

## Table of Contents

<b>Why Does it Matter?</b> .....	890
<b>The Looking Laws</b> .....	890
➤ What Matters.....	891
<b>Ontological Schisms</b> .....	892
<b>Peek-a-Boo</b> .....	893
➤ Neither Nor.....	895
➤ Life, Looking and Luck .....	896
<b>Sapience</b> .....	897
➤ Stellar Classes .....	898
<b>Horkeimer’s Rule</b> .....	899
➤ Procedural Generation .....	899
➤ Looking Up .....	899
➤ Looking Out .....	899
➤ Looking Sideways .....	900
➤ Looking Inward .....	900
➤ Looking Through.....	900
➤ Looking Around .....	901
<b>Realspace</b> .....	901
<b>City on the Edge of Forever</b> .....	902
<b>A Hostile Class Love Story in 150</b> .....	902
<b>Endnotes</b> .....	903

*See Appendix EPAT1 – The Existential Patents*  
*See Appendix EPAT2 – Existential Patents Quick Summary*

*“Will this project give us an answer? This project promises new data with hopes to understand this system. This project will be highly rewarding if we catch the star when it dips. But the possibility remains that over the course of the observing campaign the star will do nothing exciting. So please keep in mind that ‘new data’ does not necessarily mean ‘results,’ whether in the immediate or distant future. But also keep in mind, if we don’t look, we will never know!”*

– Tabettha Boyajian, Ph.D., Kickstarter Project Page, June 16, 2016

**Why Does it Matter?:** And why does it matter if we know? Each of the 1,700 people who backed the project thought it mattered enough to give up money. Each of the people involved in the project thought it mattered, enough to give up time and effort, to make it a career-defining project. We often do such things on the intuition (or faith “that the dots will connect down the road” – Steve Jobs feature quote, 3 Patents p. 747, *supra*) that it matters or will matter, somewhere, somehow, someday, without being able to articulate.<sup>1</sup>

**The Looking Laws:** Our ancestors looked up into the night sky and saw stars.<sup>2</sup> Maybe what we call stars now (our concept is remarkably different), but to them, they were steady reliable lights spots in the night sky. Why did our ancestors look up into the night sky? Because, on Earth, matter falls from the sky, rain falls from the sky and makes us wet, and our crops grow, snow falls from the sky and it gets cold, clouds block out the sun and that is a warning. Our ancestors looked up to the sky because the sky mattered. They may well have looked up into the sky anyway out of curiosity, because curiosity matters too.

- ✓ “Half of science is convincing the world that what you are working on matters.” – “Medical Student” (actor) in Microsoft Commercial, April 2018.

*Matter* is that thing which forms the universe (Merriam-Webster **2a & 2b**<sup>3</sup>). *Matter* is also a subject under consideration, a subject of disagreement or litigation, the subject of a discourse or writing, something to be proved at law, something serious as opposed to nonsense or drollery, and reason and cause, and the problem or difficulty (*Id.* 1a-1i). There are no subjects under consideration, disagreements, discourses, writings, laws, seriousness or nonsense, or even reason or cause, or problems or difficulty, without life and intelligence (mortal or divine, it doesn’t matter) and someone to ‘look.’ So, it should be no surprise then that *matter* is “the indeterminate subject of reality, the element of the universe that undergoes formation and alteration” (*Id.* 3a) and most importantly, “the formless substratum of all things which exists only potentially and upon which form acts to produce realities” (*Id.* 3b).

Looking – not just seeing or hearing – is nearly synonymous with our concept of consciousness and is the base act of nearly everything we do – checking, monitoring, experimenting, observing, creating, building, caring, duties and responsibilities, rolling the die or drawing a card, safety,<sup>4</sup> working, progress, arguing, criticism, ethics, memories (why have memories if you are not looking at them?), judgment, planning, anticipation, hunting, scavenging, being a male or female. ‘Looking’ is the doing of being.

We ‘look’ because it matters and when it matters, and it matters only when we ‘look.’ Alternatively: We look when it *matters* and it *matters* when we look. I cannot make anyone look at GGDM or anything else, until it matters to them. Can a *silly space game* be macrosociology?

- ✓ “Self-referential statements are admissible in argument so long as they are non-contradictory.” – Gennady Stolyarov II, “Doubt the Action Axiom? Try to Disprove It,” Mises Institute, April 5, 2006 (available free online).

The Galactic Space playing area is unlimited and expands when necessary. Players will look outside the initial thirty-star cluster when necessary, when it matters. Whether or not the stars outside were there the entire time is irrelevant to the game, they are there when it matters.<sup>5</sup>

- ✓ And here we dance a light step around a probable violation of the Laws of Thought and keep GGDM in rational territory. But the empirical facts of quantum physics that cannot be wished away, seem most threatening to us when the indeterminate state (and generally the concept of fuzziness) appears to violate the Laws of Thought – the center of human rational discourse – laid down by Aristotle nearly 2,500 years ago.
- What Matters: Think of it this way: The only effective way to argue that something is wrong – whether it be ethics, sin, strategy, legal procedure, cockpit procedure, or manufacturing procedures – is to argue that it matters, it might matter, or there might be a foreseeable and probable circumstance where it matters. And this requires evidence, history, foresight, sapience, and abstract thinking. Even if you are sitting on your brain currently, you can understand what matters.

The milk bond is the first bond. The people who *matter* are those who have something or can take something we want or need, are able to make a decision to give, take or withhold, and have the ability and/or legitimate or illegitimate authority to act upon that decision. This includes criminals with guns, in-laws whose approval is deemed important to domestic tranquility, and employees or family members who perform skilled, indispensable functions in the business (for which there are in some cases, business insurance policies for ‘key persons’), people of enough political or social importance to be protected by the Secret Service, organization or family unit but otherwise would not *matter*.

This is not difficult to understand. Consider: The U.S. Marine Corps does not care one bit about what I think of it or say about it after I have been discharged. Any more so than any military cares about what millions of veterans individually say about their service (with some concession that they hate negative publicity in the form of books, movies, and testimonial accounts, but they cannot do anything about that, so it doesn’t really *matter*). However, if I were a politician who somehow became the Secretary of the Navy with budgetary control, or a prominent member of Congress whose vote on military budget matters was critical, then they would be concerned about my opinion.

