

REVIEW ARTICLE

Lurianic Kabbalah as an Empirical Science

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Abstract

The academic study of Lurianic Kabbalah has focused on its mythological, symbolic, historical, philological, literary, and psychological dimensions. Parallels between its cosmological doctrines and modern cosmology have been observed in those contexts. This study proposes an alternative perspective: Lurianic Kabbalah can be approached neurocosmologically by an investigation of Reissner's fiber, an enigmatic, anomalous, strategically located filament originating from the center of the brain. The reach of the metaphors and symbols used in kabbalistic texts exceeds our grasp, but a literal interpretation of certain terms provides a blueprint for uniting heaven and earth. My aim is to encourage further research about the fiber in the context of quantum neurobiology and neurocosmology, and to provide new contexts for understanding and practicing Kabbalah.

Keywords: Isaac Luria, Kabbalah, Neurotheology, Neurocosmology, Spirituality, Reissner's Fiber.

1. Introduction

For Issac Luria and his followers in Safed during the 16th century, *tikkun olam*, one of several themes of Lurianic Kabbalah, involved practices aimed at repairing a shattered cosmos to hasten the arrival of cosmic messianic redemption. Contemporary Jews regard these theurgic practices as enactments of myths, 'dangerous nonsense,' or 'rank superstition' (Wolf 2001, 479). In contemporary parlance, *tikkun olam* means the secular pursuit of social justice.

While the ideal of justice is inherent in Judaism, modern cosmology compels a reassessment of the seemingly enlightened disparagement of Luria's doctrine. I propose that it can be developed into a neurocosmology organized around Reissner's fiber. This audacious assertion should be considered in the context of science historian Michael Hoskins' assessment:

The history of cosmology is not the easy story of the rejection of absurd ideas in favour of what (perhaps after a little thought) is seen to be patently true, but the heroic saga of the hard-won rejection of the patently true in favour of the absurd. (Hoskins 1997, 32)

Thus, the 'heroic saga' of the 'hard-won rejection' of the patent truth that human theurgic practices cannot repair a shattered cosmos in favor of the absurdity of Lurianic Kabbalah has begun. Measurements of the Higgs boson and the top quark in the Large Hadron Collider suggest that an exotic process called quantum tunneling can trigger a new cosmogenesis. Currently, cosmologists believe that this event will occur spontaneously within 20 to 30 billion years and result in the ultimate catastrophe (Devoto et al. 2022). However, by reinterpreting Lurianic Kabbalah as an empirical science based on suprasensory perceptions generated by Reissner's fiber, that patent truth might be replaced by the absurdity that quantum tunneling generated by Reissner's fiber could result in cosmic messianic redemption no later than the nightfall of September 16, 2240.

2. Lurianic Kabbalah

Lurianic Kabbalah is a product of multiple streams. According to tradition, it originated from a revelation to Adam from the angel Raziel. The secrets of that revelation, written in the Book of Raziel, *Sefer Raziel HaMalakh*, were transmitted to Enoch who ascended

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to heaven in a fiery chariot and was transformed into the angel Metatron, a channel between humanity and the divine. Abraham received a divine revelation and wrote the Book of Creation, *Sefer Yetzirah*. Moses retrieved the secrets of the Book of Razi'el that had been transmitted to Joseph and buried with him on the banks of the Nile. He received further kabbalistic secrets on Mt. Sinai. They were transmitted to Elijah, who ascended to heaven in a fiery chariot, akin to Enoch's earlier ascent and Ezekiel's later vision of a chariot ascending to heaven. He has appeared to kabbalists, including Luria, through revelations or apparitions known as *Gillum Eliyahu* (Matt 2022).

In the second century CE, following the destruction of the Second Temple, Shimon bar Yochai fled Roman persecution and hid in a cave. Guided by divine inspiration from Metatron and Elijah, he wrote the foundational text of Kabbalah, the *Zohar*.

