1 Worldline and Life Process

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Abstract In this paper I show how temporal experience in the life process and in the phenomenal world fully corresponds to the worldline (tube) in Minkowski's block universe. Temporal experience is a life path (B-series of states) of sentient beings that is drawn in relative time and space. It is directed as a local process of living form: resynthesis – a local "biological time arrow" from birth to death against the growth of entropy. The life process is a manifestation of the worldtube of the individual body and gives rise to the experience of time. In our world there are no independent minds but only conscious living bodies, and they cannot move along timeless worldlines. They generate their life processes in a phenomenal world with their own spaces, times and relative motions definable in coordinate systems. The four-dimensional block world is one, decomposed into one phenomenal block world for each conscious body. The world is coordinated with the body and centered in it. This is the reality explored also by physics, and it includes the observer. Every state, event and action is irrevocable, alternativeless in a world, and alternatives are only virtual possibilities. In this flux or series the "freedom of the will" is experienced – an indeterminacy of the future of the conscious being, which is continually being transformed into definite acts. They are determined autonomously – by the living body but are subject to causality and the laws of nature.

1 Questions

1. *How come the universe is a block, and there is no time, but we have temporal experience?*
2. *How come the world is one and the same, unique, but every sentient being has its own world?*
3. *How come everything is predetermined, yet I still have free choice?*

2 Temporal experience is relative

A thought experiment. Imagine we stay on a bridge and watch the river's movement backwards. At the same time, we experience our body flowing against the water forwards. We see that one and the same movement could be taken from one position with reference to the river and, on the other hand, to our body, which stays on the bridge, as in opposite directions.

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Now imagine we swim against the river's flow. Again, one and the same relative movement could be taken as our body swimming forwards, and as the river flowing backwards. But if we stop swimming we flow back together with the river's waters, and no movement is experienced.

This experiment demonstrates the absence of absolute motion, the indeterminacy of the future and its generation. Thus, temporal experience is relative, which means that there are no absolute time and space, but that time is experienced as a life process directed against the spontaneous process of decay, of dying, from birth to death.

Transcendental analysis of "time consciousness" – Edmund Husserl. In his work on time consciousness (*Zur Pänomenologie des inneren Zeitbewusstseins*, 1905) Edmund Husserl draws a line between mental time and phenomenological time as "subjective" and "objective" time, subjects of research, respectively, to psychology and phenomenology (Husserl 1928: 24). Transcendental phenomenology is distinguished from the psychological experience of time. "We do not classify lived experiences accordingly to any particular form of reality... we are interested in *lived experiences of time* (Husserl 1928: 28)." "We try to clarify the *a priori* of *time* by investigating time-consciousness, by bringing its essential constitution to light" (Ibid.: 29) "Naturally, I am referring here to self-evident laws such as the following: (1) that the fixed temporal order is that of an infinitive, two-dimensional series; (2) that two different times can never be conjoint; (3) that their relation is a non-simultaneous one; (4) that there is transitivity, that to every time belongs an earlier and a later, etc." (Ibid.)

Here we find two time-consciousness flows, and two terms: of "objectivity" and of "subjectivity" – transcendental and empirical, *without any clear demarcation*. Indeed, there are no two distinct time experiences: subjective and objective. This is a purely speculative demarcation, which doesn't have empirical meaning, and explicitly beyond realism. We find one reality of time experience just as we live in a real world.

3 Unreality of time and relativity of time experience

John McTaggart's analysis has been central to discussions of time since the publication of his landmark article "*Unreality of Time*" (McTaggart, 1908).

> For if, *as I believe, time is unreal*, the admission that an event in time would change in respect of its position in the A-series would not involve that anything really did change. The B-series, however, cannot exist except as temporal, since earlier and later, which are the distinctions of which it consists, are clearly time-determinations. 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. (ibid.: 460 – 461)

How could there be *two time series* (A: past-present-future, and B: before-after) in one and the same time stream? My answer is: only as *two distinct relations* (Gherdjikov 2019: 285). Series A is related to a *perceiver*: only a perceiver resides permanently in the present and is able from that point to expect the future and to remember the past. Perceiver-centered series A can be considered as *illusion* (see Stefanov, 2016: 208). So, we go to

series B or B-theory. Series B is a simple relation of a *permanent sequence* of moments in a process. The B-series preserves the linearity and directionality of temporal experience and avoids transforming future moments to past ones. It is in agreement with the block universe. Thus, the B-series does not annihilate temporal experience, but objectifies it in the way that science does.

