

A THEORY OF TIME

A REVIEW OF THE CHALLENGE OF TIME

Time is perceived in connection and association with events. There are two ancient paradoxes on which this understanding of time escapes its commonplace meaning. For a sequence of events to be observed or conceived, there has to be a corresponding sequence of moments of time. Since the events in a sequence are separate, the moments in the corresponding time sequence are also separate. This presents the opening dilemma. There is an undefined gap, however small, between two moments. Thus, among other things, an interval of time has to be open at least on one end, *or time cannot be continuous*. Let this be called Impasse 1. Another preliminary point is that separate events can not be observed or conceived without a measure of temporality. Or, time is required to define time *or time is not definable*. Let this be called Impasse 2; the circulatory one, which, perhaps, might have made the study of time, as it really is, rather unpopular.

There is the third initial predicament of an apparent multiplicity of time.

"Time 1 is the time in the physical theory, what is represented in the equations of dynamics by the letter t Time 2 is the time of human consciousness....."¹

The comprehension of t remains more or less elusive. The usual oversimplification regarding Time 2 is to think about it merely as date, hour, minute, second and part of a second, or as a "date" in short. However, Time 2 takes up forms that are different from date. A discussion on its demographic and actuarial case may be seen in the Appendix which will justify assigning to Time 2 a $V(t)^2$ like functional form and assuming that t is a metaconcept. The cases of other disciplines may not be necessary to discuss in this short paper.

And the notion does not remain restrictive to t and $V(t)$. An analytically established Time 0, which may be called $v(t)$, has to represent a "pre-time" status corresponding to a given "event-and-observation" condition. Apart from Time 0, there can be other preforms of $V(t)$. Call them $V_p(t)$'s. These preforms are internal to $V(t)$. Externally, each event or idea is commanded by a particular state of refinement in observation or awareness to conceptualise its own time of consciousness. The third predicament is, therefore, a Multiplicative Temporality.

Conversely, and without falsifying multiplicative temporality, the ordinary activity and observations like eating luncheon an hour after noon or filing a tax-return on a deadline or assuring how many years more a person may be expected to live or holding that truth triumphs, are synchronistic activities although they are or may be subsultive. These involve constriction to a fixed place where the luncheon will be when the hour strikes one after noon, or to a post-office during working hours before the deadline, or to a fixed notion that a particular ratio involving elements of time provides the expectation of life, or to the presupposition that truth and untruth always exist in two separate bundles. It is a serious business to synchronise. This paper will presume that the understanding of synchronal temporality follows the perception of multiplicative temporality in the reverse.

AN ELEMENTARY UNDERSTANDING OF TIME

The beginning is a thought. It implies an orderliness on conclusion of a chaos. When the mind travels "backwards" into the "past", it follows a course which is understood, orderly and incidental. Beyond a point, which one may theorise and call the beginning, nothing is orderly or incidental, or therefore comprehensible. It follows that beyond that point, no consciousness can exist. If a conglomeration of all consciousness leading to awareness regarding things and ideas, physical or abstract, is conceived at that point, then a rule of orderliness has to be at work there, to separate awareness, real or abstract, into one group called S . The same rule places the remainder into another group N "that which is not S ". Since it is the beginning, S and N both exist; and time remains as awareness in S and something else in N . By definition the conceptions of S and

N arise together. By definition S is next to N. By definition, the separation of S and N is subjective and therefore, the rule governing their separation is such that S may increase, size and content, as consciousness expands with the extension of knowledge, and therefore, it is also omnipresent. By definition, N is large compared to S. Or, $N > S$, such that is S absorbs n things and ideas into consciousness, or $N \rightarrow (N-n)$ while $S \rightarrow (S+n)$, the initial identity of $N > S$ is not disturbed because N is large compared to S and S is large compared to n.

One may call this arrangement of separating S from N, to be Rule 2³. Rule 2 exists.

Theorem : The Rule 2 exists.

For an inductive start to an idea or physicality, an acceptance of a system prevails. That, which is not in the system and that which is included in the scheme, are separated by some rule. Call it Rule a. A deductive termination of an investigation of a conscious idea or physicality is that which is an idea or that which is a physicality that is dependent upon attributes like information regarding and refinement of the initial idea or the original physicality or the introductory deductive process. The conclusion of the deductive process alters these attributes. Therefore, a deductive end has to be a result that opens further questions. If deduction aims at finding a terminal result, then a rule has to absorb the terminal questions. Call it Rule b.