The first documented evidence of Kabbalah, notably the writings of Isaac the Blind, 'the father of Kabbalah,' appeared in Southern France during the 12th century. In the 13th century, Moses de Leon, a Spanish rabbi, published the *Zohar*, claiming that it was a transcription of Yochai's ancient manuscript.

During the 16th century, following the Spanish expulsion of the Jews, Isaac Luria—purportedly guided by *Gillum Eliyahu*, communications with the spirits of dead prophets, and suprasensory perceptions—studied the *Zohar* in seclusion on the banks of the Nile. He then traveled to Safed, Israel where Moses Cordovero, who had developed the definitive commentary of the *Zohar* and codified Kabbalah, was teaching. There, he established an elite circle of disciples. He told them:

And when I begin to reveal to you a single secret of Torah, so much plentitude multiplies within me, like a swift-flowing river, and I seek ploys from where to open for you a thin small channel to tell you a single secret from the Torah, a tiny thing that you could bear, not to multiply for you more than your strength can bear and thus cause it all to be lost, like a baby choking because too much milk came for him. (Yassif 2019, 217)

When Luria died in 1572 at the age of 38, his foremost student, Chaim Vital, began transcribing his oral teachings. In the 1590s, when Vital fell ill, his closest follower, Rabbi Yehoshua, bribed Vital's younger brother with 500 gold coins to lend him a locked box containing Vital's writings. In three days, 100 copyists reproduced 600 pages, which, despite

Vital's denial of their authenticity, were widely disseminated. Various interpreters and innovators transmitted Luria's teachings, which evolved into a complex system of arcane metaphors and symbols.

Modern scholars have distilled several clear themes and concepts. Lurianic cosmology begins with the self-withdrawal (*tzimtzum*) of the infinite (*Ein-Sof*) to create the finite physical world. Within the vacuum (*khalal*) created by the withdrawal, a divine ray (*kav*) shone, possessing an inner dimension (*chut*) that weaves creation and an outer dimension (*kav hamidah*) that defines boundaries. It left a residue within *khalal* (*reshimu*) and descended along four planes of reality, (*atzilut*, *briyah*, *yetzirah*, and *asiyah*) increasingly concealing its connection to its divine source during a process called *hishtashelut*. Corresponding to *Ein-Sof* and the four planes of reality are five levels of the soul, *Yechida*, *Chaya*, *Neshema*, *Ruach*, and *Nesfesh*.

First, *kav* created Adam Kadmon, the divine image in which humankind was created, and then the 10 attributes that mediate the interaction between humanity and the divine (*Sephirot*). Each of the 10 *Sephirot* expanded into 10 interacting anthropomorphic *Sephirot* called *partzufim*. The essence of the substance of the emanations, creations, and formations is Hebrew letters as divine energies (*Otiyot Yesod*).

Based on the *Sefer HaTemunah*'s doctrine that the universe underwent seven 7,000-year cosmic Sabbatical cycles (*shmita*), and the verse 'For a thousand years are in Your eyes as a fleeting yesterday' (*English Standard Version Bible* 2006, Psalms 90:4), Luria proposed that the universe underwent six spiritual cycles each lasting 2,556,750,000 years (7,000 years/cycle multiplied by 365.25 days/year multiplied by 1,000 years/day), which ended on the afternoon of October 7, 3761, BCE with the beginning of the final 7,000-year terrestrial cycle (Kaplan 1993). During the spiritual cycles, the vessels of the *Sephirot* shattered (*shevirah*). Divine sparks descended and were encased in husks (*kliipot*).

In 3761 BCE, Adam and Eve were poised to repair the severed connection between Adam Kadmon and the *Sephirot*. However, the first bite from the fruit of the Tree of Knowledge resulted in a further descent of the spiritual realm into materiality. Adam's 'garments of light' were transformed into 'garments of skin' (Schorsch 2003). Paradoxically, the inhabitants of the lowest plane of reality, *asiyah*, the world of physical action—unlike the inhabitants of the two higher planes whose will is subsumed by the will of the *Ein-Sof* in the realm of *atzilut*—are endowed with free will.

