What is Possible for Theoretical Physics?

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What is ultimately possible for physics? There are two divisions of physics. One is empirical physics. The professional experimental physicists can look forward to continuing their valuable discoveries in every nook and cranny of the universe. The second division is theoretical physics. Theoretical physics is the art of imagining substitutes for *cause*. We do not know what cause is. Even so, theoretical physicists have stepped forward to explain cause.

Mathematics leaves unanswered questions for which physicists offer educated guesses. That is the principle reason for the invention of theory. Should we trust the theoretical interpretations that physicists choose to place upon parts of the equations that model the patterns in empirical evidence? This essay discusses the role played by imagination in theoretical explanations for the nature of cause. In other words: Is it possible for theoretical physics to describe the nature of the universe?

Is it possible to discern the nature of the universe?

How much are we naturally capable of understanding about the nature of the universe? How do we put ourselves on the best path to learn the true nature of the universe? Do the ideas of theoretical physics, some strange and unintelligible, demonstrate that: Our ability to understand is limited by our current level of development of intelligence and our evolution within the confines of the earth?

We and the universe share fundamental properties. We are formed from particles that exist throughout the universe. We are nothing more than that which was potentially possible for our particles since the beginning of the universe. We are parts of the universe, and, our ability to understand it is given to us by it. Our particles receive information for which they have a natural ability to react.

We have this ability because the information coming to us is the same form of information used by our own particles. We communicate with the rest of the universe in the same manner that it communicates with us. This universal form of understanding has always existed fully. That is why the universe is orderly. Lack of understanding at

any point would cause disorder. This universal understanding gives us a natural talent to discern meaning from the information that the universe shares with us.

Is theoretical physics a path to physical truth?

Theoretical physics cannot explain natural truths to us until it is freed from the artificial limitations that have been imposed upon it by us. Increasing theoretical complexity extends the detrimental effects of these limitations. Three of these limitations are discussed here. They are:

(1) The unknown nature of cause.
(2) The acceptance of theoretical disunity.
(3) The mechanical ideology.

(1) The unknown nature of cause: We willingly proceed into the face of the unknown by inventing theoretical causes for changes of velocity. For example, consider this decision about foundational theory:

We experiment with objects that are undergoing changes of velocity. We mathematically model the patterns found in the data with the equation $f=ma$. The data consists only of measurements of distance and time. We do not know what force is or what resistance to force is. We deduce from the patterns that both of these properties exist. However, we cannot learn their natures from the data. We have only distance and time to work with.

We experience distance and time directly. We move across distances during periods of time. We do not, at this early stage, see a connection between the two. So far as we can tell, they are unique, fundamental, properties of the universe. At this point, they are the properties of communication with us.

We give distance and time names and adopt unique units of measurement for each of them. The units of distance are called meters, and, those of time are seconds. Their units cannot be defined in terms of pre-existing units. There are no pre-existing units at this beginning point. Therefore, distance and time are accepted as fundamental, indefinable properties.

Even though we do not know their natures, it is from them that we learn all else. What we observe from the experiments is acceleration, and, acceleration consists of ratios of distance with respect to time. We deduce that the experiments indicate four properties. They are: distance, time, force, and resistance to force. We see variations in the motion of objects; but, we deduce just these four properties.

We cannot determine from the evidence that force and resistance to force are fundamentally unique. They may be related to each other. They may even be related to

distance and/or time. In other words, unity may exist at this fundamental level. There may be a single cause that is manifesting itself in different ways. At this early stage of scientific learning, we cannot tell whether or not this is the case.

We decide to proceed into the unknown. We begin to theorize about the meaning of $f=ma$. There are different possibilities of choice. If we guess that the natures of force and resistance to force are fundamentally unique, then we must theorize into existence a unique nature for one of them. We give them names. One is called force, and, the other is called mass. We choose mass to be assigned an indefinable nature. By this act, it joins distance and time as indefinable properties. Force is then definable in terms of mass, distance and time.

