# The Mind of the Scientist

The Need to Calibrate the Fundamental Tool of Science

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**Abstract**
The mind of the scientist is the prime tool in scientific research. It is however rarely calibrated, which suggests that there is no reliable foundation for the study of science. Individually, scientists learn to use their mind, but only indirectly and incompletely; as conditioned by their education. Few study their mind on its own; thus few make use of its full potential. From the body we can see that life is based in the integration of information and matter. This calls for an understanding of physics based on phasics (phase information. The *invariance* that is sought for in science is not based on matter, but on the phase field by which it is formed. Understanding the mind brings us closest to how this takes place; our body is our best example. This suggests some fundamental new possibilities for science, by not basing it on an erroneous idea of 'objectivity' and 'invariance', but on subjective *personal experience* of uniqueness in/and creation.
**Keywords:** Science, Scientists, Mind, Research, Response-ability.

## 1 Introduction

The Mind of the Scientist is the most commonly used tool of science. It also appears to be the least studied.

Quantum Theory already made explicit that the reality that we perceive is based on our involvement in the process. "The Collapse of the Vector of State" can be regarded as the phase lock by synchronisation of two interacting wave fields. The Schrödinger Equation which is the basis of this theoretical model thus needs to be accounted for, for both aspects of the dynamics of perception. We are part of a field of interacting waves. The Heisenberg Uncertainty Condition makes explicit that we experience only *our* half of the interaction.

From a physiological perspective this is clear also: all sensory organs form part of our body. We thus do not experience the environment; we only experience changes in our internal body dynamics. In Sanskrit this is called "*Samsara*" (sensory perception). From the changes of state of (sensory) cells of our body, we infer changes of state of our context. Technically speaking we do not experience our context; only our response – to our interaction – to it. The resulting realisation therefore is a personal construct. In Sanskrit this is called "*Maya*" (Reflection). The processes and principles of sensory perception of our surroundings (sensoricepsis) are the same as those for self-perception (propriocepsis).

It means that all our perceptions are subjective. It also means that every sensory sensation depends on the state of our body, and mind. Technically speaking these two

cannot be set apart: our body is the result of the dynamic interaction between living cells. The cell divisions are the basis of our organic coherence. It is the processing, of the processes between the living cells and organs, which also determines the processing of processes in interaction with our context. The dynamics of metabolism and those of sensory experience are inherently the same.

We cannot regard our scientific findings without accounting for our sensory processes, thus our brain function, thus the functioning of our body.

Objective science does not exist. All findings of science are subjective. When they can be replicated this does not make them objective; it means that they are conditioned consensus. As long as we do not account for the subjective sensations that lead to personal realisations, we have no foundation for understanding the emergence of consensus; nor of what is now called 'objective science'.

## 2 Measuring the mind of the Scientist

At present we have no means to measure the mind of the scientist. This is the result of an imagined separation between information and matter. Classical science opted to study only that part of reality which has physicality. This was a choice, in the past, to set science aside from church overrule and dogma. The result is that the realm of thoughts and ideas is not considered in science. It cannot be measured, and is therefore often not acknowledged. As a result, many scientists firmly belief that only physical reality is real; but their *idea* on which their realisation is based is not accounted for. Some even insist that immaterial 'objects' cannot exist, thereby belying that they *think*, using ideas, which have no physical substance. At present we are said to live in an *Information Age*, yet information processing is not yet taken into account as a fundamental aspect and property of sciencing (creating science). In computers the computational process stops, the moment the electrical current is switched off. Science has not yet come to study in which way this relates the way any scientist functions. The possibility to do so are very limited, in fact restricted; because most scientists do not study how they function. Even the few studies that are being done by applying the findings of computational informatics to the way the human (brain) functions are of little use, because they do not (yet) help understand how the electrodynamics processing of data relates to the organisation of information, or how that again relates to our ideas and thinking. It requires considerable change in our understanding, and study, of science to enable us to see how this relates to life, love, consciousness and health (the Blind Spots of Science; O#o, 2005b).

Amongst the rare studies into the involvement of the scientist in doing/making science, is the work on brain function research. An example in case is the work done in Neurofeedback, and the use of the Heart Tuner (designed by Dan Winter, and built by Jan Souren). Core of the device is the ability to monitor the ECG or EEG of two persons. Relevant is that it displays the Septrum, the 2$^{nd}$ Order FFT; a means to evaluate to internal coherence of an FFT (Fast Fourier) spectrum. The following description of

measurements by this device serve to show how the mind set of the scientist determines the outcome of science. As the measurements show, the shifts in awareness, consciousness, involvement and self-experience all affect the way our brain functions. This again determines how we think, what we think about, how we relate – and communicate – ideas. Most important: the shifts in consciousness determine how ideas come to consciousness out of pre-cognitive and unconscious realisations. In other words: devices like these help understand to which extent, and how, *Reality is a Realisation*.