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*“Physical intuition starts developing early, long before we ever encounter Newton’s laws on a blackboard. ‘Babies have a few skeletal principles that are built in to the brain and help them reason about and predict how objects should act and interact in the world,’ says Kristy vanMarle, an infant cognition researcher at the University of Missouri. They understand, for instance, that objects can’t pass through each other, a notion that’s at odds with a quantum effect called tunneling, which allows objects to slip through barriers that, in the classic world, would be impenetrable....”*

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*Babies also intuitively grasp that objects exist even when you're not looking at them, a concept called 'object permanence' that goes against the classic Copenhagen interpretation of quantum mechanics, in which an object can't be said to have any definite properties until the moment at which it is observed. Since Jean Piaget first pegged object permanence as a milestone in infant development, psychology researchers have found evidence that ever-younger babies have some sense of it; affirming object permanence seems to be the main theme of peek-a-boo."*

– Kate Becker, “Is Quantum Intuition Possible?” NOVA, July 28, 2014

**Ontological Schisms:** Peek-a-boo! Probably the first schism between the commonly perceived reality and the reality of subatomic physics came when science informed us that what we perceive as solid is mostly – nothingness, empty space. This subject usually comes up early in primary school science education, taught without implications, and generally forgotten shortly thereafter. This is not quite in the same category however, as quantum indeterminacy, as the fact that matter is composed mostly of nothingness does not challenge directly the objective existence of the universe (and the common perception thereof) – one can always shrug and say it must always have been so and we just didn't know we were mostly nothingness until science learned it. But the same can be said of quantum indeterminacy and isn't that somewhat strange? An emergent fractured-universe paradox at the core of 'reality' – that reality is both objective and indeterminate at the same time. It was there the whole time, waiting for our science to discover it.

- ✓ “One may remark here that uncertainty may simply be a mind phenomenon and not a feature of reality, that reality is in fact completely determined, or that science may eventually allow us to understand the determination of all events. [Ludwig von] Mises had no problem with that possibility and, in fact, may have been a determinist himself. By insisting on methodological dualism, however, he was simply pointing out that at present time, empirical science does not shed light on the topic one way or another and, for human scientists studying human behavior, the intentionality of human action seems to be a valid and constructive premise on which to build a social science.” – Michael Accad, M.D., “An introduction to praxeology and Austrian school economics,” alertandoriented.com (blog), April 13, 2016.

Praxeology and Schrödinger's cat? Have I just crossed the streams, is the universe going to implode? Well, it didn't happen in Ghost Busters (1984) (Egon: “Definitely, there's a very slim chance we will survive.”) so we are probably saved. It is historically notable that Austrian economics and quantum uncertainty developed in the same period and are thus part of a wider cognitive development of humanity.

- ✓ Blinding speed, especially of an object in our peripheral vision, challenges our intuitive concept of object permanence. It disappears in a 'flash' or perhaps like a bullet, we never see it in flight, only the beginning and end. Object permanence then becomes more and more of an abstraction, we wonder if it was ever there, or illusion.
- ✓ The third trailer for the 2016 horror movie, *The Witch*, shows a Puritan girl playing peek-a-boo with a giggling baby in a field. She covers her eyes – not his – and then pulls her hands away and says “Boo!” It is shown from the baby's perspective. On

the third round, she uncovered her eyes and the baby wasn't there. It was seemingly impossible for the baby to have vanished without a trace in those five or ten seconds, in the middle of an open field in daylight; she looked around frantically. In the sense expressed by Ms. Becker, quantum physics equates to old concepts of witchcraft: a violation of object permanence.

- See also Empirical Mythology discussion, 1 Technology, p. 691, *supra*.

*“Quantum physics defies our physical intuition about how the world is supposed to work. In the quantum world, objects resist such classical banalities as ‘position’ and ‘speed,’ particles are waves and waves are particles, and the act of observing seems to change the system being observed. But what if we could develop a ‘quantum intuition’ that would make this all seem as natural as an apple falling from a tree?”*

– Kate Becker, “Is Quantum Intuition Possible?” NOVA, July 28, 2014

**Peek-a-Boo:** I had a collie dog who used to hide his nose in the shower curtain when he got a bath. We used to laugh about it, I remember we thought that he thought that we couldn't see him if he hid his head in the shower curtain – despite the fact that he was getting a bath anyway and could feel the water. So ok, that didn't make any sense, but who knows? He might also have thought he was being punished (we did have to forcefully keep him in the tub and stop him from shaking water all over the place); the way a toddler fusses when an adult holds them still and wipes their face after they make a mess eating. It also might be like when someone looks away while they are getting vaccinated or having their blood drawn.

✓ “Schrödinger wrote:

‘One can even set up quite ridiculous cases. A cat is penned up in a steel chamber, along with the following device (which must be secured against direct interference by the cat): in a Geiger counter, there is a tiny bit of radioactive substance, so small, that perhaps in the course of the hour one of the atoms decays, but also, with equal probability, perhaps none; if it happens, the counter tube discharges and through a relay releases a hammer that shatters a small flask of hydrocyanic acid. If one has left this entire system to itself for an hour, one would say that the cat still lives if meanwhile no atom has decayed. The first atomic decay would have poisoned it. The psi-function of the entire system would express this by having in it the living and dead cat (pardon the expression) mixed or smeared out in equal parts.

It is typical of these cases that an indeterminacy originally restricted to the atomic domain becomes transformed into macroscopic indeterminacy, which can then be resolved by direct observation. That prevents us from so naively accepting as valid a ‘blurred model’ for representing reality. In itself, it would not embody anything unclear or contradictory. There is a difference between a shaky or out-of-focus photograph and a snapshot of clouds and fog banks.’

Schrödinger's famous thought experiment poses the question, ‘when does a quantum system stop existing as a superposition of states and become one or the other?’ (More

technically, when does the actual quantum state stop being a non-trivial linear combination of states, each of which resembles different classical states, and instead begin to have a unique classical description?) If the cat survives, it remembers only being alive. But explanations of the EPR [Einstein–Podolsky–Rosen paradox] experiments that are consistent with standard microscopic quantum mechanics require that macroscopic objects, such as cats and notebooks, do not always have unique classical descriptions. The thought experiment illustrates this apparent paradox. Our intuition says that no observer can be in a mixture of states – yet the cat, it seems from the thought experiment, can be such a mixture. Is the cat required to be an observer, or does its existence in a single well-defined classical state require another external observer?” – from Wikipedia article, “Schrödinger’s cat,” (quoting a translation of Schrödinger’s 1935 paper), captured May 27, 2019.

The cleverness of Schrödinger’s thought experiment is that he took subatomic uncertainty and blew it up into something in our world that is cognizable.

Schrödinger’s cat (the subject of endless geeky t-shirts) is at the center of the looking argument. The state of the cat is indeterminate to the outside observer at least – the state of anything is presumably indeterminate – until we look. But what does that mean? The genius of the experiment was to form a thought bridge from the indeterminacy of the quantum world to our everyday world. From this comes the notion that probabilities collapse into reality in the act of looking and this seems to be confirmed by the experiment with the two holes.

- ✓ “We can try cheating – shutting or opening one of the holes quickly while the electron is in transit through the apparatus. It doesn’t work – the pattern on the screen is always the ‘right’ one for the state of the holes at the instant the electron was passing through. We can try peeking to ‘see’ which hole the electron goes through. When the equivalent of this experiment is carried out, the result is even more bizarre. Imagine an arrangement that records which hole an electron goes through but lets it pass on its way to the detector screen. Now, the electrons behave like normal, self-respecting everyday particles. We always see now the pattern that builds up on the detector screen is exactly equivalent to the pattern for bullets, with no trace of interference.

