Alice in Everlasting Land

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Abstract

This paper describes a mathematical and engineering approach to study Lewis Carroll and his first Alice story published in the Victorian Era. This study has referred to Ellen Terry, a famous Shakespearean stage actress and the other important girl for him, as an auxiliary line from three-dimensional perspective to analyze the functions of Alice in the story. Alice is the symbol of infinity described in geometric plane, which is two-dimensional. Born out of Alice Liddell, one of the daughters of Dean of Christ Church, where Charles Lutwidge Dodgson, autonym of Lewis Carroll, taught mathematics, Imaginary Alice might keep inspiring astrophysicists to unravel the mystery of universe. If "Alicehole", my-proposed substitute for "wormhole", were widely accepted, her mission assigned by the Carroll-Dodgson-duality of storyteller and mathematician would be completed.

Keywords : Alice, Carroll, Victorian Era, Euclid, Dimension, Alicehole

There was a book waiting for my purchase at a small local bookstore in Singapore in July this year. It seemed to me that Alice in the book was asking me to write a paper about her.

1. Alicehole

This is a bold proposal. I have written this paper to propose a new word to replace "wormhole", an awkward scientific term, which means a theoretical shortcut tunnel to connect our universe with faraway universe. It was coined by John Archibald Wheeler, an American theoretical physicist, in 1957.

Although it has been in astronomical vocabulary since then, it sounds earthly and literally wormy. He must have seen plenty of small wormholes in leaves of flowers and trees in his childhood when spray insecticide had not been widely used yet. To me it sounds so weird that I subconsciously associate it with a huge alien bug creeping through the hole, something like "The Outer Limits" on TV broadcast from 1963 to 1965.

"Alicehole" is the substitute for that well-established word without hesitation. Alice is, as you can assume, the famous main character in *Alice's Adventures in Wonderland (Alice in Wonderland*, hereafter) written by Lewis Carroll, pseudonym of Charles Lutwidge Dodgson, a mathematician at Chirst Church, one of the Colleges of Oxford. It was published in 1865 and its copies are still available at bookstores worldwide, including translated versions and digital forms.

I am not sure whether the physicist had read it before he became a researcher, but if he had read it, to express the hypothetical tube in space-time, he might have jumped to the analogy of the rabbit-hole through which Alice fell into Wonderland.

Those who are interested in cosmology would like aesthetic terminology such as "Laniakea", a Hawaiian word meaning "immeasurable heaven",

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for the newly-discovered cluster of stars. It evokes nostalgia, which would nurture science. From this point of view "wormhole" should be upgraded to a sublime and fair word that has a nice ring to it.

Kaku Michio, a Japanese-American theoretical physicist, once mentioned the title of the story in his web-based video presentation to explain String Theory by saying, "*Alice in Wonderland* gives us a possibility that maybe one day we might create a wormhole between universes." This is when my intuition was inspired for the first time. Why not invite Alice from her Wonderland as a guide to lead us to unknown space?

In the story her Wonderland turned into a mere dream at the end. This finale is understandable. It was the only concept conceivable within Carroll's Euclidean mathematical mind to express different-world experiences in those days before Albert Einstein introduced space-time.

Now that dreams could be analyzed as part of subconscious or unconscious mental activities triggered by subatomic particles in the realm of quantum physics aside from science fiction, Alice is entitled for a returnee from the other world.

On our daily life basis "Alice" is a popular name for girls. In *Cell,* one of Stephen King's novels, the connotation of the name was explained, " That's a lovely name. It means 'blessed of God.' " It gives us a comfortable moment to breathe easily while reading such a terryfing horror story. "Alicehole" will be blessed as well even in the scientifically complicated and challenging hypothesis to link different worlds.

This paper focuses only on *Alice in Wonderland* to make such a proposal. (Considering the duality of Lewis Carroll and Charles Lutwidge Dodgson, I use only Carroll, hereafter.) As a result my research has covered 33 years from 1832 to 1865, from the birth of Carroll to the publication of the first Alice story.

