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Alice-Stories as Anticipatory Reflections on Experimental Psychology and Neuroscience

Hub Zwart

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Introduction

Although coming to terms with Lewis Carroll's *Alice's Adventures in Wonderland* (1865/1965) and *Through the looking-glass* (1871/1965) seems like playing at "riddles that have no answers," as Alice puts it (1865/1965, p. 70), numerous scholars have taken up the challenge, and the academic corpus of *Alice*-interpretations is quite substantial. Carroll's stories have been analyzed and annotated in numberless ways (Phillips, 1971, p. 15), spawning a "seemingly never-ending academic industry" (Snider, 2009). And yet, they continue to excite interpretative desire.

In this paper, Carroll's *Alice*-stories will be analyzed from a Lacanian psychoanalytic perspective. Notably, it will build on Jacques Lacan's suggestion to regard them as an "epic of the scientific era" (Lacan 1966/2002, p. 12). Although Lacan initially "correlates" these stories with Darwin's *Origin of Species* (seeing *Wonderland* as a countervailing "idyll" opposing Darwinian "ideology"), in various Seminars he emphasizes connections with other research fields, notably linguistics, topology, and experimental psychology. The latter came into being in the 1870s, the Lewis Carroll-epoch, during which Wilhelm Wundt established the first psychological laboratory in 1879. In Seminars *VI* and *XII*, Lacan explicitly compares Carroll's stories with the work of Jean Piaget, describing Carroll's literary approach to human cognition and language as far more revealing and groundbreaking than Piaget's scientific contributions

(1958–59/2013, p. 202; 1964–65, p. 22). Lacan criticizes the latter for regarding language merely as a vehicle or instrument of intelligence and a property that matures in a quasi-biological way, while Carroll's stories revealed how intimately language, logic, and intelligence are interconnected and how even the infantile world is profoundly *structured* by language. Thus, to a much greater extent than Piaget's experimental work, Lacan argues, Alice's literary experiments allow us to study the crucial role of language (i.e. the signifier) in the process of subjectivization (Lacan 1964–1965, p. 22). In an almost Heideggerian fashion (Heidegger 1950/1957), Carrollian art seems to *precede*, and to reach greater depth, than subsequent developments in experimental psychology. The same applies to psychoanalysis itself, to some extent. Carroll's *Alice*-stories not only anticipate psychoanalysis (as if Carroll, via his art, explored basic psychoanalytical insights decades before they were actually articulated by Sigmund Freud), but they may also serve as a critical instrument for challenging ego-psychological views that were dominant in Lacan's own time.

In the current era of high-tech brain research, exemplified by functional Magnetic Resonance Imaging (fMRI) and the multi-billion *Human Brain Project*, Lacan's claims concerning the precedence of literature over experimental cognitive research may seem outdated. Indeed, many regard even (Lacanian) psychoanalysis itself as something belonging to the past. Yet, the basic objective of my rereading of Carroll's stories is to accentuate the continuing relevance of Lacanian psychoanalysis, in line with Slavoj Žižek's claim that it is only today, during the heyday of brain imaging and psycho-pharmaceuticals, that the time of psychoanalysis has really come (2006/2007 p. 2).

From a Lacanian perspective, both the *Alice*-stories and their scientific counterparts emerge as *worlds of language* (triggering a logocentric reading) and as *spatiotemporal ambiances* (triggering a topological reading), and I have applied that perspective in the design of this essay. Thus, after introducing the Lacanian psychoanalytic framework, I will cast *Alice's Adventures in Wonderland* as the experiences of a research subject inside a laboratory setting designed to study juvenile problem-solving behavior. The research subject is exposed to

a variety of experimental conditions, in the context of which laboratory props become sublimated into “objects of desire,” while special attention is given to the role of optic devices and of neuro-active substances. Subsequently, I will address the topological dimensions of the tales, i.e. the functioning of space and time, elaborating on Lacan’s claim that, unlike the academic work of Reverend Charles Lutwidge Dodgson—Carroll’s real name—the *Alice*-stories open-up a modernistic, post-Euclidian experiential ambiance. Next, I will read Alice’s adventures as a journey through a mindscape while conducting psychedelic trials. And finally, I will discuss a cinematic *Alice*-version, casting Wonderland as an outdoors psychiatric ward. Each section serves to demonstrate not only how Lacanian psychoanalysis allows us to correlate Carroll’s stories with experimental psychology and neuroscience, but also how Carroll’s literary mirror enables us to discern the significance of Lacanian psychoanalysis in the current era of “big” brain research. For indeed, a Lacanian rereading of Carroll’s *Alice*-stories (as experimental journeys through the human mindscape, albeit employing literary tools and methods rather than high-tech science) seems especially relevant against the backdrop of the current neuro-fascination or neuro-hype, culminating in a “neurologization” of human self-understanding (De Vos, 2016).

Lacanian Psychoanalysis and Epistemological Triangulation

The mutual exposure of Lacanian psychoanalysis, Carroll’s *Alice*-stories, and experimental psychology amounts to an exercise in epistemological “correlation” (Lacan 1966/2002) or even *triangulation*, seeing Wonderland and the looking-glass world as literary laboratories that anticipate and problematize (in a playful manner) the type of research initiated by psychologists such as Wundt and Piaget, but culminating in the ICT-driven cognitive and neuroscientific research practices of today. In my Lacanian rereading, Carroll’s Alice stories are interpreted as imaginary journeys through a human mindscape. In fact, all three types of discourse—the *literary* discourse of Carroll, the *analytical* discourse of Lacanian psychoanalysis, and the *univer-*

sity discourse of cognitive psychology and neuroscience—aim at coming to terms with the human psyche, but Lacanian psychoanalysis allows us to “correlate” Carroll’s laboratories of the imagination with experimental psychology and neuroscience.

For psychoanalysis, the explicit framing of Carroll’s *Alice*-stories as dream accounts provides an obvious point of departure (1865/1965, p. 109; 1871/1965, p. 217). As Freud (1900, 1907[1906]) argued, dreams, daydreams, and dream-like stories may serve as windows into the unconscious, providing access onto a different stage. There an unusual logic reigns, based on association, condensation, and displacement, while time itself seems modifiable or absent (Freud, 1915, pp. 186–187). Subsequently, classical Freudian or even ego-analytical interpretations, such as those of A.M.E. Goldschmidt (1933/1971), Paul Schilder (1937/1938), and Phyllis Greenacre (1955), tend to adopt a psychopathological view, seeing Carroll’s *Alice*-stories as an oneiric access into the author’s unconscious conflicts or, in the Jungian case, as a compensatory supplement to the author’s logico-mathematical work (Bloomingdale 1971, Snider 2009).

A Lacanian perspective moves in a different direction. What surfaces in these stories is not the unconscious of one particular author, but rather the structure of the unconscious *as such*, as a particular discursive ambiance. Read in this manner, Carroll’s stories anticipate Lacan’s dictum that the unconscious is structured as a language (1966; 1955–56/1981), and a Lacanian perspective would focus first of all on the linguistic and symbolic aspects of the stories: the numerous word and number games. Carroll is notably famous for his “portmanteau” or “telescope” words—neologisms resulting from condensation or reversals¹—while alliteration likewise stands out as a typically Carrollian technique for organizing dialogues and events.² But Lacanianism also pays attention to the topological dimension: the ways in which time and space are organized.

