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# PUBLISH OR PARISH: ON THE THEOLOGY OF MODERN PHYSICS

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## ABSTRACT

Physics is one of the most heavily researched and well-funded areas of New Age spirituality. While astrologers and gurus struggle to understand and fund their work with healing crystals, physicists are given *carte blanche* to build gigantic underground tunnels to determine what God was thinking in the initial femtoseconds of the Universe. Given this inexplicable access to taxpayer dollars, physics has made staggering progress in recent decades, asking and sometimes answering foundational questions like: is the universe simply a Hologram emanating from some Higher Dimensional Reality? Does all Matter originate from Primordial Vibrations of the Cosmos? Will adding another Microscopic Dimension to my Unified Theory compensate emotionally for the Injustices I experienced at the hands of my peers as a Sensitive, Introspective—dare I even say, Gifted—schoolboy? While physics itself has been remarkably prolific, there remain lacunae in the comparative religion literature concerning the cultural and religious origins of this movement. In this paper, we take initial steps toward a Unified Field Theory of Physics, e.g., a Unified sociological and theological Theory of the Field of Physics, with particular emphasis on its occult origins. We show how the pioneering works of Joseph-Louis Lagrange and Sir William Rowan Hamilton in applied metaphysics laid the foundation for the modern physics movement in the early 20th century. Then, we provide three case studies illustrating how the theological commitments of physicists are used to elevate the everyday phenomena of force, temperature, and magnetism to the astral plane. We sincerely hope that our work contributes to deeper understanding and better rehabilitation of those who have fallen under the spell of physics.

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**Keywords** Super-symmetric quantum chromodynamics · Irrational conformal field theories on non-commutative geometries · Renormalized covariant holographic information geometry · Abstruse mathematics · Computational metaphysics · Low self-esteem

## 1 Introduction

Published in 1687, Isaac Newton's *Principia* introduced three universal laws of motion, marking an enormous step forward in humanity's understanding of the physical world, and establishing a paradigm for future scientific research [1]. Like scientists past and present, Newton wrote in a verbose and snobby manner, which obscured the simplicity of his underlying message: *when things get pushed, they move*.<sup>1</sup> While it is mysterious that it took the majority of human history to figure this out, it is clear that his idea immediately bore scientific fruit—from gravity [2], to fluid mechanics and elasticity [3, 4], to electricity and magnetism [5], once various kinds of pushes were defined, governing differential equations could be easily written down. And with these differential equations, scientists and engineers did wonderful things, like design bridges that didn't fall down [6], construct flying machines that allowed you to travel further away from your family than ever before [7], and connect the world with long wires and eventually invisible vibrations in the sky [7], giving you the luxury of worrying not only about your own problems, but everyone else's too [8]. Small though our brains may be, and evolutionarily ill-equipped as we are to understand such abstract notions such as “push” and “motion,” the Newtonian picture of the world could eventually be mastered by the diligent student. By the early 20th century, phenomena as diverse as fracture mechanics [9], thermodynamics [10], aerodynamics [11], and baseball [12] were under the yoke of Newtonianism—here was a happy union between the scientific project of understanding the world, and the technological project of conquering it.

Somewhere in the early-to-mid 20th century, an occult sect definitively branched off the scientific mainstream, calling themselves “physicists.” Many of these physicists were rigorous scholars of Gnostic Christianity, seeking spiritual salvation through personal, mystical experiences of the Divine [13]. While the Greek word *physis* refers to the study of nature, the physicists primarily sought *gnosis* through elaborate mathematical manipulations, with no concern for their empirical content [14]. In the early days, the sought-after mystical states were induced by revisiting and refining the esoteric interpretations of Newton's mechanics introduced by early 18th and 19th century pioneers [15]. Skeptical of the profane character of pushing and movement, and looking to somehow harmonize their occult beliefs with the unsettling fact that you actually don't need complicated ideas to explain most things, they sought a mechanics which was maximally abstract and minimally intelligible [16].

The work of two giants from the history of science served as role models for the physics movement: Joseph-Louis Lagrange and William Rowan Hamilton. In the late 1700s, jealous of Newton's success and gripped by the Platonic delusion that the world was best apprehended by *Pure Thought* [17], Lagrange set out to answer the question: *how*

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<sup>1</sup>Newton was famously unable to figure out what happens when an unstoppable force collides with an immovable object. This is still an active area of research.

