# Reality Depends upon How One Defines the Architecture of Existence

Mankind has, from its earliest beginnings, attempted to represent its experiences objectively. Processes of observation, investigation, discovery and verification have enabled such impressions to be clarified and the representation of findings more accurately registered. This has been what we like to call a rational process, justified as enhancements to our ability to secure our own interests. We have in this manner and over time "invented" the laws of nature. They are working hypotheses, practical bases from which we can, with a high degree of probability, expect to proceed.

Significance can be attached to Thales of Miletus' attempts to explain natural phenomena in the sixth century B.C. through systematic simplification and deduction. In this regard, Thales may be recognized for pioneering distinctions between reason and myth.

Pythagoras, the Greek philosopher of the sixth century B.C., perceived the point as the smallest unit of volume, much as the numeral 1 was the smallest unit of number, lending support to the idea that matter comprised aggregations of points – hence the notion of a digital foundation to reality.

If we look to history to found our understanding of time we will discover a multitude of conflicting concepts, none of which satisfactorily serves to bring unity to our knowledge, merely convenience. The Greek philosopher Parmenides argued in the sixth and fifth centuries B.C. that change was illogical, that logic, not experience, governed actuality, holding that observed events supposedly occurring on a time line were in fact illusions acting on the stationary stage of reality. How, one might ask, can it be argued today that Parmenides was correct?

Consider aggregating all time, space, matter and energy into a unity; let us say a box. Granted everything in the box is moving relative to everything else and therefore to the box, and granted that the dimensions of the box may be infinite, but from Parmenides' frame of reference, the box is stationary and everything within it is at play, acting up, never still enough to be defined as anything in particular; indeed everything, as distinguished from anything, is phenomenal. The totality is phenomenal even though composed of parts that may be tangible by our definition. Time and uncertainty are inextricably wrapped together.

In the sixth and fifth centuries B.C. Heraclitus of Ephesus held time to be of the essence of reality, from which one can infer that time preceded all other existences that necessarily rely upon duration.

The idea that matter comprises minute building blocks was first advanced by Democritus in the fifth century B.C. His purely speculative thesis was that "the only existing things are the atoms and empty space; all else is mere opinion". He had made the first recorded distinction between digital and analogical reality.

Anaxagoras claimed infinite variety in substances. He argued that all things were made of all things, each varying only in its mix proportions, and that all was always accessible through division into smaller portions. Underlying his understanding of the nature of physical reality was his belief that what one sees is, and what is, is verifiable by the senses. His thesis allowed for no ambiguities, no doubt and no deceit. The idea that perceptions were not so fundamentally informative but relied upon impressions of form, quantity and arrangement of matter had to await the dual events of Anaxagoras's death and Plato's birth, both of which occurred in 428 B.C., after which the idea that change was brought about "by" nous or reason (derived from *noos* or conscious mind) was supplanted by the idea that change occurred "for" reason or reasons. The doors of perception were imperceptibly cracked open to invite enquiry as to what such reasons could be, and how such realities could occur.

Plato, whose fifth and fourth century B.C. philosophic influence still bears strongly upon us today, espoused a difference of degree as to the extent that events were illusions, claiming reality to comprise ideal prototypes, while phenomena as experienced were ephemeral copies. To Plato a tree was a conceptual model which all experienced trees approximately resembled, but not without individual distinctions or departures from faithful replications of the prototype.

Plato, in logically extending the theories of Heraclitus, maintained that everything was in a state of change. Such logic undermined the idea that what you see is what you have. Sensual experience could no longer be relied upon to confirm knowledge of truth since it varied from one person to another.

Unlike Plato, his senior by 44 years, Aristotle embraced the notion that reality did not preclude sensation. The distinction was a break in the tradition in believing existence and truth to include the property of changeless permanence, and consequently to the improper conclusion that knowledge *per se* required to be unchanging and permanent if it was to be acceptable as true.