Rule a and Rule b exist.

Therefore, if Rule a or Rule b or both; or variations of Rule a or Rule b or both; or Rule a, Rule b, both, all variations of Rule a or Rule b or both; severally, or in groups, or altogether, are called Rule 2, then Rule 2 exists.

Another Rule 1 decides in what way N yields a part to be turned S with Rule 2; and other rules.

This is a "chaos to order" premise that accepts that time is a mental concept which gave meaning to an *order on conclusion of a chaos*. The chaos was that which did not permit a separation of a concept, including the concept of time, or a thing from N that existed while S did not. An "order" is not definable without a temporal connotation of its "start". An "order" of

corrective or expansive variation, or variation of other types in the static or cyclical patterns of the universe, bears the same temporality. This central position is due to the fact that the functional form of $V(t)$ works universally in relation to everything under the consideration, whether physical or abstract. *Time is the associative situation of "order" out of "chaos", or the first concept.* There is no need to compromise on this cardinal position. If all planets and stars stop moving and all bodies give up the property of gravitation, there remains no way to relate an event with the position of any moving body or to a change in the level of external energy, then it may be reasonable to *give up the concept of time and assign as important a position as that of time for comprehending change to another internal or static attribute like hardness.* It is not easy to outline how such a conceptual exigency may work. Until such a situation arises, or such a situation is required to be conceptualised, time will continue to be associated with everything one can imagine.⁴

Definition of time

The attempt will be to understand Time 2 first and Time 1 next, and not, as is usual, the other way round. The time, which is common to S and N, becomes conscious time in S if it is defined by four elements, two of events or ideas, and two of observations or awarenesses. Let 't' be time; 'a' be observations or awarenesses; and 'e' be events or ideas that are not 'time', real or abstract. Let e_{11} be the first stage or effect that 'e' confers to a_1 and let e_{12} be the second meaning of 'e' as it appears to a_2 . If

$e_{11} \neq e_{12}$ or, e_{11} and e_{12} are not the same e

$e_{11} \Rightarrow e_{12}$ or, e_{12} is next to e_{11}

$e_{11} \nsubseteq e_{12}$ or, e_{11} and e_{12} are not simultaneous events

$a_1 \neq a_2$

$a_1 \Rightarrow a_2$

$a_1 \nsubseteq a_2$

O is an operator that may empathise real or unreal t with an association or event or idea with observation or awareness;

V is the operator that can operate on both real or unreal t within S ; and there is an *Operator* "A" of "oneness"⁵ that can operate on any O or e or a , to create $V(t)$ in the manner

$$V(t_1, t_2) = A\{O(e_{11}, a_1), O(e_{12}, a_2)\},$$

so that

$$V(t_1, t_0) = O(e_{11}, a_1) \text{ and}$$

$$V(t_0, t_2) = O(e_{12}, a_2)$$

where t_0 joins the domain or duration of t_1 and t_2 to depict the "nothing" status of t when no observation or awareness operates. This is the first part of the rule of *Operator A*.

In this part of the rule, it is assumed that the duration between t_1 and t_2 contains the non-time t_0 and also that, although 'e's are not 'time', they may not be, perhaps, but not necessarily be, free of temporality and that is why it is necessary to say that they are at least not simultaneous.

Here, $O(e_{11}, a_1)$ and $O(e_{12}, a_2)$ are the first and the next parts of time that may be associated with a set of observations or awarenesses that come one after the other. These generate $V(t_1, t_2)$, the *conscious* time. If e_{11} and e_{12} do not exist, then $V(t_1, t_2)$ does not exist or time does not become a phenomenon.

It can be suggested that this first part of *Operator A* is but a universal rule.

Proposition :

If every unit of association of an event or idea Ω based on observation or awareness δ reduces to oneness, then the concept that reduces them so is defined.

Symbolically, using the likeness of the nomenclatures previously explained. U is defined for argument h by

$$U(h_1, h_2) = A\{O(\Omega_{11}, \delta_1), O(\Omega_{12}, \delta_2)\}$$

where $U(h_1, h_0) = O(\Omega_{11}, \delta_1)$ and $U(h_0, h_2) = O(\Omega_{12}, \delta_2)$.