I have excluded its sequence *Through the Looking-Glass And What Alice Found There* published in 1872 on purpose this time because it would be a different objective for my future research paper to delve into antiworld through Alice.

2. Fear of Death

Lurking behind *Alice in Wonderland* was fear of death. It was no wonder that Carroll had been afraid of death since his youthful period, considering the fact that the repeated cholera outbreaks in London in 1849 and 1854 respectively, killing more than twenty-thousand people in total. Oxford was also infected at the same time.

The lethal epidemic was not the only reason. It was reported that people did not drink unboiled water even without a cholera outbreak because typhoid and tuberculosis were always everywhere. London was a modern city then, but there were people called "scavengers living in a world of excrement and death in the city" as depicted in *The Ghost Map.*

The vital statistics from 1831 to 1870 indicated that these years witnessed the highest annual mortality rate. The average was a little more than 20 deaths per 1000 people. That is the period when Carroll was born and grew up to be an adult. The level of public hygiene in the places where he lived was much lower than that we have now. I could say many British people lived in dirty places under the brilliant rein of Queen Victoria

In addition, what vexed him more than those visible calamities and invisible unhealthy conditions was the sudden death of his much-loved mother in 1851. It was the most mentally devastating moment for him to reconfirm that even a necessary person will die

some day or sooner, and nobody can predict it.

"Solitude" written in 1856, one of his early poems, has clearly conveyed his depressed emotion in those days as partially quoted.

If all the day that ends in death
Be dark with clouds of woe?

Even in his childhood, concern about death is believed to have been developed in his consciousness. According to the comment of Stuart Dodgson Collingwood, his nephew, "Carroll made pets of snails and toads and numbered them " while he was living in Daresbury, where he spent his first 11 years as a small boy. He might have buried them according to their designated numbers when they died.

Another anecdote is that during his academic life at Christ Church, which started in 1851, he was always nervous about air circulation and temperature in his room in fear of infectious disease.

The final related episode was the publication of *On the Origin of Species* written by Charles Robert Darwin in 1859. All of its 1,250 copies sold out on the first day of sale at bookstores in London. Carroll added the book to his own library soon.

Although its impact on the religious society was so controversial and profound, causing fierce discussion at the 1860 meeting of British Association in the University Museum in Oxford (Carroll probably attended it) and the function of God as Creator was degraded, he was not disturbed. He tried to absorb the new scientific discovery. Carroll was a well-organized, logical and speculative thinker.

What was more shocking news for him related to the revolutionary theory was the suicide of Robert FitzRoy, the captain of HMS *Beagle,* apparently incurred by the severe controversy. He killed himself in 1865 after having regretted allowing Darwin on board his ship and felt responsibility and burden for the social turmoil. His sense of remorse was aggravated by the notorious gloomy easterly wind and defeated his religious dogma. Any biographies of Carroll did not mention this incident, but it is not hard to imagine that the captain's self-destruction made him reconsider the meaning of the human life from the view point of the survival of the fittest.

It was the period when he must have begun to extend a scheme of keeping life remained by taking an advantage of his new interest, slicing off time sequence of life. Preserving a moment of time in photography was his reaction to the disorderly changing society.

Alice Liddell herself could have been included in the early death list. Albert, one of her brothers died just after his birth in 1863 when she was 11. Carroll sensed her sorrow keenly and completed *Alice in Wonderland* to invigorate her.

Even though he was little worried about the probability of additional death in the Liddells according to his simple calculation based on the statistics, his sympathy urged him to take more photographs of their children as well as Alice to have them frozen in time while they were pretty and active. Photography, the new art form, gradually taking the place of painted portraits as personal memorial records.

