Unity and Science | Grégoire Gindrey, Alizée Weber, Caroline Ciric, Alexander Régent, Marie de Azevedo et Pierre Hirschler.

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Is there anything that physicists find more fascinating than a unifying *theory of everything?* This theory of everything would be able to encompass all of the different models used in physics, such as Einstein's Relativity and Quantum Mechanics, while also explaining discrepancies in Einstein's model at very high energy levels. In short, physicists are looking for a theory that can effectively unify all of the laws. This theory does not have to be in itself the end-all, be-all of science: it's purpose is to create a framework of sorts where all ensuing discoveries can fit, without fundamentally altering its unifying aspect.

Finding such a theory is problematic from the very start. First of all, the models currently used are not unified for a simple reason: they are contradictory. Gravity does not work the same in Newton's model, Einstein's general relativity, and Quantum Mechanics. If even the fundamental interactions are not coherent, then one can wonder how scientists hope to unify these models. It's important to note that none of these models are "truer" than the other ones. They are just that models, and not reality. So just concluding that Newton is wrong and Einstein is right is a naive mistake. What is important to understand is that there is nothing inherent in these models that can make us think that they are unified in some way. The idea of Unity is not derived from the models themselves, but is something that physicists try to force on them.This brings up a logical and an ontological problem: is Unity even necessary in regards to the various models of nature we have? Why do the different models need to be unified, and aren't they not as valid without this concept of Unity? Yet, this has not deterred scientists from pursuing said Unity, which therefore raises a psychological and epistemological question. Why are scientists so fanatical about unity, and does science gain anything from it?

The search for unity and for a "Theory of everything" goes against Kant's Transcendental Logic. Indeed, if unity is but a category, a tool, out of reach and transcendental in its very own essence, how could it simultaneously be an object of knowledge? And if unity is, indeed, impossible to reach, then why do scientists strive to unify Nature? Philosophers like Etienne Klein or Gaston Bachelard have offered valuable insights on this paradoxical search and on other obstacles, referred to as epistemological obstacles by Bachelard for which he proposes a psychoanalysis, by studying its psychological causes and evaluating its possible benefits, demonstrating that although unity is out of reach it still is a major drive for research and curiosity. Unity produces theories that in turn, when rebutted, trigger scientific progress and expand men's understanding of the world that surrounds them.

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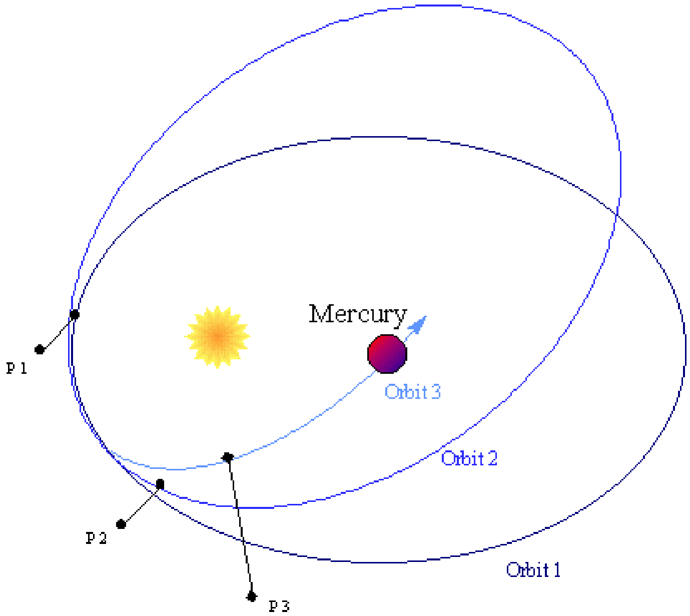
As stated earlier, it is important first of all to understand that no model or theory is superior to another scientific model or theory. Einstein's General Relativity does not disprove Newton. Rather it exposes its limits, giving it a proper frame of reference. Newton might not work on a cosmological scale, but when dealing with interactions on the surface of the earth, it is as valid as Einstein's General Relativity. Unity seems elusive, since we use many models that can sometimes be even contradictory. Take for example the frame of reference that Newton used to construct his gravitational model. Newton built the gravitational model, which is known today as classical physics. Early science explored phenomenons of daily life: dropping weights, rolling balls etc. in order to understand nature. Newton was able to synthesize everything known about movement on Earth in a few mathematical equations, establishing the basis of classical physics. Newtonian mechanics, formally known as classical mechanics, are applied in what is called a Galilean frame of reference, or an inertial frame of reference. It describes space as homogenous, which basically means that space is the same everywhere in every direction and also completely independent from time.