Example :

- 1) Ω 's can be number of electrons; h's can be electric charge; A can be induced by a conductor to generate a flow of current $U(h_1, h_2)$ as moderted for $U(h_1, h_0)$ and $U(h_0, h_2)$.
- 2) Ω 's can be amount of heat in unit mass; h's can be temperatures; A can be induced by a medium to generate U, a rate of transfer of heat.
- 3) Ω 's can be money; h can be money in bank; A can be induced by a change of bank rate to generate U, a change in bank deposits resultant from the propensity to save at levels of Ω 's tha remains predictable with a previous rule $O(\Omega, \delta)$.
- 4) The case of conscious time $v(t)$ already discussed.

Now, let θ depict "difference" an Operator A difference be defined by

$$A\{O(e_{11}, a_1) \theta O(e_{12}, a_2)\} = \text{nothing} = \phi$$

This is the second precept of the *Operator A*. Ordinarily, "*Operator A*" will indicate presence of both the codes.

It means that, when supervised by *Operator A*, $O(e_{11}, a_1)$ and $O(e_{11}, a_2)$ can neither be two independent parts of the time derived nor do they consist of the same part of time gleaned by *Operator A*. $O(e_{12}, a_2)$ is next to $O(e_{11}, a_1)$ because $e_{11} \Rightarrow e_{12}$ and $a_1 \Rightarrow a_2$, but $O(e_{11}, a_1)$ and $O(e_{12}, a_2)$ do not lead to duality.

It can be shown that the second part of the rule of *Operator A* has universal applicability.

Theorem :

$$\text{If } A\{O(\Omega_{11}, \delta_1) \theta O(\Omega_{12}, \delta_2)\} = \text{nothing} = \phi,$$

where θ is a difference, then the concept of U is not only continuous but also permits no other concept to alter U in so much as $U(h_1, h_0)$ and $U(h_0, h_2)$ are neither independent parts nor the same part of $U(h_1, h_2)$.

Since $U(h_1, h_0) = O(\Omega_{11}, \delta_1)$ and $U(h_0, h_2) = O(\Omega_{11}, \delta_2)$, and operator U is that of reduction of $O(\Omega_{11}, \delta_1)$ and $O(\Omega_{11}, \delta_2)$ to an oneness, $U(h_1, h_0)$ and $U(h_0, h_2)$ are understood but they do not manifest independently. At same time they cannot be made identical because there is nothing to compensate one with any part of another on account of the difference between them having been reduced to nothing by definition externally.

Example :

U 's of the examples 1,2 and 3 of the proposition do not alter, or understood differently, etc., as long as $O(\Omega, \delta)$'s are unique or of same composition or not tempered by external interference etc. •

Solution to Impasse 1 and Impasse 2 for $V(t_1, t_2)$

One confronts with two questions :

(1) Can e_{11} and e_{12} be observed without a gap in time? Electrons and photons sometimes appear thus in real experiments.⁶ Also, some thoughts may have the same property.

(2) Are O 's temporal by nature? Or, has time being used to define time?

$O(e_{11}, a_1)$ and $O(e_{12}, a_2)$ are the non-dual separations of parts of time. Then, $V(t_1, t_0)$ and $V(t_0, t_2)$ are also non-dual separations of $V(t_1, t_2)$. This makes Impasse 1 vanish for $V(t_1, t_2)$. It also completes the definition of $V(t)$ or conscious time in use which may now be stated as below :

Parts of conscious time constitute of and generate from the operation of awareness or observation on events or ideas placed one after the other with a possible gap of nil temporality in between. Any such gap is demolished by a hitherto undefined Operator A. As a result, parts of conscious time constituted or generated by the operation of awareness or observation on events or ideas, come one after the other without any gap in between, to constitute or generate an instant of conscious time.

In this definition of conscious time $v(t)$, the definition of t is left out which will be defined now, without an explanation at this stage, as below :

Temporality as a metaconcept can be defined as conscious time generated with maximum possible refinement of awareness or observation of the maximally refined events or ideas ad infinitum.

