



# On Minds' Localization

**Clues from a range of academic topics suggest that observers are put in operative connection or disconnection with the surrounding occurrences by the physiologically modulated motion of unidentified microphysical particles**

by

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**ABSTRACT:** A confluence of clues from a range of academic topics suggests that minds localization in nature consists of relativistically moving microphysical particles, whose motion is physiologically modulated. Here those clues are shown to imply that the localization of the operations of observers (minds or existentialities) in nature are the actions carriers of a force field, which action carriers are slightly slowed from near- $c$  speed motion by electroneurobiological variations in brain physiology – thus gating through relativistic time dilation the observer's time resolution and putting her or him in operative connection or disconnection with the surrounding occurrences. In this scenario, minds as well as sensory knowledge acquire a precise definition and appear situated in a particular point of causal sequences.

**Summary in general terms:** Why were minds selected to turn accidents into opportunities, *i. e.*, to progress toward biological goals through appropriate steps for which the instructions are nonetheless undefinable? Minds appear situated in certain force-carrying particles whose speed sets wakefulness or sleep. Through this force, observable by its influence on the evolutionary process, minds and bodies interact. Physical actions impinging on a mind generate in it physical reactions whose causal efficiency gets exhausted, so that the reactions cannot continue their causal series. In exchange, they become sensorially known. On them the mind then takes efficient initiatives –

whereby minds acquire intellectual development – generating changes. The broken causal sequence seems to be what enables minds for their biological role.

**Summary in technical terms:** Observers' localization in nature might be relativistically moving particles whose motion is physiologically modulated. Transdisciplinary clues imply that speed variation is imposed onto some action carriers of a force field by their coupling with intensity variations of an overlapping field. The operations of observers (minds or existentialities) in nature seem localized in such actions carriers, slightly slowed from near-speed motion by electroneurobiological variations – which thus gate the observer's time resolution and put her or him in operative connection or disconnection with the surroundings. Thereby minds and sensory knowledge appear in a particular point of causal sequences.

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[This written exposition comes from a wide-ranging lecture, summarizing the articulation of several concepts more detailedly expounded in other articles of this journal. Ed.]

## 1. What is observed?

Cows and cars continue causal series coming from their milieu: both of them resume chemical reactions, from the remote past when burning off fossil fuel and from more recent photosyntheses when chewing grass. News reported in this article allow us to better tell apart a cow from a car. The physical actions impinging from outside on the cow's psyche generate in it what now appears as a special type of physical reactions, called intonations, whose causal efficiency gets exhausted – so that they cannot continue the causal series. In exchange, they get sensorially known. The cow's mind may then take physically efficient initiatives – the ones whereby minds acquire intellectual development – generating variations, in quantity or distribution of the motion they originate, as an effect of internal forces. This appears to be why, during the course of evolution, minds become selected as the uppermost regulatory level of organisms thriving in environments that impel these organisms to overcome the Turing machine's limits (*i. e.*, to progress toward adaptive goals through appropriate steps for which the instructions are nonetheless undefinable), acquiring the ability to turn accidents into opportunities. Those forces can be observed by their influence on the evolutionary process, and their action carriers' features are found constrained by a number of neuropsychological and clinical observations.

## 2. Reciprocal constraints of separate findings

In a dozen independent academic fields, hints have recently surfaced whose combination suggests that the unknown localization of minds in nature features certain characteristics, the most remarkable of which is motion. It comes from the following observations:

1. Genetic epistemology is generally considered a branch of psychology, chiefly developed in the last three quarters of the 20<sup>th</sup> century by the efforts of the biologist-psychologist Jean Piaget<sup>1, 2</sup> and many collaborators. Their work shows that minds achieve intellectual development through behavioral probing of reality, not through

its Platonic contemplation. The focus of the minds' description thus shifted onto the origination of probing actions, or initiatives, a feature distinguishing minds from non-minds and discussed below. Whatever it is that senses, it proceeds as if enclosed in a supple bag: in this case, only by taking initiatives, *i.e.* by palpating the bag's wall, can it recognize what is invariantly conserved outside and, so, build a mental map or picture of the surrounding happenings.