The core principle of Newton's work is that if you know the positions and velocities of all objects at a certain moment (the "initial moment") and thus their instantaneous accelerations, you can calculate the positions and velocities of these objects at any other moment in time, with Newton's equations. Additional equations were required, and were successfully implemented by the Scottish physicist James Clerk Maxwell more than a century later by extending the framework of classical studies to include magnetic and electrical forces. This principle is called scientific determinism, in which every event has a specific cause. It can be seen in such constructs as Laplace's demon, an "intellect which at a certain moment would know all forces that set nature in motion, and all positions of all items of which nature is composed. If this intellect were also vast enough to submit these data to analysis, it would embrace in a single formula the movements of the greatest bodies of the universe and those of the tiniest atom; for such an intellect nothing would be uncertain and the future just like the past would be present before its eyes" according to Pierre-Simon Laplace, Newton's devoted admirer, in *A Philosophical Essay on Probabilities*. Prigogine and Stengers mention how Newton's work in the field of dynamics is based on reversibility, the law enabling any object, all forces having been applied inversely from a specific point in time, to return to its position in the "initial moment" and before. Thus, with such an equation, the past and future of all objects and movements can be determined by a complete knowledge of the present.

With Newton's established equations, it was understood that objects and people moved, but in which reference did they move? The obvious answer seemed to be space. But what is space? In *Principia Mathematica*, Newton states that space is an "absolute and immutable entities that provided the universe with a rigid and unchangeable arena". This means that in the frame mentioned earlier, space is homogeneous and isotropic. On a macroscopic scale, the scale at which things are visible to the naked eye, Newton's laws of gravity and motion can accurately describe the trajectory of a bullet leaving the chamber of a gun.

However if we took a much bigger gun, say the size of our solar system, and shot a sun-sized bullet near the speed of light across the galaxy, Newton's law would give us inaccurate results. Why is that? Well, while the Newtonian model is very accurate at the scale of the Earth, it doesn't work at the atomic level and isn't always applicable on a planetary scale. Observations of Mercury perihelion of precession, for example, did not match what Newton's law of gravity predicted.

To understand what the problem is, we first must understand what Mercury's orbit resembles. Mercury's orbit around the sun is thought to be an ellipse, but only approximately. Mercury's point of closest approach to the sun is not always in the same place. Thus, the rotation of this orbit is called a *precession*.

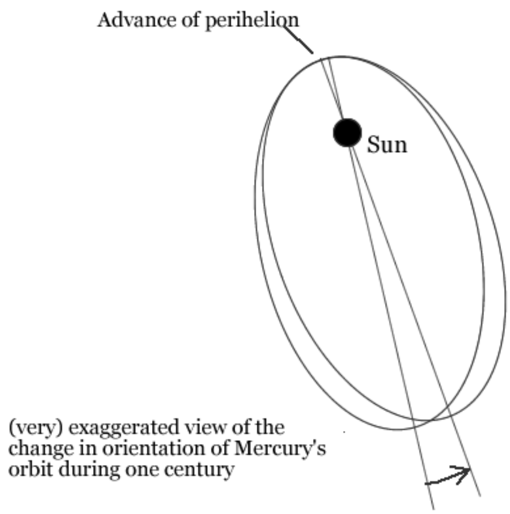


The advance of the perihelion of Mercury

The peculiarity of this orbit is not specific to Mercury. Indeed, *all* planetary orbits have this pattern. Newton's theory predicts this precession, as it derives from gravity, the force that links all objects that have mass and pulls them around each other. But the inaccuracies of Newton's predictions relate to the *amount* an orbit precesses. Indeed, it does not suffice to know and understand what is the origin of an effect is. Credence can only be given if hard numbers, mathematical proofs and demonstrative arguments are provided. In fact, Newton's equations can provide a greater precision to the precession of the orbits of all planets except Mercury's.