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*could the self-evident idea that causes precede effects be turned on its head, while simultaneously not introducing any new testable claims about dynamics?* Lagrange vigorously commenced work on this question, despite working part-time at his local vape shop [18]. After years of frustrated attempts to elevate Newton's laws to the astral plane, Lagrange was nearing the end of his patience—apparently, no amount of psychedelic trips could clear the channel to God the Almighty, who Lagrange knew held the answer to this vexing riddle [19]. Then, while spending a night in a Berlin holding cell as a result of an officer mistaking his ceremonial sage for another illicit substance, Lagrange entered a hypnotic state in which he heard the voice of God speaking to him directly: *You, Lagrange, hath sought answers in all the wrong places. You have mistaken Galileo's words about the Book of Nature—Nature speaks not in differential equations, but in stationary points of functionals. In particular, Nature seeks saddle points!*

Released from his cell with all charges dropped, Lagrange knew the answer to his question was very close, but one formidable obstacle remained: what the f\*\*\* was a saddle point? No one at the time had ever heard of this. Idly flipping through the Bible, despairing over a recent break-up, Lagrange came upon the following passage in Deuteronomy [20]:

Now what I am commanding you today is not too difficult for you or beyond your reach. It is not up in heaven, so that you have to ask, "Who will ascend into heaven to get it and proclaim it to us so we may obey it?" Nor is it beyond the sea, so that you have to ask, "Who will cross the sea to get it and proclaim it to us so we may obey it?" No, the word is very near you; it is in your mouth and in your heart so you may obey it.

Looking up from his desk, he saw his riding saddle: *The word is very near you.* A saddle point is just a point on a surface that looks like a saddle! It all became clear—not only could dynamics be non-local in time, Lagrange could additionally claim that all phenomena were Nature's attempt to locate saddle points of his infinite-dimensional functionals. "Newton is going to be so pissed," he thought. And so the seeds of modern physics were planted [21].

In the 1830s, Sir William Rowan Hamilton took important further steps in making mechanics impossible to understand. Among mainstream scientists, the Lagrangian formulation was met with a shrug. Most scientists preferred to think in terms of pushes and motion, as this accorded with millions of years of evolutionary intuition for interacting with the physical world. Hamilton was not one such scientist. He was enthused by the business of saddle points, but he did not think Lagrange had gone far enough. Growing up in a tumultuous household, very little made sense for Hamilton as a kid. Studying science brought a much-needed sense of order and predictability for the young Hamilton, which informed his choice to make science his livelihood. Unfortunately, psychoanalysis had yet to be invented, and Hamilton never learned how to transform his unconscious rage at his parents into a conscious excuse for his bad behavior [22]. He was thus all but forced to live out the patterns of his childhood in his work: the wounded inner child vowed to make mechanics just as confusing and irrational as his upbringing was.

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Alongside his adult psychological dysfunction, Hamilton was an early Western adopter of Zen Buddhism, and was fascinated by koans in particular. In 1830, Hamilton went into a full year of seclusion to meditate on the koan of Chao-chou's dog:

A monk asked Master Chao-chou, "Has a dog the Buddha Nature or not?" Chao-chou said, "Mu!"

His year of meditation paid off, as he emerged realizing he had no idea what Buddha Nature even was [23]. His Zen teachers rejoiced: *you have obtained enlightenment, Hamilton*. Despite Hamilton's protestations that this was not some sort of elevated state of not-knowing or non-duality, that in point of fact he *really did not know* what Buddha Nature was, he yielded to his teachers' praise, and acquiesced to the fact that new depths of confusion apparently counted as spiritual progress [24]. Emboldened by his accomplishment, he returned to his study of mechanics with a new zeal. Whatever Buddha Nature was, he knew that Lagrangian mechanics did not have it. First, while Lagrangian mechanics had done away with pushes, it still treated motion as the primary quantity. This was abhorrent to the obscurantist mechanic striving for spiritual purification. Second, the Lagrangian, defined as a difference between various forms of energy, was simply not abstract enough. Energy was still a more-or-less understandable concept, even if it did appear with differences rather than sums. Hamilton devised an ingenious mathematical trick to endow a function with Buddha Nature: the Legendre transform.<sup>2</sup> The Hamiltonian was thus defined as a Lagrangian with Buddha Nature, motion was no longer the only quantity of interest, and the size of the set of governing equations doubled. If Lagrange planted the seeds, Hamilton provided water and sunlight for the prickly shrub that would later become the physics movement.