**2.** Evolution of living systems, one of the most notable dynamical phenomena of nature, is a physical relaxation process. As such, it should move on a shortest path amid environmental circumstances whose variety on Earth may be considered quite constant since at least Late Proterozoic times.

**3.** Combination of the preceding observations suggests that minds are not epiphenomenal but do efficiently act in the surroundings, collectively behaving as a physical force that – also because the assemblage of mind-guided actions is never fully adapted or identically conformed to biological usefulness – modifies the shortest path of the biosphere's evolutionary relaxation process. By differently setting its minimal trajectory, minds act as a Newtonian force, observed in their biological effects which include stretching the trophic chains and anthropogenic perturbations.

**4.** This implies that the mentioned mind's initiatives – whereby minds acquire intellectual development – are variations, in quantity or distribution of the motion they originate, as an effect of internal forces. It is upon this feature that biological evolution functionalizes, or uses as a means, the regular appearances of existentialities (or subjective existences, or psyches) for overcoming the limitations of Turing machines, which are unable to convert accidents into opportunities. This function is for some organisms the foremost among the so called "functions of relation with the environment," or functions of relation for short. For nourishing, defending and reproducing themselves most biological organizations operate as Turing machines, namely as contrivances that cast step by step their outcomes' string. As such do function, *e.g.*, corals, oysters, and tropical plants, all of which are usually construed as not mind-regulated living creatures. These biological organizations solve their problems upon species-specific preadaptations; namely, all their functions of relation are preset. So, oysters solve these problems of how to nourish, defend and reproduce by basing their particular solutions on species-specific preadaptations, instead of minding of the situations they should cope with. In contrast, by refining the adaptation or adequacy of the provided solutions, in the biological organisms called "mind-regulated animals" – each of which use a mind as its uppermost regulatory level – the individual existentiality that confronts a concrete problem does this, and grasps at many of the opportunities that a Turing machine would have lost. The mind's continual forwarding of initiatives – the mentioned probings "through the bag's wall" – that allows their Piagetian intellectual development physically requires that minds' specific actions belong with an interaction modality, whose action carriers should be those of the Newtonian force observed to influence the path of the biosphere's evolutionary relaxation process.

**5.** On the other hand, clinical observations show recoveries from amnesias. This old observation, in the recently acquired scenario thus far outlined, entails that memories are not engraved data, which – in spite of the fact that the name *cerebrum* implies the engraving metaphor – could not be recovered after loss. The mentioned findings of genetic epistemology require that any recovery after a

genuine loss be achieved by way of building anew the intellectual development, which is manifestly not the case of recovered patients. This suggests that the recoveries from amnesias should not be deemed recoveries of genuinely lost mental contents, but reacquisitions of the brain's ability to have them reimaged.

**6.** Far from the study of amnesias on the academic map, physical studies on the origin of inertial mass have been as yet inconclusive but most physicists agree that this mass comes from outside onto elementary particles which by themselves are massless<sup>3</sup>. Although we are unaware of the mechanism<sup>4</sup>, it is observed that some particles hold a certain amount of mass and others none. This situation allows time processes to spread up from microphysical scales, *i.e.* the force fields' action carriers can thereby arrange structures that evolve in scales larger than microphysical.

**7.** But this process has not been found to organize the internal differentiations of minds, or mental contents. This suggests that such time processes do not course inside minds and anything that achieves sensed or known differentiations "sediments" them as its memories, altering itself by sedimenting away from time its causal involvements. "Away from time" means "not on time courses but inside the instant," which instant is where such reality which knows – as well as the whole of nature – occurs and simultaneizes the sedimented sequences ("memories") of its reactions to its causal interactions. This is tantamount to saying that whichever reality that knows itself ought to possess memory of what it knowingly differentiates; namely that, because nature vacates itself outside actuality and so every thing and process in nature, including each mind, only exists within the physical instant, the preservation of memories is an effect of the absence of time course, not of the presence of brain engrams. To put it still otherwise, it means that, in the same way that impetus is superfluous to keeping unperturbed bodies in geodesic motion, engraving such memories in the brain is superfluous to keeping them in mind.