Calculated from Earth, the precession of Mercury's orbit is measured to be 5600 arcseconds per century, or about 1.555 degrees. If the effects of gravitation from other planets and the fact that the earth is not an inertial frame of reference are considered, there is a precession of 5557 (about 1.5436 degrees) seconds of arc per century. There is a variation of 43 arcseconds (0.0119) per century.

This difference cannot be accounted for using Newton's equations. Many hypotheses have been emitted, like the assumption that a certain amount of dust existed between the Sun and Mercury, but none were consistent with other observations. But no evidence of dust was found when the region between Mercury and the Sun was observed. Another hypothesis, developed by Urbain le Verrier in 1859, was that a small planet, Vulcan, orbited between the Sun and Mercury, altering its perihelion precession. For several decades, astronomers unsuccessfully searched for Vulcan by looking for its transits in front of the Sun. Finally, in 1915, Einstein, using General Relativity, was able to *predict*, without any adjustments or modifications of his theories, that the orbit of Mercury should precess by an extra 43 seconds of arc per century.



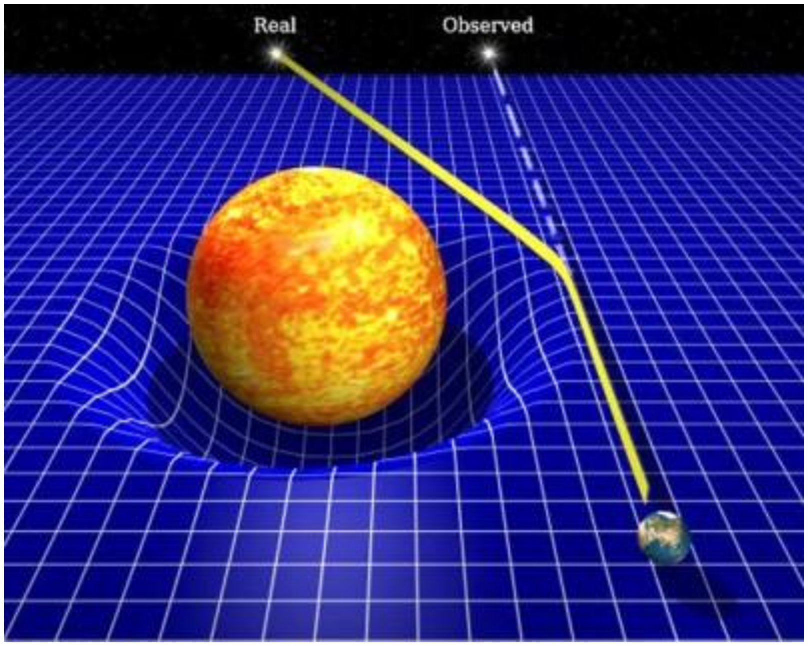


Diagram of Spacetime curvature with planet Earth : the star's position in the background appears shifted to the observer from Earth. This effect, greatly exaggerated here, is due to the curvature of space induced by the Sun's gravity. The same effect applies with Mercury's orbit, only for this planetary body is particularly close to the Sun, the effect is much greater, hence Newton's laws limit of precision is in this case widely exceeded.

Einstein's theory of general relativity, which states that observed gravitational effects between objects derives from their warping of both space and time, helped prove that Newton's equations were insufficient to depict all movement of all objects. But what were some of the elements that helped Einstein establish his theories? What other concepts did these theories introduce that only reinforced the inconsistencies that existed within different physical models?