So far, our act has consisted of words and ideas; the equation is not directly affected. Now though there has been created a need to invent a unit of measurement for mass. Its units cannot be defined in terms of pre-existing units anymore than could those of distance and time. Mass is assigned units of kilograms. There are now three indefinable units of measurement.

By this act, the theoretically invented uniqueness of mass becomes solidified into the equation. Force is assigned units of newtons which are definable in terms of kilograms, meters and seconds. The equation that began as an empirical mathematical expression has been *transformed* into part of a theory. From this point on, the equation becomes subservient to the ideas of the theory. That theory will infect itself into all higher level theory that makes use of this definition of mass.

What difference does this make? If unity exists at the fundamental level, we have not only missed the opportunity to discover it, but, we have introduced theoretical disunity into our analysis at its very beginning. Other workable interpretations are possible, even probable. When we learn what mass is, physics theory could change radically.[1]

(2) The expansion of theoretical disunity: Further experimentation reveals two distinctly different patterns in changes of velocities. We still do not know the nature of cause. However, the patterns are so very different that they appear to probably have two different fundamental causes. We move further into the face of the unknown. We continue to proceed as if fundamental unity does not exist. We theorize into existence two unique causes of force. One is called gravity. The other is called electric charge.

The complexity of theory begins to increase, and, so does our imagination. Our theory has added more fundamental disunity. The continuing invention of each new theoretical property representing a fundamental cause, or force, takes us further along the path of accepting, and, becoming subservient to theoretical disunity. What if the theory is based upon misunderstanding?

Misunderstanding results from breaking away from empirical knowledge and inventing theory to fill in for the unknowns of the universe. For example, a break away from empiricism is typified by the theory of *electric charge*. In the case of Coulomb's Law, it is a worthy contribution to our understanding of the operation of an unexplained phenomenon to write:

$$f = k\,\frac{q_1 q_2}{r^2}$$

It represents the discovery of new patterns in changes of velocity. The equation is empirical so long as k and q are admitted as representing unexplained qualities. Coulomb's Law becomes theoretical as soon as the theorist explains q as having a fundamental physical nature called *electric charge*. This act, which creates the need for another indefinable unit of measurement, causes a unique, theoretical quality to become rooted into the equation.

Historically, this occurred at a time when we knew only a small amount about the properties of this unexplained phenomenon and nothing about its cause. The risk is that disunity has been forced onto the fundamentals.[2] Disunity is evidence of error. A lack of unity between two theories is evidence that they may both be wrong. If either were correct, we should expect the correct one to extend naturally into the area of the other.

Consider this clue about possible fundamental unity. It is an anomalous equation that holds very closely:

$$h = keC$$

It says: Planck's constant numerically equals Boltzmann's constant times electron charge times the speed of light. There is no way to deduce from current theoretical physics that these constants have any chance at all of forming an equation. Their units just don't match.

Relativity theory is represented by the speed of light. Electromagnetic theory is represented by electron charge. Molecular mechanics is represented by Boltzmann's constant. Planck's constant represents quantum mechanics. The constants are very unusual numbers. They are not the simple kind where coincidence might have a chance to occur. The fact that they form an equation challenges the credibility of their theoretical interpretations.

(3) The mechanical ideology: I use the word mechanical to refer to the inanimate, unaware, purposeless forces of theoretical physics that have been substituted for the unknown nature of cause. Theoretical physics embraces the view that the fundamental nature of the universe is inanimate. Yet, we are here to observe that the universe

produces useful, meaningful accomplishments. The mechanical ideas of theoretical physics do not predict nor explain the emergence of life and intelligence. In other words, the predictive powers of theoretical physics have not and cannot predict the most important properties of the universe.

Scientific learning consists of the observation of life, intelligence, and the rest of the universe. However, in practice, theoretical physics moves out of the protection of empirical knowledge, and, invents natures for causes. Imaginative substitutes for the unknown may help us to keep our thoughts organized; however, scientific prudence suggests that we keep such risky, though educated, interpretations at arm's length if our goal is to learn about reality. *We need always to know what it is that we do not know.*

Theoretical physicists should not look at patterns in changes of velocity and then claim to learn the fundamental nature of anything else. For example, the physicist knows little about space and time other than that we make relative measurements within them. These measurements, using objects, do not capture either space or time. Neither space nor time is accessible to us for the purpose of handling them or experimenting on them.

