

Time and Communication

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Abstract

This article commences by paying attention to the dual role of signs, as physical subjects and communicative objects – both being correlated with physical law and communicative principles. In order to show that time cannot be reduced to physical time, we shall argue that there are indeed different modes of time differing from the physical and kinematic modes of time. Once the ontic reality of four modal or functional aspects has been established, it will be shown that succession (number), simultaneity (space), uniform flow/persistence/constancy (the kinematic) and (irreversible) change (the physical) are each a *mode of time* in its own right. Moreover, also within the other aspects of reality *ontic time* manifests itself, such as evidenced in (heterogeneous) biotic time-order of birth, growth, maturation, ageing and dying. A distinction between time-order and time duration is needed in order to question the wide-spread view that time is the dimension of change. Change represents just *one* among multiple modes of time. Against this background attention is given to communication and the conditioning role of the first four ontic time-orders (with a remark on identity and communication), followed by an account of communication and the other modes of time. The intimate connection between time and communication is explained by highlighting the multiple interconnections between communicative actions and the various modes of time, with a view on the *norming* role of the latter.

The two key terms captured in the title of this article are common-place within our everyday experience, although the term “time” acquired prominence long before the term *communication* obtained an important position. During the past hundred years it was particularly enhanced through the rapid development of modern technology and the new devices invented to make communication easier, faster and more reliable.

We shall explain below that understanding time requires an insight into the *ontic status* of the most basic aspects or functions of reality, namely those of number, space, movement and physical change.¹ The term “ontic” is derived from the Greek word “on” designating what exists prior to any human cognition. It will be argued that “time” exceeds both the kinematic meaning of uniform flow (rectilinear motion) and the physical meaning of dynamic changes.

¹ What is presupposed in our subsequent analysis is the distinction between the various *aspects* of reality and the concrete (natural and societal) entities functioning within them (such as material things, plants, animals, human beings and cultural objects – artifacts). In addition to the four just-mentioned aspects (number, space, the kinematic and the physical) we mention the biotic, sensory, logical-analytical, cultural-historical, the sign mode, social economic, aesthetic, jural, moral and the certitudinal aspects. Compare the *Diagram* explaining the structural features of a modal aspect just before the concluding remark at the end of this article.

The outcome of these considerations will then be applied to an understanding of time and communication.

It appears as if only physics can tell us what time is, for the generally held conviction is that we live in a “space-time-continuum” – with time as a fourth dimension (Einstein).

The dual role of “signs”: physical subjects and communicative objects

Since the nature of a *sign* (verbal or written)² is vital for an understanding of communication, one also has to account for the relation between the assigning actor and the sign. The sound heard in lingual activities and the ink or carbon used for writing / printing are undeniably physical (and chemical) in nature. As such they are subject to the known physical laws. Sound waves as well as atoms and molecules are *subjects* within the physical aspect of reality. But since no atom, molecule or macro-molecule is alive they are not biotic subjects, like plants, animals and human beings. However, mediated by (human) sense-organs physical subjects may be objectified in the biotic and sensitive modes of reality by making these *latent* object-functions *patent*. Of course physical subjects can also be objectified within aspects such as the logical-analytical, the cultural-historical, the sign-mode and the social aspect of reality. The ability to identify carbon molecules and distinguish them from sound waves entails their objectification within the logical-analytical aspect. Likewise, the formative control exercised in articulating language gives rise to the cultural-historical objectification of sound waves. Lingual objectification takes place when physical subjects are objectified within the sign-mode of reality. When the latter is deepened by the social interaction between human subjects we encounter *communicative objectification*.

Subject-subject relations and subject-object relations

The reason why time appears to be inseparably connected to communication is that most subject-subject relations are founded on subject-object relations Two lines (extended spatial subjects) may intersect at a point or may be delimited by two points (spatial objects).

From the fact that communication, as a subject-subject relation, is always dependent upon and founded in subject-object relations, one may be tempted to think that reflecting on time and communication can settle for physical time. Since normal communication involves two subjects and two objects more than physical time is needed: there is subject-1 [the person addressing someone], object-1 [the object in discussion], object-2 [the verbal sign (word): designating object-1] and subject-2 [the person addressed]. In all S-O-O-S relations the human subjects are subject to communicative norms or principles.

Law-side, norm-side and factual side

Within each aspect of reality we may distinguish a *law-side* (or *norm-side*) as well as a *factual side*. The latter embraces both subject-subject relations and subject-object relations. Moreover, all post-logical aspects are based upon the basic opposition of what is norm-conformative and what is antinormative. Contraries are founded on the logical principle of

² Modern technology explores various kinds of electromagnetic waves, such as light, microwaves, as well as TV and radio transmissions. Their recurrent propagation over a distance is designated as their *wave-length*.

non-contradiction (contraries such as *logical – illogical, polite – impolite, frugal – wasteful, beautiful – ugly, legal – illegal, and moral – immoral*).

These contraries appear at the *factual side* of each of the above-mentioned norming aspects, correlated with relevant principles on the *norm-side* of these aspects.³ Keep in mind that the word “factual” refers to what is *given* in an *ontic* sense, prior to human cognition, signification and communication.