Can it be said that $O(e_{11}, a_1)$ and $O(e_{12}, a_2)$ cannot exist if $V(t_1, t_2)$ does not exist? The proposition is argumentative. The answer is "no". If the operators of awarenesses were $O(e_{11}, a_1)$ and $O(e_{12}, a_1)$, or awareness was one but the events were two, requiring awareness to be operated twice, then the operations on awareness were dependent upon time and they could not have defined time. But, when they contain a_1 in one and a_2 in another, both awarenesses subsist by themselves, whatever be the status of time. Thus, it is not necessary that two subsequent observations or awarenesses must be temporal. Such a thought arises when one identifies oneself as the observer. This premise is unnecessary. If events and ideas may come one after the other, then their observers may also come one after the other. The relationship and the rule of O or A or V are presided over by Rule 2 that can have no limitation in perception. Further, the emergence of time precedes appearance of any other concept, including the concept of limitation. Therefore, Impasse 2 vanishes for $V(t_1, t_2)$.

Conversely, Operator A is a valid postulate of Rule 2.

Proposition \therefore

Operator "A" is a valid postulate for Rule 2.

Since the conscious time, which is associated with all things and ideas governed by Rule 2, is interpreted without an impasse with Operator "A", Rule 2 supervises Operator "A".

Thus, Operator "A" is a legitimate premise of Rule 2.

The instants of time

Let the lowest numerical value of $V(t_1, t_2)$'s be called "instant". An instant relates to a's and e's. So, it is dependent upon the status of refinement of the conceptual level of a's

and e's. An instant that results from the maximum possible refinement of a's and e's, is the most refined instant. One may call it i_m . A less refined status of a's and e's, like "seeing" with rays of light or electro-magnetic waves, creates limitations and generates instants that are less refined and may be called i_x . It becomes obvious that, on account of the rule of *Operator A*, (1) i_x 's will exist in continuity by themselves and (2) i_x will contain i_m 's in continuity.

Timeframes

Timeframe will mean a set of events and ideas that contain no more than a single pencil of $V(t)$. Timeframes are different for, as for example, different musical impulses present within a composition, or unreal parts of time sequence created in a dream, or the act of walking across the room to reach the door as against dividing the floor mentally into halves and then dividing the second half again into halves and continuing doing so. The last example is due to Zeno⁷ whose "paradoxes" have been much discussed in the contemporary literature on time. A subjective summary of these is provided as below :

The paradoxes of Zeno derive their main strength from the mixing up of different timeframes. One part of a paradox created ever-continuing or never-starting positions, which, when assumed to have also been applicable to another timeframe that related to a logically valid situation, made the logically valid situation appear untenable.

In the example of walking across the room to reach the door and mentally bisecting the distance again and again, a solution to Zeno's other problems of half-distances is provided. Zeno's paradox would state that one cannot reach the door walking across the room because of the unending half distances in between. Zeno's paradox will come true only if the walker stops at every half-distance and, may be, marks the floor at that point. Otherwise, the timeframe of walking up to the door and the timeframe of subdividing a floor with half-distances are different and may exist together. A few of the paradoxes, like the one given below, are perfectly explainable through the relativity of time and motion in ordinary dynamics.

Two equal rows of a stadium moving in opposite directions with the same speed, go past each other in half the time they go past a similar but stationary row. Therefore, half-time is equal to full-time.

This paradox is demolished with the laws of dynamics of Newton that use a timeframe of moving object with respect to a stationary object and another timeframe for moving object with respect to another moving object.

For the theory of time presented in this paper, Zeno's paradoxes are invaluable : They project with crystal clarity that events or ideas can have or be constituted with different timeframes.

Multiplicative Temporality

A pencil of $V(t)$ constituting a timeframe contains i_x 's at a given level of refinement of observation and awareness; or at R_x level. By definition, there has to be as many series of i_x 's as there are R_x level timeframes which may be supportive of a single activity like a musical composition, or a dream, or shooting down of a flying duck. It is possible that such series of instants, and the connected groups of a's and e's in timeframe, and the timeframes themselves, would be correlated or interdependent.

Definition of and solution to Impasse 1 and Impasse 2 for t

The concept of i_m based on maximum possible refinement of a's and e's leads to a requirement of convergence of a's and e's to a single pair of a's and a single pair of e's through a process of progressive refinement. Otherwise, a comparatively less refined state will continue to persist and i_m can never be a sustainable concept. It follows that at the status of an instant being i_m , a's and e's become repetitive; or $V(t)$ becomes a constant or identity; or $V(t)$ defines t at the point of maximum refinement of events and observations.

One may find an analogue in considering the reversibility of the function

$y=f(x)$ as $x=g(y)$ as $x \rightarrow \infty$, and to $x=ak$ because $y \rightarrow k$ when $x \rightarrow \infty$.