The *t* in physics equations always represents periods of time as measured by physical activity. The rate of that activity is a function of the nature of its cause. Time is not that cause. The property of time remains separate from and inaccessible by both empirical and theoretical physics. So, experiments upon objects are incapable of proving theoretical ideas about space or time.

The measurements of distance in space and periods in time do indicate something important about space and time. It is that: Space and time are equally fundamental because the two of them are used in the formation of the information that we interpret as evidence for the existence of the outside world. Neither has ever been communicated to us without the other. They are both part of change, and, photonic information is about that change. Mechanically speaking, photons cause change of velocity; mathematically, it is defined as distance divided by time. Neither space nor time is communicated to us alone.

Our minds use the two of them, always together, to generate a visualization of the outside world. If information and intelligence were the only two properties in existence, the universe would continue to appear to be material. We would not be able to tell the difference. So, it is valid to believe in the physical reality of the universe. However, space and time remain the two properties from which we reach that conclusion.

The patterns observed in the measurements of distance and periods of time can point to the existence of other qualities, but cannot make known the fundamental physical nature of those qualities. What is known with empirical certainty, mechanically speaking,

is that there are objects in the universe that change their velocities and cause the velocities of others to also change. No one knows, by empirical means, why this occurs.

When the theorist introduces physical qualities that are not distance, time, force, or resistance to force; then, it is imagination based theory. Since those theoretical qualities cannot be proven to be real by empirical evidence, then the theorist's imaginings could be wrong. If they are wrong, we should anticipate theoretical disunity and oddity.

Despite the manipulation of mathematical expressions and the ongoing theoretical interpretations of them, *the unknown defiantly remains unknown*. When the unknown becomes believed to be known, we fall victim to false end points. Satisfaction with artificial answers slows or ends the search for real answers. Progress can become stymied in those directions. The major artificial answer offered us by theoretical physics is that the fundamental nature of the universe is mechanical.

There is empirical evidence that the nature of the universe is not mechanical. There is a property, currently interpreted mechanically, that demonstrates that the nature of the universe is not mechanical. That evidence is: We learn about the universe through the intermediaries of photons whether by sight, sound, or touch. We receive their information. What we have to work with is a storm of very finely chopped information. All else is deduced by us from that information.

Our conclusions about the meaning of that information are the foundation of scientific learning. What we know that exists for certain are information and intelligence. Intelligence and information are the two proven natural properties. Their use leads to conclusions about the existence of other properties such as energy and love. One is postulated. The other is clearly observed to be real.

It is evident from properties such as love that, photons deliver higher level *information* than simple changes of velocity. The information is very complex requiring highly skilled deciphering. We are centers of intelligence that perform that deciphering. Intelligence is the defining property of human life. To describe our reality in this manner may appear to question our physical nature. We may wonder how we can exist without the material base offered to us by theoretical physics.

Our material basis, as imagined by theoretical physicists, is called *matter*. However, their *theory of matter* idea does not scientifically matter. It tells us foremost about their belief system. It is theoretically hypothesized to be the source of cause. No one knows the source of cause. We do not even know what cause is let alone its source. It is arguable that there must be something there. Yes, but *something* does not automatically mean mechanical type material. Whatever it is, its function is to communicate information.

Look at the universe and yourself. In this act, the universe has communicated with you and you have communicated with yourself. You have received a multitudinous storm of almost random, always new, discontinuous, bits of information coming at you at the speed of light. You have the ability to comprehend meaning from that storm.

The use of intelligent communication may seem uncomfortable, and, the concept of force clearer. However, which is more reasonable to say about your response: First, that the universe exerted forces on you and parts of you changed their velocities; or second, that the universe communicated with you and you understood its meaning.