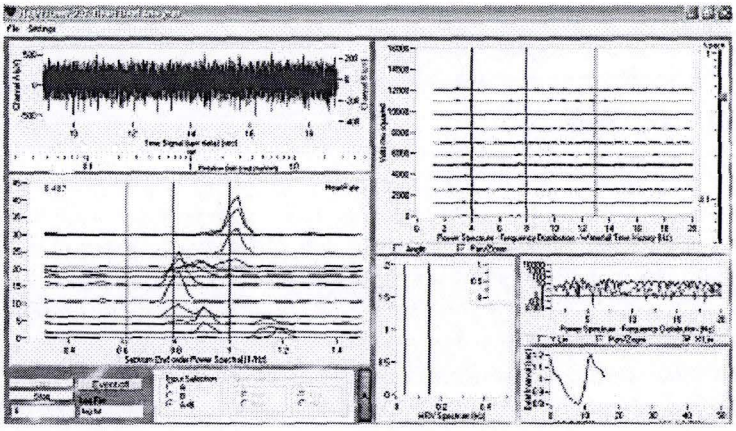

**Figure 1: measurement of mental and relational involvement of the body.** Relevant items in such measurement are the brain wave frequency, the peak of the Septrum graph, the heart rate variability, and its interpersonal synchronisation.

*Brain Wave Frequency* can be broadly discerned as: 1) sensory awareness of the surroundings (Beta), 2) Body awareness (Alpha), 3) Organic Functioning (Theta) and 4) core Cell activity (Delta). Predominance of any specific brain wave frequency waveband ($\alpha$, $\beta$, $\theta$, $\delta$) reflects a predilection of that person for a specific form of involvement with/in the context. (Neurofeedback is based on liberating a wider spectrum of the wave bands for reality processing.)

*Septrum* Peak Activity summarises the relationship between the brain frequency dynamics. Expressed as a ratio, it reflects the person's relationship to the environment. When the person is 'centred' (0.6), there is a balance between sensations from the environment (1: mental), and reflections from within (0.8: emotional). It is relevant to note that 0.6 represents the Golden Mean Ratio, a natural ratio in which the inside is in balance with the outside. (As seen e.g. in the spiral of the growth of the house of a snail.)

*Heart Rate Variability* (HRV) is a systematic dynamic, in which the heart can adapt to changes in the system. Heart rate variability represents minor instantaneous

adaptations to changes in the body and/or context. It is a vital parameter. When heart rate variability approaches zero, death is often impending: system adaptation no longer functions.

*Interpersonal Synchronisation* can be witnessed on the display as the dynamic in which the septrum peak of two persons can come to approximate or even coincide (mainly due to shifts in HRV). The last is often seen when persons hold each other, or (without touching) think of each other. If there is no affinity between the persons, if one or either person has limited flexibility in changing relational perspective, these peaks will not come to coincide. This measure can help persons to understand and appreciate differences in perspective. Especially in scientific discourse this can be of importance.

## 3 Minding Matter

Scientific discourse is often based on (erroneous) the assumption of the existence of objective reality. Insight in the functioning of the brain demonstrates that all persons relate to themselves, and their context, differently. Especially the component of self-realisation (the way in which persons relate to themselves) is at present ignored (and often denied). The result is that many arguments about reality are argumentations about realisation. As the measurements by e.g. the Heart Tuner imply, every person has a different experience of the environment and others, based on a different preferential use of the sensory system, as well as a personal bias in the internal processing of information.

It is important to realise that the mind is not the brain; just as the computer hardware is not the software program. Differences in bodily build, food, behaviour and context (nature and culture) have effect on the way the brain can function. Likewise the previous lifetime experiences, memories, unresolved personal issues and self-realisation all have effect on the way experiences are stored as memories, and can be used as the basis of knowledge or wisdom. Especially the personal relationship to problem solution in personal life affects the mind set and plasticity for its functioning in professional application; in science.

The brain is an *organ* in our body. As any other organ, it cannot function outside of the context of our body. It is dependent on the integral functioning of all organs. In fact, the brain of our body is not just the cortex in the skull. The 'brain function' is also represented by the heart, gut and all the cells of our body: all integrate our experience in our context. All process information. All are sensitive to their context. All respond to it. All communicate their findings.

To illustrate this concept we can compare the brain to the heart. The heart integrates blood from the whole body, infuses it with an electromagnetic pulse at the moment of heart contraction, and redistributes the (electrically oriented) blood throughout the body. The precise electrical activation (by 7 heart muscle layers) depends on the para-

sympathetic (vegetative) and sympathetic (animal) system response (i.e. change of environment, or adaptation within the environment).

Likewise we can compare the brain to the gut. In the Gut the *Peyers' Plaques* are the equivalent of tongue function: molecules seep through the tissue to be analysed by the immune cells – which are basically 'brain cells'- which then can synthesise molecules to be able to assimilate new substances into the body.