Lacan (1966/2002) argues that, in his academic output, Carroll’s treatment of language, logic, and mathematics remains fairly traditional, “Aristotelian” even, in comparison to the revolutionary content of the *Alice*-stories. His scholarly mind-games³ are sometimes amusing, sometimes pedantic, but it is only in his *stories* that he anticipates the epistemic

upheaval affecting research fields such as logic, mathematics, and linguistics from 1900 onwards (a development which was still a few decades away when Carroll created Wonderland).⁴ It was only when he allowed his linguistic-logico-mathematical interests to converge with his literary talents that a remarkable oeuvre materialized, a paradigm of artistic sublimation, and a leap into a completely different style of thinking about logic, space, time, and language. But Carroll also stands out as a remarkable precursor of both psychoanalysis and surrealism. Thus, for Lacan, paradoxically, Carroll's contributions to understanding language, numbers, and logic *as a literary author* prove much more valuable and significant (in hindsight) than his numerous publications as a scholarly professor (Lacan 1966/2002, p. 10; Marret 1995, p. 103). We must start, then, by following Alice into the rabbit hole.

Alice or The birth of the Psychological Research Subject

Alice's Adventures in Wonderland begins with the famous scene of the heroine falling into a rabbit's hole, a kind of "tunnel" (1865/1965, p. 24) or elevator shaft, leading into a basement. On her way down, time and space seem frozen or suspended, and it is difficult to estimate the distance and duration of her fall, as she passes books, maps, marmalade jars and pictures on her way.

Various possible interpretations of this scene come to mind. Building on the mother earth archetype, one may see it as a delivery in reverse, one played backwards as it were, a reverted birth trauma or return journey into the motherly womb. The white rabbit, a cradle companion for newborn babies—a "transitional object" (Winnicott 1971)—leads the way, acting like a gynecologist, constantly looking at his watch, apparently concerned not to arrive on the scene too late. The subsequent scene (Alice floating in a pool of tears) likewise fits into the birth series (Levin 1965/1971). All these elements make sense, even if their logical sequence seems botched up.

Another possible interpretation builds on the idea of the human body as an ecosystem: the surface of the earth's skin

contains holes (pores), giving access to a magnified body inhabited by strange organisms, the microbiota of contemporary biology. Some interpreters—including the psychiatrist Schilder, Austrian-born author of one of the first psychoanalytic *Alice* interpretations (1937/1938)—see her fall as a plunge into the unconscious which, for him, explains the atmosphere of anxiety and bewilderment pervading the stories: the weird, schizophrenic language, the fluctuating body image, and the absence (or unpredictability) of time, which either freezes or flows in unusual directions.

I will offer here a different approach. As soon as her fall through the rabbit hole comes to a stop, Alice finds herself in a hall, “lit up by a row of lamps hanging from the roof” (1865/1965, p. 25). A door leads into a garden, but it is too small to pass through. “I wish I could shut up like a telescope!” she exclaims (p. 26), whereupon she discovers a bottle on a table, labeled “DRINK ME,” which she does. Immediately she begins to shrink, becoming the size of the garden door. Unfortunately, the door is locked, and the key is on the table, now beyond her reach.

How to make sense of this scene? One possible reading is to see the hall as a test facility, a laboratory setting for psychological research, perhaps someplace in a university building, where experimental trials are conducted to study juvenile problem-solving behavior or see into the workings of a learning, problem-solving brain. The laboratory is an empty room, brightly lit, containing carefully selected items, or laboratory props, deposited there by the research team, including the labeled bottle. Alice, the research subject, participates in a test. There will be a one-way screen somewhere, no doubt, a laboratory mirror, at the other side of which researchers will watch and record each and every move she makes ($N=1$). Will she find the entrance to the garden?

There are doors all around the hall, the story tells us, and Alice-the-research-subject tries them all, systematically, one by one, but they are locked. Apparently, she is being subjected to a frustration experiment that tests her trial-and-error behavioral repertoire. What strategies will she come up with? How much time will it take? Will her improvisations provide cues concern-

ing personality traits, or problem-solving behavior in general? We know the question this experimental set-up is meant to address, namely, whether this person really is the 'real' Alice.

Soon, Alice discovers another item in the room, something that she initially overlooked: a curtain. Behind it, there is another door. This time, armed with the key that fits the lock, she opens the door, but another frustration awaits her, undoubtedly a part of the experimental design again: the door is too small for her to enter. The idea of a telescope now comes to her mind, an optic prosthesis, which, by allowing her to extend and bend her body, significantly broadens her scope, her field of vision. For indeed: telescopes not only allow us to see things out of eyesight, but they increase or diminish in size themselves. We can make them longer or shorter, thereby modulating the distance and size of the object. Alice wishes to become such an optical instrument, so that, by modulating the size of her body in comparison to the room, she may peek into the garden. Indeed, rather than to *have* a telescope, her desire is to *become* one.

When read from a Lacanian perspective, science (laboratory psychology) and literature (the *Alice*-story) can be "correlated," as Lacan (1966/2002) phrases it. The story enacts and adheres to a laboratory protocol. The subject initially seems unable to solve the task set out for her (in Lacanian algebra: $-\phi$). She focuses her attention on the telescope as an absent, intractable object she desires to incorporate (in Lacanian terminology: the *object a*), so that, either by magnifying the passage or by miniaturizing her body, she may enter the next station in the labyrinth, where a reward (reinforcement) probably awaits her. The DRINK ME bottle comes to her rescue. It carries a commanding, promising, inviting signifier on the label and indicates the presence of a third person, a powerful Other, the designer of the experiment, who selected the test items and apparently controls the situation, in Lacanian algebra: (A). This Other provides Alice with hints and cues, carefully monitors her, and guides her in a certain direction, one that gives access to the destination she is supposed to reach.

For Lacan (1967/1968, p. 8ff.), the exemplification of the experimental psychologist, of the experimental Other (A), is

Ivan Pavlov (1849–1936), a contemporary of Freud. Rather than posing as omniscient, apodictic master-agent who already knows the truth (in Lacanian algebra: S_1),⁵ experimental researchers prefer hands-on action, relying on their technical prowess rather than reflection to generate questions systematically, leading towards partial, temporary answers (S_2). Although Pavlov preferred to work with dogs rather than with girls, the experimental set-up is comparable. And although the Other is absent from the scene (as an obfuscated, hidden gaze), he holds sway over the situation, introducing a series of stimuli—or rather, signifiers—as messages coming from the Other, on whom the well-being of the research subject depends. As Lacan phrases it, Pavlov’s experiment is basically an *enactment* of the advent of the signifier, and the stimuli Pavlov uses to trigger a response (secretion of saliva, for instance) are comparable to the DRINK ME and EAT ME items in the *Alice*-story. Like Alice, the laboratory animal (the Pavlov dog) is expected to adapt to an alienating situation, purposefully manipulated. Unlike Pavlovian dogs, however, Alice dwells in a world of language, responding to signifiers rather than to signals, which allows her (partially at least) to regain her agency, recasting the scene as series of questions and answers.