**8.** The interval-like duration of the physical instant, or time-like period in which no physical action could ever insert a change, is unknown. Many physicists are sympathetic toward the view that identifies it as the Planck instant, but in present nature no separate force, or interaction modality whose relationships enter to define the Planck instant, can produce a change before a "characteristic time" of some  $10^{20}$  Planck instants or more: every transformation in time is, thus, currently ticked on intervals always larger than this one. In contrast, it is observed that moments, the least interval which an awake mind can distinguish or resolve and during which no mental action can be done, have a magnitude of the order of the hundredth of a second, about  $10^{41}$  Planck instants.

### **3. Interval dilation in mind disconnections**

This particular relationship between such physical instants and mental moments, namely about  $10^{41}$  times, may be a relativistic dilation generated by moving close to a speed equal to  $c$  minus a  $10^{-82}$  fraction of  $c$ . Further circumstances suggest that this possibility should be seriously considered.

**9.** Besides this time acuity proper of the attentional focus of an awake mind, we observe states of inattention, sleep and coma that are usually interpreted as losses of consciousness or, in the case of inattention, as a decrease in the sensed objects' "force of imposition". As an academic expression, the latter is a wording that ac-

quired some biomedical denotations following its origin in phenomenological introspection<sup>5</sup> and might require explanation: what is in the focus of attention allows one to be mindful of all that one knows that could be done with it (*i.e.*, its defining "concept"), while what is outside of the attentional focus is minded as if one's operative possibilities in its regard had been abridged into a referential block, like substituting a complicated term in equations by a single letter or a simple sign. This state of the fully sensed but faintly apperceived objects is the decrease in their operational recognition in which the reduction of their force of imposition consists. It, as well as the "losses of consciousness" (sleep, general anesthesia, coma), may manifest variations in the resolute power or acuity, caused by variations in the said relativistic dilation – not wholly unlike playing an old phonograph record at the wrong speed.

**10.** On the other hand, during the last four decades or so mentation has been reported to occur in all electroencephalographic stages of sleep<sup>6, 7, 8, 9</sup>, from falling asleep to waking, suggesting that during deep sleep no "loss" or temporary cessation of mind occurs. This observation, in the context being examined, allows us to conjecture that inattention consists of modifying the mind's resolute power of the brain's sectorial states that generate the unattended sensations, while in turn sleep, swoon and coma involve an application more intense and widely spread (*e. g.*, over an entire hemisphere or the whole brain) of the same mechanism. It could be achieved and regulated by way of decreasing the fraction of  $c$  speed which is subtracted from  $c$  for physiologically setting the velocity of the particles where the causal involvements of minds find their most immediate localization, namely the velocity of the action carriers exerting the Newtonian force observed to modify the path of the biospheric relaxation process. This increment in speed would change the dilation of the physical instant, from some  $10^{41}$  times to  $10^{45}$  times or more, preventing the observer from resolving several minutes or more in extramental sequences, while her or his own time remains unaltered.

**11.** To establish any verisimilitude in this conjecture, the mode of recovering from traumatic amnesia in neuropsychiatric patients was expressly observed, benefiting from the large quantity of cases in one of the institutions with which the present author is affiliated. No novel findings surfaced and in most cases the anterograde amnesia was indistinguishable from the effects of inattention, the recovery appearing as compatible with what could be described as reacquisition of the ability of putting and retaining at will the focus of attention on any sector of experience.

**12.** Other common observations are also congruent with viewing time acuity or resolute power as the brain-dependent factor gating the observer's connection and disconnection with the surroundings, in such a way that sleep, swoon, comas, and similar states could disconnect minds from the environment by varying the mind's time-resolution of the brain's neurodynamical sequences – the brain generating this disconnecting variation by altering the relativistic dilations created by the speed of the force carriers where minds find their most immediate localization. One of such observations is that, while dreamt sensations are being sensed those sensations coming from the sense organs are not. A dream-originated *fa* note is sensed but the same dreamer does not sense a *fa* note from the external world neurodynamically enacted in the same brain. In the discussed scenario, this is exactly what should occur because the first sensations become stirred by neuroactivity patterned with the resolution of extramental time sequences of a dreaming mind, while the second ones are stirred by neuroactivity that remains patterned with the resolution

of extramental time employed to keep track of the outer processes of biological relevance.