The electrons not only know whether or not both holes are open, they know whether or not we are watching them and adjust their behavior accordingly. There is no clearer example of the interaction of the observer with the experiment. When we try to look at the spread out electron wave, it collapses into a definite particle, but when we are not looking, it keeps its options open. In terms of Born’s probabilities, the electron is being forced by our measurement to choose one course of action out of an array of possibilities. There is a certain probability that it could go through one hole, and an equivalent probability that it may go through the other; probability interference produces the diffraction pattern at our detector. When we detect an electron, though, it can only be in one place, and that changes the probability pattern for its future – for that electron, it is now certain which hole it went through. But unless someone looks, nature herself does not know which hole the electron is going through.” – John Gribbin, *In Search of Schrödinger’s Cat* (1984), p. 171.<sup>6</sup>

Scientist however, reject the idea that humans are the agents of local collapse of probabilities (“Analysis of an actual experiment found that measurement alone (for example by a Geiger counter) is sufficient to collapse a quantum wave function before there is any conscious observation of the measurement, although the validity of their design is disputed.” *Id.*), but have not offered a replacement explanation to my knowledge (there are many interpretations). It is also not clear what exactly ‘looking’ means or what is required, cognitively, of the looker (can the cat be looking?). But what most greatly troubles the Western consciousness – if the thought experiment is taken seriously – is the lack of any explanation or framework to reconcile the looking (“To appear is to be known” – Avi Sion; the *a priori* or axiom of phenomenology) – the individual, daily, moment to moment phenomenological experience – with the continuity, existence of the larger universe that humans have long thought existed objectively.<sup>7</sup>

- ✓ “No less an authority than Max Born, who received the 1954 Nobel Prize for his contributions to the foundation of quantum mechanics, felt that our minds just weren’t up to the task of ‘intuiting’ quantum physics. As he wrote in ‘Atomic Physics,’ first published in English in 1935, ‘The ultimate origin of the difficulty lies in the fact (or philosophical principle) that we are compelled to use the words of common language when we wish to describe a phenomenon, not by logical or mathematical analysis, but by a picture appealing to the imagination. Common language has grown by everyday experience and can never surpass these limits.’” – Kate Becker, “Is Quantum Intuition Possible?” NOVA, July 28, 2014.

GGDM is not going to offer an answer to those questions (we do not speak math), but instead approaches these issues in a couple of ways. The first is the Temporal Constructural Element (see 1 Constructural Elements, p. 173, *supra*), and the second are the Looking mechanics (*ut infra*).

- ✓ The most explicit sense in which ‘looking’ is true is the Public Space; things appear in the Public Space because we collectively look, see The Collective Consciousness, 1 Constructural Elements, p. 171, *supra*. Looking in that sense is the *flip side* of phenomenology: Looking – Appearing. Heads – Tails. Within GGDM play of course, stars that are *within the game* always appear on the Star Log (a record) and can appear on the Public Space if in actual contact with civilization. There are certain other parts of GGDM, e.g., Cultural Proficiency pieces, Government Titles and pathways, which only appear on the Public Space and are generally placed there (or are affected) when positions activate Powers (i.e. ‘look’).
- Neither Nor: Ultimately, whether the cat is dead or alive can be expressed as 0 or 1, but that value cannot be assigned until someone looks. So, in this sense, does the information exist independently of the observer (unless you believe in pre-destiny), as the Wikipedia quote maintains? If so, in what state, if it cannot be either 0 or 1? See, that is the problem?
  - ✓ “Information is the resolution of uncertainty; it is that which answers the question of ‘what an entity is’ and thus defines both its essence and nature of its characteristics. Information relates to both data and knowledge, as data represents values attributed to parameters, and knowledge signifies understanding of a concept. Information is uncoupled from an observer, which is an entity that can access information and thus discern what it specifies; information may exist beyond an event horizon, for example. In the case of knowledge, the information itself requires a cognitive observer to be obtained.” – from Wikipedia article, “Information,” July 26, 2019.

Suppose I begin a game of FreeCell. Once the cards are dealt, the outcome of the game, 0 (loss) or 1 (win) is not determined until I have played through the game (independent of the amount of time required). What information exists on the outcome of the game prior to me playing the game out (again, unless you believe in pre-destiny)? A set of probabilities, potentials. Suppose I quit the game, don't finish, what is the outcome of the game in 0 or 1 terms?<sup>8</sup> This question has plagued, for example, tournament play, where it has long generally been the rule that quitting without finishing the game is considered a concession, forfeiture or loss, but that is just an interpretation to avoid difficulties in tournament play.

These questions lend themselves to the notion that we must be trying to figure this out in the wrong framework, because, there is no reason to think the stars existed only after humans looked to the sky! Most people would say that's absurd, but that is the mechanic in GGDM at least. Nor did gravity come to exist on Earth because humans looked to see if anything could hold them and the atmosphere to the surface. This is sort of a paradox because both arguments here seem valid, colorable, yet both cannot be true. Given the choice then, it is not surprising that scientists choose the objective empirical universe over human consciousness, rejecting certain arguments as 'quantum mysticism.'

- ✓ See John Archibald Wheeler 'it from bit' feature quote and discussion in Hologram Universe, 1 Information, top of p. 1327, *infra*.
- Life, Looking and Luck: Living matter must always be looking to confirm its own continued existence (and object permanence), death occurs when this can no longer happen ("If the cat survives, it remembers only being alive." – Wikipedia, *Id.*).<sup>9</sup> Life is the very first object permanence to itself, and must also be the last:
  - ✓ "Since Jean Piaget first pegged object permanence as a milestone in infant development, psychology researchers have found evidence that ever-younger babies have some sense of it; affirming object permanence seems to be the main theme of peek-a-boo." – Kate Becker, "Is Quantum Intuition Possible?" NOVA, July 28, 2014.

That is, that the cat must be the observer (its own observer) in every moment is the only explanation that makes sense to my primitive understanding. I would offer that this is part of or should be part of, the definition of life – continuous self-observation is life, consciousness.<sup>10</sup> Even if a non-sentient living being could exist, the being would always be able to 'sense' itself and its own continued existence (see tendentious pedant discussion of use of 'sentient' vs. 'sapient' in GGDM, 5 Beginnings, p. 56, *supra*).<sup>11</sup>

- ✓ Meta-consciousness then may be, must be, an emergent from infantile object permanence, where the existence of the human is the most powerful object permanence in the child's universe. See Meta-consciousness discussion, In the Mirror I Meta Me, 2 Constructural Elements, p. 195, *supra*.

But how does the universe 'exist' when no one is looking? Is it the purpose of life to keep the universe in existence?

- ✓ "This is an application of the anthropic principle: We can only observe an environment capable of producing observers." – Matt O'Dowd (City University of New York), "Are You a Boltzmann Brain," PBS Space Time Channel, April 26, 2017.

This is the heart of the quantum interpretation problem, to wit:

- ✓ “Another way of stating this question regards the measurement problem: What constitutes a ‘measurement’ which apparently causes the wave function to collapse into a definite state? Unlike classical physical processes, some quantum mechanical processes (such as quantum teleportation arising from quantum entanglement) cannot be simultaneously ‘local,’ ‘causal,’ and ‘real,’ but it is not obvious which of these properties must be sacrificed, or if an attempt to describe quantum mechanical processes in these senses is a category error such that a proper understanding of quantum mechanics would render the question meaningless.” – Wikipedia, “List of Unsolved Problems in Physics,” captured June 18, 2018.

