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Phantoms in Science: Nietzsche's Nonobjectivity on Planck's Quanta

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Abstract

What does Maxwell Planck's concept of phantomness suggest about the epistemological basis of science and how might a Nietzschean critique reveal solution to the weaknesses revealed? With his solution to Kirchoff's equation, Maxwell Planck launched the paradigm of quantum physics. This same solution undermined much of current understandings of science versus pseudoscience. Using Nietzsche's perspectivism and other philosophical critiques, Planck's answer to blackbody radiation is used to highlight the troubles with phantom problems in science and how to try to direct science towards a more holistic and complete scientific approach.

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INTRODUCTION

The current understanding of science relies on stark contrasts between physics and metaphysics. Current science requires that there be science and pseudoscience to function. However, it is possible there is more of a blending of these two realms than has been previously thought under orthodox belief. The revolution brought about with Kuhn's work significantly changed the way science was viewed without changing the way it was practiced.

Now, in light of Copenhagen quantum physics, questions may once again be raised as to the validity of the growing distinction of science versus pseudoscience, and fact versus fiction, with the increasingly obvious nature of nonobjectivity. Specifically, reductionist science tends to refute ideas by establishing the necessity for certain truths of the reduced field. With this in mind, the quandary of quantum physics once again rears its head to provide a narrative, if not an exact answer, to this development in science.

Herein, the idea of phantom problems as established by Planck's work in quantum physics may be used to reasonably understand scientific functioning in the world of reductionist necessary truths. But, this alone provides an unclear picture without practical application. Therefore, Nietzsche, a thinker who developed perspectivism and ultimately pioneered nonobjectivity in the modern age, can be appropriated to better understand the picture painted by Planck's thoughts. This interpretation gives an account of science such that the question of what science is can perhaps be explicated. Moreover, this interpretation gives an accounting of that narrative such that it may require a drastic change in science's outlook to allow it to continue functioning with the same authoritative voice. Specifically, by exploring the concept of nonobjectivity in science and scientific exploration, the question of objective law will be exposed so as to interrogate the basis of science at its core and then re-establish it in a contemporary Nietzschean philosophical light to once again give the discipline meaning.

Philosophy and Science

To properly discuss the nature of science, and specifically its limitations and direct link to error, a brief understanding of the historical conception of science's ontological and epistemological foundations is necessary. Due to the semantic changes over the course of the past 3 centuries, this explanation will remain limited to a discussion of the two major branches that will play a role throughout the rest of the discussion and certain widespread theories, as a full study of even one thinker in the field could require a lifetime's work. Still, it is possible to encapsulate the general understanding without requiring intimate exploration of every thinker to date.

The timeline then may be represented from the beginning of so called “rational thought” (rationalism) to the current presupposed end point of postmodernism—though the claim will be made later that this end point is drastically misjudged. This timeline is best suggested by an exploration of rationalism, realism, positivism, negativism, postpostivism, and postmodernism. These modes of thought may seen to, in different ways, support either the naturalistic or humanistic perspective of science. Therefore, a discussion of naturalism and humanism in science is here given in brief to allow for a broader picture of the argument of objectivity and nonobjectivity.

Naturalism and Science

To put scientific theory into a naturalistic category, a working definition of scientific naturalism is necessary. Naturalism, in brief, is the presupposition that the world and the phenomena of the world can be explained by natural means and forces. This arose from early empiricism coupled with objectivism. Put simply, everything has observable natural components. To explain reality, it is these components that can and must be analyzed. Anything that is either unobservable or supranatural is in direct opposition to this theory.

This can be understood by Mounce's explanation of the difficulty of empirical perception versus natural causation (1999). Since, Mounce claims, the empiricist views reality by the senses, the natural causes determined are naturally determined largely by the senses (1999). Empiricism, the method by which naturalism can be determined, relies upon thought, which will resurface when Kantian anti-realism is discussed. Naturalism can then be thought of in two parts: strict scientific naturalism and sensational naturalism. The latter of these may be seen to be Griffin's minimal naturalism with modification, wherein the acceptance of the human aspect allows some uncertainty to enter into the natural world (2004).

Sensational naturalism, in this respect, concerns itself with natural explanations of unnatural observance. The supranatural are still outside the realms of exploration in this, but it is implicit that there may be occurrences which cannot be readily understood. These noumena of being still produce phenomena, but we may perceive only the phenomena and not the noumena. Sensational naturalism allows for, in some respect, a social dimension of science.

Strict naturalism however, may be seen in stark contrast to sensational naturalism. The strict naturalism, as shown by both Griffin (2004) and Farber (1968), is much more at odds with the supernatural. In the strictest of this tradition, it is not simply divine or otherworldly aspects that are called into question but the nature of the psychological and human elements of the system itself. Strict naturalism ignores the human dimension, instead focusing on the phenomena of the world as being explicitly understood in and of themselves. This can be seen in modern work by Michele, who spends some length defending against Kantian anti-realism (2013) to show that the properties of the world are themselves independent of human thought and understanding (2016). This strict naturalism, discounts sketpicism in its many forms to favor worldly understanding. In its absolute strictest form, even human interaction is denied as a factor of understanding. It is assumed herein, that strict naturalism can explain the world and its properties as is and that such properties are relatively unchanging compared to the great variability in the heretofore defined social dimension (that which contains the human, sociological, psychological, and otherwise empirically indescribable).

Humanism and Science

This may be contrasted against the humanist view. Naturalism, which is a byproduct of early enlightenment thought, holds that the natural world is easily explained in worldly ways. Humanism holds quite the opposite. Humanism may instead be understood as the position holding that much of what is understood is only understood conditionally. Or, more simply, that the social dimension more greatly impacts what we know, can know, and will know than the truth of reality.

In this view, humanism is a stark opposite to strict naturalism but holds some common ground with sensational naturalism. However, humanism, like naturalism, should be broken into two separate modes of thought.

A more liberal humanism holds that perceivable reality exists independently of the human aspect. This perceivable reality may or may not be what one believes it to be. Instead, the perceptions of it are simply that. These perceptions may be correct, but the truths one comes to know about an object are dependent on social dimension. This may be understood best through Kuhnian paradigmism (2015). It may also be demonstrated by the academic science demonstrated in Holster's work (2016). Thus, one may say, that liberal humanism holds that certain truths are more truthful or more valuable than other truths, and that objective truth is simply popular subjective truth.

A more strict humanism, however, would hold that truth itself is of human construction. All truth is subjective. This then gives reality over entirely to a social dimension. While this type of humanism will not be explored in depth in this work, it will be discussed peripherally to explain the responses by science against this. To use the example once again, Kantian anti-realism, which holds that we never perceive the noumena, would fall solidly into this categorization.

Of final remark to humanistic definition, one cannot escape the explanation and definition of categorization itself. Since categorization is itself a human endeavor, the simple act of categorization (and thus taxonomy as a whole) can only be understood as a humanistic pursuit. Thus, this work itself cannot avoid the humanistic categorization and that must be acknowledged upfront. In so far as categories are helpful, they are not of themselves reality. The act of categorization that has and will occur throughout this work are themselves a point of critique, which will be further discussed at the conclusion.

Basic Principles of Scientific Methodology

To first answer the question about the meaning of science and whether or not it is humanistic or naturalistic, however, it is first necessary to understand the idea of science. Then, a broader definition can be established such that the current understanding of objectivity in scientific pursuits can be properly explored. Unfortunately, contemporary understandings of science involve not a single idea but several foundational concepts and principles that underlie current scientific practice and thought. The inevitable conclusions of these precepts are inextricable from the foundation. Thus, a brief view and understanding of the core of modern science, in both a theoretical and practical sense, is necessary. To determine whether science may be considered historically humanistic, as Kuhn would suggest (2015), or naturalistic as proponents like Lakatos (1999), Luk (2015), or Laudan (1990) may believe, one must first distinguish between what is and “is not” science—and further between what practical daily science and theoretical science look like.

As has been previously discussed, Kuhn's humanistic theory choice suggests that science is largely about choosing between theories in such a way that scientists choose not the most rational but the most preferred theory (2015). In a broader sense, however, Kuhn implicates scientific rationality as a historical pursuit—that is to say, the past history of works and body of knowledge naturally impede rational choice such that what one knows and chooses to knows is a matter of the historicity of that knowledge. Thus, part of this section will be devoted to understanding the role historical works play into current methodology and further how the concept of a current scientific body of knowledge plays into methodological practice and theory.

Defining Science

The first important dichotomy that must be explored is science versus “not science”--or more commonly termed, pseudoscience. While the term pseudoscience shall be henceforth used to refer to anything outside the realm of currently considered orthodox or “true” science, this observer notes that the term pseudoscience has historical precedence that makes this distinction in itself contradictory. For the current, this term shall be used without prejudice to its historical connotations to refer to anything considered unscientific.

In this, then, one must first determine what is scientific. However, even for most philosophers, this is elusive. If science is an exploration of one's own natural world, what may adequately describe science? A common conception is that science is limited to simply what one can see and explore in a worldly sense. However, as demonstrated by Galileo's error in determining the cause of tides, many things one cannot see or explicitly experience are scientific—in this case the gravitational effect of the moon which at the time was unknown (Naylor, 2007). However, such error does demonstrate at least one element of the current conception of science, which is that science does refer first to universal models. This is to say that the aim of all scientific study is to produce a broad understanding of the order of the universe (Naylor, 2007).

Once again, however, this definition of science falls short. Many disciplines seek to explain the overarching structure of nature and its workings. Thus, even though true, this does not distinguish any better between science and pseudoscience. As such, stricter criteria must be met.

According to Jaffe, there are 3 criterion that make up modern science: (1 logic and logical explanation, (2 it is “based solely on the production of rational constructs”, and (3 theories are falsifiable (2010). This stands in contrast to earlier theories of science which instead stated that theories must be “verifiable”, which is to say that evidence may be made for such theories. In response to critique by Karl Popper, verifiability was largely replaced by falsifiability—the role verifiability plays into science despite its definitional exclusion will be explored later (Popper, 1959).

According to Mitchell, science is much stricter. Whereas Jaffe's criteria leave room for generalist theories to remain scientific, Mitchell gives a stronger picture. Scientific laws’ generality, according to Mitchell, while applicable to science, is distinguished in this way: science is not simply a restatement of the general truths regarding the universe but rather an explanation of those truths in some degree (Mitchell, 2000). Specifically, Mitchell brings science further from humanism towards the practical and pragmatic (Mitchell, 1997). Science describes and proscribes the expected range of events resulting from certain phenomena (Mitchell, 2000). Mitchell's definition once again includes universality, but tightens science to being about the experiential and bringing the universal into what Jaffe's referred to as a rational construct (Mitchell, 2000). Whereas Jaffe suggests some constructs beyond human limits of understanding (Jaffe, 2010), Mitchell's definition of science suggests that true science requires that the construct bring phenomena into a more explicit finite comprehension (Mitchell, 2000).

Bunge suggests there are different kinds and criteria for science. Some science, nomological law, reflect classed patterns of events without provisional regard. Meanwhile, predictive statements are a form of science that suggests a future outcome without regard to actual empirical accuracy (1961). This separation of criteria diverges greatly from other suggested forms of science. Moreover, its set of criteria are based largely upon the goal. This definition of science includes many classes of exploration specifically excluded from either Jaffe's or Mitchell's definitions.

In searching to understand a difference between philosophy of science and education science in the position on the nature of science, Alters explored many differing sets of opinions of the nature of science. Answers varied from object realism to object anti-realism, from curiosity and openness to rigid prescription of exploration, from historical to independent, from defined by the body of knowledge to defined by external factors. Indeed, it seems that this inconsistency suggests no formal basis for science (1997).

However, in response to Alters, Eflins et al produced a list of consensus and dissensus areas (1999). The specifics are not quite so important, as consensus is used here to determine what science is—i.e., no overarching definition but the practices of individuals—and so only a general accounting of public belief is given. The importance of this list, instead, refers to a major distinction that separates science from other areas: it is based upon the general agreement of those within the field (Eflin et al., 1999). Thus, science may be best understood by the body of knowledge that has been generally agreed upon as science. This is, in itself, a Kuhnian principle—that is to say, herein, science already adheres to Kuhn's social theory of science (Kuhn, 2015). However, for a moment, the social element of science will be considered separately from the body of knowledge itself. This is to say, for the sake of the scientific argument and consideration, the human element will be considered as extricable from the body of knowledge and scientific understanding will be considered as external (that is, innate to the world itself). Therefore, science can be understood by the agreed distinctions between common held understandings of what is and is not.

The New Criteria for Science: Science vs. Pseudoscience

Evidently, determining criteria for science is difficult at best, and clearly outside of consensus. This is because such a definition requires a somewhat circular reasoning. To determine what is scientific, one must first establish what science is and is not. To determine what science is, one must have a firm understanding of what is scientific. However, it is perhaps simpler to work from the negative. Instead of defining science in terms of what it is, it may be easier to understand from what it is not, as this is held in better agreement.

So what is not scientific? Thagard gives a fair summary when he attacks the pseudoscience of astrology (1978). Here, he gives three criteria that demarcate pseudoscience from science. First is theory. Theory, here, refers to having a structural and predictive model. While Thagard is concerned with Popper's falsifiability, he also makes the claim that falsifiability itself is not strictly scientific. Instead, he refers to Popper's own claims to show that falsifiability (1 can be achieved by continuous modification of the theory, (2 only occurs when a theory is positively replaced by another sound theory, and (3 is based upon subjective heuristic. As such, theory in science simply means that a suggested knowledge can indeed claim to explain a phenomenon (1978).

Second, is community. Community refers to consistency of belief of the advocates of the theory. This is to say, community is the body of knowledge surrounding the topic pointed towards creating and holding a consistent theory. Moreover, the community is aimed at reducing anomalies through further explication upon the theory. Thagard suggests that, if the community is not consistent in belief with no intention of reducing anomaly, the theory is pseudoscientific. This has issues itself. For example, many scientific theories have not held up to this criterion. However, this is further explained by Thagard's third criteria: historical context (1978).

Building off Kuhn, Thagard creates two definitions of historical context by which science and pseudoscience may be considered: whether the theory has “faced anomalies over a long period of time” (227) and the extent to which alternate theories have challenged it. This leads to

Thagard's theory of progressiveness as it relates to pseudoscience. Progressiveness is the theory's historical ability to add to itself to defend against both alternate theories and natural anomalies. Thus,

"A theory or discipline which purports to be scientific is pseudoscientific if and only if:

1) it has been less progressive than alternative theories over a long period of time, and faces many unsolved problems; but
2) the community of practitioners makes little attempt to develop the theory towards solutions of the problems, shows no concern for attempts to evaluate the theory in relation to others, and is selective in considering confirmations and disconfirmations. " (1978, 228).