In the same scenario, perceived features “fade” due to inattention by altering the relativistic dilations created by the speed of those force carriers in the brain areas that are generating features of which the mind is to become inattentive. When “paying” attention to something, what is contributed is the operationalizing of its sensations. One thereby applies, to a sector of one’s sensory field, the acquired system of equilibrable operations sedimented in one’s mind. And neuroactivity is expected to lack mental concomitants when the time-structure of its patterns is not also conserved in the dynamics of the physical field in whose force carriers minds find their most immediate localization. Thus, in this outlook, inattention causes amnesia by texturing the mind with contents whose time “graining” is not resolvable in the time-resolution of the mind’s available operational combinations that conserve the object. Sleeping right after learning, in this perspective, is thus better for retention than remaining awake because the organization of memories reflects the time-resolution in which the original experiences were lived: every time-resolution allows reimagining the experiences from different time-resolutions, but just as unattended context. Thus sleep prevents the ensuing waking life from intervening and sleep mentation – physiologically supported on a different time resolution – does not itself interfere. The same specific mechanism is also expected (a) to prevent remembering most sleep mentation after awakening; (b) to dissociate the ease of access or “handiness” of awake rememberings from oneiric threads (and of oneiric episodes from awake decisions); (c) to put distractions before forgetting at the beginning of dementedness processes; (d) to confer status epilepticus more proclivity to anterograde than to retrograde amnesia; and (e), in traumatic memory deficits, to make depend the recall of the pretraumatic (retrograde) portion of life, forgotten in a mnesic lacuna or memory “lagoon,” on the same lacuna’s posttraumatic (anterograde) portion or “amnesia of fixation” period. In all these cases, in the scenario thus far outlined, the biographical episodes lived from a certain time dilation can no longer be operatively categorized in full when the relativistic speed state, of the biophysical components that form their experiencer’s immediate circumstance, changes into another relativistic speed state.

The condition in which the brain does not tune its electroneurobiology so as to furnish proper time dilation to sensory experiences is understood to result, therefore, in a condition similar to that involved in the fading, into “distraction,” of many memories of the habitual life lived in the months or years after a catastrophic bereavement. At their occurrence one perceives the sensory experiences just as one perceives scarcely attended-to vehicle and pedestrian traffic around the bus in which one travels. These scarcely attended-to vehicles and pedestrians are well seen, heard and identified in some incipient detail but soon, even perhaps before one gets out of the bus, one cannot put their perceptions in any order so as to recall their presentation. The same occurs to all the life episodes lived in some (often transient) postconcussive stages. Such a process is called “distraction” when it intrudes on one’s plans, *e. g.* when, while reading, one plays a disc with many songs and sometimes finds that the songs which one most expected to hear are finishing, have been “heard,” yet their memory – though recent – is irretrievable. In order to arouse the affects and emotions one wished to obtain from the audition they should be played anew – and listened to without reading. Preventing it is why, illustratively, theaters impose silence and darken the seating precisely when performances

commence. It should be plain that in the discussed scenario "distraction" is what in clinical contexts is called "fixation amnesia" or anterograde amnesia, namely difficulties in learning new information. In the beginning of dementias it precedes the older memories' unreimaginability (forgetting), and in the outlined scenario the same mechanism also conditions the possibilities of awake and dreaming states for reciprocal recall. In sleep mentation it is also to bring about the "attentional narrowing," the thematic or experiential reduction that impoverishes one's full experience, shrinking the menu of other experiences that one keeps available for collation with the actual contents of a dreamt thread in such a way that – above and beyond more specific cognitional effects – while dreaming we are habitually unaware that we are in fact in a dreamworld. On the same basis, it also is to set the distribution, over the sleep period, of the dreams that include "diurnal rests."