Then, Adam and Eve were expelled from the Garden of Eden to begin humankind's mission to redeem the divine sparks, repair the shattered and fallen cosmos (*tikkun olam*), and unite the exiled feminine aspect of the divine (*Shekinah/Malkuth*) with its masculine counterpart (*Yesod*). That mission would end no later than the nightfall of September 16, 2240.

For Luria and his followers, *tikkun olam* was an embodied practice rather than an abstract philosophy (Fine 2003). Virtually every aspect of life, both secular and religious, was performed with mystical intention, *kavanah*. Performance of divine commandments and other good deeds (*mitzvot*) with *kavanah* contributed to the unification of humanity with the divine. The unification of *Shekinah* and *Yesod* was enacted through sacred sexuality. Meditation on reuniting the letters of the various names of God that were shattered during *sehvirah* (*Yichudim*) was a key component of *tikkun olam*.

Reincarnation, *gilgul*, is fundamental to Lurianic Kabbalah. Luria taught that souls descend to the lower realms of *klippot* to redeem divine sparks and ascend to supernal realms to purify their souls as a prerequisite for participating in the work of *tikkun olam*. Luria believed that he was the reincarnation of Moses and Yochai. Further, his disciples were reincarnated souls of Yochai's students. He communicated with disembodied spirits and reincarnated souls by suprasensory perception and the transrational cognitions of Hebrew letters.

Like Lurianic Kabbalah itself, its ever-changing legacy is the product of many streams. Those streams have followed turbulent, diverging, and converging courses toward an unknown destination. During the bloody pogroms that devastated European Jewry in the 17th century, Lurianic Kabbalah fueled the rise of the false Messiah, Sabbatai Zvi. His disgraceful fall crushed the mystical, messianic yearnings of the Jewish people. From that devastated spiritual landscape arose the Baal Shem Tov, the founder of Hasidism. He transformed Lurianic Kabbalah. His emphasis on joyful, selfless service to God through prayer and the performance of *mitzvot* opened Lurianic Kabbalah to everyone, beyond the intellectually and spiritually elite. However, the *Mitnagdim*, led by the Vilna Gaon (1720–1797), opposed Hasidim. They believed that Hasidim was corrupting the spiritual and intellectual purity of Judaism. Later, during the rise of *Haskalah* in the 19th century, which intended to modernize Judaism with secular ideas, Hasidim and *Mitnagdim* united in their opposition to *Haskalah*.

During that period, Heinrich Graetz (1817–1891), one of the most influential historians of Judaism, called Kabbalah 'an ugly crust, from a fungoid fabric, surrounded by a film of mold' on authentic sources of Judaism (Kohler 2019, 269). Further, Adolphe Franck (1810–1893), an influential Kabbalah scholar, denigrated Lurianic Kabbalah as the 'dreams of a diseased mind' (Sossnitz 1926, 25).

Gershon Scholem (1897–1982), who established Kabbalah as an academic discipline, revalorized Kabbalah as an essential part of Judaism. Nevertheless, he disparaged contemporary kabbalists and opined that because Jews no longer believed in 'Torah from heaven,' the future of Kabbalah rests in secular mystical pursuits (Scholem 1997). He concluded that Lurianic Kabbalah was a myth created as a response to the 15th century expulsion of Jews from Spain. *Ein-Sof*, Adam Kadmon, and the *Sephirot* were symbols that 'signif[y] nothing and communicated nothing but make something transparent which is beyond expression' (Scholem 1941, 28).

Moshe Idel, the leading Kabbalah scholar after Scholem, emphasized a comparative phenomenological approach and its inextricable connection to language. Applying a neurocognitive approach to the writings of ecstatic kabbalists, Idel and neurologist Shahar Arzy (2015) proposed that their practices induced hallucinatory images of one's double, autoscapy. They also asserted that words are formative of reality. They 'conjure imaginary universes that produced meaning' (Idel 2005, 232) and form a kaleidoscopic web lacking a center, what Jacques Derrida (1981, 19) called the 'transcendent signifier'.