The idea of being, time and eternity

In early Greek philosophy the idea of “being” acquired a connotation which became an integral part of the established view on time and eternity. *Being* was related to a continuous whole which turned an infinite *succession*, extending beyond all finite limits, inwards by recognizing the infinite divisibility of continuity. Soon the multiplicity of parts was considered to be present *at once* (see Diels-Kranz 1960-I:257-258; B Fr. 3). *Succession* and *simultaneity* therefore mark key elements of the general human awareness of time and of all forms of communication. It is noteworthy that succession was first connected to recurrent events, giving rise to an awareness of *cyclic* successions, such as the succession of day and night, the succession of seasons, the succession of generations, and so on. It was much later before a *linear* view of time became dominant. Yet Assmann mentions the opposition of *cyclic* and *linear* conceptions of time in ancient Egypt, but does not find textual support for correlating succession with cyclical time and linearity with eternity (Assmann 1975:43-44).

In his philosophy of BEING Parmenides contemplated that *being* is without origination and passing away for it is inexpressible and unthinkable that NON-BEING *is* (Diels-Kranz 1960:236-237; B Fragment 8:10-25). The only option is that what IS *is* – and this IS [being] has many characteristics: while unborn it is incorruptible and it *coheres* in the *now* [present] as a *whole*, as a *continuous* (coherent) unity (Diels-Kranz 1960:235; B Fragment 8:3-6).

On this basis infinity was seen as the *timeless present* (compare Plotinus’ *Enneads* – the whole III,7). Infinity eventually became related to eternity as timelessness compare Boethius, Augustine (*Confessiones* XI,11,13; *De Trinitate* XII,14), Thomas Aquinas (*Summa Theologica* I,10) and Klaas Schilder (Schilder 1948:61) (see also Mozersky 2008 and Oaklander 2008).

Augustine assumed that God can oversee every infinite succession *at once*. The effect was that time (succession) and eternity (at once) were related to what we may designate as the *successive infinite* and the *at once infinite* (since Aristotle known as the *potential infinite* and *the actual infinite*). Late medieval speculation about the infinity of God gave rise to the expressions *infinitum successivum* and *infinitum simultaneum* (the successive infinite and the at once infinite – see Maier 1964:77-79).

Does nature make jumps?

³ Therefore we may designate the law-side of all the post sensory aspects as the *norm-side* of these aspects. There are logical-analytical principles, cultural-historical principles, and so on.

After the Renaissance *linear time* surfaced, nature does not make jumps (*natura non facit saltus*). The genius of the 17th century, G.W.H. Leibniz, incorporated this view in his famous *law of continuity* (*lex continui*). It embodies the modern ideal to bridge in thought all discontinuities encountered in reality. This ideal became all-pervasive, also underlying the idea that the physical universe is *continuous* (and therefore *infinitely divisible*).⁴ However, subsequent developments necessitated the acknowledgement of the difference between *mathematical space* and *physical space*. Spatial extension is *both* continuous and infinitely divisible, while physical space is *neither* continuous (since it is determined by the quantum-structure of energy) *nor* infinitely divisible (see Hilbert 1925:164). Paul Bernays also distinguishes between *physical space* and *mathematical space* (Bernays 1976:37 note 5). Penelope Maddy mentions Feynman saying that the view that “[physical] space is continuous is wrong” (Maddy 1997:149) and two pages further she also distinguishes between physical space (which is not continuous, owing the “impediments of matter”) and mathematical space (Maddy 1997:153). On the same page she summarizes her argument by saying “we’ve seen that a space-time continuum is not something we can take as established.”

Both mathematical space and physical space are *extended*, showing what is *similar* between them. But *in* this similarity the differences between these aspects are apparent. Physical extension represents a spatial analogy within the structure of the physical aspect. We are therefore not living in a space-time-*continuum*, at least not in a *physical continuum*. Whereas space is merely one aspect of reality, time is an encompassing dimension of the universe.⁵

Recent discussions of the problem of time within the broad context of a philosophy of time gave prominence both to the nature of *succession* and the role of *simultaneity*, although by and large most authors in this field identify time with (physical) change. Of particular significance in this regard is an article published by McTaggart in the journal *Mind* in 1908 on “The Unreality of Time.” It is republished in a four volume series of books on the theme: *The Philosophy of Time* (2008a, 2008b, 2008c, and 2008d).⁶ These works are subdivided in thirteen parts and they include diverse articles on time by 97 authors.

McTaggart’s A series, B series and C series

McTaggart distinguishes the series of positions running from the past to the present and to the future [his *A series*] from the series of positions running from earlier to later [his *B series*]. The crux of the A series is related to the “universally admitted” claim “that time involves change” (McTaggart 2008a:22). Whereas an A series entails change it is alleged that the B series “by itself is not sufficient for time, since time involves change”: “So it follows that there can be no B series where there is no A series, since where there is no A series there is no time” (McTaggart 2008a:24). On the same page a C series is introduced, which “is not temporal, for it involves no change, but only an order.” McTaggart here acknowledges the

⁴ Although Charles Darwin employed this aphorism at four places in his *Origin of Species* only this idea of continuity permeates the entire work.

⁵ “The problem of time occupies a much deeper and more fundamental level than the problem of space, with which it was incorrectly seen as an equivalent for a long time” (Dooyeweerd 1939:2).

⁶ References to articles contained in these volumes will refer to the just-mentioned dates.

fact that one can count, following the order of a C series, both forward and backward (McTaggart 2008a:25).

The reversible quantitative order of succession

The decisive feature of the B and C series is therefore given in what we may describe as the *reversible quantitative order of succession*. This order of succession forms the foundation of mathematical induction⁷ and, according to the intuitionist mathematician, Hermann Weyl, it safeguards mathematics from becoming an enormous tautology [“eine ungeheure Tautologie zu sein”] (Weyl 1966:86).⁸ Yet the attempt to strip this order of succession from any notion of time is questionable.

A time-order of succession?

