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Proto-Transmedial Narrative Structures: Lewis Carroll's *A Tangled Tale*

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DATAWOCKY

Twas global and the megabytes
Did gyre and gimbal on the disk
All mimsy were the prompts and codes
And the software was brisk
Beware the microchip my son
The bits, the bytes and bands and such
Beware the CRT and shun
The qwerty keyboard's clutch
He took his self-pace book in hand
Long time the menu key he sought
Then wrestled he with the toaster drive
And sat a while in thought
Then as he sought the glitchy bug
The microchip, with gates aflame,
Came wiffling, through its I/O plug
And processed as it came
Asynch, Bisynch, all protocols,
His binary went snicker snack,
He felt it crash, and with a dash
He came galumphing back
And dids't thou tame the microchip
Came interface my beamish boy
O frabjous day, Caloo! Callay!
O database, O joy
'Twas global and the megabytes
Did gyre and gimbal on the disk
All mimsy were the prompts and codes
And the software was brisk.

(Jack Stack 1986)

ABSTRACT – This paper explores *A Tangled Tale,* a collection of mathematical puzzles that Charles Ludwick Dodgson serialized in *The Monthly Packet* between 1880 and 1885. The hybrid narrative patterns that present mathematical questions by means of fictional storytelling are a unique form of scientific knowledge dissemination that antic-

ipates the breakdown of narrative linearity and the emergence of multiform formats present in transmedia. An inquiry into the Rule of Three and infinite regress tie the knots of a tale that highlights crucial insights on the algorithmic foregrounding of the strategies of transmedia design. Such strategies can be seen as the intersection of narrative as well as mathematical expertise that turn the media galaxy into a cosmic affair.

KEYWORDS – complexity paradigms, hybrid narratology, Lewis Carroll, natural and artificial languages, semiotics, *Tangled Tale*, transmedia.

1. INTRODUCTION

The emergence of hypermedia paradigms has obliged us to explore the exchangeability of means of communication and representation. We can speak of the fusion of different arts and media into converging forms because of their digital programming online. Terms such as multimodality, intermediality and transmedia have been the focus of scholarly discussion for some years now, and agreements seem to have been reached about their definitions. While multimodality is reserved to the involvement of different modalities in perception and cognition (many media in the perception of one and the same object), intermediality refers to phenomena that involves the combination of more than one medium (material or technical), the crossing of media borders and the co-relation of media in the sense of mutual influences between media. Transmediality, instead, points to a narrative storyline that takes various forms in different media. In this sense, it goes beyond adaptation, transposition or intermedial reference (one medium is thematised in another, for instance a movie based on a novel, based on a painting) from one medium to another (Wolf 2008).

Marie-Laure Ryan (2004) was among the critics who asserted that the condition for narrative mobility across media had been contemplated merely as a discourse phenomenon, a fact that ignored other semiotic narrative forms (images and music also tell stories). According to Ryan, seen as complex forms of storytelling, cross-media operations fall under three semiotic domains: syntax (concerning the storyline and the tools used to construct it), semantics (including techniques that have a cognitive impact on receivers and audiences, affecting their perception and understanding), and a pragmatic level that offers modes of user interaction (i.e. blogging). Transmedia narratives, based on the idea of narrative convergence brought forth by Jenkins (2003; 2006), involve a unique storyland, shared and distributed in different media platforms in order to reach a large public. The story is made viral by

expanding and circulating it so that 'prosumers' (Toffler 1980) can build it up by means of the collaborative potential of new media technology.

Interestingly for the purposes of this paper, Ryan emphasizes the fact that certain narrative strategies may actively fight the properties of the medium; with some print narratives subverting linear readings in hypertextual anticipation (i.e. Cortazar's *Hopscotch*). She adds that the fact that narrative can play with the resources of its medium is one of the many reasons that make the intersection of narratology and media studies a productive field of investigation, largely unexplored. The ambiguous relation between the logic of narrative and the logic of mathematics, present in the digital codes that make up the World Wide Web, is one of those areas that need further study. Thus, the following lines explore one of Charles Ludwick Dodgson's works in order to point out the tensions between forms of telling in natural and artificial languages, and how they might contribute to the complexity of textual structures, whether in print or online, forming the basis of transmedia structures.

A lecturer at Christ Church College, Oxford and better known as Lewis Carroll, author of the Alice's books, Dodgson published five books and pamphlets on the topics he taught, including algebra, analytic geometry, trigonometry, and the first six books of Euclid's *Elements*, which became his most important teaching subject. In his commentary of one of Dodgson's stories, *Sylvie and Bruno Concluded*, British-Canadian geometer Harold Scott MacDonald Coxeter compared the story to the German tale of Fortunatus' purse, which had been published in Augsburg in 1509 and involved a sort of magic cap/purse made of three knotted and twisted handkerchiefs that contain the entire world (cited in Lamb 2014, n.p.). One of Dodgson's most important critics, Martin Gardner, used the same metaphor in his volume *The Universe in a Handkerchief*. Like the handkerchiefs in *Sylvie and Bruno Concluded*, the 'knots' in *A Tangled Tale* conform to the Rule of Three, three stories which unfold and, in the last chapter, come together. Each tells part of the story, which in turn is embedded in the larger whole, along with mathematical puzzles and the usual riddles that appear in other fictional works written by the Oxford mathematician.

Fond of anagrams and cryptograms, Dodgson/Carroll often used acrostics to conceal the names of the child-friends to whom his works were dedicated. *A Tangled Tale* is no exception. Dodgson/Carroll unmapped travels into wonderland and beyond the mirror of representation match his work on ciphers and cryptology. This paper is an attempt to bridge coding, tropology,

topology and topography into the knotted body of Dodgson/Carroll's creation. In English, the expression 'it is a small world' is used to refer to a world where serendipity and coincidence are surprising. In Spanish we use "the world in a handkerchief". The idea of six degrees of separation is another way to talk about the path length of a topographical graph. Non-Euclidean worlds, kinetic geometries and complex networked structures (such as digital code) include several layers of paths, also characterized by the clustering coefficient that measures the connections among nodes. This paper attempts to map one, among the multiplicity of nodes and tangles, apparently unconnected, that might form part of a unique trail in Dodgson/Carroll's path; a node that concentrates multiplicity within unity.