Our purpose here has been to provide a brief history of the sub-field of New Age spirituality known today as physics. As is well documented, the 20th century saw an unprecedented emergence of physicists, and a coalescence of the modern physics ethos. Foreshadowed by the work of Lagrange and Hamilton, we propose the following injunctions as characteristic of the physics ethos:

1. Find every possible way of using complex numbers;
2. Do not distinguish between computational tricks and physical claims about the world;
3. Explain everything with maximally abstract mathematical entities, insist that Nature is nothing other than mathematics incarnate;
4. Despite the obvious empirical basis of science, proclaim that symmetry somehow specifies all natural laws, but never clarify what this means;
5. Leverage the fact that when people don't understand what you are saying they assume you are smart in order to weigh in on matters social and political on which you are not actually qualified to speak.

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<sup>2</sup>The fact that Hamilton named his transform with the French word for "legendary" foreshadows the eventual heights of his grandiosity, and ultimate spiritual collapse. In his later years, Hamilton spent nearly all the donations to his *sangha* on an expensive horse.

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We call these the “five tenets of the theology of physics.” In the following section, we provide examples of how physicists think about three elementary phenomena: forces, temperature, and magnetism. While space constraints forbid a thorough hermeneutical analysis of the physics literature, our examples illustrate the application of the theological tenets (primarily two and three) to real-world problems. In the concluding section, we sketch a practical antidote to the intellectual excesses of the physics movement, which, borrowing from Hofstadter [25], we call the “duckies and horsies” approach to science.

## 2 Thinking like a physicist: three case studies

### 2.1 Force



Figure 1: When you are run over by a car, you experience force. Image taken from [26].

Everyone knows what a force is. It is when one thing whacks into another. When stuff explodes. A force is a push. Anything that goes *bang*, *boom*, *blast*, *crunch*, *snap*, *crackle*, or *pop* is a force. For example, Figure 1 illustrates a force caused by a car rolling over a mannequin. This is the sort of hip, casual, I-don’t-take-myself-too-seriously kind of lingo that Newton would have recognized. Lagrangian mechanics—one of the physicists’ cherished perspectives on the world—does away with this sensible approach to forces in favor of abstract mathematical definitions. To understand the Lagrangian perspective, much in the way of bizarre theoretical machinery needs to be built up. First, we introduce “generalized coordinates”  $\mathbf{q} = [q_1, q_2, \dots, q_N]$  and the corresponding “generalized velocities”  $\dot{\mathbf{q}} = [\dot{q}_1, \dot{q}_2, \dots, \dot{q}_N]$ . What these are, we are not quite sure. The coordinates  $\mathbf{q}$  somehow specify the state of the system, but no one wants to come out and say how. For the physicist, this is a feature of the Lagrangian approach: a corollary to the second tenet is “whenever you could talk about a specific problem, instead talk about an abstract problem.” Following the generalized coordinates, we introduce the Lagrangian:

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$$\mathcal{L}(\mathbf{q}, \dot{\mathbf{q}}) = T(\mathbf{q}, \dot{\mathbf{q}}) - V(\mathbf{q}, \dot{\mathbf{q}}),$$

where  $T$  is the kinetic energy and  $V$  is the potential energy, both functions of the generalized coordinates and velocities. There are only so many forms that kinetic and potential energy take, but once again, we favor abstraction over clarity. Now, the dynamics of the system are governed by

$$\delta \int_0^T \mathcal{L}(\mathbf{q}, \dot{\mathbf{q}}) dt = 0,$$

where this equation is basically defined to mean “find  $\mathbf{q}(t)$  such that all small changes to it do not change the value of  $\int_0^T \mathcal{L} dt$ .” Pretending like  $\delta$  is an ordinary derivative, we obtain

$$\delta \int_0^T \mathcal{L}(\mathbf{q}, \dot{\mathbf{q}}) dt = \int_0^T \left( \frac{\partial \mathcal{L}}{\partial \mathbf{q}} \delta \mathbf{q} + \frac{\partial \mathcal{L}}{\partial \dot{\mathbf{q}}} \delta \dot{\mathbf{q}} \right) dt = 0.$$

Now, drawing on our powers of self-deception, we convince ourselves that it is not strange that an arbitrary final time  $T$  factors into the governing equation of the system, and that it is clear that  $\delta \mathbf{q}(0) = \delta \mathbf{q}(T) = 0$ . This allows us to integrate by parts and cancel boundary terms. Remembering that  $\delta \mathbf{q}$  is arbitrary, the only way for the integral to be zero is if the integrand is zero pointwise. Thus, we obtain

$$\frac{\partial}{\partial t} \left( \frac{\partial \mathcal{L}}{\partial \dot{\mathbf{q}}} \right) = \frac{\partial \mathcal{L}}{\partial \mathbf{q}}.$$

Obviously, because  $\partial \mathcal{L} / \partial \mathbf{q}$  is on the right-hand side of the equation, it must be a force. Previously, we thought a force was a push, but now, we have seen otherwise. Forces are actually gradients of the difference between kinetic and potential energies with respect to generalized coordinates. We have successfully taken mechanics to the astral plane.

