

## The Problem: We See Time Backward

Time is experienced as a series of events and with its philosophy of measurement as reality, physics treats time as a measurement from one event to the next. I argue that time is the changing configuration of the extant, turning future potentialities into current events and replacing them. It is not the present moving from past to future, but action turning future into past. While this may seem a fairly basic observation, it means time is an effect of action, similar to temperature, not the basis for it. This would mean the geometry of spacetime is correlation of measurements, not causation of actions. One of the more significant effects of this understanding of time would be eliminate the conceptual basis for an expanding universe.

## An Essay on the Arc of Time and its Context

Human knowledge is a function of the passage of time. The stories we have told each other from time immemorial, to the basic logic of cause and effect are based on this sequencing of events we call time. So it is understandable that we would incorporate this most basic of observations into our theories of how nature works.

For most of human history we tried to incorporate the movement of the sun across the sky into our theories as well. First theorized by the ancient Greeks as being carried by Apollo's Chariot and then mathematically formalized, to a surprisingly effective degree, by the theory of epicycles, it was simply not conceivable to the ancient mind that it is the earth on which we stand that moves in the opposite direction. As epicycles were so effective at predicting the future positions of celestial bodies, it was assumed the presumptive basis for this mathematical model must be real and there were giant cosmic gearwheels powering the heavens, much as the "fabric of spacetime" is currently assumed to control the actions of energy and mass. When anomalies appeared, it was obvious there must be some as yet undetected gearwheel and much theorizing would go toward finding where it must be and which effects it dictated.

I think we have committed a similar conceptual error with respect to the nature of time. By using the constant speed of light as a yardstick to correlate rates of change under different conditions, a model that combines space and time has been created that gives very accurate predictions of motion and perceptions of events. Is there this underlying four dimensional framework that is powering the motions of matter and energy, or is it because the various distortions and lensing effects of a information carrying universal speed of light can be accurately calculated? Does the earth travel the fourth dimension from yesterday to tomorrow? Or does tomorrow become yesterday because the earth rotates? Is time the basis of action, or an effect of it?

Temperature is another measure of action. While we generally understand it as a scalar measure of molecular activity, the concept applies across the entire spectrum of activity. Everything from cosmic background radiation to levels of economic activity are temperature readings of some form. Our existence is as bound by the effect of temperature every bit as much as it is by time. Because we understand it as a particular form of measure, there is no tendency to conflate it with other forms of measure, such as of space. Yet it would be as equally hard to consider any form of activity that would not register as a scalar of action, as it would to imagine one not causing the effect of change we call time. The difference is that we are able to be more intellectually objective about the nature of temperature, than we are of time, given that our intellect is a function of time. Though our physical and emotional states are largely regulated by temperature.

In neurology, there is a classical division of the brain between the left and right hemispheres; With the right being more intuitive and emotional, while the left is more analytical and rational. I would say that on a very basic level, the right brain function amounts to a thermostat, while the left brain is a clock. One is constantly absorbing, monitoring and responding to the environmental cues conveyed by the various forms of energy in the environment, while the other is devising sequential connections and reactions to them. The combination creates an effective environmental response, as the organism analyses the whole environment and devises a course of action within it. E.O. Wilson described the insect brain as a thermostat, yet it has been shown that ants count their footsteps as a navigation tool. It should be noted that since plants do not move with intention, they have far less need for a serial intellect and primarily respond in thermal terms of expansion and contraction.

The universe consists of energy fluctuating in the vacuum, contracting into more ordered formations of mass and radiating back out. This creates a process. Structure comes into being by accumulating more energy than it loses, until it reaches the tipping point of losing more than it accumulates and then dissolves. This is what we experience as the life cycle of beginning to end. Structure exists as a unit in time, from creation to dissolution.

The energy of which it consists goes onto other forms. It has no beginning or end, but simply exists in what we refer to as the present. These two forms, energy and structure, represent opposite directions of time.