By Aristotle's account, Plato recognized that there is only one type of right-angled triangle with sides proportioned in the ratio of 3:4:5 that represents an example of "reality" consistent with Plato's *Doctrine of Forms*. An infinite number of similar triangles with sides of differing lengths but in the same proportions, he would describe as "unreal" under the same doctrine. The disposition behind such thinking is that there is a singular idea, the model triangle, which is held to be constant and therefore real, but which is illustrated by means of examples by numerous sensible images that are incorporeal. It is not, therefore, entirely irrational to suggest that Plato's view of the world was a construct of numbers and their relations, which, one might argue, could be held to be the key to a greater understanding of all of nature's mysteries; an idea that can be traced to his dialogue *Epinomis*.

On the present-day premise that any quantity is mathematically divisible, Pythagoras' smallest unit of volume, the point, may be divided into two smaller points such that each part is half the volume of the original point. The division may be repeated infinitely. At the original scale Pythagoras' point is visible, at smaller scales however, a stretch of the imagination is required to believe in its physical existence, allowing for subjective variations in acuity, until no reasonable person would claim to be able to see such a subdivision of the original point. It has passed from the realm of being capable of physical verification by the senses to become a theoretical construct in the realm of the mind.

Conceptually it is difficult to imagine two nothings connected by a something. The idea is neither logical nor fantastic, but rather a kind of marriage of the two. Yet this is what we ask our peers to accept: that two abstract, ethereal, vacuous, theoretical points define the extremities of a straight line. Now take that line from nothing to nothing, of finite length but infinite thinness, and rotate it so that you view the line in-line with (radiating from) the left eye, closing the right eye. What do you see? A theoretical point; nothing! It is impossible from this vantage to entertain the idea that you are looking at something with dimension. However, you are looking at a zero-dimensional view of a one-dimensional line; Aristotle's point!

If you enlarge that infinitesimally thin line to perceptible thickness, say a rod, and open your right eye, you see a definitively thin line of finite length in perspective. It is as if one needs to open additional eyes to see additional points of view or dimensions. Without such additional points of view the imagination is taxed to entertain a fuller understanding of the true nature of a viewed object.

In about 300 B.C. Euclid, a young Greek mathematician teaching in Alexandria, was to successfully challenge the laissez-faire beliefs of the pre-scientists and to lay the foundations to spatial understanding for the next two thousand years. Drawing upon precedence and exercising the deductive methods utilized by Pythagoras, Euclid applied the same principles to mathematics that Socrates had applied to dialectics nearly 200 years earlier: a step-by-step logic intended to persuade the listener of the efficacy of a complex idea by breaking it down into simpler, more comprehensible parts, and soliciting acceptance in increments. Euclid's fundamental contribution was to espouse the necessity for recognizing that the broad acceptance of mathematical processes depended upon the application of rules. The premise underlying Euclid's geometric theorems was that – given certain information about a geometric figure, and a statement of intention to prove the correctness of a supposition – other information can be logically deduced that will be sufficient to confirm the correctness of the original supposition. A practical consequence of the use of Euclid's theorems was that an audience could be led from acceptable assumptions, through a series of simple steps, to accept proof of a proposition that it would not likely have accepted at the outset had it been presented with that same proposition in the form of an assertion.

Euclid was concerned with establishing the positions of elements of rigid bodies relative to each other. To this end he employed a singular concept, distance, to describe relative positions such that any distance can be described as a ratio of any other distance, equality arising out of coincidental sameness confirmed by repeated experience. The next step was to seek a unitary basis for describing distance by building upon the metric point system of Pythagoras. The concept of measurement, the assessment of magnitude of a distance using digital units, had been utilized by the Babylonians.

The early Greek basic unit of linear measurement was the finger, sixteen fingers describing one foot. While this unit of measurement may give anatomists a moment of consternation, the length of the human foot does lend itself to division into sixteen equal parts that approximate the width of one finger 19.3 mm (0.8 inches), the origin of such logic.

  

Eighteen hundred years were to pass before the seventeenth century was to yield fresh fundamental thoughts concerning theoretical geometry. They came first in the form of a convolution of Euclidean ideas by Descartes.