Disparities in the force of imposition, in view of the hints suggested by the observations under commentary, are to reflect not absolute but proportional disparities in resolution. This is suggested by the also common observation that the experiences that closely precede powerful emotions, although acquired with unweakened force of imposition, are as likely to be forgotten as those of the enthralling emotional event's experiential margin, which, instead, faded into "distraction" at acquisition time. Such disparities so may make that people awakened after having slept for more than a very short period cannot typically recall the last few minutes before they fell asleep, and also make people prone to forget phone calls or exchanges which they have had in the middle of the night, or the alarm's ringing in the morning if one fell immediately to sleep after turning it off. In this setting, acquisition with decreased force of imposition is also the reason why, of the memories "diluted" by anterograde amnesia, no recovery is observed similar to the gradual reinstatement of pretrauma memories common with retrograde amnesia.

Table 1 (p. 257) shows several further observations in clinical and neurocognitive sciences congruent with the portrayed scenario.

#### **4. Definitions of 'mind' and 'sensory knowledge'**

The preceding scenario furnishes objective definitions of minds in general and of sensory knowledge, as follows.

Past and future situations only rise in the context of minds. They do not exist outside of psyches: outside of minds only present situations occur. Past and future situations are only imagined, in a simplified way and certainly diversely. In this way – namely, by their being imagined now – their reality is in fact a part of the present situation; in this it exhausts itself. In other words, past and future situations lack any other relevance for extramental reality, since they are neither found, nor do they cause effects, except as assemblages of mental contents envisaged by minds. Thus, all nature is actual only at a given instant, and each present situation determines its own time transformation; nonexistent situations cannot causally determine any transformation whatsoever. In this context, because any supra-quantum indeterminacy in it is found to apply to future events, when determining each next macroscopic transformation the actual or last situation is tantamount to its entire preceding history.<sup>10</sup> In contrast, minds change quite differently: minds, existentialities or psyches are the realities that transform themselves only on a selection of their respective antecedents, not necessarily on all of them. Turning the

scales, the things we find situated amid minds in nature (or things that compound the gap among minds' operative immediacies, or hylozoic hiatus; namely, all extramentalities such as winds, rocks, fungi, trees, and computers, for which a variation in quantity or distribution of motion cannot occur as an effect of internal forces) inevitably use all of their history, tantamount to the last situation, to transform themselves as time elapses. Thus while all their yesterdays pack into their now, all our tomorrows are ours to shape. In finding the brute fact of this selection, physics finds in nature the gnoseological apprehension and ability to inaugurate causal series, enacting such selection. Both are found to come conjointly, in discrete pops-out, whose efficient actions and reactions become the natural phenomena we are trying to describe.

Gnoseological apprehension of sensory mental contents, in general *i. e.* the act of knowing or noetic act independently of who the mind is that performs it, is the feature of efficiently causal interactions whereby the enacted structureless reactions intonate the reacting entity on ranges whose manifestation exhausts the causal efficiency. This knowledge or gnoseological apprehension grasps certain phenomenal reactions, namely intonations of the self-knowing being, which cause to discontinue the outer causal series that had led to them. Such a series of efficient causal determinations comes to an end by producing intonative reactions, *i. e.* phosphene-like manifestations that are both phenomenal (that is, in which a sensation is known) and inefficient to continue the series.

## 5. The place of minds in nature's causal series

In the discussed scenario, therefore, the emplacement of circumstanced existentialities in nature is found whenever a break affects some efficient causal chain. The last link of this chain phenomenizes as the reaction of an at least partly self-knowing being, a reaction that becomes gnoseologically apprehended but lacks causal efficiency to further its preceding causal series. As empirically found, outer causal efficiency can work out intonative reactions in psychisms, but it cannot cause psychisms to be affected in such a way as to instrumentally transmit the outer efficiency. Any causal consequence from this outer efficiency is thus to be a new causal string unpromptedly originated by the causal efficiency of the same self-knowing being that had the gnoseological apprehension, and selected it as a causal antecedent rather than deselecting it, or else adjusted it contextually to posit it as a causal antecedent. Such events do not happen in the hylozoic hiatus, where all of the causal series continue (*i. e.*, all causal efficiency is transeunt, matter-energy is conserved over effects) but, in exchange, there is no gnoseological apprehension. In other words, by coming to gnoseological apprehension, the causal series that led toward the intonative reaction cannot continue any longer; an unprompted enactment of the efficient causality of the same self-knowing reality is now needed to start another causal series, which may enact continuity with or departure from the route of the former causal series.