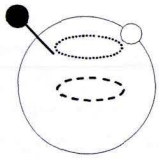

**Figure 2: Schematic diagram of the interfacing function of a cell (after Bruce Lipton). Mantle Protein on the DNA transcribes the activities of the Linking Protein integrating the activities of the Sensor Protein (|) and Gate Protein (○)**

Basically we can compare the brain to a cell of the body. The cell membrane is the skin, on which the *Sensor proteins* respond to changes of vibration in the context. The *Gate proteins* are the orifices (or sphincters) which allow for the opening of the membrane. The processing of information (sensor protein) and matter (gate protein) is integrated in the *Linking Protein*, under the cell of the membrane, which represents our 'brain' function. The *Mantle protein* relays the activity of the linking protein to the DNA, which is remodelled accordingly. This is our basic 'memory' function.

Cognitive functions are based on these cell functions. The analysis of sensations (as done by science) and cognitions (as studied by psychology) are meaningless if not based on the underlying bodily functions (as studied by medicine) which however requires a new kind of understanding (life science) in which the interplay of information and matter is understood; especially in the context of our body.

In this new approach to the understanding of the interplay between *information* and *matter* we need to realise that we are not dealing with vibrations but patterns of information. Our sensations are not to be disentangled, as if separate, as vision, sound, taste, touch and motion. Every sensory organ is sensitive to a restricted spectrum of vibrations (based on the relative wavelength of the signal and the molecule/cell/ organ/body). Our body is, physically and *phasically*, part of our vibrational context.

Our body is a construct of vibrations; it is a *wave field* interacting with its context: a *wave field.* All molecules in our body are simultaneously carriers of information (antennae) and structural components. The discernment between the functions makes no sense: both are always present. Our body as a whole is a manifestation of information. Over billions of years small process processors (e.g. microbes) aggregated information leading to the creation of ever more complex (and self-aware) life forms.

This can be seen in our body. The equivalent of the aforementioned measured brain waves and heart rhythms are found also as the circuits of *metabolomes* in our body. These are loops of interactive *branched chain* reactions in which different organs reform the structure *of molecules*, which thereby can function in different ways as carriers of information; and structural components. All forms are manifestations of organisations of phase. Our 'body language' is simultaneously a code of vibration and structure: structured vibration. (Phase coherence.)

The material phases in our body are consequential to phase organisation. Just as the separate frequencies of sensory systems of brain wave wavebands are immaterial, the physicality of the body anatomy is meaningless also except as part of a more integral dynamic. All body materials are formed and transformed, and thereby – together – serve the overall function of the preservation of body integrity. It is the phase information in the body that is the common denominator for this integral process.

The meridian system is a high speed information processing circuit. In the same manner as a regulatory system cannot regulate itself, likewise the material phase information needs the presence of an encompassing higher speed phase information system: the *Qi*. Qi is *energy-information*. It does not operate at the level of vibrations (or waves) but at the level of group waves (and *solitons*). It spells the coherence of the dynamic information system, and is the basis of system integration.

The integrity of the body is the basis of our integrity, in body, mind, soul and spirit. In science we cannot take this for granted. Medicine shows that changes in the coherence of this phase state (disease) affects not only the body but also the mind. As described above, cognition is not a mental cerebral function; it is a property of our whole body. Any derangement in the integrity of the body distorts and compromises the perception of reality. This applies to any scientist engaged in 'observation'.

We cannot regard reality without understanding the underlying principles and process of realisation. Any change in bodily function will change our involvement in, thus perception of, 'reality'. Psychosomatic and somato-psychic medicine has not been sufficiently developed to be able to address this. In fact, in order to be able to enter into this kind of research we first need to embrace the forms of healing of other cultures, where this has been much more studied, and the interplay between the healthy mind and healthy body has been made explicit. Also such forms of healing show how the use of mind affects the brain and thus the body and thereby the healthy functioning of the organism as a whole.

*Analytic* science does not allow for this understanding. It reflects on parts *separate* from their context: the whole. This makes the finding generally invalid: it assumes *inertia* (invariance) in the parts, and the universe, which does not exist at the material level. This 'invariance' *does* exist, at the *immaterial* level; but that is where analytical

science has no means for description - because it refers to the structure of matter for its description. For this reason we must shift the understanding of traditional science to include the scientist in his/her observations: that is where we see the direct interplay between matter and information. That is also where we can make explicit that, and how, the immaterial affects matter.

In other words: it is possible to use all the finding of classical science, albeit that they must be interpreted not in terms of structure of matter (physics) but in terms of the dynamics of coherence of information (phasics).