3. Engineering during Victorian Era

Photography should come first among the engineering advances in the Victorian Era. It enthralled Carroll. He took it up in 1856 when he was 24 years old, two years after he started teaching mathematics at Christ Church from which he graduated with first-class honor. His decent income allowed him to purchase a set of new magical equipment.

Photography was quite astounding in those days and in a sense it was an advanced art form because it could produce instant paintings. The term photography was etymologically adequate,

meaning “drawing with light.”

As the technology was still primitive, it took fifteen minutes to have one shot taken and a darkroom was necessary to make the whole process completed. In other words, it was a slow process from our current standard, but it was a procedural manifestation of physics and chemistry combined based on the natural functions of light and darkness.

This combination of positive and negative factors attracted the young mathematician. What he found was the physical power of enlightenment to slice and freeze moments of flowing time created by God and scientific formula to make it two-dimensionally visual. It was not the invisible hand of God but the tangible hands of engineers that made it possible. It helped him make friends with Alice and her family.

The next aspect was the introduction of time management system. The very beginning of *Alice in Wonderland* reminds us of the watch that white rabbit was carrying with him and the rabbit was worried about being late for an appointment. (Please see the picture attached at the end.)

Clocks and daily schedule control based on fixed time was not something new in the Victorian Era, but a custom for an individual to carry a small portable device named “watch” was necessarily distributed, in other words enforced, among factory workers. They had to watch their watch frequently to find whether they were on time or not. Punctuality, as it is today, was one of the most required skills for workers to join the production line brought about by the Industrial Revolution.

The arrow of time which had been deeply observed was now segmented and positioned in a single number line in Euclid plane. The last chapter of *Alice in Wonderland* can be analyzed in terms of 12. Carroll finished the story with the scene of chaotic playing cards, 4 sets of 13 cards. The extra one was additional phase to the face of a clock, implying the 13th hour, dreamtime of life.

Thirdly, another remarkable engineering achievement was the advent of underground trains. Tube is the name of London underground system, not subway. The world’s first subsurface railway was opened in January, 1863 with steam locomotives serving stations on a 6.4 km line connecting Farringdon Street with Paddington.

The news of the construction of digging a long-distance tube had reached Carroll and he probably saw the construction site at Paddington Station in London, where he got off the train when he went to a theater.

The rabbit-hole was a metaphor of the London tube taking Alice to underground, but it dived vertically toward center of the Earth. Consequently, it represented a shortcut to the Southern Hemisphere, where some British naturalists were interested in their new discovery.

Or an escape from our world which was controlled by clock-based time to underground where deep time was observable. In either way, we should never forget the first title of *Alice in Wonderland* was *Alice's Adventures under Ground.*

The fourth one was the trains running in London and its surrounding areas. The newly established daunting means of transportation had stimulated Carroll since he was a boy and “he constructed a rude train out of a wheelbarrow, a barrel and a small truck, which used to convey passengers” according to Collingwood. It was part of his amusing inventions for his brothers and sisters.

The transportation system was put into operation along with the reliable time management system. The painting attached

below is *The Railway Station* produced by William Powell Frith in 1862, and it vividly shows how busy Paddington Station was. Paddington Station, the London terminal for the Great Western Railway, was and still is the gateway to Oxford. I just wonder if I can find young Carroll among the crowd.

If there had not been train services between Oxford and London, his frequent visits to the theater would not have been realized. He must have missed a chance to run into Ellen Terry, a young Shakespearean actress and the other important girl for him, on the stage.

She was just 9 years old when Carroll serendipitously found her at the Princess Theater in London in 1856, just one year he met Alice for the first time. Since then their friendship had grown up in a different way from that with Alice. He took Ellen's photographs as well.

A couple of Alice researchers have mentioned his "shadowy" love affair toward Ellen and he might have proposed to her when she was becoming a lady. However, she married George Frederic Watts, the eminent artist, in 1864 before her 17th birthday.

Her role that contributed to Carroll's storytelling has been neglected, whereas the presence of Alice was so outstanding. However, Ellen's participation in his creative mental process as a professional actress cannot be ignored.