In other words, the distinction between Time 1 and Time 2 vanishes at the state where events and observations attain the maximum refinement and consequently, the concept of Time 0 can not arise at that stage. Let this be called i_m -stage that yields (Time) of commonsense. Since, t and $V(t)$ become the same or differ only with a constant or identity factor at i_m -stage, and for $V(t)$ Impasse 1' and Impasse 2 always vanish, it follows that these two impasses vanish for t at that stage. As a corollary, t can only be conceived *ad infinitum* when time is defined as in this model. Based on these, the definition of t emerges as has already been presented. The second corollary is that the arguments of *conscious* time need always carry a label to indicate the level of their refinement. The shortened form of $V(t)$ can be very misleading because it represents $V_p(t_{rx1}, t_{rx2})$, where r_x is the level of refinement of O , a , e and subscript p represents, as explained below, the support that $V(t)$ has to let the *Operator A* rule operate.

Support for Operator A

Operator A creates oneness from the duality of two sets of observations that occur one after the other. This is a constructed situation. Therefore, it has to take place in a narrow zone of S that endures such an exclusive operation : Call this a zone of *support*. Let a Rule 3 supervise what goes into *support* from S and what within the possibility of human comprehensibility may remain "timeless". Let support follow the basic rules of geometry.

Transcendants of "support"

Let there be a *support* $P_r(A_p)$ of class p , relating to p groups of real or abstract events and awarenesses, and Π groups of *transcendent* or unreal components.⁸

$$A_p\{O_p(e_{p1}, a_1), O_p(e_{p2}, a_2)\}$$

is the Operator A of $P_r(A_p)$ for t and

$$A_\Pi\{\Omega_\Pi(\varepsilon_{\Pi1}, \phi_1), \Omega_\Pi(\varepsilon_{\Pi2}, \phi_2)\}$$

is the same for that which is not yet time. The subscript p to A , O , and e bears the meaning that they relate to t within $P_r(A_p)$. For that which is not yet time, Π , ε and ϕ

represent that part of the unreal components of $P_r(A_p)$ that sustains Operator A; and O is also changed to Ω because "observations" of real and unreal e's have to be textually different. The term Π represent the *transcendent* of a *support*. Π , ε and ϕ belong to the substratum of time. *Conscious* time cannot be unreal; and hence, V bears the subscript p only.

Nowness

Proceeding as before, one may postulate

$$V_p(t_1, t_2) = A_p\{V_p(t_1, t_0), V_p(t_0, t_2)\} \\ + A_{\Pi}\{\Omega_{\Pi}(\tau_1, \tau_0), \Omega_{\Pi}(\tau_0, \tau_2)\}$$

It may be recalled that the expression is derived from $e_p \neq e_{11}$ and $e_p \neq e_{12}$, and

$$V_p(t_1, t_0) = O_p(e_{p1}, a_1) \text{ and } V_p(t_0, t_2) = O_p(e_{p2}, a_2) \\ \text{and consequently,}$$

$$V_p(t_1, t_2) = A_p\{V_p(t_1, t_0), V_p(t_0, t_2)\}.$$

Therefore, no part of $A_{\Pi}\{\Omega_{\Pi}(\tau_1, \tau_0), \Omega_{\Pi}(\tau_0, \tau_2)\}$ adds a value to *conscious* time at (t_1, t_2) . This unreal component of *support* that is convertible to time, transmutes itself as real components of next "now" or to (t_2, t_3) .

The abstraction of time at "now" is the argument of $\Omega_{\Pi}(\tau_1, \tau_0)$ and $\Omega_{\Pi}(\tau_0, \tau_2)$ at "now". There is a logical $v_{\Pi}(\tau)$ which is the counterpart of $V_p(t)$. This is a part of Time 0. At next "now", this part of Time 0 may become Time 1 or may become Time 2 without going through the intermediate stage of Time 1, provided the primordial observations become real observations at the next "now". Unlike t and V(t), which are derived from an unrestricted concept of time, $v(\tau)$ emerges from a *support* that has already backed t to become V(t). The second restriction on $v(\tau)$ is that it emerges at "now". Or, $v(\tau)$ is a part of "now" and its presence is not defined outside "now". Time 0, components of Time 0, Time 1 and Time 2 constitute the "nowness" at (t_1, t_2) .

