-th century by Isaac Newton. In 1963 Hawking was diagnosed with a form of motor neurone disease that gradually paralyzed him. Hawking's is famous for works on gravitational singularity theorems and the theoretical prediction that black holes emit radiation, often called Hawking radiation. Hawking was the first to set out a theory of cosmology explained by a union of the general theory of relativity and quantum mechanics. The following limerick expresses quite the essential of Hawking work and life although there is no much humour in it.

There's a handicapped crackerjack Hawking
Black holes he is known for unlocking
New worlds he has found
But here on the ground
He had terrible trouble just walking

Marie Skłodowska Curie was a Polish and naturalized-French physicist and chemist. In 1895 she married the French physicist Pierre Curie, and she shared the 1903 Nobel Prize in Physics with him and with the physicist Henri Becquerel for their work developing the theory of radioactivity. Marie won the 1911 Nobel Prize in Chemistry for her discovery of the elements polonium and radium, using techniques she invented for isolating radioactive isotopes. Marie Curie died in 1934, of aplastic anemia from exposure to radiation in the course of her scientific research and in the course of her radiological work at field hospitals during World War I. Still, after more than 100 years, much of Curie's personal effects including her clothes, furniture, cookbooks, and laboratory notes are still radioactive, author Bill Bryson writes in his book, *A Short History of Nearly Everything* (Bryson, 2010:130). Regarded as national treasures, Curie's laboratory notebooks are stored in lead-lined boxes at Bibliotheque Nationale in Paris; while the library grants access to visitors to view Curie's manuscripts, all guests are expected to sign a liability waiver and wear protective gear as the items are contaminated with radium 226, which has a half-life of about 1,600 years.

There's a quizzical couple called Curie
Who were curious and worked in a hurry
In finding the answer
They came down with cancer
Not knowing they needed to worry

Many limericks relate to diverse physical phenomena; they often need explanation as they refer to very specific issues otherwise understanding them can be limited to the mere linguistic layer.

As naturally, many are dedicated to atoms and its particles, since "A physicist is an atom's way of looking at itself"(Niels Bohr). Fission (as in the A-bomb) results in the release of neutrons and protons from the nucleus. Neutron bombardment of an atom releases all sorts of other particles, including pions, kaons, photons, et al. As the limerick has undergone experimentation and adaptation over time, sometimes it lacks the person always present in the classical form of limericks.

The atom was thought indivisible,
'Til neutron assaults made that risible.
Now we've kaons and pions,
No doubt, a few ions:
A smashing good cocktail so fizzable!

The universe is expanding, but will it do so forever? The question is open. (But the answer may not be.)

The cosmos according to Hubble
Expands like the soap of a bubble.
Let's hope it's not closed.
It would then be disposed
To shrink to a point, and that's trouble.

Accidents often happens in limericks and the delicate subject of the nuclear power which can destroy everything through simple or official mistakes gave rise to this one written by W. Bernard Wake:

A student of nuclear fission

Made a bomb with official permission;
But the earth disappeared
In the bang; it is feared,
Through an error in simple addition.

It can be easily detected that limericks on Physics are extremely varied in topic, structure, tone and language; they display skillful rhymes and describe physical phenomena and concepts in a language which ranges from scientific to puns; they use original ideas while indecent allusions are less rare in this area. They are serious, semi-serious and funny. Their humour is mild, sophisticated, gentle and subtle just like in this last one, *Wish I Were a Fly on the Wall* by Robert D. Cowan:

There once was a fly on the wall
I wonder why didn't it fall
Because its feet stuck
Or was it just luck
Or does gravity miss things so small?

Such limericks are undoubtedly composed for entertainment and for the educational pleasure. Their cognitive and artistic value are unmistakable; they explore if originality, language skills, humour, specifically non-aggressive humour and can support the idea that the knowledge of science and technology can be acquired, expanded, voiced and enjoyed in this way.

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