She showed him the power of artificially created three-dimensional space on the stage. Her words were verbal reproductions of the scripts written by Shakespeare 250 years before. Her performances overcame the barrier of time. They broke the fourth dimension, which was time, in addition to breaking the fourth wall. He felt as if Shakespeare had been with her. The theater transported him to the Elizabethan Era.

It was *ksana*, a Sanskrit word meaning "a very short moment like twinkling of an eye". Even though he did not know anything about Buddhism, it was natural that he felt the short-lived spoken words could elicit a sense of infinity. In order to get involved in the drama and feel it he had to visit the theater repeatedly.

In spite of these stage effects, however, he gradually noticed the inevitable default of the three-dimensional presentation. At the same time he reconfirmed the power of literature stored on pages of books.

Lines of actors and actresses on the stage disappeared simply because they were in the tree-dimension, whereas Shakespeare's plays could and would be replayed because they were preserved in the form of written scripts, which is two-dimensional.

From the stage Ellen taught him the best way to realize infinity, which was one of the challenging issues at that time before Georg Ferdinand Ludwig Philipp Cantor, a German mathematician, and other mathematicians began to work very hard to solve its mystery.

Without the advent of new technologies and the presence of Ellen, *Alice in Wonderland* would not have been completed. Paddington Station was the center "from which all lines extending as far as the rim are equal" as defined by Euclid.

4. Mathematics and Numerology

Carroll supported Euclid and often he took one of his books to bed. Carroll's fantastical and

mathematical logic life was well written for general readers like me in *Lewis Carroll in Numberland*. *The Magic of Lewis Carroll* provides us with his quizzes and riddles based on mathematics. Although the reputation of his teaching at Christ Church was not so high, his talents in mathematical creation were remarkable. It was also reflected in his work.

The simple fact that *Alice in Wonderland* consists of 12 chapters has not been paid much attention to probably because association with number 12 is too varied to focus on the structure of the story.

My assumption is as follows : 12 is acquired by a single multiplication: 2 × 6. 6 is the smallest perfect number as defined in Euclid's *Elements* (VII.22). Carroll needed two sets of the perfect number for himself and Alice to make the story perfect for both of them. (This paper also has 6 parts and 6 key words, respecting his numerological arrangement.)

As a result the structure of 12 chapters corresponds with hours of the morning and the evening on the face of a clock, and with the calendar as well. It was a good development for him as a writer to start the story focusing on the Rabbit's watch and to finish it by making a pack of cards flying and whirling. 12 is very important in the story, but 6 is more important in term of its numerical perfection.

The definition of perfect numbers was explained in *Euclid's Elements* (VII.Definition 22) and 6 is the smallest of that kind. The process of its discovery and understanding is just beyond me, but the basic idea is simple; a perfect number is a positive integer equal to the sum of its proper positive divisors. In case of 6; it can be properly divided by 1, 2, and 3, and the sum of 1 + 2 + 3 produces 6.

This number fitted perfectionism that Carroll had pursued. 1 was Alice Liddell, 2 were Alice and Imaginary Alice, 3 were Alice, Imaginary Alice and Carroll. Alice took 6 and Carroll also took 6, thus the structure of the story perfected.

From the theatrical point of view, Alice was the only observer, Imaginary Alice was the only performer, and Carroll was the manipulator, in a cube with 6 faces, and Carroll rearranged the story on a two-dimensional plane.

5. Infinity beyond Dimensions

Parallel straight lines are straight lines which, being in the same plane and being produced indefinitely in both directions, do not meet one another in either directions.

This is Euclid's definition in *The Elements*. (I.23) The indefinite nature of straight line in geometry had been fascinating Carroll since he started mathematics. He must have tried to infer the concept of infinity on the flat surface created between parallel lines. His meticulous way of storing letters under the numerical classification system of his own invention is convincing evidence that he was keenly aware of positioning each and every letter onto the time flow like coordinates.

