

Vigilance: Embodied Nowness? *On the Relation of Mental Presence to Time and Energy*

Georg FRANCK*

ABSTRACT. Subjectively, vigilance measures the intensity of mental presence; objectively, it refers to activation patterns and, in particular, to the energy level of the physical brain. In order to account for this dualism beyond the trodden paths, a distinction in the modes of existence is introduced. The mode in which consciousness exists is presence, the mode in which the brain exists is realness. In contrast to theories such as neutral monism or panpsychism, this modal dualism is not ad hoc, accounting for the mind-matter distinction only. Presence includes both mental presence and the temporal present. Presence, moreover, is an intrinsically dynamic mode of existing. The dualism of presence and realness corresponds to the dualism of temporal change and real change. Temporal change means that world states having been future become present and then past; real change means that world states differing in date also differ in structure or function. Temporal change, concerning the distribution of presence among world states only, is spontaneous and disregarded by physics. Real change, in contrast, is causal and energetic, thus physically objective. Vigilance represents the remarkable case of a synthesis of temporal change and real change. It is synchronized with the temporal present as well as energized by the physical brain. The hypothesis put forward is that mental presence has emerged in evolution in virtue of the inventiveness of nature to embody presence by branching off individual streams of consciousness from the overall flow of time.

Keywords: Modes of existence, presence and realness, real change and temporal change, mental presence and the temporal present, synthesis of presence and energy, evolution of consciousness.

RÉSUMÉ. La vigilance : une inscription corporelle du maintenant. De la relation de la présence mentale au temps et à l'énergie. Subjectivement, la vigilance mesure l'intensité de la présence mentale ; objectivement, elle renvoie à des patterns d'activation et, en particulier, au niveau d'énergie du cerveau physique. Pour rendre compte de ce dualisme au delà des chemins déjà frayés, on introduit une distinction au sein des modes d'existence : le mode sur lequel la conscience existe en étant présente, le mode sur lequel le cerveau existe en étant réel. Par contraste avec des théories comme le monisme neutre ou le panpsychisme, ce dualisme modal n'est pas une théorie *ad hoc*, qui rend simplement compte de la distinction esprit-matière. La présence inclut tout à la fois une présence mentale et un présent temporel. La présence, de surcroît, est un mode intrinsèquement dynamique d'existence. Le dualisme de la présence et de la réalité correspond au dualisme du changement temporel et du changement réel. Le changement temporel signifie que, les états du monde ayant été futurs, ils deviennent présents puis passés ; le changement réel signifie que les états du monde qui diffèrent selon leur date diffèrent aussi en structure et en fonction. Le changement temporel, concernant la seule distribution de la

* Dept. of Digital Methods in Architecture and Planning, Vienna University of Technology.
georg.franck<at>tuwien.ac.at

présence entre les états du monde, est spontané et disqualifié par la science physique. Le changement réel, par contraste, est causal et énergétique, dès lors physiquement objectif. La vigilance correspond à un cas remarquable de synthèse entre le changement temporel et le changement réel. Elle se synchronise avec le présent temporel et se trouve en même temps énergétisée par le cerveau physique. L'hypothèse mise en avant est que la présence mentale a émergé dans l'évolution en vertu de l'inventivité de la nature à produire une inscription corporelle de la présence en déconnectant des courants individuels de conscience du flux global du temps.

Mots-clés : Modes d'existence, présence et réalité, changement réel et changement temporel, présence mentale et présent temporel, synthèse de la présence et de l'énergie, évolution de la conscience.

