

# What Science Is

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Alex Buckley

Central Organizer of New General Management

Written for and Dedicated to the Kiwi Farms

The purpose of this text is to inform the Kiwi public about the nature of science. “Popularizers”, “Communicators”, and liars discredit science for their own personal gain in payment or popularity.

## What Science is not

Science is not truth. Science is not the verification of truth in specific or verification in general. Science is not the repeatability of experiment: it is not uncontroversial; it is not testable proof. It is certainly not objective, and no two people will ever see it the same way. The limits of our human lives prevent us from ever fully exploring the available contents of human knowledge. The average university library may contain fifty thousand books and a dedicated reader may complete fifteen thousand in their lifetime. Every scientist will be left with gaps in their knowledge, no matter how dedicated they may be.

Human experience, the sum total of human perception and theory, is too much to ever possibly be understood by a single person. The absence of knowledge is two-fold: an unaware person is unaware that they are unaware. Therefore, because of these epistemological issues, no human can ever contemplate all of science, or even imagine himself being capable of such a thing. And if no human fully understands the available science, can he claim to be a scientist?

The reason why men can study science while being unaware of their study is because science is not the repetition of facts: it is not the ability to recite taught lessons, or to reiterate solutions to known questions. Science does not depend upon a knowledge of already discovered things. Science does not require formal training in procedures, traditions, dogmas, or other explanations. Just as no one human can ever contemplate all of science, no one can ever construct a single unifying theory or easily communicated model of science to act as a standard.

It seems that the postmodern public has taken science to be their new religion. Modern science is infected by a pseudo-religious hunger for authority, which masquerades as truth. They attach to science all the old ceremonial ornaments that religion used to wear: truth, verifiability, access to knowledge, control over nature, fate and destiny, man's place in the world, and the existence of higher life or the afterlife. In my experience science has led me to no conclusive answer, just my own satisfied opinion.

Science is far too dangerous for such blind assignments. Scientific claims need to be clear and distinct: they cannot be incorrectly stated because the implied thought is simply too much to bear. Because of this implication I do not buy into the concept of innocent knowledge, nor that of a "privileged" position. Every act of acquiring and expressing knowledge is, at its core, an exercise of influence or, at the very least, possesses the potential for such influence: knowledge is inherently power.

This kind of limited thinking that I argue against is exactly the opposite of thought fostered by scientific exploration. Such vulgar interpretation of appearances does not bring understanding, much less guide future exploration.

## Human Experience

The origin of science lies in human sense perception. Lacking any other tools to meaningfully explore the world, man uses his senses. The situation is the same today. No further progress has been made in actually *seeing* nature, and not just seeing it. Actual perception of the thing is achieved by abstract understanding of things unseen. Man has not increased his ability to perceive nature; he must arrange the experiences he recollects in his own mind, and with a mental map he may then be able to traverse nature.

## The Error of Primacy in Sense Perception

Fools may disagree with the assertions that I have made above: they may try to argue from sense or instrument perception. Every mercury thermometer works in exactly the same way, given similar composition, they say. The microscope allows us to visibly perceive microorganisms and the thermometer provides reliable data points. Ah, but what of the artifacts they produce, the hidden assumptions carried into investigation, or the information that is lost by opportunity cost!

Let's not forget the fact that the data points are arbitrarily assigned meanings and have no inherent value on their own. We decided that these measurements would be meaningful: how convenient! Which parts of the observation are purposefully ignored? The instrument has been calibrated subjectively, and gives no objective measurement. We may not always know exactly what our biases are when we make our observations or instrumental pointer readings, and we may disagree with those biases, and wish to cover them over, but we can be sure that we do not make objective, universal statements. Observing the microorganism from one perspective denies the observer all other perceptive possibilities at that moment! A certain price is built into nature! Heisenberg has already helped us understand this phenomenon at a physical level, with the uncertainty between position and momentum. No one, *ever*, will be able to fully perceive the situation as it truly is. Information, and a significant part of the available observational information, will inevitably be lost, in such a way that is nonrecoverable. Accuracy and precision, supposed columns of scientific rigor, are nowhere to be seen.

Our perception of reality hinders us from seeing it as it really is. So why not put on some blinders and try to look ever more carefully at the object? Is that not what science is? An exclusive exploration of a single particular subject at the expense of others? This makes the

situation worse! The observer becomes even more blinded to reality than before. Excluding some parts of the whole at the expense of others is sure to lead to error prone models, or, at the very least, an empty, disconnected, theory.

Can the scientist not just construct instruments that more precisely measure nature than our own senses? The problem then is one of precision, and if science purports to understand the truth, or in other words perfection, then the precision of analysis also needs to be perfect. An imperfect description is just another guess with limited applicability. Does science not claim to be universal? A universal understanding with universal applications? No! This is the result of fools who speak about subjects of which they don't really understand!