I have often seen and wondered about people who have terrible luck in board and card games which use randomizers who also display a bad attitude about die-rolling, card drawing, and life in general. Is there a connection between the two? This long-debated but not well-defined question extends beyond the hobby gaming table to our amazement at people who are both incredibly successful and life positive. It extends to educational philosophy, biographical analysis and literary fiction trope. Is this a chicken or the egg argument: Did they succeed because they are positive people, or are they positive people because they succeeded?

- ✓ “Unless you’re winning, most of life will seem hideously unfair to you.” – Oliver Emberton (blog).

But wave function collapse certainly adds another intriguing layer, something suggestive of a connection between mental states and the local universe,<sup>12</sup> does our attitude actually have some effect on ‘random occurrences’ and certain types of local entropic events? Or am I really wondering if ripe apples are like oranges because red is next to orange on the low end of the visible color spectrum?<sup>13</sup>

- ✓ “Heaven, nirvana, hell, it all exists. Not because of the Bible or Quran, or Buddha says it does. It exists because we expect it to.” – Craig Leeham, Einstein’s God Model (2016).
- ✓ What if what we think is objective reality is actually a continuing set of collapsing wave functions, which shift as we look at them? This view is not entirely implausible – you think you walk by pushing against the Earth, but science tells us we walk because the Earth pushes us forward in reaction to us pushing against it. Frame. Work.

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*“How much would we appreciate La Gioconda today if Leonardo had written at the bottom of the canvas: ‘This lady is smiling slightly because she has rotten teeth’ – or ‘because she’s hiding a secret from her lover’? It would shut off the viewer’s appreciation and shackle him to a reality other than his own. I don’t want that to happen to 2001.”*

– Stanley Kubrick, Playboy Magazine, 1968<sup>14</sup>

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**Sapience:** Even in astrology, there is the act of looking, whether it is performing whatever process the astrologer performs, or calling your ‘psychic friend’ in New York City (who oddly never calls you first) to ask for your ‘personal horoscope,’ or looking at the newspaper astrology section. You are looking for something.

All of the criticisms of astrology, outlined succinctly by Carl Sagan and others, are valid, within the framework of science. And science is the framework of our current world. But looking is

the essence of sentience – sentience exists to look, it's *a priori* – and sapience is the essence of projecting sentience into the abstract. That's just what we do. But echoing what Carl Sagan said about Ptolemy's astronomy – that “intellectual brilliance is no guarantee against being dead wrong” (Cosmos, Episode 1) – so is sapient projection no guarantee against being delusional.

- ✓ Merriam-Webster online dictionary at *sentience*: **2**: feeling or sensation as distinguished from perception and thought.

Sentience here is being used in a phenomenological sense, to feel or have a sensation is to appear, to be known both that thing which has caused the feeling or sensation, and the thing (to its own self) that has experienced it.

- ✓ “Looking” as used in GGDM is intended in a very broad sense, ranging from sentience to perception, thought, sapience, as at all levels, things ‘appear’ and are known when looking. It is quite unlikely that anyone has argued that inanimate matter looks, feels, experiences anything. Thus looking is the essential quality of living matter at all levels. Living matter cannot turn off sensation, perception, feeling, appearance.

The main distinction to be made between astronomy and astrology is that, of necessity, the astrologer claims to be a messenger from heaven or the cosmos, bringing a personal message *to you*. Astronomy makes no such claims. In modernity, astrology is treated as silly entertainment. If your personal astrologer predicted your death this week, would that be entertainment?

- ✓ **Old Man:** Beware, the Ides of March! **Caesar:** He is a dreamer; let us leave him: pass. – William Shakespeare, “Julius Caesar” (1623).

It might be interesting, if somehow, a setting could be created where astronomy and astrology co-exist equally and probably, asymmetrically, both with empirically verifiable results.

However, astronomy will point you back home from a distant star, astrology will not. Astrology is not portable like astronomy since the constellations only appear as we know them from the perspective of our Homeworld and in our time; so perhaps in such a setting, astrology would be equally valid only on the Homeworld?

- **Stellar Classes:** Very roughly, the stellar classes in GGDM correspond to the classic classifications of stars, which are O, B, A, F, G, K, M, N. The classic mnemonic for remembering the classes of stars is ‘Oh Be A Fine Girl Kiss Me Now.’ For example, the Pleiades is an open starcluster of hot young blue B-class stars that is visible to the naked eye from Earth. The Concierge is free to alter the over-simplistic system for determining stellar class in the game, it can be skewed whichever way is desired, it can be expanded, a more realistic distribution can be introduced. Class dismissed, we meet same time next eon!
  - ✓ The GGDM stellar classes (colors) in order (red, orange, yellow, green, blue), correspond (roughly) to the Hertzsprung-Russell (H-R) Diagram (available on the internet) moving from bottom right to top left. Our sun is a G2V (yellow in GGDM) star.

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*“And always remember, keep looking up!”*

– Jack Horkeimer, Director, Miami Space Transit Planetarium (Miami Museum of Science), host of PBS “Jack Horkheimer: Star Gazer”

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**Horkeimer's Rule:** The stars listed on the Starlog are obviously not the only stars in the universe or even in the galactic neighborhood. Activation of the Expansion Power for the purpose of Looking allows positions to look from certain locations to find other stars outside those listed on the Starlogs. Looking attempts may not receive the benefit of any Enlightenment (i.e. no re-rolling) as that would be rather absurd. The game looks only when it matters.<sup>15</sup>

- ✓ If you were an inhabitant or governor of a frontier colony world, when you thought of the sky, which way would your mind gaze? Would your attention run toward the interior, industrial, population and interstellar government worlds of your sovereign, or would your gaze be turned outward to the next stars beyond your world? Where would you *look*? Would your mental Scene be in the Galactic or the Public Space?

Page | 899

This is the true looking rule of the game, the way to understand how this game is played; the players look. When it matters. In the game.<sup>16</sup>

- **Procedural Generation:** The detailed game setup procedure, and the Looking and Scouting rules are very primitive and burdensome (if done manually) procedural generation systems designed to make a theoretically infinite, but practically limited, game universe that is exactly the size needed for play – or as I originally envisioned it in the post-Stellar Conquest days, to make a 3D game universe that is not artificially limited to the space on a flat game board. The emphasis of GGDM is to encourage an engaging emergent game play; GGDM contains structural elements designed for that purpose.<sup>17</sup> Both concepts – procedural generation and emergent game play – were terms unknown to me when the current game was created around 2000 to 2002, so this section translates GGDM into current terminology.<sup>18</sup>
- **Looking Up:** Any colony, Scout, or Warship that begins the Regular Turn at a starsystem that has any X, Y, or Z coordinate less than or equal to 5, or greater than or equal to 25, may Look for new stars not currently on the Starlog. Each eligible star may only be used for Looking *once* in each game; that is, once one position has used a star to Look, no other position may Look from that star for the rest of the game for the simple sane reason that once the stars beyond are discovered, they cannot and should not be changed or added to by subsequent looking from the same star. A record, visible to all, will be kept of stars used for looking on the central Starlog page so that positions are informed and do not waste Activations.
  - ✓ Remember, a Scene is required and thus, the star must have been on the Public Space at the end of the previous Regular Turn. Thus the ship or colony must begin the current turn in the starsystem used for Looking.
  - ✓ New stars can appear nearby as a result of Looking from other locations; thus, the edges of the Galactic Space can be fluid until all stars in an area have been used for Looking. This can, admittedly, create some strange game situations that are a consequence of this particular looking mechanic; for example, if a position begins the game near the edge, stars can appear nearby that should have been there initially.
- **Looking Out:** Looking begins with a d10 roll to determine how many stars are nearby; the number of stars currently within 8 movement distance based on the Movement Formula used by the Generic Stardrive Existential Patent, is subtracted from the die roll. If the resulting number is greater than zero, that number is the number of new stars discovered by Looking.