New Age and postmodern currents have also contributed to Lurianic Kabbalah's legacy. Parallels between Big Bang cosmology and Lurianic cosmology have provided new perspectives. Matt (2016) argued that those parallels provide mental images that can awaken spirituality in the present moment. However, there is no *tikkun olam* as cosmic messianic redemption.

Other scholars, such as Boaz Huss, reject the category of mysticism as the direct experiences of a divine reality. They argue that it is a social construct developed in the 19th century (Huss 2020). Postmodernism argues that all truth is a social construct arising from power. The information age is overwhelming human cognitive capacities to construct consensus reality. Jameson (1992, 39) argued that this new danger, 'stands as something like an imperative to grow new

organs, to expand our sensorium and our body to some new, yet unimaginable, perhaps ultimately impossible dimensions.'

What is the role of psychopathology in Kabbalah? Are kabbalistic texts a kaleidoscopic web of symbols signifying nothing? Do the parallels between Lurianic and modern cosmology reflect common poetic images or the potential for a synthesis? Can humanity meet the imperative to expand its sensorium and body to unimaginable dimensions? The hypothesis that Reissner's fiber is the neurocosmological basis of Lurianic Kabbalah points toward two empirical paths to answer these questions.

The first, presumptively traveled by the originators and transmitters of Kabbalah, is illuminated by knowledge of the fiber from within. The second, which is becoming accessible through scientific advances, is knowledge of the fiber from without. Ultimately, the two paths converge upon knowledge from within and without, from above and below.

3. Reissner's Fiber

Since its discovery in the central canal of the spinal cord of a lamprey in 1860 by Ernst Reissner, the eponymous fiber has remained an enigma. Because it has been extensively overlooked, two neuroscience historians, Regis Olry and Duane Haines, dubbed Reissner's fiber the 'Devil according [to] Baudelaire' (Olry and Haines 2003, 73) whose 'loveliest trick . . . is to persuade you that he does not exist!' (Baudelaire 2017).

For 40 years after its discovery, most anatomists disputed Reissner's interpretation of his observations. Owing to the fiber's peculiar nature, they misidentified it as an artifact produced by cellular debris or by methods of preservation. In the spring of 1899, Sargent (1904) also observed the fiber in a lamprey. After a literature search, he was astounded that, 'so peculiar and conspicuous a structure as Reissner's fiber, which is of so great importance in the nervous anatomy as to persist throughout the vertebrate series, should've remained so little known for forty years after its discovery' (1904, 139). Similarly, he was dismayed that the ventricles, fluid-filled cavities in the center of the brain, and their lining and content, had been almost entirely dismissed.

Sargent established that the fiber is a biological structure. Based on anatomical and experimental investigations, he concluded that it is a unique high-speed conduction pathway connected to the visual pathways. His research was acclaimed by two of

the most eminent neuroscientists. Sir Charles Scott Sherrington (1906) accepted Sargent's hypothesis and Sir Victor Horsley (1908, 51) declared, 'the greatest deference is due to the opinion of Sargent, who has essentially made this subject his own.' In his 1904 paper, Sargent stated, 'the conclusions and the discussion of the results and bearings of this research are reserved for the second part of this paper dealing with the higher vertebrates. This is already well advanced, and it is hoped will appear in about a year' (1904, 240). However, he abruptly abandoned his scientific career to become a self-described poet, world traveler, and educator.

While the reasons for Sargent's abrupt abandonment of his scientific career are unclear, his mischaracterization of Reissner's fiber as a 'coalescence of axons,' led to the rejection of his hypothesis. Based on a different mischaracterization of the fiber as a coalescence of cilia-like processes springing from cells, Nicholls (1917) hypothesized that it transmits changes in its tension to sensors surrounding it to regulate fish flexure.