Thagard specifically delineates between nonprogressively scientific and pseudoscientific moreover; pseudoscience must be less progressive than alternatives whereas nonprogressive theories can be scientific so long as no alternates are more progressive. Therefore, pseudoscience can, in this way, be well distinguished from science.

Using this definition of pseudoscience, an approach to defining science is made simpler. Science is simply when one or both of these criteria is not met. That, however, continues to leave a large degree of uncertainty. After all, this allows for strictly untrue theories to be science. Thus, Galileo's explanation of the tides, as referenced before, despite being proven wrong remains scientific within its historical context but is pseudoscientific now. Similarly, certain concepts which are scientific at current may progress in the near future to be pseudoscientific. This unfortunately poses an issue methodologically speaking. How do we test for science? As our ability to test or explore improves, science that was once true may become untrue and thereby pseudoscientific. From a body of knowledge, this means that science must constantly be retested. And, if a seminal work proves to be pseudoscientific, due to the historical precedent of science, a whole field could in theory become pseudoscientific. However, is this within scientific conception? Once again, this issue shall be explored further in this section. For now, let the working definition of science hold as a way to explore current understanding of methodology.

Orthodox Science

It can therefore be seen that from an orthodox lens, science is at least naturalistic. Thagard's definition, as well as all presented other attempts to define science, points towards general conceptions of science supporting naturalistic reality. This is to say, science is aimed at providing facts about a factual world. In short, naturalism here can be replaced with objectivity, and thus the question of naturalism versus humanism becomes only about the individual human elements within science, and not about the pursuit as a whole.

This establishes the basis set of ideas for what is orthodox science within the scope of this work. From hereforth, it shall be suggested that science is believed to be an objective pursuit of naturalistic focus, though there may be some humanistic elements incorporated. It shall also be held that Thagard's definition of pseudoscience works within this framework and context.

Planck and Nietzsche

To interrogate this designation of science, and specifically to look at the way in which this orthodox definition may be obsoleted without our knowing it, some amount of science must be used. For this then it is important to choose a seminal scientist. From there, the work can be explored, and, using a proper philosophical model, the importance of the work can be deduced as it relates to orthodox practice and definition.

Planck

Maxwell Planck was a German-born physicist of the early 20th century. He did major work in the field of research as well as university lectures. He is most well known for the development of quanta of energy, and his seminal work "On the Law of Distribution of Energy in the Normal Spectrum" forever changed the face of physics. For this work, he won the Nobel Prize in Physics in 1919. This publication shifts the paradigm from classical mechanics to quantum physics by reanalyzing blackbody radiation to develop an equation that fits. This equation would come to be known as Planck's Law.

Planck is also known for his philosophical quandaries in physics. Some of these are not well known, while others are more widely read. One of the lesser known topics is phantomness, which covers the idea of unexplorable ideas in science. This concept of phantomness includes those problems that are largely considered pseudoscientific, as well as certain others considered scientific. Phantomness within the quantum scientific narrative may therefore be important to unraveling the distinction between science and pseudoscience and being able to finally put to rest how objective or nonobjective science truly may be.

The Problem of Blackbody Radiation

The problem with which Planck was presented that led to the example provided below, Planck's Radiation Law, is that of blackbody radiation. A blackbody is a term that is used to refer to an object with the capability to perfectly absorb electromagnetic radiation, no matter angle of incidence or wavelength. Thus, a blackbody is a perfect absorber for light.

The blackbody itself does not present a problem. However, in the years preceding Planck, experiments were conducted involving the specific absorption and emission of electromagnetic radiation. As used here, emission refers to blackbody radiation. Blackbody radiation occurs when a body at a given temperature emets specific wavelengths. This is true regardless of the shape or composition. Instead, it was discovered the wavelengths emitted are determined by temperature alone.

The specific relationship between spectral emission and temperature, unknown to many, was referred to as Kirchoff's equation. The determination of it was believed to be of extreme importance to understanding light and specifically spectral density. If one could solve Kirchoff's Law, the problem of light would be presumably solved. At this time, light was believed to be a wave (though there were still some arguments about whether it was wave or particle). As such, classical understandings of waves were largely believed to be the solutions to Kirchoff's equation.

There is a problem. In classical mechanics, the energy of a wave is related to the square of its amplitude. In other words, when heated, the amplitude, that is, intensity, of the light should change, but not the wavelengths. Observation showed instead that heating a blackbody caused a displacement in the wavelengths emitted (according with Wien's Displacement Law discussed later).

Because classical mechanics was scientific truth, there were certain assumptions that had to be taken by almost all models to attempt to solve this problem. First, energy for a wave was known to be continuous, not discrete. This simply means that the scientific belief was that there was a continuous energy spectrum on waves representing the different observed spectra, and that there were not discrete energy levels (for this would produce stepwise spectra). This was consistent with other classical findings. It was also known that discrete energy levels would lead to continuous emission of light and decaying of the atom. Otherwise, it was suspected (by Boltzmann and Wien) that the Law of Conservation of Energy would have to be provisional and thus not a universal truth. Thus, it was believed law of conservation of energy may not be true with blackbody radiation. Finally, it was believed that, consistent with classical mechanics, energy was emitted continuously and tended towards infinity.

As will be demonstrated in detail later, these would all prove to be untrue (or at least, fatal to accurate models). However, this set the stage for Planck. What was the relationship between spectral density, wavelength, and temperature; and what sort of equation could be created consistent with classical mechanics?

Nietzsche

Friedrich Nietzsche was a German-born modern philosopher who predated Planck by some time. His works covered a vast array of philosophical topics. He is most well known for his philosophy of health and for his critiques of various rational philosophies. He is perhaps most well known for his concepts of genealogy and for his invention of perspectivism. Nietzsche is also well known for his concepts of nonobjectivity, or rather the lack of facticity. In all this is a sense of the same sorts of problems as those posed by quantum science, and as such, Nietzsche provides a strong foundation for interpreting the results of Planck.

PLANCK AND PHANTOM PROBLEMS

The case both for and against the current and seemingly orthodox—discussed in brief above—understanding of scientific epistemology shall be made now using a specific and seminal example, to understand the role current orthodox assumptions play or fail to play shifting scientific paradigms and thought. This critique of science and objectivity may reveal the possible validity of some critiques, especially from the Nietzschean school of thought.

Though many examples exist, Maxwell Planck's work with light and electrons shall be discussed as it relates to methodological underpinnings of scientific discovery. Due to his major role in shifting the paradigm of classical physics directly into the quantum realm along with several of his contemporaries, he serves as an important example into the way current methodology does or does not fit beliefs about scientific process. His discoveries paved the way for truly new and revolutionary ideas, some of which changed not only science but the philosophy of science. Therefore, some of Planck's philosophical views of science, its limitations, and its role in discovery is first tangentially necessary before a full accounting of the actual experimentation.

Planck's Phantom Problems

Types of Phantoms

In his recorded lectures, Planck described to his students what he calls a "phantom problem of science" (Planck, 1949, p. 54). As the quantum physicist will note, his description of phantom problems fits strongly with Schrodinger's probabilistic duality and superposition of states. This phantom problem informs Planck's description of scientific inquiry and the importance of both scientific method and discovery.

So what is this phantom problem? For Planck there are three types of phantomness. The first occur when the underlying assumptions are immediately erroneous. This includes any problems in which the apparatus to explore such problems requires immaterial or impossible method(s). The examples Planck provides are perpetual motion and radioactive transmutation of elements, though this includes problems that become unexplorable as a result of changing science, such as the issue of ether, which became unexplorable once ether was disproven. But, Planck notes that meaning may be returned as new science develops (Planck, 1949, p. 54-57). Consequently, this form of phantom problem, in line with the definition of science previously discussed, retains historicity as a major component, but allows for a degree of flexibility for circular historicity that has not yet been introduced in discussion of orthodox science. This piquing, degradation, and repiquing of scientific interest, meaning, and the potential reality of phantom problems is strikingly apt for understanding the issue of light, which requires constant reevaluation, and burying, and revitalizing old and new theories. This will be returned to in short when Planck's relation to Bohr is discussed.

The second type of phantom problem exists when vagueness prevents a precise answer. For orthodox science, this will seem intuitive, but will require further dissection when actual study is discussed later. This type of problem evolves as the discussion of study evolves in relation to practical science. Momentarily, let this be understood as the type of problem that arises when asked whether phenomenon A is more normal than phenomenon B, such that the requirements of answering the question rely on the conditions in A and B and phenomenon AB (probabilistic duality) before being able to determine the probability or normality of A or B within the system. Though not referred to in this way by Planck, this may be described as the phantom problem of the probabilistic system AB which requires predetermination before either A or B's nature can be established within the system, such that either A or B becomes an acceptable or unacceptable answer as a result of ambiguity in the system. This admittedly vauge definition, can be applied to the situation of the famed Schrodinger's cat, wherein the cat must be both and neither due to lacking determinate knowledge of the system. Superposition is, within this frame, a subset of the second type of phantomness (Planck, 1949, p. 54-57).

The third type of phantom problem exists when two or more answers are equally valid, or two answers in a dichotomous system are equally invalid, depending on the viewpoint and methods of testing for the problem. The greatest example, the one which will be discussed in greatest detail below, is that of light and of wave/particle duality. In his lectures, Planck describes the electron wave-particle duality here and the issue of Newtonian emission theory versus Huygen's wave theory. This is, as Planck says, the sort of problem where the viewpoint matters and the results one receives are a consequence of the methods one employed (1949, p. 57-59).

Phantom Problems from a Nietzschean Perspective

Those familiar with Nietzsche will be quick to note the similarity between these types of phantom problems and several of his critiques of science and objectivity. Evidently obvious in the first type of phantom problem is Nietzsche's theory of eternal recurrence, wherein the past is doomed to play out again and again in the present. While one would not suggest that exact recurrence is implicit in Planck, it is clear that historical precedent must be questioned, examined, requestioned, and re-examined throughout time due to the revival of phantom problems in new and sometimes non-phantom lenses. What this means for science will be demonstrated as example problems are discussed, with specific note to Nietzschean experience and theory (Nietzsche, 1974, *The Gay Science*, §341).

These second and third types of phantom problems are also open to a Nietzschean critique of practical science, specifically his discussion of facts and interpretation. As Nietzsche says, "There are no facts, only interpretations...even that is interpretation" (Nietzsche, 1886-87, *Nachlass*, 7 (§60)). Consistent with these phantom problems, Nietzsche suggests the response of a system is necessarily part of the interpretation, not fact of the system. How this applies to Schrodingerian probabilistic systems[1] and Planck will be clearly evident, however, when one considers the necessary interpretation of the answer(s) following method. Answers are in no way a definite result preceding interpretation into method.

In so far as the third type of phantom problem, Nietzsche has the following to say,

> "In so far as the word 'knowledge' has any meaning, the world is knowable; but it is *interpretable* otherwise, it has no meaning behind it, but countless meanings.— 'Perspectivism.' It is our needs that interpret the world; our drives and their For and Against. Every drive is a kind of lust to rule; each one has its perspective that it would like to compel all the other drives to accept as a norm."
>
> —*The Will to Power,* Book III §481

While this may move beyond Planck's own understanding of the phantoms problems, it nonetheless serves as a more precise definition of those problems.

[1] This applies possibly only to the Copenhagen interpretation, which differs from other interpretations by saying that the observer causes collapse of the wavefunction to allow objective measurement. This objective measurement does not exist within this interpretation before observation. However, other interpretations do exist which may not comport with this understanding.

Consider, for the moment, the example provided by Planck of emission versus wave theory. The acceptance of either theory is, according to Planck, largely a matter of priority. And, more importantly, the facts and observations depend entirely on the point of view with which the problem is approached. If a classical model is accepted, surely one method, apparatus, and analysis will be preferred, while a quantum physicist will potentially use separate method, apparatus, and analysis. This may not seem an issue, but when considering the seeming absolute nature of scientific method, this poses a great issue, especially in the face of what seems to be a contradictory dichotomy.

One may be prone to a classical understanding of Planck's physics that "in no single instance is it possible accurately to predict a physical event" (1936, *The Philosophy of Physics*, p. 46). It is the case that there is always some amount of uncertainty in measurement. This is the impossibility of causality, which Planck terms "world image" of symbols which comprises physics (51). This too evokes Nietzsche's images of the world which claims we must always interact with symbols, as opposed to discovering true noumena. So says Nietzsche, "There are no moral phenomenon at all, but only a moral interpretation of phenomena" (Nietzsche, 1886, *Beyond Good and Evil*, §108) for "as soon as a philosophy begins to believe in itself [, it] always creates a world in its own image" (Nietzsche, 1886, *Beyond Good and Evil,* §9).

The third type of phantom problem for Planck depends upon the multiple interpretations of results, in turn depending on the status of objects and their relation to each other., that is science, of giving these images meaning. Since the results depend largely on perspective according to Planck, the image itself is but a shadow of our own image. Thus, the problem of light, and its status as wave versus particle, is philosophically predeterminate according to our own interpretations. From the perspective of Nietzsche's knowledge, this is an issue of interpretation (problem of predictability). When we, as scientists, interact with the images of the world—in this case the behavior of light as particle or wave—our results, perspectives, and resulting interpretations happily respond in a way that comports with those images, if possible.

The Meaningfulness of Phantom Problems

Planck is quick to point out that the weight of a phantom problem is not in its phantomness, but its meaningfulness as a problem (1949, 57-58). The phantom problem may be just as meaningful, even more so, than the nonphantom problem. This stipulation then suggests that the meaningfulness of a problem as a whole is unrelated to its practicality, its necessity as a problem, or its naturalistic reality. However, the phantom problem, within Planck's framework, has potential outside of these definitions. This is especially so in consideration as scientific, the difference between science and nonscience.

Take, for example, the electron as wave versus particle as cited by Planck. Within a context of late 19th century thought, the practicality of such a problem was virtual at best. The naturalistic reality of this problem was and is better understood today to be nigh indeterminate. Certainly it was not, at the time, necessary (though the debate on such claims still linger). Despite this, the behavior of such a particle is of such incredible meaningfulness to science that even the defunct theories of the electron and atomic structure persist in modern textbooks as important guides. But, was the electron a phantom particle? Though Planck explicitly names this duality part of a phantom problem of the second and third type, to the modern eye the phantomness may not appear as clear. If considered within original classical contexts, the modern particle answer to light is preposterous. If considered within modern insights, the classical wave truths become an entanglement. When considered within the quantum framework, the wave-particle duality is even more insane. What Planck's law comes to show is the strange nature of the electron's (or photon's) existence, before and after exact observation (Planck, 1901).

Simply put, an electron or a photon, due to probability fields, must be considered as existing in wave form before observation as a particle, in order to adequately fit with spectral density and radioactive emission (Planck, 1967). This means that the simple act of determining in itself changes the electron's physical nature. Or, put another way, the electron's physical nature is indeterminate until observed. This is a quite real Copenhagen interpretation paradox.