According to Smart the main purpose of Cassirer's “critical study of the history of mathematics is to illustrate and confirm the special thesis that ordinal number is logically prior to cardinal number, and, more generally, that mathematics may be defined, in Leibnizian fashion, as the science of order” (Smart 1958:245). After Leibniz the 19th century mathematician, William Hamilton (in his work: Theory of conjugate functions), advanced the view that Algebra is the “science of pure time or *order in progression*” (Cassirer 1957:84-85). In his neo-intuitionism L.E.J. Brouwer advances the view that discreteness and continuity are primitive notions and that they are mutually irreducible (see Brouwer 1907:8 and Bell 2006:217). Brouwer equates what he designates as the *intuition of bi-unity* [*twee-eenigheidsintuïtie*], that is, thinking together discreteness and continuity, with the *time-intuition* [*tijdsintuïtie*] (see Brouwer 1919:14).⁹

Change and physical time

Physics deals with energy-operation, i.e. with causes and effects (causality) – and whenever energy operates *changes* occur. However, the question is if we can detect changes without an awareness of “an unchanged element” as McTaggart calls it (McTaggart 2008a:23). On the same pages he writes: “Now what characteristics of an event are there which can change and yet leave the element the same event?” Mellor formulates a similar statement in connection with the conviction that no one thinks that “I could survive the simultaneous loss of *all* my intrinsic properties”: “So while any one property of mine *is* changing, I must, in order to preserve my identity through that change, keep enough other properties of mine unchanged” (Mellor 2008d:407).¹⁰ In passing it should be noted that the law of non-decreasing entropy, the second main law of thermodynamics, ultimately ensures that physical time is *irreversible* (we shall return to this issue below).

Does persistence (“stasis”) need a cause?

⁷ When a statement holds for the natural number 1 and [this is the inductive step] if it is the case that when it holds for the natural number n it also holds for $n+1$, then it holds in general.

⁸ In passing we may note that Weyl here defends and continues the view of Immanuel Kant, namely that mathematical judgments are *synthetic a priori judgments* (see Kant 1781, 1787²).

⁹ By acknowledging that “greater and less are undefinable” Russell implicitly accepts the primitive meaning of *numerical succession* (see Russell, 1956:194; see also page 167). He remarks that “progressions are the very essence of discreteness” (Russell, 1956:299).

¹⁰ Mellor does acknowledge that our “A-beliefs are as indispensable as they are irreducible” (Mellor 2008d:407).

When Mellor continues his argument in the next paragraph on the same page, he looks for an account of the “cause” resulting in “stasis”, i.e. in what remains the same: “The causation of stasis may be less obvious than that of change, but it is no less real, and no less necessary to secure the identity that is needed to make a difference a change.” However, this view confuses the physical meaning of change with the (foundational) phoronomic meaning of uniform, rectilinear motion. When something persists, i.e., stays the same, *no* physical cause is needed. This mistake was corrected by Galileo (his law of inertia) and Newton (his first law of motion): movement does not need a cause – only a *change in motion* is in need of a cause. As an original mode of explanation motion is primitive and therefore (just as number and space as modes of explanation) not in need of being explained.

The basic distinction between phoronomy and dynamics

Janich distinguishes between what is *phoronomic* (also designated as *kinematic*) and what is *dynamic* – by pointing out that given certain conditions a body can never accelerate in a discontinuous way, that is to say, it cannot change its speed through an infinitely large acceleration, because this would require an infinite force (Janich 1975:68-69 see also Janich 2009:140).¹¹

The distinction between the kinematic aspect of uniform, rectilinear motion and the physical aspect of dynamic energy-operation reveals a perennial philosophical problem, namely that of *constancy* and *change*. Plato already realized that if everything changes (as Heraclitus alleged) then conceptual knowledge would be at a loss (see Plato’s dialogue *Cratylus* 439 c – 440 a). His lasting insight is that without an element of constancy, no changes could be detected.

Order and time

What about the idea of a *time-order*? It appears on the law-side of reality, strictly correlated with *duration* at the factual side (see the remarks of Dooyeweerd 1936:67-70). The B series of McTaggart should be related to the numerical *time-order* of *succession* and the A series with the *irreversible* (physical) time-order of cause and effect (change or causality) which concerns physical changes occurring when the future turns into the present and the present into the past.

In addition we have to consider two other *modes of time*, namely the *spatial* and the *kinematic* modalities: the *spatial time-order of simultaneity* and the *kinematic time-order of uniform flow (rectilinear movement or constancy)*.

Modes of time and the history of time measurement

Already Immanuel Kant saw this, in spite of the psychological one-sidedness present in his general view of time as a *sensory form of intuition*. He states that the “three modes of time are persistence, succession and simultaneity” (Kant, 1787-B:219).¹²

¹¹ “Bezogen auf den Gang einer angeblich so ausgewählten Parametermaschine kann eine Körper seine Geschwindigkeit deshalb nicht un stetig, d.h. mit unendlich große Beschleunigung ändern, weil dazu eine unendlich große Kraft erforderlich wäre.”

¹² “Die drei Modi der Zeit sind Beharrlichkeit, Folge und Zugleichsein.”