INTRODUCTION

Vigilance is the most common condition we find ourselves in as organisms with a conscious brain. We cannot help to be acquainted with this state most intimately. It is the how-it-feels to be mentally present and in control of the focus of one's attention. This feeling, however, does not come forth but in the perspective of the first person, *i.e.* of the subject who her- or himself *is* consciously aware. Mental presence is *be-able*¹, it is not observable as are the brain processes supposed to bring it forth. In the perspective of the outside observer, the brain states correlating to the subjective experience of vigilance are characterized by patterns of neural activity, patterns that are discernible in terms of oscillations in spike frequency, field potentials or blood oxygen level-dependent functional magnetic resonance imaging signals. In a sense, thus, our feeling vigilant amounts to a sensing of these brain processes. In another sense, feeling vigilant could not be more different than a sensing of processes in the physical brain. The neural machinery is sealed against inspection from inside; what introspection is given access to are only ever the conscious phenomena that in turn resist to be inspected from outside. As forbiddingly, as the physical brain is sealed against inspection from the inside, as forbiddingly is the sphere of conscious experience sealed against inspection from outside. Remarkably though, the brain processes supposed to bring forth the experiences have been identified to an amazing degree of precision and reliability by those scanning and imaging methods of empirical neuroscience.

Empirically, the brain processes made responsible for the production of phenomenal states, as they are called, do not differ categorically from processes serving subconscious functions only. The parameters that could be identified are of the kind of anatomical structure, networking, firing patterns or blood oxygen level dependency (BOLD), hence nothing that could account for the categorical difference between subjective experience and physical realness. The brain processes supposed to be productive in terms of conscious phenomena cannot, accordingly, be identified by measuring physical, chemical or physiological parameters, but only with the help of the subjective reports of test persons describing their 'inner' experiences.² Without subjective reports, empirical neuroscience literally would not know where to look for the neural correlates of consciousness in the bewildering complexity of the material brain.

¹ I take the wording from Pylkkänen (2014) who, in turn, refers to John Bell.

² See Dehaene 2014.

In principle, it cannot and should not be excluded that neuroscience thus faces a purely epistemological problem. It simply has not yet found out why there are nets of neurons and glia cells that are not only capable of processing information, but of bringing forth phenomenal states as well. Already a fleeting retrospect glance at the intellectual history of Western science and philosophy suggests, however, a sceptical outlook. We are facing the infamous ‘mind-body problem’, as it is called, a notorious ontological conundrum haunting this our history of thought since Descartes has introduced the concept of consciousness. The mind resists to being reduced to its material base and thus to be explained by physical science. Hard as hard science and scientific minded philosophy have tried to explain away what dares to resist explanation, the facticity of the immaterial phenomenon has notoriously reappeared in the discourse. After the anti-metaphysical fury of 20th century modernity had settled, a *nouvelle vague* of metaphysical theories addressing the mind-matter distinction has gained momentum. Although substance dualism à la Descartes had to be given away, approaches such as neutral monism and panpsychism succeeded in reviving ontological accounts of phenomenal consciousness.

A QUICK LOOK AT NEUTRAL MONISM AND PANPSYCHISM

Instead of going into the detail which these approaches deserve, let me briefly outline the reasons for my dissent. Both neutral monism and panpsychism are theories whose only justification is the persistence, not to say the intractability, of the mind-body problem. Neutral monism adopts the view, most prominently articulated by Wolfgang Pauli (one of the founding fathers of quantum theory and friend as well as co-author of depth psychologist Carl G. Jung) that the most satisfying ontology would be “if physis and psyche could be seen as complementary aspects of the same reality” (Pauli, 1952, p. 64). Neutral monism combines an ontological monism with an epistemic symmetry breaking, thus leading to an epistemic dual-aspect approach. The keyword is complementarity, meaning that incompatible properties (like the wave-particle dualism) can be together necessary for describing the thing in question completely. It depends on the context, accordingly, whether brain activities manifest as phenomena experienced from within or as material processes observable from without.

Neutral monism is an intriguing option since it promises to open the mind-matter distinction to quantum theory.³ Its weakness is that there is no independent evidence whatsoever of the neutral ‘stuff’ supposed to lie at the base of the dual aspects. In quantum theory, the wave or the particle are constituted in a measuring process, which collapses a wave-function, the existence of which is amply evidenced. The assumption of the neutral stuff is ad hoc, following the requirement only of a common carrier of the mutually exclusive aspects.

Panpsychism suffers from a corresponding weakness. Panpsychism starts with the findings that (1) consciousness is a basic ingredient of the universe and that it is (2) inconceivable to have emerged conservatively in evolution.⁴

³ See Atmanspacher 2012.