Einstein described time as what we measure with a clock. A clock is a relationship between two frames; One representing the present, traditionally the hands and one the units of time, or the face. We normally think of the hands as moving, while the face is stable and this is in accordance with the assumption that the present moves from past to future. Alternatively it is that relative to the hands, it is the face which moves counterclockwise. Consider that the concept of the classic analog mechanical clock evolved from the sundial. So given that in the northern hemisphere, the sun moves across the southern sky from left to right, this explains why the hands go left to right across the top of the clock. Given we now know it is earth spinning the opposite direction, possibly an updated clock should have a motionless hand and the face turning counterclockwise.

Think of this in terms of a factory: The products go from initiation to completion, while the production line faces the opposite direction, consuming raw material and expelling finished product. The process points to the future, as its prodigy originate out of future potential and fade into the past. Life is like this as well. Individual lives are first in the future and eventually fade into the past, as the species is constantly moving onto new generations and shedding old ones.

The mind functions this way too. It is constantly absorbing new information and forming thoughts, which are then replaced by the next. A factory of ideas, so to speak.

The concept of time as flowing from past to future applies to individual entities, as they proceed along the arc of their lifespan. For the process though, it is not so much a singular path, but an inner woven tapestry of multiple timelines weaving around each other and providing balance to the entirety. As Newton said, "For every action, there is an equal and opposite reaction." While the action of the entity is linear, the balancing reaction of its environment is non-linear feedback. While we naturally think of the entire universe as proceeding from its universal past into its universal future, with this present as a stage on that vector, those prior and subsequent stages do not physically exist and the material by which they were manifested has been cycled back into other forms. It is as though the thread of time is being woven from strands frayed off from what had previously been woven and the past ultimately becomes as unknowable as the future. We think of ourselves as being individuals who were born at a certain time and follow a path to our death, but we are constantly absorbing matter, energy and information from and radiating it back into our environment, while our memory of past events becomes altered and distorted by the changing perspective of a dynamic present. Even our sense of self is entangled with those to whom we are close.

This view of time raises quite a number of issues in physics that were presumably settled. If time is simply a measure of the change effected by action, what is space? What is space a measure of? It would seem to me that when we measure space, whether distance, area or volume, we are measuring space.

Math treats space as three dimensional and to the information centric way of thinking, it is assumed these three dimensions are the basis of what we perceive as physical space. In reality, they are just a way to model and map of space, much as latitude, longitude and altitude are convenient ways to map the earth, but are not foundational to its form. To the extent these three dimensions are definitively expressed in a particular configuration, they are the coordinate system referenced by the center point of that system. As there can be any number of reference points in a given space, multiple three dimensional coordinate systems, as well as the narrative history of their points of reference, can exist in the same space. The obvious example is that as individual people, we all exist as the focal point of our own coordinates. Often these different perspectives yield very different interpretations of jointly perceived events. Wars are often fought over competing narratives of the same space.

There is even a mathematical contradiction built into the dimensional theory of space, since anything multiplied by zero is zero and for lines and planes, the missing dimensions are zero, which would be the same as for an apple with zero dimensions. It is just more convenient to accept this contradiction, then deal with the conceptual messiness of assuming some minimal width and depth.

Current theory holds that space is created by the singularity and has been expanding ever since, but why then is there a constant speed of light? If the very fabric of space is expanding, wouldn't this most basic measure of distance increase as well? Otherwise we just have more units of a stable measure of space, rather than expanding units of space and that is a major oversight in the theory. The recession of distant galaxies is a

simplistic explanation for cosmic redshift, with many patches to sustain it, from inflation to dark energy. Possibly photons are not dimensionless points, but quanta of energy that expand to fill their space, become entangled with similar quanta, such that photons absorbed by telescopes are samples of this expanding redshifted field, not distinct entities released eons ago.

The reason the speed of light is constant for all frames, is since nothing can exceed the speed of light, atomic activity within an accelerated frame has to slow down, so the combination doesn't exceed  $C$ , until the frame reaches the speed of light and then time becomes zero, since there is no internal motion. So the clock used to measure the speed of light from the moving frame is slower, therefore  $C$  remains constant. In effect, the scalar level of activity/temperature, within the moving frame is lowered. Thus less action = less change = slower clock rate. In the twin paradox, the one which aged faster effectively had an elevated metabolic rate, rather than having traveled a longer time vector.