This demonstrates clearly the second type of problem. Determining the nature of an electron as a particle or a wave first requires determining the answer within context of the system. AB is indeterminate from either A or B without proper constraint. The particle behavior of the electron can only be examined within contexts of a particle framework or apparatus. And yet, it is known that the wave nature of the electron must be respected to be able to examine those particle behaviors. Apart from this, methodology will not answer the question—or rather, the data gathered will be unable to satisfactorily explain the behavior because the apparatus must be designed to account for the additive behaviors of the dual-nature.

It similarly demonstrates the third type of phantom problem. To even adequately measure this problem or develop a method to analyze it, a particular paradigm must first be adopted. Measuring any part of the dual nature requires inherently that a nature be adopted as the baseline. This extends from formerly discussed Popperian postpositivist thought; if science is going to disprove, there must be a null thesis against which this disproof is measured. Thus, one thesis or in this case one paradigm), must be established as the measurer of accuracy. In itself, this implies establishing the rules by which the target, the electron, is expected or required to behave within context of the baseline assumption. Thus the answer is presupposed.

In his *Gay Science*, Nietzsche comments, “We hear only those questions for which we are in a position to find answers” (Nietzsche, 1974). Plank, it seems, would agree strongly. Phantom problems of the type just discussed require having an answer or insight, at the very least to the systematic approach, and thus a determinate answer is impossible or, at least, multiple, valid, determinate answers may exist, depending on approach and how the question is heard.

In orthodox science, unscientific questions may be meaningful but not valuable as a scientific question. For example, the question of God is meaningful to a scientist, however, of no theoretical scientific value, within orthodox conceptions of science. Using this same distinction between principally meaningful (as God) and scientifically meaningful (as an observable natural phenomena), the question of the meaningfulness of phantom problems can be properly explored. Though these underlying assumptions about scientific lines of question may be grossly inaccurate and require reworking, this framework will be used to evaluate Planck’s phantom problems within an orthodox bent.

For instance, the electron wave-particle duality, a phantom problem as demonstrated above, meets requirements for scientific questioning. The nature of the electron is testable. The nature of the electron is falsifiable, as a dichotomous matter. It is verifiable, repeatable, and observable. From a simple orthodox lens, there is scientific meaning behind this phantom problem, which allows for the consideration of other phantom problems on a case-by-case basis.

But, is there practical meaningfulness behind these types of problems? As demonstrated by Planck’s example of the determination of the true “right wall”[2], some phantom problems,

[2] The problem Planck gives in his lecture. This talks about the problem of determining whether a given wall of the lecture hall is the true right or left wall of the room. When first introduced, it is talked about as a meaningless problem, for what does it matter, even if an absolute, objective “right wall” can be determined without perspective problems impinging. However, Planck continues then to allude to the issue of right-handed and left-

while scientifically sound, are not practically meaningful. Whether a wall is right or left when physical context can change is not meaningful. However, this same problem applied to chemistry, where the right and left matter greatly, is of highest meaning (Planck, 1949, 58). Within this context, one may say generally that phantom problems can be meaningful.

They may be meaningful in one context and lose meaning in another. They may have meaning only within the context of the framework from which they are examined. Returning once more to the example of the ether, tests regarding the drag of the earth through the ether were meaningful, though phantom, when the ether was the popular paradigm, but such tests are no longer meaningful now that the ether is considered defunct as a theory. If recast into terms compatible with the vacuum paradigm, such a test may then once again (and is currently in Pilot wave theory) regain meaning while maintaining its phantom nature.

In light of this, one may believe that phantom problems are not meaningful. However, it is exactly these types of problems that result in greatest scientific change. Phantom problems are incredibly meaningful. If they are scientific and meaningful, however, how is it that they do not fit with scientific methodology?

Planck's Law and Phantomness

Planck's Radiation Law

Coming then to experimental anecdote to exemplify the methodology that is being employed by Planck, one must examine his law of thermal radiation. Planck's Law was a response to early attempts to solve the issue of blackbody radiation. A brief history is given here.

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handed molecules, wherein the state of "true right" or "true left", which has not changed in abstraction from the classroom example, becomes of apical rather that the formerly semantic importance to the chemist as right-handed and left-handed molecules exhibit different properties and different biological ability.

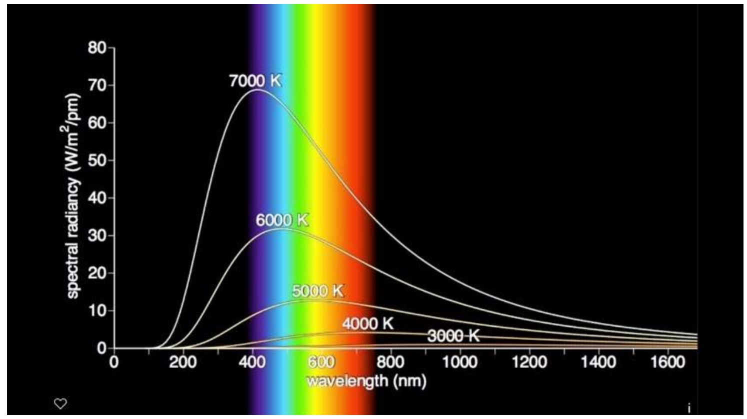

Figure 1 Displayed above is a public domain image representing the relationship between temperature of a body, spectral radiance, and wavelengths emitted. As show, emission moves towards violet as temperature is increased.

Blackbody radiation had been historically understood by physics as early as the 1800s. It was known that the blackbody was a perfect absorber and emitter of light. In the 19^{th} century Kirchoff discovered that spectral density of black bodies depended only on the frequency of the radiation and the temperature of the blackbody (Figure 1). This showed that spectral density was a natural characteristic of a given blackbody and natural to that radiation (Baggot, 4-24).

The shifts in wavelengths based upon temperature however was unpredicted. This launched a generation of classical physicists to explore this problem (Baggot, 4-24). There were several developed theories, but for simplicity, two are presented here to illustrate the issues brought about by the classical approach. One of the competing theories was Wien's Law, which was developed from experimental data. Wien, using the data of blackbodies, determined an equation as shown below:

$$p(v,T) = \frac{8\pi h v^3}{c^3}\, e^{-\frac{hv}{kT}}$$ (Baggot 294)

This equation accurately predicts spectral density at shorter wavelengths, but fails at longer wavelengths, from which a clear divergence can be seen.

Meanwhile, another leading theory, the Rayleigh-Jeans Law (represented below), similarly approximated spectral density.

$$p(v,T) = \frac{8\pi v^2 kT}{c^3}$$ (Baggot, 294)

It used logical deductions from classical physics to suggest that energy is continuously emitted and that energy emitted tended to infinity with increasing frequency. In brief, the failings of this particular theory can be summarized simply by showing the divergence of spectral density within shorter wavelengths. Due to the tendency towards infinity, this approximation resulted in what came to be called the ‘ultraviolet catastrophe”; while the approximation for longer wavelengths was fairly accurate, the approximation in shorter wavelengths (seen especially in the ultraviolet range from which the maximum peak emission was expected under a classical model) was catastrophically inaccurate (Baggot, 4-24). See Figure 4 for comparisons of the varying models.

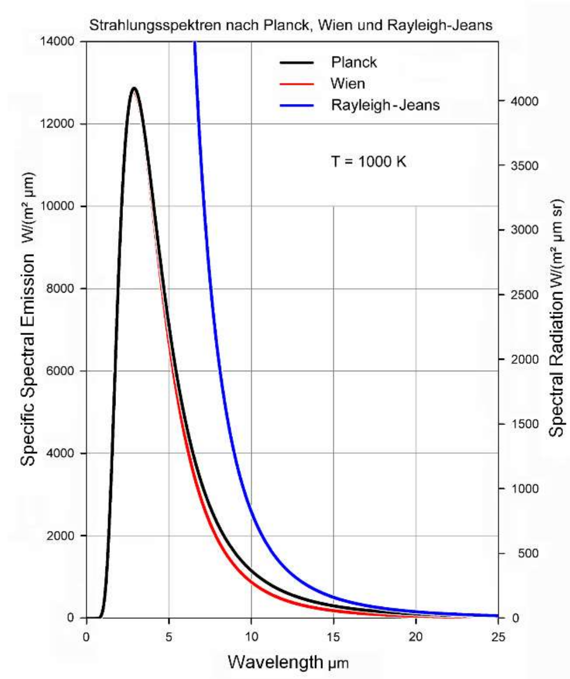

Figure 2 Above, the predicted spectral density for a 1000 K blackbody is given for each model of Wien's, Plancks, and Rayleigh-Jean's. Figure courtesy of Wikimedia.

Obvious in retrospect is that both models ultimately failed due to inaccurate classical assumptions at the quantum level. Namely, the continuum of energy held by classical mechanics for waves would be found as wanting. Secondarily, the assumptions of electron activity, not yet formally discovered, proved another source of error.

But, Planck made a major discovery. Shown below is that discovery, now known as Planck’s law:

$$p(v,T) = \frac{8\pi h v^3}{c^3}\frac{1}{e^{\frac{hv}{kT}}-1}$$ (Planck, 1901)

Here, *v* represents the frequency of the wave (which is inversely proportional to wavelength), T represents temperature of the blackbody, h is Planck's constant, and *k* is Boltzmann's constant. This formula was a theoretical derivation made from the experimental data. Yet, at the time developed, Planck's derivation did not extend from theoretical foundational principles and instead introduced new assumptions into physics inconsistent with classical assumptions. Namely, Planck had to assume that energy was only absorbed and released in discrete quantities of integer multiples of *hv* (Planck, 1967). This directly contradicts the continuous nature of wave behavior established in earlier classical mechanics (Baggot, 13). Moreover, it describes a certain molecular behavior (or particulate behavior) for which there was no explanation and no proof, theoretical or otherwise. Yet, this formula matched accurately to experimental observations.

This stroke of luck would kickstart quantum mechanics, revolutionizing physics. The term now applied to Planck's discrete energy levels, quantization, has become a staple of physics and chemistry. But was the reasoning scientifically valid? Moreover, what is the epistemological significance? While Planck later came back and proved theoretically this equation using Boltzmann's statistical method for probability densities in locating a gas particle (what would come to be known as photons for Planck), the beginning of this established physical law contrasted orthodox science in many ways.

Additionally, this stands in direct contrast to the way popularized epistemological definitions suggest the scientific process of knowledge works. For instance, the development of quanta, obvious here to be important to discovery of the law, is not at all in keeping for previously discussed epistemological considerations. However, without adding this basic assumption, it is clear that attempts to discover Kirchoff's function would have failed.

Moreover, Planck used as a basis for derivation the defunct Wien's Law, known to have failed in its approximations though it worked under certain circumstances (Planck, 1967). Important to its discovery was his ability to derive Wien's Law from his own developed formula. This was important because Wien's Law was intricately tied to Wien's Displacement Law, a law of radiation that was deemed necessary to explain light's behavior. Indeed, as the frequency approaches infinity, Planck's Law and Wien's law can be seen to converge due to reduction of the exponential term. This has major implications itself. Planck used and confirmed his theory, which had "weak theoretical foundations" (Baggot, 13), with an incorrect though close approximation. This tweaking of numbers from incorrect to seemingly correct, without the normal method has a major impact on its validity, despite that it did something necessary to be an acceptable descriptive law.

Beyond matching the experimental curves, his law also correctly reached the maximum wavelength of emission as a function of temperature as predicted by Wien's Displacement Law. This law, shown below,

$$\lambda_{max} = \frac{b}{T} \quad (Planck, 1959, 102)$$

describes the inverse relationship between maximum wavelength of emission and temperature of the radiating body. b here represents a proportionality coefficient equivalent to hc/(xkT), where x is a coefficient solvable through Planck's law. The importance of this is that, Planck's law, which can be reduced to predict Wien's Displacement Law, further correctly predicted maximum wavelengths of blackbody radiation without depending on the Displacement Law to derive. Indeed, the Displacement Law may be derived from Planck's Law (Baggot 4-24).

Unintuitively, this is important itself for two major reasons. First, as mentioned before, the classical assumption for waves is that energy is related to the square of the amplitude. However, the displacement law states that frequency distribution is directly related to temperature. Thus, the underlying basis for establishing Planck's Law was a necessarily quantum assumption of the nature of wave behavior (that energy is discretely related to a proportionality to frequency); this conversely means that the predicate for its acceptance as a theory was an inherently quantum assumption. Second, the derivation of the former law, as with Wien's approximation, from the developed law is important to consideration as a phantom problem within the nature of scientific historicity.

Planck's Law in Consideration as a Phantom Problem

As mentioned above, the conundrums of Planck's Law are mostly theoretical, rather than necessary factual. The philosophical implications of the law itself are discussed elsewhere, however, the methodological truths and mistruths have been mostly overlooked. To properly understand the critique of science, a meta-analysis of Planck's method in terms of his own philosophical approach is necessary. Such an analysis of his law as a phantom problem shows clearly the relationship of phantomness to science and method. Second, the analysis of his solution within the different phantom frameworks will resolve discrepancies within orthodox and classical approaches in solving phantomness of types 2 and 3. And third, such an analysis showsthe true inconsistencies within scientific epistemology to a more thorough critique not constrained by naturalistic dichotomy, while avoiding the errors of both positivist and negativist attitudes towards reality.

So first, it must be established, if Planck's law is or was a phantom problem, what types or types of phantomness it contains. As mentioned above, there are a number of major concerns with Planck's Law and its development. The first issue, then, is the required assumption of the law. In order for the law to work, it required that Planck first assumed that energy could only be released and absorbed in discrete quantities, known as quanta. However, at the time Planck discovered the law, such a derivation had not been developed. In fact, it was only after the theory gained acceptance that Planck actually went to produce a sound derivation of this phenomena. But is this phantom?

According to Planck's definition, this exemplifies all types of phantomness. In the first case, the basic assumptions, from contemporary scientific understandings were erroneous. They were not factually erroneous, but simply contextually erroneous. It was a widespread understanding that energy in a wave was continuous, according to certain classical contexts. At the time, though, the use of quanta to explain emissive behavior was problematic, yet, this does not mean it was wrong. As Planck points out, phantomness can change, i.e, as ideas about energy quanta were developed, this became no longer phantom.

This also conforms to the second type of phantomness. On the surface, it is easy to see its phantomness: quantized energy (quanta) states assume a certain quality of quantum understanding of thermal energy and wavelength (A) about the dual-imposed system (AB) before either quantum (A) or classical conceptions of thermal energy and wavelength (B) is fairly established and by nature prevent superposition of the states by reducing the B qualities of the system. Within context of Planck, the assumption of quantized energy states naturally oppose the underlying assumption of continuous energy states thereby allowing only exploration and explanation related to quantized energy states. As such, the system AB is minimized providing images of system A as if system AB were generally reduceable to A. However, this reduction does not negate the basic vagueness of the question. That is, at the discovery of the law, system

AB was necessarily phantom; thus, there were two possible answers depending on the context and constraints of the system. The system AB, spectral density as a function of thermal energy and wavelength, was then explored given the constraint of quantized energy, as if the constraint were generally applicable to both systems A and B separately.