This is the final framework of *Alice in Wonderland*. One of the parallel lines is Carroll and the other is Alice, and Carroll knew they never meet. There was no space where affectionate emotion more than genuine partnership could have been incorporated, contrary to what some literary researchers, psychologists, and biographers have assumed. Carroll tried to trap Alice into infinity based on his careful calculation without romantic affection which ordinary men would nourish toward girls. That is why we cannot feel any touch of romanticism in the story, which I once pointed out as "dry" when I worked on it in my university graduation thesis.

Carroll knew three-dimensional space could also expand infinitely mathematically, but he

intentionally or unintentionally rejected it from his audience point of view at the theater. Dramas were presented in such a way that dialogues disappear immediately as soon as they are spoken like a real life. Recording was still beyond imagination. Even photography, one of the advanced technologies in the middle of the 19th Century, was impossible at theaters because actors and actresses were constantly in motion on the stage. Every action, every voice and every image dissipated as the drama went on. In other words, gravity and time prohibited infinity in three-dimensional space whereas the scripts written by Shakespeare had survived the torture of time in printed forms preserved in two-dimensional plane.

The invention of Gutenberg was one of the few technologies that could make everlasting effect possible based on Euclid geometry. Beautiful painting was also future-oriented. The clear and excellent examples were botanical and animal encyclopedias produced by naturalists with the help of skillful artists. John Tenniel, a prominent illustrator and political cartoonist, played the similar role to have *Alice in Wonderland Alice* visually presented on the assumption that Carroll would try to create another kingdom where strangely anthropomorphized animals coexist, but not any elves. (He was thinking about *Alice's Hour in Elfland* as the title for the publication of his first story, but he changed his mind soon probably because he just did not want to incorporate fairytale-like aspects in his mathematically-well written book.)

Words and pictures were orderly arranged in the two-dimensional plane without any mass, and they were free from gravity. In this respect I can guess why Carroll often took Alice and her sisters to a boat trip on the river, symbol of two-dimensional infinity. His childhood memory in Daresbury had convinced him animals and people die in real life under the influence of gravity and time. Alice fell into Wonderland to get away from gravitation.

6. Alice in Everlasting Land

The book I mentioned at the beginning of this paper is *The Story of Alice* written by Robert Douglas Fairhurst published in 2016. A pile of its copies jumped into my eyesight as soon as I entered Booksacutally in Singapore and I immediately bought one as if I had planned before the trip in summer this year.

While reading it in my hotel room, I just imagined future astronauts reading *Alice in Wonderland*, of course digitally, in a non-gravity spacecraft with a mission to study a wormhole. I remembered Kaku's comments very well. It was the moment that urged me to write this proposal.

To conclude this paper, let me reconfirm what happened between Alice and Carroll again.

In 1855, she arrived at Christ Church with her family. Henry George Liddell, her father, was assinged Dean of the College. Carroll came close friends with his wife, Lorina Hanna Liddell, and their children, particularly the three sisters Lorina, Edith, and Alice Liddell. His camera played a very important role to attract the young girls who were curious about the new device.

July 4, 1862 will be remembered as the most important and historical date for Alice, Carroll and anybody who is interested in their story. It was the date when Carroll took three of the Liddell daughters, Alice (10 years old), Lorina (13), and Edith (8) on the famous boat tour. That "golden afternoon" as Carroll described it, his memory was filled with happy and unforgettable moments.

He did not regret not carrying his camera with him because it was the place and time where and when Alice kept insisting on his storytelling to entertain her. His imagination turned into

Alice's Adventures under Ground hand-written and completed in 1864.

It was presented to Alice while the relationship between Carrol and her mother was shifting into a difficult time. Even such a special gift, beyond literary evaluation, did not help Carroll regain the comfortable and friendly relationship between them.