2. The Golden Mean and Transmedia

Everyone knows that the Alice's books deal with the adventures of a little girl inspired by the real figure of Alice Liddell, the daughter of Henry Liddell, Dean of Christ Church, Oxford, where Dodgson lectured. His devotion was striking, as seen in many of the photographs where she appeared as a favourite model. However, Carroll conceived the first story during a boat rowing trip along the river Isis in 1862 not just with Alice, but also with her two sisters. One of the first signs of language hybridity is the poem that appears in the preface to the first edition of *Alice's Adventures Underground*, subsequently collected in Dodgson's biography by his nephew, Dodgson Collingwood, published in 1889. Using navigational jargon and word-puns, the poem speaks of "a tale of breath too weak / to stir the tiniest feather!" and goes on to refer to the "cruel Three", to be named in mathematical code as "Prima", "Secunda" and "Tertia". Noticing the mathematical symbol for infinity around Alice Liddell's photography in the first edition of the book, critics interpreted it as the confirmation of Carroll's enduring appreciation for the little girl. Ronjaunee Chatterjee (2015) has demonstrated that Alice's subjectivity is dependent on a wonderland that conceptualizes difference numerically, arguing that the author poses questions such as what it mean to be a one and not a two, or what it means to be a third queen when a chessboard only allows two. According to Chatterjee, mathematical logic seems to have influenced Carroll's way of understanding literary selves in terms of mathematical singularities and infinities, rather than in narrative particulars and universals.

Indeed, as Gilles Deleuze posited in *The Logic of Sense* (1969), Alice's books would represent the "paradox of infinite identity", and the multiplicity of avatars or ways of "becoming" captured in the one (Deleuze 1969, 2-3).

The topic of infinity also appears in the way in which Dodgson/Carroll structures his Alice's books around the idea of reality as opposed to the unreality of wonderland and the world beyond the looking-glass. However, this is not a clear cut logical opposition, as the stories are framed within the dreams of the protagonist who, in turn, seems to be part of another dream, that of the White King in the sequel. These series of stories within the story conform to a fractal universe where looking-glass inversions open up infinities, like two mirrors facing each other.

A few years after the publication of Alice's books Dodgson/Carroll wrote several books on recreational mathematics: *The Game of Logic* (1887) and *Pillow-Problems* (1893). *A Tangled Tale* was published as a serial in Charlotte Yonge's magazine for children, *The Monthly Packet*. The first issue appeared just a few months after *Euclid and his Modern Rivals* (1879). Taking the term 'knot' from Alice's remark to the Mouse in the third chapter of *Alice in Wonderland* – "A knot! Oh, do let me help to undo it!" – the collection comprises of 10 episode/knots which run from April 1880 to November 1884. It was published in book form the following year, with six illustrations by Arthur Frost (not all approved by Carroll as seen in his diary entry of July 10, 1885). Fond of acrostics, Carroll dedicated the volume to his friend and pupil 19-year-old Edith Rix (1866-1918) [1] in the form of a poem that spells her name in the second letter of each line:

> Beloved Pupil! Tamed by Thee,
> Addish=, Subtrac=, Multiplica=tion,
> Division, Fractions, Rule of Three,
> Attest thy deft manipulation!
> Then onward! Let the voice of fame
> From Age to Age repeat thy story,
> Till thy hast won thyself a name
> Exceeding even Euclid's glory!

[1] As he states in his diary, Carroll and Edith first met on 25 June 1885. On 27 June he took her and her mother to the Royal Academy; Mrs. Rix left at noon, leaving Edith with Carroll until 8 pm. His last surviving letter to her is dated December 31, 1889 (when she was 23). His diary shows that he continued to meet her regularly, and had tea with her on 21 August 1897, just months before his death.

As mentioned, the knots in *A Tangled Tale* follow the Rule of Three: three stories which unfold in recursive patterns and, in the last chapter, come together. Each one tells part of the story being, in turn, embedded in the larger whole, along with mathematical puzzles and riddles. Following the serial format, readers were invited to submit answers and contributions to the puzzles proposed. Carroll published his solutions with critical commentaries to some of the answers received, which generated a certain amount of debate, much like today's blogs or Twitter and Facebook entries. This format can be seen as an anticipation of contemporary transmedia narratives. Using pseudonyms, correspondents sent solutions and Carroll marked them – following again the Rule of Three – with grade I, II or III, depending on their approximation to success. One entry answering the last question posed in Feb. 1885 was signed E. M. Rix, to which Carroll awarded grade I.

The Golden Rule or Ratio, also-called Rule of Three, conveys the ideal of artistic perfection in many cultures, Western and non-Western. The Latin proverb, *omne trinum perfectum* supports this tenet, holding that the number 'three' combines the smallest amount of information able to create a pattern within a structure (beyond two dots that create a line). The so-called triad pattern is found in many forms of storytelling, suggesting its use as a mnemonic device. The semiotic theory developed by Charles S. Peirce also relies on triad patterns for the study of signs and communication, just like the laws of causality in propositional logic are based on the axiomatic rules of rational discourse. The figure of speech known as *hendiatris* in Greco-Roman rhetoric also stressed the use of three words to summarize and emphasize an idea, as in *veni, vidi, vici* attributed to Julius Caesar, or the motto of the French Revolution: *Liberté, Égalité, Fraternité*.