As signifier, the DRINK ME label suggests that the bottle contains what in Lacanian grammar is called the (oral) *object a*, the object of desire, the missing item which allegedly will allow Alice to overcome her short-comings, her sense of lack ($-\phi$), and to live up to the situation, opening doors that otherwise would remain locked ($a / - \phi$).

While the bottle allegedly contains the oral version of the *object a*, the telescope (as a contrivance that can be present or absent and whose size and shape can be modified) represents the phallic *object a*, which Alice desires to become and to incorporate, rather than to have. This phallic experience of growing and shrinking has been a focus of attention for psychoanalytic interpretations (Goldschmidt 1933/1971; Grotjahn 1947/1971) and resonates with Fenichel’s famous equation *girl* = *phallus* (1936/1954). This equation, casting the girl as object-cause of phallic desire, is cited by Lacan on more than one occasion, but deconstructed and reframed at the same time. He uses the

formula in his analysis of Alice (1965–66, p. 634), but also with respect to other literary targets of desire, notably Shakespeare's Ophelia (1958–59/2013, p. 360),⁶ Nabokov's *Lolita* (1958–59/2013, p. 454; 1961–62, p. 215) and the newborn Venus of Mannerism (1960–61/2001, p. 154). For Lacan, however, the phallus is not an organic, bodily entity, but primarily a signifier (ϕ), referring to an elusive, enigmatic object which allegedly allows subjects to live up to the expectations and demands of the Other, but which oscillates between presence and absence in a frustrating and inhibiting manner. Thus, whenever Lacan uses this equation, phallus does not refer to a bodily thing or organ, but rather to the *object a*: an unreliable, precarious entity “that is never so much there than when it is absent” (1961–62, p. 154), such as the (absent) telescope mentioned above. In short, the phallus as a signifier refers to something we *desire* to be present (available and functional), but which usually fails us. By consuming the DRINK ME liquid, Alice seems to *become* this telescope, this entity, which can be shortened and extended, increased and decreased in size, and which enables her to move from a situation of helplessness and impotence to a position that allows her to look and see and gain control over the situation ($a / - \phi$).

This experience of growing and shrinking, invoked by the phallus/telescope as a signifier, continues to resurge as the story unfolds. Somewhat later, for instance, when she enters the rabbit's house, Alice begins to grow again, until her grown body fills up the entire domestic space. As a consequence of her growth, the shape of her body changes, with her head on top of an elongated neck (suggestive of a phallic form).

Lacan admires Carroll for his ability to *play* with this phallic equation, allowing us to see that Alice indeed *is* the phallus, as traditional psychoanalysis suggests, but at the same time emptying the phallic object, depriving it of its corporeal, organic features, and reframing it as a “negative entity,” as an object that continues to escape and elude us (Lacan 1966/2002, p. 9). It is in *this* sense, according to Lacan, that Carroll's Alice-stories are playful tales devoted to the enigmatic, fugitive, inexorable phallic object and its vicissitudes (1958–1959/2013, p. 280). This structure or experience is also discernible in experimen-

tal settings, as certain substances or props (such as liquids or keys, provided or withheld by the Other) may suddenly allow research subjects to resume agency and reset the situation.

From a Lacanian perspective, the telescope not only functions as a phallic object, but also as a prosthetic materialization of scopic desire: the craving gaze. As such, it is connected with the *author* as well as with the heroine. Unlike the Pavlovian experimenter, the author is not completely in control of the situation. He rather functions as a craving, desiring, tormented subject (in Lacanian algebra: $\$$). Besides being a novelist and mathematician, Carroll was a pioneer photographer as well. His favorite models were celebrities (notably writers) and young girls (Pudney, 1976). Two of his favorite activities—namely, telling stories and taking pictures—served as socially acceptable ways of communicating with juvenile models (the *object a*), the camera functioning “as a butterfly net to trap his specimens,” as Carpenter phrases it (1985, p. 51). Via the “phallic” camera (ϕ), Dodgson maneuvers himself into a position of close proximity to his *object a*. Armed with a powerful optic contrivance that temporarily allows him to overcome his position of falling short ($-\phi$) and provides him with otherwise inaccessible opportunities for scopic pleasure, Dodgson modulates (miniaturizes and magnifies) his favorite object—10-year-old Alice Pleasance Liddell, on whom *Alice* was modeled—keeping his distance, and yet coming sufficiently close.⁷ Sustained by fantasy and desire, the activities of picture taking and storytelling represented precarious parallel practices that allowed Dodgson, the “desiring, split subject” ($\$$), to maintain his optimal distance vis-a-vis the cause of his desire—his pet model Alice as *object a*—while retaining her imaginary presence in his pictures and stories. This resulted in a delicate balancing act of attraction and abstention, represented by Lacan’s matheme of desire: $\$ \diamond a$, where the lozenge or *poinçon* (\diamond) is reminiscent of contrivances such as the camera that enabled Dodgson to zoom out ($<$) or in ($>$). But, Lacan argues, even the Pavlovian experimenter (S_2) purportedly in control of the situation—keeping himself at a distance, silently hiding behind a one-way screen as the optic device to spy on the *object a*—might actually be driven by a similar scopic desire ($S_2 \rightarrow a \rightarrow \$$).

Rather than concentrating on optic devices, however, we may also focus on the DRINK ME liquid and EAT ME cake as oral *objects a*. Once again, the *object a* proves an enigmatic entity, both intimidating and attracting, coming into view quite suddenly and yet remaining out of reach, the one thing that Alice apparently needs to overcome her lack ($a / - \phi$).

From the perspective of experimental science, the DRINK ME liquid and EAT ME cake may be seen as consumables containing substances that activate specific brain parts. Rather than miniaturizing or magnifying the size of her *real* body, they alter what one of the earliest Freudian interpreters of Alice, Schilder (1950), referred to as “body image.” Indeed, as a research subject in a trial, Alice seems exposed to nootropic psycho-pharmaceuticals. As part of the experimental design, she is asked to perform a series of tasks, such as making calculations by head and answering geographical questions.⁸ The DRINK ME liquid and EAT ME cake, however, act as benumbing narcotics, affecting mental functioning, and making her drowsy and unfocused. As she clearly underperforms, she seems to lose all sense of proportion and experiences a condition known as “micropsia” or the “Alice in Wonderland syndrome” (Todd 1955; Kew et al 1998; Fine 2013), seeing herself as significantly larger or smaller than she really is. It does not take Alice very long to conclude that, after every liquid or cake intake, which act as stimuli or variables (as laboratory props), “something interesting is sure to happen” (1865/1965, p. 43). From a Lacanian perspective, such experiences build on the mirror experience. By recognizing our image, our *Gestalt*, in a mirror, we perceive ourselves as whole. In the botched-up topology of Wonderland, however, where everything seems tilted and out of shape, the vulnerability of this imaginary self-image is acutely revealed.