The history of time-measurement reflects four different time-orders which actually belong to our everyday awareness of time, namely *earlier and later* (number), *simultaneity* (space), *time-flow* (kinematic) and *irreversibility* (physical). The physicist Stafleu points out that these are *well-known modalities of time* (Stafleu 1980:16).¹³

Universal constants implicitly confirm the existence of the first four modal aspects

Our awareness of time is also reflected in the *units of measurement* (designated as: *constants*) identified in the protophysics of Lorenzen. He distinguishes the following four units, namely *mass, length, duration* and *charge* (Lorenzen 1976:1 ff.). This clearly demonstrates that linking time with duration embraces all four above-mentioned modes of time, which opens up the possibility to employ them also as modes of explanation. Interestingly, Heisenberg acknowledges two universal constants only, namely the constant velocity of light in a vacuum postulated by Einstein and the quantum of action discovered by Max Planck. The latter was understandably in search for a *third* universal constant, namely *length*. He believed that we need at least three units – such as *length, time* and *mass*. One may replace them by *length, velocity* and *mass* or, alternatively, by *length, velocity* and *energy* (Heisenberg 1958:165). Interestingly, time is here implicitly identified with its kinematic mode, because the word “time” (which Heisenberg equates with the vacuum-velocity of light, *c*) is substituted by “velocity” in the last two alternatives contemplated by Heisenberg.

Once the four basic units of measurement are identified, we can represent the outcome in the diagram below, distinguishing number (“mass”), space (“length”), the kinematical (“duration”) and the physical (“charge”). Weinert lists the *kilogramme* (number), the *meter* (space), the *second* (the kinematic) and *temperature* (the physical) (Weinert 1998:230; and see also Lorenzen 1989 and Strauss 2010:169).

	Lorenzen	Heisenberg (a)	Heisenberg (b)	Heisenberg (c)	Heisenberg (d)	Weinert
Physical	charge	quantum of action			energy	temperature
Kinematical	duration	c (velocity of light)	time	velocity	velocity	second
Space	length		length	length	length	meter
Number	mass		mass	mass		kilogram

It is clear that these thinkers implicitly provides their account of different units of measurement in terms of the four most basic aspects of reality and it is also clear that they related *time* rather to the *kinematic* aspect than exclusively to the physical mode.

Change is just one among multiple modes of time

This broadened perspective straightaway questions the identification of time with *change*, which is no more than just *one* of the *modes* of time. McTaggart holds that a “universe in which nothing changed ... would be a timeless universe” (McTaggart 2008a:22). Mellor

¹³ Carey touches upon physical (ir)reversibility where he refers to North American communications theory during the third quarter of the 20th century. He says it could have been described “by an arc running from Harold Innes to Marshall McLuhan.” “It would be more impressive,” as Oscar Wilde said while staring up at Niagara Falls, “if it ran the other way” (Carey 2009:109).

clearly still adheres to this conviction by stating that “time is the dimension of change” (Mellor 2008d:406). However, as soon as it is realized that the various aspects of reality are not fitted into an “either-or” relation, but into a relation of mutual coherence based upon their uniqueness, then room is left for different angles of approach to the same event or state of affairs. In passing we may note that the sociologist, Anthony Giddens, questions the identification of time with change. He does this because he is aware of the problem of *identity*: “Time is not to be identified with change, since an object only has identity in so far as it has continuity that ‘abides in time’ ” (Giddens 1987:141).

The biotic time-order

A person maturing and reaching adulthood certainly manifests the determining and limiting effect of the *biotic time-order* of *birth, growth, maturation, ageing and dying*.¹⁴ In this example the focus is on the biotic subject-function of living entities. Of course they are also *physical subjects* (constituted by their atoms, molecules and macro-molecules), a *kinematic* (moving) *subject*, a *spatially extended subject* and a *numerical subject* – a person is *one*, not many. Observing that such a person has aged (*changed*) over the past decade does not *exclude* an assessment from the angle of the kinematic subject-function of such a person, but *presupposes* it for noticing changes over a decade rests on the assumption that we are still speaking of the *same* person – (kinematic) constancy lies at the *foundation* of (physical) change. When time is one-sidedly identified either with *change* or with *constancy* the result will be a meaningless theoretical construct.

The reality of the biotic time phases exceeds *physical* time. The French-American biologist, Lecomte du Noüy, points out that biotic life phases accelerate, for the older a living entity gets, the quicker the process of ageing advances.

(Ir)reversibility

Although communication involves *reciprocity* it does not entail reversibility. In this sense it echoes the physical meaning of irreversibility. The development of modern physics highlights these distinctions also from the angle of (ir)reversibility. Within the aspects of number, space and movement, the time-orders are *reversible*. McTaggart already noticed the reversibility of the numerical time-order (see McTaggart 2008a:25). The succession of the natural numbers could be counted in two directions: 1, 2, 3, ... or ... 3, 2, 1, while the integers *by definition* include positive and negative numbers [... -3, -2, -1 0, +1, +2, +3, ...]. An actual (physical) process of counting, in whichever direction, will always be bound to the irreversibility of the physical time-order.

The symmetry of spatial figures reveals the reversibility of the spatial time-order and in the case of the kinematic time-order, switching the sign will change the direction of movement (like in the case of a pendulum).

Every aspect of reality is unique, characterized by its peculiar core meaning or meaning nucleus, and at the same time it reveals its meaning only in coherence with the other aspects

¹⁴ The factual life-span (duration) of individual plants, animals and human beings vary largely from less than a year to several thousands of years (like the Redwood trees in California).

of reality. For example, the physical concept of *mass* reflects a *physical quantity* (a numerical analogy). We already briefly discussed the difference between physical space and mathematical space (*physical extension* reflects a spatial analogy within the structure of the physical aspect). On the law-side of the physical aspect the kinematical analogy is revealed in the configuration of *energy-constancy* (the first law of thermodynamics). The order of succession between these aspects suggests that we may call the backward-pointing analogies *retroicipations* (forward-pointing ones are *anticipations*).