The definition of the second type of phantomness given above gave the more general form of superposition—that is, when A and B are directly superimposable and the system AB is a superposition of those states as a result of dualism. However, modernist logic would suggest that the superimposition of AB in this way is exclusively true only when A and B are dichotomous. When A and B are not mutually exclusive, that is, when there is overlap (A∩B), and when A and B are not given as absolute (when there is a situation C with some chance or a situation A'∩B' with some chance), this superimposition changes. System AB is also dependent upon the logical premises of A'∩B', A∩B, A∪B and A'∪B'. Other conditional operators may also exist, but for simplicity this list has been shortened. This changes the superposition. These types of vagueness are typical of the second type of phantom problem.

Now, the argument may be made that such a duality already contains such a logical distinction. Afterall, Schrodinger's superposition of states, where both and neither are the logical consequences of the superposition. However, the distinction made here goes one step further: it is that both and neither are already subset possibilities of the superposition. In this case, then, one can say that it is simultaneously both both and neither, and neither both and neither.

So, with regards to Planck's Law, it contains the simpler understanding of the second type of phantomness and the more complex examples of phantomness. In this case, the system was explored with regards to quantized energy. But, the basic assumption of quantized energy brought into possibility the subsets of the system that both and neither set of understandings would work.

This brings up the second issue. Planck confirmed his equation by showing his law reduced to a Wien's Law. Put another way, a quantum mechanical law could be reduced to a classical law. This directly addresses the system stated above. In this case, the quantum mechanical assumption was true according to classical mechanical laws. Or simply put, two opposed schools of thought remained both true within the law's context, while at the same time one became false by the assumptions already provided. The importance of this dichotomy is, for now, not related to the truth of the assumptions or even the truth behind the broader theories. For now, it is sufficient acknowledging that the problem of the assumptions about quanta developed before the derivation of the formula created a second type of phantomness.

Thus finally, the third type of phantomness can also be seen. In this, it becomes clear both through the earlier point and through the final issue. In the former case, the interdependence of truth mentioned reveals a definite issue: classical and quantum thought are both, to some degree, acceptable representations of the systems in question. Already traced out, the classical system has failures which show it fails in many ways. However, the relative truth of the experiment depends largely on the approach one takes. Take the case of interference patterns. Classical models suggested light would be a wave, not a particle, due to the interference patterns observed consistently. Planck's Law does not negate the wavelike behavior, but reinstates a particle model too using certain other truths. In this example, the context of a problem, and specifically the approach one takes, determines largely what the answers will be.

In the more specific case, this is visible in the required quantum assumption to allow Planck's law to be true. To get the answer (the law), classical mechanics must first be rejected in some degree, in this case quantization of energy. Depending on the assumptions taken, answers differ. The theory of quantum mechanics, put simply, evolved out of quantum mechanics. To develop Planck's law, Planck first had to develop the assumptions that Planck's law would ultimately invent. Or, Planck's law could not develop out of classical mechanics. This is a direct example of the third type of phantomness.

So far then, it has been shown that Planck's law was indeed a phantom problem. It fits every type. And, this then goes to suggest that some phantom problems are indeed scientific, to a point. In fact, some scientific problems are thoroughly phantom problems. Furthermore, from each consideration, it can be shown no single type of phantomness can necessarily be pointed at as more scientific than the others. Therefore, it is now important to start considering the actual implications of phantomness.

Phantomness Opposed to Method

As stated before, phantomness does not necessarily contradict normal scientific progress. Some phantom questions are quite scientific. Some phantom questions are meaningful. Yet, phantom problems do not fit with current methodology. So what distinguishes exploration of phantom problems from other scientific inquiry?

Taking again Planck as the example, the prior explanations will be used to reveal the differences from normal modes of inquiry. Examine the first type of phantomness. Planck's law used as its basis multiple erroneous assumptions, at least within context of the contemporary orthodox view. Unlike normal inquiry, which earlier was described to build upon earlier theories and specifically to use and test earlier theories, Planck's law ultimately established its own route.

It did not build off established classical truths. Indeed, the equation that built from that base was the worst approximation of those discussed. It took a totally separate route with only retroactive theoretical basis. The problem then is not that it did this, but that it succeeded, and is the case with such types of phantom problems.

When this type of phantom problem succeeds in its inquiry, it contradicts the normal method by failing to cooperate with the greater body of historical science. Namely, the concept, presented briefly in introduction, is that a phenomenon is explored and questioned. If a theory explains it, it is accepted. If not, it is rejected. Then, unless challenged by a competing theory, it is accepted into the body of work and used as a premise for further exploration. This is the "body of scientific knowledge". But, when an assumption is erroneous in contemporary frameworks, there is no building from this base, for the erroneous assumption has already been rejected by the base for either failing to work or not fitting with other established science. This is not valid by orthodox methodology.

As to the second type of phantomness, it suggests that there is a duality of the naturalistic system. Or, put more simply, this type of phantomness rejects dichotomy. It accepts a superposition of states. This does not seem an issue, but once again consider the specific case. For Planck, that phantomness is equated with two different aspects. In the first, the case of a classical wave was explored within constraints of quantized energy states. That is, the superposition of quanta and continuous energy (understood as spectral density), was examined without constraint. Planck then deduced a law by assuming that energy was quantized, and applying that generally to the whole system. That is, a dual system was explored by reducing it to a separation of its superimposed states, though both states were explored with the assumptions of just one state.

In the second case, both quantum mechanical and classical equations were used to demonstrate and affirm the law. In this, a quantum/classical superposition was established by the law itself. The solution, despite working, had to maintain what would otherwise be contradictory systems.

In both cases, this inquiry is not fitting with traditional epistemology. On the surface it may appear to equate to the normal process of the hierarchy of ideas. But it does differ. In the standard hierarchy of thought, one idea succeeds over the other through strength of value or truth. This hierarchy would suggest that one principle is more true than another. Instead, in Planck's explanation, one truth gains value from another truth which loses value—simply put, this differs in that there is no hierarchy but an interdependence of value.

Combined with earlier points, if truth is interdependent there again comes trouble with the body of knowledge. How can one truth be undermined if it establishes another truth and vice versa? How can an untruth establish a truth? Scientific methodology is currently believed to build off success and create greater success. Instead, Planck's methodology requires establishing superpositions that necessarily make the concept of hierarchy defunct, thereby forcing questioning of the path of knowledge.

This leads once again to the third type of phantomness. For a moment not considering superposition, Planck's example of phantomness is the need for quantum mechanical assumptions to properly understand the question in a quantum mechanical method. Or rather, the necessity approach plays in interpretation. As an issue of apparatus and perspective, one may say that to answer the question in this way it was necessary to first assume a quantum mechanical approach. This does not mean there was not a classical answer. Rather, to get the answer Planck received, it was necessary to first take a certain perspective. Another perspective, such as

Rayleigh's or as Wien's, would and did produce different results. Some were more drastically variant. The note here is that the quantized assumption was not an established fact—while it easily could have been it wasn't. This means then that the quanta were a matter of perspective (clearly show in the acceptance of Boltzmann's statistics by Planck to later affirm his approach).

Once again, though it worked, it is not in line with orthodox epistemology. Firstly, there is accepted proof and disproof, as stated earlier. Proof, disproof, and results are all assumed to be objective and absolute. But if proof/disproof and results are all part of perspective, then none of these can be objective. This then means that acceptance and truth of a theory is only ever provisional (a term that will be reintroduced in following sections). If true, then science can no longer reduce theories to right and wrong, and the whole postpositivist theory falls apart. Moreover, if true, then universality, another constant of science, similarly falls apart, as a theory may only be universal given known constraints and perspectives. This would not actually be universal or even generally universal; this would be constrained (in line with the second type of phantomness).

Secondly, the result of perspectivism is that scientific linearity is questioned. Once again, there is a consensus that science must build from one sound theory and develop into another. This expansion of knowledge, which is truly a reductionist pursuit, requires then that scientific theory and results be linear, which is to say that one idea naturally progresses into the next. While Kuhn anticipated the trouble with this idea of linearity, even his understanding does not escape this concept of linearity (Kuhn, 2015). Simply, even for Kuhn, one paradigm progresses into the next, though not necessarily naturally or logically. Either way, it is a stepwise progression. But from the perspectivist lens, this is not a requirement and moreover a limitation. Since two competing theories ultimately just provide different results, progression down one path simply because it is more likeable produces error. This is evident once again with the correctness of Planck versus the incorrectness of his competitors. Therefore, knowledge cannot take a linear stepwise progress. It might be necessary, to proceed down an adjacent, parallel path, as Planck did. And before giving in to suggesting quantum was simply the next step, remember Planck stepped back to classical mechanics rather than forward to denying it. While perhaps convergent paths, they were parallel and not linear. Moreover, the implication is that perhaps knowledge must regress before going forward—i.e., Rayleigh's foundation on classical mechanics was a failure due to linearity, while Planck's law succeeded by ignoring those same discovered principles.

This rejection of linearity is once more against standard epistemology in science. And, moreover, the suggestion is that these cases of phantom problems, which by and large exist outside the standard, should be included in a more thorough understanding of science. The question then is how? What methodology can accomplish being scientific and including inquiry that involves these sorts of phantom problems? Importantly, what currently is scientific methodology compared to its ideal and what should it be?

ON NIETZSCHE

Nietzsche's Phantom Problem

In an aphorism written into one of his notebooks, Nietzsche writes about the conception of the real world as reality. In this, he discusses the way from which exterior reality progresses from being a phantom problem to being real in the minds of the reader. This is translated below:

> "For a single human being, the reality of the world would be without probability. But she probably will for two people. For the other person is an imagination of us, our very "will," our very "idea": and we are the same again in him. But because we know that he has to deceive us and that we are a reality despite the phantom he carries in our heads, we conclude that he, too, is a reality in spite of our imagination about him: in short, that there are realities outside of us."
>
> – Nietzsche, *Nachlass*, Spring, 2 §10 (1880)

This Nietzschean phantomness mirrors the phantomness we have already seen in Planck. But it also has an additional implication inasmuch as it deals more directly with the concept of shadows and images, which is of great significance when talking about the failures of empiricism. Moreover, this directly tackles an issue of grounded naturalistic empiricism that in some ways comports with Planck, but in others stands almost in direct contradiction with Planck's concept of physics.

Nietzsche's phantomness relies on the difference between idea, will, and reality. Remember, Nietzsche does not actually accept that there is a grounded objective reality, regardless of whether there is an absolute reality. This means then that Nietzsche's claim here is partly a refutation of Cartesian thought. Indeed, it refers back to Descartes' automata, from which he derives cogito ergo sum, about which Nietzsche here comes to a different conclusion.

For Nietzsche, our minds may create the realities of which we can be sure. While for Nietzsche these are interpretations, for the individual onlooker they are definite and without alternate perspective, without separate interpretation, and containing no other nonobjective to interpose. The world simply is. But once a second person is introduced, the other person becomes a dualistic system of reality and unreality. To each person, they are themselves real. Based on the Cartesian line, we believe that any person we perceive, like us, must be real. This leads quickly into naturalistic empiricism with objective realities that are the byproducts of our observations. But this same line of logic allows Nietzsche to make the point that it is our observations that create the world. Our will, our idea of the other person, makes them a reality to us and us to them. So what is the Nietzsche phantom?

The phantom, in this specific aphorism, references to the pressure of the idea and its nonbjectiveness that guides the individual thought into the belief other humans are extrinsically and externally real. It is the acknowledgement of (1 the necessary deception the other plays on our thoughts as a result of our interpreting him and (2 the reciprocal nature of the deception. In this, it is our belief in our reality that causes us to come to acceptance of extrinsic reality.

This seems so different from Planckian thought. Yet, it is almost exactly the same, just applied within different philosophical contexts. Planckian thought focused on the way a problem is a phantom; that is, the way in which a true problem may not be a naturalistically real problem. Planck suggests that there are phantom problems, which is to say problems without a true or objective method for discovering an objective truth or problems without a true or objective truth to objectively discover. The slight nuance here is simply a distinction between undiscoverable versus perspectival reality.

This is the same problem Nietzsche tackles here in his discussion of the phantom. In this case, the phantom is the problem of the external world's deception (objective natural reality) on our ability to discern (observation). While Planck describes the process and the problem itself, Nietzsche explores here the consequence of this problem. The consequence is of course empirical naturalism. If the objective is undiscoverable or if there is only objectivity in one's own head, as a subjective object, then the only thing humanity can do to preserve facticity is change the rules: chiefly, he must accept the other's nonobjectivity as objective, and from there claim mutual reality with discoverable truth but nonobjective discoverers. Man must become his own skeptic, rather than become a skeptic of the world.

This is not, however, Nietzsche claiming this is the final, or even right, answer. Actually, this is a lament. Nietzsche is here illuminating the exact issue of the world: we continue to believe in its absolute objective reality despite our (pre-)determined knowledge of the deception the world plays. In fact, we contribute to—perhaps even fully create—our own deception about the world's objectivity. This comports with Planck's phantomness, too.

Both Nietzsche and Planck, in discussion of phantomness, present a dilemma and argument against the current orthodox view of science that all scientific problems have an objective and determined answer based on infallible methodology. The roundaboutness of this is what raises the concern. If some scientific problems do not have traditionally scientific methods to solve (that is, if some science is not purely based on naturalism and empiricism), what alternatives are presented that still live up to the title of science?

The answer itself lies in both Nietzsche's and Planck's critiques of scientific understanding. As such, the examination of this critique must be the starting point of any alternative. This section will therefore be devoted to developing a complete picture of that critique to better explicate the actual trouble with current orthodox underpinnings in science.

The Death of God and the Birth of Quantum

In one of the most quoted of his passages, Nietzsche discusses the death of God where he predicts the rise of nihilism after religion cedes its authority to rationality. This is the birth of Nietzsche's philosophy and movement towards a freer spirit and happier philosophy. Provided below, this passage can be seen can be read in terms of the progress of science and the way in which quantum mechanics must be scientifically considered.