Descartes is reputed to have had a dream revealing a system by which physics could be reduced to geometry thereby interrelating all the sciences, upon which he is said to have based his life's work.

Descartes laid the foundations to the modern scientific method by which verifiable knowledge could be seen to flow from the application of general principles. Mathematics, he asserted, was to become the common denominator of all scientific endeavours by virtue of its reliance upon, and reduction of, concise definitive data.

His *Discourse* set about the task of searching for universally applicable laws of nature that would validate his thesis and replace the then-current multiple and dissociated "explanations of existence" with a single system of reasoning.

According to Descartes, what was necessary was a clear understanding of the nature of each part, its relation to other parts and the sequence by which the parts needed to be assembled in order to arrive at the intended end condition. He had defined and espoused the scientific method as we know it today.

In this manner, he argued, a reasonable person could "read" and therefore discover the essential nature of a complexity by virtue of knowing the language and syntax necessary for its decomposition.

Acting to enhance his ability to secure his own scientific interests in advancing an understanding of mechanics in the seventeenth and eighteenth centuries, Isaac Newton distinguished between what he called absolute time, an abstract model of convenience, and other notions of time that appeared to be conditional and variously called relative, apparent or common time.

Newton was simply doing what his forebears had done; acting upon the evidence peculiar to his circumstances and making his own rules of convenience. The fact that others found his rules to be convenient assured him of a place in their history books.

In the absence of a definitive exposition as to what time is, we focus upon the aspects of time that are useful: the relation of time to the realms of our physical and mental experience. When existing expressions of time are not readily applicable to our current needs, we conceive of new ones. Thus, when a need arose to equate time with the multi-directional quality of space, we "imagined" and applied such a multi-directional form of time, calling it "imaginary time", which concept helped in the reconciliation of gravity with quantum mechanics.

Today we have Atomic Time, Barycentric Dynamical Time, Coordinated Universal Time, Dynamical Time, Ephemeris Time, Greenwich Mean Time, Hypertime, Imaginary Time, Pulsar Time, Radiometric Time, Rotational Time, Sidereal Time, Solar Time, Standard Time, Terrestrial Dynamical Time and Universal Time; enough to convey the idea that there is no general consensus among physicists as to what time is, but a fervent desire to capture its essence and harness it to advantage.

The dilemma that time poses is that, not withstanding time being the very essence of existence; we are unable to define a single unitary system of time to our satisfaction.

  

Thus, time appears to be a holistic relational environment, the clock a means of describing it.

The true nature of time is that it has the properties that one gives to it until one finds more fitting substitutes for the moment at hand. With such illusory beginnings, how can we hope to understand anything else of which time is such an essential part?

Isaac Newton's greatest contribution to an understanding of space may be seen to be a byproduct of his enquiry into the forces that operate in it. His discovery of the law by which force decreases in intensity with the square of the distance (known as the inverse-square law) established a common connection through observed behaviour between the movements of celestial and earthbound objects, including the tides, thereby affording a scientific language of spatial relatedness that had hitherto been missing.

Notwithstanding geometry's deductive passage to reason, we shall continue to show how distinctions between the "real" and the "imagined" are blurred, difficult to draw, or undifferentiable.

No one so eloquently disclosed the importance of this turn of events as Albert Einstein in a 1921 lecture Geometrie und Erfahrung: "As far as the mathematical theorems refer to reality, they are not sure, and as far as they are sure, they do not refer to reality."

Imagine an apple with sweet juicy flesh enfolding a central core containing seeds and their protective shells in a kind of pod. There are small mass-less pockets that may be found in the apple. The seeds and their shells are the hopes of the apple for evolving and protecting future generations of apples. Hopefully, the future prospects are for more fine flavour and rosy colour.