Resistance of nowness to change
"Force" and the "Relevancy of Past"

The reality of time is the argument of $V(t_1, t_2)$. So, $V_p(t_1, t_2)$'s, which contain the same argument although they are the preforms of time, turn, by definition, at least a part of the intangible concepts of the substrate of time contained in them, that which are pre-times, into a tangible concept of time or components of Time 2. In doing so, the real and unreal components of emerging time instrument alteration of the values of operator V on t_1 and t_2 , which may be postulated now as $q V(t_1, t_2) \geq \Pi_r p_r V_{p_r}(t_1, t_2)$ where $q < 1$; and $R = 1 - q$ is the resisting power of $V(t_1, t_2)$ to change; p_r the strength of a *support* to effect time such that $\sum_r p_r = 1$; and the product operator is indicative of a common zone of $P_r(A_p)$ that affects $V(t_1, t_2)$. In this postulation, q , R , and p_r are enforced identities that assist to understand and ensure that $V(t_1, t_2)$ may not exceed in value the product term on the right hand side of the equation. Each $V_p(t_1, t_2)$ projected individually on $V(t_1, t_2)$ will leave a zone on $V(t_1, t_2)$ that is not covered with the projection, because $P_r(A_p)$ must have an inclination with $P_r(A_0)$, the logical *support* of *conscious* time in which $V(t_1, t_2)$ exists. The absence of such an inclination will make $P_r(A_p)$ the same as $P_r(A_0)$. Thus, the product term of the expression will leave an unaffected zone on $V(t_1, t_2)$. This untouched part is the "force" of *conscious* time that will resist a changing of its own "identity" completely, whatever be the modifications various support-borne sub-strata of time, real or unreal, may suggest. One may as well call this the "force of the past". And, the angle of inclination of a *support* may be called the "relevancy of the past". An inclination of 90° will relate to parts of "past" which have no "relevancy" at all, because, then, the projections reduce to points carrying no volume or substance, or do not affect $V(t_1, t_2)$.

Freedom of now

In an orderly world of perception, $P_r(A_p)$ contains $V_p(t_1, t_2)$'s, Time 1 and Time 0. As ordained by Rule 2, Time 0 is that which has not become t . Time 0 is also that which can become Time 2 but has not yet become so. Time 0 is incidental to (t_1, t_2) and its circumstances. The projection of

$V_p(t_1, t_2)$ on $V(t_1, t_2)$ at (t_1, t_2) , which is "now", will contain Time 0.

The Rule 2, Rule 1 and any or all of their likely associates, exclude imbalance; and as a consequence, when the status of consciousness tends to become somehow "complete" in S, Rule 2 draws from N, under the supervision of Rule 1, that which did not exist before, and therefore not yet comprehensible, to restore the required equilibrium of reality and unreality in S. Subsequently, *supports* contained in S under the supervision of Rule 3, receive their due share of unreality. Thus, $v(\tau)$ will always be present at (t_1, t_2) . Also if consciousness tends to be complete, the instants become i_m , and by definition, t and $V(t)$ become the same. At any situation other than such completeness of consciousness, and since a $V_p(t)$ is projected on $V(t)$, there has to be at least one functional linkage or one common element, which perpetually vacates room for at least one element to belong to Time 0.

Therefore, writing more liberally, τ for $v(\tau)$ as argument of $N_p(\tau)$ so that it may represent that which has the potential to become real or abstract time at next "now", $v(\tau) = \phi$ or $N_p(\tau) = \phi^0$.

If that be so, then, there exists $f_p = [N_p(\tau) - \phi]$ which is the "freedom" of "now"¹⁰, and N_p is an operator of *nowness of support* $P_r(A_p)$ of order p at (t_1, t_2) , which is real; such that $N_p(\tau)$ increases with the elemental constitution of $v(\tau)$; or $N_p(\tau)$ assumes a higher value if the status of consciousness is higher, because, in that case, the freedom of "now" to innovate is enhanced with the liberalisation that may be derived from the higher status of consciousness.

Linear and continuous time

The concept of $V(t)$ within a timeframe is of a real, linear and continuous time. What is between two entities of t , does not make $V(t)$ an unreal or a nonlinear or discontinuous concept. The rules of *Operator A* demolish discontinuity and nonlinearity from the concept of time.