⁴ See Strawson 2006.

Mind is too different a kind of existent to have emerged through increasingly complex organisation of matter. The emergence of consciousness as we know it thus presupposes that elements of consciousness or, as it is called, proto-consciousness has to be intrinsic to matter as such: from the cosmological all the way down to the elemental (if not subatomic) level. Panpsychism, in short, is the doctrine that everything has a bit of something like consciousness in it. Phenomenal consciousness up to the level of self-consciousness must have emerged by way of higher and higher organization of proto-consciousness.

Panpsychism enjoys growing popularity in the consciousness debate since it attacks head-on the ontological question of why and how consciousness exists. As does neutral monism, it can be understood as a promise to open the mind-matter distinction to quantum theory. Quantum mechanics has put an end to atomism. The so-called ‘fundamental’ entities (such as electrons, quarks and gluons) represent patterns of reality, yet they are not building blocks of reality. They are not primary, but secondary and derived, they do not exist in a theory-independent sense.⁵ It is thus an open question to decide what matter is in the last analysis. Nevertheless, there is no trace of evidence that proto-consciousness should be among its constituents. Again, the assumption is *ad hoc*, strained exclusively for the sake of handling the mind-matter dualism.

PROPOSAL OF AN ALTERNATIVE: DUAL-MODE ONTOLOGY OF REALNESS AND PRESENCE

The appearance of extravagant metaphysical theories supposed to account for such a common everyday phenomenon can be read also as a sign that something too obvious to be recognized explicitly is overlooked. A candidate of this something is in our case the *mode* in which conscious phenomena exist (Franck, 2008, 2012a). Phenomena such as sense-qualities, feelings, moods, in short qualia, exist as appearances only, they have nothing substantial, let alone material. Their mode of existing is *presence* in contradistinction to *realness*. They exist actually in virtue of the fact that they are actually experienced. The conundrum of the mind-body distinction lies in the difficulty of accounting conclusively for presence as a mode of existing. To this day, there is no ontology of presence worth its name. The reasons will become clear as we proceed. What is hard to understand, however, is the oblivion of the fact that presence is not exclusively the mode in which consciousness ‘is there’. Presence is also the mode in which the now, this distinguished moment of time, exists. Is it perhaps too obvious to be recognised explicitly that both mental presence and the temporal present are forms of presence?

As forms of presence, both consciousness and nowness are ontologically distinct from physical reality. Yet, they are distinguished neither as substances nor as aspects of an underlying substantiality. They are distinct in virtue of a dualism inherent in the very meaning of “exist”. To exist can mean to belong to physical reality, and it can mean to occur in present time. These meanings do not risk to be confused or confounded insofar as science draws a clear line between them. For science, realness is co-extensive with existence, presentness is insignificant. Presence is not even defined in scientific terminology. For

⁵ Cf. Primas 2009, p. 172.

physics, the state of the world happening to be present this moment is no more and no less real than any other. Perceptually and practically, in contrast, this distinction amounts to the one between access given and access denied. In time, we are blind towards our immediate as well as extended environment. We are prevented to look both in the past and in the future, we can access these regions of time only indirectly by means of mental re- and pre-presentation. This blindness is not an individual deficiency, we rather share it with our fellow humans (and whatever sentient beings). The temporal present, accordingly, is objective in the social meaning of objectivity. People agree on living in one and the same now, they even agree – to an arbitrary degree of precision – on the world state happening to show up in the now.