We are formed with the inherent ability to select patterns for their level of significance and seek out possible, appropriate meanings for those patterns. How do we know what patterns are? Why are we capable of assigning meaning to patterns? Mechanical theory is far too simple a viewpoint to account for these abilities. What are the fundamental causes for awareness and understanding?

Change is a part of all effects in the universe including the property of intelligence. However, change, when limited to the mechanical interpretation of theoretical physics, has no potential to produce anything more than additional changes of velocity. Mechanical interpretation is convenient for use in the equations of theoretical physics; but, its inadequacy is laid bare by the failure of those equations to tell us anything about awareness, intuition, and emotion.

If theoretical physics described reality, the universe would consist of inanimate objects bouncing around. Its apparent success relies upon its practice of making certain that its theory is restricted to interpreting equations that accurately model the empirical patterns in changes of velocity. It is the original empirical form of the equations that support all success of theoretical physics.

It is probable that the predictive power of the equations is greatest when they are viewed only as empirical equations without the limitations imposed by theoretical interpretations. Even then, the equations are inadequate to help us learn the nature of the universe. Mathematics is not the language of the universe. It is a tool for its mechanical interpretation.

Just as the mechanical functions became more complex, so did the properties of awareness and intellect. Our intelligence arose along with our increasingly complex assemblages of particles. Both evolved from potential complexity to realized complexity. Something amazing happened here on earth. Parts of the earth became us. All of our properties, both potential and realized, were passed on to us by the earth. They were given to the earth by the universe.

The full potential for every property that we have acquired has existed since the beginning of the universe. Our insignificant amount of matter did not change its nature when it became us. It existed for eons as part of the universe. It evolved to become individual centers of high intelligence. The universe produced parts of itself capable of comprehending itself.

We appear to be insignificant with regard to our share of material; but, we share the nature of the immense expanse. When viewed from the perspective of the properties of information and intelligence, we are, by far, the most significant parts of the universe. The universe realized its greatest success in us. In so far as the fundamental properties of intelligence are concerned, we are their highest realized success. We may even be their ultimate goal.

Conclusion: If theoretical physics does achieve a *theory-of-everything*, it will not be a theory of everything. It will be the unification of mechanical knowledge as defined by theoretical physics. When physicists defend their ideas about *natural* causes, they are defending their belief in mechanical type causes. When we look to nature for answers, we see that life and intelligence are natural. However, there is no probability function derived from mechanical type theory that offers any probability for their existence.

That which is imagined should at least make sense. Dumbness evolving into intelligence does not make sense. In order to raise the probability of life above zero, it is necessary to put mechanical theory aside and search for reasons why molecules acquire purpose. It is the purpose of our molecules to form recognizable life. It is a purpose of our molecules to cause human awareness.

There is a misstep that occurs so easily it can seem to make sense. Theoretical physics has postulated fundamental mechanical forces for the purpose of explaining why action in the universe occurs. Its perspective on the atomic and molecular scale is that electric charge is the most important property as the means for evolution of more complex assemblages of matter. It is known that life occurs at a higher level of complexity and intelligence is recognized as occurring at an even higher level.

The misstep occurs because we theoretically identify electric charge and its effects as the cause leading to the very complex effects that we recognize as intelligent life. The theoretical, mechanical idea called electric charge gains credit, by association, for the development of intelligent life. How about establishing a more logical connection by explaining the process of causation? If electric charge is the primary cause for the evolution of life, then it is something much more than the mechanical definition offered to us by fundamental physics theory.[2] Life involves more than mechanical activity.

The most important step to understanding the nature of the universe is to: Learn the reason for the existence of intelligence. Empirically speaking, we are the highest level of

intelligence. We are the greatest embodiment of the properties of life and intelligence. We should begin our investigation with ourselves. Then, we would be beginning at the beginning. Not the beginning of the universe; but rather, the beginning of understanding. Begin with our unexplained ability to assign meaning to photon data. We all share this fantastic, highly intelligent, ability.