The more populated the neighborhood, the less new neighbors you will find! *Or.* The farther out you are, the further out you will be!

- Looking Sideways: For each star discovered by Looking, a ten-sided die is rolled once for each coordinate. The result of the die roll is subtracted from the X, Y, or Z coordinates of the Looking location *if any coordinate is less than fifteen, or added if any are greater than fifteen*. Negative numbers or numbers higher than 30 are possible and likely.
  - ✓ For example, the Looking location is X5, Y20, Z18. Looking is allowed from this star because of the X5 coordinate, *ut supra*. The others are irrelevant.
  - ✓ One new star is located by Looking from that location, the die is rolled once for each coordinate with 8, 6, and 2 results.
  - ✓ Subtracting and adding from the Looking location's coordinates as described above, the location of the new star would be at X-3, Y26, Z20, located 16 movement from the Looking location using the Generic Stardrive Patent's Movement Formula.

Further Looking may subsequently be done from stars discovered by previous Looking, so that the Galactic Space is effectively infinite. Since stars are large bright physical objects in the sky, their location is perfectly obvious to everyone, therefore, a new star 'discovered' by Looking is added to the game's central Starlog and is available to all positions, and may be announced via Special Bulletin.

- ✓ GGDM necessarily assumes that all Major Races are capable of 'seeing' stars. A 'blind' species would not know there is a sky, only an infinite up and finite down.
- Looking Inward: The initial Starlog has coordinates in X, Y and Z from 0 to 30, and all of the starting positions and starsystems are located within that +++ quadrant. The initial Starlog does not have any negative coordinates. Thus, stars with coordinates from 0 to 5 and 25-30 represent the stars on the outer edge of the initial Galactic Space.

This system makes the initial Galactic Space playing area of the game inviolate; no new stars should appear inside the initial playing area (for game sanity). It must be assumed then that the 30 stars on the initial Starlog are all of the stars within the cube of X1-30, Y1-30, Z1-30. Either this represents a truly miniscule piece of Galactic Space, or, if the initial Galactic Space represented a spherical radius of say, 50 LY, then it is unrealistic that new stars would not be 'discovered' within the sphere of only 30 stars (*ut infra*, next page).

- Looking Through: Finally, for each new star, one die must also be rolled for the stellar class of the star (i.e. the color), on a result of 1 the color is red, on a result of 2 or 3, the color is orange, on a result of 4, 5 or 6, the color is yellow, on a result of 7, 8 or 9, the color is green, and on a result of 10, the color is blue. This information will be recorded, available for all.

Each position will be assigned, during set up, a stellar class of their Homeworld star, even if their homeworld (i.e. the world on which their species evolved) is not in the Galactic Space. During the game, the stellar class of each star in GGDM is a determining factor, in percentages, of Habitability Class of planets in the starsystem, with positions most likely to find Optimal and Hospitable Class planets in starsystems with a stellar class identical to or close to the stellar class of their home star. It's only natural. But it creates an interesting dynamic.

- ✓ For example, a position whose Native Population Type evolved in a system with an 'orange' star (in GGDM stellar classifications) will most likely find Optimal and Hospitable Class planets at orange starsystems. The chance of finding Optimal Class

planets at either red or yellow class systems is significantly less, and is extremely unlikely in green or blue starsystems. But the chance of finding Hospitable and Habitable Class planets is still decent or good in red or yellow class systems. *Und so weiter.*

The stellar classes do not loop, that is, red class stars are not next to blue class stars on the spectrum. Thus, species that evolved in blue or red class stars (the extremes) will likely find less stars of those classes in the Galactic Space, and also, will only have one adjacent color, which will also be slightly less numerous than the orange and yellow mainline stars. On the other hand, paw, tentacle, orb, whatever, there will be significantly less competition for living space in blue and red stars than among species evolved in orange, yellow, or green stars.

- **Looking Around:** Discovery of a new star via Looking does not grant ownership or any rights not enforced by arriving with warships first. New stars are like the old stars, they are *terra incognita* and *terra nullius* and may be subsequently explored, colonized, and conquered as any other starsystem.
  - ✓ Looking could be altered to allow new stars to appear inside the original Galactic Space if participants desire more ‘realism’ or want to experiment. See discussion Stage Illusions, 1 The Sidereal Stage, p. 107, *supra*. I do not believe it necessary.

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*“If there are millions of civilizations in the Milky Way each capable of radio astronomy how far away is the nearest one? If they’re distributed randomly through space then the nearest one will be some 200 light-years away. But within 200 light-years there are hundreds of thousands of stars.”– Carl Sagan, Cosmos, Episode 12*

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**Realspace:** This suggests that the Galactic Space is probably a tiny area indeed. This also suggests that even at sub-light speeds, outbound from the Earth, there are probably thousands of planets that could be colonized.

- ✓ “About one third of the stars visible with the naked eye lie within 250 light years, even though this is only a tiny part of our galaxy. There are 133 stars visible with the naked eye within 50 light years of us.... The Hyades cluster is the nearest major star cluster and the only one close enough to be mapped in three dimensions. The Hyades cluster is a bright object in Taurus, but the view is partially ruined by Aldebaran – a brilliant orange giant star that lies in front of the cluster at less than half the distance. The cluster itself is 151 light years away. It was formed about 660 million years ago and the cluster has probably gone around the Galaxy three times since then. Like most open star clusters, the stars in the cluster are slowly moving apart.” – captured June 22, 2018, from website <http://www.icc.dur.ac.uk/~tt/Lectures/Galaxies/LocalGroup/Back/250lys.html> (Institute for Computational Cosmology, Durham University, UK; website has some cool 3D star maps).
- ✓ “As many as 512 or more stars of spectral type G (not including white dwarf stellar remnants) are currently believed to be located within 100 light-years (or 30.7 parsecs) of Sol – including Sol itself. Only around 64 are located within 50 light-years (1y), while some 448 are estimated to lie between 50 and 100 light-years – a volume of space that is seven times as large as the inner sphere within 50 ly of Sol. A comparison of the density of G-type stars between the two volumes of space indicates that the outer spherical shell has around 100 percent of the spatial density of known G-type

stars as the inner spherical volume, which suggests that astronomers have identified the great majority of the G-type stars that are actually located within 100 ly of Sol, assuming the same spatial distribution in the Solar neighborhood... As of October 2005, astronomers have been able to detect the presence of planets around only 28 G-type stars (including Sol) – or around 5.5 percent – of those 511 stars located within 100 light-years of Earth.” – captured from <http://www.solstation.com/stars3/100-gs.htm>, on June 22, 2018.