4 Herman Minkowski on four-dimensional reality

In his landmark lecture "*Raum und Zeit*" of 21 September 1908, Hermann Minkowski proclaimed the four-dimensional world as a reality in itself. There are no "Time" and "Space" in this spacetime continuum, but an infinite number of times and spaces into which a four-dimensional block world in itself "dissolves".

> One can call t' time, but then must necessarily, in connection with this, define space by the manifold of three parameters x', y, z in which the laws of physics would then have exactly the same expressions by means of x', y, z, t' as by means of x, y, z, t. Hereafter we would then have in the world no more the space, but an infinite number of spaces analogously as there is an infinite number of planes in three-dimensional space. Three-dimensional geometry becomes a chapter in four-dimensional physics. You see why I said at the beginning that space and time will recede completely to become mere shadows and only a world in itself will exist. (Minkowski 2020: 62)

Vesselin Petkov explains: "The profound implication of 'the requirement of orthogonality in space' is evident. . . – as t and t' are different times, it necessarily follows that two different spaces must be associated with these times since each space is orthogonal to each time axis" (Petkov 2019: 6).

The four-dimensional world is reality, not merely a mathematical description (Petkov). The world is a block universe and all moments on all worldlines are given once and for all. This is confirmed by the relativistic effects of shortening and retardation and by the absence of absolute motion. This seems drastically at odds with the experience of an advancing "now", which is alleged to be the unique reality. Here is the entire central thesis in the brilliant formulation of Vesselin Petkov:

> The drastically counter-intuitive nature of a four-dimensional world makes it enormously difficult not only to non-experts but even to physicists to consider seriously the possibility that the concept of spacetime may represent a real four-dimensional world. Moreover, it seems that there exists a contradiction between two facts. First, the relativistic experimental evidence overwhelmingly supports Minkowski's discovery (deduced from the failed experiments to detect absolute motion as we will see below) of the spacetime structure of the world – that reality is a static four-dimensional world containing *en bloc* the entire history of the perceived by us three-dimensional world. Second, it is an inter-subjective fact that we are aware of ourselves and the world only at one single moment of time – the present moment (the moment *now*) – which constantly changes. (Petkov 2024: 5)

The problem is defined as a contradiction between the temporal experience of a flowing present in a three-dimensional world, and the timeless block reality. We are aware of ourselves and the world only in one moment – the "now". A particular problem here is freedom of will: without experience, from the constant present position, about the future being in suspense we would not perceive ourselves as choosing.

Here we can generalize phenomenologically that there is a spatio-temporal reality beyond immediate experience, but still everyone perceives one's "own" real world in one's "own" time and space.

5 Consciousness crawls up the worldtube of the body: Hermann Weyl

Hermann Weyl follows Minkowski and simultaneously Husserl. With Minkowski, he accepts spacetime reality, and with Husserl, the absoluteness of conscious experience and relativity in the science of the objective world – unlike Minkowski. He explains why we have temporal experience: consciousness passes through the worldline (tube) of the body in the four-dimensional continuum.

> The objective world merely exists, it does not happen; as a whole it has no history. Only before the eye of the consciousness climbing up in the worldline of my body, a section of this world "comes to life" and moves past it as a spatial image engaged in temporal transformation... splitting up of the world into space and time at some moment for some consciousness. (Weyl 2009: 135)

He draws a line of life from birth to death along which consciousness "climbs" and in which the future is active and the past is passive (Ibid: 130). Hermann Weyl gives no explanation of why and how consciousness moves along the worldline of the body.

Vesselin Petkov adds an important detail: the temporal experience of consciousness along the worldtube of the body leaves behind and welcomes forward unconscious bodies: "So, the feeling that time flows in the four-dimensional world is created by our consciousness which 'moves' toward the future part of the worldtube of our body, leaving our past bodies consciousnessless and 'giving life' to our also consciousnessless future bodies" (Petkov 2013: 115). It is implied here that living bodies are real but unconscious in their timeless worldtubes. But if consciousness is autonomous, it could "get ahead" of the present and predict future events as well as "go back" into the past. Nothing even could hinder consciousness to illuminate more than one worldtube, and not just from birth to death: exciting possibilities that seem to lend legitimacy to out-of-body experiences.

There is a premise here: *Consciousness is autonomous and body-less.* Weyl formulated one more premise: "The world does not exist independently but only for a consciousness" (Weyl 2009). This contradicts the four-dimensional world as an absolute (Minkowski) and gives rise to ontological ambiguity. Here Weyl adheres to a Husserl-type phenomenology and, with Husserl, assumes without analysis that consciousness stands in opposition to reality. This assumption was shared by almost all Western classical philosophers until the

20th century. It is deeply embedded in the mentality of the West, and we find it in the East as well: *dualism of consciousness and matter, spirit and nature, soul and body, mind – body.*

So how is the body alive in the timeless world-tube, and in what sense does consciousness gives life to timeless worldtube of the body?