Because, the *support* of $V(t)$, which is a product term, is common to all others of $V_p(t_x)$'s arranged in i_ϕ moments, where the subscript "x" to t imply a paired character of two consecutive R_ϕ level durations of t 's. Call this $P_r(A_0)$. In the extreme case when all other *supports* of $V_p(t_x)$'s coincide with $P_r(A_1)$, the argument of $V(t)$ can have two real contents, one from $P_r(A_1)$ and one from $P_r(A_0)$. On account of the Operator A rule, for the existence of t in i_ϕ sequence, there has to be a non-dual separation of events or ideas and their R_ϕ level observation. Or, two contents of $V(t)$ leads to one identity. Therefore, $V(t)$ itself can not have more than one elementary dimension at any "now", or $V(t)$ is a linear duration common to $P_r(A_1)$ and $P_r(A_0)$, or a creation of two *supports* or a creation of one dissentient *support*, say of order 1.

On the same analogy, for $P_r(A_0)$ having n groups of dissentients, $V(t)$ will be a linear duration of order n ; because no other form will sustain the elementary relationship between $V(t)$ and any of the $V_p(t_x)$'s.

Thus, $V(t)$ is linear.

Also, $V(t)$ is continuous because the rule of Operator A demolishes the discontinuity.

APPENDIX

A SHORT INTRODUCTION TO DEMOCHRONON AND ALLIED MATTERS

Justification for assigning $v(t)$ like form to Time 2

In a relevant duration of time, a population is required to be related with its increase by birth and in-migration and decrease by death and out-migration. It is known that the earth, as well as life on it, have existed for finite periods. The emergence of man is said to be the latest event in the evolutionary process of living beings. It occurred only a short geological while ago. Let this limited duration of human existence be called the demochronon and separated from other time sequences like, say, one relating to the radiation from a rock since the first man sat upon it;

the main difference being the disagreement between the shrotest durations of time that are required to understand demography and the ones needed to grasp the energy loss from an atom. Demochronon is a part of the "date", defined in the main text. In the beginning, human beings were very few in number. Some believe in genesis from a single man and woman. Even at the present time the count of human beings yields a number that is large but finite.

Only females, who are usually half the human population, can beget a baby to increase the human race when they attain sexual maturity and are yet not too old. Naturally, women who answer this restricted grouping is but a small part of the total human population. The ova of an ordinarily healthy woman remain infertile till the woman reaches her puberty. On attaining this child-bearing age, an ovum matures once in a mensual period, usually every 28-30 days. Extraneously introduced sperm may then fertilise it to create a human zygote. The process of growth within the woman's womb, called pregnancy, is completed on an average in about 240 days, at the end of which the woman gives birth. During pregnancy and for a minimum period of about 40 days after child-birth, the woman does not present an ovum for fertilisation by sperm. This is a period of compulsive infertility. As a woman completes the age of 45 years, on the average a physiological change called menopause occurs and her capacity to produce a baby is terminated. Between puberty and menopause, a female can conceive at intervals of 28 days. This capacity is limited only by the period of compulsive infertility and the days within the 28 days cycle when the ovum is not presented to be fertilised by sperm. Unlike many other animals whose urge for cohabitation between the male and the female of the species is limited to a fixed number of days in the year, a man and woman may have sexual relations at any time. Thus, at every moment of conscious time, subject only to the limitations described above, a woman may conceive and lead humanity to increase. But it is also a natural phenomenon that, because of the aforesaid limitations, increase by birth has to be but a smaller fraction of the number of people that exist at given moment. The population of a region also can increase through in-migration of people into the region. Increase in population

by births and in-migrations relate to every point of, say, auxochronon which is related to demochronon but cannot be the same.

Death can occur at any stage of human life. It decreases the species in number. Nothing in nature can prevent a loss of human life at any moment. Under the ordinary circumstances, deaths are fewer than the births for most of the societies. The human population of a territorial region may also decrease due to out-migration of people at any time and at any age. The decrease in population relate to any point of, say, meiochronon.