Compared with the parent apple the qualities of the future apple may range up in flavour to the top or down to the bottom of all possible tastes, be charmed or strange. The future colours are also uncertain; they may be green or red but a bruised apple can catch the blues. All depends upon the forces of nature. On the apple tree there are large succulent caterpillars whose primary interests are devouring the flesh of the apple. The caterpillars are very positive about their mission but the flesh, understandably, is negative. The core may be swarming with latent destruction for even uncertainty has its degrees, absolute or partial. The components of the apple may be classified by science according to common qualities; thus, representative class distinctions may be by absence of size, clusters of seeds and shells, proximity of clusters to danger, or other considerations deemed useful. Thus, names signify classes determined by behaviour.

Now substitute atoms for apples, electrons for flesh, nucleus for core, protons for seeds, neutrons for shells, baryons for clusters, nucleons for pods, neutrinos for pockets, quarks for futures, positrons for caterpillars, mesons for dangers, hadrons for proximities, antiquarks for destruction, leptons for absence of size, muons for shortness of life expectation, spin for uncertainty, fermions for partial uncertainty and bosons and their cousins, gluons, for absolute uncertainty, while retaining the up, down, top, bottom, strangeness and charm of flavour, and the greens, reds and blues of colour – all while maintaining leave of your senses – and you will understand a little more about atoms and the relations of their parts.

  

Now substitute the concept energy for the concept matter, for this is what you would hope to gain from eating an apple which, by the time you have finished it, is, for all practical purposes, vacuous. What are we to understand about the up, down, strange, charmed, top and bottom qualities of the flavour of a vacuous apple? Or of the reds, greens or blues of its absent colours? Or of the integral or half spins of its uncertainty when its very existence is in question? Figuring this out is the joy of physics.

Physicists play with make-believe models of reality. Their toys are theories and the means of testing them. One such toy currently receiving attention is the String Theory that all particles are made of hyperdimensional space inferring that there may exist an inescapable connection whereby time and space, linked as space-time, are themselves linked to particles represented as matter but made of energy. The notion ‘hyperdimensional’ suggests that time, space, energy and matter are aspects of the same phenomenon viewed as different "dimensions" along different axes, as limited visions of existence.

What is the basis of existence? How should we define reality? If we embrace all that has had a detectable presence in the past, and all that has being in the present, and we further qualify all such notions as having a presence irrespective of human consciousness, then we arrive at the concept of objectivity. If, however, we predicate existence upon human experience, then we admit two distinctly different forms of being: the sentient and all else that may or may not be potentially perceptible. The extent to which objectivity precludes subjectivity is a moot point, but if we combine the two indiscriminately, then we indulge a richer, more profuse understanding of existence. However, for the purposes of our discussions and in the interest of clarity we shall continue to distinguish between the two in order that we may define non-existence as that which is practically or theoretically inaccessible to confirmation or has not had being to date.

Anything with potential for being confirmed may be said to exist from an objective standpoint, as are hitherto unseen trees in the middle of forests, or moons circling distant planets. Anything that cannot be substantiated may exist as subjective realism, as is the case of love, the circumstantial existence of which can only be inferred as a manifestation of behaviour. From the latter we must acknowledge that there are many more realms of subjective reality than there are subjects. There are also those domains of compromise between subjects that, while they may serve us well collectively, do not constitute either of the existences mentioned above. Common law, a contrivance of reason and emotion, belongs to this category. Laws do not exist by objective or subjective standards, but society is generally well served by believing that they do.

Reality is totality, any detail of which, while it may seem real, is experienced in the limited context of virtual blindness to that total reality, from which the detail may be interpreted to be virtual itself.

"To be or not to be, that is the question" is an improper question. "Not to be" imports that whatever the "it" of being is, it is not considerable nor to be considered. The act of posing the concept "not to be" assumes a conceptual existence of non-existence. What the question appears to mean is: to maintain or to change identity or integrity, that is the question. But that is unsatisfactory for whatever "it" is, the nature of its integrity will change, which change renders the question moot.

We are left with the alternative question: to be conceptual (qualitative) or tangible (quantitative); that is the question – any answer to which inevitably leads us alternately from one to the other.