This awesome free website, last updated in 2013, has a tremendous amount of information, including a table of all G-stars within 100 light years and, back-browsing, interactive maps, tools.

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*“Somewhere out there, something incredible is waiting to be known.” – Carl Sagan*

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*“We began as wanderers, we are wanderers still. We have lingered long enough on the shores of the cosmic ocean. We are ready at last to set sail for the stars.” – Carl Sagan*

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**City on the Edge of Forever:** Who knows what you will run into out there? That’s why we go (or possibly don’t go). It’s also why we bring a gun. It is probable that positions will encounter each other during exploration and/or that exploring ships may encounter **alien colonies**, Minor Races, and whatever other strangeness the Concierge decides to put into the game. When units and colonies owned by different positions encounter each other for the first time, it is resolved per the First Contact Rules (see Bump in the Night, Diplomacy, p. 1099, *infra*); treatment of Minor Races is described in Mathó Thípila, 4 Diplomacy, p. 1140, *infra*. Finally, the practical limitations and considerations of what ships, colonies see is described in 2 Information, *infra*.

**A Hostile Class Love Story in 150:** A jilted and jealous lover attempted to commit suicide and mass murder by explosively decompressing the domed research colony. Twenty of one hundred colonist survived in an emergency shelter control room.

When the supply ship arrived a year later, bearing news of turmoil at home, a few less than a score of colonist remained; the jilted lover, overtaken at the last moment by survival instinct, had dashed to the shelter before the catastrophe. The supply ship, loaded with a new colony of 150 persons and another pressure dome, had no spare room to take off the survivors.

After an incident that destroyed the supply shuttle at the colony, the supply ship departed leaving behind the survivors and their hostages. Many years later, another supply ship arrived to find a few survivors who were not quite the same species as those who landed... EOM.<sup>19</sup>

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*“There are now five different lines of observational evidence pointing to the existence of Planet Nine,’ Konstantin Batygin, a Caltech planetary astrophysicist, explains. ‘If you were to remove this explanation and imagine Planet Nine does not exist, then you generate more problems than you solve. All of a sudden, you have five different puzzles, and you must come up with five different theories to explain them.’”*

– Mike Wehner, “NASA says evidence for Planet Nine is mounting,” foxnews.com, October 18, 2017

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## Endnotes.

<sup>1</sup> Commentary: On Wednesday, November 7, 2018, Washington Capitals forward T.J. Oshie had a rough night; first he was hit in the eye under the visor with a stick and had to leave the game in the 1<sup>st</sup> period, then in the 3<sup>rd</sup> period, he was in a violent collision with Pittsburgh Penguins forward Evgeni Malkin in which he was hit in the head by Malkin's shoulder (Malkin was ejected from the game), and Oshie had to leave the ice for concussion protocol. I had a feeling he would return, and when he returned in the latter part of the 3<sup>rd</sup> period, and was active on the ice, I just got this feeling that he was going to score a goal. Somehow, it just felt 'right' and indeed, he scored the winning goal. How did I know? I have watched many baseball, hockey, and football games; it just felt predictable. That is literally what I thought at the time, it was predictable. But how?

- ✓ By one common philosophical argument of knowing, I 'knew' because I was right – no matter how – and had it not happened, my feeling would have been a 'belief' and not knowledge. Not JTB.
- ✓ A critical approach would suggest that I am highlighting all of the times it happened and ignoring the times it didn't happen. That still does not explain my intuition of the moment. I have seen this too many times before. Sean Young was traded back to the Pittsburgh Pirates after a horrific time in Atlanta, arrived just in time to dress for the game, but was not a starter. In extra innings, he came in as a pinch hitter and hit a walk-off home run over the wall. I have lost count of the number of such – what should we call them? – synchronicity moments over the years, and I was not thinking of those at the moment I had that intuition about T.J. Oshie. Was the expectation created in both instances by the broadcasters? And they just got lucky that a really special moment happened after their buildup? Ok, but I have seen it in person, without broadcasters in my ear. I was at the game where Josh Harrison broke up the no-hitter in the 10<sup>th</sup> inning with a homerun. I suddenly thought it would happen, and mentioned it to my friend when Harrison came to bat. I was also at a Penguins playoff game that went to overtime, I thought and said to my friend, that we would win quickly, and indeed, the Penguins scored a winning goal 30 seconds into the overtime. By definition, as they had not happened yet, no evidence was available to support my knowledge.
- ✓ See discussion of pre-theoretical intuition, *The Fine Print-isms*, 1 Temporal Technology, p. 811, *supra*.

<sup>2</sup> Commentary: If you look up in the sky long enough, without blinking, moving or looking away, you will eventually see stars...one way or the other...or if someone whacks you in the back of the head for not paying attention.

<sup>3</sup> Citation: Merriam-Webster 11<sup>th</sup> Collegiate Dictionary.

<sup>4</sup> Commentary: For example, we tell children to look both ways before crossing the street. What we are trying to make them understand is something more than simply seeing; we want them to process, pay attention, judge.

<sup>5</sup> Commentary: I am aware of the potential charge of "quantum mysticism." *Nolo contendere, ad altiora tendo!* And the same goes for any suggestion of a creator or supreme deity.

- ✓ The sibling of modern quantum mysticism is "nuclear mysticism" which one of its main proponents, Salvador Dali, visualized in a painting, "Living Still Life" (1956). "Nuclear Mysticism is composed of different theories that try to show the relationships between quantum physics and the conscious mind. The different theories are composed of elements that range from 'Catalan philosophers' to 'classicism, pop art, and nuclear physics.'" – from Wikipedia article, "Living Still Life," citing to E. Baden (2011).
- ✓ "Quantum mysticism in the sense of consciousness playing a role in quantum theory first appeared in Germany during the 1920s when some of the leading quantum physicists, such as Erwin Schrödinger, leaned toward such interpretations of their theories." – from Wikipedia article, "Quantum Mysticism," manifested on my computer, February 7, 2019.
- ✓ The early controversy died off by the 1950s, to be revived later in 1961. By the 1970s, it had become part of the New Age culture (possibly ranging to manifestation).