General relativity accurately predicted Mercury's orbit and corrected other errors of Newton's theory. The main difference between the two models is their conception of space and time. As we saw before, Newton's equations only included gravity at first; magnetic and electrical forces were introduced by James Clerk Maxwell in the 1860s. After this extension, physicists believed that their field was on its way to the finality that all things that needed to be known had been discovered. But in 1900, Lord Kelvin noticed that these equations were not sufficient to describe the properties of light's motion and light emissions from heated objects. Thus, with the idea of a "complete physics" destroyed, a scientific revolution began. Einstein's role was key in the revolution, as he noticed many flaws in Newton's conceptions of space. In the spring of 1905, he determined that space and time are not absolute or independent. 10 years later, he rewrote the laws of gravity, proving that space and time constitute and unified whole that warped and curved affecting cosmic evolution. Newtonian physics capture our physical experiences mathematically, but pure reality is not always the reality of our world. Ours is relative. Only larger, extreme circumstances can cause a deviation between relativistic and classical physical reality.

But how did Einstein prove this cosmic evolution? And what are the warps and curves that characterize them? With special relativity, Einstein demonstrated that any observer cuts up spacetime into parallel slices that he or she considers to be all of space at successive moment of time, depending on where they are in space and the speed at which they are moving. If one observer starts to accelerate, the moment to moment changes in the speed and/or direction of motion would cause changes in the angle at which the slices are cut. Thus, the accelerated observer carves *warped* spatial slices. But according to Einstein's principle of equivalence, where gravity and acceleration are equivalent[1], Einstein knew that gravity must be nothing but warps and curves in spacetime. If we imagine an empty universe - no sun, stars, planets, warps or curves - it's flat. Einstein imagined that presence of matter or energy affects space by causing warps and curves. Anything moving through this warped space will travel along the curved trajectory. While, as seen above, Newton's model is based on a universe in which space is the same everywhere and is independent from time, Einstein's model unites space and time with both elements being able to differ from one point of space-time to another. Gravity acts on spacetime like a ball on a stretched piece of cloth: it deforms it by bending it.

But that's not the end of our problems. While Newton's theory is very accurate from a macroscopic scale up, it gets muddy on a quantum scale - the scale of elementary particles - and when huge amounts of energy are taken into account. To describe interactions between particles, we're forced to use a completely different model: quantum mechanics.

The concepts of past and future in relativistic physics are much more subtle than in classical physics, but relativity equations still allowed determining of elements of present. So physicists needed to introduce a conceptual representation called quantum physics. But according to quantum laws, even the most perfect measurements possible of how things are and behave, the best that can be done is the prediction of the probability that things will be one way or another. Thus, the universe is not entirely entrenched in the present, according to quantum mechanics, the evolution of the universe depends entirely on probability and chance. With, quantum mechanics, things become definite only when observation forces create quantum possibilities and settle on a specific outcome. This outcome cannot be predicted, but we can predict that there will definitely be a probability to define whether or something will turn out one way or another.

When Newton established his three laws, the scientific community thought the discoveries determined and described all motion and action that had ever and will ever occur. He established the framework of classical physics with his laws of motion, as well as James Clerk Maxwell's theory of electromagnetic radiation. This framework can be divided into fields like mechanics, dynamics, hydrodynamics, thermodynamics, acoustics, and optics. Yet the start of the 20th century marks a new period for the science community, revealing there was far more to physics than the ideas of movement and dynamics, and many more scales to discover. Max Planck began exploring the idea of tiny units of energy he called quanta, introduction the concept of quantum mechanics, a new field of physics that treated phenomenons on small scales, where Newton's equations can not be applied. The rest of the 20th century, from Einstein's work on relativity, the elaboration of string theory in the 1960s and the discovery of the Higgs Boson in 2012, provided proof that Newton's work in the 17th century was very incomplete, and represented only a single frame of reference for the study of physics.