Planck, Einstein and Janich on the limitations of the classical mechanistic view in modern physics

Einstein endorses the earlier mentioned position taken by Peter Janich, as well as the view of Max Planck. These scholars are critical of the *mechanistic* main tendency of classical physics which reduced all physical phenomena to *reversible* mechanical movements. Mac Planck explains (Planck 1910:53). Planck also points out that the irreversibility of natural processes (also known as the “arrow of time”), confronts the mechanistic view with unsolvable problems, since within the latter all processes are considered to be reversible (Planck 1910:55). In his *Autobiographical Notes* Einstein mentions that Planck recognizes thermodynamically irreversible [*nicht umkehrbaren*] courses of events but immediately adds that seen “from the molecular-mechanical point of view ... all courses of events are reversible [*umkehrbar*]” (Einstein 1959:42). The difference between reversibility and irreversibility therefore concerns the kinematical time-order and the physical time-order.

According to Planck the most encompassing and perhaps last attempt to reduce all natural phenomena in principle to motion, is contained in the *Mechanik* [mechanics] of Heinrich Hertz. Hertz only acknowledges one kind of matter only, namely *mass-points*, just as there is also only one kind of energy, namely *kinetic energy*. All the other forms of energy (such as potential energy, electromagnetic energy, chemical energy, and thermic energy) are for Hertz derived from the invisible *movements* of mass-points (Planck 1910:56).

Acknowledging the feature of *irreversibility* therefore represents *the* crucial step in the transition from classical physics to modern physics!

In the context of our present assessment, the correlation of time-order and time-duration expresses itself within each aspect in accordance with the unique nature of the aspect concerned. What we have called the dimension of *ontic time* guarantees an ontic time-order amongst the various aspects of reality, which is revealed in their succession. Dooyeweerd indeed distinguishes between the law-side and factual side of “cosmic time” in terms of the distinction between time-order and time duration (Dooyeweerd 1940b:193).

Communication: the conditioning role of the first four ontic time-orders

We have noted earlier that communication embodies a S-O-O-R relation, that is to say it concerns the relation between a primary subject (S-1), a primary object (O-1), a secondary object (O-2) and a secondary subject (S-2). Communication is therefore based upon a communicative multiplicity and the actualization of this communicative multiplicity always has to conform to the numerical time-order of succession because in the communicative interaction the participating subjects and objects successively serve the communicative

interaction. Yet in all face-to-face communicative interaction the successive elements involved in communication are present at once, conforming to the spatial time-order of simultaneity. Communication at a distance, depending upon different kinds of technology (from the telegraph up to almost instant WEB-interactions), depends upon a continued interaction, persisting throughout the particular communicative event. Likewise, in the case of face-to-face communication, the interconnected subjects and objects have to *continue* their participation, for if it does not persist (kinematic time), the actual communication will break down. The communicative interaction taking place evinces the physical time-order of irreversibility, ensuring that the communication does take *effect*.

The Achilles' heel of a positivistic understanding of time

The Achilles' heel of positivism is given in its emphasis on *observation, sense-perception* and *sense data*. Does "time" allow access to sensory perception? Can we *taste* time (is it bitter or sweet)? Can we *hear* time (is it soft or loud)? Can we *feel* time (does it hurt)? Can we *see* time (is it beautiful or ugly)? Can we *touch* time (is it hard or soft)? Does the absurdity of these questions compel us to conclude to the "unreality" of time? No, not if we *do* acknowledge the *ontic reality* of the aspects of reality. Otherwise we may be tempted to see time merely as a *theoretical entity*, as it is done by Nyíri (Nyíri 2006:302). He follows Sellars who calls upon the "framework of everyday observational discourse" causing the "postulation" of certain "unobservable entities" – and Sellars then claims that "time is just such a postulated entity" (Nyíri 2006:302-303).

However, such a view would not only eliminate the ontic reality of time, but also the ontic reality of the various modal aspects of reality. Once the positivist scientist has observed a material entity the next task is to *describe* it – producing statements concerning "how many?"; "how big?"; "how enduring?" and "how strong?" And immediately we can ask questions similar to those raised above in connection with time. *What does the numerical aspect feel like? How heavy is the spatial aspect? How loud is the kinematic aspect? How sweet is the physical aspect?*

Communication and other modes of time

The Dutch philosopher, Herman Dooyeweerd, noticed that all definitions of "time" are actually definitions of the multiple ways in which ontic time expresses itself within each aspect of reality¹⁵. How does this insight relate to the different ontic modes of time?

Communication always entails a *succession of recurring S-O-O-S* relationships: a subject communicates with another subject (a subject-subject relation), on the basis of a twofold subject-object relation, encompassing whatever state of affairs is objectified and in a secondary sense whatever written or oral signs mediate the process, leaving aside which technical means are used.

We can now proceed by looking at the *foundational relation* between the human communicative capacity and the organic subject function of the communicator. A certain level of organic development is required before the lingual abilities of humans come into

¹⁵ See Dooyeweerd 1940a:166-174 and Strauss 2010:169-174 for a more detailed analysis of ontic time.

their own. Nonetheless, lingual performance involves the human person in its totality, implying that strictly speaking human lingual and communicative activities do not depend on so-called speech-organs.¹⁶

Furthermore, communication is also co-conditioned by the sensory mode of time. A boring conversation may *feel* as if it lasted four hours, whereas in fact, measured against the yardstick of physical (clock) time, it lasted only a few minutes. Bergson captures the meaning of *psychical* duration by speaking of *durée*.

Argumentations are governed by the logical order of *prius et posterius* – the logical ground precedes the logical conclusion. Leibniz discovered the logical principle of sufficient ground, also known as the *principle of sufficient reason* or *ground*: the *principium rationis sufficientis*.