## 2.2 Temperature

Though all examples we have discussed thus far pertain to classical mechanics, physicists have also infiltrated other fields. For example, in thermodynamics, the definition of temperature was once considered to be entirely self-evident. When it is winter and it snows, it is cold. When it is summer and you go swimming, it is hot. When you touch ice it is cold, and when you touch fire it is hot. These ideas are illustrated in Figure 2, where pre-physics thinking is used to say that a flaming mannequin has temperature. This trendy, commonsense, devil-may-care sort of reasoning is comfortable for all but the most devout physicists. Among them, a different understanding of temperature prevails. To see this, consider two systems that are put in thermal contact with one another. System A has energy  $E_A$  and system B has energy  $E_B$ . There is no energy exchange with the outside environment, so that the total energy is constant:

$$E_{\text{tot}} = E_A + E_B.$$

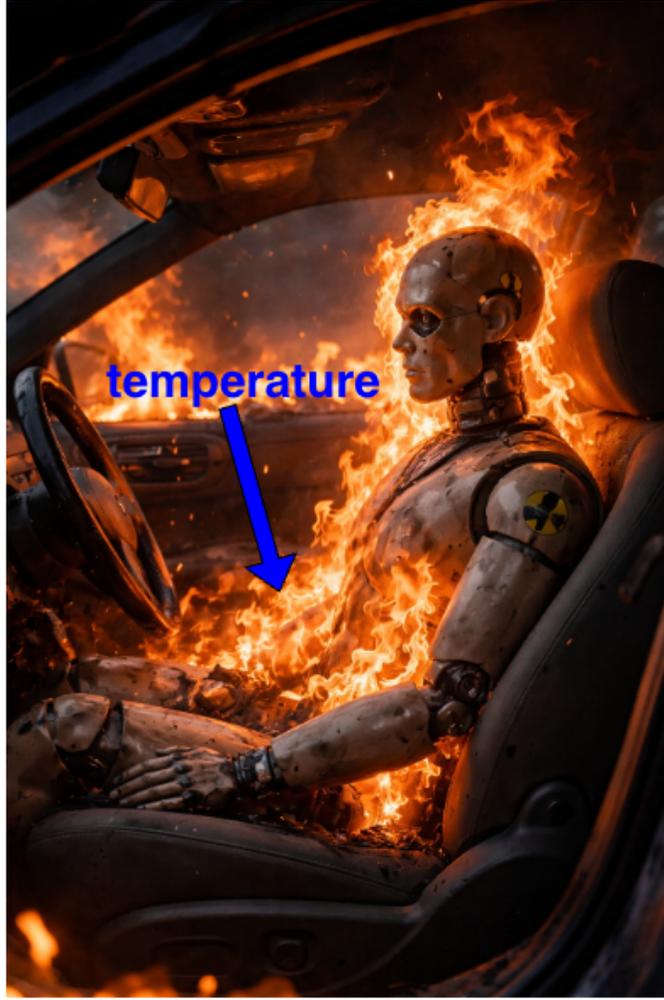


Figure 2: When you are on fire, you experience temperature. Image taken from the mind of the machine [27].

Now, we know that nature tends to a state of maximum entropy. What is entropy? It is the thing that nature tends to maximize. Naturally, entropy  $S$  is additive, so we can write the total entropy as the sum of the entropies of the two components of the system:

$$S_{\text{tot}} = S_A + S_B.$$

Nature can maximize the thing that it tends to maximize by moving energy around, so entropy must be a function of energy. Thus, we have  $S_A = S_A(E_A)$  and, using the fact that the total energy is constant,  $S_B = S_B(E_B) = S_B(E_{\text{tot}} - E_A)$ . The maximum entropy state is thus governed by

$$\frac{\partial S_{\text{tot}}}{\partial E_A} = \frac{\partial S_A}{\partial E_A} + \frac{\partial S_B}{\partial E_B} \frac{\partial}{\partial E_A} (E_{\text{tot}} - E_A) = \frac{\partial S_A}{\partial E_A} - \frac{\partial S_B}{\partial E_B} = 0.$$