In fact, all fundamental laws of Nature, are in fact formulations of OUR nature. They are not descriptions of *reality*, but of *realisation*. They are not reflective of anything *objective*, but in the way we define patterns in *subjective* functioning. Science is a conditioning into a specific belief and mind set, accommodating for a specific mode of observation. The use of instruments is a means to restrict the possible forms of observation to focus only on mechanical material modes of observation. The limitations of this method become most evident in medical science, where *living* beings are now being studied as if *inanimate* objects. This has severe effects on health care.

All laws of nature are descriptions of the way *we* function. For example: the basic equation type $F=m.a$, $I=\omega^2R$, $E=mc^2$ reflects the way our mind organises information (Uri Fidelmann, 2004). There are two most basic laws: one category describes invariance (the properties of a field, e.g. $\nabla^2\Phi=0$); the other addresses change (the transitions in an interface). In reality, we need a science in which both are combined and can be inverted, as they are dual to each other.

The duality between the boundary and the field requires the understanding of the way the one can turn into the other. This requires two types of understanding: 1) the dimensional collapse that takes place in the course of the transition, and 2) the preservation of information integrity (logic) during the immaterial phase of the transition. (As in the transition of a caterpillar into a butterfly, the physicality is seen to be subordinate to the *phasicality* of the system). Phase information (in formation) underlies the organisation of material phase.

Such a system transition is characterised by a dimensional transition. It is related to what Quantum Theory addresses as the Collapse of the Vector of State. It is the moment where the observer involvement, mental and material, affects the outcome of the observation. The measurements by the Heart Tuner bring out the way our experience of ourselves conditions (and limits) the potentials of such changes of observation. Any change of state that we can become aware of, reflects changes of phase/state that already pre-exist within us. Every observation thereby is a form of self-observation.

Systems Theory (von Bertalanffy, 1968) presented a more integral model of such observations, by relating our description of our environment to the way we function. This can be made more explicit, by the example of Dimensional Analysis (Langhaar,

1951). In modelling any situation we select parameters for its description; these parameters together combine in a Dimensionless Number; which defines the Critical Boundary of the observed system. I.e. we limit, thus restrict, our observation by our choice of parameters (i.e. bias of involvement). Any change in the *choice* of parameters changes the Critical Boundary (Event Horizon) of *our perception* of the system.

We all do this individually; and collectively. We not only set and limit our scope of observation, but also our experience of ourselves, our interaction with others, and thus the collective realisation. Objective science does not exist. What we know as science is a conditioned collective consensus construct – an artefact – based on the way we individually limit our realisation. Science – like religion – is intended to resolve this limitation by helping us understand how we are – all – part of the same context.

Many people have tried to base science on the findings of science, forgetting that the findings of science are the result of the operation of science. It is a circle definition.

Likewise people have tried to define science in terms of the mental and communicative properties of consciousness and awareness. This is a circle reasoning also.

Sometimes people try to define the nature and basis of science in terms of the formalisms of mathematics and logic, i.e. in terms of the language that was created by science. This is a circle argument also.

Whatever we experience, and realise, is based on the properties of our body. The basis of science can thereby be found and defined in the origin and functioning of our living cells.

*Reality is a realisation*:
all we perceive is filtered via our body and mind;
we need to know *how* we filter/create our realisations
*our involvement matters*.

It implies a conundrum: we need to understand our body, to be able to understand the basis of science. However, at present, scientists try to understand the body *in terms of the formulation of science*; this defies the purpose. It means that we need to define and redefine our understanding of science in an iterative approximative manner to bring out new insights and new formulations, until whatever we formulate as tenet for science is *immediately* experienced in our body. I.e, at that moment reality is indeed a direct realisation.

For this we will need a different language; not based on symbols referring to physical tangible inert objects in nature, but referring to the immaterial dynamic logic of phasics. This in fact calls for a fertile crossbreeding of science and religion. We need a very clear and specific formulation of *phasics*; the logic of coherence of information. The closest language we know – but yet need to learn – is our body language, in which molecules are carriers of information. There, all changes of phase are part of a preservation of life: integration in context.

From our body we also need to learn, and appreciate, the differences in scope of this language of description. The *information* dynamics, the ensuing *atomic* interaction, (de)creation of *molecules* and transformations of *materials* are all interrelated: aspects of the same dynamic. The functioning of the cell, the organ, our body and the world-that-we-are-part-of likewise all need to be described in the same formulation. Likewise in science, the personal *state* of being of the individual, the modes of *relationship*, the ensuing types of *interactions* and the concluding *constructs* of realisation all need to be describable in the same manner. We need a new language in which the objective is based on the subjective; where the individual is understood as the carrier of the collective, and where phasics is known to be the basis of physics. This calls for an interesting understanding. We know that gasses formed amino acids which built into proteins which formed (and still form) DNA. We see that the informatics determines the electromagnetic charge discharge which creates the process chemistry that can lead to tangible forms. We must deconstruct our reality and realise that the formed manifest reality is conditional on a context; psychologically, socially, culturally and naturally. And no longer confuse the end *result* (physics) with a *cause* (phasics). Our reality is not physical but *phasical*. This is most clearly seen in the scientists mind. What we think determines how we function, what we perceive, how we interact, and what conclusions that gives us. This is seen in its most condensed form in the functioning of the living cells in our body; where each cell is a micro processor, a unique individual 'brain', and basis of the reality realisation that we create.