The original story was not only the prototype of *Alice in Wonderland* but also the first customized fiction for one specific reader in the history of publication. It grew up to be *Alice in Wonderland* and its first copies appeared at bookstores in 1865.

If he had been a passionate poet like Edgar Allan Poe, he could have followed his path. Poe married Virginia Clemm, his 13-year-old cousin in Richmond in 1836, and it was natural that Carroll knew their marriage.

There was a possibility for Carroll to tie the knot with Alice under the British marriage regulation permitting girls to marry at the age of 12. However, Alice was just an objective of his photography and then the partner for his storytelling. She was mentally treated like a coordinate even though they enjoyed friendship to each other through several occasions.

That was why Lorina Hannah Liddell, Alice's mother made her burn all the letters from Carroll, and she was also gradually rejecting his visit to their house. It was an intuition of mother to get rid of a man whose intention was unusual.

In this way the relationship between the Liddells and Dodgson worsened and he suffered a sudden break in June, 1863. What actually brought the rift was not recorded. Carroll never talked about it in the public. His depression was so severe that no record between 27 and 29 of June in that year in his diary was stored.

Their happy days were gone, but not only Carroll's works but the biographies of Carroll and Alice are still available respectively. Festival for Alice is conducted in Oxford and movies based on Alice stories are made. I received a paper bag with the Rabbit printed on it for my purchase at Barnes & Noble, a bookstore in Ala Moana Center in 2016. (Please see the attached picture.)

Imaginary Alice has been out of her story and is deep in the minds of many people. She will surely live far into the future to mesmerize our children. Her final mission is to lead our future generation to travel through the Alicehole into a new universe to help them to survive the death of our universe.

Infinity is the mere extension of our present as Carroll noticed.

References :

Carroll, Lewis (1973) *Alice in Wonderland, Lewis Carrll the Complete Works, The Nonesuch Press, London*

Collingwood, Stuart Dodgson (1898) *The Life and Letters of Lewis Carroll*, The Century Co., New York

Cohen, Morton N (1996) *Lewis Carroll A Biography*, Vintage Books, New York

Hudson, Derek (1976) *Lewis Carroll An Illustrated Biography,* Constable & Company Ltd, London

Gattegno, Jean, translated by Rosemary Sheed (1977) *Lewis Carroll Fragments of a Looking Glass*, George Allen & Unwin, London

Guliano, Edwars, editor (1982) *Lews Carroll : A Celebration*, Clarkson N. Potter, Inc., New York

Clark, Anne (1981) *The Real Alice*, Michael Joseph, London

Beer, Gillian (2016) *Alice in Space*, The University Chicago Press

Douglas-Fairhurst, Robert (2016), *The True Story of Alice*, Vintage, London

Wilson, Robin (2009) *Lewis Carroll in Numberland*, Penguin Books

Fisher, John, editor (1975) *The Magic of Lews Carroll,* Penguin Books

Euclid, translated by Thomas L. Heath (1956) *The Thirteen Books of The Elements (Vol.1 Vol.2 Vol.3)* Dover

Publications, Inc. New York

Johnson, Steven (2006) *The Ghost Map*, Riverhead Books, New York

Trease, Geoffery (1975) *London a Concise History*, Charles Scribner's Sons, New York

Scientific American, Wonders of Cosmos (Fall 2017)

King, Stephen (2006) *Cell*, Scriber's, New York

Kaku Michio: https://www.youtube.com/watch?v=RZ5dj-Ozwm0

高山宏（2002）『表象の芸術工学』工作舎

(1972)『別冊現代詩手帖第二号』思潮社

高橋裕子・高橋達史（1993）『ヴィクトリア朝万華鏡』新潮社

角山榮・川北稔 編（1981）『路地裏の大英帝国』平凡社

荒俣宏（2004）『想像力の地球観光』角川ソフィア文庫

砂田利一（2010）『現代幾何学への道』岩波書店

A Barnes & Noble paper bag