Modern anatomical methods have shown that Reissner's fiber consists of 5-nanometer diameter filaments and embedded nanostructures formed by secretions from specialized structures lining the ventricles (Kohn 1969). It projects filaments to nerve endings of cerebrospinal-fluid contacting neurons (CSF-cNs) whose functions are discussed later. The main source of the fiber is the subcommissural organ, located on the roof of a fluid-filled cavity in the center of the brain called the third ventricle. Another branch extending from the subcommissural organ to the hypothalamus located on the floor of the third ventricle has also been identified (Enami 1954). The ever-growing fiber travels down the fluid-filled central canal to a dilation at the end of the canal called the terminal ventricle (Wislocki, Leduc, and Mitchell, 1966) where it coils (Studnicka 1899).

The terminal ventricle is surrounded by secretory cells, forming the intraspinal organ, whose activity correlates with reproductive activity (Motavkin and Bakhtinov 1990). From the terminal ventricle, the fiber passes through the filum terminale (Molina et al. 2001), a narrow passageway in a filament containing nerve fibers of unknown function (Klinge et al. 2022) that connects the end of the spinal cord to the coccyx.

The functions of Reissner's fiber are unclear. It has been implicated in the regulation of hydromineral balance, biorhythms, embryogenesis, neurogenesis,

detoxification of the CSF, and the pathogenesis of hydrocephalus, scoliosis, schizophrenia, and Alzheimer's disease.

Despite the fiber's evolutionary persistence from its first production 770 million years ago in a single cell lining the inner surface of the brain of a millimeter-long gelatinous sea squirt called *Oikopleura* (Gobron et al. 1999) to primates, its strategic location, and potential important physiological functions, it continues to play its role as 'the Devil' according to Baudelaire primarily because of two reasons. First, because the fiber is not a nerve, it has been ignored as a correlate of consciousness. Second, it is extremely rare in humans. In fact, although other exceptions to the near universal absence of the fiber might have been missed because the fiber is too small to be detected by current neuroimaging devices and undergoes rapid postmortem degeneration, it has been observed in a fourteen-year-old teenager (Agduhr 1922). Only one exception to the perinatal regression of the subcommissural organ has been identified. A fully developed organ has been observed in a 60-year-old man (Gomez, Benito-Aaranz, and Rodriguez 1961).

However, emerging technologies are thwarting the fiber's satanic tricks of concealment. First, while the fiber's nonneural structure has excluded it as a correlate of consciousness, its unique properties could integrate it into the emerging quantum neurobiological model of consciousness. While the immaterial, multidimensional quantum world with its paranormal properties of superposition, entanglement, and tunneling has provided an intriguing potential correlate of consciousness, its effects had been assumed to be diminished in the warm, wet, noisy brain. However, new theoretical and experimental data are overturning that assumption. The fiber's 5-nanometer diameter filaments, which are surrounded by nerve endings connected to the most powerful information processing system in the known universe, could operate as a biological analog of current technologies being used to harness the quantum world's paranormal properties to create new technologies such as quantum computers.

For 20 years, my team, under the leadership of Alexander Sergienko, dedicated extensive efforts to detect potential quantum coherences in the photon emissions from Reissner's fiber within transparent zebrafish larvae. To this end, cutting-edge technologies have been used, including a novel correlation time-resolving infrared microspectroscope with a scanning confocal microscope, superconducting single-photon

detectors, and femtosecond pulsed lasers. Soon, to overcome the challenge posed by the inherent noise in biological systems, my team will investigate the fiber with cryo-electron microscopy to develop atomic models that will guide the search for quantum effects.

Second, although the fiber is extremely rare in humans, the genes responsible for its production exist as pseudogenes, imperfect copies of functional genes, or suppressed functioning genes. Biotechnologies such as cellular reprogramming and meditation, which promotes neuroplasticity and gene expression, could restore the function of the genes that produce Reissner's fiber.