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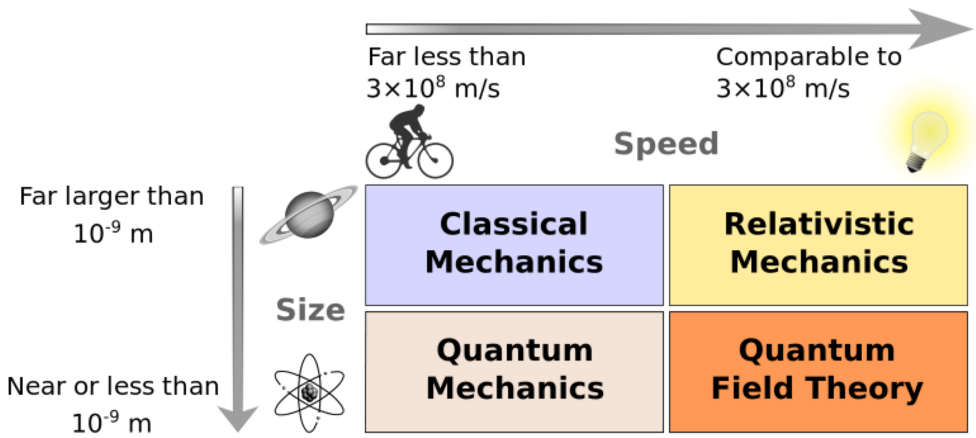
[1] Accelerated motion is very different from relative motion. For example, when one is squeezed against a car if it accelerates, you *feel* acceleration, there is no way to avoid it. The only way to do so would be to not accelerate the car. We observe the same characteristics in gravitational forces. There is a way to protect from electromagnetic and nuclear forces, but not from gravity. By changing motion, you can avoid feeling sensations associated with the movement. Einstein thus concluded that the forces felt from gravity and acceleration are the same, discovering principle of equivalence.



The four main fields of study in physics

This troubles many scientists: how can two completely independent models provide exact results in different frames of reference? The answer can't be that one model is right and that the other is wrong, since they are both right in their own frame of reference. This has led some scientists in a quest to find a theory that engulfs both models: a theory of everything. However, nothing indicates that such a theory actually exists. There is nothing in these models that show us that Unity plays a quintessential part in the interactions that govern our world. Physics can, and has, worked without this concept of Unity.

Although we've shown that unity is not necessary in physics, as our different models work perfectly in their respective frame of reference, we still haven't formally disproved the concept of unity. To do so, we'll first reflect on whether or not we have access to nature in itself, which is to say whether or not our observations reveal something about the object in itself. The famous German philosopher Kant argued that we only have access to the phenomenon, and not the object in itself, which makes the nature of our knowledge not objective but inherently subjective.

Phenomena can be studied and linked to one another by using Kant's categories, which he develops in *Critique of Pure Reason*. There are four main categories: Quantity, Quality, Modality and Relation. Unity is a sub-category of the category of Quantity. Therefore, unity allows us to find and quantify the relations between phenomena. Yet, these categories are useful when applied to phenomena, but cannot be studied in themselves. No knowledge can be derived from an analysis of a Kantian category, as they serve merely as a tool. This means that these categories, including unity, transcend our understanding. An analysis of unity is an exercise in metaphysics. However, unity is also an important concept in physics. Physicists are always looking for a "theory of everything", that manages to tie Einstein's Relativity and Quantum Mechanics together. So we can ask ourselves if Physics gives itself, unwillingly perhaps, a Metaphysics, since it seems to rely so much on Unity.

The first part of Kant's magnum opus *Critique of Pure Reason* revolves around what Kant calls Transcendental Aesthetics. In this Transcendental Aesthetics, Kant discusses the notion of time and space, and most importantly our representation of these two notions. Kant's reasoning goes like this: we can never picture a geometric shape or any object without having an *a priori* intuition of space. This basically means that it is impossible to picture a material object without placing it the context of space. The same can be shown with time. When we think about two events in succession, we already have an *a priori* intuition of succession. Without the intuition of time, the very concept of succession is devoid of any meaning. The two intuitions are pure (existing in our minds), and not empirical, because they need to be present in our minds *a priori*. They cannot be derived from an observation of a material object or an observation of two successive events, because they act as conditions for the existence of such phenomenon. The term phenomenon is used in this context, because transcendental aesthetics does not tell us anything about the object in itself. We can only hope to know more about our representation of said object (the phenomenon). Therefore, these two intuitions set up the framework of our own knowledge. These two intuitions seem to limit our own knowledge, since we cannot hope to find out more about the object in itself. However, this Transcendental Aesthetic is essential for scientists, as it allows them to formulate apodictic (both universal and necessary) laws. While empirical research can only hope to create general laws, Transcendental Aesthetic makes it possible to derive universal and necessary laws from our representation of an object applied to these two intuitions.