Life without change is physically impossible, and consciousness is alive. We are aware as embodied living beings and consciousness always inheres the body, it is *one* with the living body. Within our life, in our world they are inseparable and correlated. One does not observe living human bodies devoid of mentality, and one is not aware of future or past moments beyond the series through which the flowing "now" runs. Life is a process (or B-series of moments), not a static state, and it generates the series of moments in its life.

Therefore, it is the living conscious body that "crawls" on its "worldtube," it *generates* it as a living one. Weyl presupposes life without clarifying it in connection with the motionless and therefore inanimate worldtube. But this contradicts the static nature of the worldlines: how come we are "crawling up a timeless worldtube" while constantly generating the next B-moments?

> The immediately experienced is subjective but absolute; no matter how cloudy it may be, in this cloudiness it is something given thus and not otherwise. To the contrary, the objective world which we continually take into account in our practical life and which science tries to crystallize into clarity is necessarily relative; to be represented by some definite thing (numbers or other symbols) only after a system of coordinates has been arbitrarily introduced into the world. We said at an earlier place, that every difference in experience must be founded on a difference of the objective conditions; we can now add: in such a difference of the objective conditions as is invariant with regard to coordinate transformations, a difference which cannot be made to vanish by a mere change of the coordinate system used. This pair of counterpoints, subjective-absolute and objective-relative, appears to me to contain one of the most fundamental epistemological cognitions which one can gather from natural science. Who desires the absolute, must take subjectivity, the ego for which things exist, into the bargain; who is urged towards the objective cannot escape from the problem of relativity! (Weyl 2009: 134 – 135)

Symbolic structure corresponds to the structure of experience, and this correspondence of the subjective-absolute to the objective-relative is a fundamental epistemological truth.

Weyl continues his analysis from the position of a world point, the position of observer O, for which position the continuum is decomposed into time and space: "one obtains, in the neighbourhood of O the decomposition into space and time relative to the observer... I shall simplify the perceiving consciousness into a point-eye whose worldline shall be called b. The observation takes place at the moment O of its life." (Ibid.: 135 – 136)

Thus, Weyl explicitly includes an observer with a physical body as the zero point in the measurement and mathematical description of motions and formulates the requirement that equal measured values correspond to equal perceptions (Ibid: 137). Physics

> ... constructs an objective world in mathematical symbols, but afterwards, to establish the connection with experience, it has to indicate by what procedure the quantities are

> found which are decisive for immediate perception – decisive in such a way, that equal values of these quantities indicate equal perceptions. In doing that it must of course include the observer as a physical being and his condition in the objective world. (Ibid.)

Here there is an unresolved issue about the procedures for relating measured values to sense perceptions – the former are symbols and the latter are phenomena, and in particular how the description of the observer's physical body is included. Here we face the ontological problem of the access of consciousness to external reality, formulated also by Husserl. In fact, there is no such problem if we assume that the phenomenal world is not divided into subject and object and so there is no need for such a feat – reality is always present and is revealed in science.

If the subjective is absolute and the objective is relative, then physics and the four-dimensional block world it describes is something relative, and our consciousness of life and motion is absolute. But didn't Minkowski find out exactly the opposite: that the observed dynamic world with spaces and times is a "shadow" (relative) and the four-dimensional world is real in itself (absolute)?

If the flow of the phenomenal world is an illusion, then all our awareness, including in scientific experimentation and scientific construction of theories, is illusory. If consciousness of the flowing life process is absolute and the objective physical world is relative, then the four-dimensional block world theory is relative. Traditional ontology and Husserl's phenomenology require us to accept either the objective or the subjective as absolute.

Mechanics finds invariants in transformations between coordinate systems, physics in general finds symmetries, constants and laws in all sorts of changes represented in the mathematical form of functions. These invariants are symbolic values, relations that predict, are subject to tests and are confirmed or rejected in experiments. Defining is only possible in reference, and only in *certain respects* (in particular scientific laws and protocols). So is relativism overcome as the impossibility of a true description of a reality. For relativism is not the claim that science is relative, but the claim that every alternative theory that describes physical reality is equally correct, or, in other words, that there is no true knowledge, but only a web of descriptions.