4. Reissner's Fiber and Lurianic Kabbalah

4.1 Evidence of a Correspondence

Preliminary evidence supporting the hypothesis that Reissner's fiber is the neurocosmological basis of Lurianic Kabbalah is its resemblance to *kav*. A more explicit resemblance is presented in the writings of Isaac the Blind and his students about the eroticized connection between the masculine Jerusalem and the feminine Zion represented by the 'middle line' connecting *yesod* and *malkuth*. Rabbi Ezra, citing his teacher Isaac the Blind, in his 'Commentary on the Song of Songs,' wrote, 'For it is the middle line, the drawing down of vitality and watering, which extends from the brain to the spinal cord, extending from there to the sinews in all directions' (Idel 2008). This identification of the 'middle line' connecting *yesod* and *malkuth* reflects the belief in the Middle Ages that semen descends from the brain through the spinal cord to the male genitals.

The skeptical reader will undoubtedly object that *kav* and the 'middle line' are fragile foundations for a scientific hypothesis. However, the identification of *kav* and the 'middle line' with Reissner's fiber is strengthened from a perennialist perspective that posits a common experiential and therefore common neurobiological origin of primordial spiritual traditions. The clearest evidence comes from the resemblances among the *sephirot*, the yogic system of *nadis* and *chakras*, and the anatomy of Reissner's fiber (Wile 2022).

Yoga traces its origins to Indian *rishis* who received yoga secrets directly through divine revelation. Over time, this knowledge known as *Śruti*, was preserved, reinterpreted, and elaborated upon in the form of *Smritis*. Descriptions of the 'subtle body' first appeared in texts around 700 BCE. The central feature of this

anatomy is a channel (*Sushumna nadi*) in the center of the spine through which divine, feminine energy (*kundalini*) ascends. Within the *Sushumna nadi* are four concentric *nadis*.

The ‘*Shatchakra-nirupana*’ (‘Description of and Investigation into the Six Bodily Centres’), written in 1526 and translated by Sir John Woodroffe, writing under the pseudonym Arthur Avalon in 1927, provides indications of the diameters of the innermost *nadis* (Avalon 1974). The second verse mentions the following: ‘Inside the Vajra is *Chittra* . . . She is subtle as a spider’s thread.’ The 48th verse states that the Brahma *randhra*, the entrance to the *Brahma nadi* inside the *Chittra nadi*, is ‘extremely subtle and like unto the ten-millionth part of the end of a hair.’

In 1940, Theos Bernard, a celebrity scholar-practitioner of yoga and the first American to initiate Tantric Yoga practices by the highest Lama in Tibet, identified Reissner’s fiber with the *chittra nadi*. In his book ‘Heaven Lies Within Us,’ Bernard (1939, 78) wrote, ‘Inside this central (*Sushumna*) *nadi*, the Yogi identifies an invisible *nadi* known in the West as the fiber of Reissner, but which is known here as *Chittra* (‘the Heavenly Passage,’ in Sanskrit).

Not only do the central *nadis* resemble Reissner’s fiber, but descriptions of the *Mooladara chakra*, from which *kundalini* begins its ascent at the base of the spine, resemble the terminal ventricle and filum terminale. Like the *kundalini*, which coils in the triangular-shaped *Mooladara chakra*, Reissner’s fiber coils in the triangular-shaped terminal ventricle. The *Mooladara chakra*’s connection with the filum terminale was proposed by Avalon in 1919 (1974) and reexamined by Maxwell (2009). He suggested that the *Sushumna nadi* is a column of gap junctions in cells that remain in the region where the edges of the neural crest join to form the neural tube; this tube opens from the filum terminale to the brain as *Kundalini* rises.

Investigations of another primordial spiritual tradition, acupuncture as applied Taoism, provide direct empirical evidence that Reissner’s fiber is central to Taoist spiritual practices. Taoism traces its origin to the Three Sovereigns and the Five Emperors of China who began their reign in 2852 BCE. Traditions handed down over the centuries were compiled around 100 BCE and published in ‘The Yellow Emperor’s Classic of Internal Medicine.’ This text describes the governing and conceptual vessels that conduct vital energy (*Qi*) through the center of the spinal cord via the Microcosmic Orbit.