> “"Where has God gone?" he cried. "I shall tell you. We have killed him - you and I. We are his murderers. But how have we done this? How were we able to drink up the sea? Who gave us the sponge to wipe away the entire horizon? What did we do when we unchained the earth from its sun? Whither is it moving now? Whither are we moving now? Away from all suns? Are we not perpetually falling? Backward, sideward, forward, in all directions? Is there any up or down left? Are we not straying as through an infinite nothing? Do we not feel the breath of empty space? Has it not become colder? Is it not more and more night coming on all the time? Must not lanterns be lit in the morning? Do we not hear anything yet of the noise of the gravediggers who are burying God? Do we not smell anything yet of God's decomposition? Gods too decompose. God is dead. God remains dead. And we have killed him. How shall we, murderers of all murderers, console ourselves? That which was the holiest and mightiest of all that the world has yet possessed has bled to death under our knives. Who will wipe this blood off us? With what water could we purify ourselves? What festivals of atonement, what sacred games shall we need to invent? Is not the greatness of this deed too great for us? Must we not ourselves become gods simply to be worthy of it? There has never been a greater deed; and whosoever shall be born after us - for the sake of this deed he shall be part of a higher history than all history hitherto."”
>
> — *The Gay Science* §125 (1882)

Since Nietzsche's accounting does not, on the surface, appear related to science, it must be. What is truly meant by the death of God, and what does this death marks?

In the first case, we see the “enlightened” man crying “Where has God gone?”. Then he claims that God is dead and in the process of dying. From the futility of rational activity to discover God, nihilism takes hold. What can be holy or mighty in a relativistic sense? What importance does it have? Rational philosophy anthropomorphizes God. Hence God dies beneath the knife of nihilism. While God is dead, the full significance of this death is still on its way. God may be mostly a genealogical hanger-on[3]. Nietzsche does not claim the superiority of nihilism, but simply its historical occurrence and consequences. This has a broader meaning when considering the role that the value of ideas, as opposed to the facticity of them, plays in the historical development. This historicity, inherent to Nietzsche's perspectivism, suggests then that the death of God is simply a continuation of the life of God, just with a different valuation given in the accepted perspective or paradigm.

So, even the death of God is possibly just another value that plays a role in the advent and history of nihilism. This is important since an analogy can be drawn with classical mechanics and the disruption caused by quantum mechanics. Secondly, Nietzsche suggests that the only way we can make sense of life in a world without moral grounding is to acknowledge it as seemingly meaninglessness and absurd. This is to say, the response to the lack of the objective must be to adapt a perspective that openly accepts the absence of objectivity. A fine point here, as discussed earlier in conjunction with error theory, is that Nietzsche does not propose oppressive and negativist nihilism.

This is different from surrendering to a despairing nihilistic paradigm. Instead, Nietzsche views it as freeing. He regrets the death of God, namely in the beauty, nobility, and most of all certainty that has been lost, as evidenced by the requiems which he says mark God's death. But,

[3] This concept of genealogy is provided in full by Nietzsche in his work *On the Genealogy of Morality*. Referenced here is the idea that every text is a translation. Specifically, morality as a text is a translation from earlier moralities and values. Thus, an idea may work its way quite far from the original, but still remains impacted by the original values. This means there is a change over time of the idea, but it retains some form, just transliterated.

he also acknowledges that this is the necessary path. Just as with error theory, Nietzsche is not making a claim against absolutistism, but is affirming the non-objectivity of things and the way reason has killed objectivity.

In short, nihilism, has been affirmed by both reason's success and failure. This can be applied then to quantum mechanics and classical mechanics. Quantum mechanics is to classical mechanics as nihilism is to God and reason. The very mechanisms on which classical mechanic's success is built are its downfall. Hence, quantum mechanics is the nihilism of science.

How the True World Finally Became a Fable and Planck's Symbol World

The True World

With this in mind, what does it mean for quantum mechanics to be the nihilism of science? This requires an understanding of Nietzsche's will to truth and Planck's discussion of the world of symbols. This starts, however, first with the progress of philosophy (and understanding nihilism's development. Quantum's role, and its paradigmatic nature, can be shown, through this progress, in the same way nihilistic philosophy is revealed. To show this, Nietzsche revealed his understanding of philosophical progress in an aphorism titled "The History of an Error". This is reproduced below, with discussion following.

> "1. The true world — attainable for the sage, the pious, the virtuous man; he lives in it, he is it. (The oldest form of the idea, relatively sensible, simple, and persuasive. A circumlocution for the sentence, "I, Plato, am the truth.")
>
> 2. The true world — unattainable for now, but promised for the sage, the pious, the virtuous man ("for the sinner who repents").
>
> (Progress of the idea: it becomes more subtle, insidious, incomprehensible — it becomes female, it becomes Christian.)

3. The true world — unattainable, indemonstrable, unpromisable; but the very thought of it — a consolation, an obligation, an imperative.

(At bottom, the old sun, but seen through mist and skepticism. The idea has become elusive, pale, Nordic, Königsbergian.)

4. The true world — unattainable? At any rate, unattained. And being unattained, also unknown. Consequently, not consoling, redeeming, or obligating: how could something unknown obligate us?

(Gray morning. The first yawn of reason. The cockcrow of positivism.)

5. The "true" world — an idea which is no longer good for anything, not even obligating — an idea which has become useless and superfluous — consequently, a refuted idea: let us abolish it!

(Bright day; breakfast; return of bon sens and cheerfulness; Plato's embarrassed blush; pandemonium of all free spirits.)

6. The true world — we have abolished. What world has remained? The apparent one perhaps? But no! With the true world we have also abolished the apparent one.

(Noon; moment of the briefest shadow; end of the longest error; high point of humanity; INCIPIT ZARATHUSTRA.)"

— *Twilight of the Idols,* "How the 'True World' at Last Became a Myth"

This aphorism is a philosophical indictment stretching across centuries. In the beginning, then, there is a true world, real, discoverable, absolute, objective. There too is a world of image, of shadow, in Plato's cave. The goal of man is to discover the true form of the worlds, its edoi. In scientific terminology, this is the beginning of discovery, of science. The true world can be experienced, but it must be differentiated from a false one. Indeed, the true world itself is almost inconsequential. Next, the world becomes sinful, something that leads one astray from the good. The true world exists only in the images one sees. To fully understand the world, one must become separate from the tempting symbols of true world. For science, this is the beginning of skepticism. There is truth underlying the world only found by rejecting the world. The world can betray the observer. The world can be tested and its lies can be revealed through rationalization. The rational man can dismiss falsehoods and discover the singular Truth. One escapes this deception by realizing how the world and one's own experiences of it lead to inaccuracies. Once again, the skeptic, the scientist, is created.

From here, Nietzsche moves to the birth of modern science—Kantian antirealistism. One cannot simply be skeptical of the world; the true world is unattainable, nonobservable. It is so suspect that we must question its very reality. There is a true a real true world; it simply is beyond our grasp. Only the phenomena, not the noumena, can be understood. At this stage, one can observe and predict events. One can establish laws and wait for them to be true. Not long after this era, positivism takes a stranglehold on reality. The laws and truths of the world cannot be observed, only their effects, both direct and indirect. One may believe these Truths, but actual observation of them is impossible. Proof is god over reality; the more proof (or evidence), the more valid a theory.

If the true world produces images, those images are a product of the Truths of the true world. Therefore, the causal nature means the evidence left behind is a (fallacious) logical demonstration of the nature of the world's noumena. A then B; B therefore A becomes the scientific rule. Since one must be a skeptic of the world, as images, this is the only way to determine truth, for truth is based on observing the effects of the non-observable, the true world, the noumena, on the observable, false phenomena.

Alas, positivism too cannot last. It is fallacious, obsolete, inefficient. It produces indefinite answers. Postpositivism then, for negativism is too nihilistic. The world can be disproven. Thus, there is no true world, only conditionally apparent worlds that are conditionally "true". One can observe in symbols, and this is true enough until disproven. The Popper reigns in his believed superiority—he thinks he has triumphed over relativism and answered the problems of perspective. Instead of proving true, for that involves perspective, one can prove false or disprove. The lies can be shown, but the truths cannot. Refutation (falsifiability) overcomes.

With the announcement of nihilism, this too must end. What is disproof but situational and perspectival proof? Disproof, too, relies on symbols, images, and perspectives. Both the true world and the "true world" is abolished. Not even "true" exists, for its situational nature is dependent on not truth but falsehood. However, even the world of images become meaningless. If there is no true world to produce the images, to produce the phenomena, then the apparent world is also an image. There can be no apparent world without a true world to produce it. The symbols have no meaning, seemingly, except in themselves and in their utility. True nihilism has finally arrived. And yet, even this is interpretation. For, while this final era is Nietzsche's own philosophy, his philosophy, too, is but another perspective, another paradigm. There may be others yet, for this is but an interpretation of an interpretation, a situational "truth" that may be overcome by the next step towards the apparent.

So why does quantum mechanics announce the arrival of nihilism for science? Quantum mechanics, the death of classical mechanics, destroys reason. Suddenly, postpositivism, the idea of disproof, collapses. How can disproof be true in a world where something can be both wave and particle? How can light respond however it is needed to respond. As shown in the discussions of Planck, disproof, at least in optics, is situational and perspectival. Quantum mechanics calls meaningfulness itself into question. In the classical world, images of the world were meaningful. In the quantum, a symbolic model is important in so far as it can be used, yet one model can easily be replaced for another that works better or converted for the same reason. Multiple, contradictory truths can be right, and some truths can still be true while also being false. Quantum mechanics, as with nihilism, questions the fundamental beliefs of science.

Unlike scientific determinism, which suggests a definite outcome, scientific nihilism recognizes the variability of truth and acknowledges the conditionality of truth. The apparent world has not yet been truly overcome, however. Quantum mechanics may be the beginning of scientific nihilism; still, it relies upon symbols and images of the world. Thus, the death of scientific reason is still on its way.

World Symbols

Nietzsche's strongest explanation of nihilism and the role of symbols and their human interactions, comes from his "On Truth and Lies in an Extra Moral Sense". In this essay, Nietzsche tracks the human "urge for truth" ("On Truth and Lie in an Extra Moral Sense", §4), and its relation to lie as a matter of the linguistic manipulation of symbols.

The social theorist may easily see the beginning of symbolic interactionism, and the Kuhnian will be quick to understand the role of paradigms. In both cases, this quickly leads to the talk of language within scientific concepts. First it must be established that since scientific nihilism depends upon a symbolic interpretative framework, the world exists in symbols. It must also be understood how symbols exist in a "true" world and what "true" means in a world of symbolic interactions. Nietzsche provides a starting point from which the Planckian concept of world symbols can be explored. The full essay details the entire evolution of the concepts of truth and lies, as well as the evolution of language.

The first claim important to a scientific dialogue that Nietzsche makes is that the concept of a lie is not, in itself, about actual truth. Instead, it is about agreed[4] truths. The passage below illustrates this,

> "For now that is fixed which henceforth shall be "truth"; that is, a regularly valid and obligatory designation of things is invented, and this linguistic legislation also furnishes the first laws of truth: for it is here that the contrast between truth and lie first originates. The liar uses the valid designations, the words, to make the unreal appear as real; he says, for example, "I am rich," when the word "poor" would be the correct designation of his situation. He abuses the fixed conventions by arbitrary changes or even by reversals of the names. When he does this in a self-serving way damaging to others, then society will no longer trust him but exclude him. Thereby men do not flee from being deceived as much as from being damaged by deception: what they hate at this stage is basically not the deception but the bad, hostile consequences of certain kinds of deceptions. In a similarly limited way man wants the truth: he desires the agreeable life-preserving consequences of truth, but he is indifferent to pure knowledge, which has no

[4] The word agreed here refers to a collective combination of two different terms, which are of equal value. For Nietzsche, agreed refers to conventional; for Nietzsche the conventional represents that which had become an established set of rules, procedures, and meanings in science. However, in science, the terms conventional and consensual have separate meaning. Convention in science tends to refer to modelling and methods. While the convention of method is of interest here, convention for science refers specifically to practices, not philosophical knowledge. Instead, the term within scientific convention that comports with Nietzschean terminology would be consensus. This refers to agreed upon laws of natures, rules of science, ideas of knowledge, etc. A scientific consensus is reached by an agreeing body of knowledge or practitioners (scientists), just as convention is reached by an entrusted body of language practitioners (speakers) for Nietzsche.

> consequences; he is even hostile to possibly damaging and destructive truths. And, moreover, what about these conventions of language? Are they really the products of knowledge, of the sense of truth? Do the designations and the things coincide? Is language the adequate expression of all realities?”
>
> — On Truth and Lie in an Extra Moral Sense”, §6

What Nietzsche demonstrates here, is that we desire truth, but not for truth itself. The desire for truth lies in its utility. Nietzsche calls desire also will or drive. Truth however, is elusive, inasmuch as truths are based on consensus of meaning. A man who lies deceives the expectations of the listener. Nietzsche’s example of poor and rich can be used to illustrate this. A man who calls himself rich but possesses nothing lies to the listener by deceiving him with the expectation of what rich means—namely material wealth. But, the man has not necessarily deceived his listener with objective untruth, because all of language is contextual. We may even be deceived by objective truth. This turnabout may clearly occur when that man makes a return reply, “I am rich in spirit”. Suddenly, we are no longer deceived, despite that the word has not changed. What has changed? By modifiying with “in spirit”, the listener understands the implicit “not in material wealth but”. Instead, the speaker has clarified that it is only in spirit. Is the man truly rich? Regardless, the man will still be a liar; this is because any who listens will expect material wealth. In essence, the nuanced usage and meaning determine truth and lie, not the objective reality behind the statement.

This linguistic argument is seemingly beyond science. However, it is already established that science is a necessarily interpretable text. Thus, science, as much as any other pursuit, linguistic. What is meant here is the same consequentialist understanding as with language. Language is used by Nietzsche to explain anything which has an agreed established representation of what is believed to be objective reality. Therefore, it may be said that “rich” and “poor” are but symbolic stand-ins for the actuality of “possessing money” and “possessing nothing”. Why is this so? Symbols work, they allow us to pursue our drives and urges to engage the world. However, this concept of utility is skewed. Technically, a negative symbol also has utility. This can be explained by looking at scientific symbols.

The symbols of chemistry have, and continue to be, quite effective tools. They allow modelling of processes and their continuous functioning. However, symbols may become outdated—i.e., alchemy. Yet, this had utility at the time, but once it ceased to have utility, was deemed damaging to the utility of the new model. It was done away with. Yet the negative symbol has utility, if even just in bringing about the utility of the next model.

So, symbols are not simply about utility. Instead, the symbols must have some other hallmark to become symbols that can be interpreted as truth or lie. Nietzsche's concept of benefit is useful. Instead of simply having utility, it is whether the symbol produces a beneficial or damaging "truth". First, since the truth is agreed, and thus based on shared illusions, it is not about the real truth of the object. This then means we determines the meaning and truth of the object. Now, to determine what shall be "True", man must determine the meaning and "truth" which helps to attain satisfaction. Meanwhile, the damaging and destructive truths are determined to be lies or inconsequential. They are forbidden. These become unusable symbols.

This now sets the stage for understanding scientific nihilism in light of world symbols. Regarding truths, since one may generally say science deals only in agreed upon symbols, science suggests symbols are the world and its interactions: the empirical nature of the world. Now, it is established symbols are not True, nor true, but "true". Instead, the symbols are a simulation of the world. In much the same way, science, and especially quantum mechanics, touts itself as a simulation of the world.