Isn't it much more plausible to make use of this modal dualism when trying to account for the mind-matter distinction than postulating a primordial unity of psyche and physis? The postulated unity of mind and matter relies on speculation, the modal dualism inherent in the meaning of "to exist" is a matter of fact. This fact is evidenced by the passage of time; it cannot be denied without denying the facticity of the passage of time as well. Theoretically, nevertheless, the facticity of the passage of time can be denied as theoretical physics exemplifies; practically, however, it cannot be denied as evidenced by experimental physics. Experimenters cannot afford to do as if the difference between past, present and future were insignificant. In particular, they cannot ignore the now when measuring time itself. Even though relativity theory treats time as a coordinate exchangeable with the spatial coordinates, time stubbornly resists to being measured like space. In space, distances are measured by simple comparison; for measuring distances in space, a ruler is enough. In time, things are not so simple. The reason is that we are prevented to reach beyond or leave the now. This prohibition is as objective as anything can be objective. It forbids comparison of distances in time because distances in time extend beyond the now. The only way of measuring time thus consists in counting recurring events in the very now. That is what clocks do; they count recurring events whose intervals are supposed to equal. The dependence on this cumbersome and finally unsatisfactory method is experimental proof of the objectivity of the temporal present and the passage of time.

FROM THE MODAL DUALISM OF REALNESS AND PRESENCE TO THE DYNAMICAL DUALISM OF REAL CHANGE AND TEMPORAL CHANGE

When including the fact that the world state presenting itself in the now is never the same, the dualism of presence and realness expands into a dualism of change. Change is ambiguous in denoting both *real change* and *temporal change* (Franck, 2003). Real change means that world states differing in time (*i.e.* date) also differ in structure or function. Temporal change, in contrast, means that world states having been future become present and then past. Real change is what kinetics and dynamics in physics are about, temporal change consists in the redistribution of the intensity of presence among world states. Real change is driven by causes, temporal change is spontaneous. Real change involves energy, temporal change does not.

Real change and temporal change are not just of different nature, but downright orthogonal, *i.e.* independent of one another. Nothing changes in the

state space of physical spacetime when time goes by. Conversely, no physical means, let alone technology, is known that could influence the passage of time. This independence explains why it is so easy for theoretical physics to analytically separate real change from temporal change and abstract the latter away. For physics, this abstraction is of dual use: it dispenses with intractable spontaneity and disturbing subjectivity in one go. The costs of this elegant move, however, lie in confounding mental presence and the temporal present as if they were one and the same. Denying the objectivity of temporal change amounts to declaring it subjective, hence indistinguishable from mental presence. If, however, temporal change is subjective, it follows that it is subjectivity and subjectivity alone that makes time go by. In this case we must totally revise our view of subjectivity. Subjectivity is then far from being without factual power. Instead of being a powerless epiphenomenon, consciousness then is the most powerful thing there is. Compared with the rule governing temporal actuality, the laws governing physical reality are mild. In contrast to the coercion exerted on us by the laws of nature, the coercion exerted by the passage of time has been unmitigated by the progress of knowledge and technology. Whatever it may be that makes time go by, its rule is plainly overwhelming for beings that find themselves caught in the now (Franck, 2004).

WHAT ABOUT AN INTERACTION OF PRESENCE AND REALNESS?

With the dualism of real change and temporal change we are back to the mind-brain dualism from a new angle. The brain processes responsible for the coming forth of mental presence are certainly processes of real change. The dynamics of mental presence, however, does not coincide with temporal change. Dynamically, mental presence and the temporal present are partly indistinguishable and firmly synchronized, but they differ with regard to the phenomena that come and go. They differ as do the stream of consciousness and the flow of time. Both these processes concern the changing intensity with which phenomena are present. In order to be compared and thus distinguished, they both have to manifest within the stream of consciousness, however. The way we draw the distinction lies in realizing that part of the change we experience is susceptible to control whereas another part is not. We categorize that part of the intensity change of presence that we feel capable to control as *focal change*, whereas that part we feel to be definitely withdrawn from control as temporal change.

The capability of dealing with the distinction of focal change and temporal change is tied to vigilance in a two-fold way. First, the control of the focus feels easy when we are wide-awake, it feels harder and harder the more we get tired. Second, the control is completely lost when we fall asleep and start to dream. In dream, the difference between focal and temporal change is wiped out. In dreamless (nREM) sleep, mental presence even disappears altogether (or does it just fall below the level of being aware of itself?). Though disappearing, however, it does not cease to be synchronized with temporal change. Vigilance, accordingly, is the parameter in which mental presence, though remaining synchronized with the temporal present, has gained independence regarding intensity and agency.