The imperialistic claim that only physics can tell us what time is runs into serious difficulties with *historical* time. Visiting a farm may cause the visitors to notice that it appears as if life stood still during the previous five decades. This mode of speech says that during the past fifty years nothing changed, an absurdity for *physical time*. Yet, when it is realized that it concerns our *historical awareness of time*, no absurdity is present.

The general pattern of cultural development distinguishes between the Stone Age, the Bronze Age, and the Iron Age. It is even said that that within the 21st century there are communities still living in the *stone age* (more or less dated between 2 million and 10 000 years ago). In passing we may note that historicism aimed at reducing everything to historical change, but actually discovered the *historical aspect* as a genuine *mode of time*.¹⁷ Historical time phases are determined by historical criteria of cultural development. Tradition may be appreciated as an important *communicative link* between the present and the past. Seeing the past as behind us and the future in front of us will not be constitutive for the understanding of time in “cultures in which tradition is the primary medium of organizing time experience,” as Giddens remarks (Giddens 1987:143).

Various cultures may be more or less advanced in terms of their technology, tertiary academic institutions or economic systems, yet through translations intercultural communication is opened up at once. Bührig, House and Ten Thije edited a book dedicated to this perspective (2009).

Highlighting that human existence is characterized by “historicality” does not automatically need to result in the historicistic conviction that human nature is inherently “historical” as Giddens correctly remarks (Giddens 1987:141).

¹⁶ If a speech organ is defined as that bodily part which exists solely in service of the production of speech sounds, then there are no human speech organs. The lungs, larynx, mouth cavity, palate, teeth, lips and nose cavity, without an exception will perform their primary normal biotic functions even if humans never uttered a word (Overhage 1972:243)!

¹⁷ Already Hegel and Fichte introduced the concept of “geschichtliche Zeit” (historical time), further explored by thinkers such as Kierkegaard, Jaspers, Heidegger, and many others. These developments prompted Zuidema to present his *Inaugural Address* (1949) under the title: “De Mensch als Historie” (The historical nature of being human – Zuidema 1949).

Time also comes to expression in what is normally designated as the *lingual mode*. A more encompassing characterization is found in calling it the *sign mode*, because it then includes the lingual trait (linguistic structures), the semantic trait (what is signified) and the semiotic trait (given in the normative calling: signify!). The meaning of the sign mode is opened up or deepened when its forward-pointing analogies (anticipations) are disclosed. The first aspect towards which the sign mode is opened up is the social aspect. The term *communication* aptly describes this deepened meaning of the sign mode. Within the sign mode itself lingual time is evident in the semantic effects of punctuation marks or pausing in speech acts.

The phenomenon of *interest* reveals *economic time*, also captured in the slogan: “Time is Money”!

Legal communication is embedded in particular features attached to the way in which law treats time. Whereas the physical calendar follows the normal succession of days, weeks, months and years, the jural calendar contains gaps or discontinuities, such as excluding public holidays, Sundays or weekends from the number of days specified. Laws with a *retroactive effect* underscores the uniqueness of jural time. A declaration of age (a privilege granted a minor – *venia aetatis*) or the new marital status (after a wedding), may affect the jural time involved in “coming of age” in such a way that the generally specified age of majority may vary in the legal order of Western states. Legal arrangements therefore contain their own communicative force since they cannot be reduced to physical time. Moreover, laws are made valid by competent legal organs requiring an interpretation of what is communicated by such laws.

Identity and communication

Both the subject-subject and subject-object relations involved in communicative acts have to retain their communicative *identity* throughout actual communication. The problem of identity concerns the relationship between *constancy* and *change*. There are two ways in which terms can be derived from a particular modal aspect: (a) to designate what functions within the boundaries of an aspect; and (b) to account for the way in which such a term can be used to point beyond the boundaries of that aspect.

For example, although the term *wholeness* or *totality* is located within the spatial aspect, it may be used in order to refer to the entire universe. One may call usage (a) a *conceptual* use of spatial terms and usage (b) a *concept-transcending* use of spatial terms (also designated as an *idea-use* of such terms). Likewise, uniform motion may refer to a moving body (as a kinematical subject), but the *persistence* or “abiding in time,” as Giddens has called it, points at the *identity* of an entity.

A concept-transcending use of terms derived from the first four aspects communicates the most basic philosophical statements any scholar can make: everything is unique, everything coheres with everything else, everything is constant and everything changes. This applies *mutatis mutandis* to communication as well: it is unique, coheres with everything else, endures and changes.

The multiple aspectual time conditions norming linguistic communication¹⁸

In their account of participatory communication Jacobson *et al* consider four normative conditions, namely *truth* (is the information being offered undistorted and reliable?), *rightness* (legitimacy), *sincerity* (honesty), and *comprehensibility* (Jacobson et al. 1999:274). When linguistic communication is equated with the adjective *communicative*, then the interconnections between communicative actions and the various temporal modes of reality analogically reflected within the deepened structure of the sign-mode shed a new and more nuanced light on the relationship between time and communication.¹⁹

We have alluded to the presence of principles on the norm-side of all the post-sensory aspects. Every retrocipation and anticipation on the norm-side of the post-sensory aspects reveals a fundamental modal norm or principle. We highlight this perspective in terms of the multiple modes of ontic time.