In Kim’s (1962) pioneering study, the radioactive isotope phosphorus (P^{32}) was injected into the acupuncture point on a rabbit’s abdomen corresponding to the Governing Vessel Meridian. The injected isotope labeled Reissner’s fiber, which Kim called the Neural Bonghan Duct. Kim also discovered a system of ducts, ‘primo-vascular system,’ that connects acupuncture points to meridians. While Kim’s research is controversial, subsequent investigators have confirmed some of his results. Future investigations of the pathway from the abdominal acupuncture point to Reissner’s fiber and the hypothesis that ducts of the ‘primo-vascular’ system function as an optical channel for coherent biophotons (Soh 2004) could contribute to evaluating the role of Reissner’s fiber in acupuncture as applied Taoism.

The skeptical reader will undoubtedly question how prehistoric originators and transmitters of spiritual traditions, first documented in the Middle Ages, could have possessed knowledge of neuroanatomical structures discovered in the 19th century. The answer is that knowledge of those structures came from interoceptions generated by the sensory system surrounding Reissner’s fiber. CSF-cNs surrounding Reissner’s fiber are structurally similar to sensory cells found in the retina and inner ear (Vigh 2004) and they project to the visual, auditory pathways, and proprioceptive pathways (Guillery and Sherman 2002; Song et al. 2020).

4.2 Reissner’s Role in Spiritual Experiences

While objective measurements are key to evaluating the truth or falsity of Lurianic Kabbalah as a neurocosmology organized around Reissner’s fiber, subjective spiritual experiences generated by the fiber would have been the driving force for Luria and his disciples. Reissner’s fiber could facilitate spiritual experiences in several ways. First, the fiber projects filaments to CSF-cNs originating from the dorsal raphe nucleus, a key site of action for entheogens (Aghajanian and Gallagher 1975; Halaris et al. 1982). An intriguing entheogen is N,N-dimethyltryptamine (DMT). Users describe encounters with beings resembling the *Chayot Ha Kodesh* (holy angels), *hayyoth* (living creatures), and *Ophanim* (wheels) described in Ezekiel’s vision of the Chariot (Strassman 2014). Reissner’s fiber could play a role in facilitating the action of endogenous DMT secreted by the pineal gland. While the concentrations of DMT produced by the pineal appear to be too low to produce entheogenic effects, Reissner’s fiber could amplify its effects. Because the fiber binds amines, such as DMT (Caprile

et al. 2003), it may transport molecules directly to synaptic membranes. This mechanism could explain how low concentrations of endogenous DMT, secreted by the pineal gland, which is adjacent to the source of Reissner's fiber, can produce effects similar to those produced by exogenous sources (Nichols 2018).

Second, after descending through the third ventricle, Reissner's fiber descends into the narrow cerebral aqueduct, which surrounds the periaqueductal gray, recently identified as a 'circuit for spirituality and religiosity' (Ferguson et al. 2022). Because Reissner's fiber projects filaments to CSF-cNs originating from the central gray, it could trigger its activity. The high concentration of opiate receptors and endogenous opiates in that area suggest they play a role in its psychological effects.

Third, serum levels of antibodies that attack the subcommissural organ rise during acute schizophrenic episodes (Vilkov et al. 1979; Vilkov et al. 1984). In the words of Joseph Campbell, 'The schizophrenic drowns in the same waters in which the mystic swims with delight.' Reissner's fiber could open the doors of perception to transcendent realities. Owing to complex psychoneuroimmunological interactions, the psychotic's immune system rejects the fiber, resulting in transient, fragmented, liminal experiences, while the mystic's immune system accepts it, resulting in genuine mystical experiences.