The problem arises in the acknowledgment of knowledge and truth. In classical mechanics, the simulation is the world. In quantum mechanics, the simulation represents the world. This difference is part of why quantum mechanics necessitates so strong an epistemological change in science. Representation versus reality changes how universal law is conceived. In all cases, science deals with symbols and images of the object, never with the object itself; however, the object is already a lie, and that is before it is further interpretation ad the imposition of scientific reason and scientific naturalism.

According to Nietzsche, “truths are illusions about which one has forgotten that this is what they are” (“On Truth and Lie in an Extra Moral Sense”, §9). This is very much true in quantum mechanics; in Planck’s work, there is a recognition of the necessarily illusory status played by perception and the conception of an idea. As formerly discussed, wave-particle duality in light integrally includes this matter of symbols. The concept of even wave or particle is naturally a simulation, not a reality. As such, their meaning lies in their utility. At some point, one must recognize how light is not the simulation. It acts however it will, as light. This is not to say light is free-willed or human, but that imagined constraints are anthropomorphic from humanity as observers, as opposed to its noumenal natural constraints. Meanwhile, we continue to put constraints around it by the imposition of paradigms we find useful based on experience and chance.

Even these paradigms are just symbols. As Nietzsche puts it, science, which has long believed it works in nature, actually works in an “anthropomorphic world”. Science is an inherently human pursuit. As such, it cannot escape the importance of symbols, nor can it return to the thing itself. The problem then becomes the method. Since the method still relies on the concept of a discoverable, falsifiable, verifiable, reproduceable world, it fails to recognize the anthropomorphic nature of science. Even though quantum mechanics has foundationally challenged the concept, the physical world is still pursued “scientifically” without acknowledgement of anthropomorphism. Is there a way to get past the anthropomorphic world?

Planckian Causality and World Symbols

Turning quickly to Planck’s writing on causality and symbols in physics helps to reveal what symbols mean to scientific practice. Planck’s the concept of a world-image derives from the basic idea of causality. That is, causality in science is the idea that an event can be accurately predicted by developing models and laws. This gives rise to what Planck refers to as the Determinist and Indeterminist schools of thought. In the former case, it is believed that there are causal connections with inaccurate measurement (i.e., symbols). In the latter it is believed that the rules and causal connections themselves are inaccurate or not absolute. Focusing on the determinist path leads to modern and even classical science. The determinist realizes that the world contains inaccuracies as a result of anthropomorphic interactions. As such, no measurement is absolute. But the determinist, who still fully accepts causality, will suggest that the world is still causal, i.e., there are accurate predictions and universal rules. This seeming paradox, that the observable world which is observably inaccurate is governed by completely accurate rules to which it does not accurately adhere, is explainable when it is understood that the variables outside the control of the rule influence the exactitude of the measure. That is, the world is still wholly absolute, but there is no sufficient means to render the world into those absolutes.

This is why science relies upon symbols. Since observation is always dependent on inaccuracy, science must rely upon precise, mathematical models. These models are not, and cannot be, the observations. Thus, the scientist must rely upon something else to determine the rules of the world. Thus, the scientist relies on meaningful symbols. These symbols and their interactions constitute Planck's world image, which consists only of symbols (*The Philosophy of* Physics, 51).

The process, which employed both classical and quantum mechanics, renders a system or property is made into a symbol and which is then transferred from the observable world into the world image. As a result, it loses its inexactitude and becomes absolute and precise. Following this, the worldly influences are likewise brought into the world image. The "liminal conditions" (those uncontrollable influences) have been defined symbolically and thus allow for modelling. From this model, calculations are performed to determine the world image's definite functions. These are then translated back into the observable world; a translation from anthropomorphic back to anthropomorphic, according to

Planck, thereby allows proper approximation. However, the inaccuracy has not been reduced. Indeed, the inaccuracy has simply been passed on. Instead of the inaccuracy relying in the measurement, the inaccuracy has been passed forth into the predicting and approximating. In classical mechanics, this transference is often overlooked. It seems the inaccuracy and transference of it are unimportant. But, quantum mechanics changes things, such that this peripheral discussion transference of inaccuracy in symbols is important to how science may respond to the inaccuracy of anthropomorphism.

The temporary uncertainty, or phantomness, of quantum problems makes the concept of transferring inaccuracy troublesome. The world image of approximation allows belief in definite rules and causality and seems to allow for definite explanations to govern the world. But when a phantom system impinges, introducing uncertainty not simply in predicting but in transferring, the concept of a dual system, of a historically precedented system, and any type of Planckian or Nietzschean phantomness suggests that inaccuracy is not simply transferred to prediction, but is heightened at the point of transference. Indeed, inaccuracy is present even in the translation. That which is in the world image cannot be translated to sensation (the empirical world), and thus the definite functions themselves may not accurately apply to whatever situation into which they have been transferred.

One may then say that quantum mechanics, which has answered some of these uncertain questions, has solved the problem and expect a solution. Unfortunately, even for Planck, it is not true. This perhaps reveals why Planck was so staunchly against quantum designation. Quantum mechanics is not the solution to a determinist world image. Instead, it is simply an evolution of determinism. Quantum mechanics produces a new causal mechanism that seeks to apply a new deterministic causality to the world from another perspective. In other words, quantum mechanics faces the same difficulty as classical mechanics despite its having most clearly revealed the trouble with causal world images in response to symbols.

Instead of changing the rules of causality, quantum mechanics has changed the symbols and the rules of the world. The inaccuracy of transferring, from observation to world image and vice versa, the inaccuracy pointed out by Nietzsche, is still present. Indeed, measurement itself interferes with measurement, thus causality seems a fair position in light of indeterminist solutions. But Planck has no solution. Neither the indeterminist nor the determinist position are entirely tenable. Indeed, both are self-contradictory in ways that are against the very value they provide. Thus it is that the world of symbols, of a lack of accuracy (and inability to make accurate predictions), leads the collapse of scientific determinism.

Nietzschean Concept of Facts

The trouble of the quantum question is the trouble of determinism. Science needs definite, objective, absolute answers and laws. Therefore, the paradoxical problem of science lies in its pursuit of facts. The problem more specifically is in its need of certainty. The trouble raised by the quantum question is perspectivism. The quantum reveals the perspectival, situational, and provisional nature of facts. Moreover, the inaccuracy introduced by world images and symbols, leads to a perspectivism that confounds both indeterminism and determinism. In essence, the concept of facticity, is questioned by the development of quantum mechanics. Originally, this, is paradoxical due to the way scientific determinism allowed the establishment of the nonobjectivity of facts. That is, the absolute facts of quantum science have determined objective nonobjectivity, but in so doing cannot proceed for science depends upon deterministic objective fact.

Therefore, to understand the nature of the quantum phantom, and to determine if there is a solution, a Nietzschean exploration of facticity is useful. This was briefly touched previously. In a passage from his unpublished notebooks Nietzsche states:

> "Against positivism, which remains with the phenomenon, "there are only facts," I would say: no, precisely facts do not exist, only interpretations. We cannot find a fact "in itself": maybe it's nonsense to want something like that. "It is all subjective," you say: but even that is interpretation, the "subject" is not given, but something additional-grounded, behind it-is it ultimately necessary to put the interpreter behind the interpretation? That is already poetry, hypothesis.
>
> As far as the word "knowledge" has meaning, the world is recognizable: but it is interpretable differently, it has no meaning behind it, but innumerable senses of "perspectivism."
>
> Our needs are those that interpret the world: our drives and their pros and cons. Every instinct is a kind of domination, everyone has their perspective, which he wants to impose as a norm on all other impulses."
>
> —Nietzsche, *Nachlass*, 7 §60 (1886-1887)

Here, Nietzsche makes the devastating claim that our presuppositions about reality are themselves metaphysical and the nature we discuss are also a matter of interpretation. The point here is that even the basis for our facts, the objective world, is in itself non-objective. It too is dependent on our knowing and observing, so these "facts" are interpretations.

The counterclaim to this seemingly morally relativist (perhaps even objectively determinist) claim is that even this claim of facts is an interpretation, that his knowledge of the situation of knowledge is in itself an absolute truth claim. Nietzsche states that this claim of nonobjectivity is itself an interpretation of the "facts" present. However, this is where the true discourse as it relates to scientific knowledge begins. The trouble with the quote in its shorter form is that it leaves open no room for a discipline based on occasionally absolute claims. So, this quote should be understood in its entirety, not as a theory of relativism, but in line with Richard Joyce's error theory and Kuhnian paradigmism (here understood as the Nietzsche's perspectivism).

However, this accounting of Nietzsche is necessarily different from the typical relativist stance. While many note that Nietzsche is an error theorist, inasmuch as he argues for the lack of moral truth, (Pidgen, 2015; Leiter, 2015), what is an error theorist?

According to Richard Joyce, the error theorist holds that (i) “Morality conceptually involves non-institutional categorical imperatives” and (ii) “In fact, non-institutional categorical imperatives are indefensible”. Or, more succinctly, “The moral error theorist thinks that moral language and moral thinking aim at the truth (i.e., that moral language is assertoric and moral thinking doxastic) but that they systematically fail to secure it.” (2010). Perhaps, more to the point for the work at hand, according to Joyce, a moral error theorist “maintains that moral judgments are truth-evaluable assertions, but that the world doesn’t contain the properties to render moral judgments true” (2013). Thus the moral error theorist believes one can make moral claims (i.e., claims with moral judgment that have an absolute answer) but that the real world is non-objective and thus does not provide truths to defend such an assertion.

This may, at first, seem disconnected from the Nietzschean quote above. After all, Nietzsche talks about facts, interpretations, and about a lack of meaning. He does not seem, at first glance, to indicate at all that truth claims are possible. However, Nietzsche’s full quote gives the clear answer. He talks first of the lack of a grounded subject from which one can base a factual claim; i.e., the existence only of interpretations. He then speaks about innumerable perspectives which arise from the lack of meaning. Reworded slightly: there are no facts but only subjective experiences of the world. These subjective experiences then lend to multiple perspectives. This still sounds like moral relativism; however, according to Joyce, a moral relativist may hold that there is truth only from each subjective experience. In other words, the moral relativist believes there are no absolute truths, but that within each relativistic sphere (perspective), that truth is objective. Meanwhile, the error theorist believes there are absolutes in the world (i.e., the monetary value of an item), but that there are no objective underlying values.

Nietzsche's greater point is not simply—and possibly not at all—an ethical one. Indeed, Nietzsche here is critiquing the idea of knowledge and of empiricism as naturalistic fact. Of course, this can be seen through analysis in the same way as the error theorist. Nietzsche says there is no fact, only interpretation.

At this point, one would think that Nietzsche is a relativist. It is exactly opposite. Joyce gives the example of a tyrant selling a fish. As above, the relativist believes in a lack of absolutes but the existence of objective facts from which those relative facts derive; i.e., a fish exists but whether or not we only call it a fish is dependent on how we perceive it. However, like the error theorist, Nietzsche suggests there is a lack of objective fact (i.e., that we know the world as subjects). Joyce uses the example of a tyrant selling fish as an example; when a tyrant sets the price of fish at $5, it is absolutely $5. The dollar figure is not relative. It is not objectively $5, i.e., the value of the fish set by the tyrant is not a given fact of the world. Nietzsche calls into question not how the "fish" is perceived, but that the fish is a fish in the first place. Like, Joyce's tyrant, Nietzsche questions whether the value of the fish, not only its monetary value but in its status as an absolute idea (eidoi) is truly a given. All we know about our world is interpretation, according to Nietzsche. Moreover, "even [this] is interpretation" (Nietzsche, 1886-87, *Nachlass*, 7 §60). Does this make the above statement relativistic? Not at all. Simply, to say that the world is objectively only interpretation denies the lack of objectivity in the world. In other words, things may or may not be solely nonobjective. Suddenly, the world gets more complicated.

To answer the question, "Are there objective facts", the questioner must first find an answer to how to objectively answer the question. This is a circular paradox. But to answer "Is the world non-objective/subjective", the questioner must contradict his or her answer with their method or arrive at the same circularity. This is indeed the same conundrum posed by quantum scientific determinism at the beginning of this discussion of facticity. The only solution is Nietzsche's: the world is non-objectively non-objective.

More to the point, the way we interpret the world naturally determines the result. The method we use to test the world is itself an interpretation which means that whether or not there are objective facts, we are already beyond any actual fact that may exist. There is no way to interact with the world other than making an interpretation. Definite results are the conclusion, not of objective facts, but of absolutist methods. In other words, Nietzsche's claim suggests we only have reproduceable "fact" because we have determined what we believe are absolute methods, not because the results are actually definite or objective. Such "facts" then are always open to revision, which for Nietzsche, includes the likelihood that each revision is an error. The error may be necessary and important error, but an error nonetheless. Error is not problem, at least in Nietzsche's mind, since error is a given. Instead it is the dominance of "knowledge", or rather what we have come to regard as knowledge. This is part of Nietzsche's perspectivism. For Nietzsche, replacing one idea or interpretation for another happens because it is more sonorous—it resonates with our drives and urges and comports with our concepts of convenience. This is much like Kuhn's concept of paradigms in which one illusion of absolute fact is replaced for another. What then of paradigmism and perspectivism. If all we know of the world are images, are not all answers valid? Is science but a futile, self-satisfactory attempt of sating our urges for truth? If so, then does quantum mechanics imply all is naught and science is ended?

Luckily, for science, no. Even Nietzsche's concept of facts is not so closed. Instead, all answers may be valid, although some answers will necessarily be better than others. For

Nietzsche, these answers will not be inherently more factual, but they will be more fulfilling and satisfactory. If so, then science may proceed. Not all perspectives are valid. Instead, science now must determine what makes a better perspective or a better answer. On the other hand, science also is at a loss. If facticity is not the true drive, if objective answers are not obtainable, what makes one perspective, answer, or method better than another?

The Will to Truth

Perhaps the problem with scientific determinism lies not in the error of the worl. It may also not be in the error of translating—that is, in interpreting and humanizing in different ways—but there is nothing inherently wrongful with this error either, despite it being possibly in constant error. The problem, the root of phantomness, lies possibly instead in the value and meaning of truth as it relates to determinism.

It has been suggested already that determinism itself is opposed to truths that determinism has produced. Truth is opposed to determinism, though truth is the goal of determinism. This paradox is itself part of the phantom problem. Truth in the first type of phantomness may change, and therefore solubility and utility of a phantom problem may change. In the second type of phantom problem, truth may rely upon provisional truth—i.e., Truth may not be true but "true". In the third type of phantom problem, truth is perspectival—i.e., truth is instead collective "truths".

Why is one truth better than another, if it is, and what objective judgment, if any, does better hold? Methodologically, science has an answer. This answer depended upon the following 3 factors: theory, progressivity, and consistency, all considered within a context of historicity. But, as pointed out with Thagard, this is also true of pseudoscience.