The number three was also very important for Pythagoras (569-475 BCE) and his followers who, like Plato, held that perfection was to be found in the proportions and harmonious arrangement of parts, constructed in accordance with a single principle where numbers were given symbolic meaning, just as the letters of the alphabet were given numerical values. According to Aristotle (384 BC - 322 BCE), Pythagoras introduced the Hebrew Kabala to the Greeks, arguing that numbers were the principle of all things, and that the organization of the universe follows a harmonic system of numerical ratios (Stakhov 2008, 5-48). Thus, the properties of Rule of Three expand from aesthetic, moral, and ethical consequences related to the harmony of the world, to intellectual and social progress and perfection (Tatarkiewicz 1980).

Plato's long monologue given by Timaeus of Locri, written c. 360 BCE, sets the basis for Western speculation on the mathematical/alphabetic nature of the physical world. The narrator mentions that the creator, a sort of divine craftsman, used an eternal and perfect model (Forms/Ideas) to put four basic elements – earth, air, fire and water – which had previously existed in a state of disorder and shapeless constant motion, in homogeneous harmony in order to create the universe. According to Plato (c. 428-348 BCE), the world is harmonised by proportion when the demiurge (from Greek demos = people and ergon = worker, dēmiourgos meaning "one with special skill" [2]) mixes two types – divisible and non-divisible – of three properties: sameness, difference and being (or existence), from which another three intermediate substances emerge, resulting in the world's 'soul'. In this way, creation follows the harmonic mathematical proportions marked by the Golden Mean.

Indeed, compelling evidence coming various disciplines, shows that, somehow mysteriously, the Golden Ratio appears in many natural patterns including, for instance, the spiral arrangement of leaves and other plant parts, as discovered by Charles Bonnet (1720-1793). It is also present in Adolf Zeising's (1810-1876) research on anatomy, in Roger Penrose's (1931–) theory of non-periodic tiling in crystals and, more recently, in DNA structural patterns [3]. In Book III, Chapter 1, Paragraph 3 of his *De Architectura*, Vitruvius (80-70 BCE, c.15 BCE) writes about proportions following the Golden Ratio. He compares temple architecture to human bodily structure in order to put in relation the idea of micro and macro cosmic structures. Reformulated by Leon Battista Alberti (1404-1472) for his idea of perspective in *De pictura*, the Italian scholar developed a version of Euclid's geometry in terms of non-divisible semiotic 'signs' or 'marks' (he termed *signum*) which, like points joined together, constitute lines that, like threads in a cloth, create a surface transferable from the bi-dimensional world (of painting for instance) to the three dimensional world of architecture and vice versa. Alberti explained that, unlike abstract mathematics where lines are conceived as made up of infinite points, in the geometry of painting, they are limited to finite regions.

[2] In Henry George Liddell and Robert Scott, *A Greek-English Lexicon*, revised and augmented by Sir Henry Stuart Jones and Roderick McKenzie, Oxford: Clarendon Press, 1940, http://www.perseus.tufts.edu/. Henry Liddell was the father of Alice Liddell, the inspiration for the fictional Alice.

[3] For contemporary examples in mathematics, see https://www.theguardian.com/science/alexs-adventures-in-numberland/2015/jan/13/golden-ratio-beautiful-new-curve-harriss-spiral.

His cartographic method was also developed from the work of Ptolemy, particularly his Book VII of the *Geographia*, which was discovered in Florence around 1400 (although it dates from c. 140 CE). Samuel Edgerton has noted that Ptolemy used a method which projected portions of world regions onto a map by using forms of visual perspectival projections, possibly with the aid of optic instruments as in Alberti's *reticolato* (grid) (Edgerton 1975, 104).

During the Renaissance, owing to Vitruvius' influence, the interrelationship of the modular patterns of geometry and their mapping upon representation in the visual arts by means of optic instruments (lenses, mirrors etc.) was a widely discussed issue. As it is well known, in this period, the human body became a paradigm for the required rules of proportion. Adolf Zeising, Dodgson's contemporary, claimed that the Golden Ratio contained the fundamental principle of all formation striving to beauty and totality in nature, and that artistic figuration and representation aspired to this ideal of harmonic formal relations at all levels, organic or inorganic, including all perceptual forms and having their perfect realization in the human figure (Zeising 1854, v).

In the above lines, I hope to have shown, however briefly, that the Golden Ratio discussion stretches from pure abstract mathematics to physical artistic representation, in architecture, painting and, as I am trying to show, in Lewis Carroll's literary fiction and non-fiction. My inquiry seeks to unveil the algorithmic nature (finite sequences of process instructions in mathematical form) of transmedia by exploring the Golden Ratio and its possible use at *Tertium comparationis* between different expressions of art, stressing that convergence stems from the hybrid forms of telling used in digital formats. Indeed, as Lev Manovich (2004) has pointed out, one of the most important properties of digital media technologies is the use of algorithms which serve to automatize and replicate processes. Computer software is programmed to execute steps without human intervention. But, for the user, the most important factor is the level of automatization offered by the interface, that is, the translation from artificial language (binary code at its lower level) into natural language, and the reverse process, what Carroll referred to as the "logic of counting" versus "the logic of naming".

3. Hypertext: The Logic of Counting and the Logic of Naming the Infinite

One of the questions that Dodgson/Carroll addresses in his works is whether the logic of counting could correspond to the logic of naming. This question relates to the paradox of infinite regress and to the inquiry into how multiplicity originated from one single cause, i.e. the many from the One. In other words, the problem asks the human brain to think about infinity by using a physical finite framework based on language. In turn, this may bring us to the question of analogue and digital brains.

In his paper "Über eine Eigenschaft des Inbegriffes aller reellen algebraischen Zahlen" ("On a Property of the Collection of All Real Algebraic Numbers", 1874), Carroll's contemporary, Georg Cantor provided for the first time rigorous proof that there was more than one kind of infinity. His ideas generated huge debate, since accepting them opened the door to paradoxes that challenged the validity of mathematics as whole, just like Carroll did for inferential logic. In the following years, Cantor established the importance of one-to-one correspondence between the members of two sets, invoking the notion of a 1-to-1 correspondence with natural numbers. Between 1877 and 1878, his research on correspondence between the points of a unit line segment yielded the result that this occurs in all the points of an n-dimensional Euclidean space (where n tends to infinity) This discovery had huge implications for geometry and the notion of dimension, which Cantor discussed stressing that his mapping between the unit interval and the unit square was not a continuous one. In the introduction to "Grundlagen einer allgemeinen Mannigfaltigkeitslehre" ("Foundations of a General Theory of Aggregates", 1883) he also indicated the connections between his mathematical view of the infinite and the philosophical one (see Grattan-Guinness 2000; Rescher 2010; for the interest on infinity in the 19th century arts, Hall 1991 and Henderson 2009).