*Medicine therein offers a better basis for understanding the basis of science.*
*But this cannot be done as long as medicine bases itself on physical material science.*

Medical science cannot base itself on the notion of repeatability and replaceability, implied in classical mechanical material science. It needs to understand and account for uniqueness: freedom of choice in creation.

Classical science pretended that it could offer an 'outsiders'' perspective. Instead we find *we are always involved.* Rather than addressing reality as an existence outside of us, we need to realise that we are part of it; we are involved insiders. We (co)create creation. This makes the scientist fully personally responsible for every (collective) creation of science. This responsibility does not only apply to what is created, but also at the level of ideas. Science requires a mental discipline and hygiene. We need to know how we think in order to be able to know what we think.

The change from 'Outsider' to Insider requires a fundamental shift in perspective. Instead of regarding reality as a field, to which we are outsider, we are participants: operators in and on a boundary. In technical terms it means that we need an Operator mode of description for mathematics (Rowlands, 2007). At a practical level we can use our understanding of the functioning of cell membranes as a core model for the basis of realisation.

On basis of this understanding, we can redefine our understanding of our interactions with reality in terms of metaphors found in our body: the relationship between cell and environment, the agonist/antagonist muscle interaction, the parasympathetic/sympathetic (vegetative/animal) system response; the mind/matter (information/manifestation) aspects of body processing, and the cerebrum/cerebellum (environment/body) awareness aspects. The work of Hans Selye (1978) is relevant in this context: our body redefines its interface with/in its context by pro-/anti-inflammatory agents. We dissolve and reset our (self)definition (membranes), in/of our body. Our body has a mind of its own: it regulates how it integrates in its context.

## 4 The Mind of the Scientist

The mind of the scientist is not different than that of any other person. Some people who opt to become scientist do so based on a bodily propensity for mental engagement. Oriental medicine explains how this can be found in the interplay between organs; astrology helps understand (as does recent neuro-research) which brain wave frequency dominance may play a role. In some cases it is the social setting, or cultural context, which implicitly or explicitly drives a person towards a mental cognitive bias in interacting with life. Yet underlying all these conditions of context and setting: the mind of the scientist has the same components and make up as that of all other persons.

It is the scientist's use of the mind which differs from that of many other persons. The affinity for abstract thinking, communication in code, socialisation within specific cultural constraints for conduct, and a combination of obedience to consensus and individual freedom of thought discerns science from other socio-cultural engagements.

Science is, crudely speaking, a specific use of the mind (thus brain, thus body). As for all professions and activities (each in their own way) the scientist integrates a personal accumulated memory of the body's experience of the context, in relationship to the sensory impressions from the context. The *pineal gland* therein is the pivot between the cortex (mapped environment) and cerebellum (body image). Based on the interaction between those two information fields, the hypothalamus responds via (animal) neuronal and/or (vegetative) hormonal response. The immune system and regulatory system together reset the 'event horizon' of our perception and (via the aforementioned pro-/anti-inflammatory hormones) the membranes in our body.

In our body, the *information* of our experience of our interaction with our context, relays to the electromagnetic *regulation* system of the body (neuronal/hormonal. 'telephone and letter' communication; C Smith, 1992, Nordenström, 1986), by which the *process chemistry* is accelerated or slowed down (cf. the agonist/antagonist complementarity in our body) which changes the *physical state* of the molecular substrate; of which our anatomy is a result. The mind of the scientist, like the mind of any person, determines the reality that we, individually, live in. For this reason it is all the more important that scientist get to know, study, and calibrate their mind. Because

the models that they hold to be generally valid, must therefore, first, be valid for themselves also. Whatever is described as science, describes us.

Science has made many, ever-changing, descriptions of reality. Classical science purported that a reality exists *without* our observation. Classical scientist somehow ignored that the so-called universal truth of the reality that they described must – if they are truly universally valid – apply to themselves also. As modern medicine now shows: the tenets of classical science are unwholesome, even deadly, when applied to our *living* body. It is treated as if a *dead* object. The person-in-the-body is considered a nuisance; a potential interference with the predictability of in vitro chemical reactions.

The essence of the living being however is the capacity of freedom of choice. From that follows the realisation that the physicality of our body, thus the bio-chemistry of our organism, is based on the way our bio-regulatory system responds to our experience of our context. The immaterial aspect of personal happiness and well-being matters more to our health than the laws of physical nature. How we feel determines our *Inner Climate* by the molecules that are secreted in our body. The living cells of our body secreted all the materials our body is composed of. If this is no longer the case this is not due to the physicality of our living body, but the integrity of the information by which the synergy of our living body cells is maintained.