I accept Vesselin Petkov's objection to Einstein's understanding of spacetime as a purely mathematical description, not reality. This view is a consequence of Ernst Mach's "sterile scientific philosophy, (utter relativism)" (Petkov 2024: 53). Realism here leads to the solution of fundamental questions of gravity and "quantum gravity":

> By contrast, if spacetime is regarded as real, Einstein's general relativity has, as we will see below, a natural explanation because, for example, the Riemann curvature tensor represents *real* spacetime curvature – gravitation is completely geometrized since it is fully explained as a manifestation of the curvature of spacetime without assuming the existence of gravitational interaction. (Ibid.: 56)

6 Temporal experience as the life path of a living body

Physical realism requires phenomenological realism: phenomena are not illusions; they are real and therefore point to a reality beyond immediate experience. Illusions can be sur-

mounted by means of new perceptions. Phenomenal reality, however, is not a world "in itself," but a world lived by living beings. In observation we find an observed reality that is boundless and goes far beyond our lives. In it, science discovers and formulates invariant dependencies and values – laws and constants. This is how we reach a theoretical and experimental reality beyond the phenomenal one. Phenomena, however, are coordinated in form with a living conscious sensitive body. Thus, the world, including observed reality, is inevitably coordinated with a corporal living existence. In this existence the world "flows" as a temporal experience. Time is not real in an absolute sense, but the experience of time is a real phenomenon. Here again the difficulty of the phenomenon-reality dichotomy appears. Is time experience reality or illusion?

Angel Stefanov (Stefanov 2016) accepts Weyl's claim about the consciousness crawling along the worldline of the body. He points out a difficulty: the "forward" of temporal experience in a line with asymmetrical dimensions of past and future seems to legitimize the unreal A-series. He offers a transcendental solution in the spirit of Kant and Husserl: the *a priori* form of "internal sense". "This is really a solution to the problem at stake, since it explains the phenomenology of time, passage, keeping the validity of the B-theory of time" (Ibid.,: 220). Transcendental explanation is expressed as follows:

> From the point of view of transcendental philosophy there is no problem with the transient moment "now," at which we are aware of the events around us. This is simply the mode of our temporal access to the world, which is possible because of the *a priori* form of the internal sense as an organizer of human experience... Temporal flow is a structural feature of finite minds. (Ibid.: 221)

I accept Angel Stefanov's argument about the arrow of time as a form of organization of the experience of finite minds. An arrow of time is presupposed also by Husserl, Weyl, and physicists including Stephen Hawking, and is indeed a solution to the problem, since it explains the phenomenon of unidirectional time-consciousness, "time passing", while preserving the validity of the B-theory of time. I also accept that the temporal arrow is (relatively) *a priori* – it is intrinsic to living existence prior to and independent of any particular temporal experience.

But a *transcendental a priori* form of organizing experience is at odds with many facts of psychology and neurophysiology. Space and time are perceived by all senses in their entirety. Senses are corporeal and bodies are animate and mortal. Finite minds are integral to finite bodies. Being aware is awareness by a body endowed with a nervous system. It follows here that minds are not autonomous, are not transcendental, and cannot crawl up the world-tubes of bodies: they are one with bodies: living bodies are carriers of mental forms, which correspond to living corporeal forms. Thus, unacceptable consequences are avoided, such as travelling freely into the future and the past, as well as unconscious and timeless living bodies.

The duality of mind and body and the autonomy of consciousness with respect to the body has enormous epistemological, scientific and everyday projections. In fact, one has no experience of pure consciousness. Consciousness is assumed to be something autonomous because we perceive and describe in a state of being conscious and consciousness is always "me" and never accessible from outside. But actually, we are aware of a very small layer of

the individual's subjective reality, consciousness may get stronger and weaker as we focus and relax, fall asleep and wake up.

The body itself, as a living thing, moves together with its consciousness in space and time and so generates its life process. But how does this reconcile with the timeless reality of a worldtube, in which all moments of life are given once and for all?

The solution to this enormous difficulty must, in my view, be sought in realistic-phenomenological terms. The subjective and the objective are indistinguishable in experience: A star doesn't break up into subjective and objective one. This is entirely consistent with modern physics (special relativity theory, Minkowski's block world, and quantum mechanics in another vein), which inevitably involves observer – observed reality through measurement techniques created and used by conscious corporeal beings. Conscious existence is integral to the phenomenal reality in which science operates. It is a relative reality with respect to the reality that is presented in scientific laws and specifically the four-dimensional continuum. This "transphenomenal" reality is cognizable by means of experiments and symbolic mathematical relations, not immediately. In observable reality, the four-dimensional world is decomposed into time, space and motions. In it relative motions are measured and explained against the background of the denial of absolute motion. In it is confirmed also the fundamental fact of the immobility of the block world, indirectly accessible through the moving phenomenal flux and especially through the effects of relativity. Flow can be an illusory perception of a discrete series of indivisible moments in a phenomenal block reality.