This independence amounts to nothing less than the branching off of the stream of individual consciousness from the general flow of time. In contrast to the general, socially objective flow of time, the side stream of consciousness, though purely present, is *not orthogonal* to real change. Nor is it purely spontaneous as is temporal change. Most significantly regarding vigilance: presence, as an intrinsically dynamic mode of existing, has made *contact with energy*.

What we thus face is a process that seems to seamlessly connect what is deemed to be categorically incompatible. It would be a category error indeed to confuse presence and realness and thus temporal change and real change. In the stream of consciousness, nonetheless, real change and temporal change must be bridged somehow. Mental presence is firmly tied to the temporal present; it does not come forth but in the now and is bound to travel with the now along the chronological axis. Mental presence and the temporal present share the mode of existing including the dynamic nature of presence. Mental presence, at the same time, lives on the energy provided by the brain; it even varies in intensity depending of the level of physical energy. The seemingly unbridgeable ontological dualism of mind and matter thus turns into the psychophysical question of how it is to be explained that presence and energy can be made to react and form a compound together.

Hypothesising that such a reaction is possible and has been detected in the evolution of conscious brains has nothing metaphysical in it – unless the passage of time is declared supernatural. Even though mainstream naturalism today, by defining nature as that which natural science is concerned with, denies presence as a mode of existence, it would be an offence to common sense not only, but downright foolish to expel temporal change from nature. The passage of time is as natural a phenomenon as is the enclosure that experimental physicists are doomed to experience when trying to measure time like space. The passage of time has to be acknowledged as a natural phenomenon, as does the growth of entropy, another matter of fact that so far resists impeccable explanation. As long, however, as the passage of time has to be acknowledged as a natural phenomenon, as long is presence a mode of existing that is as natural as is realness. The problem that a naturalism acknowledging the naturalness of temporal change faces is, of course, to account for the possibility that the spontaneous process of temporal change makes contact with the causality of focal change.

To explore the question of how it is to be explained that presence and energy can be made to react, nothing seems to be better suited than a thorough investigation of the phenomenon of vigilance. Vigilance, to start with, displays a characteristic pattern of varying intensity: the daily cycle of wakefulness, tiring, fatigue, REM sleep, non-REM sleep and back to the wake state. When feeling wide-awake we feel an upscale intensity of ‘being mentally there’ which, at the same time, feels like being charged with energy. This feeling can be as ‘high’ as euphoria, whereas low levels of energy can feel like depression. When ‘high’ it feels easy to concentrate presence, which means to suppress, by intention and effort, the drive of attention to roam autonomously. It then feels, to put it differently, to require little effort to control the focus of one’s attention. Research that immediately suggests itself in this regard is that of the

relation between (a) the intensity of mental presence and the power of agency felt from within and (b) the energy level(s) of the physical brain observable with imaging techniques from without. What, precisely, are the neural correlates of the feeling energized and being in control of the focus of one's attention? Does it make sense to look after something like a threshold where physical energy passes over into psychic energy? Or would that be a relapse to psycho-physical interactionism *à la Descartes*?

THE PROBLEM WITH ASKING WHY EVOLUTION HAS COME UP WITH SENTIENCE

Descartes conceived mind and matter as substances that influence one another by medication of the pineal gland. What Descartes and his followers did not consider is making use of the dualism of temporal change and real change. When taking both these kinds of change as natural kinds we can search biological evolution for signs of interaction. It will be not even long that we have to search. The evolution of animal organisms has reacted from early on to the situation that, last but not least, those experimenters measuring time, find themselves in: the situation of being caught in the both narrow and spontaneously moving now.