The EAT ME and DRINK ME labels work as imposing signifiers, such as the ones we encounter in supermarkets, which cast us as divided, desiring subjects (\$). The fact that the bottle is barely out of reach makes it all the more desirable. Such entities speak to us, as objects of desire. As behaviorist John B. Watson (expert in experimental psychology, but also in advertising) argued, no principal difference exists between the behavior of consumers in supermarkets, manipulated by

labels and advertisements, and that of test animals in laboratory labyrinths, manipulated by experimental psychologists (Buckley 1989, p. 137). Building on Pavlov's research (Watson 1916), Watson actually coined the term "behaviorism" (1913, 1924), envisioning the social world as a living laboratory where millions of rural Americans and immigrants drifted into the wonderland of urban metropolises (Buckley 1989), a challenging landscape and alienating labyrinth where threats and seductions awaited, and billboards and advertisements acted as principal markers, showing the way to products that promised to help the migrants to adapt.

The Topological Dimension: *Alice as a Space-Time Laboratory*

As we have seen, Alice's fall has been interpreted as the beginning of a journey where time and logic no longer operate in predictable ways, a reflection of the unconscious where temporal and logical order, as Freud wrote, no longer apply. Freud was hesitant to link his topology of the mind to neurological and anatomical theories concerning the brain (1915, pp. 174–175). Now, however, in light of contemporary brain research, Carroll's stories may be read as exploratory journeys through a surrealistic mind- or brain-scape. Alice, for example, acts as a living camera of miniature size, passing memory files on her way, until the movement suddenly comes to a stop, in a cavity inside her brain system. The Caucus race (1865/1965, p. 37 ff.), a very weird event with no clear beginning or discernable rules, where everyone seems to run randomly in various directions, has been considered a parody of modern democratic elections (Gardner, 1960/2000; Carpenter, 1985), but perhaps we could also see it as representing the way in which neurons interact. Neural processes, brought to light with the help of modern brain technologies, at first look chaotic but in the end may produce meaningful outcomes, or conscious decisions.

The terrifying Queen of Hearts is a formidable lady acting on impulse and responding to various situations in a highly repetitive way ("Off with their heads"). Male inhabitants of

Wonderland live under the constant threat of “castration” by the mighty queen. All problems are dealt with in the same manner: victims are bereft of their most precious organ, their brain.⁹ The Queen embodies “ungovernable passion”, “blind and aimless fury” (Gardner, 1960/2000, p. 109), and “uncontrolled passion” (Empson, 1960, p. 253). At the same time, much effort is spent on counterbalancing her sadistic impulsiveness, notably by staging court trials, before the victims are sent off for execution. From a neuroscientific point of view, the Queen may resemble the amygdala, a limbic system involved in hot cognition and impulsive decision-making.

From a Lacanian perspective, the terrifying Queen (as an intimidating Gestalt) recalls the female praying mantis discussed by Lacan on several occasions, who, with her minimal brain, operates like a “living machine” (Lacan 1991/2001, p. 255), ruthlessly beheading male partners (who are captivated by her image and paralyzed by her freezing stare, as Lacan phrases it) after copulation. Adopting a posture reminiscent of religious prayer, she chops off their heads (as a partial, detachable organ) with her powerful jaws, precisely at the moment of *jouissance*.

But the Queen’s automatic, minimal brain cannot fully explain the ubiquitous sense of angst pervading Wonderland. It arises not from a particular being (the intimidating Queen), but primarily from *Being* as such: from the topological structure of the situation, the way in which time and space are organized, or distorted in various directions. Time seems frozen. Bodies become diminished, enlarged, or flattened into pure surfaces like two-dimensional playing cards, like bodies without organs. Some inhabitants experience literal annihilation, such as the famous Cheshire cat, who, reduced to a grin, to an uncanny, autonomous smile no longer attached to a body (Žižek 2004/2012), appears as pure signifier, as the organism’s bare, one-dimensional essence, a “mathematical abstraction” (Gardner 1960/2000, p. 91).

This is even more noticeable in *Through the Looking-Glass* (1871/1965), where time and space seem out of joint. Take the famous scene shortly after Alice has left the looking-glass house, where the story begins. To meet the Queen, a flower advises her not to approach her directly, but to move the

other way. This seems nonsense, and Alice, setting off exactly towards the Queen, loses sight of her immediately. She then decides to move in the opposite direction, and before long finds herself face to face with the Queen (p. 132). This apparently ridiculous scene maintains consistency if one takes literally the concept of a mirror-world and correlates it with experimental psychology. The mirror-world has been studied via looking-glass experiments, albeit involving very young food deprived chicks (N=20) instead of an inquisitive young girl (N=1). In an article titled "An Approach Through the Looking-Glass," Hershberger (1986) describes an experiment in which young chicks must be able to learn, if they want to reach their food, literally to walk the other way, as the food cup they try to reach automatically moves in the same direction as the chicks themselves. As Hershberger describes it:

Hungry young chicks with very limited locomotor experience were tested . . . in a straight runway in which the chick's visible environment, including the food cup, moved in the same direction, and twice as far, as the chick. In Lewis Carroll's picturesque terminology, the chicks were tested in Alice's "room through the looking-glass," wherein they could approach the food cup only by walking "the other way." (p. 443)

Unlike Alice, however, who learns the trick (of moving in the opposite direction) remarkably fast, the hungry young chicks failed the test. After twenty training trials in this abnormal (reversed) environment, they persistently kept chasing the cup away. Alice adapts her behavioral responses ("learns") more easily, reflecting greater brain plasticity.

Other mirror-world situations can be correlated with scientific discourse as well. A well-known example is the famous scene following the one just described. After Alice joins the Queen, the latter urges Alice to run. As they run side by side, the Queen keeps crying, "Faster! Faster!" (1871/1965, p. 135). Yet, trees and other items remain in place, however fast they go. This has been regarded as a description of the predicaments of living organisms in their struggle for survival: the so-called

Red Queen Hypothesis in evolutionary theory (Valen 1973). A relentless arms race goes on between organisms, Van Valen argues, and constant adaptation is crucial to maintain one's position among co-evolving rivals. Simply to remain where you are is a fatal mistake, as the environment as a whole is relentlessly on the move.¹⁰

In the looking-glass reality “a great huge game of chess [is] being played—all over the world” (p. 134), offering us another correlation with experimental science. The chessboard structure clarifies the topology of the place. Alice starts off as pawn in square D2, flanked by the Red Queen. Upon reaching the eighth square, she becomes a Queen herself, capturing the Red Queen and checkmating the Red King in her final moves. Meanwhile, playful experiments (often involving manipulations of space, time, and language) are taking place. Experimental research, one could argue, is likewise structured like a chess game, with scientists making moves (with the help of props or stimuli) and waiting for research subjects (or model organisms) to respond. For instance, Gregor Mendel, whose research has been regarded as “playing chess with nature,” compartmentalized his monastery garden into a large chessboard and analyzed nature's responses by using letters from the alphabet (Aa, Bb, Cc, etc.), with upper-case letters indicating dominant and lower-case letters indicating recessive features (Zwart, 2008, p. 216 ff.).¹¹ This chessboard approach accords with the story in *Alice in Wonderland* about the rose-tree, whose roses are white instead of red. Alice encounters three playing-card gardeners, busily repainting them. There ought to have been a red rose-tree, they explain, but they put a white one in by mistake, and the Queen will be furious if she discovers it (1865/1965, p. 75). In other words, features of roses can either be dominant (red) or recessive (white) and the chances of growing a white plant are one in four. Apparently, the gardeners planted the recessive variety and now hastily try to refurbish it, but their technique for doing so is rather time-consuming, and fraudulent at that.