What this suggests is that space itself is a neutral equilibrium state, rather than just an abstract measure. Space is then both an absolute and infinite and it is this absolute frame in which light travels. So it would be in this frame that the fastest velocity is light, as the purest form of energy. A possible theoretical test of this would be to place clocks in various positions in space and then the one which ran fastest would be closest to this universal equilibrium, much as GPS clocks run faster, since they are in a weaker gravitational field.

Nothing has been a conceptual question mark in physics since the time of the ancients. While it may seem nothing would have no effect, there are various reasons to consider it may be the ultimate frame. Current theory is that everything began at the singularity, yet that is something. The most logical description of nothing is the void, vacuum, empty space. Lacking physical properties, it can't be warped, bent, bounded, etc. There is a very thin conceptual line between everything carried to infinity and nothing, since all positive and negative energy cancels out. Reality would be a fluctuating vacuum of infinite space, with these galactic cycles of expanding radiation and contracting mass trading energy around. On this infinite scale, even the largest galaxies and most powerful super novas would be just fluctuations. Entropy would not prevail, since the infinite is not a closed set. Energy lost to one frame would be gained in another.

It should be noted that fully formed galaxies have been observed at distances which would put them very close to the presumed birth of the universe and careful examination of the infrared spectrum may well yield even older ones.

One aspect of Quantum Mechanics I would venture to consider is the idea of the wave function, between measured and measurement and how this seems to yield quantum super positions; What if the external timeline is removed and an internal timeline is allowed to emerge from the process? We think of time as proceeding from past to future, but what if it is the future becoming the past? The past is inherently deterministic, since all probabilities have played out and yielded their effects, while the future is inherently probabilistic, since there is no way to fully know all input from an infinite reality into a given situation, even if the principles guiding their actions are deterministic. So if we follow the classic timeline from past to future, we end up in multiworlds, where all possibilities are deterministically required. On the other hand, if we eliminate this vector of time and just allow these extant physical properties to engage as they will, it is the collapse of probabilities which yields actualities. The future becomes present. The fate of the cat is determined by what happens.

It is the nature of our mental processes to break time into instants of comprehension, but this is due to the necessary function of the mind and not a feature of the physical reality. If we were to simply perceive the flows of energy around us, all detail would blur together. It would be like leaving the shutter open on a camera. On the other hand, these instants cannot be dimensionless, as that would be as if the shutter speed was zero. If all motion were to actually freeze, reality would vanish, as all that atomic activity underpinning reality would cease as well. It would be the equivalent of a temperature of absolute zero.

With the Uncertainty Principle, it is pointed out that one cannot know both the position and momentum of a quantum particle, but with time as an effect of action, the particle and its action cannot be separated. There is no frozen instant of time in which the particle exists, independent of its action. Like the camera, it is simply a matter of how short a time frame you measure, as to where any entity, micro, or macroscopic, exists.

The irony here is that the more information received, as with leaving the shutter open longer, the more all this information becomes blurred and detail is lost. This goes to the very nature of perception and why it is inherently subjective. The more universal and general a point of view, law, principle, etc. is, the more generic it

becomes, as all detail is distilled away, or cancels out. We cannot see both sides of a coin at once and blending them together wouldn't give a more accurate description of the coin.

The incredible complexity of something like the human condition cannot be encompassed by a basic set of laws or ideals. Like math, such concepts are a distillation and modeling of this complexity, not some encompassing formula. It is a choice of either narrowing one's focus to a particular principle, effect, aspect or frame of the larger reality, or expanding it to a broad generalized view which loses the specificity and detail. Thus there is an inherent trade off and a universal knowledge of all detail is a contradiction. It is the uncertainty principle writ large.

This dichotomy creates an intellectual expansion/contraction dynamic, as we are constantly organizing details into ever broader patterns, insights and models. Which then go through the cyclical wave of increasing relevance and appeal, until reaching natural limits of effectiveness and are either replaced by more effective models or branch back out and mutate into different applications. This network of knowledge is motivated by raw curiosity and striving, which then projects ideals to be attained, but that doesn't mean there is some ultimate goal. It is just that a singular entity is best at focusing on a singular goal. Neither academic or religious authority can turn an ideal into an absolute.