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This shows that the energy derivatives of entropies of the two systems are equal at the maximum entropy state. What else becomes equal when you put two systems in contact with each other? Temperature! Thus, we define temperature as

$$\frac{1}{T} = \frac{\partial S_A}{\partial E_A} = \frac{\partial S_B}{\partial E_B},$$

where the  $1/T$  is thrown in order to make the definition even less obvious. The benefit of this approach to understanding temperature is that it uses no intuition about lived experience of the world, and relies entirely on the famously hard-to-grasp concept of entropy. With sufficient abstraction and mathematization, the elementary concepts of hot and cold can also be mapped to the astral plane.

### 2.3 Magnetism

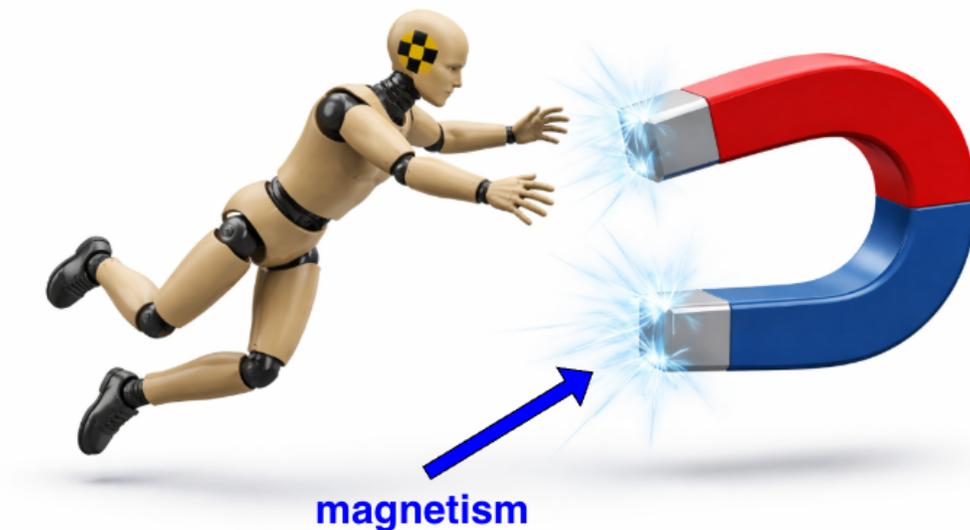


Figure 3: When you are attracted to a giant horseshoe magnet, you experience magnetism. Image taken from the mind of the machine [28].

Admittedly, not everyone has extensive first-hand experience with magnetism. Some amount of abstraction is thus inevitable in understanding this phenomenon. Maxwell was a pretty smart guy, and cooked up elaborate notation to hide the fact that electricity and magnetism are actually pretty complicated. The equations he came up with are:

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$$\begin{aligned}\nabla \cdot \mathbf{E} &= \rho / \epsilon_0, \\ \nabla \cdot \mathbf{B} &= 0, \\ \nabla \times \mathbf{E} &= -\frac{\partial \mathbf{B}}{\partial t}, \\ \nabla \times \mathbf{B} &= \mu_0 \left( \mathbf{J} + \epsilon_0 \frac{\partial \mathbf{E}}{\partial t} \right),\end{aligned}$$

where  $\mathbf{E}$  is the electric field,  $\mathbf{B}$  is the magnetic field,  $\rho$  is the charge density,  $\mathbf{J}$  is the current density, and  $\epsilon_0$  and  $\mu_0$  are empirical constants. Now, you might think that writing down equations and solving them are two independent tasks. This is how the majority of the scientific community thinks about partial differential equations. To the physicist, this is a profound mistake. Consider that the magnetic field has zero divergence. It is known from vector calculus that the divergence of a curl is zero. Thus, if we write  $\mathbf{B} = \nabla \times \mathbf{A}$ , where  $\mathbf{A}$  is some new vector field called the “vector potential,” we satisfy  $\nabla \cdot \mathbf{B} = 0$  by construction. This seems like a convenient step in the direction of solving Maxwell’s equations. However, we also know from vector calculus that the curl of a gradient is zero. This means that  $\mathbf{A}$  and  $\mathbf{A} + \nabla\chi$  produce the same magnetic field for any scalar function  $\chi$ . To most, this would be a minor nuisance, but to the physicist, this  $\chi$  field, which amounts to an integration constant in the definition of the vector potential, provides mystical insight into the inner-workings of Nature. In physics, gauge theory has emerged as an occult study of integration constants, with the hope of divining hidden structure from fields which have no empirical content [29]. In some physics circles, deep tribal affiliations have formed over which “gauge” to adopt, with both sides arguing that the vector potential is more fundamental than the magnetic field it is meant to compute. This is a particularly striking example of the second theological tenet from our list.