Yet, a Lacanian psychoanalytic perspective can disclose even more fundamental correlations between *Alice* and modern science than those suggested so far. In his own readings of the *Alice*-stories, Lacan focuses on the spatial (topological) dimen-

sion, but from a rather different angle. *Seminar XIII* contains an intriguing section (Lacan, 1965–66, p. 544ff.) in which he discusses the topology and optics (the space and gaze) of the classical era as exemplified by *Las Meninas*, painted by Velázquez in 1656 (Fig. 1), contrasting it with the space-time topology of the modern world developed by Bernhard Riemann (b. 1826) and others, but exemplified by Carroll's *Alice*-stories.¹² As classical topology (i.e. three-dimensional space) seems hard-wired into our brains, we initially feel completely at a loss in a Riemann-world, but Carroll's *Alice*-stories provide a playful introductory tour into this surrealistic-modernistic ambiance.

Lacan starts his analysis by pointing out the most striking feature of *Las Meninas*, namely that we see Velázquez himself at work on the very painting we are viewing. The back of the canvas is depicted on the left. The painting, Lacan argues, is actually like a playing card whose backside is the canvas and whose frontside is the painting. In fact, numerous paintings are visible and they all very much look like playing cards—with identical backsides (gray canvasses, hidden from view when the card is shown) but unique frontside or faces. In the case of *Las Meninas*, however, we see both sides of the card, as if the front is suddenly turned towards us, while the back remains visible as well.¹³ The individuals portrayed in these paintings actually look like playing card persons, like two-dimensional bodies without organs.

According to Lacan, this configuration suggests that Velázquez was working in front of a mirror. We imagine that to produce his painting (on which not only the painting itself, but also the act of painting it is visible), a large mirror is placed in front of him, exactly where we are standing, almost as if we are invited to enter this mirror-world of the painter's studio, now frozen like a movie still.¹⁴ At a distance, we see the King and Queen, as two-dimensional as playing-card figures. Again: as if an enormous card (i.e. the painting) has just been turned towards us, has just been played, put on the table, albeit in an upright position, a gesture that conveys an invitation to us visitors to do the same. Show us your card! Enter the painting! Enter the looking-glass world! Jump though the mirror—just like Alice. We, apparently standing on the spot of the imaginary mirror, are thereby implicated in the painting's space.



Figure 1. Velázquez, *Las Meninas*. 1656. Oil on canvas.
© Museo Nacional del Prado, Madrid.

The central figure, Lacan argues, is Velázquez's "Alice," the little princess, the *Infanta* (Doña Margarita), whom he painted dozens of times during his career (more often than any other member of the court). She stands there "just like Alice," while playing-card figures (the King and the Queen) gaze at her from a distance. This painting captures us: the viewer is, as Lacan phrases it, like a fly fossilized in amber (p. 622). We seem trapped by this phantasmagoria, or *tableau vivant*, at the same time a parlor game of multiple gazes and a topological experiment. But first and foremost, we are captured by the painting's *object a*, the charming little princess, who indeed

seems a classical (seventeenth-century) precursor of Carroll's Victorian version (p. 625). The painting summons us to join her, to plunge into this mirror space through the invisible mirror's surface.

What holds us back? Most of all, Lacan argues, it is the princess herself.¹⁵ Resembling a painted vase, she is the *object a* that simultaneously attracts us to her *and* compels us to keep our distance, a delicate balancing act comparable to the balancing act of Carroll the photographer. For a brief moment in which time seems frozen or suspended, we are allowed to enter this secluded, guarded space (the King's *Gynaecium*), but we dare not come too close. Notwithstanding the carefree ambiance, the royal gaze (the playing-card King and Queen) holds sway, like a panopticon supervising Velázquez's work: the gaze of the Other. Indeed, Lacan argues that Velázquez' masterwork exemplifies "Baroque theology in paint." The gaze of the Other is always there, watching us closely, from above or behind.

One detail (not mentioned by Lacan) seems especially relevant here. The painting freezes a particular event, a singular moment in time, like a Baroque picturesque movie frame. It is at this moment that a maid of honor presents to the princess a small vase or tiny bottle: Velázquez's version of the DRINK ME container.

While Velázquez' artwork exemplifies seventeenth-century Baroque topology, Lacan argues, Lewis Carroll (b. 1832) elaborates in his stories the space-time concept developed by his contemporary Riemann. On his journeys through the unknown "wonderland" of imaginary numbers (Du Sautoy 2003/2004, p. 82), Riemann discovered that both time and space are folded and curved and open to modification. This concept of modifiable space-time correlates with the *Alice*-stories, whose topological features anticipate the topology of modernism and surrealism. The spatial ambiance opened and exemplified by Velázquez' painting, featuring the *Infanta* and her Baroque milieu, is subverted by Carroll's depiction of Alice. With space and time thoroughly destabilized, these stories radiate what Schilder (1937/1938) describes as the atmosphere of anxiety and uncertainty. Alice is a research subject, a Victorian *Infanta* who tries to come to terms with a bewildering, unfamiliar space-time by performing tasks, playing games, and asking questions.

Feed Your Head: The Role of Nootropic Drugs

To contain the Queen's limbic-impulsive decision-making, a mock trial is staged, chaired by the King, in which the Mad Hatter, acting as witness, claims that the Dormouse said something of importance, but the Hatter is interrupted when he is about to cite him and subsequently proves unable to remember this piece of evidence (a *Fehlleistung*, as it were). A century later, in 1967, Grace Slick, lead singer of the psychedelic rock band Jefferson Airplane, who composed (and wrote the lyrics of) their famous acid rock anthem *White Rabbit* (from their album *Surrealistic Pillow*), took up the question of what the Dormouse said:

One pill makes you larger, and one pill makes you small
 And the ones that mother gives you, don't do anything
 at all
 Go ask Alice, when she's ten feet tall . . .
 When logic and proportion have fallen sloppy dead
 Remember what the dormouse said
 Feed your head, feed your head

The final line tells us what the Hatter forgot: "Feed your head."

In an essay titled "Feeding the Mind," Carroll argues that, while we care a great deal about feeding our bodies, we hardly care at all about how we "feed" our minds (Carroll, 1907/1965). Is there such a thing as mentally spoiling our teeth, or mental indigestion, or a "fat mind" that has difficulties in keeping up with others in conversation or fails to jump over the easiest logic fence? The proper mind-food, Carroll argues, is logical exercise.