In Nietzschean terms, scientific truth fulfills the drive for truth but is not necessarily satisfied by absolute truth. Scientific truth is sometimes pseudoscientific and scientific at others, consistent with Thagard's concept of historicity such that pseudoscience in one era may fulfill truth inn another

In *On Truth and Lie in an Extra-Moral Sense,* Nietzsche states, "truths are illusions about which one has forgotten that this is what they are" (§9). Until this point, the discussion has focused on the illusory nature of truth both in Nietzsche's philosophy and in scientific discovery. But, what does it mean that one forgets the illusionary nature of truth is truth is a human desire? Human urge is satisfied by the illusions of truth, despite that no truth is given.

Having forgotten that this truth is but an illusion allows these "truths" to be understood as noumena. "The venerability, reliability, and utility of truth is something which a person demonstrates for himself from the contrast with the liar, whom no one trusts and everyone excludes" (*On Truth and Lie in an Extra-Moral Sense, §* 10*)*. In short, science acts as truth, working on the basis of a symbolic world-image applicable to the world only in error by convincing others of the veracity of its status by fulfilling the truth urge. Scientific determinism is but lie in a larger sense.

Why this urge exists and why, which is orthogonal to that there is a drive, is of equal importance. Why must man pursue truth?

"Our needs are those that interpret the world: our drives and their pros and cons. Every instinct is a kind of domination, everyone has their perspective, which he wants to impose as a norm on all other impulses."

—Nietzsche, *Nachlass*, 7 §60 (1886-1887)

There is a drive to interpret the world that follows our desire to dominate. This impulse is imposed upon the world and others. The drive is truth and the will is power. For science, the knowledge becomes a replacement for power.

Nietzsche explains that every one wills him- or herself to power in such a way that his/her drives always point towards this will, even if unconsciously.

` “…Accordingly, I do not believe that a "drive for knowledge" is the father of philosophy; but rather that another drive has, here as elsewhere employed knowledge (and mis-knowledge!) as a mere instrument. But anyone who considers the basic drives of man to see to what extent they may have been at play just here as in *inspiring* spirits (or demons and kobolds—), will find that all of them have done philosophy at some time—and that every single one of them would like only too well to represent just *itself* as the ultimate purpose of existence and the legitimate *master* of all the other drives. For every drive is domineering: and *as such* it attempts to philosophize.— To be sure: among scholars who are really scientific men things may be different—"better," if you like—, there you may really find something like a drive for knowledge, some small independent clockwork that, once well wound, works on vigorously *without* any essential participation from all the other drives of the scholar. The real "interests" of the scholar therefore lie usually somewhere else, in his family, say, or in making money, or in politics; indeed, it is almost a matter of total indifference whether his little machine is placed at this or that spot in science, and whether the "promising" young worker turns himself into a good philologist or an expert on fungi or a chemist:—it does not *characterize* him that he becomes this or that. In the philosopher conversely, there is nothing whatever that is impersonal; and above all his morality bears decided and decisive witness to *who he is*—that is, in what order of rank the innermost drives of his nature stand in relation to each other.”

—*Beyond Good and Evil*, §6

Philosophy, for Nietzsche, is the attempt to satisfty power-cravings through knowledge. Likewise, the scientist, as a natural philosopher, is in the same position. He or she imposes their will upon nature forcing it to conform to a concept.

For Nietzsche, science is a schema which us “to volatize perceptual metaphors” and “dissolve an image into a concept” (“On Truth and Lie in an Extra Moral Sense”, §10).

“For something is possible in the realm of these schemata which could never be achieved with the vivid first impressions: the construction of a pyramidal order according to castes

> and degrees, the creation of a new world of laws, privileges, subordinations, and clearly marked boundaries—a new world, one which now confronts that other vivid world of first impressions as more solid, more universal, better known, and more human than the immediately perceived world, and thus as the regulative and imperative world. Whereas each perceptual metaphor is individual and without equals and is therefore able to elude all classification, the great edifice of concepts displays the rigid regularity of a Roman columbarium and exhales in logic that strength and coolness which is characteristic of mathematics."
>
> —"On Truth and Lie in an Extra-Moral Sense", §10.

Schemas exist as a subjugation of nature, which to Nietzsche is full of more than mere mathematical representation. These schema contribute a full grasp of Niezsche's perspectivism. The schema is contraindicated by the illusory nature of truth just the same way that the earlier Nietzschean phantom is. Because the schema is but one in a multitude of provisional, perspectival, nonobjectively nonobjective perspectives, it gives rise to the dominance of specific and singular ideals.

Truth leads to claims of power. These claims, which depend upon the absolutist objectivist view of truth, are in themselves illusory and built upon a divide which is inherently unachievable. In other words, the power derived from truth is itself a lie. But, the value of "truth" is determined by its ability to satisfy this will to power. "Truth" is that which resonates with us—it comports with our desires, our will, and our needs, as well as our situatedness. With it, we satisfy the need for power while having to submit to it. What is best is that which gives in to these desires and fits with the perspective that adapts most easily to these desires. Science, then, is simply the agreed adherence to this hierarchical domination of orthodoxy over unorthodoxy. Science has established itself as the new God, founded on the nihilism that killed the old one.

Perspectivism

Since it is fair, then, to say that better scientific concepts are not necessarily more objectively truthful, or necessarily more generally useful, but ones more resonant with human desires within each subjective experience applied to an agreed upon world image, then what can we make of utility. Simply, if resonates with the will to power, there must be some other way of looking at the world that allows for what may otherwise not resonate to become resonant. How do we explain the resonance of quantum physics with classical thinkers in the original conception of the quantum. In other words, how do the solutions to phantom problems overcome cognitive dissonance and lead to resonance? How does quantum overtake the classical?

Nietzsche's perspectivism, like Kuhnian paradigmism, adds to this concept of perspectivism in useful ways. The lack of objective truth requires that multiple interpretations of the world exist that result from our will to power over nature. These interpretations are situated in a Nietzschean horizon, by which the world is ultimately governed[5].

> "Consider any morality with this in mind: what there is in it of "nature" teaches hatred of the laisser aller, of any all-too-great freedom, and implants the need for limited horizons and the nearest tasks—teaching the *narrowing of our perspective*, and thus in a certain sense stupidity, as a condition of life and growth. "
>
> —*Beyond Good and Evil*, §188

Here, Nietzsche addresses the narrowing of knowledge that has thus far been discussed. The current scientific practice of reductionism teaches that a perspective must be informed in a certain way to lead to a correct end. In essence, there are better truths which guide scientific knowledge, and only those better truths can be taken. Better, here, is still historical, such that

[5] Horizon is a Nietzschean term that ultimately refers to a person's situatedness in the world. Specifically, it references the basic assumptions that someone carries about the world. This could almost be conflated with a Kuhnian paradigm except that the horizon is individualistic. Neither society nor the scientific community sit upon a horizon. Instead, the individual practitioners each carry with them a horizon/(-s), a perspective from which they view the world, which is influenced by the paradigm that the community takes. Meanwhile, the Nietzschean concept of a perspective is also different, as the perspective is made up of the various horizons which comprise a person's individual viewpoint.

Nietzsche would likely approve of the matter historicity and reinterpretation. However, there is no acknowledgement of these values. Read as a critique of science, Nietzsche accuses science, of discovering truth by limiting horizons. So, truth does not serve to expand knowledge. Rather it reduces it by designating particular agreed upon paradigms that align with particular agreed upon horizons. One consequence is the self-confirming nature of orthodox science. A second is the recognition of consensus as determining a better truth.

But this does not get at the heart of why some truths are more reasonable to an individual, just what social factors affect the development of more reasonable truths. We must turn to a different Nietzschean concept. According to Nietzsche, "*We* hear *only* the *questions to which we* are capable of finding an *answer" (The Gay Science,* Book V, §196). This finally provides a real answer. Reasonable and resonant truths are dependent upon the horizon just discussed. It is not that truth is resonant with us, but that we resonate with it. Nietzsche's damning statement is a turnabout of a basic empirical premise: we are capable of finding answers to only those things we can adequately question. Or, we have a limited set of answers based upon the phantom nature of science and the world.

But, if so, then it is not that we can answer whatever we question. If that were the case, then a change in perspective could not change the answer. The answer should remain the same, for it should reveal all the correct answers. Instead, a reluctance to accept reality and truth's desires to maintain their hidden parts, leads to the inability to account for our own inability. Thus the rise of empiricism. But by quantum mechanics and Planck's phantomness have exposed the error of empiricism. Thus, the dogmatic claims of science now support Nietzsche's philosophical claim: facts are not discoverable, but producible.

Thus, the only questions we can answer are those we have already developed a satisfactory answer for. Those questions we have already answered, even if not consciously, are those we can ask and explore. The truth which resonates with us is that we have already determined from our horizons. Resonant truths are those which support our prefabricated notions of truth and lead to questions that reveal those prefabricated truths.

But, then, one may ask, how did quantum mechanics come to exist? Did it not undermine classic mechanics by answering the question that classical mechanics did not, could not, ask? Here now, we return to a point made much earlier. Planck developed an answer and then later solved the problem he developed. This is in line with the Nietzschean claim. He heard an answer and followed. But this alone is not necessarily a fatal blow for science.

The truth is that quantum mechanics is still deterministic. Indeed, the solution to blackbody radiation which lead to quantum mechanics was ultimately a rephrasing of the original question to find the answer of determinism. How did it do so in a different light? It allowed the bending of other truths which ceased to resonate. But what about the damages dealt to certainty? Once again, the problem was not with certainty. Everyone knew about uncertainty, the issue was degree. And once the possibility was opened, there was already an answer, one just needed a push to shift the horizon towards uncertainty, such as the ultraviolet catastrophe. Quantum mechanics is a set of truths that resonated with those that the failings of other explanations of blackbody radiation did not resonate with.

It may be said, then, that resonant truth is that which aligns with preformed notions of the world. Resonant truth is governed by perspective, horizon, and interpretation. If that's the case, the final issue arises. Kuhn suggests that truths are accepted based upon their value. This is also true for Nietzsche. But their resonance is based upon perception. When talking about science, resonant truths are determined from that which corresponds to the symbolic truths developed by determinism to create a paradigm to control nature. When that control is questioned, such as when a paradigm fails, if the failure is recognized, the resonance ceases. Resonance is determined by a truths ability to maintain a power structure and the need to replace that power structure if need be. But with this in mind, what method can account for hearing questions we cannot know? What allows us to find answers we don't expect? And how can a method account for the potential of perspectivism? Finally, if science develops off of conflict and cognitive dissonance, rather than truth, then what can be done to redirect science towards its original goal?

CREATIVE SYNTHESIS

A Marriage of Planckian Ideas with Nietzschean Philosophy

What has been demonstrated to this point is simply that there are Nietzschean philosophical models which may accurately be pursued to similar conundrums as the quantum mechanical model and that there is a Planckian quantum mechanical model that is a phantom. In turn, each imply a certain rendering of the external world. And certain concepts of phantomness have been explained in such a way that both connect.

However, the findings of both are intimately connected in such a way that the answer to the question for science may, potentially, be pointed towards a solution. Namely, the question is two-fold. First, from the consideration of the Planckian phantom, what sort of mode of scientific inquiry can be applied that accounts for and uses the implications of phantomness? Second, from the Nietzschean philosophical school, is there a paradigmatic science that recognizes the perspectival nature of questions and answers such that it can produce and answer questions outside the normal deterministic approach of science? Both of these questions may be generally reproduced in this way: is there a modification that can be made to scientific approach such that inquiry can be successfully made and produce practical results regarding a nonobjectively nonobjective, anthropomorphic world? Is there a way to interact with the world image as a world image, rather than as the world?

World Phantoms

If there is an answer to how may scientific inquiry address phantomness, then phantomness is a necessary starting point. Of course, in the larger, broader question, this is simply addressing the question of nonobjectively nonobjective anthropomorphisms. But, indeed, it is not simply a question of how. Instead, one must first understand what is phantom in science.

Up until this point, this author has accepted the premise, unquestioningly, there are 3 types of Planckian phantoms that are governed largely by the Thagardian description of pseudoscience presented before and which appear occasionally throughout science. These were generally that of error, vagueness, and perspective. Nietzsche describes the major category of phantomness such that all three types are brought into one umbrella within a description of phantom: nonobjective problems. Thus, it may be said the three types of phantom problems all occur from some issue of nonobjectivity. Erroneous assumptions produce nonobjective answers, for the answer itself is erroneous. Vagueness produces nonobjective answers for it creates states of superposition within single paradigms and perspectives. Perspective creates nonobjective answers for in it exists multiple absolute answers from the same absolute situation, but with different underlying, possibly convincing assumptions. Planck here creates the specific framework for the types of phantomness observed while Nietzsche gives the explanation for what creates the phantom.

But, there is an even finer point. Planck suggests that this describes some problems. There are any number of Planckian examples. The best example, though, it the quantum problem that Planck himself creates. It is never noted within Planck's body of work that the question of blackbody radiation, and of quantum mechanics as a whole, is indeed a phantom problem. This designation has been provided in full before, but it is established that the whole problem fulfills the necessary qualifications as a phantom problem. The truths revealed by quantum mechanics are answers to a phantom problem. This leads to the development of uncertainty and troubles with an objective world, especially in the realm of light and the wave-particle duality.

It is not the specific answer, however, that is problematic. As Nietzsche reveals, the problem of uncertainty is not actually a problem. Error existed before. Error is sometimes necessary. In fact, error is a necessary byproduct of anthropomorphism. Error is part of the world. Then, when compared with Planckian concepts of the world image, it is evident that error is necessary part of interacting with the world image. It is simply the understanding that has changed: we now realize that error is inescapable, and the world cannot be readily determined. Therefore, it is not error that is the problem for science.

If error was already built in, then perhaps the candidate for understanding the relationship between a scientific method and phantomness lies in perspective or vagueness. However, Nietzsche once again becomes key. The answer to these problems seems, at surface, to possibly be in finding the correct paradigm. Nietzsche shows it is not the case; there is no such thing as a correct perspective. There are multitudes of perspectives. Each perspective is in itself an interpretation. The "correctness" of this interpretation is simply based upon the value of that interpretation to give man the illusion of truth so as to give him power over nature. It satisfies truth claims, while not being truth. In other words, there is never a correct perspectives, but many perspectives will varying resonance based upon their situational utility. Perspective is not the issue for there may not be an absolute objective perspective.

Then what is the problem? The problem is the designation. Planck's phantomness is key to understanding scientific progress. Planck correctly designated and described the phantom problem. What Nietzsche adds to this designation is a caveat. While Planck shows the phantomness of some problems, Nietzsche reveals that all problems are in actuality phantom problems.