The most stringent test of science is not if an experiment can be replicated outside of our living body, bit in which way the new insight helps us understand our living being. All instruments are extensions of capacities found already in our body. All models are extensions of concepts already found in our psyche. Any test of reality is thereby a test of realisation. A test of physical reality, inertia, is merely a reproduction of something already in existence. The principle quality of life is creation: to know the unknown and to create newness. (K Forsythe, 1989) The main capacity of our body, autopoiesis (Maturana & Varela, 1980) is subservient to this capacity of/for creation. As in our body, creation is not based on the properties of manifest matter, but on the properties of manifestation; materialisation. Cosmology has come to conclude that physics is based on phasics (matter is a form of information in formation). This is more explicitly seen, and experienced, within our body. What we thus need is not a science of matter, but a science of life to elicit this understanding of creation.

Science is not an individual activity. Sciencing takes place in part in the scientist (innovation of concepts), in part in the scientific community (conditioning consensus), in part in the social context (realising reality) but is meaningful only in our interaction with nature (knowing the unknown). Science is a collective coping strategy, in which individuals (scientists) work together (science) to create a collective understanding (sciencing) by which humanity can live in better understanding with nature. Language and Technology are the main tools for synergy by which personal Experience and Ability can be used by the collective.

However, if the tool is not calibrated and not validated, then it can be destructive, as is seen in the current world wide destruction of life forms and planetary pollution. It is therefore not enough to create a science that is effective and efficient; it also needs to be an art: esthetical and ethical. I.e. the subjective experience and worth must complement the objective value and meaning.

## 5 The Response Ability of Science

The principles that are active in our body determine how we interact with each other. Humans are the cells of humanity. And science is but one of the many organic functions of the collective human mind. If we were to compare science to the brain of humanity, then we can draw the parallel between the way the brain functions; and the functioning of science for humankind. One of the caveats that springs to attention is that science needs to become self-aware, in order to be response-able in its actions. The model of science that placed the scientist outside of reality also made the scientist unable to come with the changes that science affected. Responsibility of science requires a model that enables scientists to be response-able: not outsiders, but involved. This means both that the scientist is to be regarded as a creator of the outcome. It also places the responsibility of the findings of science at the levels of the individual: the scientist. As is the case for any cell in our body: if it no longer functions in accordance with the environment conditions that we live in, the body as a whole risks to become sick.

In the brain we can see that the body as a whole contributes information of the state of our body; this includes the response of our body to our context. Frequencies assessed by separate organs are correlated in forming a body-sensed representation of our context. Likewise we experience the state of all organs and cells within us. These two 'holographic' representations form the basis of our interaction with/in our context, and our use of freedom of choice in changing our relationship with/in it. On basis of our change of involvement, we activate vegetative or animal in-built responses: we adapt ourselves, or our context.

Every change in adaptation alters our interaction with our context: we reset the Event Horizon of our participation. This Resets the Interface, which determines our interaction. This is done (Selye, 1978) by rephrasing the inner-phase: we change the boundary definitions of our body. As Dimensional Analysis points out: this redefines our experience of the 'reality' we live in. Such a boundary transition has four aspects: these we see reflected in our brain (forebrain, identification, left brain, analysis; right brain, synthesis; rear brain: integration). The same patter in seen in sensory perception (sensor – sensation, neuron – translation; plexus – synthesis, brain – integration). Most scientists seem to operate predominantly in the left-frontal part of the brain: the areas of Broca and Wernicke, for analytical processing of symbols. This is a flat, stamp-sized, part of our full brain potential.

Our brain is shaped by the information exchange between living cells. As is the case for our whole body: every structure is a consequence of a flow pattern, consequential to cell division (O#o, 2007). It is the interactions between cells that determine their affinity and repulsion, in which photon, electromagnetic, chemical and the ensuing physical interactions determine the shape of our brain and body. Science has created informatics (on basis of our own processes of information processing) but hesitates to realise that our brain is shaped by our own thinking. In living beings, 'the software shapes the hardware'.

The shaping of our brain is determined by what we experience (information) and eat (nutrients), and especially by our interpretation (the way we feel) and evaluation (the way we respond). It is the interplay between experience and expectation that conditions the hormonal climate by which our body response capacity is conditioned. It is on that basis that our body is created (sculpted and re-sculpted) by our actions and interactions. Our reflexes and beliefs therein determine the shaping of our body and our "reality", i.e. our realisation. *Reality does not exist: every 'reality' is a realisation.*

What we hold to be real is based on a specific state of mind. In our sleep cycle we see that our experience of the context around us (beta waves) is released to resort to the experience of our body (alpha waves) and its internal functions (theta waves) based on our cell dynamics (delta waves). Vibrational wave bands are therein seen to be interrelated. As Neurofeedback and other brain studies have shown: it is the interplay between these wave patterns and wave bands that determines the 'reality' that we live in. A change of wave patterns and wave bands can change our state of awareness; and heal our body. The sleep cycle is a mechanism which our body needs to recover its wholeness. It also suggests that this is a cycle of consciousness, of fundamental importance to science. It is a dynamic on which we base our sense of reality/realisation.