Carroll's *Alice*-stories may be seen as exactly that: mental exercises playing on language, logic, numbers, chess puzzles, and the like. But besides such cognitive "pillow-problems," neuro-active EAT ME, DRINK ME substances (psychedelic pillows) are also involved. Various characters rely on nootropic enhancers rather than on exercises to feed their minds, from the hookah-pipe smoked by the caterpillar (causing one's mind to move "low") up to the addictive "tea" that is served during the mad tea party (producing curious dialogues which suggest

that Wonderland-tea contains something else besides plain tea). Indeed, the stories contain fairly outspoken references to opiates, psychedelic mushrooms, and treacle. Most if not all of the eating and drinking in *Alice* seems related to *drug use* rather than to *food intake*: to feeding the mind rather than the body. Foods and drinks are used to modulate moods, and this explains the drowsy, dreamy atmosphere.

Basically, there are two options for studying the effects of nootropic substances: either self-experimentation (first-person perspective) or laboratory tests (third-person perspective). The hookah-smoking caterpillar, who speaks with a languid sleepy voice, seems modeled on first-person reports by opium-using literati such as Coleridge (Lefebure, 1974) and De Quincey (1822/1960). He sits on a mushroom, the eating of which has paradoxical effects, notably on body image. After eating from it, Alice apparently shrinks and grows again, but eventually she learns to modulate these mental phenomena. Such results correlate well with experimental research. Whereas the traditional remedies “that mother gives you” often rely on the placebo effect, Wonderland stuff seems more effective. Indeed, as cognitive neuropsychologist Roshan Cools suggests (Cools, et al., 2011), the first lines of Grace Slick’s lyrics point to the paradoxical and unpredictable effects of neuro-pharmaceuticals on mental functioning. First-person and third-person perspectives confirm each other. Alice herself experiences the need to determine the optimal dose. And in *Memoirs of an Addicted Brain* (2011), Marc Lewis, who uses his expertise as an experimental neuroscientist (S₂) to examine his own “journey through addiction” as a young drug user (trying marihuana, LSD, heroin, opium), reassesses from a third-person perspective the experiences of his former, craving, addicted Self (\$).

Here again, the basic question in my triangulation exercise is what Lacanian psychoanalysis may add to these correlations between *Alice* and neuroscience in the realm of psycho-pharmaceuticals. At first glance, drug use is not an important topic for psychoanalysis, which focuses on words rather than pills. Drug use is hardly discussed, either by Freud or Lacan, although their oeuvres do contain some provocative leads.

Freud addresses drug abuse most explicitly in *Civilization and its Discontents* (1930[1929]), where he discusses various

(ineffective) techniques to promote happiness or reduce unhappiness. The “crudest” technique, he argues, is “intoxication” (p. 78): the use of chemicals to influence our bodies, producing pleasurable sensations, but also modifying perceptivity and immunizing ourselves against disagreeable sensations coming from the outside world. He discards these substances as dysfunctional, however, because they do not really allow us to solve our problems, all the while draining away valuable energy. This plea for sobriety fits with Freud’s discussion of the “oceanic feeling” (p. 64) as the source of religious and mystical experiences, with which he (posing as the enlightened, scientific skeptic) claims to be completely unacquainted. Indeed, in Freud’s view, religion historically played a role similar to drug abuse, and in modern civilization, art, a replacement for religion, fulfils a function not unlike a “mild narcosis” (p. 81).

The oceanic feeling, one could argue, is the equivalent of the use of psychedelics. From this angle, Freud’s anti-drug discourse and his critique of the oceanic feeling seems remarkable in light of his own (probably lifelong) use of cocaine (Ellenberger, 1970), not only as an anesthetic (to immunize himself against unpleasant external influences), but also as an aphrodisiac (Victorian Viagra) and as a stimulant (to fight neurasthenic symptoms and fatigue). While Freud as a rational *expert* (third-person perspective: S_2) seems opposed to or at least skeptical about drug use, as a craving, neurotic subject ($\$$), he was highly dependent on it.

Insofar as Lacan discusses drug use at all, what applies to Freud also applies to him: Lacan discards it as an ineffective strategy for meeting existential challenges. He addresses drug abuse (*toxicomanie*) most explicitly in an early text on “familial complexes” (1938/2001), where he interprets it as a “protest” against separation from the mother during early childhood. As fetuses, Lacan argues, humans once enjoyed a parasitic, oceanic existence inside the womb, and drug abuse is a slow, self-poisoning “suicide” driven by the desire to simulate this (now impossible) original position of unworldliness. Moreover, drugs allow users to circumvent societal expectations, notably in the sexual realm. Abuse of toxic substances as a method of avoidance allows craving subjects to focus their attention

on bodily *jouissance* directly, while disconnecting themselves from the demands of phallic desire and the sexual encounter (Askofaré & Sauret 1998). Drug abuse entails withdrawal from social and erotic ties: a shift of focus from Other to “substance,” creating an artificial paradise, provided the substance is as pure and undiluted as possible.

From a Lacanian perspective, religion, as distinct from drugs, affects us on three levels: the Symbolic, the Imaginary, and the Real. Monotheistic religions are denominations of the Word (the signifier), addressing their followers primarily via texts, commandments, and prohibitions—in Lacanian terminology, the *symbolic* dimension. Other religions, from the ancient cult of Diana in Ephesus to the Catholic devotion to the Holy Virgin in Lourdes (Freud, 1911), impress their followers via images and statues—the *imaginary* dimension. Still other practices, including shamanism and the Orphic and Eleusinian mysteries of Greece, incorporate the use of psychedelics. They “feed the mind” via the biochemical and bodily *real*. In other words, three religious strategies for mind feeding can be distinguished: *psychedelic* strategies (relying on substances), *iconic* strategies (relying on an archetypal *imago* or *Gestalt*), and *discursive* strategies (relying on authoritative signifiers, such as the Word of God), although Karl Marx (1844/1983, p. 378) even regarded the latter as opiate.

All these strategies for mind feeding can be discerned in Carroll’s *Alice*-stories: the symbolic (riddles, logical exercises, pillow-problems, food for thought), the imaginary (for instance the intimidating figure of the Queen versus the inviting figure of the rabbit), and the *real* (psychedelics). Whereas Carroll (Dodgson) in his scholarly output focuses predominantly on the symbolic, in his *Alice*-stories he employs and combines all three registers. And this allows us to correlate the *Alice*-stories with Lacan’s views on the *genesis* of addiction. *Alice in Wonderland* begins with an inverted birth-scene, as we have seen: a return into the womb, the type of event also enacted by ancient psychedelic cults, preferably in grottos and gardens. Alice enters an artificial, surrealistic, psychedelic paradise. The symbolic order, represented by a weak and clumsy (“castrated”) King, is suspended. Drugs shift the power-balance between neo-cortical

reasoning and limbic sensitivity. In comparison to the Queen's straightforward impulsivity, the King's legal (symbolic) procedures seem impotent and bizarre. Drug use undermines the functioning of the symbolic order, which can now easily be parodied and ridiculed, but this playfulness eclipses a darker, more negative and pathological side of pharmaceuticals, which will be discussed below.