Cantor's discovery came to him, as he claimed, by God's inspiration. In fact, what he found out is that by removing the middle third of a line (in reverse to Plato's account of creation by means of the Golden Ratio), then removing the middle third of the resulting two lines, replicating the process *ad infinitum*, multiple infinities were created: a discontinuous set of infinite points, as well as a set of infinite no-points. The discovery brought to the fore a problematic relation between the parts and the whole, since the multiple infinities of the parts of a line (including the set of all points in the Cantor

'middle third' set) appear greater than a unified whole (Grattan-Guinness 2000, 124; Gillespie 2008, 53-54). Indeed, it introduces infinity as embedded in the system, rather than something that merely transcends it, disturbing series nesting (interior within exterior) and, in general, analogic processes based on human perception and reason. It also opens up the possibility that the system of finite sequences is not closed but, rather, that one can up open forms of infinity, reconfiguring the relationship between unity and multiplicity, that is, a One that no longer refers to a singular/particular, but to a continuum of point zones or "singularity". The legacy of such discovery has re-emerged in contemporary dynamic systems theory (also known as chaos theory) as well as hypertextual theory in relation to the workings of the World Wide Web.

I have argued that in his explorations on tropology, topology and topography, Dodgson/Carroll investigates whether the logic of counting could correspond to the logic of naming. His Alice's books initiate this quest the moment the protagonist falls into the rabbit hole interrogating herself over "Who in the world am I? Ah, *that's* the great puzzle!". Or when she trespasses the mirror to become a new White Queen instead of the one in place. In the space-time continuum, black holes constitute singularities. In optics, the formation of an infinite series of receding images is created by facing two parallel mirrors. As indicated before, Chatterjee (2015) has demonstrated how the new conceptions of singularity impact the characterization of feminine protagonists in Victorian literature. In her Lacanian reading, the lateral horizontal continuum is understood in relation to the negotiation of Alice's individuality with regards to lateral relationships with Wonderland creatures, rather than in a vertical axis of authority power structures. During her frequent physical changes, Alice reinforces her identity in front of the other characters, who view her with persistent distrust. Chatterjee shows how the book exemplifies the first/third person asymmetry of semantic versus pragmatic intentions in the way Alice refers to herself as 'an Other'. To Chatterjee, Alice uses a number of strategies that reinforce her thinking in terms of sequence in order to solve the dilemma of who she is. Enumeration and counting are two these, and both displace the 'one' of its position of primacy (*ibid.*, 42). Many episodes in the first book recall this splitting: from the child-pig in the "Pig and Pepper" chapter, to the Cheshire Cat's insistence in defining his self-awareness with regards to his madness, which as Chatterjee notices, refers to the asymmetry of fantasy world operations. Indeed, because human consciousness cannot face an infinite number of propositions, 'oneness', like Alice's self, begins to lose its analogue symmetric contours, becoming part of wonderland.

Similar situations occur in *Through the Looking Glass*: for instance through the figures of Tweedledum and Tweedledee, the paradox of the cosmic egg, or the idea that Alice exists only in the Red King's dream, an infinite regress is introduced that places the reader on the quest for meaning by introducing the question "Who do *you* think it was?", "Who dreamt who?". The reality of the dream world in the novel is split between two dreamers who, like twins, are not opposites but complements to each other, so that the linear nesting of one dream within another turns into an impossibility and becomes an *n*-dimensional space. All the dreamers, including the reader, can continue to create storylines *ad infinitum*; a narrative that, rather than a storyline, constitutes a writerly fractal or hypertext.

4. *A Tangled Tale*: From Analogue to Digital Cartographies

Many of Carroll's tales reveal the problematic borders of the one and the many. In the case of Alice's books, he seems to explore individuality as a form of negotiation between complementary positions. His inquiry brings him close to the foundations of recursion, a process that occurs when something is defined in terms of itself or of its type. The so-called Fibonacci's (Golden Ratio) sequence is a classic example of recursion. It involves two rules: $Fib(0) = 0$ as base case 1 and $Fib(1) = 1$ as base case 2. Then for $n > 1$ $Fib(n) = Fib(n-1) + Fib(n-2)$. The series starts: 0, 1, 1, 2, 3, 5, 8 … In computer science, recursion follows two operational modes: (1) a simple base case that does not use recursion to produce an answer, and (2) a set of rules that reduce all other cases towards the base case. For example, it can follow a discrete (digital) form where behaviour is uniquely determined once a complete description of a given state is provided, and the analogic form, where reasoning can use continuously valued parameters. Alan Turing (1950) argued that, like a computer, the human brain follows underlying binary patterns (algorithmic "rules of behaviour") that at superficial higher-level of reasoning require that cause-effect relations are established in their inferences ("rules of conduct"). The program's purpose influences the rules used to create the program so that the algorithm for which the input will be manipulated should be established beforehand.

In Alice's conversation with the Mouse about his tale, he asserts that "it is a long and sad tale", to which Alice replies, "It is a long tail, but why

do you call it sad?". In this game of words between tale and tail, the Mouse also mentions the word "not" and Alice thinks he refers to a knot, once more alluding to the potential ambiguity of language. As in mathematical language, in natural languages logic rules need to be predefined in order to avoid possible confusions. As Martin Gardner has noted, Carroll was influenced by the work of his contemporary, the Irish mathematician George Boole who tried to establish a framework to transform philosophical rules into mathematic ones by means of what is known as Boolean algebra, upon which all computers depend. "There is no one-value logic-no way to record or transmit information without a binary distinction between yes and no, or true and false. In computers the distinction is handled by the on-off switches of their circuitry" (Gardner 1960, 269).