The key to advancing scientific learning is to study the common interpretive ability of our collective intelligence. That is where the foundational properties of the universe can first be learned. Beginning there, we can try to trace our amazing properties of life and intelligence downward to the particles from which we are made, and, backward to the origin of the universe. Even particles, at their simple level, *know* about the existence of each other. That is why they react with one another. They are in communication with one another.

The potential for understanding the nature of the universe is contained within us. It might seem that since the universe came first, we should anticipate understanding ourselves after we understand the universe. However, it is by our innate intelligence that we are able to understand the universe. Therefore, paradoxically, we may anticipate that *we will understand the universe after we understand ourselves*.

The greatest property to understand about ourselves is free will. Human free will is the ultimate achievement of the universe. Mechanical ideology tries, theoretically, to rob us of this amazing property. That ideology contradicts what we observe to be the case. A return to empirical physics may help to clarify this conflict. It provides us with a key to learning about the nature of human free will.

Empirical physics has shown that we receive all information via photons. How do we discern meaning from their always changing formations flying to us at light-speed? Not only do we discern those meanings, but we intelligently adjust them enabling ourselves to view the universe in a more practical form. It is an important clue that we visualize things differently from the literal interpretation of photonic information.

We receive photon information, but, we interpret the universe differently from what is literally communicated to us. How is it possible for us to visualize the universe differently from the only information we have ever received about it? Any original, intelligent conclusion on our part demonstrates the pre-existence of the information necessary to form that conclusion.

Why can we visualize anything at all? For example, we do not see what is happening at a distance. Our reception of information is not experienced over distance. We only know about distance because we receive information that our intelligence interprets and uses to form a visualization of distance. We form the image of distance in our minds without

ever having experienced distance. The mind decides by its own inherent store of possible meanings, what it thinks the outside world is like.

Each individual photon is a very tiny sign that a nearly insignificant effect has occurred. The effect always involves change. That effect may or may not be related to effects signified by other photons. We absorb this mishmash of information about multitudinous effects and make sense of it. We have never seen that same data in that same form before. Our mind forms, by its own source of knowledge, a best guess concept of reality.

Our mind decides and selects which patterns are most significant. It superimposes continuity onto the selected data and draws an image of its conclusion. We anticipate properties that do not exist. For example, we anticipate *continuity* and *no change*. We experience discontinuity but invent continuity. To do this, we add information. That information is inherent within us. We experience change but invent no change. We have the ability to add unlearned information that fits neatly into learned information.

It is generally believed that learning comes through our senses. However, for patterns of information to be logical to us, the patterns and their possible meanings must already be in our possession. Both of these must be internally available for use before we can learn from even our very first experience with the outside world. Experiences must be anticipated by our minds or the signs signifying them can have no meaning. We are born with the ability to anticipate everything that we will ever learn about the universe.

We receive photonic information and think for ourselves about its possible meanings. Thinking is a process of multitudinous bit-by-bit discovery and best-fit evaluation of photonic information. The mind will even disregard good data in favor of what it expects to see. That is why optical illusions work. For example, lines that are definitely parallel will sometimes be visualized as being curved. Even when we know the answer is wrong, our mind continues to deliver it to us again and again.

Theoretical physics is not immune to the problems encountered by our minds when trying to understand reality. It is dependent upon choices and victimized by illusions. When professionally derived theory repeatedly dictates imaginary causes to our minds we become conditioned, similarly to experiencing optical illusions, to accept distorted concepts and images.

Theoretical physics should free itself from its mechanical ideology. It should correct its lack of fundamental unity, and, discard its odd, mathematically based, speculations. It should expand its ideas in favor of trying to learn the true, intelligence producing, fundamental properties of the universe. Otherwise, it risks reduced relevancy. Theoretical, mechanical illusions must ultimately give way to a study of the fundamental nature of intelligence.

1. Further development of this concept is available at: http://newphysicstheory.com.

2. For an example of reinterpreting electric charge, please see my essay entry *The Absoluteness of Time* in the first essay contest *The Nature of Time.*