Communicative orderliness reflects the subjectedness of successive communicative actions to the numerical time-order. Information communicated ought to be properly *ordered* and presented in an *orderly* way. In addition, it ought to be communicated in a *coherent* way, integrated into a meaningful communicative whole (the appeal of the spatial time-order of *at once*). Once communication commences it ought to be sustained (continued) in such a way that it is terminated only when the participants completed their communication (the kinematic time-order of uniform flow). Although communication oftentimes involves repetition, it ought to have communicative effects (the irreversible physical time-order of causality). Communicative vitality, fruitfulness and adaptivity (the biotic analogy) call for communicative growth and communicative maturity, reflecting the conditioning role of the biotic time-order. Communicative sensitivity, in turn, serves as the foundation of the normative appeal of communicative consistency, comprehensibility and reaching of sound conclusions (the norming effect of the logical time-order). In the presence of communicative mastery, power, care and control, communicative actions ought to avoid the break-down of communication or a too rapid advancement, for it should be guided by considerations of communicative continuity and steadfastness (within the cultural-historical mode these features are known as avoiding reactionary or revolutionary tendencies by acting in reformational ways). Within a differentiated society communal and inter-individual communicative politeness (as opposed to impolite communication) provide the foundation for communicative frugality (communicative economy – the avoidance of communicative excesses and redundancy). In communicative harmony, communicative retribution (justice), communicative integrity (morality); and communicative reliability, confidence,²⁰

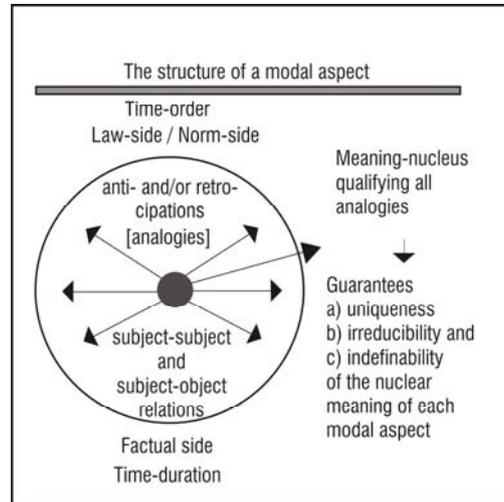
¹⁸ When communicative actions are contextualized within different kinds or types of societal interaction, in addition to unspecified universal modal norms, specified type-laws need to be taken into account. However, such an analysis exceeds the limits of this article.

¹⁹ What Jacobson et al. identified merely concerns a few analogical interconnections (retrocipations and anticipations), namely communicative truth and comprehensibility (logical-analytical retrocipations), communicative rightness (a jural anticipation), and communicative sincerity (an ethical anticipation).

²⁰ Dianna Booher's book on communication with confidence, in the absence of a theory of modal aspects prevented her from realizing that the meaning of confidence comes to expression only in its coherence with all those aspects differing from the certitudinal aspect. Implicitly this book deals with this insight all the way. The subtitle reads: "How to Say It Right the First Time and Every Time". It reflects the

trustworthiness and being convincing (*bona fides*), we discern the aesthetic, jural, moral and certitudinal anticipations (within the communicative deepened structure of the sign-mode).

It may be illuminating to summarize the structural features of a modal aspect which surfaced in our preceding analysis succinctly in the following *Diagram*.



Concluding remark

Of course acknowledging multiple modes of time does not intend to deprive kinematical and physical time from their rightful place. But this point is so obvious that it barely needs further elaboration. From the sundial and mechanical clockwork up to the radio, telegraph, telephone and cell-phone modern societies organize indeed themselves on the basis of the trustworthiness of kinematic and physical time. Nonetheless, we have seen that the acknowledgment that ontic time distinctly comes to expression in each of the modal aspects of reality, enables a more nuanced understanding of the relationship between time and communication.

Literature

- Assmann, J. 1975. *Zeit und Ewigkeit im alten Ägypten*. Heidelberg: Carl Winter Universitätsverlag.
- Bell, J.L. 2006. *The Continuous and the Infinitesimal in Mathematics and Philosophy*. Milano: Polimetrica.
- Bernays, P. 1976. *Abhandlungen zur Philosophie der Mathematik*. Darmstadt: Wissenschaftliche Buckgesellschaft.
- Booher, D. 2012. *Communicate with Confidence*. New York: McGraw Hill.
- Brouwer, L.E.J. 1907. *Over de Grondslagen der Wiskunde*. Amsterdam: & Leipzig: Maas & Van Suchtelen.

numerical time-order because the word “first” points at an *ordinal number*. Right from the start she lifts out guidelines derived from the various modal aspects, such as “find commonalities” (the logical-analytical aspect), “show compassion” (the sensory-emotive aspect), “demonstrate competence” (cultural-historical control, mastery and skillfulness), avoid doublespeak (ambiguity – the sign mode), and so on (see Booher 2012:1-8).