The way in which we sense information – by separate cells on/in our body surface – is more than a simile for the functioning of science. Individual scientists (in contact with their internal sensations) present their findings. Information sorting (similar to the relaying via neurons and plexus to the brain) takes place by which information is integrated (similar to the process in the plexus) and incorporates it into the knowledge of body of science (the brain). Science has not studied this process of information filtration; and thereby missed out on much of the information that is available by what the individual scientists have to offer. Our body offers a fundamental aid to understand the dynamics and role of science: to help humanity deal better with the unknown.

Science is a *collective* cognitive process. Science is not about fitting our perception of reality into the models of science, but to adapt our models to be able to deal with our context better. This is the same dynamic process balance as found in our body, in the relationship between the vegetative system (adapting the models of science) and the animal system (creating new models for science). The dynamics of 'sciencing' are not

enigmatic; they are based on our *internal* mental processes, thus on the functioning of our body, thus science is based on the functioning of our cells.

This also implies that there is a Healthy form of science – Science of Life - in which the findings of science are compatible with your body (thus life) and our context (thus creation). Formulations of science lacking this compatibility can be considered unhealthy. This is the basis also of the interference of wave fields: constructive (creating integration) or destructive (creating disintegration). The equivalent of our body sensory warning system (pain, fear, depression, death, for respectively the integrity of body, mind, soul and spirit) apply for the integrity of science also. Iatrogenic diseases, planetary pollution, social-political dissatisfaction, and death of populations and species are indicators that the models that are being used are not beneficial for the subjects it is applied to.

## 6 Conclusion

Science is based on scientists. Sciencing is based on the use of the Scientists' minds. As long as the mind is not understood, there is no means to assess the use of this most basic tool of science. Nor is it possible to calibrate the use of the mind of scientists. *Without this fundamental calibration, there is no fundamental basis for science.* The best known method for mind calibration is the sleep cycle. It shows a rotation between brain wave frequencies, which together form the equivalent of a boundary transition. The phases of the sleep cycle correlate with the transition of information from sensory cell to the brain function. It also reflects the changes in identification associated with the brain (forebrain, left-brain, right-brain, and hindbrain). In this systemic phase rotation we see a *dimensional* pattern, in which 1D, 2D, 3D and 4D facets are all interrelated.

Mental function involves systematic and systemic processes of (dis)association. It serves to assess and evaluate our integration in our context. All sensory input is derived from cells of our body: every so-called objective observation is based on subjective involvement. Our changes in involvement must therefore be addressed and assessed. This implies the need to evaluate and understand the changes of consciousness in observation. This is also the case in mental reflection; a process of controlled regurgitation of information in which the functioning of the brain and the body functions are directly interrelated. Healthy thinking thereby presupposes integrity of the functioning of the brain, thus the body.

By our interpretation of our context (i.e. the sensory cells on the surface of our body) we evaluate a(n) (im)balance between our body *surface* and the *inside* of our body. By our assessment we create a shift in the Milieu Interne: our psychological state affects our regulatory system which affects the physiology which affects the anatomy of our body. Our subjective experience determines our objective behaviour. Our spiritual realisation determines our formulation of reality.

Our individual body information processing and material dynamics is the basis also for our interaction with others. Science can be considered to be the brain for humanity; but it can only function in this manner is science has self awareness. Scientists need to

realise that their so-called objective reality is a subjective realisation. If their assessment is valid, it must be able to experience it within their body. (The 'beauty of mathematics' is an example.) At present, science is a social guild with its own code and conditioning for common conduct. By its effects it is seen that the world and humanity suffers severe damage from science. This calls for a change in realisation: *science is based on scientists*; *objective description is based on subjective experience* always; and the core of *creation lies not in replication of invariance, but on our response- ability in using freedom of choice*. This still needs to be studied, explicitly, by science.

The mind of Science is an unconscious and subconscious entrainment of shared beliefs in the scientific community. Social acceptance in this group is based on adherence to these conditioned beliefs. This makes science as a whole driven by beliefs and reflexes: autonomous replication of behaviour of the past in an unconscious, thus irresponsible, manner. Science as such has no consciousness, no awareness, no response-ability and is an oxymoron: 'objective' science is a conditioned consensus of subjective scientists' minds.