4.3 Reissner's Fiber as the Empirical Basis of Lurianic Kabbalah

Not only does Reissner's fiber have the potential to augment neural substates of known spiritual experiences, but it also provides a unique quantum neurobiological laboratory for the search for spiritual experiences beyond the known limits of perception (Wile 2016, 2018, 2020). Since its inception, quantum mechanics has inspired a controversial variety of comparisons with mysticism. The purported suprasensory perceptions of mystics and the paranormal realities implied by physicists' experiments have an alluring affinity. However, we are denied perception of the paranormal quantum world because somehow, somewhere, sometime during its mysterious interactions with the environment, measuring devices, and neural pathways to fixation in consciousness, it transitions into classical realities. I propose that the suprasensory perceptions of Luria and other mystics are based on direct consciousness of the quanta comprising Reissner's fiber.

Such direct consciousness is seemingly precluded by 'decoherence' induced by the warm noisy environment

of the brain, which would almost instantaneously destroy the fiber's quantumness. However, the cavities of the cerebral ventricles and passageway of the cerebral aqueduct and central canal functioning as a biological analog to quantum cavity electrodynamic systems that use feedback and control to create macroscopic quantum systems could preserve and enhance the fiber's quantumness.

Random quantum fluctuations are astronomically unlikely to penetrate the barrier separating the false vacuum from the true. However, such an improbable event might be achieved by configuring the quanta comprising Reissner's fiber as described above.

Cosmologists predict that cosmogenesis triggered by quantum tunneling through the barrier separating the false vacuum from the true vacuum will involve 'bubbles of nothing' containing compacted higher dimensions that expand to infinity, devouring the space-time in an ultimate catastrophe (Witten 1982). The neurocosmological interpretation of Lurianic Kabbalah proposed here predicts that it will unite heaven and earth.

5. Conclusion

For those who find spiritual truths in Kabbalah, the identification of Reissner's fiber as the Devil according to Baudelaire is more than a playful analogy. The article 'Reissner's Fibre: The Exception Which Proves the Rule, or the Devil According [to] Charles Baudelaire?' (Olry and Haines 2003, 74), cryptically invites the reader to fill in the gap of the concluding ellipsis: 'From time out of mind, the Devil was always called the Devil: now we do not even know if it exists, and even less what it might be used as . . .' However, before 'time out of mind,' the Devil was known in Hebrew as *Satan*, whose every action, according to the Talmud, is for the sake of Heaven.

Kabbalah teaches that *Satan* is an adversarial angel who challenges us to grow spiritually. He/she is one with God. While *Satan*'s adversarial role generally takes the form of temptations to succumb to evil inclinations, in the Book of Job, it takes the form of a challenge to understand cosmogenesis. When Job pleaded with God to explain the apparent injustices that He had allowed Satan to inflict upon him, God answers, 'Where were you when I laid the earth's foundation? Tell me, if you understand. Who marked off its dimensions? Surely you know! . . .' and 'Will the one who contends with the Almighty correct him? Let him who accuses God answer him!' (Job 38:4–5; 40:2).

According to Lurianic Kabbalah, the channels connecting humanity with the divine will be repaired by 2240. Job's perplexity will be replaced by knowledge. A turning point in the development of that knowledge was predicted by the *Zohar*:

In the six hundredth year of the sixth millennium (5600 = 1840 C.E.), the gates of wisdom above [Kabbalah] together with the wellsprings of wisdom below [science] will be opened up, and the world will prepare to usher in the seventh millennium. (*Zohar* VaYeira 177a, quoted in Backst 2008, 39)

During that predicted time of the preparation for the ushering in of the seventh millennium, Hasidim transformed Kabbalah from an esoteric discipline into a practice accessible to everyone. Later, Kabbalah became an academic discipline that could engage with science. Thus, Reissner's fiber emerged from the wellsprings of science in 1860 and its innermost activity is engaging the seeds of cosmogenesis.

Albert Einstein famously declared, 'Science without religion is lame, religion without science is blind.' Therefore, the synthesis of Lurianic and science based on a neurocosmology organized around Reissner's fiber could be an antidote to lame science and blind religion.

6. References

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