The now is indeed a narrow place to live in. To live in the Now means to be prevented access to both the past and the future region of time. For an organism whose survival depends on its capability to access sources of energy, to avoid toxins and escape predators, this means that it has to find out ways of circumventing its blindness towards the temporal environment. Even an amoeba must be able to compare, in one way or another, its present with a previous state in order to follow the concentration gradient of a nutrient solution. It must have a minimum memory and the anticipatory disposition of goal directedness. For beings living in the now, past and future do not exist but in actual re- or pre-presentation. If the now and thus presence had nothing to say regarding existence, there were no regions of time that do not yet or no more exist. Change along a dimension of space and the dimension of time were exchangeable (as in fact relativity theory assumes). It would be hard to understand, then, why evolution has developed organs for movement in space, but not for movement in time. The same applies to the evolution of sense organs, *i.e.* organs that inform the organism about its environment. An animal that lives from and has to avoid dangers from its environment cannot afford to simply blind out its temporal environment. Evolution reacted to this exigency by developing substitute senses, quasi-senses that replace presentational immediacy though re- or, respectively, pre-presentation. Re-presentation of the no longer present is called memory, pre-presentation of the not yet present is called anticipation.

Developing organs for re- and pre-presentation is pointless if not in reaction to temporal change. The development and the working of these organs are processes of real change, of course. It may be too far-fetched, though, to classify this dependence as a case of interaction between real change and temporal change. But it makes full sense to classify it as the emergence of a context conditioning new possibilities of so-called contextual emergence (Bishop & Atmanspacher, 2006). As long as there is no such activity as

anticipation and recollection, there is no comparison of before and after, hence no change discernible and no notion of time, there is, for whatever creature, only what is ever given in presentational immediacy. Once a comparison occurs of what is and what is not yet or no more, that which has been actual, *i.e.* both present and real, splits into the immediate present and the reality extending beyond the now. It was only in this novel context that basic biotic processes of self-organisation could develop into the growth of organs dealing with recollection and anticipation, a dealing that includes the faculty of switching between alternative modes of presentation: direct and indirect, and in the case of indirect: backward and forward directed. With this switch, the faculty of switching between input channels of attention has become highly functional and thus reachable by natural selection.

Do we thus have a route before our eyes leading to the evolution of the capability called attention? In a sense we have. It is plausible that by way of differentiation, upscaling and adaptive refinement the presentation dynamics is turned into that kind of selective processing of information that reductive minded psychology and neuroscience are determined to reduce attention to. In another sense, though, we are way back behind an idea of how attention may have evolved. We are back at the beginning as soon as we include awareness and the feeling of agency in our understanding of paying attention. The advent of awareness in evolution literally transcends the mere reaction of real change to temporal change. The advent of awareness means that presence and its intrinsic dynamics have in fact been *embodied* in organisms. To this day, nobody really understands how nature has accomplished this feat. Our ignorance goes as far as to not even knowing for sure the reason why nature entered this wondrous route in evolution. It seems as clear that recollection and anticipation are adaptive as methods of gathering information, as it is hard to prove and to pin down the survival value of the embodiment of presence. Wouldn't organisms, even such as primates, work as well as they actually do if they were biological automata only, automata as announced by those prophets of transhumanism who dream of replacing our fallible biological nature by a more machinic technology?

The idea is of replacing the existence of a sentient being with a mechanistic vision of information processing capabilities is as insane and self-indifferent as it is telling that there are even philosophers around who proclaim that we are "robots born of robots born of robots ..." (Dennett, 1994) The only reason why it can happen that an accountable thinker confuses himself with a machine is that it is scientifically legitimate to insist on a conclusive demonstration of the difference that sentience makes in the behavioural capabilities of an organism. As long as such a demonstration is lacking, it seems scientifically admissible to insinuate the possibility of zombies, *i.e.* of organisms that are behaviorally identical with sentient ones, but lacking conscious experience.

Science, to be sure, is not a republic of zombies. Nor do you have to undergo, in order to be initialised as a confessed scientist, the brainwash that makes you feel as a robot born of robots born of robots. Rather, there is an ongoing debate in evolutionary biology about whether consciousness is adaptive and thus susceptible to natural selection or not. There are even

reasonable arguments in favour of adaptivity.⁶ What is lacking, nevertheless, is the striking proof. We therefore find ourselves venturing on thin ice when we adduct evolution to explain how presence could be embodied in living matter. Still, we are on perfectly solid ground when we presuppose what is beyond our powers of explanation. It is only reasonable to presuppose that evolution has brought forth sentient beings and thus set the stage for a novel branch of elaboration. Sentience includes vigilance and thus mental presence varying in intensity according to the supply of physical energy. From that stage on it is highly adaptive to develop a sense for the difference between the kind of intensity change that is due to energy and the kind of changing presence that is spontaneous. Evolution has now crossed the threshold to the development of specifically human intelligence. The keywords are time consciousness and thought economy.