In an article for *BBC Earth* entitled "We May Live in a Computer Program, but It May not Matter" (2016), Philip Ball cites a number of top scientists from various disciplines who agree upon the plausible possibility, provided by the regular mathematical patterns of nature (among them, Golden Ratio), that our world is a mathematical simulation and that the outer universe has been pre-designed. Among them, he mentions the pioneer of artificial intelligence, Marvin Minsky, the astrophysicist and Nobel Laureate George Fitzgerald Smoot – who said that some perplexing features of quantum physics are what we would expect in a simulation – or James Gates, who studies matter at the level of subatomic particles like quarks, the constituents of protons and neutrons in the atomic nucleus, and affirms that the rules governing these particles' behaviour have features that resemble the codes that correct for errors in manipulating data in computers. It would seem that at its most fundamental level, nature might be binary code, like computer ones and zeros, an idea introduced by John Wheeler in his article "It from Bit", and supported by Seth Lloyd of the Massachusetts Institute of Technology. Ball's article ends with the anecdote of Samuel Johnson refuting Berkeley's claim that the world is a mere illusion by kicking a stone. In answer to Ball's assertion that it does not matter if we live in a computer program, he affirms that "Johnson did not really refute anything. But he may nevertheless have come up with the right response" (2016, n.p.). Indeed, the episode reminds us of Alice, knocking down the pack of cards in anger in the first book, and pulling the chessboard/tablecloth/mandala in the sequel.

Interestingly, this dual framework, between the world of tropes, analogies and mirrors, and the world of numbers, recursions and bits may present conflicts between what has been termed the logic of narrative and that of

the database: "Many new media objects do not tell stories; they don't have beginning or end; in fact, they don't have any development, thematically, formally or otherwise, which would organize their elements into a sequence. Instead, they are collections of individual items" (Manovich 2004, n.p.). The term meta-language refers to the mappings between formal logic, expressed in natural language, and algorithms, and thus to language used to make statements about statements in another object language, that is, embedded or nested. Meta-language is a language formally fixed in an object language, an idea put forth by Douglas Hofstadter in his book *Gödel, Escher, Bach*, where, with Carroll in mind, Hofstadter analyzes the characteristics of self-reflexivity in various media. Coded systems such as hypertext are examples of nesting structures. Rather than building on linear (active) relationships, they include recursive (static) loops that help reduplicate messages, the basis of multiplicity within unity, as in transmedia.

A Tangled Tale is an example of a meta-language structure where openness and infinity are embedded in the system, disturbing series nesting (interior within exterior). My argument is that this occurs because of Carroll/Dodgon's mixing of natural and artificial languages, as well as his intertextual allusions to esoteric elements, which appear fundamentally in Knot X where all the characters are reunited. Martin Gardner has already mentioned about the hermetic component of Alice's stories [4]. In *Lewis Carroll among His Books*, Charlie Lovett offers a complete catalogue of the books that Charles Dodgson had in his library at Oxford, including some that attest his interest in Hermetic studies (Lovett 2005, 11).

A Tangled Tale is a collection of mathematical tales that gets its inspiration from the success of serial stories which contributed to the rise of literacy in Britain during the Victorian period. Benefiting from technological advances in printing and distribution, as well as laws which reduced taxes on paper and publication, audiences were encouraged to intervene in the development of stories by means of letters addressed to the authors of the serial. Later on, serial columns were used as a strategy to avoid newspaper taxes, with serials evolving as a way to fill an extra column space (see Law 2000). One of the first serials was *The Pickwick Papers*, which Charles Dickens began to publish in 1861. *A Tangled Tale* lies somewhere between a series and a serial, with distinct types of continuity in their storylines. The series includes a

[4] See also M. Conner, http://www.examiner.com/article/alice-wonderland-and-the-occult.

systematic transition from one storyline to another with one or two characters playing the main roles and the others constantly changing, including one story per episode. The serial encompasses one meta-story which includes several interwoven plots and storylines (a classical example is *One Thousand and One Nights*). In both cases nesting devices can be exploited to turn the narrative into a recurrent generative process that weaves storylines and reception in more complex layers of analysis. For instance, additions to the plot came from the echoes of the serial's own reception in a process that incorporates media-centred and reader-centred perspectives. In the case of *A Tangled Tale*, readers sent their responses to Dodgson's mathematical problems and he later discussed them and rated them.

A Tangled Tale is made up of ten knots. In his introduction to the volume, Carroll explains that each tale appeared serialized, and that the writer's intention was to introduce in each knot one or more mathematical questions. Each of the knots has a title and some have a subtitle or quote that refers to the general topic presented in the tale, and which often came to the author in his sleepless nights (*Pillow Problems* is another collection of mathematical tales, often published alongside *A Tangled Tale*). At first sight, the knots are loosely interconnected. I will attempt to provide a brief account of their connections in what follows.

In Knot I, Excelsior, two knights resemble those in *Through the Looking-Glass*, but later in Knot IV they turn out to be father and son discussing the distance they will have traveled uphill and downhill at different speeds. In Knot II, Eligible Apartments, Professor Balbus, who embodies Dodgson himself, takes a walk with his two students, the brothers Hugh and Lambert, in search of an apartment. As they walk, the brothers mention to have received a letter from their father with a problem regarding a very small dinner-party given by the Governor of Kgovjni. This Knot also ponders on the question of symmetry regarding the rectangular square with twenty doors on a side and each side divides into twenty-one parts. They approach door numbers 9, 25, 52, 73 and rent the four rooms to use as three bedrooms and one dayroom. The problem is to choose the dayroom from the three taking into consideration the least walking distance.