### 3 Conclusion: duckies and horsies

In this work, we have discussed the origins of what we call “physics” in the works of Joseph-Louis Lagrange and Sir William Rowan Hamilton, who refashioned Newtonian mechanics to reflect their own mystical ontologies. Building on these pioneers, the 20th century has seen a veritable explosion of physics research, from super-symmetric quantum chromodynamics [31, 32, 33] to renormalized covariant holographic information geometry [34, 35, 36]. Forgoing a review of this tremendously vast and esoteric literature, we posited five theological tenets of physics, and then showed how these tenets can be applied to elevate everyday phenomena to the astral plane. This elevation from the concrete to the mystical is, we posit, a hallmark of the physics movement.

Communicating with a physicist can be a very disorienting experience. You may leave the encounter thinking: *Do I really know what a force is? Maybe my understanding of temperature should involve entropy gradients? Was I mistaken to think that magnets were just bars of metal that attracted stuff?* In these moments, it is important to remain calm. At the Center for Computational Metaphysics, we are developing a strategy to counteract the vertiginous effects of physics, which we call the “duckies and horsies” method. Our method is illustrated in Figure 4. For the scientifically-educated

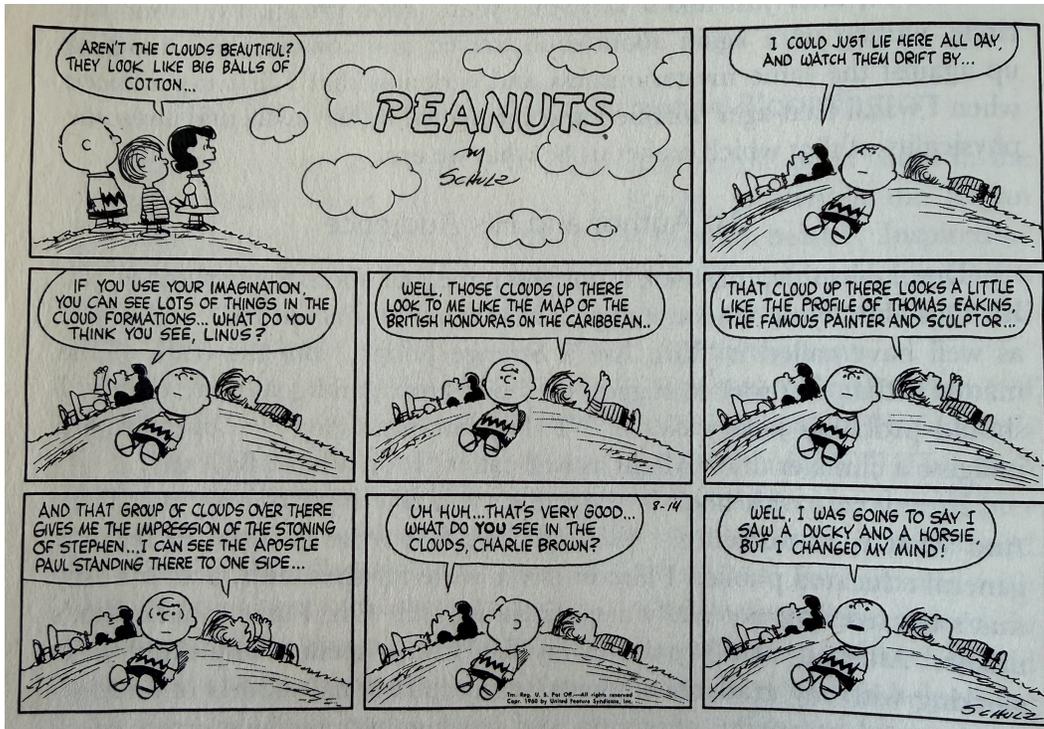


Figure 4: Renowned for his clarity, the philosopher Ludwig Wittgenstein once said: “What can be said at all can be said clearly” [30]. In the opinion of the author, the world is best understood as duckies and horsies.

individual with mystical tendencies, it may be tempting to read Lagrangians, entropies, and gauges into the fabric of reality. Take a deep breath, and focus on the ground beneath your feet. *There is nothing out there but duckies and horsies.*

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