Return of Alice: From Psychology Lab to Psychiatric Ward

Besides psychedelic music, Carroll's stories inspired numerous cinema and television versions. A movie directed by Tim Burton and released in 2010 (featuring Mia Wasikowska as Alice and Johnny Depp as the Mad Hatter) deserves our special attention, if only because Burton was awarded a Lacanian Psychoanalytic Prize for his achievement.¹⁶

The film stages Alice's return to Wonderland, re-baptized as "Underland." Alice has grown up; a marriage proposal serves as entry ticket into adult, upper-bourgeois existence, but she remains in doubt. During the proposal scene, in a spacious garden in summertime, with Alice desperately trying to make up her mind, a rabbit suddenly distracts her. She impulsively follows the animal and again falls into a hole, thus escaping from the suffocating adult world.

The movie highlights, in high-resolution format, themes already addressed above. Alice's fall visualizes a journey through a brain-scape. The hairy roots which she passes on her way look like axons and dendrites, while books and other items look like stored memory traces. Her fall takes rather a long time, as if she has been miniaturized into a camera of microscopic size. Weird characters, representing submerged childhood memories, vividly come to life again. The movie stages a juvenile dreamscape where places, persons, and concepts are connected through association and alliteration.

Underland is in a state of disarray. Time has definitely come to a standstill and the inhabitants are waiting for Alice to return. A traumatic catastrophe has taken place in her absence. With the help of the Red Knave and some other Carrollian

mythological creatures (the Jabberwocky and the Bandersnatch) the Red Queen has gained full control over Underland. Her regime is based on terror, but the legal heir to the throne (the charming, peace-loving White Queen) is still alive and the day of uprising and revolt seems imminent.

The Mad Hatter plays a more prominent role than in the original story. The movie, working like a magnifying glass, presents him in greater detail, but he still excels in nonsensical conversation. The March Hare, the Dormouse, and the Hatter appear as a “trio of lunatics,” but also as political opponents of the Red Queen: as institutionalized political prisoners. Their deviance is caused by traumatic experiences in the past—the violent seizure of power by the Queen and her terrifying band of killers—and reinforced by the effects of long-term hospitalization. Spending your days with tea and pointless conversations “kills time,” as the Hatter phrases it, and must be deadening. An element of simulation may also be at work—as long as they play their game, no further harm will befall them—but every now and then they are overcome by fits of anger and involuntary spastic movements. On such occasions, Alice assumes a therapeutic role. After his release from imprisonment, the Hatter’s symptoms (mood shifts, fits of incoherent speech, a weird gaze) refuse to disappear.

The phrase “mad as a hatter” was actually quite common in Carroll’s time and referred to mercury poisoning as a professional affliction. The process of manufacturing felt hats released mercury vapors, which over the course of time produced tremors, exaggerated reflexes, incoherent speech, and other neurological disorders in the hatter’s trade (Gardner 1960/1966, p. 90; Fine 2013). Although he derived the Hatter character almost certainly from an eccentric furniture dealer (Carpenter 1985; Gardner 1960/2000, p. 93), Carroll was probably familiar with symptoms of dementia praecox among hatters (Waldron 1983).¹⁷

Thus, the movie highlights the gloomier aspects of Carroll’s *Alice*-stories: the experiences of estrangement and angst. The participants in the mad tea party act as inmates in an outdoor psychiatric ward, and several inhabitants of the looking-glass world likewise display psychiatric features.¹⁸ Various readers,

from traditional Freudians (Schilder, 1937/1938) to Deleuze (1969), have considered the language of the *Alice*-stories to be “schizophrenic,” and the movie captures this disintegration of speech, as well as movement. Every square on the chessboard appears like the section of a mental hospital, inhabited by patients who act like figurine Kings or Queens and who move like chess pieces, suffering from muscular rigidity, finding it difficult to express emotions or even to change their posture.¹⁹ And many of them seem to be on (prescribed?) drugs.

Among the movie characters afflicted with neurological symptoms is the Red Queen herself, who has a “bulbous” head, as Alice phrases it, and whose brain seems an “extimate” organ (Lacan, 1968-69/2006), belonging to her body, but menacing and disruptive, frightening and alienating at the same time. To obfuscate her deformity, she surrounds herself with courtiers equipped with prostheses (fake noses, fake chins) to suggest facial and bodily deformities similar to her own. According to the White Queen, she may actually have “some kind of growth in there, something pressing on her brain,” a mitigating circumstance for her misdemeanors. The Hatter kindly offers to “hat” her head, “this monument, this orb, this magnificently heroic globe,” so as to conceal her misshapeness. Because a Queen is supposed to wear a new hat every day, a hatter is an important courtier and she eagerly accepts his offer. In fact, deformed courtiers were once stock elements of courtly life, as underscored by Velázquez’ painting discussed above. During the Baroque era, royal families surrounded themselves with dwarfs, clowns, knaves, and exotic animals (Foucault 1961/1972), but in *Alice*, the Baroque perspective is overshadowed by the Lombroso era (Foucault, 1975), so that physiognomic and motoric abnormalities now function as “stigmata” of mental and moral deviance.

From a Lacanian perspective, the mirror event liberates young children from the angst invoked by the primordial experience of a fragmented and awkward “real” body (Lacan 1949/1966). Through exteriorization—recognizing the image of our body as reflected by a mirror, or by other flat surfaces such as lakes or ponds—an imaginary sense of unity and coherence is achieved. This body image remains highly precarious,

however, and events such as puberty, involving sudden changes in body size and shape, may challenge it. Something similar befalls Alice who, via trial and error, has to re-establish her figure and size. Size matters, in Carroll's stories, but can be modulated, as we have seen, by pharmaceuticals and optic devices, and *Through the Looking-Glass* adds a whole series of such devices to the telescope of *Alice's Adventures in Wonderland*. Besides the looking-glass itself, there is a microscope, an opera glass, and a gyroscope.²⁰ And while Alice diminishes or grows in size, the world around her changes as well, so that flowers and insects suddenly become gigantic. Alice never seems of the right format. She is either too tiny or too enormous, resulting in a bizarre ballet, with Alice seizing, picking up, pushing over, and manhandling others while huge, but finding herself seized, picked up, manhandled, and pushed over by others when small. This fits with the fact that the inhabitants of Underland remain chronically in doubt about whether she truly is the "real" Alice, and, as a result, subject her to a series of tests. Paradoxically, she becomes the person she is expected to be as soon as she diverts from the path outlined by others. It is only by ignoring expectations, moving "the other way," that everyone suddenly recognizes her as Alice.