Based on this, then, the progress of science is necessarily phantom progress. Unfortunately, this reveals the way the scientific world may actually work. In other words, all problems are phantoms, and thus all problems ultimately can be regarded as perspectival. In this, no single answer of paradigm is of ultimate importance. Simple, there is a World Phantom, which is the world itself from which we generate our symbols. It is not the objective world, but the seemingly objective with which we constantly interact. It is presented as the objective world, when indeed, it is just the subjective anthropomorphic reality which we can achieve.

Now the true problem, and answer, is presented. Instead of science being about finding the correct paradigm, instead it is about discovering paradigms in general. But discovery of paradigms, which is answering phantom problems, depends on seeming objectivity. This means that we cannot truly discover the world, only that world with which we are easily provided answers understandable by our own situatedness in the world and our perspective.

Simply, that all problems are phantom problems means that science is an anthropomorphic text. To create valuable paradigms requires not a discovery of correct paradigms, but an ability to change perspective. Of course, to change perspective requires an ability to hear and answer questions other than those which are resonant with our current perspectives and situatedness—that is, to hear and answer what is beyond our current grasp to hear and answer.

Of course, this paradoxical problem is itself an answer. The original premise of science that allows for designation towards truth is that there are indeed necessary truths. It is these necessary truths that lead to issues of situatedness, as these necessary truths are those which impinge upon what can or cannot be discovered. Thus, the first answer to developing an (Un)certain science is the removal of necessary truth. This is easy enough already by recognizing provisionality. However, provisionality is much harder to apply. In such a science, it is necessary every “truth’ begin “if”, and if is not practical in an all-encompassing discipline.

Therefore, what can be done? This is where paradigmism comes to play. Perspectivism requires recognizing the subjectivity of the world—that is, it’s nonobjectivity. Meanwhile, paradigmism means recognizing the constant provisionality. For such a science to exist and remain viable, “if” must be rolled into the perspective. That is, instead of making broad truth claims provisional, another method is possible. Namely, the provisionality may be transferred from one claim to one perspective. This then means that the provisionality is not of every active pursuit of truth, but inherent to each world model.

That is, the “if” claim becomes manageable. Now, instead of “if this is true about the world”, the claim may be said “if the world truly acts as x”. Thus, the birth of a paradigm that is aware of its perspectival paradigmatic nature. Since acting here refers to a broader claim about the law of the world, as opposed to the individual results, the issue has been solved by considering not individual phantom problems but by acknowledging the world phantoms. That is, by considering all problems to be phantom problems, the paradox that arises is solved by the very designation—a world of phantom problems means that substitution of the paradigm or perspective as the provisional solves the trouble that is posed by consideration of the world as nonobjective.

Now, with a completely phantom world, an objective discipline still works, for it deals with provisional objectivity. That is, all statements may be rephrased, “within this paradigm” or “from this perspective” and still maintain a hint of objective truth. This conditional “if” can also be understood without explicit statement, so long as the paradigm and its associated symbols are well acknowledged. Suddenly, science has been freed, partly, from determinism. Each problem may be explored perspectivally and without the bias of deterministic paradigmism. Problems that are pseudoscientific under a Thagardian definition can still be scientifically explored with the recognition of the provisionality of their nonphantom nature. But, it is always up to the scientist, the discoverer, to always remember and tell the significance of that paradigm or perspective upon the results.

The Provisionality of Provisionality

There is however a certain determinism even in this claim. As already stated, the world is nonobjectively nonobjective. In short, the world may or may not be nonobjective. Thus, it must be said that the before discussed paradigmism is itself a paradigmatic designation just as perspectivism is a perspectival answer. Just as any given perspective is useful in its value to us, so too perspectivism itself may be an unnecessary assumption.

This does not mean not considering it. In fact, quite the opposite. It means that it must be used and not used as befits the value it produces in its use. Classical mechanics, for all its failure to answer blackbody radiation, was itself useful. It was valuable. In short, it failed to answer some questions, but succeeded in providing comforting illusions to many others. Should classical mechanics be dealt away with because it was not perspectival?

Just as Planck answered, no. Instead, it should be understood to be a perspectival answer that did not consider itself a perspective. This allowed it to give the sorts of answers it did. This does not make it valueless, for to be valueless means to claim classicalism lacked truth just as objectively as it claimed those truths. The answer is not simply integrating provisionality.

Rather, that would be stifling in the same way not recognizing it is. The answer is to use provisionality to better understand and interpret the world. It is a tool, to be substituted and used. This can be framed in another more scientific way. Based on Nietzsche, paradigms change based upon valuation. The paradigms are just a reflection of the current listener's values. As those values change to conflict with the science, so too do the paradigms. If we accept this, then we must also accept the use of the same criteria to interrogate perspectivism, paradigmism, and provisionality. Phantomness, which is not so interrogable because it exists beyond the body of value and rather in the nonobjective world itself, shows that these values too are nonobjective claims to objectivity that may and must be changed to give a broader depth of answers. Orthodox science up to now has been so lacking in these that claiming they ought be integrated is easy; it is comparatively hard to argue that in so doing, one must remember this may and should be changed as necessary.

More simply, quantum mechanics revealed the failures of determinism, and in so doing became deterministic. Quantum mechanics, which seems to be provisionality at its best, has actually become objectivity at its worst. Quantum mechanics, based on this simple understanding of nonobjectivity, must not be the end. It is but another perspective in a long line of perspectives; another translation of the world waiting to be reinterpreted. So too with perspectivism. And thus it is with (Un)certain science—the only way it can maintain viability is for it to remember its place; it may and possibly should change, and the answers it gives while recognizing provisionality are in themselves provisional too, and thus may not be the best answers. Provisionality in such a science must also be provisional, lest (un)certain science itself become but another milestone of linear progress, rather than a tool of increasing "objective" knowledge.

Phantom Recognition

Returning once more now to ability to recognize provisionality, there is a problem. That problem is that provisionality seems to be dependent on recognizing the way in which a problem varies to produce various answers. However, this limited view of phantomness ignores the much larger point made by Planck's discoveries and Nietzsche's critical lens placed upon it. The issue is not simply in the phantomness of problems, but in the phantomness of answers and phenomena.

A viable science, a science which is science, requires a recognition of phantomness as a legitimate entity. It was stated before that phantom problems are not soluble by scientific exploration. This is demonstrably misleading, for it has already been established that in reality all problems are phantom problems, just possibly ones for which we have yet to see their phantom natures. It is therefore scientific to recognize that science is grounded in a deterministsic naturalism that is opposed by the nature of the world. Simply, a viable science recognizes that phantomness is indeed scientific.

Moreover, a viable science recognizes that the objective natural world is indeed nonobjectively nonobjective. Once again, this is misleading. How can an objective world be nonobjective in any fashion? A viable science must reframe the concept of objectivity. Instead of focusing upon absolute validity, perhaps a new framework is required.

As was mentioned much earlier, science in general thought is believed to be based upon verifiability, falsifiability, reproducibility, repeatability, and other hypotheticals. It is epitomized in the so-called scientific method. But, this method relies on objectivity, and especially upon absolute, objective, dichotomous logic. Such a science is starkly opposed to phantomness.

Instead, science must recognize phantomness. Within phantomness, the concept of perspectivism has already been well established both in the Nietzschean and Planckian lens. Now it can be applied to the concept of what is and is not scientific. Phantomness disregards these -abilities that others use to describe science. Phantomness begs the question of whose. Whose falsifiability? Whose verifiability? Whose reproducibility? It furthermore questions the very nature of these in the first place. Therefore, the first methodological implication is the removal of these terms from the definition of science to be relegated to only a definition science among multiplicitous possible definitions of science.

However, this still raises the issue of the Thagardian definition of pseudoscience, which until this point has been held as a viable definition. Science is that which is more progressive over time and reduces inaccuracies. Such a definition has seemed fitting with everything presented by considerations of phantomness so far. This is not actually fair. Because of the use of progress and inaccuracy, recognition of phantomness now raises a major concern about this definition within metholodogical implications.

First, progress is a linear idea. The points have already been raised that a problem can progress to and from phantomness (insofar as it becomes scientific and pseudoscientific within the body public) without true major changing of the seeming objective nature of the world. Simply, progress is still a determinist method of reducing the anthropomorphic considerations of empirical study. Unfortunately, science and pseudoscience are inherently human. There is no way that progress can be achieved if the natural world is nonobjective.

This is because progress relies on a building up of correctness. Progress relies on the defeat of one theory to the success of the next. Progress is a way of ignoring the human effects on knowledge. Linear progress is only possible when a truer reality can be discovered. Since truth is illusory, any progress achieved is only seeming progress. Thus, already the first principle of science is dissolved. There is no way to truly be more progressive, for there is always progress, the question is just towards or in support of which perspectives and paradigms. The theory of chemistry as it stands may or may not need changing, but that does not make it a bad perspective. Meanwhile, the theory of heliocentrism, far more progressive for a much longer time, perhaps did need changing. Thus, the question of progress is thrown upon its head by phantomness. The first step to recognizing phantomness is understanding this about progress.

How can such an understanding occur? The first step is to remember the past. As anthropomorphic texts, scientific perspectives and paradigms do not exist in ideological vaccums. They arise from previous values and assumptions. It is of supreme importance then to remember the influence these values, ideas, and symbols had upon the current understandings and perspectives. It is possible that these must be changed, or at least understood, to get a clear picture of ways in which they may be solved (or fail to be solved) otherwise.

The second problem of Thagardian pseudoscience is the reducing of inaccuracies. It is a baseline assumption that discrepancies between the model and perceived reality automatically represent pseudoscience, inasmuch as not trying to solve them indicates a lack of ability to rightly explain the phenomena. This is only partly fair. The phantom problem reveals the fairer nature. Discrepancies, as Planck and Nietzsche note, as revealed by the world image, are a byproduct of the world itself. They are inherent to the nonobjectively nonobjective world. Uncertainty exists.

People, namely scientists, try to reduce inaccuracy as much as possible. In so doing, they simply transfer it. In other words, the error in a model is not the problem. The model may or may not be accurate—that is beyond the model itself. Instead, the true value in the model is its value to us in understanding some facet of an issue. There may be problems for which grossly inaccurate models are better truth illusions. Some problems like this already exist, epigenetics in human development for instance as opposed to the Mendelian model. But, if we accept the Thagardian definition, a quite truly orthodox scientific position, then we must accept that such a discrepancy in the model creates a pseudoscience. There is no room in orthodox science for these two competing, simultaneously accurate and inaccurate models, to both be fair models. Yet, it is the case.

This tells the second epistemological consideration for phantomness. Science, to recognize phantomness, much recognize provisionality, but in a special sense. It must remember the importance of value rather than necessarily of complete accuracy. Recognizing phantomness may mean learning to approach problems from angles that highlight specific issues, rather than the whole. This then means ignoring universality. A viable science must recognize the un-universality of universality to be able to recognize phantomness.

The New Paradigmism

This too then means something special about scientific paradigms and their construction. This viable science now recognizes the un-universality of universality. This means knowing that a model does not have to be accurate, correct, or useful to be scientific. With this in mind then, the question of the paradigm arises. Namely, what even is meant by paradigm? In theory, the paradigm is that which governs what is right and wrong. But as stated before, this understanding of the movement of knowledge is itself a paradigm which may be substituted out and considered as faulty—it is provisional provisionality.

The concept the world is governed by paradigms arises naturally from the Nietzsche understanding of perspectives raised by phantomness. But this paradigm of paradigms (paradigmism) does not have to be absolute or objective. At first glance, this revealed the provisionality of perspectives and methods. This is short-sighted.

In the case given, such provisionality is that of perspective and interpretation. But, the concept of paradigmism requires more. Its interrogation of itself suggests a provisionality of answers and conclusions as well. It is not simply the perspectives that may or may not be correct. The very world that is spoken of is provisional, as it too is paradigmatic in nature. This conversely means science is a paradigmatic entity. It relies upon the world's paradigms of itself. Or, the world's answers to our interrogations of it may change to fit the value of the world's paradigms.

In a sense, this paradigmism suggests the world is itself provisional. In essence, the world is paradigmatic, as are we. Now a method can be revealed, for what is truly being said is the world is uncertain in a way heretofore unimaginable.

(Un)Certain Science

Based, then, upon all of this, the answer to scientific methodology in the face of phantom problems is that of uncertainty. Specifically the new, viable science is an (Un)Certain Science, one which is uncertainly uncertain. This is strange given the lack of the use of certainty throughout. But certainty here simply is a replacement for knowledge and truth. Since truth and knowledge have been utterly destroyed by a more complete rendering of phantomness form the Nietzschean lens, these terms become meaningful only rhetorically within science. Therefore, something else must be used: certainty. This term has previous weight but suffices. Perhaps it is not knowledge or truth that governs science, but absolutism. Clearly objectivity has been removed, but absolutism has not been attacked. However, without objectivity, how would we ever know if it was truly absolute, truly certain? Thus, (un)certainty.

This is all made clear by a reading of Planck's quantum under a Nietzschean interpretation recast into contemporary scientific critique. This perhaps suggests the exact reason Planck was so hesitant to establish the quantum paradigm. If, indeed, science is now (un)certain, it would seem it is a pointless pursuit. Alas, that is so untrue. Instead, science is given back a potentially higher purpose. If science is given free reign to create laws and explore the potential of those creations, then it is no longer constrained. It is free to discover all the various truth illusions out there without fear of the nature of the current paradigm.

But, once again, this too reveals the truly worrisome side. If true, then knowledge and claims to truth are fleeting. We must be ready and willing to constantly renegotiate with our drives to truth. Specifically, if quantum is just a paradigm, then it too, like any other paradigm, could and probably will be replaced. It does not last long and is not truth. This means that at some level, we must accept its inability to fulfill our drives to truth. We must be constantly searching.

This, revealed by quantum itself, must make us question our world as truth. The world, with which we have so long lived enamored with it as truth, ceases to fulfill the truth drive. Quantum makes us question the world and quantum itself. It is not a human fault. Instead, the world is acting just as illusion. So based on these points there is a certain inevitability: problems, answers, and perspectives are provisional. This provisionality is itself provisional. Consequently, science is not about providing a real and accurate world, and is certainly not about discovering more truth. From this, it can be seen that the world is not only nonobjective, but constantly (un)certain.

If this is true, then the basic premise of science up until now is question. That is, it has been believed that the issue with scientific discovery is human inaccuracy. It is the human measurer that introduces inaccuracy. This is truistic. It is also incomplete. It is not just human observers. It is also the world itself as an anthropomorphized symbol. The world is inaccurate. Therefore, an (Un)Certain Science poses a discomforting critique of empiricism: perhaps it is not us who are the problem, but world itself. Perhaps the world is never truly ready to reveal herself, and we are always left guessing. Perhaps, like Nietzsche's Sophia, the world has grounds to not reveal itself, but we are always ready to interpret and misinterpret her in return. Perhaps, the world's inaccuracy manufactures our inaccuracy.

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