*It is critical to know that information is never contained and can only be interpreted.* As a consequence of this simple fact, there is *no* inherent information *contained* in *any* sense or perception or instrumental reading: these results can *only* ever be interpreted. Here lies the issue, the far away object and the limited interpretive subject. Personal subjective experience is popularly held to be the antithesis of scientific methodology and understanding, but, for us, will serve as the basis of our thing.

Because of the nature of information, by its interpretation, inner experience can never be accurately communicated and received by anybody else. Both the transmitter and the receiver of information must interpret, and therefore no objective information can be received. This is a very tricky situation, magnifying the already inherent issues, and has led to the popular insistence upon confusion, arrogance, and ignorance of today's science.

## Science as Personal Interpretive Activity

Science is each individual's interpretive relationship with nature. It is highly personal, subjective, and incommunicable.

## Other Epistemological Issues

In the first edition of this text, I received a comment that falsification is the only way to know truth, a Popperian sentiment. I find this philosophy (Poppers) to be lacking in its creative ability. This negative methodology can only prove ideas wrong, and can never suggest what a thing is or the way forward to knowing that thing. If a soulless science is desired, Popper provides. Probability comes up short for similar reasons. I do not care about the how or the statistic of, but the why. Probability can only tell the experimenter about the chance of some result, and not why it is that result occurs. Empiricism would be fine if not for the fact that the subject matter, facts, are inherently non achievable without the reminder of personal understanding. Please explain to me the "interpreted empirical fact".

## Science

Science is any formal exploration of a domain of nature. It is any organization of ideas. This could be for any human experience but is best known for physics, chemistry, and biology: the hard sciences. This has been happening for over two millennia and started with the Greeks.

Science is, through this exploration, the personal relationship that man has with nature. This is frequently remindatory, and these moments I have named clairvoyance: sudden glimpses of brilliance that flash in the scientist's mind upon connection with some idea. I do not view science as being a collective or group action. Because of the reasoning above, my opinion of science is of a highly personal experience that is very difficult to communicate to others and (almost?) never understood correctly by another. I will cite Marx here, in that he claimed to not be the marxist that his interpreters thought he was.

Science is frequently expressed in the form of ideas, stories, mathematics, logics or abstract forms. The most common scientific product is the model, or a very precise tool scientists use to understand some one part of nature, but we must remember that the model in no way represents nature in the slightest. It is also becoming more common for science to be referred to as poetic. A modern form of the scientific theory is the metaphorical story, a means of carrying to the reader's mind the ideas of the writer. Journals, monographs, textbooks and university classes are all just stories told from this highly personal experience.

Scientists, in the course of their lifetime, will package these clairvoyant moments into narrative commodities and put them onto the market for other scientists to consume and interpret. While somewhat obscured by fancy and self important writing and presentation, scientific products are these kinds of personal narratives. Scientists like to call this "theory".

## Nature

Nature does not dictate to us in one specific description. Nature admits a class of equivalent descriptions that we pick from to use as a convention in a situation. Unless there is a direction of interest we do not observe at all. Our capacity to observe is limited, so we must decide for ourselves what will be important to us. Consumption is the specific arrangement of desired objects in our lives, and its organization or design that we decide for ourselves.

## Theory

Nature is, by its substance, capable of being understood through theory. A theory is a hierarchical classification and organization of ideas, sequential and consumptive. Just as a house is not just a pile of bricks, a scientific theory is not just a disorderly pile of learned facts. While no fact by itself ever proves anything, many facts can be arranged into a structure of theory that can produce understanding. This understanding only has two considerations: completeness and consistency. Completeness is the ability of theory to explain and provide a framework for known fact, consistency is the absence of inter contradicting and conflicting results or propositions. As already stated, no man can have a complete model of nature, so his model will always be in some way inconsistent and incomplete. His model will have loose ends and, upon construction, will suggest avenues to further thought. When these paths are followed, nothing new is learned: new ideas are only implied. Implication is very important in scientific exploration. This suggests areas of accessible but not yet explored thought.

Theoretical abstraction is the organization of knowledge acquired in given fields. These ideas and implications need to be arranged into a classification, or a web of interconnecting

concepts and their relations. This classification will be an abstract structure with inevitable gaps and holes. These are your markers for further study. Consumption is the act of managing these systems of thought, of balancing arranged ideas into an organized alignment. Care needs to be taken in the exact ordering and sequencing of ideas, of their relations with each other and as a whole. Absence also needs to be acknowledged, either as implication or as a part of structure itself. Ontology is crucial here, the sequencing of ideas, their origin, end, and teleology. A good idea arranged into an insufficient theoretical frame loses its explanatory power, and is forgotten until it is rediscovered and assembled into a better theory. A good theory oftentimes discovers identity in dissimilar phenomena. The prediction of future observations is both the goal and the test of practice in scientific theory: theory helps us by mapping out what we know and hinting at what is missing by providing predictive parameters. Finally, ideas themselves need to be understood: this is self reflection.