The intuitions of Time and Space have to be subjective, which means that they are situated in one's mind. If one takes the principles of geometry, for example, one notices that these principles are by their very nature apodictic. This means we need some conception or intuition to arrive to such conclusions. However, they cannot be empirical conceptions, because only general laws can be derived from such conceptions. They must thus be intuitions. These intuitions have to come *a priori*. As Kant puts it, we cannot deduce the concepts of a straight line from the proposition: "Two straight lines cannot inclose a space; and with these alone no figure is possible." The intuition of the straight line must therefore lie *a priori* in our mind. Space and Time are therefore *a priori* intuitions. However, since they are by their very nature subjective, it goes without saying that we cannot attain the object in itself, through the lens of these two intuitions.

Yet, it seems that Einstein's relativity and Quantum Physics defy Kant's notions of space and time. In Einstein's relativity, space is malleable and time can be deformed by gravity. It seems that Kant was wrong when he said that Space and Time are subjective. But it is important not to confuse the intuition of Time and Space to time and space itself. The two intuitions are not connected to the "physical time" in that they are necessary conditions for the existence of phenomena. They still have their role to play in that without these two intuitions, geometry and mathematics are impossible, as their propositions rely on the intuitions of Space and Time.

Physicist are passionate about unity (as we can see with attempts to unify the different models), although, as we have seen earlier, unity belongs to the metaphysical realm, which, by its very definition transcends physics. So why are scientists so intrigued by unity, if it's in essence metaphysical and not scientifical? Is the desire for unity akin to a histeria, since scientists find it appealing but cannot find it through science?

Something that Etienne Klein has pointed out, a physicist who has done work in philosophy of science, is that science, or rather the 'scientific goal' has necessarily metaphysical foundations. Part of the goal of science is to define concepts which have a metaphysical scope, such as "time, space, objectivity, causality, and unity". Yet in a scientific context, philosophical debate and definition about these concepts is limited or nonexistent. The concept of unity, which we focus on in this article, is an example of such a strangely-treated part of science, and in particular physics, as Klein argues in his book *The Unity of Physics*.

It can be said that science, or rather, scientists, physicists, and mathematicians, strive for unity while avoiding defining it or explaining why. We could consider omitting mathematicians from this list, since in 1931, Gödel essentially proved that mathematics as we know them are incomplete. This demonstrates a certain acceptance of the incompleteness of things, of the impossibility of absolute unity and knowledge. But still, why do we want unity? According to Klein, because we have monistic tendencies which can be traced to a number of sources. The first more obvious one is monotheistic religion, which means explaining all things with a single omniscient entity responsible for all aspects of all things. Monotheistic religion, differently from polytheistic religion which typically assigns a specific area of responsibility to each of many deities, means to explain all things with one source. There is also a deeper source, the desire for knowledge, which comes from our frustration at not being able to understand all things, and which drives us to go to unreasonable lengths in order to assimilate and synthesize known things. So, as Klein points out, there is a sort of absurd wish for absoluteness in the sciences, coupled with a general refusal to talk about this desire or clearly define it. This makes for a vague and inarticulate desire stemming from tendencies which can be characterized as whimsical or unreasonable, even.