Always in the examined scenario, and assuming a plausible understanding of causation (not to be discussed here), one might question how privately accessible mental events can cause or be caused by non-privately accessible physical events. The reason is, because efficient causation is the same for both mental and physical events, as well as across them. The mind↔brain causally-efficient interaction is not

more perplexing than the field generation of variations in local potentials. In establishing, as initial causal link to set in motion some course of regular extramental effects usually called "voluntary behavior," the local potentials of the field whose carriers are utilized by minds to launch this causal series, every circumstanced mind does the same as all segregated fields do everywhere but in the microphysical scale when, from an unlocalizable set of determinations, they make themselves bring forth either more, or less, of its force carriers at every spot of volume, thereby changing the spatial distribution of their local potential (which in macroscopic scales may remain stable on average). In setting up sensations the circumstanced mind's immediate field, on the same efficient causality, generates intonative reactions in the mind.

But no dimensional mirroring of actions with reactions is conserved across the brain-mind interface. Where no minds exist, actions and reactions characterize each another with features from the same set. But in a nature that includes operations originated by minds, intonations are found to result from extramental actions that are depicted with a certain set of features, which actions generate reactions depicted with another set of features.

This symmetry breaking is a very fundamental datum of the natural science which attempts to describe a nature where the operations of minds are encountered. We observe four segregated or diversified modalities of causal interaction – also dubbed "basic forces," being by name the strong nuclear force, the weak nuclear force, the electromagnetic force, and the gravitational force – in its actions outside us, and a further segregated modality of causal interaction or "basic force," namely the one which acts as a Newtonian force on biospheric evolution and whose action carriers undergo the speed variations that tune the mind's time acuity, likewise from its actions outside of us (*e. g.* its effects in biological evolution) but moreover from our reactions to it. Such reactions are the mind's subjective intonations, or sensational phenomena.

## **6. Ciliary control and nervous systems**

As mentioned, to obtain nourishment, defense and sex recombination, biological organisms enact their distinctive menus of relationships with the external world by performing what is called their "functions of relation." Distinguishing any particular external thing or sector to be acted or reacted upon (object) from the rest of the environment, while allowing for its relevant relations with this environment (mapping), is termed a "reference to object." It was once thought that, for the functions of relation to make reference to objects and map them, a nervous system was requisite. Nervous systems, for that reason, became conceived as having started with cellular specialization; that is, with the evolutionary selection of surface cells specialized in detecting and cooperatively communicating the presence of relevant objects to other bodily cells specialized in adaptively dealing with them. Though functional, this criterion accentuated the primacy of anatomical distinctions: the nervous systems were assumed to have started with the functional diversity that made neurosensory cells different from other cells – specially from motor cells. Otherwise stated, it was thought that the natural selection of paths (hodologies, or neural nets) for nerve activity supplied the physical processes to which minds can react by intonating themselves subjectively. But the story is incorrect. Already in

the acellulars from which all animals derive, far before any cell differentiation and presumably any subjectivity, the functions of relation made reference to objects.