In Knot III, we meet Mad Mathesis, and her niece Clara, twenty years younger and still attending high school. They are at Charing Cross Station in London watching the trains come and go every 15min in their circular journey. They realize that the ones coming from the west take two hours and the ones from the east three hours before they meet. Clara and her aunt

bet who can count more trains if they travel in opposite directions. Clara thinks she can count 50% more than her aunt: "Remember, we only count the trains we meet on the way. You mustn't count the one that starts as you start, nor the one that arrives as you arrive". Clara thinks this will make only the difference of one train, but she is wrong. In order to avoid her niece's disappointment, Mad Mathesis varies the experiment "We will start as we did before, but not begin counting till our trains meet. When we see each other, we will say 'One!' and so count on till we come here again. […] Each gazed eagerly from her carriage window, holding up her handkerchief as a signal to her friend".

In Knot IV, The Dead Reckoning, the two knights of Knot I, appear in the 20th century. As they lie onboard a ship on the way to Kgovjni Island, they observe some native fishermen carrying a small bag each. When they approach the captain, he tells them that five fishermen from Mhruxi Island carry money, which is heavy but costs little. He says that he buys it from them by weight, at about five shillings a pound. The bags are placed near the jib, and as it is hoisted, they fall overboard into the sea. The captain tries to pay for the bags but he is not sure about their weight, as they were weighed two at a time. The tale ends with the older knight reconsidering the problem and muttering "if only my sister were here".

In Knot V, Oughts and Crosses, aunt Mad Mathesis and her niece continue to discuss where they left off in Knot III. Referring to the school where she studies, Clara mentions that one day at tea time, when the little girls were making a lot of noise, her preceptress said: "– The more noise you make, the less jam you will have, and vice versa – Clara thought they wouldn't know what vice versa' meant and she explained it saying, – If you make an infinite noise, you'll get no jam: and if you make no noise, you'll get an infinite lot of jam" (Carroll 1885, 27-33). The question of noise and jam relates indirectly to the problem presented in this tale. As they descend from their carriage at Burlington House (the Royal Academy of Arts), aunt Mad Mathesis gives her niece another chance to win. She draws lines on the margins of the catalogue and they play to classify paintings giving crosses for good marks and oughts for bad. The first column reflects the choice of subject, the second the arrangement, the third colouring. Clara must give three crosses to two or three pictures, two crosses to four or five and one cross to nine or ten. The one who marks fewest pictures wins, but if the two, niece and aunt, mark the same, then the one who uses most marks wins. They discuss the first gigantic painting, Lieutenant Brown riding an elephant and occupying the space of

twenty paintings. They separate and soon after Clara meets two old ladies who turn out to be sisters and puzzle Clara with their conversation.

In Knot VI, "Her Radiancy", the two travellers arrive in Kgovjni. The Governor welcomes them and tells the country is wonderful. He explains that he has received a letter from a friend and his brother, who went to London a year ago with a thousand pounds a piece. On New Year's Day they had sixty thousand pounds between them. Norman and his father, the travellers, wondered how they did it and the Governor reads from the letter "We borrowed nought: we stole nought. We began the year with only a thousand pounds a piece and last New Year's Day we had sixty thousand pounds between us-sixty thousand golden sovereigns!". The enigma remains unsolved as they enter the palace and visit Her Radiancy. The Governor then tells them that they shall be the judges of the yearly competition for the post of Imperial Scarf-maker. They need to account for the rate of work, the lightness of the scarves, and their warmth. Last year Fifi and Gogo made the same number of scarves in the trial-week, and they were equally light; but Fifi's were twice as warm as Gogo's and she was pronounced twice as good. This year there are three competitors and it is more difficult to judge. Father and son are brought down a winding staircase (one of the metaphors for the Golden Mean Φ/φ), lodged in the best dungeon, and fed abundantly on the best bread and water until they can solve the problem.

In Knot VII, "Petty Cash", aunt Mad Mathesis and her niece are in the cab on their way back from the Royal Academy after stopping at a confectioner's shop. Aunt Mattie is waiting to note down the amount that Clara has just spent as well as that for the dinner of the day before. When they get off the cab they meet the two old and fat identical ladies who were at the Royal Academy at lunch at a table near them. They were soon sitting on the same bench waiting for the train. To Aunt Mattie, these occurrences are not independent coincidences. They discuss the improbabilities of such coincidence and examine the lunch bill.

Knot VIII, "De Omnibus Rebus", begins with a line from the story of the three little pigs: "This little pig went to market: This little pig staid at home". Norman and his father are being liberated and they are crossing a large quadrangle paved with marble and tastefully decorated with a pigsty in each corner. Soldiers carrying pigs march in all directions. Her Radiancy has commanded to place twenty-four pigs in four pig-sties so that, as she goes round the court, she may always find the number in each sty nearer to ten than the number in the last. Norman tries to solve this problem and also the

problem of an omnibus in which he might be able to abandon Kgovjni with his father.

Knot IX, "A Serpent with Corners", contains a subtitle "Water, water, everywhere, nor any drop to drink". The location is the beach of Little Mendib Spa, and the protagonists are the same as in Knot II. "Time 1:30 P.M. Hugh is floating a bucket in another a size larger, and to test how many pebbles it would carry without sinking. Lambert is lying on his back, doing nothing". The first problem has to do with Archimedes' laws. The second is posed by Balbus in the following terms:

> "A friend of mine has a flower-garden – a very pretty one, though no great size –" "How big is it?" said Hugh.
> "That's what you have to find out!" Balbus gaily replied, "All I tell you is that it is oblong in shape – just half a yard longer than its width – and that a gravel-walk, one yard wide, begins at one corner and runs all round it." "Joining into itself?" said Hugh.
> "Not joining into itself, young man. Just before doing that, it turns a corner, and runs round the garden again, alongside of the first portion, and then inside that again, winding in and in, and each lap touching the last one, till it has used up the whole of the area."
> "*Like a serpent with corners*?" said Lambert.
> "Exactly so. And if you walk the whole length of it, to the last inch, keeping in the centre of the path, it's exactly two miles and half a furlong. Now, while you find out the length and breadth of the garden, I'll see if I can think out that seawater puzzle." "You said it was a flower-garden?" Hugh inquired, as Balbus was leaving the room.
> "I did," said Balbus. [5]

Alongside the above non-Euclidean paradox, there is yet another problem posed by Balbus to 'fix his thoughts'. It has to do with a cylindrical glass jar, as a counterexample to the first problem in this tale. Balbus also produces an essay which is embedded in the tale, as the pebbles in the buckets in the first problem, or the solid cylinder which is introduced in the cylindrical glass jar filled with water in the second. Balbus' reflection ends with an allusion to Galileo and Kepler as "martyrs of science" and an obscure brief thank note to someone named Kossuth, now deceased.