<sup>6</sup> Citation & Commentary: Mr. Gribbin perhaps uses some unfortunate language (such as electrons 'knowing'), unfortunate perhaps in his choice of words to convey the concept to lay readers, but also unfortunate because our language is still mythopoeic-anthropomorphic (and geo-centered, as Sagan pointed out) and lacks other words to convey the meaning more accurately. I am not a proponent of the electron 'knowing' anything, they should just remain ignorant, pay taxes, make baby electrons (quarks?) and vote for whomever the party bosses put up on the podium.☺

- ✓ "What we see is what we get. An experimental observation is only valid in the context of the experiment and cannot be used to fill in details of things we do not observe. You might say that the double-slit experiment tells us that we are dealing with waves; equally, by looking only at the pattern on the detector screen

you can deduce that the apparatus has two holes in it, not one. The whole thing is what matters – the apparatus, the electrons, and the observer are all part of the experiment. We cannot say that an electron goes through either hole, without looking at the holes as it passes (and that is a different experiment). An electron leaves the gun and arrives at the detector, and it seems to possess information about the whole experimental setup including the observer. As Freyman explained to his BBC audience in 1965, if you have an apparatus that is capable of telling which hole the electron goes through, then you can say it either goes through one hole or the other. But when you have no apparatus to determine through which hole the thing goes, then you cannot say that it goes through one hole or the other. ‘To conclude that it does go through one hole or the other when you are not looking is to produce an error,’ he states. The term ‘holistic’ has become such a misused buzzword that I hesitate to introduce it. However, there is no word more apt to describe the quantum world. It is holistic; the parts are in some sense in touch with the whole. And it doesn’t just mean the whole of an experimental setup. The world seems to keep all of its options, all of its possibilities, open for us as long as possible. The strangest thing about the standard Copenhagen interpretation is that it is the act of observing a system that forces it to select one of its options, which then becomes real.

In the simplest experiment with two holes, the interference of probabilities can be interpreted as if the electron that leaves the gun vanishes once it is out of sight, and is replaced by an array of ghost electrons that each follows a different path to the detector screen. The ghosts interfere with one another, and when we look at the way electrons are detected by the screen, we find traces of this interference, even if we deal only with one ‘real’ electron at a time. However, this array of ghost electrons only describes what happens when we are not looking; when we look, all of the ghosts except one vanish, and one of the ghosts solidifies as a real electron. In terms of Schrödinger’s wave equation, each of the ‘ghosts’ corresponds to a wave or rather, a packet of waves, the waves that Born interpreted as a measure of probability. The observation that crystalizes one ghost out of the array of potential electrons is equivalent, in terms of wave mechanics, to the disappearance of all of the array of probability waves except for one packet of waves that describes the real electron. This is called the ‘collapse of the wave function,’ and bizarre though it is, it is at the heart of the Copenhagen interpretation, which is itself the foundation of quantum cookery. It is doubtful, however, that many of the physicist, electronics engineers, and others who happily use the recipes in the quantum cookbook appreciate that the rules that prove so reliable in the design of lasers and computers, or studies of genetic material, depend explicitly on the assumption that myriad ghost particles interfere with each other all the time, and only coalesce into a single real particle as the wave function collapses during an observation. What’s worse, as soon as we stop looking at the electron, or whatever we are looking at, it immediately splits up into a new array of ghost particles, each pursuing their own path of probabilities through the quantum world. Nothing is real unless we look at it, and it ceases to be real as soon as we stop looking.” – John Gribbin, *In Search of Schrödinger’s Cat* (1984), pp. 172-173.

- **The post-millennial version:** “Quantum field theory describes the interactions between particles as the sum total of all possible interactions that can lead to the same result. ... Every interaction with virtual photons that can happen, does. At least, in a sense. And the sum of the infinite possible interactions defines the strength of the one real interaction. And if that doesn’t make your head hurt, try thinking about it again. So yeah, quantum field theory is a type of madness.” – Matt O’Dowd (City University of New York), “Quantum Theory’s Most Incredible Prediction,” PBS Space-Time Channel, August 15, 2018.

Since the end of the Cold War, and possibly since the millennia, there are a number of card games that use this idea. You have a hand of cards, you must (or should if you are being competitive) try to play one or more of the cards when possible. Each card represents a possibility of what you might do, a possible future for your position in the game. Each has its pros and cons, and unknown or unknowable possibilities in terms of what you might draw, what your opponents might do, or die rolls, and such. You take your best guess and play a card. What makes the newer card games more interesting, is that you must (unlike old card games), pay-to-play by discarding cards from your hand to play a card, the process of doing so eliminates possible futures, possible timelines for your position by the act of choosing one to play on the table (and discarding others to pay for it). This intuitively reflects our lives when we stop to think about it, and also reflects quantum physics and that is sublime to me. This is what I see in games like *Race for the Galaxy* and why I have continued to play that game daily long after most gamers have forgotten about it. There have developed a number of other card games that use the same mechanic, and many board games (e.g., the underrated and forgotten board game *Lyssan*) in recent years have adopted this style of card play.

✓ My copy of Gribbin’s book looks like a venerable ancient text, according to a friend who borrowed it a few years ago, with its creased and worn cover and spine. It has a long history in my possession (i.e. Temporal 2 Expansion – Horkeimer’s Rule

Constructural Element), moving from place to place. I sat on the deck of the U.S.S. Tuscaloosa (LST 1187) and read it in the summer of 1988 on my way to the Philippines and Hong Kong. As such, in terms of science, Mr. Gribbin's book is, like me, a bit 'dated' and further, I sense, would be met with derision in the scientific community (like GGDM), Gribbin rather alludes to that above. They probably don't teach this in high school for the same reason they don't encourage teens to read science-fiction stories even now: Temporal authority must be completely objective, hard and fast, undeniable, beyond each of us, and in control (as Gatto and others have pointed out), no wishy-washy science of ghost probabilities or power to collapse wave functions by the act of observation are allowed to taint the youthful minds. I was fascinated by quantum tunneling of alpha particles who lack sufficient energy to escape the potential energy well (long before I heard of quantum entanglement, etc.) which I think I discovered on my own in high school and I recall doing a class presentation project on it in 11<sup>th</sup> grade; I had an unusual teacher however. Quantum tunneling, as I understood it in high school, suggests to the young mind that one might 'magically' escape and suddenly find oneself outside the bounds of whatever situation or system one finds themselves in (and I did just that after high school), regardless of rules, math, and probabilities. And so here I am, here I sit.

The quantum concepts have only very slowly crept into the Western consciousness in the last century and very little of science-fiction literature uses it (despite its apparent fertility for science-fiction concepts). The most notable science-fiction setting that I recall using the fascinating observer-triggered probability collapse is the Andromeda television series where it is the basis of Slip Stream travel (see 'quantum intuition' discussion, *Trans-human Touch-down*, 1 Stardrive, p. 784, and Andromeda Wiki feature quote at the top of 3 Movement, p. 854, *supra*).

<sup>7</sup> Commentary: Thus in looking, we are roughly 'forcing' something into 'reality' against 'its' will, or without 'its' consent. Is that an absurd concept? Yet, it has parallels to the fact that all of us were born – brought into existence, ontologically by the acts of others – without our consent, and cannot be unborn, regardless of what we do (short of creating a paradox). It's just a metaphysical observation and not much more, if life has a pre-conception state, we have no idea where to look for it right now. That is, we have no empirical evidence of such right now, but it would be some great epic fiction. If life has a preconception state, don't picture babies in heaven or souls floating about waiting to be born; no it will be something much, much stranger still and related to abiogenesis.

<sup>8</sup> Commentary: I have no answers to offer, but I am sure that someone much brighter than me has figured this out already. I am sure there is some math solution to the question of what if it is neither 0 nor 1 in a system that allows only 0 or 1?