The worldtube of the body is represented in our experience as a life process (or B-series of moments) and is (re)synthesized in each respective moment in time and space, while in the block world it is a timeless worldtube. Without a living corporeal existence, observation and creation of physical theories, including the four-dimensional theory, is impossible. But all our observation and description is shaped in our corporeal form of a kind of living beings. It is thus that we "make real" phenomena, observations and descriptions. This is not a transcendent self, but a living form in a living series of real moments, in which we find a reality far beyond our lives.

7 Temporal experience as a biological arrow

What does temporal experience generate, as a directed arrow, as a phenomenal flow pointing forwards? Should this flow (B-series of moments) *coincide* with the flow of the world (B-series of moments), there would be no awareness of flow, as well as no life. In the thought experiment with the river this would correspond to floating downstream, which would be conceived as rest: a pure consciousness would perceive the body as being at rest, i.e. as dead.

There is at least one physical theory that describes an irreversible process, or time arrow. This is thermodynamics. The second principle of thermodynamics states that entropy in the world is increasing. But if we stop here, life seems impossible. However, the principle is statistical and allows for local deviations in open systems.

James Maxwell describes a thought experiment: In a vessel with a gas in thermodynamic equilibrium (temperature is the same everywhere in the vessel) we place a membrane with

a small slit. By the slit a *microscopic demon* stands. The demon decides to distribute the molecules of the gas, letting to the right only the molecules with a higher temperature than average, i.e. the faster ones, and keeping the slower ones on the left. Thus, after a while the temperature of the gas in the left half falls below that in the right. Consequently, heat will flow from colder to warmer, violating the Second Principle of Thermodynamics. Thus, locally the entropy decreases. But in the demon-environment system, entropy increases. This is because the demon, in order to decide which way to direct an individual gas molecule, must measure its velocity. This requires an energy that is greater than the entropy reduction in the entire vessel. Thus, in the demon-environment system, entropy increases. The second principle is respected, but statistically and globally, and local entropy reduction requires *the operation of intelligence*.

Stephen Hawking finds three arrows of time: thermodynamic, psychological and cosmological, with the thermodynamic coinciding with the psychological.

> The laws of science do not distinguish between the forward and backward directions of time. However, there are at least three arrows of time that do distinguish the past from the future. They are the thermodynamic arrow, the direction of time in which disorder increases; the psychological arrow, the direction of time in which we remember the past and not the future; and the cosmological arrow, the direction of time in which the universe expands rather than contracts. I have shown that the psychological arrow is essentially the same as the thermodynamic arrow, so that the two would always point in the same direction. (Hawking 1989: 196)

For Hawking, the thermodynamic arrow is the same as the psychological one, so they always point in the same direction. But in the direction of increasing entropy life is impossible. The direction of entropy growth is opposite to the direction of psychological experience in the same line (flow): we place the future forwards, but entropy grows backwards, towards the past. The psychological arrow coincides with the biological one: the direction of synthesis (reproduction or re-synthesis) of living structures against their inevitable decay. The "coincidence" of this arrow with the thermodynamic one is in fact one and the same relative movement of opposed synthesis and decomposition. These movements are different from the movements of bodies in space and time. If the thermodynamic and psychological arrows coincide, consciousness should have no temporal experience. Conscious life should annihilate in the flow of entropy growth. This need for opposite relative motion is consistent with the absence of absolute motion.

Living bodies are alive in the sense of "Maxwell's demons," beings that reverse the flow of entropy locally and temporarily. Here consciousness, taken in the broadest sense as the mental aspect of any (mobile) organism, is a biological function without which survival is not possible. Consciousness and body are two sides of the life process, but regarded from internal, and respectively, external position. The mind-body gap is not ontologically fundamental, but one between dimensions of experience: "subjective experience" and "objective observation".

The B-series of "before-after" is real in the sense that no two moments can ever change places in a line. Changing the "direction of projection of the film frames" is impossible, neither is their order reversed nor are they rearranged. In a life process from birth to death what follows cannot come to precede and *vice versa*. This is a *block series* in one conscious

body, in one life and in one phenomenal block world. It is completely consistent with the monolithic block universe.

Spacetime reality is "illuminated" locally and momentarily, as one phenomenal world with its own time and space, in one life process in which one worldtube appears. For each observer who generates this tube in their experience, there is their own series of states and spatial environment – a world shaped *according to the structure of the body.* Worlds are coordinated as reference frames with observers are coordinated, and measurements show invariants in accord with the laws of mechanics.