- Brouwer, L.E.J. 1919. *Wiskunde, Waarheid, Werkelijkheid*. Groningen: Noordhof.
- Bührig, K., House, J. and Ten Thije, J.D. 2009. *Translational Action and Intercultural Communication*. Manchester: St. Jerome Publishing.
- Butts, R.E. and Brown, J.R. (Eds.) 1989. *Constructivism and Science*. Dordrecht: Kluwer.
- Carey, J.W. 2009. *Communication as Culture*. London: Routledge.
- Cassirer, E. 1957. *Das Erkenntnisproblem in der Philosophie und Wissenschaft der neueren Zeit*. Stuttgart: Kohlhammer Verlag.
- Dooyeweerd, H. 1936. Het Tijdsprobleem en zijn antonomieën op het immanentiestandpunt. In: *Philosophia Reformata*. 1(2): 65-83.
- Dooyeweerd, H. 1939. Het Tijdsprobleem en zijn antonomieën op het immanentiestandpunt. In: *Philosophia Reformata*. 4(2): 1-28.
- Dooyeweerd, 1940a. Het Tijdsprobleem in de Wijsbegeerte der Wetsidee. In: *Philosophia Reformata*. 5(3)160-192.
- Dooyeweerd, 1940b. Het Tijdsprobleem in de Wijsbegeerte der Wetsidee. In: *Philosophia Reformata*, 5(4):193-234.
- Einstein, A. 1959. Autobiographical Notes. In: *Albert Einstein, Philosopher-Scientist*. Edited by P.A. Schilpp. New York: Harper Torchbooks (pp. 2-95).
- Giddens, A. 1987. *Social Theory and Modern Sociology*. Stanford: Stanford University Press.
- Heisenberg, W. 1958. *Physics and Philosophy. The Revolution in Modern Science*. New York: Harper Torchbooks.
- Hilbert, D. 1925. Über das Unendliche, *Mathematische Annalen*, Vol.95, 1925: 161-190.
- Jacobson, T.L. and Servaes, J. (Editors), 1999. *Theoretical Approaches to Participatory Communication*. Cresskill, N.J.: Hampton Press.
- Janich, P. 1975. Tragheitsgesetz und Inertialsysteem. In: *Frege und die moderne Grundlagenforschung*, Red. Chr. Thiel. Meisenheim am Glan: Hain.
- Janich, P. 2009. *Kein neues Menschenbild*. Frankfurt am Main: Suhrkamp Verlag.
- Kant, I. 1781. *Kritik der reinen Vernunft*, 1st Edition (references to CPR A). Hamburg: Felix Meiner edition (1956).
- Kant, I. 1787. *Kritik der reinen Vernunft*, 2nd Edition (references to CPR B). Hamburg: Felix Meiner edition (1956).
- Lorenzen, P. 1976. Zur Definition der vier fundamentalen Meßgrößen. In: *Philosophia Naturalis*, Volume 16:1-9.
- Lorenzen, P. 1989. Geometry as the Measure-Theoretic A Priori of Physics, in: Butts and Brown (Eds.), 1989:127-144.
- Maddy, P. 1997. *Naturalism in Mathematics*. Oxford: Clarendon Press.
- Maier, A. 1964. Diskussion über das Aktuell Unendlichen in der ersten Hälfte des 14. Jahrhunderts. *Ausgehendes Mittelalter*, Vol. I, Rome: Edizioni di storia e letteratura.
- McTaggart, J.E. 1908. The Unreality of Time. In: Oaklander 2008a:21-35.
- Mellor, D.H. 2005. Time. In Oaklander 2008d:389-410.
- Mozersky, J.M. A tenseless account of the presence of experience. In Oaklander 2008c:104-132.
- Oaklander, L.N. Presentism. In Oaklander 2008b:218-235.
- Nyíri, K. 2006. Time and Communication. In: Stadler & Stöltzner (Eds) (pp.301-316).

- Oaklander, L.N. (Editor) 2008a. *The Philosophy of Time*. Volume I. The Reality and Language of Time. London: Routledge.
- Oaklander, L.N. (Editor) 2008b. *The Philosophy of Time*. Volume II. Time and Metaphysics. London: Routledge.
- Oaklander, L.N. (Editor) 2008c. *The Philosophy of Time*. Volume III. Time, Experience and Freedom. London: Routledge.
- Oaklander, L.N. (Editor) 2008d. *The Philosophy of Time*. Volume IV. Time and Physics. London: Routledge.
- Overhage, P. 1972. *Der Affe in dir*, Frankfurt am Main: Josef Knecht.
- Planck, M. 1910. Die Stellung der neueren Physik zur mechanischen Naturanschauung (Vortrag gehalten am 23. September 1910 auf der 82. Versammlung Deutscher Naturforscher und Ärzte in Königsberg im. Pr.). In: Max Planck, 1973:52-68.
- Planck, M. 1973. *Vorträge und Erinnerungen*, 9th reprint of the 5th edition. Darmstadt: Wissenschaftliche Buchgesellschaft.
- Plotinus 1956. *The Enneads*. Translated by Mackenna, S. London: Faber & Faber.
- Russell, B. 1956. *The Principles of Mathematics*. London: George Allen & Unwin. (First published in 1903, Second edition 1937, Seventh impression 1956).
- Schilder, K. 1953. *Christus en Cultuur*. Franeker: Wever.
- Schilpp, P.A. (Editor) 1958. *The Library of Living Philosophers, The Philosophy of Ernst Cassirer* (First edition, second printing). New York: Tudor Publishing Company.
- Smart, H.R. 1958. Cassirer's theory of mathematical concepts. In: Schilpp 1958 (pp.241-267).
- Stadler, M. And Stöltzner, M. (Eds). 2006. *Time and History. Zeit und Geschichte*. Frankfurt am Main: Ontos Verlag (pp. 301-316).
- Strauss, D.F.M. 2010. Do we really comprehend time? *South African Journal of Philosophy* (SAJP) 29(2):166-177.
- Weinert, F. 1998. Fundamental Physical Constants, Null Experiments and the Duhem-Quine Thesis. In: *Philosophia Naturalis*, 35:225-251.
- Weyl, H. 1966. *Philosophie der Mathematik und Naturwissenschaft*, 3rd revised and expanded edition. Vienna: R. Oldenburg.
- Zuidema, S.U. 1948. *De Mensch als Historie*. Inaugural Oration, Free University of Amsterdam. Franeker: T. Wever.