These acellulars distinguished from the rest of a mapped environment the particular thing or sector to be acted or reacted upon. A good example is provided by hunters like *Didinium nasutum* which exhibits an insatiable appetite for paramecia. Propelled by its girdles of cilia, barrel-shaped *Didinium* attacks paramecia horn first. Rapidly whirling through the water, it then maneuvers its prey into a position in line with its cytostome, ingesting the prey by opening its cytostome and swallowing it whole. *Didinium* can swallow paramecia twice its size, and can repeat this remarkable performance as many as a dozen times a day. Ciliophora, thus, for over more than a thousand million years have fed because the mechanism that controls cilia reorientates them or their water currents toward fast swimming preys and edible floating crumbs. As the means for attaining reference to objects, in the last phase of the chase they utilized electric field patterns probably composed at the deformation of the distribution of submembrane potential fluctuations – resulting from the automatically coordinated ciliary beating – by the viscous contact of the ciliary rows with a floating piece or the hydrostatic waves from also ciliated preys. These means disappeared in many animal lineages, which instead formed nervous ganglia as their uppermost level of organic regulation. Those means, on the contrary, were preserved during the process of nervous path concentration that formed brains, such organs looking like a feltwork of fibers in a soup of enzymes<sup>11</sup> but also tapping mind interactions. The electropotential system for ciliary control was kept in the descendants that in their larval stages (“dipleurula”<sup>12, 13, 14</sup>) had the cilia around the “mouth”, *i.e.* in the ciliary band and the apical organ. From the cells supporting these cilia, our nervous system comes. In it we still retain not only the cilia but, also, gene sequences such as the one called *onecut*<sup>15</sup>, which, anatomically, initiate the nervous system “above” what is to become the buccal cavity in our early embryos.

As a result, always in the discussed scenario, the brain organs that nowadays carry out the chordate’s uppermost level of organic regulation include neural ganglia that subserve a specific, connectivity-based function, which is not the uppermost regulatory function of the organism: the neural ganglia embedded in each chordate brain do hodologically enact unmindful behavior through refined sensomotor archs that lack any memory of particular objects. As another result of the same course of events brains also include the said electric field means. They perform another specific function. These electric means furnish the therein circumstanced mind both with exchanges to which to intonatively react and, also, with a pathway for ecphoria, *i.e.* for causally chaining some extramental processes to mental operations. Further, these very electric field means, by way of making relativistic effects assume specific values at the locations of the mind-extramentality causal exchanges, enact variations in time resolution that modulate the mind’s intonative reactions, while the mind’s retentiveness (in the context under commentary, no reason appears for assuming that memories could succumb to time) supplies a memory of particular objects in terms of their operative characterization. By that means individual intellectual developments are enabled within the biosphere - whereupon the regular eclosions of never regular minds get placed within the causal organization of behaving organisms, as their uppermost regulatory level. Thereby, it is not through the hodologies or circuitry of the neural ganglia embedded in the brain, that these organisms become able to surmount the Turing machine limits and, so,

colonize biological niches where transforming accidents into opportunities is requisite for survival.

## 7. Objections

Objections rise immediately against the verisimilitude of this scenario. What is the separate force field whose action carriers provide immediate localization to minds' operative efficiency? *Ignoramus*. In the discussed perspective one can note that minds do not ride photons nor gluons because these action carriers, being massless, cannot become decelerated or vary from the  $c$  speed in the medium. Neither do minds ride W or Z particles because the masses of these bosons are too large to generate by way of dilation the observed relationships. This is so whether one takes as the time-like thickness of nature the Planck instant or – on the other end of a possible range – the characteristic time of some interaction modality. Neutrinos and electrons are precluded, too. They are not action carriers of force fields (they are classified as belonging with matter fields). Furthermore, when taking the Planck instant as the time-like thickness of nature, at the speeds assumed to produce the awake acuity dilation neutrinos attain a dynamical mass of some four tons ( $10^{40}$  eV) each, while electrons become  $10^{41}$  MeV, or about  $10^{11}$  kg each. Such masses still increase by a factor of the order of a million at the speeds assumed to produce deep-sleep acuity dilation. These particles remain precluded even when less formidable prospects come into view by taking, as time-like thickness of nature, the characteristic times taken by the transition caused by, or specific delay of, some currently segregated interaction modality (in which case the dilation factors, between about  $10^{20}$  for awake minds and  $10^{24}$  in sleep mentation, would require speeds of between  $c - 10^{-40}c$  and  $c - 10^{-48}c$ ). Thus no clue has been identified for matching the properties of any known species of fundamental particles with those required for producing the mentioned effect.