TIME CONSCIOUSNESS, RATIONALITY AND THE ECONOMY OF THOUGHT

A joint product of the distinction of temporal change and focal change is time consciousness. Time consciousness in the sense of being aware that there are regions of time extending beyond the present, with a past encompassing the moments that have gone and the future encompassing the moments still to come. Knowing about these regions and knowing about the ever changing border separating them opens up the possibility of reacting to the unstoppable process in a targeted way. Knowing that there is a time still to come implies to feel encouraged to make provisions for the future. When there is pleasure and pain not only today, but tomorrow also and probably next year, it pays, e.g., to defer consumption and laying the goods in stocks. Beings who knowingly save seeds (even when presently hungry) to grow grain next year (in order to end the famine) have acquired rationality – economic rationality to be precise.

The time consciousness emerging from the distinction of temporal change and focal change thus feeds back to the control of focal change. With caring presently for the vicissitudes to be expected in the future, attention has started to categorize needs and wants as ends, and to categorize the objects of desire as means. Means and ends are abstractions that render the heterogeneous items subsumed comparable and interchangeable. They imply a notion of efficiency. We should be careful with the claim that this categorization presupposes symbolic language, since the inclination of turning things at hand into means is certainly older than language. With trying to use things as means, however, the attention paid to the handling takes on the character of what later came to be called thinking. Heterogeneous things, when looked at as means turn into goods with comparable power of satisfaction, and diverse kinds of desire, when translated in the form of ends, find themselves compared with regard to the relevance of satisfaction. By thus taking the possibility of alternative uses into account, means are compared in the quantity called scarcity. Scarcity differs from lack by being a function of the numerousness of alternative uses of a means. Scarcity has the potential to develop into a key concept of economic rationality, thus inviting to sophistication, which, in turn, calls for dealing with the energy that the control of one's attention relies on as a means – nay, as a *scarce* means – of the practiced rationality called thought. This energy, finding

⁶ For an overview see Earl 2014.

itself thus rated according to efficiency is the very same energy that mental presence disposes of in its effort to suppress the drive of attention to roam unbound (instead of staying focussed on one and the same item).

Even if it seems very hard to pin down the adaptivity of mental presence, it is hard, too, to find an innovation in evolution that has contributed comparably more to the survival and reproductive fitness of the pertinent species than rational thought. The key question regarding the evolution of a species endowed with reason is not, accordingly, whether the embodiment of presence as such was adaptive, but whether the emergence of mental presence was contextually indispensable for the emergence of self-assured thought.

In order to go into the question, we should avoid a preoccupation with language, logic and computation, but return to the energetic base of the mind's dealing with re- and pre-presentations. One of the reasons why the philosophers of robotic mind think that consciousness is dispensable is that the symbol manipulation that computation, the use of grammar and logic consist in are arguably done subconsciously. Let us, for the sake of the argument, agree. Even if the mechanics of symbolic manipulation is delegated to the subconscious back office of thought, there is still a front office that must consciously delegate the jobs. The front office's business is to make the effort needed to direct attention and keep it focused on the problem to be solved. Without this effort, performed in mental presence, no responsibility can be claimed for success in reaching solutions and conclusions. Most importantly, it is only in the state of presence that the capacity of focused attention assumes the character of a *means* of productive thought. As a means of production, attention can be used more or less effectively and more or less efficiently. Each particular way of use is from now on a selection among alternative possibilities of use. Rationality requires to select the efficient option. Thought itself thus turns into a question of applied economic rationality. The approach, accordingly, that suggests itself for pointing out the indispensability of mental presence for the contextual emergence of human reason is *thought economy*.⁷