Is only the present real? If the past and the future are unreal, the present is unreal in the same sense, because without this order it dissolves. The real is always expected, perceived and remembered and what we are aware of is not a zero point but a dynamic world in which for the "mind's eye" the future passes into the present and the past. I would note here that it is inadequate to present the block universe as already present with all time points *prior to* the beginning of each worldline. So, everything in our life would be *pre*determined. But the objective block world is timeless and there is no "before and after" in it. Such a block world eludes our human conception and has no concrete characteristics beyond the accessible relativity experiments, in which time and space are dependent on each other. We know nothing about the four-dimensional block world beyond the accessible experiments coordinated with our bodies in the phenomenal block world, and we cannot unambiguously infer that all moments are available – for example, are the pre-Big Bang moments available and how?

If consciousness crawls along an ever-present worldtube, then that tube (individual life) must be at rest, and that is incompatible with life. The process of life or a series of states appears as a local and temporary decrease of entropy in living bodies. On the scale of the universe, life is a gleam in a very small local area.

Explanations of consciousness and phenomena, as generated by quantum decoherence, miss this fundamental point. Consciousness and phenomena do not arise from decoherence in any system, but only in a vastly complex biological organization. An elementary life process is the replication of DNA. Even this elementary process is highly specific and immensely complex and is observed only in a living cell. (The human body consists of about 60 trillion coordinated living cells.)

Entropy grows in opposite direction to the life process. From "the future" comes increasing entropy, against which organisms work to preserve life, and they reduce it locally and temporarily. Entropy reduction, while life is maintained, happens at the expense of energy from the environment (solar energy in the last analysis) – organisms feed. Increased entropy in the environment happens at the expense of entropy release.

Living forms extract and create order out of chaos like "Maxwell's demon," and that order is life itself in the form of a living body. The details of this process are unique to species, levels of organization and environments, behavioral situations, and organisms, and are not completely predictable. At the end organisms die, but they reproduce themselves. *Life finds a way* to bypass the growth of entropy by extracting energy and information from the environment and synthesizing order. Every intelligent decision and action synthesizes order, and science is an ordering of the world of the highest power.

8 Free will is the generation of determinateness

8.1 A real event is irrevocable

The phenomenal real world is given and flows in a certain way, not otherwise, and this distinguishes it from virtual symbol systems, in which no physical constraints are found. A real event or state at a point O is, for the observer, one, irrevocable, unique, for that point. A real B-series is immutable, and this is not distinguishable from "necessary". Once something has happened, it has no alternatives, it is not subject to change, replacement, deletion. Thus, a life process is monolithic – there are no variations in it. This makes it coherent with one transphenomenal spacetime block universe. The phenomenal world is a block private universe – one single world in space and time and an inescapable series of states. Unlike a real event, a virtual event – *a synthesis of signs – is prone to editing*, repetition, copying and transfer. Virtually, on a film reel played backwards, events are reversed: a broken glass may reassemble itself and rise on the table. Virtually, the future and the past may change places. In reality, the past cannot be changed by the future.

When something has happened, we can no longer justify empirically the claim that something else could have happened. If we repeat the observation or action in another version, it is still one and only variation at a later time. This is a factual argument against the freedom of will. At one point and moment, for one observer, *one thing happens, one of the possible versions*. In one line of events that is being built forwards and passes away backwards, there are no ramifications and double series. *Probabilities and possibilities do not happen*. We don't pass to other worlds with other versions of series of events. One network of occurrences happens at one moment for one observer in one world. Probabilities and interferences of probability waves in quantum mechanics collapse into measured states and are measured in frequencies over a large number of measurements. Superposition of probability amplitudes is a theory of quantum behavior, not an observation. A state is a definiteness against a background of indefiniteness.

For us, real action is freely chosen in the sense that it is generated by us as corporeal conscious beings, but it has no alternative and in the block world it is "given once and for all." Like observed movements in time and space, our body performs conscious and deliberate actions that have mechanical aspects in space and time. Thus, freedom, subjective intention, purpose, plan, expectation, which for us determine action, are in accord with this action being necessary and in the aspect of time-space reality it is "given forever."

Events are determined only when causal chains are actually played out. Because of their complexity and untraceability, they remain unpredictable to us despite determinism. *Post factum* we can trace a series of events as a causal chain, but, in a sufficiently complex situation, we cannot predict what single event will happen in the future. Causal reconstruction involves relevant causes in a chain that dissolves into indefiniteness. Causal dependence is limited from the front and from behind (future and past) as is the light cone, but under sufficiently detailed reconstruction many causes and conditions are present. Apart from that, unique causes are not separated as indivisible events but can be divided and combined. Causal analysis is the transition from indeterminacy to determinacy of processes or series of states. The laws are the same, but the specific causes are unique.