Alice becomes the White Queen's heroic champion, able to slay the Red Queen's major trump card: the monstrous and supposedly invincible Jabberwocky. This remarkable feat not only demonstrates her athletic skill, but also reveals that she has literally *grown* into her role and found her right authentic size. She fits perfectly into her armor. In psychoanalytic terms, she successfully passes her rite of passage, establishing and incorporating an ego ideal, one that contrasts sharply with the societal ideal to which she refused to adapt. Now, she is ready for her return journey to the symbolic order: the adult world where her fiancé is still waiting for her response to his marriage proposal. She arrives in time because, in Underland, where space is curved and tilted, time can be telescoped as well: either drawn-out or compressed. The dream-story apparently consumed just a few minutes in real time. Thoughts and fantasies pass speedily through her nervous system. She soars quickly from a world of deformity, awkwardness, and fragmentation (the

“real”), via her newly acquired ego ideal which she tries to live up to (the “imaginary”), into a world of binary, consequential choices: Yes or No (the “symbolical”), where she is now ready to make up her mind—and refuse.

From the point of view of cognitive neuroscience, Carroll’s *Alice* stories read like journeys through an elaborate mindscape of decision-making (from locked doors to marriage proposals), all with the help of labyrinths, laboratory props, and psychopharmaceuticals. Triangulation from a Lacanian psychoanalytical perspective, however, shows that Carroll as a literary author not only transcended his own Victorian research fields, but also challenged (in a playful and anticipatory manner) experimental psychology and neuroscience. While Freud began his career as a neuro-anatomist and a neurologist, Lacan was a forensic psychiatrist by training. But both became interested in literary documents as oblique windows into the human psyche. As playful experimentation (*gaya scienza*), Carroll’s *Alice*-stories prepare the ground for surrealism, psychoanalysis, and post-Euclidian topology. Functioning as a literary rival to fMRI, these stories depict their heroine as a craving subject, dwelling in a modernistic and surrealistic ambiance of images, language, and numbers, continually experimenting and interacting with visual and linguistic cues. A Lacanian rereading of this idyll, therefore, allows us to understand contemporary neuroscience against a broader cultural horizon. In other words, the exercise of rereading *Alice* contributes to a diagnostics of the techno-scientific present.

Notes

1. Carroll’s predilection for weird, difficult to pronounce words has been interpreted as compensation for his stammer, demonstrating his virtuosity with words *on paper*.
2. See the Hatter’s riddle: “Why is a raven like a writing-desk?” (1865/1965, p. 68). The answer is alliteration.
3. As an Oxford professor, Carroll specialized in designing mathematical exercises and logical puzzles, a genre nicely captured by the title of one of his publications: *Curiosa mathematica*, whose second volume, subtitled *Pillow-Problems* (1893), was meant to help both author and readers through sleepless nights.
4. This depreciation of Carroll’s academic output seems at odds with Hofstadter’s judgment (1979). But even Hofstadter builds on materials that, in terms of genre, are midway between scholarly mathematics and belles-lettres, notably “What the Tortoise said to Achilles” (Carroll, 1895/1965). In *Lewis Carroll in Numberland*, Wilson argues that much of Carroll’s career involved teaching Euclidian geometry and that, as tensions between Euclidian and non-Euclidian mathematics

- increased, Carroll became an outspoken advocate for Euclid's Elements (2008, p. 91). His *Euclid and his Modern Rivals* was a four-act play with Euclid's ghost defending himself against critics. Thus, in contrast to his use of mathematics as a literary author, Carroll's academic career was committed to a lost discipline.
5. For Lacan (1969–70/1991), the exemplification of the omniscient master thinker is Aristotle, in *De Anima*, for instance.
 6. Lacan suggests an etymological connection between Ophelia and *ὁ φαλλός* (1958-59/2013, p. 360).
 7. Via extrapolation, we may link the optic contrivances of Carroll's world with present-day high-tech tools, seeing Alice's telescope as an anticipation of laboratory equipment that was unimaginable in the 1860s, but available for laboratory research today, such as a functional Magnetic Resonance Imaging (fMRI) scanner or a PET scanner, high-tech contrivances that allow us entrance into the "weird garden" of our brain. The small passage, barely large enough to put her head in, may even be seen as the upper part of an MRI apparatus. The key turns on the machine, and Alice, through this high-tech looking-glass, is able to glance into her own mind.
 8. "Four times five is twelve, four times six is thirteen, and four times seven is—oh dear! . . . London is the Capital of Paris, and Paris is the capital of Rome, and Rome—no, that's all wrong" (1865/1965, p. 31).
 9. The clever reaction of the Cheshire cat to this threat is to give up the rest of his body in order to save his head, because, as the executioner rightly argues, one cannot behead a person unless there is a body to be beheaded (1865/1965, p. 82).
 10. The scene may also be compared to the experience of rowing upstream. *Alice in Wonderland* was conceived in 1862, during boat trips on the Thames, when Dodgson invented fairy tales to amuse his passengers, Lorina, Alice, and Edith Liddell (aged thirteen, ten, and eight). When seated in a rowing boat, we experience the world from a tilted perspective. While at ease in the floating vessel, the banks themselves are moving. By rowing, the speed or direction of the boat can be modulated.
 11. "[Mendel] had the mind of a chess player (he was a chess-player) and he watched nature's moves patiently" (Mawer, 1998, p. 60). Or: "Skilled chess player that he was, he was thinking through his next move and his next . . ." (Henig, 2000, p. 80).
 12. Lacan's analysis includes a dialogue with Michel Foucault, who had just published *Les Mots et les Choses* (1966), which opens with an analysis of *Las Meninas*, and who had participated in the session of 18 May in person.
 13. As if the playing card, like an electron in a double-slit experiment, can occupy both positions at the same time.
 14. The fact that we see both the back (the canvas) and the front of the painting at the same time induces Lacan to see them as part of a Möbius Ring (Lacan, 1965–66, p. 545).
 15. The Infanta is the enigmatic, captivating object *a*, i.e. the phallus, in accordance with the equation $girl = phallus$, cited here by Lacan again (1965–66, p. 634).
 16. Retrieved from: <http://psychanalyse-paris.com/1272-Lewis-Carroll-Lacan-et-Tim.html>
 17. Similar neurological health problems occurred in other professions as well. Several famous nineteenth-century chemists, for example, exposed themselves to high doses of mercury and other poisonous compounds in their laboratories and suffered similar symptoms—incoherent speech, memory problems, eccentric behaviour—a condition known as hysteria chemicorum (Ostwald, 1909).
 18. "We're all mad here [said the Cat]. I'm mad. You're mad . . . You must be, or you wouldn't have come here" (1865/1965, p. 65).
 19. The egg-shaped Humpty Dumpty, famous for his use of self-invented terms, represents the bare essence of a human form, reminiscent of the parable by Aristophanes in Plato's Symposium concerning egg-shaped humans that supposedly inhabited our world at the dawn of history.

20. An example of optically enhanced voyeurism is the guard who asks Alice for her tickets: "All this time the guard was looking at her, first through a telescope, then through a microscope, and then through an opera-glass," as if to determine whether she is ready for entering the adult world. At last he says: "You're travelling the wrong way" (1871/1965, p. 139). That is, she still persevered in her regression towards childhood.

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