EEG and ECG measurement make explicit that *any* person operates by personal mental bias; this includes scientists. Unresolved psychological issues of the past determine the way a person related to his/her context. This is the case for scientists also. It can be seen that scientists as a group have a *collective perceptional bias*; this makes them distinct from e.g. artists, traders and mystics. Neurofeedback studies have shown that individuals can resolve such reflex-based perceptional and functional bias. Research is needed to show which EEG functions correspond with the various faculties of science: discovery, experimentation, validation, administration. More important however is the use of such studies to resolved engrained personal and collective mental fixations, to allow the full and free use of the mind, and thus the integral range of potential perception.

Devices such as the Heart Tuner show the difference between mental, emotional and feeling states. It also points out that the flexibility and ease to shift from one state to the other may correlate with the Heart Rate Variability dynamics. It signifies our co-responsiveness in our context. Healthy functioning allows for a wide dynamic range of involvement. As with our sensory organs: it is the difference in perceptions by which scientist's views complement each other and, together, offer a broader and deeper understanding of what is being studied. As in our personal interactions, the value of science lies not in repeatability and sameness, but in understanding how differences can add to a more encompassing understanding. As is the case in our sleep state: we need to relate our experience of our environment, with our experience of our body, and the way we process changes in our body, on basis of the functioning of our body cells.

*Differences in view are based on differences in involvement.* By taking interest in the differences in understanding, that what is seen can be understood in relationship to its origination. As in our body, this requires an understanding how the physics is based on phasics; how forms are based on information. Outspoken examples are the differences in perspective of *classical, relativistic, probabilistic and unified science*: their

differences too are *only based in difference in involvement*. The same is seen in the relationship between somatic medicine, Ayurveda, acupuncture and spiritual forms of healing. They too are related by differences in involvement with our body. It is this change in involvement that is most explicitly seen in our mind, in our brain, in our body as part of our universal context.

By understanding our mind, we can come to see why we observe the same in a different manner, and how that helps to complement other forms of perception. In life, it is of little interest that we can see the same in the same way always. In understanding life, we wish to understand how the seen (physics) is based on what lies beyond our sensory perception (phasics). Understanding how our views come to differ, helps understand how we can understand more of what we see; based on those differences in perception.

*Sciencing* is the social process of creating science. It is based on the personal perceptions of subjective scientists. Their realisations can be shared only if personal beliefs and biases can be related to those of others. The steps required to do so correspond with shifts in the scientists' minds.

Scientists must learn how their mind works. Scientists must learn to shift mental state

Scientists must realise that sciencing is based on the communication between scientists; limited by personal & collective beliefs & bias, code & consensus, illness & health. The mind is the most used instrument in science. It needs to be calibrated, thus understood. At the personal level.

## References


Bertalanffy, L von (1968) *General System theory: Foundations, Development, Applications*, New York: George Braziller, revised edition 1976

Black Hole navigation

Fidelman, U (2004) Cognitive and neuropsychological basis for quantum mechanics: Part II (Quantum-mechanical behaviour of macroscopic object), Kybernetes, Vol.33, No. 9/10

Forsythe, K (1989) Metaphor and Metadomain: The Art and Science of Understanding-Preceeding Paper for the Conference Support, Society and Culture: Mutual Uses of Cybernetics and Science, University of Amsterdam.

Langhaar, Henry L., (1951), "Dimensional Analysis and the Theory of Models", Wiley, NY, USA

Maturana, Humberto and Francesco J. Varela (1980): "Autopoiesis and Cognition"(The realisation of the Living), Reidel, Dordrecht, NL.

Nordenström, B E W (1986) Biologically Closed Electric Circuits (Clinical, Experimental and Theoretical evidence for an additional circulatory system, Nordic Medical Publications

O#o (van Nieuwenhuijze, Otto), (2000a), "Information Medicine: Healing Information" (The role of Information as a means to restore Wholeness), '00, Baden-Baden.

O#o (van Nieuwenhuijze, Otto), (2003), "Dimensional (de)Compression", (The Art of

Black Hole Navigation), CASYS, Liège, 2003
O#o (van Nieuwenhuijze, Otto), (2003a), "Total System Inversion", (The Alchemy of Realisation), CASYS, Liège, 2003
O#o (van Nieuwenhuijze, Otto), (2005a), "Bio-Information Healing", (Qi Healing) Honolulu Conference on Bio-Energy and Information Medicine, Honolulu, 2003
O#o (van Nieuwenhuijze, Otto), (2005b), "The Blind Spot of Science" (Life, Love, Consciousness and Health), CASYS, Liège, 2005
Rowlands, P (2007) Zero to Infinity (The Foundations of Physics), World Scientific, Singapore
Selye, H (1978) The Stress of Life (Revised Edition), McGraw-Hill, USA
Smith, C (1992) Electromagnetic Fields and the Endocrine System, Paper presented at the 10th International Symposium "Man and His Environment in Health and Disease", Dallas, Texas, Feb 27-Mar 1, 1992