8.2 Why have we, nevertheless, experience of "free will"?

Just as we experience a flow of the world, we also experience freedom of will. This is a concept and value that is highly ideologized and difficult to analyze. Essentially, "free will" is *autonomy* in the behavior of living beings. Every living being is a body, acting as the cause of multiple effects and reacting to causes. Consciously we decide what to do, and unconsciously there is a complex state of the body that directs us to future behaviors.

It is assumed that there is free choice only if there is an alternative to the action. Alternatives exist with respect to future, as yet unrealised actions. One present action *may* be the cause of different future consequences in different conditions, but only one version occurs. Since, when a real action takes place, only one version of it is present, we never experience the alternatives beyond expectations and hypotheses. Alternative actions are predictions: we don't yet know exactly what is going to happen and what we are going to do. The moment we do it, we do it without an alternative: all the alternative options, foreseen and assumed *post factum*, are annihilated.

Hence, "free will", as an undetermined conscious choice, is not a fact, but only an idea and a conception. It is a consequence from the ontology of autonomous consciousness. This is a philosophical idea rooted in the Christian doctrine of the person, not an elementary experience. A transcendental consciousness creates "laws" (Kant). As an idea, freedom is quite different in Buddhism – freedom from dependence, not free choice. Freedom, for a corporeal being, is relative autonomy in a causal world. We choose consciously only within the range of possible consequences of our bodily and symbolic actions. Jean-Paul Sartre is on the fantastic pole of arguing that freedom is absolute and essence follows existence through our obligatory choice of what to be. The other pole is fatalism, according to which everything is predetermined. The reality of the four-dimensional universe has no room for stories: it is timeless, but the meaning of the reality of all moments in a block is not clear.

Our autonomy is bodily and mentally limited. In fact, it is not our choice to be human beings, to be born, to live, to die. It is not our choice to fight for life and we are subject to instincts such as breathing, feeding, excreting and the drive to survive. We do not choose our parents, the place and moment of our birth, our innate biological sex. Habits, customs, attitudes and biases are very difficult to choose – we are dependent on them. The Far East has developed a philosophy of freedom exactly *from* those great dependencies that we find most difficult to change. We choose actions and are "doomed" to make choices, pushed by the *inevitability of determining*: what to do now and tomorrow. There are degrees of freedom, and the lowest one is to continue living – there is no force that could eliminate the pursuit of life – while the highest one is conscious creativity and moral action, in which one sacrifice one's life.

Thermodynamically, the choice between future alternatives is an equipotential bifurcation state. Two different trajectories of future states of the system have the same energy, and a small change in conditions points into one of the two trajectories. One is in hesitation, and from an energetic point of view it is "all the same" which of two actions one will choose. In these points small changes can cause large deviations. In these moments we may experience the "finger of fate" and indeed very different consequences can follow from the choice. It is therefore in these indeterminate states that we feel the strongest sense of freedom and

responsibility.

For example, one chooses a number to play roulette with a huge bet. Assuming a perfect construction of the roulette, the probability for each number is equally small. However, one inevitably chooses one number or combination. This is a transition to determinateness and there is no going back – one loses or wins. Freedom is the indeterminacy of choices and actions *before* we make them. The act itself at the moment of performance is no longer a choice – one does *one thing*. There is a complex brain process involved when deciding what to do. Brain states that are complex and intertwined precede every choice. The choice of what to bet on has causes in the agent's conscious brain, and these are ascertainable (at least in principle) by real-time observation of the brain. Such observations and experiments have been executed. We are not aware of the inner reasons for a free choice, but they are there.

Actions in space and time are generally computable, but even if they are not, something necessary happens as a result. This is a consequence from the unreality of possibilities: In quantum theory, it is a superposition of amplitudes of trajectories which *decohere* into the real macro-event (wave function collapse). Plans and reports for actions select certain schematic chains of actions and events tied together by the chain or by a common goal. Those actions and events are "plucked off" an indefinite multitude (network) of events. Free choice is therefore valid subjectively, but objectively, observed from the outside, it is invisible and subject to causal description. Bodies do not escape the laws of relative motions in space and time, neither the law of entropy.

As far as I know, exactly this kind of "compatibilism" or *argument from uniqueness* has not been developed. (I do not follow or participate in the speculative debates about free will and compatibilism as a purely philosophical question because I know from experience how relative and contextual the concepts and arguments used are.)

From the absence of an alternative at the moment of action it does not follow that we are not autonomous in an empirical sense and not responsible. We are free and responsible in the full sense of common meaning of freedom because we are living conscious beings sharing our lives in communities. Every being bears the consequences of its behavior, which amounts to its directing its actions as a causal agent in virtue of being the bearer of biological and mental powers. Each human person as a member of a community bears the consequences of his or her actions, despite of their causal and irreversible nature. Responsibility here is not a metaphysical moral category, but the inevitability of acting and suffering the consequences of actions. Some of the consequences are defined in the moral and legal norms of the community, which survives by means of these norms.