We should consider for a moment what the concepts "real" and "reality" really mean in relation to existence. Real, as distinct from less real or unreal, draws its authority from the comparative context in which it is used. Understanding this is to understand that reality is not of itself the product of confirmation by the senses, or evidence to that effect, but rather a relative term indicating plausibility and fitness to circumstance. In this way we accord to a wristwatch the distinction of reality if it ticks and registers the passage of time, surreal if a draped impression painted by Salvador Dali to infer contradiction with its presumed physical function, and unreal if a photographic imprint.

Reality is a state of transitoriness in all things extant. All existences assume forms and all forms transform! Our place in the overall scheme is that of the only part of the whole establishment that is conscious that this is so.

The character of quantity is represented by numbers. Digits are numeric. It is not coincidental that, in an age where the populace bathes in virtual reality, mathematicians are immersed in "imaginary", "quarternion", "hypercomplex" and "transcendental" numbers.

Mathematicians design systems of numbering that can, in their imaginations, perform tasks that they have set themselves that more pedestrian numbering systems cannot address. So-called imaginary numbers produce negative numbers when multiplied by themselves. When measuring time using "imaginary" numbers for example, distinctions between time and space disappear and space-time is confirmed to be a singular identity. By inference we are given to understand that "imaginary" numbers are more useful and therefore more real than ordinary "ordinal" numbers, and that imaginary time is therefore more real than so-called real-time since it is reconciled with space rather than excluded from it. In order to survive in the everyday physical world, and to come to terms with appearances of paranormal mentality, we need to dispense with numbers and revert back to thinking about the things that they represent at the most fundamental levels. Numbers are not what we often think they are. They are merely patterns of "nesses" (onenesses, twonesses, etc.). To say that ants have the quality of abundance makes no sense. Only numbers, representing quantity, indicate abundance. Those qualities that we equate with power, and therefore tendency, are functions of number not of the subjects to which the qualities refer.

As to whether the environment is more "real" than our perceptions of it, or the contrary, we shall leave to philosophy. What is more immediate and pertinent for us than either is the degree to which the impressions gleaned from such processing serve us well, particularly with regard to our security and survival.

Our concept of "reality" is the product of choice between alternatives represented at the extremes by contradictions. It is as if we are unconsciously engaged in multiple choice games by which we optimize and select the best reality to fit the perceived conditions of the occasion. To accept this thesis is to accept that reality is not what it is commonly held to be, an absolute condition, but rather a best-fitting description of a phenomenon at particular points in time and space.

Discordance is the prevailing characteristic of existence from which we draw our perspective of the paradox of duality. Whether reality is composed of opposites or our perception structures our experiences so, or both, our "reality" is that of such a world. Why should opposites be so if not to serve as counterweights in an eternal self-correcting system wherein the predominant collective bias works towards the resolution of forces and unification, while the bias of each individual force is directed towards an extremity of experience and the promotion of imbalance? The more that forces build in support of maintaining a state of imbalance, the greater the impetus builds behind the forces of change. It is as if, within any single system and set of circumstances, there is a point of optimal resolution. The pendulum is only momentarily at such a position, yet, on balance, it is always there – confirming equilibrium to be Nature's secret force.

So-called "virtual reality", a simulation format that models perceptions of our environments that are neither virtual nor real, draws its appeal through our understanding that the events that we witness are not really real.

The critical juncture in the use of such invocation occurs where "virtual reality" ceases to entertain or instruct but is used to condition the mind regarding environments that do not exist, for the purpose of controlling human behaviour. The effect of such causes the subjugation and negation of free will.

"Virtual reality" is a substitute for direct experience, the logical extension of which would be to simulate human experience on a grand scale in order to condition humans to accept imposed authority while appearing to grant them every conceivable experience removed from that authority.

In his 1911 text *Die Philosophie des Als Ob* the German philosopher Hans Vaihinger argued that perception demands the fabrication of reasonable "fiction" in order to represent irrational experience as having some semblance to intelligible reality. By such a device we are led to accept the implausible findings of science and theology "as if" our notions of physical laws and metaphysical lore correspond to the truth in the absence of proof.