On a purely logical standpoint, studying unity in itself is illogical in a scientific framework. As we've seen earlier, while science uncovers knowledge by applying the two *a priori* intuitions of space and time to phenomena (Kant's transcendental dialectic), studying unity pertains to metaphysics. Scientists who try to analyze unity in itself do a critical mistake, a bad use of Kant's categories. These categories are there to analyze the phenomena, and not to be analyzed in themselves. A scientist that tries to analyze Unity, or another category, necessarily steps out of the boundaries of science and lands in the world of metaphysics.

This desire for unity and unification is also, in a certain sense, paradoxical. Even while science presents itself as a unified whole, it divides itself into smaller and more specific areas. By wanting unification, or grossly, a single "theory of everything", we also want drastic synthesization and limitation. But more importantly, a "theory of everything" would mean the end of research and the 'quest for knowledge'. That is the absurdity that Klein points out. While this desire is impossible and even foolish, argues Klein, it drives scientific research and curiosity, drives the quest for knowledge, even though its obtention would mean, ironically, the end of all these things.

Unity is an idea of pure reason. Nothing in the phenomena presupposes the existence of Unity. In the appendix *Of the Regulative Employment of the Ideas of Pure Reason*, Kant explains that these ideas are transcendent, which is why they cannot be the subject of a study. The idea of Unity in science implies the idea of Unity in nature. This explains why the Idea of Unity is necessary in science. Although it is impossible to find said Unity, it is only by looking for it that we can formulate laws with apodictic certainty. If we were not looking for Unity, then it would be illogical to find laws that are universally applicable.

There is therefore an important area of metaphysics that goes hand in hand with science. It is hard for scientists to accept this, as they cannot apply their scientific model to this metaphysical aspect of their area of study. But the Idea of Unity - transcendent so metaphysical - is what validates science and gives the attributes of universality to the laws of nature. Scientists have to accept this presence of metaphysics if they wish to continue on their quest for knowledge.

The search for unity is but one of many obstacles that scientists have to face during their quest for knowledge, as demonstrated by French epistemologist Gaston Bachelard in his works *The New Scientific Spirit* (1934) and *The Formation of the Scientific Mind* (1938). For Bachelard, in order to study the obstacles facing scientific knowledge, we must not consider "external obstacles, like the complexity and transience of phenomenons, nor incriminate the weakness of human senses and mind" but discern "the delays and troubles" which appear at the core of the act of knowing. "It's in terms of obstacles that we must present the problem of scientific knowledge". Thus, he defines the notion of an epistemological obstacle as anything that, in the very mechanism of knowledge, halts its development. The main epistemological obstacles come from various causes. One of them is prejudice. Indeed, for Bachelard, "the mind is never young," in other words, it presents itself before scientific research full of preconceived ideas; it is "as old as its prejudices." Indeed, Bachelard critiques the scientific attitude which aims to accept conclusions and theories without even testing them. An example that comes immediately to mind is Newton's understanding of space and time. In Newton's model, space is the same at every point in space, and space is isotropic - the same in every direction. However, Einstein's model shows that space and time are both relative. For Bachelard, such an approach is totally antithetical to the scientific method; scientific knowledge is an active process which cannot be achieved through the mere acceptance of the comments of others. The scientist must then fight against certitudes without proof, and against the faith which would drive him or her to be satisfied with them. Scientific knowledge is a process of rebuttal. Bachelard's argument here goes against Kant's a priori according to which "We possess a certain amount of knowledge *a priori* (as opposed to *a posteriori*) that even common understanding never lacks." and favors a framework that is more contingent yet nonetheless determining in the evolution of research. Admiration and images are other causes at the stem of epistemological obstacles. In fact, the scientist must constantly be wary that s/he does not replace knowledge with admiration and ideas with images. Bachelard says "A science which accepts images is, more than any other, a victim of metaphors. Therefore the scientific mind must constantly fight against images, analogies, and metaphor." In fact, images could not alone be sources of knowledge because they do not allow for the elaboration of theories and rigorous conclusions. Bachelard also insists on the fact that "the most obvious features are not always the most characteristic features." He warns against "first test positivism". He explains that "Simple ideas are work hypotheses, work concepts, which should be reviewed in order to receive their rightful epistemological role. Simple ideas are not the definitive basis of knowledge." Finally, the author reminds us that "there are no primary truths, there are only primary errors." Indeed, that which is primary is not truth but error, and that is why scientific knowledge is a process of rebuttal as Karl Popper characterizes it. A theory only becomes scientific if it is rebuttable, in other words if we can conceive of an experiment in order to test it. We can go even further than this to say that a theory is never as scientific as when rebutted**.** Indeed, however paradoxical this affirmation might seem, it is only when we rebut a theory that we become aware of its limits, of the repository to which it pertains, and that we can then use it to obtain pertinent and useful results. In addition, by being rebutted, a theory enables science to advance since this rebuttal brings the formation of a new theory which will in turn be rebutted. For instance, it is only when we rebutted Newton's laws that we defined the repository and situations in which to apply them.