Another objection, redolent of the Bohr electron issue, observes that brain tissues are not accelerators radiating in the gamma spectral band the energy needed to make those particles to revolve so as to usefully remain inside the biological organ while darting at those speeds. Those sharp turns, however, are uncalled for inasmuch as individual particles become suitably substituted. Dragged by the sum of known astronomical motions at almost 400 km per second<sup>16</sup>, the brain organ remains in Fermi scale-contact with a fixed volume or region of its own size, of all physical fields, during  $\sim 10^{-21}$  second. Into and out of this macroscopic region, but in the microphysical scale, all of the overlapping physical fields bring the particles which set their respective, overlapping potentials. Since the discussed scenario comes from a combination of observational hints, seemingly one could only surmise that this short time in contact with the same place suffices for the unknown force field coupled with the electromagnetic one to engage by coupling into following the local electromagnetic variational trends of potential variation.

A third and more important objection takes for granted that, in order to bring in speed fluctuations, physiology should influence barygenesis – *i. e.* generate and wipe out inertial mass. It is correct to observe that the action carriers where minds localize their causal exchanges must have a slight invariant mass, namely the one allowing them to move at close to light speeds rather than  $c$ . By modulating this speed, the fluctuations of electroneurobiological states are to slow

these action carriers down to the speed causing the time dilation proper of awake minds' attentional focus; in the discussed scenario, when such a physiological action becomes physiologically relaxed or pathologically impaired, relativistic dilation increases and minds get disconnected from the surrounding causal courses. However, assuming that the rest mass should vary is unnecessary. Putting aside the exotic supposition that the brain's electroneurobiological action could add inertial mass to these action carriers so as to vary their invariant mass, leaves one with the possibility of envisaging this effect just as a coupling varying their speed, *i.e.* some absorption mechanism, redolent of a modulation of hysteresis losses, that reduces the carriers' dynamical mass by way of specific variational patterns of the superimposed electric field – abstaining for the moment from further theorizing.

Finally, one should observe that space, or dispersivity for forces, is not a cosmological primitive: vast amounts of fresh space are being continuously created with the expansion of the observable universe. What we can localize in space is action, not the action's determinations, whence "minds's localization" means that we localize the presence of some of mind's operations, not that of their determinations. Whether mental or not, the latter seem to eschew manifestation in such a derivative occurrence, spatiality.

In conclusion, neuropsychological observations, a part of the description of the evolution of living systems as one of the most notable dynamic phenomena in nature, suggest a scenario in which the localization of the operations of observers (minds or existentialities) in nature are certain force-carrying particles whose speed, physiologically modulated, sets the variations of wakefulness. Through this force, observable by its influence on the evolutionary process, minds and bodies interact: physical actions on a mind generate in it physical reactions whose causal efficiency gets exhausted. As the reactions cannot continue their causal series, they become sensorially known. Upon them the mind then takes efficient initiatives – whereby it acquires intellectual development – setting up broken causal sequences that enable minds for progressing toward biological goals through appropriate steps for which the instructions are undefinable. For clinical practice, this scenario's validity means that the issue of "impaired consciousness" amounts to controlling the tissue's electroneurobiological activity that gates the proper acuity, thus restoring the time-resolution matching. For physics, the present analysis can provide a starting point for investigating the means enabling for biological purposes the strangest things in cosmology, these existentialities, subjective existences, minds or psyches.

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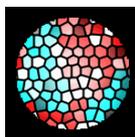
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[4] This continuing effect that extends time processes up from microphysics deserves to be called *baryogenesis* ("origin of mass"), in contrast with the historical occurrence that originated the population of baryons (*baryogenesis*).

- [5] E. g., philosopher X. Zubiri says “Every apprehension has its own force of imposition, and this imposition in the intellective state is knowing”. Taken from: <[www.zubiri.org/works/englishworks/si/conclusion.htm](http://www.zubiri.org/works/englishworks/si/conclusion.htm)>
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