Progress in human knowledge marches into virtual novelty whereby each step appears to clarify the picture but belies the constancy of inexactitude that prevails in the impressionist landscape of reality. Knowledge is a state of relative enlightenment.

That events have revealed so much suggests that, as important as science undoubtedly is, it is only one of many braids in the fabric of evolution that serve to define reality. However, it is not unreasonable to suggest that there is an explanation for everything, as causes are to effects. It is simply that most people are unwilling or unable to look for explanations to complex phenomena, preferring to follow lines of least resistance.

  

The one thing that science has not been able to grapple with successfully is the homocentric nature of reality as defined by each of us. Individual mentality is to cause as individual action is to effect!

There is widespread confusion as to what constitutes truth. 0 and 1 are assumed (i.e. axiomatic) mathematical "facts"; however, their infinite variety in combination can never be known. Thus it can be inferred, but not proven, that the absolute truth is absolutely inaccessible. We may take comfort that it is also absolutely unnecessary. We live in a relative world, a "fact" that makes fiction out of one of our most hallowed institutional axioms, the promise to tell "the whole truth and nothing but the truth".

Observable truth is not a vision from a single point but rather a composite of visions, reconciled by the minds and intellects of individuals that define reality. The more visions, the greater the potential for a higher, more definitive resolution of the subject as a whole made of parts.

The pursuit of the ideal of truth is not merely commendable but essential to progress towards a higher, worthier purpose: understanding that the nature of truth "is" the reality of nature. Failure to seek the truth on a rational basis simply facilitates the substitution of alternative ideas drawn from the imagination in support of prejudice.

However, even the most abstruse of ephemeral ideas, once formed, acquires an identity of its own and thereby exists in "reality" as an idea - and that’s a fact!

The power of romanticism lies in aspirations to synthesize ideals with reality. To be romantic is to cast the best possible light upon a relationship. Optimism is the life force of romance.

"Relativity" is the operative reality!

We are as bubbles in a tumultuous stew, our mental faculties somewhere between a state of frozen potential and full maturity, unable to ascertain a full picture of a reality of which each of us is an infinitesimally small and protean part.

And now perhaps we better understand why "To be or not to be" (digital or analogical) was an improper question when considered free of any context, as was the case in our early discussion of existence. But, in the context of life and the survival of species, particularly our own, this profound question underlies all others.

In conclusion, the question as to whether reality is "digital" or "analogical" is a non sequitur. The digit and the analog are, respectively, quantitative and qualitative descriptors of relations. Rather, reality may be defined in any way one wishes because, in electing to do so, such definition is useful for the purpose of supporting a conjecture – from which notion benefits bearing upon greater knowledge of relative truth may flow.

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## References


1. Albert Einstein Quotation (on p.5)
   "As far as the mathematical theorems refer to reality, they are not sure, and as far as they are sure, they do not refer to reality".
   Lecture, *Geometrie und Erfahrung* on 27 January 1921 to the Prussian Academy of Science in Berlin. Published on 3 February 1921. (8 pages)
   This mss constitutes the first part of a book by the same title published by Springer 1921, and in CPAE Vol.7; Doc. 52.
   Location: Albert Einstein Archives. The Jewish National and University Library, The Hebrew University of Jerusalem, Israel.

2. William Shakespeare Quotation (on p.6)
   "To be or not to be, that is the question".
   *Hamlet* Act 3, Scene 1.

3. Hans Vaihinger Reference (on p.8) The essay text used is not a quotation.
   *Philosophie des Als Ob*
   Published in 1911 (but written thirty years earlier).

   [In *Philosophies des Als Ob* Vaihinger argued that human beings can never really know the underlying reality of the world, and that as a result we construct systems of thought and then assume that these match reality: we behave "as if" the world matches our models. In particular, he used examples from the physical sciences, such as protons, electrons, and electromagnetic waves. None of these phenomena have been observed directly, but science pretends that they exist, and uses observations made on these assumptions to create new and better constructs.]


  