To respond to the problems caused by epistemological obstacles, Bachelard introduces what he names the psychoanalysis of objective knowledge to get rid of intellectual and emotional projections that prevent the objective knowledge of the studied object. This psychoanalysis stems from Bachelard's suspicion that epistemological obstacles originate from an unconscious form of objective knowledge. Indeed, he states that there are many scientific works in which the influence of the libido and the imagination, linked to the Freudian unconscious, are clearly noticeable. Scientists often describe chemical reactions in a sexual framework, likening the reaction to the union between two bodies. Thus, Bachelard states that "All emerging objective science passes through a sexualist phase." To Bachelard, this step seems inevitable, albeit unscientific. Therefore, the psychoanalysis of objective knowledge that Bachelard puts forth would allow reason to externalize preconceived ideas, prejudice, and the images that fill and haunt it, in order to rid itself of them.

In his works, Bachelard also highlights the paradox that is created by the search for unity in science. Indeed, the scientific method, which proceeds by rebuttal, directly opposes unity. "We often say that science is eager for unity, and that it usually identifies phenomena with varying aspects, or that it seeks simplicity and efficiency in principle and in method. Science would quickly find such unity if it could enjoy such circumstances. On the other hand, scientific progress is clearly indicated by the abandonment of "easy" philosophical principles of unification like the unity of action of the Creator, the unity in intent of Nature, and the unity of logic. Indeed, these factors or unity, still active in the pre-scientific thought of the 18th century, are never mentioned again. Today, any scholar attempting to reunite theology and cosmology would be dismissed as a pretentious fool." Besides, many scientists search for unity by assuming it beforehand. What this means, though, is that they specifically direct their research in such a way that their conclusions are in harmony with their preconceived idea of unity. These sorts of ideas are specifically targeted by Bachelard's psychoanalysis. However, if a scientist uses the concept of unity as an axis of research and not as the goal of his research, just like a sailor navigates a course by following a star knowing all the while that he will never reach it, the quest for unity can present several benefits. In such a framework, the search for unity would guarantee an imagination favorable to the act of knowing and to scientific knowledge, since it would foster creativity and, by this means, become a source of scientific progress.

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It is evident that science can easily forgo the concept of Unity and still function well. The fact that we use two contradicting models in Physics - Einstein's General Relativity and Quantum Mechanics - indicates that we can still pursue our quest for knowledge without the need for a unified theory. Moreover, Unity cannot even be a source of knowledge, because, as a category of quantity, it is transcendent, outside of the realm of our understanding. The search for Unity is therefore inherently metaphysical. Nevertheless, although it seems unfit to talk about the search for Unity in science, the idea of Unity plays an important role in the psyche of scientists. This idea pushes scientist to look for different answers, thus expanding human knowledge. Unity is necessarily out of reach of scientists because of its transcendent nature. While the search for Unity is in itself a fool's errand, it still has its role to play: this belief in Unity allows scientists to figure out solutions to the problems they encounter, and by doing so, expand our knowledge. A scientist cannot rid himself of all prejudices before doing science. While some may mask sources of understanding, others, like the preconceived concept of Unity, actually indicate which paths to follow to uncover new discoveries.