All this takes place in the phenomenal world of relativity in which we make our way through life as corporeal conscious beings. There is no fundamental conscious free will. Beyond this life and world, reality is unclear, and we don't know why we are here at all and why there is life. It remains unclear whether and how life exists in the timeless block world.

9 Conclusion – descriptive superposition or layers of reality

We live in a world of phenomena shaped according to our (human) form of life. Science also operates in this unique world, discovering invariants and laws of reality inaccessible to immediate experience. Among them, a special place is occupied by the four-dimensional block world that annihilates stories, making our life seem an illusory process with illusory freedom.

I have tried to show that the world of phenomena in which our lives take place is not an illusion, and is also a block world, since it is the only one for every being with a single life path, with no real alternatives. This world is not divided into transcendental and empirical or subjective and objective. Consciousnesses are not autonomous but are conscious living bodies that generate their life process in a single line.

The process of life overlaps with the worldtube of the body. But there is a contradiction and incompatibility here: the worldtube is motionless, and life is a process, as is consciousness. Is life one reality and the worldtube another? The answer should be negative: Here are *two dimensions of one and the same reality*: one phenomenal and one transphenomenal. The process of life falls into the same sphere as any movement. Movements are relative and take place in space and time into which the block universe is "decomposed". Similarly, thermodynamic, biological, and psychic processes are relative, in a sense "illusory," but they realize a block life path in a block world of phenomena.

Variants, alternatives, probabilities, do not really exist, as do real events (states), but are potential, hypothetical, virtual. Retrospectively, no real thing can be changed, edited, corrected as in virtual information. This is in complete agreement with the theory of a block world and a fully defined life path. We do not choose the fundamental laws and conditions of life: the world we live in, birth, living, and death. We choose to the highest extent those acts which are of the lowest energy. Choices are not acts of pure consciousness but are bodily causal processes which we become aware of in varying degrees. Thus, the path of life from birth to death is a single line or series that overlaps with the worldline, but it is not described as life by relativistic mechanics.

When options are fulfilled, no transitions from one world to another happen – alternatives fall away without being realized. Freedom as variativeness is virtual, but every act of a living individual is determined by the body and in this sense individually autonomous. How it is possible for a worldline, in which all moments are at hand, to be a life process, remains unknown insofar as our boundary as human beings is not clear. We inevitably live and know a world of our own, shaped and bounded by a human form, and this form remains invisible because we do not penetrate beyond it. We are forced (at least for now) to remain in different and, to a certain degree, incompatible descriptions of a reality.

What I call here descriptive superposition is an overlay of theories and descriptions that describe in different terms and theories different cross-sections of reality, while exploring the same world. Here fundamental theories apply to phenomenological theories and not vice versa.

The theory of spacetime must be valid for all spatial and temporal relative motions, as also life physically is. Thus, a movement of a system from disorder to order follows the laws of mechanics, but requires another physical description – from thermodynamics. Ther-

modynamics, on the other hand, does not describe the biological aspects of organization and self-organization that lead to the generation and maintenance of the living state. This is a superposition of theories and corresponding cross-sections of one and the same reality – four-dimensional world, relative motions, (non-equilibrium) thermodynamics, biology, psychology.

In astrophysics, from the standpoint of a visible vast and deterministic universe, life is a *microscopic anomaly*, and one, which does not violate the geometry of the world and the laws of mechanics, an almost invisible short-lived "illusion". In mechanics and all of physics, life is not "visible". Temporal experience is an "illusion," as is free will.

Illusions about realities are false perceptions, concepts, statements, and they can be eliminated. But the "illusion" of phenomena dependent on senses, brains, and bodies in general is preserved as an invisible form and boundary. The "illusion" of choice, of life paths, of relative movements, is a whole world we live in and with. And through the medium of this life the world appears to us as a unique world of phenomena. Science, as a virtual ordering of reality, also operates in this world, and it gets the furthest in revealing it as far beyond our lives. This world is coordinated with the form of human beings as a living form. And every living form has its own version of a phenomenal world. And every individual has its own phenomenal world, which is shared with others in the way of intersubjectivity.

Observers, conscious humans, all beings, which perceive the world, make it appear as they are. We cannot understand and explain why this world transcends life, condemns life to transience, generating and destroying it in one instant of the universe. The reality "beyond" remains unknown "in itself" and so there is no fundamental explanation for life and the phenomenal world themselves.

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