Since demochronon is of limited duration, the count of humanity is finite and both auxochronic increase (i) and meiochronic decrease (d) are "events" for the population as a whole, i and d are finite numbers. But the human race never ceased to exist continuously in demochronon or C. The "common" postulation is that there are no such things like auxochronon or meiochronon, and i or d occur in continuity within a duration of C. This is really not possible. A duration of C can be made as short as one pleases, and there will be a corresponding population, p relating to each point of it, but not shorter than the shortest duration within which at least one i and one d can take place for the existence of a "growth" relationship like $p_1 = p_0 + i - d$, where p_0 and p_1 are respectively the population at the beginning and the end of the duration. The alternative is to accept saltuses like $p_1 = p_0 + i$ and $p_1 = p_0 - d$. Or, that there are parts of C that bear no relationship with i or d. So, if auxochronon and meiochronon are not taken to be different forms of Time 2, the natural law that i and d can take place at any moment of our conscious time, is contradicted. The failure of "common" leads to the possibility that event i takes place in an intersection of an I-curve with C, and event d takes place, likewise, in the intersection of a D-curve with C. Or, demochronon (C), auxochronon (I) and meiochronon (D) represent different dimensions of conscious time. Or, that not only demochronon but also auxochronon and meiochronon are "date" like concepts. It is, thus, justified that each of these can be assigned with functional forms of t, like $v(t)$, where t is now a metaconcept.

Again, in the mortality experience of a cohort of people form the basis of actuarial investigations. Using the well established

notations, the survivors l_x at exact age x are linked with q_x the probability of dying between exact ages x and $x+1$. The probability distributions of both l_x and q_x have x as the argument. One may estimate q_x from D_x , the actual number of deaths considered to have been suffered by a real mid-year population P_x , that provide for a sort of age-specific death ratio M_x . Secondly, no one really waits for a cohort to die out. One synthesises a cohort either from the *past* data of population and deaths or by converting the *current* M_x 's to q_x 's approximately. Thus, inadvertently, actuarial study begins, sooner or later, directly from census or sample data, or indirectly from synthesised data, *a priori* or *a posteriori*, with a form of arrangement of people in a table with two variables : rows given by age 'a' and columns given by date 't'. A cohort emerges diagonally in downward steps from a cell of this table along the rows and columns subsequent to the cell or along an 'x' path. In other words, an actuarial study uses time in three frames : age of cohort-rows, hlikiachronon; the date to which the age relates-columns, demochronon; and surviving- diagonals, epizochronon. This gives three distinct meanings to three kinds of conscious time; and also puts three types of time to three different uses, justifying that hlikiachronon and epizochronon are also "date" like concepts and can be given a $v(t)$ like form, where t is the metaconcept of time.

The use of terms like auxochronon, meiochronon, hlikiachronon and epizochronon was for the purpose of demonstration. It is not essential to devise such terms and the common words may serve all practical purposes once it is understood that every concept or activity bears its own concept of time. It is also possible to pick up the common features to work in unison with related time forms. As for example, if age, date and surviving are arranged within demochronon in an 'year' of 365 days or 240 days, it becomes unnecessary to bother about the individual characteristics of geneachronon or thanatochronon even though the conception of these is inescapable in theory.

NOTES

1. Park David; *The Image of Eternity Roots of Time in the Physical World*; The University of Massachusetts; Amherst. USA; 1980 p-100.
2. V is the first letter of *vyavaharika* time, or "time put to use" in *Sanskrit*.
3. Of *Brahman* or the "initial reasoning" for the purpose of this paper.
4. Atharva Veda says that following creator of things (*Prajāpati*) or creation of things, a divinity (*Rohit*), that which is the source of knowledge and source of happiness, came into being; which became identical with time. (AV:XIII :2:39)

In other words, the concept of divinity came next to the creation of that which was not divine; and the moment the ideas of creation and divinity materialised, time appeared. The text says that "divinity becomes time"; that is, time is not the "concept next to the concept of divinity" but the "concept next to the concept of creation" or "time is the first concept created".

5. Based on the concept of *advaita* proposed by *Adi Shankaracharya* while commenting upon the twelve verses of *Mandukya Upanishad* of classical Hindu literature.
6. A separate essay will demonstrate how the theory of time presented in this article can explain such departures from the commonplace expectations.
7. Born in Greece in 490/485 B.C. According to Plato, Zeno of Elea described, in defence of his teacher Parmenides, a number of paradoxes relating to space, time and motion.
8. "P" stands for the first two letters of the word "*pratistha*" or "placed on support" in *Sanskrit*.
9. 'N' is the first letter of '*Nitya*' or 'every now' in *Sanskrit*.
10. Tanabe H., *Philosophy as Metanoetics*, Berkeley (California). 1986, p. 65.

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