## The Origin of Theory

But where do these ideas come from, are they merely the caprice of the individual investigator? Yes! Indeed this is so! It should be hardly necessary for me to state that I am not interested in an uninspired theory of knowledge devoid of curiosity and remembrance. This is simply a matter of personal taste! Personality, experience, our very own existence! Nature is these things, and through them, us, recapitulates an already completed ontology. Through nature, its substance and function, an organ is generated, one that can reflect upon nature. This organ's evolutionary development, a trajectory in ecology, is each unique.

This uniqueness, this subjectivity, is the problem that I am presenting. Unless the investigator relies on himself he has nothing. Disinterested fools never think of anything and live poor, yet they have had a guide that is not their own thought! (*Applause*)

## The Error of Construction

Because of the above, we can be sure that knowledge is not constructed but instead interpreted or better yet, remembered by the investigator. I fail to believe that the answer to a simple mathematics equation is simply the result of the calculator performing the function: it is instead a set of a priori questions and answers that the investigator knows of or is capable of knowing because it already exists. A clairvoyant moment is not the exclamation of a completed project, but the recollection of something already existing and previously known.

## The Difference Between Theory and Application

While theory is the arrangement of facts in man's mind or on paper, he needs to gather those facts in the first place. Fortunately enough nature seems to be just overflowing with such offerings. There are so many facts that for many people the importance of the fact is its verifiability or authenticity, rather than its presence or lack thereof. So, how do we prove facts found in nature?

Before we begin we need to understand that science is only ever explained in part. Because of the limitations expressed above, we must live with partial explanation and personal

understanding. While there is no assured way to prove anything, there are a few methods to at least ensure reliability.

One of the ways to find theory is to discover relevant factors of the same underlying phenomena in two or more different parts of nature. It is highly unlikely that the same occurrence or mechanism is acting in two separate parts of nature and are unrelated. A familiar example of unification is Sir Newton's discovery, inspired by the apple falling on his head, that the same force governs both the motion of planets around the sun and the apple's descent (In addition to the moon's orbit and the action of the tides). These natural happenings were explored through theory, confirmed by experiment, and discovered to be unified phenomena.

## The Role of Experiment

Experiment is the testing of an a priori assumption. Experiments could only ever "prove" the assumption made by the investigator to himself. Hypothesis, or the origin of the idea, lies in the experimenter's mind. The purpose of experiment is the verification of the idea already assumed. Remember that for us the concern is the reminding of the idea, and not the truth value of it. Consequently the experimental parameters are all presupposed: verified experiment is not the origin of the idea. An experimental fact can only be used as a verification of proven assumptions in finding further ideas. This is the purpose of empirical experimental results and are in no way useful on their own except as data points in theory assembly.

In an experiment the scientist attempts to limit the outlying factors of investigation to more thoroughly examine the phenomena under inspection. Again, while no limit is ever good enough, a degree of exactitude is achieved and a measurement is taken. Further experiments refine the arbitrary measurements gathered. This becomes the verification of hypothesis.

Application is the name given to the interaction between theoretical science and nature. Application is merely the repetitive and casualized use of scientific theoretical instruments, whether they be material or mental. The reliability of data points to natural uses determines the degree of applicability in nature. Data points become concrete fact in the natural world, and nature regularly proves this fact.

## The Difference Between Science and Medicine

Medicine is a separate and little related field to science. It has its own traditions, instruments, and epistemology. Medicine is not science. Medical doctors may use the products of scientific investigation, but they are not themselves scientists and do not understand science. Medical doctors often take a minimum of scientific courses, most frequently cell biology, molecular biology, organic chemistry, and virology; physiologists study that and anatomy.

Medical doctors fail to understand scientific theory, the philosophy of science, the history of our studies and the deeper knowledge of philosophy. They, in my opinion, cling to the same postmodern understanding of nature as the rest of the popular public. "Truth", "certainty", and "reliability" are all non-scientific sentiments, but are in fact medical concerns.

Medical doctors have a fortune unavailable to natural investigators: namely that the subject of investigation is the same every time. An expected heart rate, blood pressure, and behavioral affect can all be reliably charted and studied and compared to a control that is known to be desired or otherwise true. Philosophy plays little role: this is one of the occupations in human experience where the “why” simply does not matter. To act, despite the individual subjective concerns of the doctor towards the patient, is the essence of the Hippocratic oath. Medicine is downstream from science, an application of its results with none of its philosophy or theoretical methodology.

## Further Reading

Jean Baudrillard, *The System of Objects*, Verso 2020

Ernst Cassirer, *Substance and Function*, Dover 1980

Pierre Duhem, *The Aim and Structure of Physical Science*, Princeton 1954