Finally, Knot X, "Chelsea Buns". This is one of the darkest tales. There are many obscure allusions. One of them is the reference to the Chelsea buns.

[5] The description is a nice metaphor for hypertextual design (emphasis added).

The secret to the buns' shape consists in getting the spacing between them right so that they snuggle up to each other, restricting further movement, in a metaphor that resembles the composition of the tales in Carroll's series *A Tangled Tale*. Indeed, Carroll uses the Rule of Three to solve most of the proposed mathematical tangles. And if we bear in mind the recursions that occur by the repetition of the characters in each knot, we get the following number: 123 1313 123, with Knot 4 = Knot 1, Knot 5 = Knot 3, Knot 6 = Knot 1, Knot 7 = Knot 3, and the last three Knots repeating the 1-2-3 sequence again, with 1313 embedded in the middle.

It is also important to mention that the geometrical representation of the Golden Ratio and Fibonacci's series is a spiral as follows (*Fig. 1*).

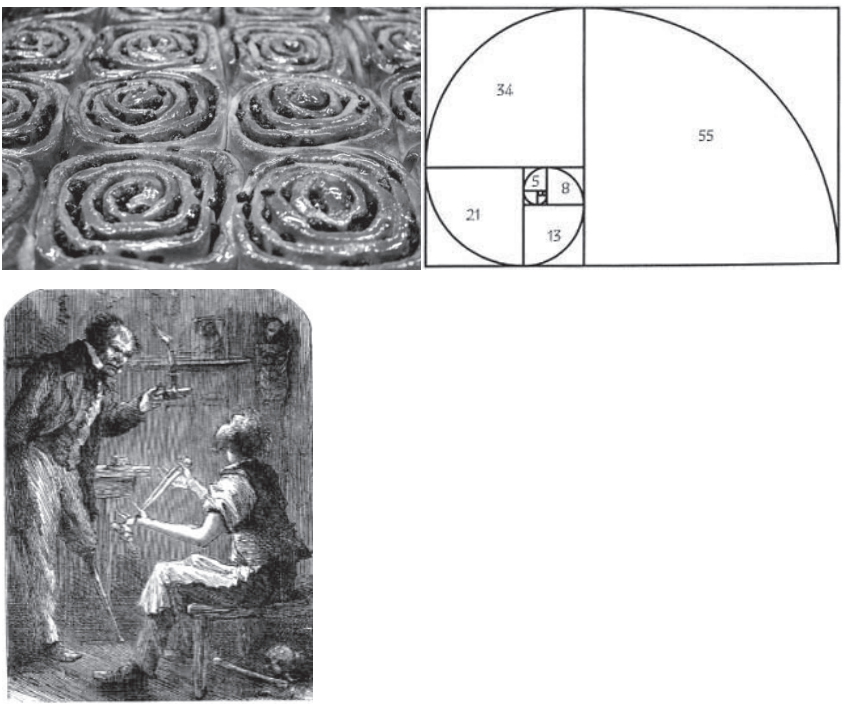

Figure 1. – Chelsea Buns + The Golden Ratio + Illustration for chapter 7 of Dickens's "Our Mutual Friend", Lee & Shepard (Boston), and Charles T. Dillingham (New York) 1870 Household Edition at the Victorian Web http://www.victorianweb.org/victorian/art/illustration/eytinge/5.html.

Another allusion refers to a man on the beach who draws a map with his wooden leg: "Did you notice that very old one, with a red face, who was drawing a map in the dust with his wooden leg, and all the others watching? I think it was a plan of a battle", "The Battle of Trafalgar, no doubt". The image seems to echo Charles Dicken's character Silas Wegg in *Our Mutual Friend*, published more or less at the same time as *Alice Adventures in Wonderland*. Wooden-legged characters are popular in many other contemporary stories, such as Dickens's *David Copperfield* or Robert Louis Stevenson's *Treasure Island* (1883). The symbolism of freemasonry is entangled with pirate's history, to the point that the use of the 'skull and bones' is common to the pirate's flag, as a reminder of one's mortality (known as *Memento Mori – Remember You Must Die*). It is also the emblem of a secret society with the same name at Yale University. The Household edition of Dickens' *Our Mutual Friend* depicts the wooded legged Mr. Wegg with the symbol under the chair of Mr. Venus.

Finally, Aunt Mattie asks Clara to solve the following problem: "Say that 70 per cent have lost an eye, 75 per cent an ear, 80 per cent an arm, 85 per cent a leg, that'll do it beautifully. Now, my dear, what percentage, at least, must have lost all four?" asks Aunt Mattie. Both are walking and Clara is thinking about Chelsea buns. They reach the old Chelsea mansion, where Clara's father has been staying, with his three sons and their old tutor. Balbus, Hugh and Lambert are already at the house discussing the problem of different time zones in the world and the order of the days of the week, thought in visual synesthetic terms in a certain mental sequence, left to right, west to east. The inquiry seems to return to the problem of the trains presented in Knot 3. Aunt Mattie and Clare are shown inside by the butler: "Yes, m'm, Master is at home, m'm", said the stately old butler (N.B. – It is only a butler of experience who can manage a series of three M's together, without any interjacent vowels) "And the ole party is a-waiting for you in the libery". They enter the library, and encounter five solemn faces. Clara's father "sat at the head of the table, and mutely signed to the ladies to take the two vacant chairs, one on each side of him. His three sons and Balbus completed the party". The number of people assembled is 7 (not counting the butler who might not be present).