<sup>9</sup> Citation & Commentary: "...your physical body exists only to confirm your existence." – Serial Experiments Lain, Episode 6 (1998). In the series, Lain eventually has to give up her physical body in the Real World to inhabit the Wired. Lain cannot then cross back over into the real world and exists here only in the memories of those who are aware of her existence (this is referenced in the Wikipedia article in relation to a philosophical society talk given by Professor Susan Napier in 2003, "The Problem of Existence in Japanese Animation" (published 2005)).

- ✓ About fifteen years ago when I watched Serial Experiments Lain in its entirety, I was not aware of Russian Cosmism and was only vaguely cognizant of Transhumanism. But revisiting the series in the current context, it is clear that discarding the physical body to enter the Wired is related to the concepts of Russian pre-Cosmism (see excerpt from book by George Young in *The Sidereal Stage*, *supra*) and it is not coincidental that there is a link to the Noosphere article at the bottom of the Wikipedia article on Serial Experiments Lane. This form of ascension is not uncommon in science-fiction literature, of course.

<sup>10</sup> Commentary & Citation: Steven R. Donaldson's two volume series *Mordant's Need* (1986-1987) comes somewhat close to this; the main character Teresa lives in an apartment covered in mirrors, so that she can always know that she still exists. Though I read this in the late 1980s after having read the *First and Second Chronicles of Thomas Covenant* trilogies (1977-1979, 1980-1983) and *Daughter of Regals and Other Tales* (1984), I do not believe it is directly the source of my commentary here.

<sup>11</sup> Citation & Commentary: "...appearing is being known." – Avi Sion, from abstract for his book *Phenomenology* (2003). Thus living matter, from a phenomenological view, must always be appearing to itself and when it cannot, when that condition ceases, it is organic non-living matter.

- ✓ The point of distinction that GGDM makes from phenomenology is the emphasis on looking, or more properly, appearance through looking. This extension of phenomenology into quantum interpretation – the horror of physicists worldwide – is where sentience and sapience are properly situated.

<sup>12</sup> Citation: "Time lines can not only interfere with each other, they can alter or even erase aspects of each other, and the potentials of each other as a whole. Or in terms of the plot of the film [Looper, 2012], young Joe's short term

future can alter his long-term future, which is ultimately, old Joe's past, hence, the memory fuzziness described by old Joe in the diner.

All of which is quite resonant with the structure of quantum entities, whether or not Johnson did this intentionally, or, as he has indicated, by instinct. According to quantum physics, sub-atomic entities aren't quite particles, and this is why, after at first depicting electrons as tiny satellites in fixed orbits around the central atomic nucleus, physicists came increasingly to depict electrons as fuzzy 'clouds' which hover around a nucleus. What's particularly difficult to grasp about this, however, is that electrons aren't spread out like a rain cloud, but rather, the electron and the space and time in the area of the so-called cloud are, to use a popular metaphor in the science literature, 'smeared' within and through each other. That is, while a rain cloud is full of little drops of water, there is only one electron in the spacetime of the cloud, and it could show up anywhere in there, but its location within this is, in a sense, 'fuzzy.' The reason for this is that quantum entities, which are only described as particles by scientists today as a short-hand, simply don't follow the laws of time and space like large entities do, they're able to be in more than one space and time at once, even if more intensely in some of those spaces and times than others. What's more, they interfere with each other, in a manner not all that dissimilar to what is described in *Looper*.

This is why we can think of old and young Joe as being similar, in many ways, to quantum entities. As they get closer to each other, in space and time, their actions increasingly begin to interfere, not only with each other in the present, but in the past and future as well. This manifests in the way in which young Joe's actions can rewrite old Joe's memories, or to the extent that the memory of one character is the future of another, also impact their potential future paths." – Christopher Vitale, "Collapsing the Fuzzy Wave: Rian Johnson's 'Looper' (2012), Quantum Logics, and the Structures of Time Travel Films," networkologies (blog), written in 2012, updated and reposted, October 31, 2014.

<sup>13</sup> Commentary: The classic mnemonic for remembering the color spectrum is ROY G. BIV which stands for Red, Orange, Yellow, Green, Blue, Indigo, and Violet. The first five are the Stellar Classes in GGDM.

- ✓ Within our solar system, 'My Very Educated Mother Just Served Us Noodles' is a way of remembering Mercury, Venus, Earth, Mars, Jupiter, Saturn, Uranus, Neptune. Watch out for the Klingons circling...
- ✓ In the orders of life on Earth, in 7<sup>th</sup> grade we learned 'King Philip Came Over for Grape Soda' which stands for Kingdom, Phyla, Class, Order, Family, Genus, Species. *Homo Sapiens* are the only surviving species of genus Homo, which of course is the flash-point of much evolutionary-religious debate.

<sup>14</sup> Commentary: La Gioconda is known in English as the *Mona Lisa*; the model who sat for the painting was Lisa del Giocondo and it was painted for her husband. Mona is a polite form of address, like Mrs. in English.

<sup>15</sup> Commentary: The first rule to surviving a military inspection – or any inspection – is to pass on the first look. If the inspecting officer sees anything wrong or out of place, they will look more closely, start looking behind the facade. It's human nature. And cat nature. There are certain people who live on the edge, they make business deals, communicate and/or act in ways that are borderline unethical and possibly illegal at best. They talk the talk, act like big shots, connected with all the right people, knowing it all about how the game is played. They can do this as long as no one is *looking* – until something happens, some event, or events, something beyond what they imagined, that brings the gaze of a prosecutor, special investigator, or grand jury in their direction.

<sup>16</sup> Commentary & Citation: Yes, I am aware that by my suggestions here I will be branded as the greatest scientific heretic, criminal of the 21<sup>st</sup> Century by the respectable scientific establishment (if they notice and *think it matters*); this very debate has arisen in 2020, e.g., Dr. Sabine Hossenfelder's video, "Is COVID there if nobody looks?" (YouTube channel, June 28, 2020); Frau Hossenfelder is a Fellow at the Frankfurt Institute for Advanced Studies.

<sup>17</sup> Commentary & Citation: As opposed to, for example, the infinite procedurally generated universe of No Man's Sky (in its original form; they added a backstory, guilds and procedurally-generated missions later), which was roundly criticized as an overpriced, flat and soulless game-play experience (however, according to Gita Jackson at kodaku.com, a year later after several expansions, "No Man's Sky is good now").

<sup>18</sup> Commentary: How is this for an example of a looking problem: I have observed many instances of the computer stating that it cannot find (i.e., 'no results') the word I typed to search in an open document, yet I am looking at the word it says it cannot find? I have seen instances where it jumped to the location of the word I searched, yet claimed that it cannot find the word in the document. It is displaying the word, I am looking at it; the machine obviously 'knows' it is there if it is displaying it, yet it cannot find it in the search function? I am sure there is a discipline term or name for this phenomenon somewhere in computer science, just as there are names for this phenomenon among humans.

<sup>19</sup> Commentary: No humans were harmed in the making of this story.

2 Expansion – Horkeimer's Rule