Thought economy puts a new complexion on the mechanics of symbolic manipulation. Language and calculation can be seen as technologies enhancing the attention performing thought. Thinking and theorising are activities with significantly high demands on attention. Attention, accordingly, is the critical input to intellectual work. From its very beginning of philosophy and science, working on theoretical problems has meant to get to grips with the limited bandwidth of the capacity of consciously processing information. Since the bandwidth of simultaneous processing is defined organically, thinking worth its name starts with colonising the dimension of succession, *i.e.* of time. The most basic and proven technology of involving the dimension of succession into mental activity is language. To cast an idea into the form of language means to decompose it into standardized units (words), suited for sequentially passing the bottleneck of simultaneous processing and to be used repeatedly. By concatenating the units according to mechanical (syntactic) rules, content is sequenced into the form of sentences, which, in turn, can be linked up to descriptions of any complexity.

⁷ For an exposition of the approach see Franck 2012b, 2015.

Language thus proves to be the basic technology of thought economy. It vastly amplifies the weak forces of unarmed attention. It overcomes the narrow limits of the naturally defined capacity of conscious information processing. Language empowers attention to deal, in a controlled way, with ideas whose complexity vastly overburdens the forces of unarmed attention. It was only logical, thus, that philosophy and science started with developing the thought economic potentials of language.⁸ By applying language onto itself, *i.e.* by explicitly describing the meaning of words, words were turned into concepts with sharply demarcated meaning. The leverage of language was further enhanced by extending the specification and refinement of concepts through the elaboration of terminologies, which, in turn, paved the way to the definition of artificial languages such as symbolisms that allow formalisation. It was by way of the formalisation of language that thought economy could cross the threshold to mechanisation. The upshot of formalisation is calculation, *i.e.* the gain of precise information by a purely mechanical manipulation of symbols. Mechanisation advanced when mathematics was utilized as a language of description (and when empiricism, accordingly, developed systematic observation into the methodology of measurement). Simultaneous equation systems are capable of turning descriptions into models that work as abstract machines. These abstract machines can be turned into concrete machines when translated into algorithms implemented on digital machinery. By involving digital machinery, mechanisation of cognitive labour finds itself extended to automation. Eventually, cognitive labour thus harnesses external sources of energy, as does physical labour in heavy industry.⁹

Starting with the technology that automates symbol manipulation, the robotic theory of mind simply presupposes what could be – and still waits to be – explained by an elaborated economy of thought. Such an economy of thought would be, in turn, an approach to go both systematically and historically into the question whether the emergence of mental presence was contextually indispensable for the emergence of self-assured thought.

CONCLUSION

When asking after the possibility of the emergence of mind from matter we should remember that we have, immediately before our mind's eye, a case in point: our daily awakening from the depths of dreamless sleep to the heights of sprightliness. In dreamless sleep, as in coma, our existence is reduced to merely biological life. When awaking, it is first the feeling of being an embodied presence that returns, followed by the feeling of being in control of one's attention. This does not mean that we daily relive the emergence of sentience as it presumably happened deep down in evolution, but it means that vigilance indeed emerges from the biological stratum. In order to be precise, though, we must not forget that vigilance emerges from brain states that are both physically real and temporally actual, *i.e.* actualized by surfacing in the

⁸ It is strange, thus, to find that the theory of science grossly ignores the role that thought economy plays in scientific research. Remarkable exceptions to the rule are the classics Mach (1883) and Husserl (1935). Until today, even psychology, sociology and economics of science feel justified to circumvent the topic.

⁹ Cf. Franck 2012b.

now. It might be premature, thus, to claim that vigilance emerges from nothing but the physically real. Since presence cannot arise from nothing, we may be better advised to take the possibility into consideration that vigilance emerged from both physical reality and temporal actuality. The phenomenon is reducible to neither of its allegedly incompatible constituents. Both sides, rather, have to be taken into account for describing the phenomenon completely. We thus face a narrow choice: we can account for that which is together necessary in terms of complementarity or in terms of fusion.

Might it be that this choice is too narrow? That we first have to work on terminology? Work out an ontology of presence? The paper would have fulfilled its aim if having made the inclined reader more insecure.

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