> Writing materials had been arranged round the table, after the fashion of a ghostly banquet […]. Sheets of quarto paper, each flanked by a pen on one side and a pencil on the other, represented the plates, pen-wipers did duty for rolls of bread, while ink-bottles stood in the places usually occupied by wine-glasses.

As if dealing with Fortunato's purse, "The piece of resistance was a large green baize bag, which gave forth, as the old man restlessly lifted it from side to side, a charming jingle, as of innumerable golden guineas". The father poses a problem related to the number of speeches he has pronounced in previous gatherings and the age of all the participants, in relation to the guineas he will share with them: "my boys, calculate your ages from the data, and you shall have the money!". The old brother and sister leave the room: "Nothing could exceed the solemnity with which the old couple had risen from the table, and yet was it- was it a grin with which the father turned away from his unhappy sons? Could it be- could it be a wink with which the aunt abandoned her despairing niece?".

Carroll's obscure tale, full of winks to freemasonry and illuminati symbolism, ends with the following lines:

> The shades of evening granted their unuttered petition, and "closed not o'er" them (for the butler brought in the lamp); the same obliging shades left them a "lonely bark" (the wail of a dog, in the back-yard, baying the moon) for "a while": but neither "morn, alas", nor any other epoch, seemed likely to "restore" them to that peace of mind which had once been theirs ere ever these problems had swooped upon them, and crushed them with a load of unfathomable mystery!

The 1885 volume also includes the discussions and solutions that Dodgson and his participant students shared. Without explaining the reasons why the serial publication stopped, Carroll fares goodbye to his readers using the following words:

> I take this opportunity of thanking those who have sent, along with their answers to the Tenth Knot, regrets that there are no more Knots to come, or petitions that I should recall my resolution to bring them to an end. I am most grateful for their kind words; but I think it wisest to end what, at best, was but a lame attempt. "The stretched metre of an antique song" is beyond my compass; and my puppets were neither distinctly in my life (like those I now address), nor yet (like Alice and the Mock Turtle) distinctly out of it. Yet let me at least fancy, as I lay down the pen that I carry with me into my silent life, dear reader, a farewell smile from your unseen face, and a kindly farewell pressure from your unfelt hand! And so, good night! Parting is such sweet sorrow, that I shall say "good night!" till it be morrow.

"The stretched metre of an antique song" is a line from Shakespeare's Sonnet 17, normally interpreted as referring to procreation. The sonnet includes another line, "in fresh numbers number all your graces", which might

have appealed to the writer of *A Tangled Tale*. The 'lame' attempt points back, elliptically, to the man with the wooden leg, mentioned in Knot X, an ellipsis that opens up towards Hephaestus ('the lame one'), god of fire, metalworking, alchemy and stone masonry, who was rejected by his mother Hera (earth) because of his deformity. He designed Hermes' winged helmet and sandals and built automatons to work for him in the forge. Hermes, in turn, messenger of the gods (also known as the Mercury of alchemy) was an androgynous being; two embodied in the one. Hermes is a fundamental figure in Hermetic and esoteric secret societies. However, Carroll would have been identified with Hephaestus for many reasons (I leave it to my reader to find them out), and like the Victorian (Mad) Hatters, crazed by their exposure to mercury, most smiths of antiquity would have suffered from chronic arsenic poisoning used to harden cooper. Which brings us to the language game: "I know a man with a wooden leg called Smith", to which people what respond: "What's the name of his other leg?" [6].

5. Conclusion

Carroll's use of hybrid forms of telling lie somewhere between the logic of storytelling and the cartography of the database; between the grammar of tropes, mathematical recursive topologies like the Rule of Three (or Golden Ratio), and feedback loops of infinite regress. His tales also include obscure and hermetic symbolism in a semiotic combination of languages that opens up the text and creates a sort of plasticity that involve readers in deciphering, interpretation, and logbook commentary, much like contemporary bloggers and social media followers. In *A Tangled Tale*, the serial format also encouraged the audience to participate in problem solving situations in a way that anticipates experiments in hypermedia storylines with multiple transmedia affordances.

In his book on the cultural origins of hypertext, George Landow mentioned Roland Barthes' theory of the "writerly text", which appears in his book *S/Z* (1974), where

[6] A joke used in many tales such as Edgar Allan Poe's story "The man that was used up" (1850).

> The writerly text is a perpetual present, upon which no consequent language (which would inevitably make it past) can be superimposed; the writerly text is *ourselves writing*, before the infinite play of the world (the world as function) is traversed, intersected, stopped, plasticized by some singular system (Ideology, Genus, Criticism), which reduces the plurality of entrances, the opening of networks, the infinity of languages. (Landow 2006, 5)

In this sense, Dogson/Carroll's *A Tangled Tale* is already a writerly text that transcends the limits of representation, advancing hypertextual interaction. The ending of the story recursively loops back to the man with the walking stick and the wooden leg, who draws a map on the watery sand of Chelsea beach as Clara and Aunt Mattie stare in intermedial contemplation. In order to open my text to further inquiry, let me finish with a riddle from Gregory Bateson on maps, territories and infinite regress:

> We say the map is different from the territory. But what is the territory? Operationally, somebody went out with a retina or a measuring stick and made representations which were then put on paper. What is on the paper map is a representation of what was in the retinal representation of the man who made the map; and as you push the question back, what you find is an infinite regress, an infinite series of maps. The territory never gets in at all. […] Always, the process of representation will filter it out so that the mental world is only maps of maps, ad infinitum. (Bateson 1972, 429)

The question remains, open to my reader for further commentary, on the inner workings of storylines mapped in transmedia convergence; nodes that concentrate the multiplicity of the media galaxy within the unity of a nutshell; the Universe in a Handkerchief.

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